NOVITATES ZOOLOGICAE.

A Journal of Zoology

IN CONNECTION WITH THE TRING MUSEUM.

EDITED BY

THE HON. WALTER ROTHSCHILD, PH.D.,

DR. ERNST HARTERT, AND DR. K. JORDAN.

VOL. XIII., 1906.

(WITH TEN PLATES.)

ISSUED AT THE ZOOLOGICAL MUSEUM, TRING.

PRINTED BY HAZELL, WATSON & VINEY, LD., LONDON AND AYLESBURY.

1906.

CONTENTS OF VOLUME XIII. (1906).

GENERAL SUBJECTS.

(See notes on nomenclature of species, geographical and other varieties, etc., pp. 423—432.)

AVES.

REPTILIA.

COLEOPTERA.

LEPIDOPTERA.

SIPHONAPTERA.

LIST OF PLATES IN VOLUME XIII.

ERRATA.

p. 8, line 3 from above, read: vol. 38 instead of vol. 39.
p. 9: the heading of species 14 ought to be: *Cyanerpes cyanea cyanea*.
p. 33, species 99: the authority of *Glaucis hirsuta* should be: (Gm.).
p. 58, species 6, read: *Cardinalis* instead of *Carduelis*.
p. 320, line 17 from below, read: adult ♂♂ instead of adult ♀♀.
p. 351, line 33 from above, read: p. 322 instead of 222.
p. 351, last line, read: p. 332 instead of 322.
p. 369, line 14 from below, read: "the *main* difference" instead of "the only difference."
p. 387, line 16, 18, 22 from above, read: *yenisseensis* instead of *yenisseinsis*.

NOVITATES ZOOLOGICAE.

Vol. XIII. FEBRUARY, 1906. No. 1.

ON THE BIRDS OF THE ISLAND OF TRINIDAD.

By C. E. HELLMAYR.

THE present paper is primarily based on the extensive collections made by Mr. André or his collectors in different parts of the island. Besides these series, which amount to upwards of 1500 skins, the Tring Museum received a number of birds collected by Dr. Percy Rendall in the districts of Savannah Grande and Tacarigua.

The greater part of Mr. André's collections was brought together on the Caparo and Caroni Rivers, in the province Chaguanas; but a good many specimens have also been sent from Chaguaramas, on the north-western peninsula, and from Valencia, province of Arima. A few skins were obtained at Mount Aripo, at an elevation of from 1500 to 2500 feet. Among these are several species not obtained elsewhere: such as, *Tanagra cyanocèphala subcinerea* Scl., *Colibri delphinae* (Less.) and *Steatornis caripensis* Humb. Thus, it would appear that the avifauna of the mountainous district is to a certain extent different from that of the plains.

The best account of the birds of Trinidad has been published by Mr. Frank Chapman in the *Bulletin of the American Museum*, vol. vi. (1894) pp. 1—86. This elaborate paper contains a review of the existing literature, and the faunal position of the island is so fully discussed that I need not go into the question at great length. Mr. Chapman also called attention to the fact that most of the so-called "Trinidad" skins are collected on the Venezuelan mainland. Many of these skins in continental museums are labelled "Trinidad," "Orinoco delta," or even "Guiana," but their exact localities are as yet unknown. I suspect, however, that they mostly come from that part of Venezuela south of the Orinoco delta adjoining British Guiana, inhabited by the Warraw Indians. It appears that the Indian hunters visit the plains as well as more elevated districts (perhaps the Serra de Imataca), as typical Guiana forms, such as *Xenopipo atronitens*, and at the same time characteristic highland species, for instance *Catharus melpomene birchalli* Seeb., occur in these trade collections. The most remarkable type, however, is *Hylonympha macrocerca* Gould. This has been attributed to Brazil by Salvin and Hartert, but the make of the skins leaves not the slightest doubt as to their origin. The many specimens examined are all of the usual "Orinoco" make, as is also the type of *Chlorophanes purpurascens* Scl. & Salv.

As well known, Trinidad belongs faunistically to Venezuela, and has no relations whatever to the West Indies. Only one species, a swift, *Chaetura cinereiventris lawrencei* Ridgw., is peculiar to Grenada, Tobago and Trinidad, being represented in Guiana by the nearly allied *C. c. guianensis* Hart. All other species are of undoubted South American origin.

The greater part of the resident land birds appears to have found their way to

Trinidad through the Paria peninsula. Quite a number of forms characteristic of the north coast of Venezuela extend their range into the island, and several others are strictly confined to Trinidad and the neighbouring district of Venezuela, viz. the state of Cumaná (and sometimes the northern portion of the Orinoco delta). Such species are the following: *Turdus phaeopygus phaeopygoides*, *Ramphocelus jacapa magnirostris*, *Phoenicothraupis rubra*, *Phaëthornis guy guy*, *Agyrtria chionopectus chionopectus*, etc.

Other species show decided Guiana affinities, and are not known to occur in the coast region of Venezuela. Here belong *Molothrus atronitens*, *Selateria naevia*, *Phaëthornis longuemareus*, *Ceryle superciliosa superciliosa*, *Trogon violaceus violaceus*, *Ramphastos vitellinus*, *Amazona amazonica*, *Columba rufina rufina*, *Rallus longirostris longirostris*, etc. Thus the avifauna of Trinidad is composed of two elements, but the true Venezuelan forms are much in preponderance.

Besides, there are a number of species and subspecies peculiar to the island of Trinidad. Mr. Chapman (*l.c.* p. 7) enumerates twelve species, four of which were since shown to occur also on the mainland (Phelps, *Auk* 1897, p. 362). The careful comparison of our Trinidad series with the material from Cumaná* and the Orinoco region† in the Tring Museum brought to light several other forms, which, though nearly allied to their mainland representatives, have sufficiently marked characters as to warrant subspecific separation. The following is the list of these forms with their mainland representatives:

Species peculiar to Trinidad.	Represented on the mainland
Cyanerpes caerulea trinitatis (Bp.) .	near Cumaná by *C. caerulea caerulea* (Linn.).
Calospiza mexicana vieilloti Scl. . .	in the Orinoco delta by *C. mexicana media* Berl. & Hart.
Pitangus sulphuratus trinitatis Hellm.	near Cumaná by *P. sulphuratus rufipennis* (Lafr.).
Synallaxis terrestris carri Chapm. .	near Cumaná by *S. terrestris striatipectus* Chapm.
Dysithamnus affinis andrei Hellm. .	in British Guiana by *D. affinis spodionotus* Salv. & Godm.
Saucerottea erythronotos erythronotos (Less.)	in Cumaná by *S. erythronotos feliciae* (Less.).
Celeus elegans leotaudi Hellm. . .	in the Orinoco delta and British Guiana by *C. elegans reichenbachi* auct.
Piaya cayana insulana Hellm. . .	near Cumaná by *P. cayana columbiana* (Cab. & Heine).
Pipile pipile (Jacqu.)	on the Orinoco River by *P. cumanensis* (Jacqu.).
Hydranassa tricolor rufimentum Hellm.	in Surinam and Cayenne by *H. tricolor tricolor* (P. L. S. Müll.).

Of these ten peculiar forms three: *Dysithamnus affinis andrei*, *Calospiza mexicana vieilloti*, and *Celeus elegans leotaudi*, are of undoubted Guianan origin; *Pipile pipile* finds its nearest ally in a bird inhabiting the environs of Pará, while five others are of decided Venezuelan affinities. *Hydranassa t. rufimentum* has close allies in the West Indies and in the Guianas, being therefore of no importance for the present consideration.

It now remains to say a few words about the relations between Trinidad and Tobago. The only recent account about the birds of Tobago is Comte de Dalmas' excellent paper in the *Mémoires de la Société Zoologique de France*, xiii. (1900)

* This collection, numbering about 1200 specimens, was made by a Mr. Caracciolo, one of Mr. André's collectors.

† This comprises the extensive collections made by Mr. Cherrie on the Orinoco, that of Messrs. Klages and André on the Caura River, and a small collection from Guanoco in the Orinoco delta, received from Mr. André.

pp. 132-44, wherein 55 species are recorded for the island. Mr. André sent a collection of 400 specimens from Tobago to the Tring Museum containing all the species mentioned by Dalmas, with the exception of two or three. Ten subspecies are peculiar to the island of Tobago; only four of these have representatives on Trinidad, but of the others nearly allied races are found on the Venezuelan mainland. Three (or perhaps four) species are common to **Trinidad** and **Tobago,** while allied races take their place on the Paria coast.

The following lists give a better idea of these species and their mainland representatives:

Peculiar to Tobago.	Represented on Trinidad by	Represented on the mainland by
Turdus xanthoscelus Jard. . .	——	[*Turdus leucops* subsp. (Brit. Guiana).]
Mimus gilvus tobagensis Dalm. .	——	*Mimus gilvus melanopterus* Lawr.
Troglodytes musculus tobagensis Lawr.	*T. m. clarus* Berl. & Hart.	*T. m. clarus* Berl. & Hart.
Hylophilus flavipes insularis Scl.*.	——	*H. flavipes acuticauda* Lawr.
Tanagra episcopus berlepschi Dalm.	*T. episcopus sclateri* Berl.	*T. episcopus sclateri* Berl. (?).
Chiroxiphia pareola atlantica Dalm.	——	*Chiroxiphia pareola pareola* (Linn.) in Brit. Guiana, etc.
Synallaxis terrestris terrestris Jard.	*S. terrestris carri* Chapm.	*S. terrestris striatipectus* Chapm.
Sittasomus griseus griseus Jard.	——	*S. griseus phelpsi* Chapm.
Formicivora intermedia tobagensis Dalm.	——	*F. intermedia intermedia* Cab.
Saucerottea erythronotos wellsi Bouc.	*S. erythronotos erythronotos* (Less.).	*S. erythronotos feliciae* (Less.).

Species peculiar to Trinidad and Tobago.	Represented on the mainland by
Dendroruis susurrans susurrans (Jard.) . . .	*D. susurrans jardinei* Dalm.
Veniliornis kirki kirki (Malh.)	*V. kirki continentalis* Hellm.
Momotus bahamensis bahamensis Sws. . . .	*M. bahamensis venezuelae* Sharpe.
Geotrygon sp. (near *G. linearis*).	*G. linearis venezuelensis* Salvad. (Mérida).

Besides the ten forms peculiar to Tobago, there are six species which are known to occur on the mainland, but have not been found on Trinidad. These are the following species:

Sporophila americana (Gm.) (= *lineata* auct.) Found also in Brit. Guiana, Cayenne, Surinam; but **not** in Venezuela.

Euetheia bicolor omissa (Jard.). Found also in the state of Cumaná, etc.

Dysithamnus mentalis mentalis (Temm.). Found also in the state of Cumaná, etc.

Campylopterus ensipennis (Sws.). Known also from Cumaná.

Melanerpes terricolor Berl. Known also from Cumaná, Orinoco, etc.

Ortalis ruficauda (Jard.). Also found on the Orinoco, but not yet recorded from Cumaná.

The occurrence on Tobago of these birds is difficult to explain. Even if we admit that the two Finches and the *Ortalis* might have been introduced, any such

* *Hylophilus insularis* Sclater, *P. Z. S.* 1861. p. 128 (Tobago).—*H. pallidifrons* Dalmas, *Mém. Soc. Zool. France* xiii. 1900. p. 135 (Tobago). I compared Sclater's type in the British Museum, and found it to be an immature bird of the large island race of *acuticauda*, named *H. pallidifrons* by Dalmas.

supposition would be quite impossible with regard to the Humming-bird and the Woodpecker.

The first chapter of my paper contains the account of the species collected by Messrs. André, Percy Rendall and Chapman, the second a list of the species found on the islands between Trinidad proper and the Paria coast, and the third an enumeration of those the occurrence of which is doubtful or has been wrongly given. I have not included a number of Water-birds once or twice recorded for Trinidad, as they are carefully enumerated in Chapman's paper referred to above.

I.—LIST OF THE BIRDS ACTUALLY FOUND ON TRINIDAD.

1. Turdus phaeopygus phaeopygoides Seeb.

[*Turdus phaeopygus* Cabanis: in Schomburgk, *Reise Brit. Guiana*, iii. (1848) p. 666 (Brit. Guiana).]
T. phaeopygoides Seebohm, *Cat. Birds Brit. Mus.* v. (1881) p. 404 (Tobago).
T. phoeopigus Léotaud, *Ois. Trinidad*, p. 197.

2 ♂ ad., 1 ♂ jr., 1 ♀ jr., Valencia, March: 1 ♂ ad., Caparo, April; 1 ♂ ad., Aripo, 2000 ft., May.

This series agrees with two topotypical Tobago-skins, in having the back olive-brown with a slight greenish tinge, which is never to be seen in typical *T. phaeopygus* from British Guiana, etc. The specimen from Aripo, although rather browner than the others, is still decidedly more olive, less rufous brown on the crown and nape than Guiana examples. One ♂ ad. from Cumaná and one ♀ from Guanoco in the Orinoco delta belong likewise to *T. p. phaeopygoides*, while the specimens collected by Mr. S. M. Klages on the Caura River represent typical *phaeopygus*. Notwithstanding some individual variation, the distinctness of *T. p. phaeopygoides* is fully confirmed by the present series. Its distribution is as follows: *Tobago:* Mariah and Castare, May (André coll. in Mus. Tring); *Trinidad* (*vide suprà*); *N.E. Venezuela:* Santa Ana Valley, near Cumaná, March (Caracciolo coll. in Mus. Tring); Guanoco, in the Orinoco delta, February (André coll. in Mus. Tring).

The adult specimens from the various localities have the following measurements:—

♀ (probably ♂), Mariah, Tobago	Wing, 110;	tail, 91;	bill, 20½	mm.
♀ Castare, Tobago	„ 100;	„ 89;	„ 20	„
♂ Caparo, Trinidad	„ 110;	„ 87;	„ 19	„
♂ Valencia, „	„ 109;	„ 85;	„ 19	„
♂ „ „	„ 109;	„ 87;	„ 20	„
♀ Guanoco, Orinoco-delta	„ 102;	„ 82½;	„ 19	„
♂ Sta Ana, Cumaná	„ 103;	„ 86;	„ 19	„

According to Léotaud (*l.c.*) this species is "sédentaire." Cf. my remarks in *Journ. f. Ornith.* 1902, pp. 63-5, 69.

2. Turdus fumigatus Licht.

Turdus fumigatus Lichtenstein, *Verz. Dubl.* (1823) p. 38 (Brasilien).
T. casius (nec Bonaparte!) Léotaud, *Ois. Trinidad*, p. 204.

8 adults (♂ and ♀) and 2 juv. from Caparo, March and April; 1 ♂ ad. Valencia, March.

These specimens are above much lighter, not so dark rusty brown as

others from Pará (coll. Steere), and on the lower parts also considerably paler, more ochreous-brown, less rusty. A specimen from Duaca (near Tocuyo in N.W. Venezuela) is similar. Two examples from the Orinoco (Maipures, Munduapo) are everywhere darker, but not so intensely coloured as those from Brazil. Cf. my remarks in *Journ. f. Ornith.* 1902, pp. 65-6.

3. Turdus gymnophthalmus Cab.

Turdus gymnophthalmus Cabanis: in Schomburgk, *Reise Brit. Guiana*, iii. (1848) p. 665 (ex La Guaira, Caracas, and Cayenne).
T. nudigenis Lcotaud, *Ois. Trinidad*, p. 201.

2 ♂ ad., 3 ♀♀, from Caparo, March, April; 1 ♂ from Seelet, April; 2 ♀♀ from Caroni, May.

With a series of 32 adult birds from Cumaná, Surinam, British Guiana, Trinidad, Tobago, and the Orinoco region, I can see no difference whatever between the skins from the various localities. All, whether in fresh plumage or not, have the base of the bill dark horn-colour or plumbeous, the apical portion yellow or greenish yellow. The naked space behind the eye is bright orange-yellow in freshly killed specimens, but is also very well pronounced in old skins.

The nearest ally of *T. gymnophthalmus* is *T. maculirostris* Berl. & Tacz., of West Ecuador, as I have pointed out in *Journ. f. Ornith.* 1902, p. 53, where also a short review of the allied forms is given.

I have since had an opportunity of inspecting the series of "*T. maculirostris*" of the "Monograph of the Turdidae" in the British Museum.

As suggested in my former article, it is a *mixtum compositum* of three different species. The following is the identification of the specimens listed by Mr. R. B. Sharpe (*l.c.* i. p. 240) s.n. "*T. maculirostris*":—

(*a*) *Turdus maculirostris* Berl. & Tacz.

Spec. *b*, *c*. Balzar (Illingworth) .
„ *f*, *g*. Pallatanga (Fraser). } All these places are in *West Ecuador*.
„ *i*. Santa Rita (Villagomez) .

The above specimens have the base of the bill dusky and the apical portion yellow; behind the eye there is a small naked spot.

(*b*) *Turdus ignobilis debilis* Hellm.

Spec. *a*. Rio Napo (Jameson) .
„ *d*, *e*. Sarayacu (Buckley) . } East Ecuador.
„ *h*. Zamora (Fraser) .
„ *k*—*o*. from various localities in Peru.

These nine specimens, as well as those collected by Messrs. Goodfellow & Hamilton at Archidona and on the Rio Napo, East Ecuador (Mus. Tring) have the bill entirely black and no trace of the naked spot behind the eye. Most of the above examples have a pure white patch on the fore-neck below the striped throat, but sometimes this character is obsolete. *T. i. debilis* can, however, always easily be distinguished from the typical form by its much shorter and weaker bill, and the pure white throat with the dusky stripes much more distinct.

I have examined three Bogotá skins which, undoubtedly, belong to *T. i. debilis*. They probably came from the eastern slopes of the Andes, while typical *T. ignobilis* seems to be confined to the mountains north of Bogotá, and evidently occurs only on high elevations.

(*c*) *Turdus amaurochalinus* Cab.

Spec. *p*, *q*. Mapiri and Baganti (Buckley).

No. *q* is young, but specimen *p* a fully adult bird. It has a yellow bill, and **is nothing else than a very worn example** of *T. amaurochalinus*. Count Berlepsch has a large series of beautiful skins from various places in Eastern Bolivia which are in no way different from the Brazilian ones.

4. Troglodytes musculus clarus Berl. & Hart.

Troglodytes musculus clarus Berlepsch & Hartert, *Nov. Zool.* ix. (1902) p. 8 (typ. ex Bartica Grove, Brit. Guiana).

T. rufulus (nec Cabanis !) Chapman, *Bull. Amer. Mus.* vi. (1894) p. 23 (Trinidad).

1 ♂ ad. from Caparo, April, agreeing with the pale form which inhabits British Guiana, Cayenne, Surinam, Cumaná, and the Orinoco region.

T. m. tobagensis Lawr.* from the island of Tobago, however, is quite distinct, having the lower surface pure white, only the sides and under tail-coverts being washed with isabelline-rufous. The differences have been well pointed out by Comte de Dalmas.† It has also much longer wings and a rather longer tail.

In *T. m. clarus* the whole lower surface is pale isabelline-rufous, only the fore part of the throat and the middle of the abdomen inclining to creamy-whitish.

5. Thryothorus rutilus Vieill.

Thryothorus rutilus Vieillot, *Nouv. Dict.* xxxiv. (1819) p. 55 ("Amérique septentrionale"—errore ! we substitute *Trinidad* as the typical habitat).

Sixteen specimens of both sexes from Chaguaramas (January), Caparo (April), Lavantille (March), Valencia (March), Pointe Gourde (January), and Seelet (April). They agree with a large series from Tobago, Cumaná, and Ejido (near Mérida), in having the whole undersurface strongly tinged with rufous except the middle line of breast and belly, which is white. In some specimens, however, this white stripe is almost wanting, and they come nearer to *T. rutilus hypererythrus* from Costa Rica and Panamá, but the latter form is still recognisable by the decidedly lighter, more orange-rufous tint of the lower parts.

T. rutilus hypospodius Salv. & Godm., from Bogotá, has only the chest bright rufous, the rest of the lower parts being dirty greyish with a brownish wash on the flanks.

6. Compsothlypis pitiayumi (Vieill.).

Sylvia pitiayumi Vieillot, *Nouv. Dict.* xi. (1817) p. 276 (Paraguay—ex Azara, No. 109).

Compsothlypis pitiayumi Chapman, *Bull. Amer. Mus.* vi. (1894) p. 24 (Trinidad and Monos Island).

4 ♂♂ from Chaguaramas, January ; 5 ♂♂ from Pointe Gourde, January ; and 1 ♂ ad. from Caparo, April.

These specimens are generally richer coloured than typical Paraguay skins.

7. Dendroica aestiva (Gm.).

Motacilla aestiva Gmelin, *Syst. Nat.* I. ii. (1788) p. 996 (Cayenne and Canada : the latter locality accepted as the typical habitat).

1 ♂ ad. and 1 ♀ from Laventille, 19. iii., 6. xi. ; 1 ♀ Chaguaramas, 1. i.

* *Troglodytes tobagensis* Lawrence, *Auk* v. (1888) p. 101 (Tobago).

† *Mém. Soc. Zool. France*, xiii. (1900) p. 133.

8. Seiurus noveboracensis (Gm.).

Motacilla noveboracensis Gmelin, *Syst. Nat.* i. ii. (1788) p. 958 (Louisiana).

1 ♂, Caparo, 19. iv.; 1 ♂, Chaguaramas, 6. i.; 1 ♂, Seelet, 14. iv.

9. Geothlypis aequinoctialis (Gm.).

Motacilla aequinoctialis Gmelin, *Syst. Nat.* i. ii. (1788) p. 972 (ex Daubenton, *Pl. col.* 685, fig. 1—Cayenne).

Although Taylor and Chapman met with this species, and Léotaud says it is common, Mr. André did not send it in his numerous collections.

10. Setophaga ruticilla (Linn.)

Motacilla Ruticilla Linnaeus, *Syst. Nat.* x. (1758) p. 186 (Virginia: ex Catesby).

2 ♂♂, Pointe Gourde, 13, 18 i.; 1 ♂ ad., 2 ♀♀, Laventille, 6 xi., 20 xii.; one pair, Chaguaramas, January.

Winter visitor.

11. Basileuterus auricapillus olivascens Chapm.

[*Setophaga auricapilla* Swainson, *Anim. Menag.* (1838) p. 293 ("Mexico & Brazil."—We accept *Brazil* as typical locality.*).]

Basileuterus vermivorus olivascens Chapman, *Auk* x. (1893) p. 343 (Trinidad).

3 ♂♂ and 1 ♀, Caparo, March and April; 1 adult (not sexed), Laventille, March.

This subspecies differs from typical *B. auricapillus* (Sw.) ex Rio, S. Paulo and Paraguay by its slightly more greyish, less greenish back, and in having the outer webs of the tail-feathers and quills olive-grey instead of olive-green. Specimens from Cumaná (a large series in the Tring Museum) are practically identical with those from the island.

12. Coereba luteola (Cab.)

Certhiola luteola Cabanis, *Mus. Heinean.* I. (1850) p. 96 ("Puerto Cabello?")

Sixteen specimens of both sexes (adult and young) from Caparo, iii. iv.; 1 ♂ ad. Valencia, iii.; one pair from Seelet, iv. They agree perfectly with a large series from Cumaná, S. Esteban and the Orinoco River. One ♂ ad. from Englishman Bay, Tobags, is a shade blacker on the back, but otherwise not different. All have the whole upperside dull blackish, deeper on the head (only the immature birds with a slight olivaceous tinge) and a large white speculum at the base of the primaries.

C. guianensis Cab., quite erroneously synonymised with *C. chloropyga* by Mr. Sclater, differs from *C. luteola* by its much paler, smoky grey upper surface, and by the want of the white speculum, which is but barely indicated under the primary coverts by some traces of whitish; the rump-band is as bright yellow as in *C. luteola*.

C. chloropyga Cab., which ranges from Rio to Pará, is again much paler, light olivaceous grey above, the crown decidedly duller and less intense than in *C. guianensis*, and the rump-band much paler, dull olive-yellowish (instead of bright chrome-yellow); the wing-speculum is, likewise, nearly wanting. In fact, the three forms are very distinct one from another.

* Swainson's description evidently refers to the Brazilian species, for he says, "above, olive-green."

13. Cyanerpes caerulea trinitatis (Bp.)

[*Certhia caerulea* Linnaeus, *Syst. Nat.* 10. i. (1758) p. 118 (ex Edwards—Surinam).]
Cereba trinitatis Bonaparte, *Compt. Rend. Ac. Sc.* vol. 39. (1854) p. 258 ("ex Insula Sancta-Trinitas."—Mus. Verreaux)
Arbelorhina caerulea Chapman, *Bull. Amer. Mus.* vi. (1894) p. 25 (Trinidad).

8 ♂ ad., 6 ♂ jr. or ♀♀ from Valencia, March. Besides, we have two adult males, collected by Dr. Percy Rendall in the Savannah Grande district, in February 1897.

The series differs from all the other subspecies in having a much longer, and at the base considerably broader bill. In the males the anterior part of the crown, too, is decidedly darker blue, there being no trace of the distinct light blue patch to be seen in the other forms. The females from Trinidad have the upper parts of a darker, duller green, and the ochreous colour of the throat distinctly darker.

Birds of the so-called "Orinoco"-make agree perfectly with those from Trinidad, and raise once more the question whether some of these skins may not really come from some part of that island. This supposition is strengthened by the fact that specimens collected by Mr. André at Guanoco in the Orinoco-delta do **not** belong to the long-billed island race, but agree in every way with typical *C. caerulea* from Surinam and Cayenne.

The Trinidad form is apparently entitled to the name *C. trinitatis* of Bonaparte, which is entirely omitted from the *Cat. of Birds*, vol. xi. Perhaps *A. longirostris* Cab.* is an earlier name for the same form, but then the locality must be wrong, since specimens from S. Esteban and Cumaná both represent the short-billed typical *C. caerulea*.

With a series of 80 specimens before me, I can easily recognise the following subspecies south of the isthmus of Panama:

(*a*) *Cyanerpes caerulea caerulea* (Linn.)

Typical locality: *Surinam* (ex Edwards).

♂ ad. Bill slender at the base, 18—20½ mm. long. Anterior part of crown slightly tinged with clear azure bluish.

I cannot find any constant difference between typical Surinam skins and others from Puerto Cabello upon which the name *Arbelorhina brevirostris* Cab. has been bestowed. The latter have not shorter bills, as claimed by Professor Cabanis; on the contrary, one of my specimens from Puerto Cabello has the bill slightly longer than those from Cayenne and Surinam. A series from Cumaná also agrees with those from the two latter localities.

The following measurements of some adult males out of my series may be useful to students of this difficult group:

2	from	Guanoco, Orinoco-delta:	wing	56	—57	; tail	28	—29	; bill	19 —20 mm.
8	„	Cumaná	„	56½	—59	; „	29	—31	; „	19 —20 „
2	„	Cayenne	„	56		; „	26	—27	; „	19 —19¾ „
1	„	S. Esteban, near Puerto Cabello	„	59		; „	30		; „	19¾ „
8	„	British Guiana . .	„	55½	—57½	; „	25½	—29	; „	20 —21 „
5	„	Pará, Lower Amazons	„	54	—56	; „	25½	—29	; „	17¾—19 „
1	„	Surinam	„	56		; „	29		; „	19 „

* Mus. Heinean. i. (1850) p. 96.—Caracas.

As will be seen from the above, the specimens from Pará, on the average, have slightly shorter bills, but some of them are not different in this respect from Cayenne skins.

Distribution : Surinam, Cayenne, Brit. Guiana, westwards through the Orinoco-delta along the north coast of Venezula as far as Puerto Cabello, southwards extending to Pará on the mouth of the Amazons.

(*b*) *Cyanerpes caerulea microrhyncha* (Berl.)

Coereba caerulea microrhyncha Berlepsch, *Journ. f. Ornith.* 1884, p. 287 (Bucaramanga).

♂ ad. This form differs from the typical one by having the anterior part of the crown as well as the cheeks of a much clearer and paler azure blue ; the rest of the pileum is also brighter blue. Bill slender and short, sometimes even shorter than in *C. c. caerulea*.

20 Bogotá skins . . Wing 56—58 ; tail 28 —31 ; bill 18—19½ mm.
1 from Mérida, W. Venezuela „ 57 ; „ 28½ ; „ 19 „
2 „ Beni, E. Bolivia . „ 58½ ; „ 31½ ; „ 17½ „

Distribution : Colombia (Bucaramanga, Bogotá coll.) ; Mérida in N.W. Venezuela; thence through the Upper Amazonian region of East Ecuador and E. Peru to N.E. Bolivia.

(*c*) *Cyanerpes caerulea cherriei* Berl. & Hart.

Nov. Zool. ix. (1902) p. 16 (Munduapo, Upper Orinoco).

♂ ad. exactly like that of No. 2, but considerably smaller, with the bill still shorter and more slender.

Two males (types) measure : Wing 52—53 ; tail 26—26½ ; bill 16—17 mm.

Distribution, known only from the type locality : Munduapo, Upper Orinoco.

(*d*) *Cyanerpes caerulea trinitatis* (Bonap.)

♂ ad. Differs from No. 1 in its much longer and stronger bill, and in having no trace of the light azure blue tinge on the front of the head, which is dark blue like the occiput.

Fifteen ♂ ad. measure : wing, 58—59 ; tail about 30 ; bill, 23½—25 mm.

Distribution : Apparently confined to *Trinidad*. Also found in the so-called "Orinoco-delta" collections, but their exact locality is, of course, not known. Mr. André, however, collected in the Orinoco delta another form (cfr. sub *a*).

14. Cyanerpes cyanea (Linn.)

Certhia cyanea Linnaeus, *Syst. Nat.* xii. i. (1766) p. 188 (ex Edwards, Brisson, etc.—We fix *Surinam* (ex Edwards, whom Linnaeus quotes first) as the typical locality).

6 ♂ ad., 1 ♂ jr. and 1 ♀ from Valencia, iii. : 1 ♂ ad. Seelet, iv. ; 7 ♂ ad. and 1 ♀, Caparo, iii. and iv. : 1 ♀, Aripo, 1800 feet elevation, v. : 1 ♂ ad. from Savannah Grande, collected by Dr. Percy Rendall.

In the length of the bill this series agrees best with specimens from Cayenne, and Guanoco in the Orinoco-delta. Two ♂♂ from Tobago are exactly alike. The birds from the interior of British Guiana appear to be referable to the same form, although some specimens have very short bills. A series from Cumaná and San Esteban, as well as a specimen from Ejido, however, certainly represent a different form, having the bill very much longer. In the so-called "Orinoco-delta" collections, both forms occur, hence it seems that these skins come from different places.

The long-billed form from N. Venezuela is evidently entitled to the name

C. c. eximia (Cab.), described from Puerto Cabello. Mr. Oberholser* adopted for it the name *C. c. brevipes* (Cab.), based on a specimen from the same place. However, I am not quite sure whether the locality is reliable, and as the description of *Arbelorhina eximia* suits much better the long-billed race, I prefer the latter designation.

It is very interesting to note that the specimens from Cumaná belong to the long-billed form, while those from the Orinoco-delta, Trinidad and Tobago, agree with the typical bird from Cayenne. Bogotá skins belong also to the true *C. cyanea* (Linn.).

The following measurements may help to distinguish the two races :

(*a*) *Cyanerpes cyanea cyanea* (Linn.).

3 ♂ ad. Cayenne (Cherrie coll.) . Wing, 61—64; tail, 33—37; bill, 17, 18, 18 mm.
6 „ Mines district, British Guiana . . . „ 63—65½; „ 36—37; „ 15—17¾ „
2 „ Guanoco, Orinoco-delta „ 65½, 67 : „ 36, 38; „ 18½, 19 „
15 „ Trinidad . . . „ 64—68 : „ 35½—40; „ 17½—19 „
2 „ Tobago . . . . „ 67, 68; „ 38, 40; „ 19 „
5 „ "Orinoco-delta" skins . „ 63½—65; „ 37—39; „ 16½—18 „
5 „ Bogotá coll. . . . „ 64—66; „ 36—41; „ 16½—18 „
1 „ Bahia . . . . „ 65; „ 39; „ 17½ „

(*b*) *Cyanerpes cyanea eximia* (Cab.).

Arbelorhina eximia Cabanis, *Mus. Heinean.* i. (1850) p. 96 ("Porto Cabello").

4 ♂ ad. S. Esteban, near Puerto Cabello . . . Wing, 64—67; tail, 39—40; bill, 20—22½ mm.
1 „ Ejido . . . . „ 65; „ 39; „ 22½ „
1 „ Margarita Island . . „ 64; „ 38; „ 22 „
7 „ Cumaná . . . . „ 64—69; „ 38—40; „ 20½—22 „
3 „ "Orinoco-delta" skins . „ 66—68½; „ 38½—40; „ 20½—21 „

Hab. : North coast of Venezuela from Cumaná to Puerto Cabello, thence to Ejido, near Mérida.

15. Chlorophanes spiza spiza (Linn.).

Motacilla spiza Linnaeus, *Syst. Nat.* x. (1758) p. 188 (ex Edwards—Surinam) [excl. var β].

4 ♂ ad., 1 ♀ from Caparo, iv. : 8 ♂ ad. and 2 ♀♀ from Valencia, iii. They belong to the typical form, agreeing with a large series from Cumaná, S. Esteban, Guanoco in the Orinoco-delta, British Guiana, Caura River and Cayenne. *C. s. guatemalensis* Scl. from Central America is larger, with a longer bill, and has the plumage of a lighter, more greenish tinge.

16. Dacnis cayana cayana (L.).

Motacilla cayana Linnaeus, *Syst. Nat.* xii. 1. (1766) p. 336 (Cayenne.—ex Brisson †).

2 ♂♂ from Laventille, iv., v. ; 1 ♂ from Seelet, iv. ; 1 ♂ from Chaguaramas, i. ; 1 ♂ juv. Valencia, iii. ; 1 ♂ ad. and 2 ♀♀ from Caparo, iv.

The adult ♂♂ agree in colour and dimensions with others from Cayenne, British Guiana, Pará, Cumaná and the Orinoco region.

* *Auk* xvi. (1899) p. 33.

† "Elototol" of Hernandez, also cited by Linnaeus as a synonym of his *Motacilla cayana*, does not belong to this species.

17. Dacnis bicolor (Vieill.).

Sylvia bicolor Vieillot, *Ois. Amér. sept.* ii. (1807) p. 32. tab. 90 bis. ["très rarement sous la zône boréale, et plus communément entre les tropiques."—We substitute *Cayenne* as the typical locality].
Dacnis plumbea auct.*

3 ♂ ad., Seelet, April, and 1 ♂ ad. from the Caroni Swamp, March.

These skins agree with one ♂ from Cumaná, except in being rather more brightly coloured above and in having the throat slightly mixed with greyish (instead of pure buff). Specimens from Cayenne are partly like those from Trinidad, and partly like the one from Cumaná, thus proving that the said differences are of no significance.

18. Cyclarhis flavipectus flavipectus Scl.

Cyclorhis flavipectus Sclater, *P. Z. S.* 1858. p. 448 ("Trinidad, Venezuela, and Colombia litt.").
C. f. trinitatis Allen, *Bull. Amer. Mus.* ii. (1889) p. 131 (Trinidad).
C. f. canticus O. Bangs, *Proc. Biol. Soc. Wash.* xii. (1898) p. 192 (Santa Marta).

A large series from Caparo, March and April; Laventille, December and March; Chaguaramas, January; Pointe Gourde, January; Valencia, March; Seelet, April. These skins are practically identical with an extensive series from the mainland of Venezuela (12 Cumaná, 10 Orinoco, 4 from N.W. Venezuela: Bucarito, San Esteban and S. Carlos). With two dozen Bogotá skins before me, I can no longer maintain *C. f. canticus* as distinct. Many of the Colombian specimens have the yellow colour on the underparts quite as pale as a number from Trinidad, though some are certainly richer coloured and of a more golden yellow beneath, as claimed by Mr. Bangs. All of the many specimens examined have the plumbeous spot at the base of the lower mandible very strongly pronounced.

19. Vireo chivi (Vieill.) subsp.?

Sylvia chivi Vieillot, *Nouv. Dict.* xi. (1817) p. 174 (ex Azara.—Paraguay).

One ♂ and 3 ♀♀ from Caparo, March and April; 1 ♀ Valencia, March. These four skins, as well as a good series from Tobago, differ from a large number of true *V. chivi*† in their larger size, especially longer wings and considerably longer, heavier bill. The upper mandible is always blackish, while in typical *V. chivi* it is much paler, more brownish horn-colour. Specimens from Cumaná (a large series in Tring) approach the Trinidad form in size, but the colour of the bill is exactly like that of true *chivi*. Very likely the birds inhabiting Trinidad and Tobago constitute a different race—which, however, cannot be called *V. c. agilis*, as has been done by Chapman and other American writers. *Lanius agilis* Licht. is based on Bahia skins which agree in every way with topotypical examples from Paraguay. If separable, the northern form must have a new name.

* As already pointed out by Berlepsch (*Ibis*, 1881, p. 242), *Sylvia plumbea* Lath. cannot apply to the *Dacnis plumbea* auct., since in this species the upper parts are certainly not "deep lead-colour, nearly black," nor are the lower parts "pale ash-colour."

† Fifty specimens from Paraguay, Rio, Bahia, Ceará, Orinoco, Caura, South Peru, British Guiana and Western Ecuador.

20. Pachysylvia aurantiifrons saturata nom. nov.*

Hylophilus insularis (nec Sclater !) Lʼotaud, *Ois. Trinidad*, p. 186.
H. aurantiifrons (nec Lawrence !) Chapman, *Bull. Amer. Mus.* vi. (1894) p. 27 (Trinidad).
Pachysylvia aurantiifrons hypoxantha (nec Pelzeln !) Ridgway, *Birds N. and M. America*, iii. (1904) p. 215 (Venezuela, Trinidad).

Eight ♂♂ and ♀♀ from Caparo, April and May. They agree with a series of 14 specimens from the vicinity of Cumaná, the differences mentioned by Mr. Ridgway being apparently not constant.

Professor Allen, as well as Count Berlepsch and Mr. Hartert, have conclusively shown that *P. aurantiifrons* and *P. acuticauda* are specifically distinct. I have now before me a series of both from near Cumaná.

P. aurantiifrons is at once distinguishable by having the forehead and lores light yellow, the ear-coverts and sides of the neck pale rufous isabelline, and the lower surface clear yellow. In *P. f. acuticauda*, on the other hand, forehead, lores, sides of the head and lower parts are uniformly buffy brownish. Generally, there is no trace of yellow on the under surface, but some specimens from the Orinoco (Maipures, etc.) have the flanks slightly washed with yellowish, thereby approaching *P. f. flaripes* (Lafr.) from Bogotá.

As pointed out by Mr. Ridgway, the yellow-bellied form, inhabiting N.E. Venezuela and Trinidad, differs from typical *P. aurantiifrons aurantiifrons* (Lawr.) in having the chest distinctly washed with ochraceous or buffy. It is, however, quite distinct from *P. hypoxantha* (Pelz.), with which it has been identified by the same author. The typical specimens in the Vienna Museum are readily distinguishable by the following characters. Head above and back are dull sepia brown, only the rump and upper tail-coverts being pale green ; the sides of the head and neck dark brownish (not rufous isabelline) ; no trace of yellow on forehead or lores : whole lower surface uniform pale yellow without any ochraceous wash on the chest, the latter being greyish yellow, slightly flammulated with brighter yellow. In the coloration of the upper parts, and in lacking the yellowish tinge on the forehead and lores, the types of *P. hypoxantha* agree exactly with those of *P. fuscicapilla* (Scl. & Salv.) (ex Eastern Ecuador), but the latter differ in having the lower parts (except the dirty whitish throat) much darker, deep greenish yellow. I am, however, not certain whether this difference will hold good when a larger series of both races is compared. For the present, the following species and subspecies ought to be recognised :

1. *P. aurantiifrons aurantiifrons* (Lawr.). Panama to Santa Marta.

2. *P. aurantiifrons saturata* Hellm. Northern coast of Venezuela, from San Esteban to Cumaná and Trinidad. (The locality "Guiana" is erroneous, the so-called Guiana skins being of the well-known "Orinoco" make.)

3. *P. hypoxantha hypoxantha* (Pelz.). North Brazil : Rio Içanna and R. Vaupé, tributaries of the upper Rio Negro.

4. *P. hypoxantha fuscicapilla* (Scl. & Salv.). East Ecuador : Sarayaçu.

21. Tachycineta † albiventer (Bodd.).

Hirundo albiventer Boddaert, *Tabl. Pl. enl.* (1783) p. 32 [based on Daubentou, *Pl. enl. tab.* 546. fig. 2.—*Cayenne*].

One ♀ ad. from Seelet, April. "Iris brown." Identical with examples from British Guiana and Cayenne, only the bill being rather larger.

* Type : Mus. Tring, No. 978, Caracciolo coll. "♀" ad., San Antonio, Cumaná, March 18th, 1898.
† There is not the slightest ground for separating this species generically as *Iridiprocne*.

22. Progne chalybea chalybea (Gm.)

Hirundo chalybea Gmelin, *Syst. Nat.* 1. ii. (1788) p. 1026 [based on Brisson & Daubenton, *Pl. enl.* 545. fig. 2.—Cayenne].

One ♀ ad. from Seelet, April. "Iris brown." Not different in any way from Brit. Guiana and Pará examples. An adult male has been collected by Mr. André, near Castare, Tobago, May 15, 1903. It also agrees with mainland specimens.

23. Stelgidopteryx ruficollis aequalis Bangs.

[*Hirundo ruficollis* Vieillot, *Nouv. Dict.* xiv. (1817) p. 523 (ex Azara No. 306.—Paraguay)].
Stelgidopteryx ruficollis aequalis Outram Bangs, *Proc. New Engl. Zool. Cl.* ii. (1901) p. 58 [type from Santa Marta].

1 ♂ ad. Laventille, May; 1 ♀ Chaguaramas, January; 1 ♂ Caroni, April; and 1 ♂ from Cangrejal, May.

These specimens have the rump ashy whitish, in marked contrast to the dark brown back, agreeing in that respect with a good series from Cumaná, Carthagena, British Guiana, Mérida, and the Orinoco and Caura Rivers. This form, which has been well described by Mr. Bangs, differs from *S. r. uropygialis* (Lawr.) in its decidedly paler rufous throat and paler brownish grey chest and sides. *S. r. ruficollis* (Vieill.) is easily recognisable from both by having the whole upper surface uniformly dark brown without any trace of the ashy whitish rump band.

I have but a few words about the geographical distribution to add to Mr. Bangs' excellent account.

1. *S. ruficollis ruficollis* (Vieill.).
   Distribution.—Paraguay; Brazil: Rio, S. Paulo, Minas Geraës, Bahia, Mattogrosso, Cuyabá, Caicara (Natterer coll.), west to the eastern slopes of the Andes in Peru and Ecuador; and east to Pará on the mouth of the Amazons.
   Obs. I have before me 2 adult ♂♂ from Nauta (N.E. Peru) and 2 ♂♂ and 1 ♀ from Archidona, East Ecuador, which agree perfectly with specimens from Eastern Brazil, and show no approach to the pale-rumped form found on the western side of the Ecuadorian Andes. Three examples from Pará are also quite identical.
2. *S. ruficollis uropygialis* (Lawr.).
   Distribution.—Costa Rica; Chiriqui, Panama; and southwards through Western Colombia (Remedios, etc.) to Western Ecuador.
   Obs. A good series from West Ecuador and 1 ♂ jr. from Remedios, Antioquia, agree with others from Costa Rica, etc., and are much darker everywhere than *S. r. aequalis*.
3. *S. ruficollis aequalis* O. Bangs.
   Distribution.—North coast of Colombia (Carthagena, Santa Marta): Bogotá coll.; Venezuela: Mérida, Cumaná, Orinoco and Caura Rivers; British Guiana (Roraima); Trinidad.

24. Euphonia trinitatis Strickl.

Euphonia trinitatis Strickland, *Contrib. Ornith.* 1851. p. 72 ["Trinidad, Cumaná, Venezuela, St. Thomas."—We accept *Trinidad* as typical locality].

1 ♂ ad., Chaguaramas, January; 1 ♀, Pointe Gourde, January. They agree in every respect with a series from Cumaná and the Orinoco River.

25. Euphonia violacea lichtensteinii (Cab.)

[*Fringilla violacea* Linnaeus, *Syst. Nat.* x. (1758) p. 182 ("in calidis regionibus").]
Phonasca lichtensteinii Cabanis, *Journ. Ornith.* 1860. p. 331 [Cayenne].

One hundred specimens of both sexes from Caparo, March; 1 ♂ ad., Pointe Gourde, January; 2 ♂ ad., Valencia, March; and one pair from Chaguaramas, January. This series agrees perfectly with mainland specimens.

The name *E. v. violacea* (Linn.) is to be retained for the Brazilian form, since Cabanis, when first distinguishing the two races, separated the northern subspecies. In the tenth edition, Linnaeus gave no locality, and Cabanis was, thus, justified in restricting the original name. In the *Cat. Birds*, xi., the names are just reversed.

26. Calospiza desmaresti (Gray).*

Calliste Desmaresti G. R. Gray, *Gen. Birds* ii. (June 1844), genus Calliste, No. 6 [based on "Tanagra gyrola" Swainson, *Zool. Illust.* n. ser. tab. 28.—No locality. We substitute *Trinidad*.]

Twenty-one adults and young from Caparo, March and April; 2 ♂ ad. from Chaguaramas, January. They agree with a large series from the vicinity of Cumaná, and Estanques near Mérida, Venezuela.

27. Calospiza mexicana vieilloti (Scl.)

[*Tanagra mexicana* Linnaeus, *Syst. Nat.* xii. i. (1766) p. 315 [ex Brisson: Cayana.—(excl. Syn. Hernandez—Mexico).]
Calliste vieilloti Sclater, *P. Z. S.* 1856. p. 257 [Trinidad].

Fifty specimens of both sexes: Caparo, March and April: Laventille, March: Valencia, March.

All have the belly bright yellow, differing thereby very markedly from the pale-bellied *C. m. media* Berl. & Hart.† which inhabits the Orinoco region. A series from Guanoco, Orinoco-delta, belongs also to the latter race, but one specimen approaches *C. m. vieilloti* in the colour of the under parts.

No *Calospiza* of this section has as yet been found on the north coast of Venezuela, and *C. m. vieilloti* appears to be confined to the island of Trinidad.

28. Calospiza guttata (Cab.)

Callispiza guttata Cabanis, *Mus. Hein.* i. (1850) p. 26 ["Roraima, Guiana."]

One ♀ ad. from Chaguanas, July 5th, agreeing with a large series from Cumaná.

29. Tanagra episcopus sclateri Berl.

[*Tanagra episcopus* Linnaeus, *Syst. Nat.* xii. i. (1766) p. 316: ex "L'Evesque."—Brisson.]
Tanagra sclateri Berlepsch, *Ibis*, 1880. p. 112 ("Orinoco District oder Trinidad").

A series of 31 specimens from Caparo, March and April; Valencia, March; Chaguaramas, January; Pointe Gourde, January; and Seelet, April.

Specimens from Guanoco (Orinoco-delta) and Ciudad Bolivar on the lower Orinoco agree in every way with those from Trinidad, while the birds from Cumaná

* Although Swainson's description and synonymy evidently refer to *C. gyrola* (Linn.), the plate seems without doubt to be intended for the above species, since there is no trace of the golden yellow humeral patch to be seen! So we may retain the name *C. desmaresti* for it.

† *Nov. Zool.* ix. 1902, p. 19.

and from the upper Orinoco (Altagracia, Maipures, etc.) form the transition between *sclateri* and *cana*. Some skins from Cumaná, however, are scarcely different from the Trinidad series.

T. e. berlepschi Dalmas,* from Tobago, agrees with *T. e. cana* in the bright blue colour of the shoulder patch, but differs in the more bluish, less greenish, median and greater upper wing-coverts, and in having a decided violet or bluish wash on the under parts.

30. Tanagra palmarum melanoptera Scl.

[*Tanagra palmarum* Wied, *Reise Brasil.* ii. (1821) p. 76 (Canavieras, Bahia).]
Tanagra melanoptera Sclater (ex Hartlaub MS.), *P. Z. S.* 1856. p. 235 (East Peru, etc.).

A large series from Caparo, March and April: 1 ♂ ad. from Laventille, December; 2 ♂♂, Chaguaramas, January; 2 ♀♀, Pointe Gourde, January; ♂ ♀, Valencia, March; 1 ♂, Seelet, April.

None of these specimens have any trace of olive edgings to the wing- and tail-feathers, thus agreeing with topotypical *melanoptera* from East Peru. The latter, however, show a decided violet suffusion on the back and breast, almost or altogether wanting in the Trinidad birds.

31. Tanagra cyanocephala subcinerea Scl.

[*Aglaia cyanocephala* Lafresnaye & D'Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837. cl. ii. p. 32 (Yungas, Bolivia).]
Tanagra subcinerea Sclater, *P. Z. S.* 1861. p. 129 (Venezuela).

One ♂ ad. from Aripo, 2000 ft., May 15, 1903. It agrees with a good series from Cumaná except in having the under parts a shade darker grey.

T. c. subcinerea is a strongly marked subspecies and easily recognisable by its pale dingy grey under-surface, passing into dull whitish grey on the middle of the abdomen. Throat and foreneck are slightly speckled with paler greyish. This form is strictly confined to Trinidad and the mountains near Cumaná, N.E. Venezuela.

T. c. auricrissa Scl. has the under parts much darker: schistaceous with a faint bluish tinge; throat and foreneck are uniform dark schistaceous, crissum and thighs much brighter yellow. It occurs in Colombia (Antioquia and Bogotá-coll.) and in the Andes of Venezuela near Mérida.

T. c. cyanocephala (Lafr. & D'Orb.) differs from the foregoing form in its paler grey under-surface (but not nearly as pale as in *T. c. subcinerea*), much lighter, lemon-yellow crissum and thighs, as well as by its much more greenish back. It is found in Northern Bolivia, Peru, and West Ecuador.

32. Ramphocelus jacapa magnirostris Lafr.

[*Tanagra jacapa* Linnaeus, *Syst. Nat.* xii. i. 1766) p. 313 (Surinam—ex Edwards; et Cayenne—ex Brisson).]
Ramphocelus magnirostris Lafresnaye, *Rev. Zool.* 1853. p. 243 (Trinidad).
Ramphocelus atrosericeus capitalis Allen, *Bull. Amer. Mus.* iv. (1892) p. 51 (El Pilar, near Cumaná).

More than sixty specimens, adults and young, from Caparo, Valencia, Chaguaramas, Seelet, and Laventille. Examples from Cumaná and from Guanoco in the Orinoco-delta are practically identical with those from Trinidad; hence *R. a. capitalis* becomes a synonym of *magnirostris*.

* *Mém. Soc. Zool. France* xiii. (1900), p. 136.

I can recognise the following races of the *R. jacapa* group :

(*a*) *R. jacapa jacapa* (Linn.)

Distribution : *Cayenne, Surinam, Brit. Guiana : Lower Amazonia :* Pará (Steere coll. in Mus. Tring), Manáos (Natterer); *Upper Amazonia :* Nauta, Pebas, Iquitos in N.E. Peru ; Guayabamba, North Peru (Baron coll.) ; *Eastern Ecuador :* Napo (Goodfellow coll.—Mus. Tring) ; *Venezuela :* on the middle and upper Orinoco and its tributary, the Caura River.

(*b*) *R. jacapa magnirostris* Lafr.

Distribution : *Trinidad* ; and *N.E. Venezuela :* Cumaná (Caracciolo coll.), and Guanoco in the Orinoco-delta (André coll.—Mus. Tring).

This form differs from the typical one by its larger size (wing 80—85, instead of 74—80 mm.) and larger, stronger bill.

(*c*) *R. jacapa venezuelensis* Lafr.

Ramphocelus venezuelensis Lafresnaye, *Rev. Zool.* 1853. p. 243 (Venezuela).

Distribution : *North coast of Venezuela*, near San Esteban.

It differs from the two foregoing races in having the whole ventral surface nearly uniform dark crimson ; only a small patch on the lower abdomen being blackish. In *R. j. jacapa* and *R. j. magnirostris* only the throat and the chest are bright crimson, while the breast is decidedly duller and the blackish patch in the middle of the belly more extended. The back is also more washed with crimson in *R. j. venezuelensis* than in its allies.

I have a good series of this form from S. Esteban, near Puerto Cabello (A. Mocquerys coll.), which answers well the original description.

(*d*) *R. jacapa unicolor* Scl.

Ramphocelus unicolor Sclater, *P. Z. S.* 1856. p. 128 (Bogotá).

Distribution : *Colombia : Bogotá* coll. ; *Mérida, Venezuela.*

Perhaps barely separable from *R. j. venezuelensis.* Seven examples before me differ only by the dorsal surface being almost uniform crimson, while in the precedent subspecies the back is always rather duller than the pileum.

(*e*) *R. jacapa connectens* Berl. & Stolzm.

Rhamphocelus jacapa connectens Berlepsch & Stolzmann, *P.Z.S.* 1896. p. 344 (Central Peru).

Distribution.—*Central* and *South Peru*, extending eastwards through the interior of *Brazil* (Mattogrosso, Goiaz) to *Bahia* and southwards to the *Rio Paraná*, which forms the northern frontier of the state S. Paulo.

This form differs from *R. j. jacapa* and *R. j. magnirostris* in having only the throat and chest crimson, the breast and abdomen being dull blackish, with but a faint crimson hue. The whole back, too, is uniform velvety blackish.

R. atrosericeus (Lafr. & D'Orb.) from Eastern Bolivia is still purer black above and beneath, and the female is so very different from that of the subspecies of *R. jacapa* that it may be regarded as specifically distinct.

33. **Piranga rubra rubra** (Linn.).

Fringilla rubra Linnaeus, *Syst. Nat.* ed. x. (1758) p. 181 (ex Catesby, *Nat. Hist. Carolina* i. p. 56 tab. 56.—*Carolina*, Virginia).

Tanagra aestiva Gmelin, *Syst. Nat.* 1. ii. (1788) p. 889 (based on the same).

Pyranga aestiva Sclater, *Cat. B. Brit. Mus.* xi. (1886), p. 182.

One ♀ nd. from Laventille, taken November 6, 1903.

34. Phoenicothraupis rubra (Vieill.).

Tachyphonus ruber Vieillot, *Nouv. Dict.* xxxii. (1819) p. 359 ("île de la Trinité").

3 ♂ ad. from Caparo, iv. ; 2 ♂ ad. from Laventille, xii. and iii. ; 1 ♂ ad. and one bird in female dress (marked "♂ jr"), Chaguaramas, i. : 1 ♂ ad., 1 ♂ juv., 1 ♀ ad. from Valencia, iii. ; 1 ♂ and 1 ♀ ad. from Aripo, 2000 ft., v.

The males agree in every respect with three others from the neighbourhood of Cumaná. The range of this species is restricted to the extreme north-east of Venezuela, north of the Orinoco delta and the island of Trinidad. As far as I know it has not yet been recorded from Carácas.

35. Tachyphonus luctuosus Lafr. & D'Orb.

Tachyphonus luctuosus Lafresnaye & D'Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837. cl. ii. p. 29 (Guarayos, Bolivia).
T. albispecularis Léotaud, *Ois. Trinidad* 1866, p. 300 (Trinidad).
T. atricapillus Lawrence, *Proc. Acad. Philad.* 1868. p. 360 (Trinidad) [= ♂ juv.] undè :
Lanio (?) *lawrencii* Sclater, *Ibis* 1885. p. 272. tab. 6. fig. 2.
Chlorospingus léotaudi Chapman, *Auk* x. (1893) p. 343 (Trinidad) [= ♀] ; idem, *Bull. Amer. Mus.* vi. (1894) p. 31 (Trinidad).

Two ♂ ad. from Valencia, March, agreeing with Bolivian skins, but rather more glossy on the lower surface. The female of this species has been described as *Chlorospingus léotaudi*. Chapman's careful description leaves no doubt, and the differences from *Chlorospingus chrysogaster* Tacz., pointed out by him, are quite obvious when an actual comparison of both species is made.

Although I have not seen the type of *Lanio lawrencei* I do not hesitate to pronounce it to be nothing else but a young male of the same species, changing from the juvenile to the adult plumage ! The blackish head and the intermixed black feathers on the interscapulium clearly indicate that the specimen would have become black in more advanced plumage. A skin from Bogotá agrees perfectly with the description and figure in the *Ibis*. It is very unfortunate that the three stages of plumage of this bird not only should have been described as three distinct species, but also placed in three different genera !

36. Tachyphonus rufus (Bodd.).

Tamagra rufa Boddaert, *Tabl. Pl. enl.* (1783) p. 44 (♀.—Cayenne : ex Buffon).
Tachyphonus melaleucus (Sparrm.) auct.

Many specimens from Caparo, iv., v. ; 1 ♂ ad. from Pointe Gourde, i. ; one pair from Valencia, iii. ; 1 ♂ ad. from Seelet, iv. ; one pair from Chaguaramas, i. ; and 4 ♂♂ from Laventille, xii, iii.

These birds, as well as a series from Tobago, do not differ from others from Cumaná, Cayenne, and the Orinoco delta.

37. Saltator striatipictus Lafr.

Saltator striatipictus Lafresnaye, *Rev. Zool.* 1847. p. 73 (Caly, W. Colombia).
S. albicollis auct. nec Vieillot ! *

One ♂ ad. from Caparo, March ; one from Chaguaramas, January ; and another from Pointe Gourde, January.

They agree well with some specimens from near Cali, W. Colombia (Raap coll.).

* Cf. my paper on little-known types of neotropical birds which will be published shortly.

The dusky streaks on the lower parts are perhaps rather broader, but this does not seem to be a constant character, for in a series from Cumaná both broadly and narrowly striped examples are to be found.

38. Saltator olivascens Cab.

S. olivascens Cabanis: in Schomburgk, *Reise Brit. Guiana* iii. (1848) p. 676 (Brit. Guiana).

Seven adults of both sexes from Caparo, April; 1 ♂ ad. Valencia, March; and one pair from Seelet, April.

The series agree perfectly with others from Surinam and Cumaná.

A young bird, collected near Caparo, April 12, is above olive-green (instead of dark ashy grey), the supraloral and superciliary stripes are pale sulphur-yellow, the blackish malar stripe barely indicated, and the lower parts strongly tinged with yellowish.

39. Volatinia jacarina splendens (Vieill.).

[*Tanagra Jacarina* Linnaeus, *Syst. Nat.* xii. i. (1766) p. 314 (ex Maregrave.—East Brazil).]
Fringilla splendens Vieillot, *Nouv. Dict.* xii. (1817) p. 173 (Cayenne).

5 ♂ ad., 5 ♂ imm. and 4 ♀ ♀ from Caparo, April.

The males have the axillaries and under wing-coverts entirely black, and there is but a small white spot on the shoulders. Tobago specimens are identical.

40. Sporophila grisea (Gm.).

Loxia grisea Gmelin, *Syst. Nat.* 1. ii. (1788) p. 857 (based on Daubenton, *Pl. enl.* 393. fig. 1. "Virginie"—errore! We substitute *Cayenne* as typical locality).

5 ♂♂, 2 ♀ ♀ from Caparo, March; 1 ♂ Chaguaramas, January; 1 ♂, Pointe Gourde, January; 2 ♂♂, Seelet, April; and 2 ♂♂, Valencia, March.

The series is not very uniform, some specimens having a large white patch on the sides of the neck, entirely wanting in others.

41. Sporophila gutturalis gutturalis (Licht.).

Fringilla gutturalis Lichtenstein, *Verz. Dubl.* 1823. p. 26 (S. Paulo).

One ♂ ad., Caparo, April; and another from Aripo, 1800 ft., May. Not different from typical Brazilian specimens.

42. Sporophila minuta minuta (Linn.).

Loxia minuta Linnaeus, *Syst. Nat.* x. (1758) p. 176 (Surinam).

2 ♂ ad. and 2 ♀ ♀ from Caparo, March, April and May; 1 ♂ from Seelet, April.

The ♂♂ agree with specimens from Cumaná and British Guiana. Two ♂♂ from Surinam are rather darker below, but an example from Antioquia, Colombia, is quite as dark.

43. Euetheia fuliginosa (Wied).

Fringilla fuliginosa Wied, *Beitr. Naturg. Brasil*, 3. i. (1830) p. 628 [Camamú in Bahia].
Phonipara fumosa Lawrence, *Ann. Lyc. New York* x. (1874) p. 396 [Trinidad].

4 ♂♂ and 2 ♀ ♀ from Caparo, April; and 1 ♀ from Valencia, March.

These specimens (topotypes of *P. fumosa*) are practically identical with two

Bahia skins (*E. fuliginosa*). A series from Cumaná is also not different. This species is not included in Chapman's paper on the birds of Trinidad, though the type of *P. fumosa* has been collected on that island.

44. Oryzoborus angolensis (Linn.).

Loxia angolensis Linnaeus, *Syst. Nat.* xii. i. (1766) p. 303 (ex Edwards: "Angola"—errore! We substitute *East Brazil* as typical locality).
L. torrida Scopoli, *Ann. Nat. Hist.* i. (1769) p. 140.

2 ♂♂ and 3 ♀♀ from Caparo, March and April; 3 ♂♂ from Seelet, April; and 1 ♂ each from Laventille, December, and Chaguaramas, January. This series agrees exactly with specimens from Surinam, British Guiana, and Cumaná. I have 35 adult males from different localities before me, and none of them shows any trace of a chestnut cross-band on the throat. Therefore it seems very probable that *O. specularis* Finsch,* if not an accidental variety, may yet turn out to be a different race.

45. Oryzoborus crassirostris (Gm.).

Loxia crassirostris Gmelin, *Syst. Nat.* 1. ii. (1788) p. 862 [ex Latham: Hab. ign.—We substitute *Cayenne*.]

Two ♂♂ ad. from Seelet, March.

They agree with specimens from the Orinoco (Quiribana de Caicara) and Upper Rio Negro (Lamalonga and Marabitanas) in having rather large and strong bills. The birds found in British Guiana have mostly smaller bills, but this is not quite constant.

46. Ostinops decumanus (Pall.)

Xanthornus decumanus Pallas, *Spicil.* fasc. vi. (1769) p. 1 (Surinam).
Ostinops decumanus insularis Dalmas, *Mém. Soc. Zool. France* xiii. (1900) p. 137 (Tobago).

Two ♂ and 8 ♀♀ from Caparo, April, and Seelet, April.

Count Dalmas separated the Tobago birds as a subspecies on account of their smaller size and paler castaneous rump, but there must be some mistake here.

On comparing 4 ♂♂ and 3 ♀♀ from Tobago with a very large series from different localities on the mainland, I cannot find the slightest difference, either in size or in colour. The females are always considerably smaller than the males, the crest is much shorter, and the rump usually paler castaneous. These are just the characters by which *O. d. insularis* is said to differ from the typical form, and I strongly suspect that Count Dalmas was misled by wrongly sexed specimens.

Measurements:

2	sexed	♂ ad.	from Trinidad . . .	Wing,	217, 235 mm.
4	„	„	„ Tobago . . .	„	195, 221, 231, 234 mm.
1	„	♂	„ Orinoco . . .	„	238 mm.
1	„	„	„ Valencia, near Carácas	„	229 „
1	„	„	„ Minas, Brazil . .	„	230 „
8	„	♀♀	„ Trinidad . . .	„	160—173 mm.
3	„	„	„ Tobago . . .	„	162—168 „
1	„	♀	„ Surinam . . .	„	169 mm.

* *P. Z. S.* 1870, p. 583.

47. Cacicus cela (Linn.).

Parus Cela Linnaeus, *Syst. Nat.* x. (1758) p. 191 ("in Indiis"—errore! We substitute *Surinam*).
Tanagra albirostris Linnaeus, *Mus. Ad. Frid.* ii. *Prodr.* (1764) p. 31 ("America").
Oriolus persicus Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 161 ("in America meridionali").
Cassicus persicus auct.

Five adults from Caparo, April and May; one pair from Seelet, April. They agree perfectly with specimens from Surinam and Cumaná.

N.B.—The above is the proper name for the species commonly called *C. persicus*, as has been brought to my attention by Count Berlepsch. Linné's diagnosis of *Parus cela* reads as follows: "P. niger, rostro albo, macula alarum basique caudae flavis, *Mus. Ad. Fr.* 2. p. . . . Habitat in Indiis." Turning to the "Museum Ad. Frid.", we find but one species, *Tanagra albirostris*, to which this description can apply. The diagnosis given for that bird is the same, word for word, but a more detailed account is added that renders the identification absolutely certain: Cf. "corpus sturno fere maius, nigrum, basi pennarum in tergo albo."

48. Xanthornus xanthornus xanthornus (Gm.).

Oriolus xanthornus Gmelin, *Syst. Nat.* 1. i. (1788) p. 391 [(excl. Edwards and habitat: Jamaica) ex Brisson & Buffon, "Mexico"—errore! We fix *Cayenne* ex Buffon as the typical locality.]

A good series from Chaguaramas, January; Seelet, April; Caparo, March and April; Pointe Gourde, January; Laventille, March.

These examples have generally longer and stronger bills than others from Cumaná and the Orinoco valley, and the wings average 2 to 3 mm. longer. One specimen from Margarita Island is somewhat intermediate. *X. x. curaçoensis* (Ridgw.) has the bill still longer and more slender.

Immature birds are much less brightly coloured throughout, more greenish yellow above and less orange below.

49. Molothrus atronitens (Cab.

Molothrus atronitens Cabanis: in Schomburgk, *Reisen Brit. Guiana* iii. (1848) p. 682 [coast of British Guiana].
M. minimus Dalmas, *Mém. Soc. Zool. France* xiii. (1900) p. 138 (Tobago).

3 ♂♂ from Caparo, April; 1 ♂ ad., Caroni R., April; 4 ♂♂ and 3 ♀♀ from Seelet, April.

These specimens agree in coloration and size with a series from Tobago (*M. minimus* Dalm.) and with the type of *M. atronitens* (Cab. in the Berlin Museum. I suspect that Dalmas, when describing his *M. minimus*, compared it with *M. venezuelensis* Stone, which he might have mistaken for *M. atronitens*. *M. venezuelensis* is indeed much larger than the latter species, as will be seen from the following measurements.

M. atronitens (Cab.

♂ ad., British Guiana (Schomburgk coll.) Type of the species. Mus. Berlin	.	Wing, 97;	tail, 71 mm.
8 sexed ♂♂ from Trinidad	. . . .	„ 95—101;	„ 71—78 mm.
9 „ „ „ Tobago (*M. minimus* Dalm.)		„ 96—100;	„ 72—77 „
1 „ ♂ ad. from Pará (Natterer coll.)	.	„ 99 ;	„ 78 „
1 „ „ from R. Cauamé, Rio Branco (Natterer coll.)	. . . . .	„ 100 ;	„ 77 „

M. venezuelensis Stone.*

4 sexed ♂♂, Puerto Cabello, Venezuela . .	Wing	114—116 ;	tail	86—90	mm.
1 „ ♂ ad. Lagunillas	„	114 ;	„	89	„
6 „ ♂♂ from Merida	„	110—118 ;	„	84—91	„
4 „ ♂ ad. from Quiribana de Caicara, Orinoco	„	115—119 ;	„	88—94	„

50. **Agelaius icterocephalus** (Linn.)

Oriolus icterocephalus Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 163 ["Cayana," ex Brisson & Edwards].

A good series of adults and young birds from Seelet, April, and Caroni, March and April, not different from Cayenne specimens.

51. **Leistes militaris** (Linn.)

Emberiza militaris Linnaeus, *Syst. Nat.* x. (1758) p. 178 (ex "America"—"Asia," err. !—We substitute *Surinam*).
Oriolus guianensis + *Tanagra militaris* Linnaeus, *Syst. Nat.* ed. xii. i. (1766) pp. 162, 316.
Leistes guianensis Sclater, *Cat. B. Brit. Mus.* xi. p. 348.

2 ♂♂ and 2 ♀♀ from Caroni, iv.; and 1 ♂ from El Socorro, iv. These specimens agree perfectly with others from Surinam, British Guiana, and the Orinoco River.

52. **Quiscalus lugubris** Sw.

Quiscalus lugubris Swainson, *Anim. in Menag.* (1838) p. 299 ("Brazil," err. !—We substitute *Brit. Guiana*).

One ♂ ad. from Caroni, 25 iv. 1903, agreeing with specimens from Cumaná and the Orinoco region. One adult from Lagunillas near Mérida, W. Venezuela, is apparently also not different.

53. **Cassidix oryzivora** (Gm.)

Oriolus oryzivorus Gmelin, *Syst. Nat.* 1. i. (1788) p. 386 (Cayenne.—ex Latham)

1 ♂ ad. from Seelet, iv.

54. **Arundinicola leucocephala** (Linn.).

Pipra leucocephala Linnaeus, *Mus. Ad. Frid.* ii. Prodr. (1764) p. 33 (*Surinam* : cfr. *Syst. Nat.* xii. 1. p. 310).

One ♂ from Caroni, iv., agreeing in colour and size with a series from Brit. Guiana and the Orinoco River.

55. **Fluvicola pica** (Bodd.)

Muscicapa pica Boddaert, *Tabl. Pl. enl.* (1783) p. 42 (ex Daubenton, tab. 675 f. i.—Cayenne).

6 ♂♂ from Seelet, iv., 1 ♂ ad. (sexed ♀ !) and 1 ♂ jr. from Caroni Swamp, ii. They are in no way different from a very large series from the Orinoco, Brit. Guiana, Cumaná, Maracaibo and Bogotá coll.

Auk 1891, p. 347 (Venezuela—Goering coll.)

56. Platyrhynchus mystaceus insularis Allen.

Platyrhynchus insularis Allen, *Bull. Amer. Mus.* ii. (1889) p. 143 [Tobago].

1 ♂ from Laventille, March, and 1 ♀ from Caparo, April.

They agree with three adults from Tobago (topotypical *P. insularis*) in every respect. Specimens from Cumaná and Tocuyo in Northern Venezuela belong also to this form, which differs from the typical race of Paraguay and S.E. Brazil in its dull greenish (instead of warm oil-brown) upper parts, less brownish crown and much paler under-surface, the chest being but slightly washed with brownish. The birds from the upper Orinoco (Caicara) and the Roraima Mts., Brit. Guiana, are somewhat intermediate between the typical and the northern race, but nearer the former; yet they differ in having the back slightly paler brown and the under parts not quite so dark. Very likely they represent another distinguishable form, but I would like to see more specimens before describing it. The difference in size upon which Mr. Allen laid much stress is not constant.

57. Orchilus* ecaudatus (Lafr. & D'Orb.).

Todirostrum ecaudatum Lafresnaye & D'Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837, cl. ii. p. 47 (Yuracares, E. Bolivia.—type in Mus. Paris examined).

One pair from Savannah Grande, February 7, 1897, collected by Dr. Percy Rendall (Nos. 35, 36)—"Iris dark brown (♀), yellowish brown (♂), feet steel-colour, bill greyish horn-colour, tipped with dirty white."

The specimens from Trinidad are in no way different from others, collected by Natterer on the Rio Madeira. The species is for the first time recorded from Trinidad. The most northerly locality hitherto known was San Esteban, in N.W. Venezuela, where Prof. Goering collected a specimen. Cherrie sent an example from Munduapo, R. Orinoco, and Klages another from Suapure on the Caura R., to the Tring Museum.

58. Mionectes oleagineus pallidiventris nov. subsp.

[*Muscicapa oleaginea* Lichtenstein, *Verz. Dubl.* (1823) p. 55 (Bahia).]

A good series from Caparo (April) and Valencia (March).

These specimens, as well as a good many from Cumaná, and one male from Castare, Tobago, differ from 30 skins from more southern localities in the decidedly paler orange colour of the belly, much less greyish green suffusion of the throat, and duller olive green upper parts. The differences are so obvious when a series is compared that I propose to separate the northern race as

Mionectes oleagineus pallidiventris Hellm.

Type in Mus. Tring: ♂ ad. *Rincon* of *San Antonio, Cumaná*, March 14, 1898. Caracciolo coll., No. 859.

M. o. assimilis Scl. and *M. o. parcus* Bangs, from Central America, are at once known by their much paler and duller colour of the abdomen, considerably darker greyish green throat, and darker green upper parts.

* *Perissotriccus* Oberholser [*Proc. U. S. Nat. Mus.* xxv. 1902, p. 61 (Type: *Todirostrum ecaudatum* Lafr. & D'Orb.)]. This genus is not separable from *Orchilus*, since *O. albiventris* Berl. & Stolzm. connects *O. auricularis* with the two short-tailed species, *O. ecaudatus* and *O. atricapillus*.

59. Ornithion pusillum (Cab. & Heine).

Myiopatis pusilla Cabanis & Heine, *Mus. Hein.* ii. (1859), p. 58 (Cartagena, N. Colombia).

3 ♀♀, 1 ♀ from Caparo, iv.; 1 ♀, Seelet, iv.

They agree with a very large series from Cumaná, the Orinoco region, Surinam, and Bogotá coll. Costa Rica birds differ somewhat by their slightly greener back and generally brighter yellow under-parts, and may stand as a subspecies, *O. p. subflavum* Cherrie.

60. Elainea gaimardii (D'Orb.).

Muscicapara Gaimardii D'Orbigny, *Voyage* (publ. between 1838 and 1847), *Ois.* p 326 [Yuracares, North-east Bolivia].

Fourteen specimens of both sexes from Caparo, March and April.

They are mostly paler yellow below than a large series from the Orinoco and Caura R., Guiana, Cumaná, and Bogota coll.; but some are hardly different in that respect.

61. Elainea pagana pagana (Lcht.).

Muscicapa pagana Lichtenstein, *Verz. Dubl.* (1823), p. 54 [Bahia].

Three females from Seelet, April, and three adults of both sexes from Caparo, April. They have usually more white in the crest than typical Brazilian birds, agreeing in that respect with others from Venezuela, Tobago, Guiana, and Bogotá collections, though this character is not quite constant.

62. Legatus albicollis (Vieill.).

Tyrannus albicollis Vieillot, *Nouv. Dict.* xxxv. (1819), p. 89 [ex Azara—Paraguay].

One female from Caparo, April, and a male from Seelet, April, agreeing with a series from British Guiana, Surinam, and Bahia. Typical Paraguay skins were not available for comparison.

63. Myiozetetes sulphureus (Spix).

Muscicapa sulphurea Spix, *Av. Bras.* ii. (1825), p. 16, tab. xx. ["in Brasilia"].

Mr. André did not send this species, and its occurrence in Trinidad rests on the single specimen collected by Mr. Chapman at La Brea.

64. Rhynchocyclus flaviventris flaviventris (Wied).

Muscipeta flaviventris Wied, *Beitr. Naturg. Brasil.* 3 ii. (1831), p. 929 [Mucuri and Alcobaça: Espiritu Santo, S.E. Brazil].

5 ♂♂ and ♀♀ from Caparo, April, 1 ♂ from Valencia, March, and 1 ♀ from Seelet, April. They are not different from Bahia skins, and one adult from Tocuyo, Venezuela, is also identical. None of the many specimens before me approaches *R. f. borbae* Hellm. in the colour of the under parts.

65. Rhynchocyclus sulphurescens sulphurescens (Spix).

Platyrhynchus sulphurescens Spix, *Av. Bras.* ii. (1825), p. 10, tab. xii. fig. 1 ("♂") [Rio de Janeiro, Piauhy, etc.—We accept *Rio* as typical locality].

8 ♂♂ and ♀♀ from Caparo, March and April. Besides, the Tring Museum has one "♀" collected at Tacarigua in February by Dr. Percy Rendall.

The series agrees in every detail with specimens from Cumaná and S. Paulo in S. Brazil, the pileum being olive green like the back, and but slightly mixed with grey. A number of skins from N.E. Peru (Xeberos and Chamicuros, E. Bartlett coll.) have the pileum grey with very little greenish admixture, and the undersurface distinctly pale yellow. They ought to be called *R. s. assimilis* Pelz., although the types of the latter form have a duller, more greyish green back.

66. **Pitangus sulphuratus trinitatis** nov. subsp.

[*Lanius sulphuratus* Linnaeus, *Syst. Nat.* xii. i. (1766), p. 137 (ex Brisson : "*Cayana*"].
Pitangus sulphuratus (nec Linné) Chapman, *Bull. Amer. Mus. N. Y.* vi. (1894), p. 40 (Trinidad).

8 ♂♂ and ♀♀ from Caparo, March and April, 1 ♂ from Chaguaramas, January, and 1 ♀ from Seelet, April.

The birds from Trinidad are exactly intermediate between typical *P. s. sulphuratus* and *P. s. rufipennis* (Lafr.). The differences of the three subspecies may be expressed as follows :—

(*a*) *P. s. sulphuratus* (Linn.)

Upper wing- and tail-coverts with scarcely any trace of rufous margins ; quills narrowly edged with rufous; outer tail-feathers with the extreme base of the inner webs only rufous.

Hab. Surinam, Cayenne, Brit. Guiana, and Amazonia, from Pará to N.E. Peru and East Ecuador.

(*b*) *P. s. trinitatis* Hellm.

Upper wing- and tail-coverts distinctly margined with rufous ; quills more broadly edged with rufous, these edges being separated from the rufous colour of the inner webs by a distinct dusky stripe along the shaft; tail-feathers with broad rufous margins occupying about half the breadth of the inner web.

Type in Mus. Tring : " ♀ " ad., Caparo, Trinidad, April 16, E. André coll.

Hab. Trinidad.

(*c*) *P. s. rufipennis* (Lafr.).

Saurophagus rufipennis Lafresnaye, *Rev. Zool.* 1851, p. 471 (Carácas).

Upper wing- and tail-coverts almost entirely rufous, only a narrow central streak being dusky ; both webs of the quills (except the tips of the primaries and a broad shaft-stripe on the apical half of the secondaries) and inner web of the outer tail-feathers entirely rufous.

Hab. Venezuela: from Cumaná to S. Esteban, south to the Orinoco valley and its tributaries ; Colombia : Cartagena, Santa Marta, Cauca valley, and Bogotá collections.

The above differences are quite constant in a series of 54 adults.

67. **Myiodynastes audax** (Gm.).

Muscicapa audax Gmelin, *Syst. Nat.* I. ii. (1788), p. 934 [ex Daubenton, *Pl. enl.* 453. fig. 2 : Cayenne] -

1 ♀, Valencia, March ; 1 ♀, Pointe Gourde, January ; and 8 adults of both sexes from Caparo, March. They agree with a large series from Tobago, Cumaná, Mérida, and British Guiana. It is certainly wrong to treat *M. solitarius* (Vieill.)

as a subspecies of *M. audax*, since they occur together at various localities. In the Tring Museum there are both species from the Rio Rupurumi, British Guiana, and Natterer collected both at Barra do Rio Negro, N. Brazil. *M. solitarius* has never any trace of rufous on the tail; the black stripes on the under-surface are also more extended and broader, especially on the throat, which in *M. audax* is almost devoid of dusky markings. The back, too, is blacker, and the rufous edges of the upper tail-coverts much darker.

68. **Megarhynchus pitangua** (Linn.).

Lanius pitangua Linnaeus, *Syst. Nat.* xii. i. (1766) p. 136 (ex Brisson: "Brésil").

Eleven adults and one young bird from Caparo, March and April; 1 ♂ ad. Laventille, December; 1 ♂, Pointe Gourde, January; 2 ♂♂, Chaguaramas January. They are not different in any way from topotypical Brazilian skins.

69. **Myiobius fasciatus** (P. L. S. Müll.).

Muscicapa fasciata P. L. S. Müller, *Naturgyst. Suppl.* (1776) p. 172 ["*Cajenne*"—ex Daubenton, *Pl. enl.* 574, fig. 3).]
Muscicapa macrura Boddaert, *Tabl. Pl. enl.* (1783) p. 34 [based on Daubenton].
Myiobius macrurus auct.

1 ♂ ad. from Caparo, April, and 1 ♀ from Seelet, April, agreeing with examples from Cumana, Cayenne, and Brazil. In the male the crest is lemon yellow, in the female ferruginous.

70. **Empidonax lawrencei** Allen.

Ochthoeca flaviventris Lawrence, *Ann. New York Ac. Sci.* iv. (1887) p. 67 (loc. ign.) undè:
Empidonax lawrencei Allen, *Bull. Amer. Mus. N. Y.* ii. (1889) p. 150; Chapman, *Bull. Amer. Mus.* vi. (1894) p. 42 (Trinidad).
E. oliva Selater, *Cat. Birds Brit. Mus.* xiv. (1888) p. 224.

Seven specimens of both sexes from Caparo, April. They agree in every respect with a series from Cumana and the Canra River, Venezuela.

E. lawrencei is the bird commonly called *E. oliva* or *E. pileatus* (cfr. *Nov. Zool.* ix. 1902, p. 174); but it is almost certain that the "Gobe-mouche olive, de Cayenne" of Daubenton, upon which both names have been based, does not refer to the species in question, which is not known to occur in Cayenne. It seems, therefore, best to retain Mr. Allen's name.

Measurements: Wing 61—68; tail 55—65 mm.

71. **Blacicus brachytarsus** (Scl.) (subsp.?)

Empidonax brachytarsus Sclater, *Ibis*, 1859, p. 441 [Cordova, South Mexico].

A series of 20 specimens (♂♂ and ♀♀) from Caparo, April; Pointe Gourde, January, and Valencia, March; agreeing with others from Cumaná and Mount Bucarito, Venezuela.

Two skins from Vera Paz, Guatemala, have decidedly darker under parts, but are not otherwise different. Perhaps the South American birds could be separated subspecifically. *Empidonax andinus* Tacz. seems to be the same as *E. virens* (Linn.), so they would require a new name. A larger series, however, should be examined.

72. Myiarchus tuberculifer (Lafr. & D'Orb.).

Tyrannus tuberculifer Lafresnaye & D'Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837. cl. ii. p. 43 [Guarayos, East Bolivia].

1 ♂ and 2 ♀♀ from Caparo, April : 1 ♂ from Aripo, 2000 ft., May.

These examples agree exactly with a large series from Cumaná, Brazil, British Guiana and Bogotá coll. In the *Cat. Birds Brit. Mus.* most of the specimens of this species have been placed under *M. nigriceps*, while two others are registered as a different species : *M. tricolor* ! ! As a matter of fact, however, the former are absolutely identical with those from Bahia and Rio Tocantins. The distribution of the two species or subspecies is as follows :

(*a*) *Myiarchus tuberculifer* (Lafr. & D'Orb.)

Brazil : Rio, Bahia, Mattogrosso, Pará, Borba ; *East Bolivia :* Guarayos ; *Upper Amazonia :* Iquitos, N.E. Peru ; Sarayaçu, East Ecuador ; *Colombia :* Bogotá coll. ; *Venezuela :* Mérida ; S. Esteban ; Cumaná ; Orinoco valley (Quiribana de Caicara, Nericagua) ; *Trinidad ; Brit. Guiana :* Roraima, etc.

Obs. Having not seen specimens from Santa Marta and Panama, I cannot say whether they belong to this or to the next form.

(*b*) *Myiarchus nigriceps* Scl.

Western Ecuador : Pallatanga, Esmeraldas, Chimbo, Bugnac, Niebli, etc. ; and *Northern Peru :* Tambillo, Callacate, Cutervo, Huambo, Tamiapampa, Cajabamba, Malca, etc.

73. Myiarchus tyrannulus tyrannulus (P. L. S. Müll.).

Muscicapa tyrannulus P. L. S. Müller, *Natursyst. Suppl.* p. 169 (1776.—Cayenne—ex D'Anbenton, *Pl. enl.* 571, fig. 1).
Myiarchus erythrocercus Sclater & Salvin, *P. Z. S.* 1868. pp. 628, 631 (Caracas).

1 ♂ ad. from Chaguaramas, January : 1 ♂, Laventille, December ; and 3 ♀♀ from Seelet, April.

These specimens, as well as some others from Tobago, are practically identical with a series from Cumaná and the Orinoco River. They evidently represent typical *M. tyrannulus*.

M. t. oberi Lawr., from the Lesser Antilles, differs in its larger and longer bill, decidedly darker upper parts, and in having the whole inner web of the outer tail-feathers rufous. *M. t. brevipennis* Hart., from Curaçao, etc., on the other hand, is much smaller, especially with a considerably shorter and weaker bill.

74. Tyrannus melancholicus satrapa (Cab. & Heine).

[*Tyrannus melancholicus* Vieillot, *Nouv. Dict.* xxxv. (1819) p. 84 (ex Azara : Paraguay).]
Laphyctes satrapa Cabanis & Heine, *Mus. Heinean.* ii. (1859) p. 77 ("Guiana and Caracas").

Many specimens from Caparo, April, agreeing in size and colour with a series from Tobago, Panama, Costa Rica and British Guiana. The northern form differs from typical *T. m. melancholicus* only by its somewhat larger size. On the other hand, *T. m. couchi* Baird is a strongly marked race, easily known from those of South America by its larger size, paler, more whitish throat, much less greenish suffusion on the foreneck and much paler yellow belly.

75. Tyrannus rostratus Scl.

Tyrannus rostratus Sclater, *Ibis*, 1864. p. 87 [Port of Spain, Trinidad (Taylor) and Guiana.]

1 ♂ ad. from Seelet, April; and another ♂ from Laventille, December. They are absolutely identical with a large series from the Antilles (Santa Lucia, Dominica, etc.). Although originally described from Trinidad, this bird is certainly only a winter visitor on the island.

76. Muscivora tyrannus (Linn.).

Muscicapa tyrannus Linnaeus, *Syst. Nat.* xii. 1. (1766) p. 325 [ex Brisson: "Canada" (errore!) and Cayenne].

One adult from Caroni, April.

77. Pipra erythrocephala (Linn.).

Parus erythrocephalus Linnaeus, *Syst. Nat.* x. (1758) p. 191 (ex Edwards. – Surinam).
Pipra aurocapilla Lcht.

A good series from Caparo, March and April; Valencia, March; Pointe Gourde and Chaguaramas, January.

Like others from Cumaná, and Guanoco in the Orinoco delta, the ♂♂ have the cap brighter, more orange than those from Cayenne and Surinam. Specimens from the Orinoco and Caura are, however, so variously intermediate that I do not venture to separate them.

78. Chiromachaeris manacus manacus (Linn.).

Pipra manacus Linnaeus, *Syst. Nat.* xii. 1. p. 240 (1766.—ex Edwards: "supposed to be *Surinam*," and ex Brisson: part).

A very large series of both sexes from Caparo, March and April; one pair from Laventille, December; 2 ♂♂ from Valencia, March; and 2 ♂♂, 1 ♀ from Chaguaramas, January.

The males agree with several specimens from Surinam in having only the sides of the belly and the under tail-coverts grey. 2 ♂♂ from Archidona (East Ecuador), one from the Caura River, and several from the Rio Negro (Natterer), belong also to this form.

C. m. purus (Bangs) from the Lower Amazons, is easily recognisable by its white under tail-coverts and narrow black area on the back.

79. Tityra cayana (L.).

Lanius cayanus Linnaeus, *Syst. Nat.* xii. 1. (1766) p. 137 (ex Brisson.—Cayenne).

2 ♂♂ and 2 ♀♀ from Caparo, iii., iv.; and 1 ♂ ad. from Valencia, iii.

Apparently not different from Cayenne and Cumaná specimens, but the males are a shade more cinereous, both beneath and above.

80. Pachyrhamphus niger cinereiventris Scl.

[*Pachyrynchus niger* Spix, *Av. Bras.* ii. (1825) p. 33, tab. 45, fig. 1 (no locality given.—We substitute *Fonteboa*, Amazons, as the typical locality).]
Pachyrhamphus cinereiventris Sclater, *Cat. Amer. Birds*, p. 242 (1862.—Santa Marta).
Pachyrhamphus niger (nec Spix!) Chapman, *Bull. Amer. Mus.* vi. (1894) p. 47 (Trinidad).

2 ♂♂ from Caparo, April, and 1 ♂ ad. from Pointe Gourde, January.

These specimens agree with a series from Cumaná, Tobago, the Orinoco valley, and Bogotá-collections. I compared also the type of *P. cinereiventris* from Santa Marta

in the British Museum, and found it to belong to the same form. The under surface is dark cinerous, more or less freckled with dull blackish, especially on the throat and foreneck. The true *P. n. niger* from N.E. Peru and East Ecuador differs at a glance by having the lower parts uniform deep black, the rump and upper tail-coverts black like the back (never grey as in *cinereiventris*), and by its larger bill.

81. Chasmorhynchus variegatus (Gm.).

Ampelis variegata Gmelin, *Syst. Nat.* I. ii. (1788) p. 841 [ex Brisson, etc.—"Brasilia"—errore! We substitute *Cayenne*.]

1 ♂ ad., 1 ♂ jr., and 1 ♀ from Aripo, 2000 ft., May; 1 ♂ ad. Caparo, May; 1 ♂ ad., 2 ♂♂ jr. and 3 ♀♀ from Valencia, March.

This series agrees well with several specimens from the Roraima Mountains, British Guiana. The species has not yet been recorded from the "Côte de Paria," but Goering collected it at S. Esteban, near Puerto Cabello.

82. Sclerurus albigularis Scl. & Salv.*

Sclerurus albigularis Sclater & Salvin, *P. Z. S.* 1868. p. 630 [Carácas.]

1 ♀ ad. from Valencia, March 25; and 1 ♂ from Caparo, April 12.

Identical with specimens from Tobago and Cumaná.

S. canigularis Ridgw. has quite erroneously been united with the above species by Dr. Sclater. It is a very much darker bird throughout. The upper parts are dark rufous brown (instead of pale olive brown), the foreneck deep chestnut rufous (instead of pale ferruginous), breast and abdomen dark rufous brown mixed with blackish, and the whole throat is uniform dark ashy grey (chin and upper throat not whitish, as in *S. albigularis*).

83. Synallaxis cinnamomea (Gm.).

Certhia cinnamomea Gmelin, *Syst. Nat.* I. i. (1788) p. 480 [ex Latham: loc. ign.—We accept *Cayenne* as the typical locality].

2 ♂♂ from Caroni Swamp, March: 3 ♂♂ ad., 1 ♀ ad. and 2 juv. from Seelet, April: agreeing with a good series from Surinam, British Guiana and the Orinoco River.

84. Synallaxis albescens albigularis Scl.

[*Synallaxis albescens* Temminck, *Pl. col. livr.* 38 (Sept. 1823) tab. 227. fig. 2 (S. Brazil)].
S. albigularis Sclater, *P. Z. S.* 1858. p. 63 [Rio Napo, East Ecuador].
S. occipitalis Madarász, *Ann. Mus. Nat. Hung.* i. (1903) p. 463 [Mérida, Venezuela].

Three ♂♂ from Caparo, March and April; and one young bird from Laventille, March.

The adults agree with a large series from the Orinoco, Mérida, Bogotá, and East Ecuador. Through Sclater's "lumping" of *S. albescens albescens* and *S. a. albigularis* in the *Cat. B.* xv., Dr. von Madarász was misled to create a new name for the northern form. The latter may be distinguished from the Brazilian bird by the much broader, greyish brown frontal band, paler, more greyish brown (instead of reddish brown) tail, and, as a rule, lighter rufous, less castaneous colour of the crown and shoulder patch.

* The name is commonly attributed to Swainson (*Birds Brazil*, etc., tab. 78), but that plate is not to be found in any of the copies I consulted.

85. Synallaxis terrestris carri Chapm.

Synallaxis carri Chapman, *Bull. Amer. Mus.* vii. (1895) p. 323 [Caparo : Trinidad].

One ♂ ad. from Caparo, collected April 4, 1902.

This is a very distinct form, at once known from *S. t. terrestris* Jard. by the following characters : the upper parts are much darker, mummy brown (instead of pale olivaceous brown), the wings darker chestnut, and the breast and abdomen also much more intensely coloured, scarcely lighter than the back. The whitish spots on the throat are greatly restricted, the blackish ground-colour becoming much more apparent. Only the anterior portion of the chest shows a few narrow fulvous shaft-lines, while in *S. t. terrestris* from Tobago the whole breast is covered with distinct pale stripes, which are slightly margined with dusky laterally.

S. t. striatipectus Chapm. from Cumaná is another close ally, but differs in the decidedly rufous sides of the neck and superciliaries, and in having the whole breast and abdomen marked with broad fulvous shaft-stripes.

86. Xenops rutilus rutilus Licht.

Xenops rutilus Lichtenstein, *Verz. Dubl.* 1823. p. 17 [Bahia].

One ♂ ad. and one specimen not sexed, from Laventille, December and April. They agree with examples from Bahia, S. Paulo and Cumaná.

87. Dendrocincla meruloides (Lafr.).

Dendrocops meruloides Lafresnaye, *Rev. Zool.* 1851. p. 467 [" Côte ferme " coll. Beauperthuys.—This means the north coast of Venezuela near *Cumaná* *].
Dendrocincla meruloides aphanta Oberholser, *Proc. Acad. Philad.* 1904. p. 460 (Tobago).

Thirteen specimens of both sexes from Caparo, April ; 1 ♂ ad. from Pointe Gourde, January.

The series is fairly uniform, and agrees perfectly with a good many skins from Cumaná and Puerto Cabello. Two specimens from Tobago are also in no way different. It is certainly wrong to treat *D. meruloides* as a subspecies of *D. merula* (Leht.). The latter is readily distinguished from all South American species of *Dendrocincla* by its deep chestnut upper wing- and lower tail-coverts and bright orange axillaries. *D. meruloides*, on the other hand, agrees in both respects with *D. phaeochroa* (which occurs together with *D. merula* at different localities, e.g. on the Orinoco), but differs in its more cinnamomeous-brown upper parts, more rusty under-surface, and in the throat being uniform with the breast (instead of buffy).

88. Dendrornis susurrans susurrans (Jard.).

Dendrocolaptes susurrans Jardine, *Ann. Mag. Nat. Hist.* xix. (1847) p. 81 [Tobago].
Nasica albisquama Lafresnaye, *Rev. Zool.* 1852. p. 465 [loc. ign.].
Dendrornis consubrinus Dalmas, *Mém. Soc. Zool. France* xiii. (1900) p. 140 [Trinidad].

Fourteen specimens (adult and young) from Caparo, April ; 1 ♂ ad. Chaguaramas, January ; 1 ♂ ad., Pointe Gourde, January ; 1 ♀ jr., Seelet, April ; 4 ♂♂, Laventille, April and May ; 1 ♂, Valencia, March.

* I compared two of the typical specimens, collected by M. Beauperthuys, in the Paris Museum. They are both labelled " *Cumaná*," and as Beauperthuys never collected anywhere else, this locality must be regarded as the typical one.

On comparing this series with fifteen specimens from Tobago I fail to see any difference, and cannot, therefore, admit the validity of *D. consobrinus* Dalm.

The form found on the opposite mainland, near Cumaná, Maturin, and in the Orinoco delta (Guanoco), however, is apparently different and worthy of recognition. It differs in its more fulvous under-parts, this being especially noticeable on the throat, which is distinctly buff (instead of whitish), and more rufescent back. This subspecies has to stand as *D. susurrans jardinei* Dalm.

At my request, Mr. Oberholser examined the types of *Nasica albisquama* in the Lafresnaye collection, and found them to be identical with the white-throated Tobago form. Most probably, Lafresnaye's types came from Trinidad.

89. Picolaptes albolineatus (Lafr.).

Dendrocolaptes albolineatus Lafresnaye, *Rev. Zool.* 1846. p. 208 ["Colombie ou Mexique."—We accept *Bogotá* as the typical locality].

2 ♂♂ and 1 ♀ from Caparo, April: exactly agreeing with three adults from Cumaná.

Bogotá skins and several examples from West Colombia differ slightly in having the back rather more rufescent and the under-parts darker brown, with the whitish longitudinal streaks somewhat broader. Two specimens from Valencia appear to be identical with those from Bogotá.

A much larger series is necessary to decide whether there are any geographical races of this species or not.

90. Thamnophilus major semifasciatus (Cab.).

[*Thamnophilus major* Vieillot, *Nouv. Dict.* iii. (1816) p. 313 (ex Azara: Paraguay).]
Diallactes semifasciatus Cabanis, *Journ. f. Ornith.* 1872. p. 234 ["Pará, Guiana and Veneznela"].
Thamnophilus albicrissus Ridgway, *Proc. U.S. Mus.* xiv. (1891) p. 481 [Trinidad].

6 ♂ ad. and 5 ♀♀ from Caparo, April.

In the markings of the tail they agree with a series from Venezuela (Cumaná and R. Orinoco), British Guiana, Cayenne, and Pará. Typical *T. m. major* Vieill. of Paraguay, Mattogrosso and Bahia has much more white in the tail, broader white edges to the primaries and, as a rule, a smaller bill.

91. Thamnophilus doliatus (Linn.).

Lanius doliatus Linnaeus, *Mus. Ad. Fridr.* ii. Prodr. p. 12 (1764) [loc. ign.—We substitute *Surinam*, as the typical locality].
Thamnophilus doliatus fraterculus Berlepsch & Hartert, *Nov. Zool.* ix. (1902) p. 70 [Orinoco River].

25 ♂ ad. and juv., 17 ♀♀ from Caparo, April and May; and Seelet, April; 1 ♂ ad., 1 ♀, Pointe Gourde, January; 1 ♂ ad. from Laventille, December.

With a series of seventy adult males before me, I can no longer distinguish the form named *T. d. fraterculus* by Berlepsch and Hartert. In some cases, the specimens from Cayenne, Surinam and Trinidad have rather broader bars on the lower surface than those from Venezuela, but so many of them are quite indistinguishable from the latter that I cannot make any separation. Birds from Tobago agree better with the narrowly-barred form of the mainland.

92. Thamnophilus canadensis canadensis (Linn.).

Lanius canadensis Linnaeus, *Syst. Nat.* xii. 1. p. 134. descr. ♀ [1766 : ex Brisson, "*Canada*" : errore !—We substitute *Cayenne* as typical locality].
Thamnophilus trinitatis Ridgway, *Proc. U.S. Mus.* xiv. (1891) p. 481 [Trinidad].
T. cirrhatus auct.

2 ♂♂ and 1 ♀ from Seelet, April ; 5 ♂ ad., 1 ♂ jr. and 1 ♀ from Pointe Gourde, January ; 1 ♂ ad. from Chaguaramas, January ; and 1 ♂ jr. from Laventille, March.

Besides these specimens, I have examined a series of 40 adults from Cayenne, British Guiana, Surinam, Cumaná, the Orinoco and the Rio Branco (Natterer coll.), and I fail to see any constant differences between them. Dark and pale-backed specimens are to be found in Trinidad as well as on the mainland, and some of the (typical) Cayenne skins are even darker on the upperside than those from Trinidad. I can, therefore, no longer maintain *T. trinitatis* as different.

93. Dysithamnus affinis andrei n. subsp.

Dysithamnus mentalis spodionotus (nec *D. spodionotus* Salv. & Godm. !) Chapman, *Bull. Amer. Mus.* vi. (1894) p. 50 [Trinidad].

4 ♂ ad. and 3 ♀♀ from Caparo, April.

♂. Differs from *D. a. affinis* of Mattogrosso only in having the under tail-coverts white.

♀. Quite different from that of *D. a. affinis* and *D. a. spodionotus* by having the back olive-grey (not cinnamomeous or warm olive-brown) and the under-surface much paler without any cinnamomeous tinge on sides or foreneck, only the flanks and crissum being pale olive yellowish.

Type in Mus. Tring : ♀ ad., Caparo, Trinidad, April 12, 1902. E. André coll.

It is strange that the ♂♂ of the Trinidad form are much more like *D. a. affinis* of Mattogrosso than *D. a. spodionotus* from the Roraima Mountains. Comparing three males of each, I can hardly perceive any differences between them, but the females are strikingly different. The distinguishing characters of the three subspecies may be summarised as follow :

(*a*) *D. affinis affinis* Pelz.—Distribution : *Mattogrosso*, C. Brazil : Villa Maria (Natterer) ; Chapada (Smith).

♂ ad. Upper parts pure schistaceous grey, pileum rather darker, rump slightly washed with pale greenish. Throat and middle of the breast and abdomen white, sides and foreneck washed with pale grey, flanks and under tail-coverts distinctly tinged with pale brownish or greenish. Wing, 61 ; tail, 39 mm.

♀ ad. Back warm olive-brown : upper wing-coverts and outer web of the remiges light rufescent brown. Throat and middle of the belly pure white, chest and sides pale cinnamomeous brown. Wing, 61 ; tail, 39 mm.

(*b*) *D. affinis andrei* Hellm.—Distribution : *Trinidad*.

♂ ad. Exactly like the ♂ of the *D. a. affinis*, but the under tail-coverts pure white, only the flanks being faintly shaded with greenish. Wing, 61—63 ; tail, 40—43 mm.

♀ ad. Back olive-grey, passing into pale greenish on the rump. Upper wing-coverts and outer webs of the remiges pale olive brownish. Throat and middle of

the belly pure white, foreneck scarcely shaded with buffy; flanks and under tail-coverts olive-yellow with a brownish hue. Wing, 60—63; tail, 39—41 mm.

(*c*) *D. affinis spodionotus* Salv. & Godm. Distribution: *Roraima* Mt., British Guiana.

♂ ad. Differs from *a* and *b* by the darker, more slaty grey upper parts without any trace of greenish on the rump. The grey colour below is also rather darker and more extended, and the flanks are always washed with brownish. Wing, 65—68; tail, 46 mm.

♀ ad. Exactly like that of *D. a. affinis*, perhaps a shade paler, more rufescent olive-brown on the lower parts. Tail distinctly longer. Wing, 62—64; tail, 44—47 mm.

These three subspecies form a natural group, and are quite different from *D. mentalis mentalis* (Temm.) and *D. m. olivaceus* (Tsch.) which have the belly in both sexes sulphur-yellow without any white. Cfr. *Journ. f. Ornith.* 1905, p. 14 ff.

D. a. andrei is evidently confined to the island of Trinidad, since two specimens from Tobago (♀ ♀) and several adults from Cumaná belong to the yellow-bellied *D. m. mentalis*.

94. **Myrmotherula axillaris** (Vieill.).

Myrmothera axillaris Vieillot, *Nouv. Dict.* xii. p. 113 (1817) [ex "La Guayane," sc. Cayenne].

3 ♂ ad. from Caparo, April, agreeing in every respect with typical Cayenne specimens.

95. **Ramphocaenus melanurus trinitatis** Less.

[*Ramphocaenus melanurus* Vieillot, *Nouv. Dict.* xxix. (1819), p. 6 ("Brésil"—coll. Delalande: sc. *Rio de Janeiro*)].
Ramphocaenus trinitatis Lesson, *Rev. Zool.* 1839. p. 42 ("in insula *trinitatis*").

♂ and ♀ from Caparo, April and March 1902.

The specimens agree with a good series from Cumaná and the Orinoco and Caura Rivers in having the under-parts strongly washed with ochraceous buff (Ridgway, *Nomencl.* v. fig. 10). The cheeks, ear-coverts and sides of the neck are uniform deep ochraceous (Ridgway v. fig. 7), and the back dull smoky brown in decided contrast to the dull rufous brown pileum. Two specimens from Cumaná have only a slight ochreous buffy wash on the innermost sides of the belly, thereby approaching *R. m. albicentris* Scl. from British Guiana and Surinam; but the sides of the head are deep ochraceous, as in *R. m. trinitatis*.

R. m. melanurus of East Brazil (S. Paulo to Pará) resembles the brightly coloured specimens of *R. m. trinitatis* on the under parts; but the ear-coverts are much paler buff, and the back is warm rufescent brown, scarcely different from the colour of the crown.

It is extremely doubtful whether Lesson's name can be accepted for the northern form of *R. melanurus*. Although Trinidad is given as the typical locality, the description does not fit very well, and the terms "corpore infra niveo, lateribus griseis," apply much better to *R. m. albicentris*. Perhaps Lesson described a specimen of the latter race with a wrong locality. Before giving a new name, however, the type of *trinitatis* should be examined.

96. Myrmeciza longipes longipes (Sw.).

Drymophila longipes Swainson, *Zoolog. Journ.* ii. (July 1825), p. 152 ["some part of Brazil (I was told from Rio de Janeiro)"—errore! We substitute *Trinidad* as the typical locality].
Myrmeciza swainsoni Berlepsch, *Ibis* 1888, p. 130 [Puerto Cabello and Trinidad].
Myrmeciza longipes albirentris Chapman, *Auk* x. (1893), p. 343, and *Bull. Amer. Mus.* vi. (1894), p. 51 [Trinidad].

2 ♂♂ and 1 ♀, Chaguaramas, January; one pair from Laventille, April and December; one ♂ ad., Caparo, April.

The series is absolutely identical with another from Cumaná and Puerto Cabello, Venezuela. I fully agree with Mr. Chapman that the term *longipes* Sw. should be accepted for the bird named *M. swainsoni* by Berlepsch, but I cannot follow him in separating the Trinidad form under a new name. One ♂ ad. from Panama (coll. Harris) differs from the latter in having the sides of the chest ashy grey (instead of pale fulvous brown like the flanks), as pointed out by Chapman. In Swainson's description, however, no mention is made of this colour; hence his name becomes strictly applicable to the Trinidad race. Moreover, *M. swainsoni* Berlepsch being based upon specimens from Puerto Cabello and Trinidad, antedates in any case Chapman's later designation, while the birds from Cartagena and Panama, if really separable, must have a new name.

In the Orinoco valley and in British Guiana a very distinct subspecies takes its place. This has been named *M. l. griseipectus* Berl. & Hart., and is easily known by a broad grey band across the chest just below the black throat.

97. Sclateria* naevia (Gm.).

Sitta naevia Gmelin, *Syst. Nat.* i. 1 (1788) p. 412 [ex Edwards: Surinam].

4 ♂♂, 1 ♀, from Caparo, March and April: one ♀, Chaguaramas, January. Identical with a series from Cayenne.

98. Formicarius hoffmanni saturatus Ridgw.

[*Myrmornis Hoffmanni* Cabanis, *Journ. Ornith.* 1861, p. 95 (Costa Rica).]
Formicarius saturatus Ridgway, *Proc. U. S. Mus.* xvi. (1894), p. 677 [type ex Trinidad].

2 ♂♂ from Caparo, April; 1 ♂ from Valencia, March; and 1 ♀ from Aripo, 2000 ft., May.

The Trinidad specimens agree perfectly well with others from Cumaná, Tocuyo, Venezuela, and from the Cauca valley in W. Colombia. *F. h. saturatus* is easily recognisable from *F. h. crissalis* Cab. (ex Cayenne and Brit. Guiana) by its paler, more olive-brown colour above, smaller or obsolete white loral spot, darker grey under parts, and paler lower tail-coverts.

99. Glaucis hirsuta (Linn.).

Trochilus hirsutus Gmelin *Syst. Nat.* i. 1 (1788), p. 490 ["Brasilia"—ex Maregrave].

Two pairs from Caparo, April, and three specimens from Laventille, November. They agree with a series from Puerto Cabello, the Caura River, and Tobago. Topotypical East Brazilian skins are not available for comparison. According to Phelps (*Auk* 1897, p. 366) the species occurs also in the state of Cumaná.

* Olim *Heterocnemis* (preoccupied).

100. Phoethornis longuemareus (Less.).

Trochilus longuemareus Lesson, *Hist. Nat. Trochil.*, p. 15. pl. 2 (1832—Cayenne).

Three ♂♂ from Caparo, April. The Tring Museum has also two skins (♂♀) collected by Dr. Percy Rendall at Caparo.

They differ from a series of Cayenne skins (coll. Cherrie) by having the blackish subterminal bar on the tail-feathers less distinct and the upper tail-coverts not so broadly margined with rufous. The blackish gular spot, too, seems to be larger. These slight differences, however, are not quite constant.

P. longuemareus is hitherto only known from Cayenne, British Guiana (Schomburgk), and Trinidad.

101. Phoethornis guy guy (Less.).

Trochilus guy Lesson, *Hist. Nat. Trochilid.* p. 119. tab. 44 [1832: no locality given. We substitute *Trinidad*].

3 ♂♂ from Caparo, March and April; 1 ♂ ad. from Aripo, 2000 ft., May.

Specimens from Cumaná are practically identical. All have the base of the tail and the upper tail-coverts bronze green, without any bluish gloss. This form is confined to Trinidad and N.E. Venezuela (state of Cumaná).

102. Florisuga mellivora (Linn.).

Trochilus mellivorus Linnaeus, *Syst. Nat.* x. p. 121 (1758—ex Edwards: "in Indiis": sc. *Surinam* ex Edwards).

♂♀ ad. from Caparo, April: 1 ♂ from Valencia, March: and 1 ♂ imm. from Aripo, 1600 ft., May.

Though occurring in Tobago, the species has not yet been found on the opposite Venezuelan coast.

103. Agyrtria chionopectus chionopectus (Gould).

Thaumatias chionopectus Gould, *Monogr. Trochil.* v. (1859), tab. 293 [Trinidad].

A large series from Caparo, March and April, and Laventille, March. It occurs also on the opposite Venezuelan coast in the state of Cumaná, where it has been collected by Mr. Phelps (*Auk* 1897, p. 366).

In British Guiana and on the Canra River it is represented by a smaller form with a less coppery tail, *A. c. whitelyi* (Bouc.).

104. Saucerottea erythronotos erythronotos (Less.).

Ornismya erythronotos Lesson, *Hist. Nat. Ois. Mouches*, pp. xxxii., 180. tab. lxi. [1829: "Brésil"—errore! We substitute *Trinidad*].

Twelve specimens of both sexes from Caparo, April; 1 ♂ from Chaguaramas, January; 1 ♂ from Laventille, November; and 1 ♂ from Aripo, 2000 ft., May.

In most specimens the under tail-coverts are dark coppery with cinnamon edges, but in one ♂ from Caparo they are dark violet edged with whitish, and in another from Laventille pale greyish with whitish margins.

The Tobago form, *S. e. wellsi* Bouc., is rather larger, with the tail more deeply forked, and with the back and crown darker, purer green. On the Venezuelan mainland it is represented by another close ally, *S. e. feliciae*. (Cf. the excellent remarks by Count Dalmas in *Mém. Soc. Zool. France* xiii. 1900. pp. 142-3.)

105. Chlorestes coeruleus (Vieill.).

Trochilus coeruleus Vieillot, *Nouv. Dict.* vii. (1817), p. 361 [Cayenne].

30 ♂♂ and 3 ♀♀ from Caparo, March and April, and 1 ♂ ad. from Chagnaramas, January.

The males agree perfectly with a good series from Cayenne, British Guiana, and the Orinoco region. The species has not yet been taken in the Cumaná region.

106. Chlorostilbon caribaeus (Lawr.).

Chlorostilbon caribaeus Lawrence, *Ann. N. Y. Lyc.* x. (1871), p. 13 [Curaçao].

2 ♂♂ from Laventille, May. We have also 2 ♂♂, collected in March 1897 at Tacarigua by Dr. Percy Rendall.

These four specimens agree with several others from Curaçao in having the throat and breast pure glittering green. The birds from Cumaná have been separated by Simon & Dalmas as *C. c. lessoni*, but their chief character, the bluish hue on the throat, occurs sometimes also in specimens from Curaçao, and I doubt the possibility to distinguish them.

107. Colibri delphinae (Less.).

Ornismya delphinae Lesson, *Rev. Zool.* 1839, p. 44 [loc. ign.—We substitute *Trinidad*].

Eight adults from Aripo, 1600 to 2000 ft., May, fully agreeing with a good series from Cumaná and Colombia (Bogotá coll.).

108. Anthracothorax gramineus (Gm.).

Trochilus gramineus Gmelin, *Syst. Nat.* i. 1 (1788), p. 488 [based on the "Haussecol vert" of Buffon. No locality given: we substitute *Cayenne*].
Lampornis gramineus auct.

1 ♂ ad., Seelet, April 8; 1 (♂) ad., Caroni Swamp, February 10; 1 ♀, Caroni, March 22, 1902.

The Trinidad birds agree perfectly with a series from Cayenne and Surinam.

109. Anthracothorax nigricollis (Vieill.).

Trochilus nigricollis Vieillot, *Nouv. Dict.* vii. (1817), p. 349 ("Brésil").
Lampornis nigricollis auct.

1 ♂ ad., Valencia, March; 2 ♀♀, Laventille, November 8, March 19; 1 ♂ juv., Seelet, April; 1 ♀, Aripo, 1800 ft., May; 26 adults and young from Caparo, April. We have also 2 ♂♂, 1 ♀, from Caparo valley, and 2 ♂♂ from Tacarigua, February, collected by Dr. Percy Rendall.

The series agrees exactly with other examples from Cumaná and S. Brazil.

The female of *A. nigricollis* differs from that of the preceding species by having a broad velvety black stripe along the middle line of the underside from the chin to the anal region. In *A. gramineus* there is only a dull blackish stripe to be seen on the middle of the throat and foreneck.

110. Chrysolampis mosquitus (Linn.).

Trochilus mosquitus Linnaeus, *Syst. Nat.* x. p. 120 [1758: ex "Indiis"—errore! We substitute *Suriam* as typical locality].

A large series of both sexes from Caparo, April; Laventille, December; Pointe Gourde, January; and Seelet, April.

111. Polytmus thaumantias chrysobronchos (Shaw).

[*Trochilus thaumantias* Linnaeus, *Syst. Nat.* xii. 1 (1766), p. 190 (ex Brisson: "Brésil").]
Trochilus chrysobronchos Shaw, *Gen. Zool.* 8. 1 (1812), p. 287 [based on Audebert & Vieillot, *Ois. Dorés* i. tab. 41—"Guiana," sc. Cayenne].

1 (♂) ad. and 1 (♀) from Caroni Swamp, February. They agree with specimens from British Guiana and Cayenne.

This species has not yet been recorded from the Paria peninsula.

112. Anthoscaenus longirostris longirostris (Audeb. & Vieill.).

Trochilus longirostris Audebert & Vieillot, *Ois. Dor.* i. (1802), p. 128. tab. 59 ["Indes occidentales." We substitute *Trinidad*].

1 ♂ ad. from Caparo, April 13, 1902, agreeing with a specimen from Cumaná.

113. Lophornis ornatus (Bodd.).

Trochilus ornatus Boddaert, *Tabl. Pl. enl.* p. 39 [1783: ex Daubenton, *Pl. enl.* 640. fig. 3, Cayenne].

A fine series of eleven specimens from Laventille, October and November. The ♂ ad. are not different from others collected by Mr. André on the Caura River in Venezuela. Typical Cayenne skins are not available for comparison.

114. Chaetura zonaris albicincta (Cab.).

[*Hirundo zonaris* Shaw, *Cimelia Phys.* (1796) p. 100, tab. 55. (No locality).]
Hemiprocne albicincta Cabanis, *Journ. f. Ornith.* 1862. p. 165 (part: Guiana).
Acanthylis collaris Léotaud, *Ois. Trinidad*, p. 83 (Trinidad).

Two specimens, marked ♂ and ♂ juv., collected by Mr. Carr at Chaguanas, September 24, 1894.

Both are young and have the white neck-band still incomplete, but agree with specimens from British Guiana in dimensions. The wings measure 177, 187, the tail 61, 69 mm. The length of the wing in skins from Guiana (Annai & Roraima) varies from 179 to 186, that of the tail from 60 to 65 mm. According to Léotaud, the species does not breed on the island, but Carr's specimens seem to indicate that such may be the case. Anyhow, further observations are required to establish its claims as a breeding bird.

115. Chaetura sp. (near *C. pelagica* (L.)).

Mr. E. André sent a female, collected March 29, 1903, near Valencia, of a species allied to *C. pelagica*, but evidently distinct. I refrain, however, for the present from naming it, since it may be a migrant from some more northern locality, in which case it would be difficult for future writers to identify the species.

It agrees with *C. pelagica* and *C. vauxi* in general form and size, but differs very conspicuously in having no trace of the whitish throat-patch, and the pileum and back of a much darker, metallic black colour.

116. Chaetura cinereiventris lawrencei Ridgw.

[*Chaetura cinereiventris* Sclater, *Cat. Amer. Birds* (1862) p. 283 (ex Wied & Burmeister. Bahia).]
Chaetura lawrencei Ridgway, *Proc. U.S. Nat. Mus.* xvi. (1894) p. 43 (Grenada, W. I.).
Acanthylis oxyura (nec Vieillot!) Léotaud, *Ois. Trinidad* p. 84.

1 ♀ ad., collected by Mr. Carr, 22. iii. 1894, without exact locality.

This specimen as well as a ♀ from Tobago are practically identical with a ♂ from Grenada. All have the upper tail-coverts blackish with a slight steel-green gloss, only a very narrow edge along the inner web being pale greyish; the lower surface is pure schistaceous, in strong contrast to the steel-black under tail-coverts. *C. c. guianensis* Hart., of which form there are three examples from British Guiana in the British Museum, differs in having the upper tail-coverts or at least their inner webs light schistaceous grey like the rump.

According to Léotaud, the species is sedentary on the island.

117. Chaetura brachyura (Jard.).

Acanthylis brachyura Jardine, *Ann. Mag. Nat. Hist.* xviii. (1846) p. 120 (Tobago).
Acanthylis poliourus (nec Temminck!) Léotaud, *Ois. Trinidad*, p. 86.
Chaetura poliura auct. (nec Temminck!).

1 ♂ ad. from Laventille, 19. v. 1903.—E. André coll.

It agrees perfectly with a typical specimen from Tobago. A series of twenty examples from Cayenne and Surinam is also absolutely identical.

This is the bird commonly called *C. poliura*, but Temminck's name certainly does not refer to the species in question. *Cypselus poliourus* Temminck * is exclusively based on D'Aubenton's plate 726, fig. 2. Both the figure and the description of the "Hirondelle brune acutipenne de la Louisiane" suit much better the common North American *Chaetura pelagica* (Linn.); and, moreover, in the letterpress Montbeillard expressly states: "L'individu dont il est ici question a été envoyé de la *Louisiane* par M. Lebeau." Thence there is not the slightest doubt that *Cypselus poliourus* must be regarded as a pure synonym of *C. pelagica*, which is the only species found in Louisiana. The next available name for the South American species is *A. brachyura*.

118. Panyptila cayennensis (Gm.).

Hirundo cayennensis Gmelin, *Syst. Nat.* 1. ii. (1788) p. 1024 [based on Daubenton, *Pl. enl.* 725 fig. 2.—*Cayenne*].

Although Chapman found the species common at La Brea, Mr. André's collectors never met with it.

119. Nyctibius griseus griseus (Gm.).

Caprimulgus griseus Gmelin, *Syst. Nat.* 1. ii. (1788) p. 1029 [ex Buffon.—"Cayenna").
Nyctibius jamaicensis griseus Hartert, Tierreich, *Lief.* 1. (1897) p. 16.

1 ♂ from Chaguanas, May 17, 1894, collected by Mr. Carr, received from Mr. E. André; and 1 ♀ from Savannah Grande, February 15, 1897, collected by Mr. Percy Rendall.

* *Tabl. méth. Pl. col.* p. 57.

♂ : Wing, 253 ; tail, 178 ; ♀ : wing, 240 ; tail, 167 mm.

One adult from Bahia measures : wing, 260 ; tail, 180. One from Cayenne : wing, 265 ; tail, 180 ; and another from British Guiana : wing, 259 ; tail, 185 mm.

Thus the Trinidad birds belong to the smaller southern form. Several skins from Jamaica are much larger : wing, 290—310 ; tail, 210—225 mm., and apparently separable as a subspecies. Its proper name is *N. griseus jamaicensis* (Gm.)

It is strange that all authors used to call the species *N. jamaicensis*, but as *C. griseus* stands first in Gmelin's work, it must be adopted as the specific name.

120. Lurocalis semitorquatus semitorquatus (Gm.).

Caprimulgus semitorquatus Gmelin, *Syst. Nat.* I. ii. (1788) p. 1031 [based on Daubenton, *Pl. enl.* 734.—"Cayenna"].

1 ♂ and 2 ♀♀ from Chaguanas, July, May and September, collected by Mr. Carr, received from Mr. E. André.

These specimens agree in coloration with a Cayenne skin, but have rather shorter tails—77 to 84 instead of 92 mm. There is, however, no difference in the length of the wing.

Skins from S.E. Brazil are much larger, and form an easily recognisable race, which has to be called *L. semitorquatus nattereri* (Temm.).

121. Nyctidromus albicollis albicollis (Gm.).

Caprimulgus albicollis Gmelin, *Syst. Nat.* I. ii. (1788) p. 1030 (ex Latham.—*Cayenne*).

3 ♂♂ and 1 ♀ from Laventille, November and April ; 1 ♀ from Chaguanas, January 29, 1897, collected by Mr. Carr. Agreeing in colour and size with others from Cayenne.

122. Steatornis caripensis Humb.

Steatornis caripensis Humboldt, *Bull. Soc. Philom. Paris* (3) xvii. (1810) p. 295 [Caripé, Venezuela].

3 ♂♂, 2 ♀♀ and 1 without indication of the sex from Aripo, 2400 ft., collected May 13—15, 1903. "Iris black."

They agree with some specimens from Venezuela (Mocquerys coll.).

123. Chloronerpes rubiginosus rubiginosus (Sw.).

Picus rubiginosus Swainson, *Zool. Illustr.* i. (1820–1) Pl. 14 ["Spanish Main."—We substitute Cumaná as typical locality].

12 ♂♂ and ♀♀, Caparo, April ; 1 ♂, Valencia, March ; 1 ♂, Seelet, March ; and ♂♀, Chaguanas, June.

Some of them are strikingly small, but others quite as large as birds from Cumaná. In the Andes of Mérida and near Bogotá a much larger form occurs, which, however, is hardly different in coloration from typical *rubiginosus*.

♂ ad., Los Palmales, Cumaná	.	Wing, 108	;	tail, 68	;	bill, 22	mm.
4 ♂ ad., Caparo, Trinidad	. .	„ 99—106	;	„ 60—67	;	„ 21—22½	„
♂ ad., Valencia, „	.	„ 108	;	„ 68	;	„ 22	„
♂ ad., Seelet, „	.	„ 104	;	„ 64	;	„ 21	„

Unfortunately, I have no specimens from Tobago to compare; from the remarks of Mr. Hargitt* and Count Dalmas† it would seem that they are different from those of Trinidad.

* *Cat. Birds Brit. Mus.*, xviii. p. 88. † *Mem. Soc. Zool. France*, xiii. (1900) p. 141.

124. Veniliornis kirkii kirkii (Malh.).

P. (*Chloropicus*) *kirkii* Malherbe, *Rev. Zool.* 1845. p. 400 (Tobago).

1 ♂, Chaguanas, May; 1 ♂ ad., Pointe Gourde, January; 1 ♂ ad., Aripo, 2000 ft., May; 1 ♂ juv., and 1 ♀ ad., Caparo, April; and 1 ♀ ad., Laventille, November.

This series agrees, in coloration and size, with a fair number of skins from Tobago, while 3 ♀♀ from the Venezuelan coast (Caripé and San Esteban) are so much smaller that I do not hesitate to separate them as

Veniliornis kirkii continentalis nov. subsp.

Type in Mus. Tring, ♀ ad., Caripé near Cumaná, Venezuela, January 1894. A. Mocquerys coll., No. 243: wing, 83; tail 60; bill, $18\frac{1}{3}$ mm.

Another ♀ from the same locality (Mus. Tring): wing, 82; tail, 56; bill, 19 mm.

1 ♀, S. Esteban, near Puerto Cabello (coll. Goering.—Mus. Brit.): wing, 81; tail, 56; bill, 18 mm.

Measurements of *V. kirkii kirkii* (Malh.).

7 ♂♂ ad.	from Tobago	. .	Wing, 89—90	;	tail, 58—63	;	bill, 22 —$23\frac{1}{2}$	mm.
3 ♀♀ ad.	„ „	. .	„ 88—89	;	„ 59—61	;	„ $21\frac{1}{2}$—23	„
4 ♂♂ ad.	„ Trinidad	. .	„ 91—93	;	„ 60—63	;	„ 23 —24	„
2 ♀♀ ad.	„ „	. .	„ 91	;	„ 60—61	;	„ $20\frac{1}{2}$—22	„

125. Celeus elegans léotaudi nom. nov.

One ♀ ad., Valencia, March; one ♀ ad., Caparo, May; ♀ juv. from Chaguanas, July. Besides these, we have another ♀ ad., collected February 11, 1897, at Savannah Grande, by Dr. Percy Rendall.

The Trinidad form has erroneously been called *C. elegans* by all previous authors. *Picus elegans* Müll., as well as *P. fuscofulvus* Bodd. and *P. cinnamomeus* Gm., are based on Daubenton's *Pl. enl.* 524, "Pic jaune tacheté de *Cayenne*."

Four adult specimens (3 ♂♂, 1 ♀), collected in Cayenne by Mr. G. K. Cherrie, are very different from our Trinidad series, being much larger and darker throughout, with the back distinctly spotted. In fact, they agree very closely with the characters of *C. reichenbachi* (as given in the *Cat. B.*) to which Mr. Hargitt actually referred several examples from Cayenne. It is the more surprising to find the name *elegans* used as the specific term of another species which does not at all occur in Cayenne!!

It seems also that two distinct forms have been united hitherto under the name *C. reichenbachi*, but to which of them the latter is strictly applicable, cannot be decided with certainty from Malherbe's description. The distinguishing characters of the three races are as follows:

(*a*) *Celeus elegans elegans* (P. L. S. Müll.).

Picus elegans P. L. S. Müller, *Natursyst. Suppl.* (1776) p. 92 [based on Daubenton, *Pl. enl.* 524—Cayenne].

Picus fusco fulvus Boddaert, *Tabl. Pl. enl.* (1783) p. 30 [based on the same].

Picus cinnamomeus Gmelin, *Syst. Nat.* I. i. (1788) p. 428 [based on the same].

Top of the head and crest ochraceous-buff (Ridgw. V. 10); back and upper wing-coverts deep chestnut brown (rather darker than Ridgw., IV, fig. 9), with

very distinct pale yellowish spots ; underparts deep chestnut brown, still darker than the back. Wing 161—170 ; tail 106—117, bill, 29—31 mm.

Hab. *Cayenne*, Approuague (Cherrie coll.).

(*b*) *Celeus elegans reichenbachi* (Malh.).

Celeopicus reichenbachi Malherbe, *Monogr. Picid.* ii. (1862) p. 28, tab. 56, figs. 4, 5 [" le Brésil, la Colombie." The latter locality is doubtless erroneous].

Top of the head and crest cinnamon ; back and upper wing-coverts deep cinnamon-rufous without any pale markings, only the greater series of the latter sometimes with obsolete pale cinnamon cross-lines ; underparts chestnut-rufous. Wing 160—168, tail. 102—115, bill 28—30 mm.

Hab. *Surinam*, Paramaribo (Chunkoo coll.—Mus. Tring) ; *British Guiana*, R. Carimang, Camacusa, Quonja, etc. (H. Whitely coll.) ; *N.E. Venezuela*, Guanoco in the Orinoco delta (André coll.—Mus. Tring).

Specimens from Guanoco and Surinam are exactly like those from British Guiana, except the head and crest being slightly paler, more ochraceous-cinnamon. Whether this form is really entitled to the name *C. reichenbachi*, can be ascertained only by an examination of Malherbe's types. I suspect that the birds obtained by Natterer at Barra do Rio Negro and on the Rio Branco will prove to belong to the present subspecies, but I have not yet had an opportunity to compare them.

(*c*) *Celeus elegans léotaudi* nom. nov.

Celeus elegans (nec Müller) Hargitt, *Cat. Birds Brit. Mus.* xviii. (1890) p. 426.

Top of the head and crest pale cinnamon ; back and upper wing-coverts bright cinnamon-rufous, the former as well as the smaller wing-coverts with indistinct pale yellowish spots ; underparts bright cinnamon-rufous. Wing 139—142, tail 86—98, bill 26—28 mm.

Type of subspecies : " ♀ " ad., Valencia, Trinidad, March 26, 1903. E. André coll.—Mus. Tring.

Hab. *Trinidad.*

This form is evidently confined to the island of Trinidad. The specimens collected by Goering at Guaramno in the province of N. Andalucia, Venezuela, and those obtained by Mr. André's collectors in the Orinoco delta, belong to the large race found in British Guiana and Surinam.

I take great pleasure in naming this bird after Dr. Léotaud in recognition of his valuable contributions towards our knowledge of the avifauna of Trinidad.

126. Ceophloeus lineatus (Linn.).

Picus lineatus Linnaeus, *Syst. Nat.* xii. 1. p. 174 (1766.—ex Brisson : Cayana).

One ♂ and 2 ♀♀ from Seelet, April 1903. In bad plumage, with the abdomen much stained. They are apparently not different from Cayenne specimens.

127. Momotus bahamensis bahamensis (Sw.).

Prionites bahamensis Swainson, *Anim. in Menag.* (1838) p. 332 [" Bahama Islands "—errore !].
Momotus swainsoni Sclater, *Cat. Amer. Birds* (1862) p. 261 [nom. emend. on grounds of purism].

3 ♀♀ from Caparo, April ; 1 ♂, Chaguaramas, January ; ♂ ♀, Pointe Gourde, January ; and 3 ♀♀, Chaguanas, May and June.

This series agrees in every way with 14 specimens from Tobago. All have the whole under surface from the chin to the under tail-coverts deep cinnamon-rufous.

M. b. bahamensis is evidently confined to the islands of Trinidad and Tobago. In the Venezuelan coast region (Cumaná and Puerto Cabello), *M. b. venezuelae* Sharpe * takes its place. It is distinguished by its much paler under-parts, only the breast and abdomen being light cinnamon-rufous, while the throat and foreneck are ochreous washed with greenish. There are five specimens of this form in the Tring Museum, collected by A. Mocquerys at El Guacharo (near Cumaná), S. Carlos and San Esteban (near Puerto Cabello).

M. b. subrufescens Scl. of northern Colombia (Santa Marta and Cartagena) is another very close ally, but differs from *M. b. venezuelae* by its generally more greenish under-parts and the colour of the nuchal cincture as pointed out by Mr. Sharpe.

128. Ceryle americana americana (Gm.).

Alcedo americana Gmelin, *Syst. Nat.* 1. i. (1788) p. 451 [based on Daubenton, *Pl. enl.* 591. fig. 1. 2.—*Cayenne*].

1 ♀, Pointe Gourde, January; 1 ♂, Chaguaramas, January; 2 ♂♂, Seelet, April; and 1 ♂, Caroni Swamp, March.

Identical with specimens from Tobago and Cayenne.

N.B. *Alcedo brasiliensis* Gm., quoted in the *Cat. Birds* as a synonym of *C. americana*, cannot in any way be referred to the present species. This will be easily conceived by a glance at the description.

129. Ceryle superciliosa superciliosa (Linn.).

Alcedo superciliosa Linnaeus, *Syst. Nat.* xii. 1. (1766) p. 179 [ex Edwards and Brisson.—"in America."—We substitute *Surinam* as typical locality].

♂♀ from Seelet, April; ♂♀, Caroni Swamp, March; and 1 ♀, Chaguaramas, January. Absolutely identical with specimens from British Guiana and Surinam. The species does not occur in Tobago nor on the "Côte de Paria."

130. Trogon curucui curucui Linn.

Trogon curucui Linnaeus, *Syst. Nat.* xii. 1. (1766) p. 167 [ex Brisson: ex Marcgrave.—"Brasilia" (exel. Syn. Hern.—Mexico)].
Trogon collaris auct.

One ♂ and two ♀♀ from Caparo, April. They agree with a series from Tobago, Cumaná, and Puerto Cabello. Typical Brazilian skins are not available for comparison.

The above is the proper name of *T. collaris* auct., as has been pointed out long ago by Cabanis and Heine.† By all recent writers, however, the term *T. curucui* has been ignored, apparently owing to the erroneous description of Linné, who calls the under-parts "fulvus," although they are exactly described as red both by Brisson and Marcgrave, upon whose accounts the name has been based. Brisson's description is so clear and full as to leave no doubt of his bird being the same as *T. collaris* auct.

In Western Ecuador an easily recognisable race, *T. curucui virginalis* Cab. & Heine, takes the place of the typical form (cfr. Salvadori & Festa, *Boll. Mus. Torino*, xv. No. 368 (1900) p. 17).

* *Momotus venezuelae* Sharpe, *Cat. Birds* xvii. (1892) p. 321 in text (S. Esteban and Puerto Cabello, Venezuela).

† *Museum Hein.* iv. (1863) p. 177.

131. Trogon viridis Linn.

Trogon viridis Linnaeus, *Syst. Nat.* xii. 1. (1766) p. 167 (ex Brisson: "*Cayania*")
Trogon cyanurus Finsch, *P. Z. S.* 1870. p. 559 (Cayenne!).

6 ♂♂ and 2 ♀♀, Caparo, April; 1 ♀, Valencia, March; ♂♀, Chaguanas, May
Not different from a series from Venezuela and Surinam.

132. Trogon violaceus violaceus Gm.

Trogon violaceus Gmelin, *Syst. Nat.* 1. i. (1788) p. 404 (ex Koelreuter, *Nov. Act. Petrop.* ii. p. 436. No. 7, tab. 16, fig. 8.—As terra typica accepted *Surinam*; cfr. *Nov. Zool.* ix. 1902. p. 106).
Trogon meridionalis Swainson, *Anim. in Menag.* (1838) p. 332 ("Bahamas."—Type in Mus. Cantabr. examined by me).

3 ♂♂ from Caparo, March and April, perfectly agreeing with specimens from British Guiana. We received also 1 ♀, collected by Dr. Percy Rendall, at Savannah Grande, Trinidad, February 14, 1897.

This species has not yet been recorded from the north coast of Venezuela, and I greatly doubt, therefore, whether the specimens from Remedios, W. Colombia, referred to *T. violaceus* by Grant,* are correctly determined.

In Upper Amazonia the typical form is represented by *T. violaceus ramonianus* Dev. & Des Murs.

133. Galbula ruficauda Cuv.

Galbula ruficauda Cuvier, *Règne Anim.* i. (1817) p. 420 (ex Levaillant, *Ois. Paradis.* ii. tab. L.—"La Guyane," sc. Cayenne).

3 ♂♂, 4 ♀♀, from Caparo, April and May; 1 ♀, Valencia, March; ♂♀, Seelet, March; ♂♀, Laventille, March and April; 1 ♂, Chaguaramas, January; and 1 ♀, Chaguanas, May. We have also a series of 14 specimens from Tobago which are perfectly similar. As a rule, the birds from the islands are rather darker on the abdomen than those found on the north coast of Venezuela (Cumaná, Valencia, Puerto Cabello) and in the Orinoco valley; but some from Puerto Cabello are not different, one being even more intensely coloured than the darkest from Trinidad. Hence I prefer, for the present at least, to include all under the name *ruficauda*. The above observations are based upon a splendid series of 64 adults in the Tring Museum.

134. Ramphastos vitellinus Licht.

Ramphastos vitellinus Lichtenstein, *Verz. Dubl.* (1823) p. 7 (Cayana).

1 ♀ from Valencia, March; 1 ♂, Chaguanas, March; 2 ♂♂ from Caparo, April. Besides these specimens we have 1 ♂ from Savannah Grande, February, collected by Dr. Percy Rendall.

They agree in size and colour with a good series from Surinam, Guanoco (Orinoco delta), and British Guiana. This species does not occur on the "Côte de Paria," nor on the island of Tobago.

135. Crotophaga major Gm.

Crotophaga major Gmelin, *Syst. Nat.* 1. i. (1788) p. 363 (ex Brisson and Buffon.—Cayenne).

1 ♂ from Laventille, March; and another ♂ from Caroni Swamp, February.

* *Cat. Birds* xvii. (1892) p. 468.

136. **Crotophaga ani** Linn.

Crotophaga ani Linnaeus, *Syst. Nat.* x. (1758) p. 105 (ex Brown & Sloane, Jamaica; and Maregrave, Eastern Brazil).

3 ♀♀ from Caparo, April; 1 ♀, Seelet, March; and 1 ♀, Chaguaramas, June.

137. **Tapera naevia** (Linn.).

Cuculus naevius Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 170 (ex Brisson.—Cayenne).

8 ♂♂♀♀ from Caparo, April and May; 1 immature bird from Laventille, November; 1 ♂ from Chaguanas, May; and 1 pullus from Valencia, March.

138. **Piaya rutila** (Ill.).

Cuculus rutilus Illiger, *Abhandl. Akad. Berlin*, 1812. p. 224 (ex Gmelin, *C. cayanus* var. β (and γ errore!): (ex Brisson, Cayenne).
Piaya minuta auct.

1 ♂ from Caparo, April 14, 1902, agreeing with a series from Surinam, but rather darker rufous on throat and foreneck.

139. **Piaya cayana insulana** n. subsp.

[*Cuculus cayanus* Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 170 (ex Brisson—Cayenne).]

Six adults of both sexes from Caparo, April; 2 ♂♂ from Chaguaramas, January; 1 ♂, Chaguanas, May; ♂♀ from Valencia, March. In addition to these we have some specimens from Savannah Grande, February, collected by Dr. Percy Rendall.

Similar to *P. cayana guianensis* (Cab. & Heine), but differs by its much lighter and brighter cinnamon-rufous (instead of dark rufous chestnut) upper parts, and in having the outer web of the second and third rectrix entirely rufous (except a distinct blackish subapical band). The lower parts are just of the same pale ashy grey as in *P. c. guianensis*, the under tail-coverts being only a shade darker than the abdomen.

Type in Tring Museum: "♂" ad. Chaguaramas, Trinidad, January 11, 1903: E. André coll. Wing, 135; tail, 237; bill, 28½ mm.

This interesting race is evidently confined to the island of Trinidad. A large series from northern Venezuela (Cumaná and Duaca) is easily distinguished by the still paler cinnamon-rufous upper parts and by having the outermost tail-feather on both webs rufous (except the blackish subterminal band); the rufous colour on the two next rectrices is also more or less extended over the inner web, which is never the case in the Trinidad form.

With about one hundred adults from south of the isthmus of Panama before me, I am able to distinguish the following races occurring north of the Amazon:

(*a*) *Piaya cayana cayana* (Linn.).

Cuculus cayanus Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 170 (ex Brisson.—Cayenne).

Hab.: *Cayenne* * and *Lower Amazonia*: vicinity of Pará† (Steere, Robert coll.).

Under-surface of the tail-feathers dull blackish, without any rufous tinge. Upper

* Three specimens. † Four specimens.

parts dull cinnamon-rufous, breast and abdomen very pale whitish grey, under tail-coverts pale ashy greyish.

(*b*) *Piaya cayana guianensis* (Cab. & Heine).

Pyrrhococcyx guianensis Cabanis & Heine, *Mus. Hein.* iv. (1862) p. 85 [Guiana].

Hab. *British Guiana:* Quonja,* Annai*; *Surinam:* Paramaribo,† Kwata †; *Orinoco:* Altagracia,† Caicara,‡ Ciudad Bolivar §; *Caura R.:* Snapure,‡ La Pricion.‡

Like *P. c. cayana*, with the tail-feathers underneath uniformly blackish, but the breast and abdomen are distinctly darker ashy grey and the under tail-coverts more sooty greyish. Upper parts distinctly darker, rufous chestnut.

(*c*) *Piaya cayana columbiana* (Cab.).

Pyrrhococcyx columbianus Cabanis, *Journ. f. Ornith.* 1862. p. 170 (Cartagena, and Aragua, Venezuela).

Hab. *North Venezuela:* from Cumaná‖ to Duaca*; and *North Colombia:* Cartagena.*

Readily known from (*a*) and (*b*) by its much lighter, bright cinnamon-rufous upper parts, and by having the three outer tail-feathers (except the blackish subterminal bar) mostly rufous underneath. Under parts just as in *P. c. guianensis*.

One adult from Duaca is exactly similar to those from Cumaná, the crissum being pale grey, not black as in *P. c. nigricrissa*, which occurs farther west, near Mérida.

(*d*) *Piaya cayana insulana* Hellm.

Hab.: *Trinidad* (for characters see above).

(*e*) *Piaya cayana nigricrissa* Scl.

Piaya nigricrissa Sclater, *P. Z. S.* 1860, p. 285 (Babahoyo, W. Ecuador).

Easily known from all the foregoing races by having the crissum blackish, in marked contrast to the ashy grey abdomen.

Hab.: *Colombia:* Bogotá coll.¶; *Venezuela:* Mérida¶; *Ecuador* on both sides of the Andes**; *North Peru:* Guayabamba,† Loreto,* Ucayali.*

140. **Amazona amazonica** (Linn.).

Psittacus amazonicus Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 147 (Surinam—cfr. *Nov. Zool.* ix. (1902) p. 110).

One pair from Seelet, April, and one ♂ from Chaguanas, December.

They agree with a large series from Surinam and Guanoco (Orinoco delta). The species does not occur on the Paria peninsula, and reached Trinidad evidently from British Guiana through the Orinoco delta.

141. **Pionus menstruus** (Linn.).

Psittacus menstruus Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 148 (ex Brisson—Cayenne).

Mr. André did not send us this species, but Chapman says it was "common in pairs or small flocks of four to seven birds."

* One specimen. ‡ Three specimens. ‖ Nine specimens.
† Two specimens. § Four specimens. ¶ Six specimens.
** Sixteen from W. Ecuador, four from E. Ecuador.

142. **Urochroma batavica** (Bodd.).

Psittaca Batavica Boddaert, *Tabl. Pl. enl.* (1783) p. 49 [based on Daubenton, *Pl. enl.* 791, fig. 1. "Batavia"—errore! We substitute *Surinam* as typical locality].
Urochroma cingulata auct.

2 ♂♂, 4 ♀♀ from Cangregal, May; and 2 ♀♀ from Chaguanas, September.

This series agrees perfectly with two specimens collected in the state of Cumaná by A. Mocquerys. Several skins from the interior of British Guiana differ slightly in having the feathers of the nape more distinctly margined with blackish, but this is not likely to be a constant character.

143. **Pulsatrix perspicillata** (Lath.).

Strix perspicillata Latham, *Ind. Orn.* i. (1790) p. 21 (Cayana).

♂ ad., ♀ ad. and ♂ juv. from Laventille, October and July.

The adults are much paler—buff (not ochraceous) on the belly—than a series from Surinam, British Guiana and North Ecuador. A larger series from Trinidad is required to confirm the constancy of this difference.

144. **Ciccaba virgata** (Cass.).

Syrnium virgatum Cassin, *Proc. Acad. Philad.* iv. (1850) p. 124 ("South America").

1 ♂ fere ad. from Caparo, May; 1 ♂ juv., and one young bird, not sexed, from Chaguanas, October and June.

The first specimen, being nearly adult, agrees best with another from Guatemala, while an adult male from Cumaná is much more suffused with ochraceous below.

145. **Glaucidium brasilianum phalaenoides** (Daud.).

[*Strix brasiliana* Gmelin, *Syst. Nat.* 1. i. (1788) p. 289 (ex Brisson; ex Marcgrave. Eastern Brazil—cfr. Berlepsch, *Bull. Brit. Orn. Cl.* xii. 1901. p. 8 ff).]
Strix phalaenoides Daudin, *Traité d'Orn.* ii. (1800) p. 206 (Trinidad).

4 ♂♂, Caparo, March and April; 6 ♂♂, 2 ♀♀, Laventille, December and March; 2 ♂♂, Valencia, March; 1 ♂, Pointe Gourde, January; 1 ♂, Chaguaramas, January; 1 ♀, Cangregal, May; ♂♀, Chaguanas, May and June.

In the series both the rufous and the brown phases are represented. They agree with specimens from British Guiana in size and coloration. While the fox-red birds from Cumaná are exactly like those from Trinidad, the brown phase is rather more greyish on the upper surface; but some specimens are hardly distinguishable, and I believe that the birds from Venezuela and British Guiana cannot be separated from *G. b. phalaenoides*, a view already expressed by Berlepsch and Hartert (*Nov. Zool.* ix. 1902. p. 116).

146. **Pisorhina choliba crucigera** (Spix).

[*Strix choliba* Vieillot, *Nouv. Dict.* vii. (1817) p. 39 (ex Azara No. 48.—Paraguay).]
Strix crucigera Spix, *Av. Bras.* i. (1824) p. 22, tab. ix. ("juxta flumen Amazonum").

3 ♂♂, 2 ♀♀, 2 young birds from Laventille, April, May and December; 1 ♂ from Caparo, April; and 1 ♂, Chaguanas, May.

The specimens agree with a good series from Mérida and the Orinoco valley (Ciudad Bolivar, Quiribana de Caicara and Perico), which I had compared with the

type of *Strix crucigera* Spix. Like *P. c. decussata* (Lcht.), this form has no fox-red phase, but differs by its slightly smaller size, paler upper parts in all plumages, and less buffy mixture on the lower surface.

147. Buteo albicaudatus albicaudatus (Vieill.).

Buteo albicaudatus Vieillot, *Nouv. Dict.* iv. (1816) p. 477 (ex Azara—Paraguay).

One ♂ from Chaguanas, August; and one pair from the outskirts of Port of Spain, March.

None of the three specimens is quite adult, though in the two males the whole breast and abdomen are mainly white, only the throat being blackish. In all three examples there is a large rufous patch on the shoulders.

So far as I am aware, this is the first record of the species for Trinidad. Léotaud clearly describes *Buteo abbreviatus* Cab. s. nom. *B. zonocercus*, but Mr. André has not sent us the latter species.

148. Urubitinga albicollis (Lath.).

Falco albicollis Latham, *Ind. Orn.* i. (1790) p. 36 ("Cayana").

A single ♀ adult from Chaguanas, April, exactly agreeing with other specimens from Cumaná and N.E. Peru.

149. Elanoides furcatus (Linn.).

Falco furcatus Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 129 (ex Catesby—Carolina).

One adult, not sexed, from Chaguanas, July.

150. Harpagus bidentatus (Lath.).

Falco bidentatus Latham, *Ind. Orn.* i. (1790) p. 38 ("Cayana").

Two immature birds, one marked ♂, the other not sexed, from Chaguanas, April and May.

151. Ictinia plumbea (Gm.).

Falco plumbeus Gmelin, *Syst. Nat.* 1. i. (1788) p. 283 (ex Latham—Cayenne).

One ♂ and one adult not sexed, from Chaguanas, April and May; and one ♂ from Seelet, April.

152. Falco peregrinus anatum Bp.

[*Falco peregrinus* Tunstall, *Orn. Britann.* (1771) p. 1. (ex Brit. Zool.).]
Falco anatum Bonaparte, *Comp. List Birds Eur. and N. Amer.* p. 4 (1838.—ex Audubon, pl. 16. "Northern parts," sc. of North America).

One ♀ ad. from Seelet, April 5, 1905.

153. Columba speciosa Gm.

Columba speciosa Gmelin, *Syst. Nat.* 1. ii. (1788) p. 783 (ex Buffon—Cayenne).

One ♂ ad. from Aripo, 2000 ft., May, and a female, collected by Mr. Carr near Chaguanas, November 15, 1894.

Identical with examples from British Guiana and Cayenne. The species has as yet not been found on the opposite Venezuelan coast, and might be looked upon as an intruder from Guiana.

154. Columba rufina rufina Temm. & Knip.

Columba rufina Temminck & Knip, *Pigeons* i. fam. sec. p. 59. tab. 24 [1808–11 : "La Guiane française"].

One ♂ and two ♀♀ from Seelet, April. The former has the nape pure metallic purple, instead of bronze green with golden reflections, but there is sometimes a slight purple admixture to be seen in specimens from British Guiana. In northern birds the tail is always uniformly pale brownish grey, while those from South Brazil have the basal portion blackish, in strong contrast to the brownish grey apical band. The southern form appears to be entitled to the name *C. rufina sylvestris* Vieill.,* but I have not yet been able to compare typical Paraguay skins.

C. r. rufina is not found on the north coast of Venezuela, but it occurs also on the island of Tobago, whence Mr. André sent us a fair series.

155. Columbigallina† rufipennis (Bp.).

Talpacotia rufipennis Bonaparte, *Consp. Av.* ii. (1854) p. 79 (Carthagena).

Seven ♂♂♀♀ from Caparo, April, and a single ♀ from Seelet, March.

They agree with a large series from Cumaná, Tobago, and Bogotá. From Surinam the Tring Museum has lately received *C. talpacoti* (Temm. & Knip).

In the *Cat. Birds* xxi. p. 487, the specific name *rufipennis* is wrongly attributed to G. R. Gray, who never described the species. The first description was published by Bonaparte; consequently, spec. v″, w″ of the Brit. Museum cannot be the types!

156. Claravis pretiosa (Ferrari-Perez).

Peristera pretiosa Ferrari-Perez, *Proc. U.S. Mus.* ix. 1886 (1887) p. 175 (ex Jalapa, Mexico).

One ♂ ad. each from Chaguaramas, January, and Laventille, April. They agree perfectly with a large series from Cumaná and Brazil. I am unable to separate the South American form from typical *C. pretiosa* ex Mexico.

157. Leptotila verreauxi Bp.

Leptoptila verreauxi Bonaparte, *Consp. Av.* ii. (1854) p. 73 ("Nova Granata").
Leptotila insularis Richmond, *Proc. U.S. Mus.* xviii. 1895 (1896) p. 659 (Margarita Id.).

Two ♀♀ from Laventille, March, and one ♀ each from Pointe Gourde, January, and Seelet, April.

They agree in colour and measurements with a series from Tobago, Cumaná, Margarita Island (*L. insularis*) and the Orinoco valley. The differences between Colombian and Venezuelan specimens, alluded to by Berlepsch & Hartert (*Nov. Zool.* ix. 1902. p. 118) do not appear to be constant; yet a larger series from Bogotá may prove them to be separable. Anyhow, the birds from Trinidad, Tobago and Venezuela are absolutely identical with the one from Margarita Island.

* *Columba sylvestris* Vieillot, *Nouv. Dict.* xxvi. (1818) p. 366 (ex Azara—Paraguay).
† *Columbigallina* Boie, *Isis* 1826. p. 977 (Species unica : *C. passerina* Linn.).

158. **Leptotila rufaxilla** (Rich. & Bern.).

Columba rufaxilla Richard & Bernard, *Act. Soc. Hist. Nat. Paris* i. (1792) p. 118 (Cayenne).

♂ ♀ ♀, Caparo, April ; ♂ ♀, Chaguanas, May ; ♀, Valencia, March.

Most of these specimens are rather darker, more rufous on foreneck and breast than others from the mainland of Venezuela, but the difference is not quite constant.

159. **Geotrygon** sp.

Peristera frenata (nec Tschudi !) Jardine, *Ann. Mag. Nat. Hist.* xx. (1847) p. 374 (Tobago).
P. linearis (nec Prévost & Knip !) Léotaud, *Ois. Trinidad*, p. 373 (Trinidad).

There can be scarcely any doubt that a species of *Geotrygon* inhabits the mountainous parts of Trinidad, although it has not been collected there of late years. Kirk sent it from Tobago, but, unfortunately, his specimens seem to have been lost—at least they are not in the British nor in the Tring Museum. As the nearest allies occur in the Andes of Mérida (*G. linearis venezuelensis* Salvad.) and Colombia (*G. l. linearis*), the birds inhabiting Trinidad and Tobago form most likely a different species or subspecies.

160. **Pipile pipile** (Jacqu.).

Crax pipile Jacquin, *Beytr. Gesch. Vögel* (1784) p. 26. tab. II. (1784 : "Am Orenokoflusse bei Kumana") undè :
Pipile Jacquini Reichenbach, *Columb.* p. 154.
Penelope cumanensis (nec Jacquin !) Léotaud, *Ois. Trinidad* (1866) p. 383 (Trinidad).
Pipile pipile Chapman, *Bull. Amer. Mus.* vi. (1894) p. 74 (Trinidad) ; Hellmayr, *Bull. Brit. Orn. Cl.* xiv. No. 105 (March 1904) p. 59 (Trinidad).

One ♀, killed at Caparo, Trinidad, April 19, 1902. "Iris brown, bill black, feet red." Wing, 345 ; tail, 300 ; bill, 33½ mm.

This bird is, no doubt, of the same species as those figured by Jacquin and described by Léotaud and Chapman. As I have shown in a note, published in the *Bull. Brit. Cl.* xiv. p. 59, it is quite distinct from *P. cumanensis*, with which it has generally been confounded. In fact, it is more nearly related to *P. cujubi* (Pelz.), but there are some differences which serve to distinguish it at a glance. The feathers of the pileum are mainly blackish brown with only narrow white edges laterally, which in *P. cujubi* are much broader ; the middle upper wing-coverts are pure white except the extreme base and a large blackish brown tip, while in *P. cujubi* they are blackish brown with a short white stripe on each margin ; the white on the greater series, too, is much more extended in the Trinidad bird, occupying nearly the whole outer web except the dark-coloured tip and reaching almost to the shaft. In *P. cujubi*, however, there is only a narrow white margin along the second third of the outer web. In the purplish gloss of the plumage both species agree, as they do also in the amount of the naked skin on the sides of the head and on the throat. In both there are but very faint indications of white edgings on some of the feathers on the foreneck. I may add that the bare skin of the throat in the Trinidad specimen looks uniform dark grey, while in *P. cujubi* the lower part is decidedly reddish flesh-coloured. A better series of both species is required to confirm the constancy of this character or otherwise.

P. jacutinga (Spix) is quite distinct from *P. pipile* and *P. cujubi*, having the chin and anterior part of the throat as well as the sides of the head densely covered with deep black feathers. Moreover, the forehead is broadly black, and the feathers of the pileum have only hair-like blackish shaft-lines.

The four known species of *Pipile* may be distinguished by the following key.

A. Sides of the head (except a narrow rim round the eye) as well as chin and upper part of the throat thickly covered with deep black feathers. Forehead and superciliaries deep black. Pileum and crest with narrow, hair-like blackish shaft-lines. Plumage dark brown, glossed with purple. Foreneck and breast strongly edged with white. . . . *P. jacutinga* (Spix).

B. Lores, superciliary—and eye-region, cheeks and the whole throat naked, only a broad malar stripe being feathered. Forehead never black.

a. Plumage glossed with green. Pileum and crest uniform buffy white, or with hair-like blackish shaft-lines . . . *P. cumanensis* (Jacqu.).

b. Plumage glossed with purple. Pileum and crest with broad blackish brown stripes.

*b*¹. White margins of the crest-feathers broader. Median series of upper wing-coverts purplish brown, with a white margin on each side ; greater series with a narrow white margin along the second third of the outer web. . . . . *P. cujubi* (Pelz.).

*b*². Crest-feathers blackish brown with only very narrow white edges. Median series of upper wing-coverts pure white, except the extreme base and a distinct blackish brown tip ; greater series on the outer webs white to the shaft except the tip.

P. pipile (Jacqu.).

161. **Crypturus soui** (Herm.) (subsp.?)

Tinamus soui Hermann, *Tab. Affr. Anim.* 1783. pp. 164, 235 (ex Daubenton, *Pl. enl.* 829.—*Cayenne*). *Crypturus pileatus* auct.

One ♀ ad. and ♂ juv. from Caparo, April ; two ♀♀ ad. and one ♂ juv. from Chaguanas, June and January.

The adult birds agree best with others from the Orinoco delta (Guanoco), while those from Cumaná and British Guiana, as a rule, are rather lighter and brighter beneath. A large series from different parts of its range is required for defining the various geographical races into which *C. soui* is doubtless separable.

162. **Eudocimus ruber** (Linn.).

Tantalus ruber Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 241 (syn. part.) ["in America" : ex Brisson Cayenne) and Catesby (Bahamas).—We accept Cayenne as typical locality].

A single ♀ adult in red plumage, from Caroni Swamp, October.

163. **Ajaja ajaja** (Linn.).

Platalea Ajaja Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 231 [ex Brisson (Cayenne), etc.].

A single young ♀ from the mouth of the Caroni River, July.

164. **Herodias egretta** (Gm.).

Ardea Egretta Gmelin, *Syst. Nat.* 1. ii. (1788) p. 629 ["in insula S. Dominici, insulis Falkland et America australi ad Louisianam."—We take *Cayenne* (ex Buffon, Gmelin's first and principal source) as the typical locality].

Three ♂ ad. from Caroni River, March and August. Identical with skins from Surinam.

165. Florida caerulea (Linn.).

Ardea caerulea Linnaeus, *Syst. Nat.* x. 1 (1758) p. 143 ["in America septentrionali."—We accept as the typical habitat *Carolina* ex Catesby].

One ♀ ad. in the slaty bluish, and ♂♀ in the white plumage, all from Caroni Swamp, March. We have also a good series of both phases from Tobago.

166. Hydranassa tricolor rufimentum n. subsp.

Agrees with *H. tricolor tricolor* (P. L. S. Müll.) in size, but differs at a glance by its much darker, blackish instead of slate-grey colour of the upper parts and neck, and by having the chin like the whole middle line of the throat chestnut, while the chin is always white in *H. t. tricolor* and *H. t. ruficollis*. The chestnut colour on the throat is also decidedly darker than in the two last-named subspecies.

Type in Tring Museum: "♂" perad. Caroni Swamp, Trinidad, March 22, 1902, E. André coll.—Wing, 214; tail, 73; bill, 85 mm.

Unfortunately Mr. André sent only one male of this interesting new form.

It differs, however, so strikingly from ten examples from Cayenne and Surinam (true *H. t. tricolor*), and from a good many specimens of *H. t. ruficollis* that I feel quite confident as to its distinctness, and have no hesitation in describing it as a different race. In both of its allies, the chin and more or less also the anterior portion of the throat are white. The upper parts and the foreneck are always bluish or slaty grey, while they are deep blackish in the Trinidad form, and the elongated feathers on the rump are decidedly darker, more umber-brown, in the latter.

We have thus to distinguish the following subspecies:

(*a*) *Hydranassa tricolor tricolor* (P. L. S. Müll.).

Ardea tricolor P. L. S. Müller, *Naturayst. Suppl.* p. 111 (1776: ex Daubenton, *Pl. enl.* 350.—Cayenne).

Ardea leucogaster Boddaert, *Tabl. Pl. enl.* p. 24 (1783: based on the same).

Hab. *Cayenne*: Roche Marie, etc. (Cherrie coll.); *Surinam*: near Paramaribo (Penard coll.—Mus. Tring); *N.E. Brazil*: Cajútuba, near Pará (Natterer coll.).

2 ♂ ad., Surinam	Wing, 210;	tail, 65;	bill, 82, 85 mm.
8 from Cayenne	„ 204—218;	„ 68—78;	„ 78—86 „

(*b*) *Hydranassa tricolor rufimentum* Hellm.

Hab. *Trinidad*.

(*c*) *H. tricolor ruficollis* (Gosse).

Egretta ruficollis Gosse, *Birds Jamaica*, p. 338, tab. 93 (1847—Jamaica).

Hab. Warmer portions of *Eastern North America*; south through *Central America* to *Panama* and *N.W. Ecuador*; and the *West Indies* south to Aruba, off the north coast of Venezuela.

2 ad. (♂♀) from Georgia	Wing, 263, 249;	tail, 92, 86;	bill, 102½, 99 mm.
1 ♂ ad., Jamaica	„ 260;	„ 86;	„ 97 mm.
1 ♀ ad., Isle of Pine, Cuba	„ 245;	„ 84;	„ 96 „
♂ ad., Mexico	„ 260;	„ 92;	„ 100 „
2 (♂♀), Andros Isl., Bahamas	„ 255, 238;	„ 88, 82;	„ 99, 95 mm.
1 ♂ jr., Panama (Harris coll.)	„ 245;	„ 84;	„ 101 mm.
1 ad., Vaqueria, N.W. Ecuador	„ 245;	„ 81;	„ 97½ „
1 ♀ ad., Aruba (Hartert coll.)	„ 236;	„ 82;	„ 93 „

167. **Nyctanassa violacea violacea** (Linn.).

Ardea violacea Linnaeus, *Syst. Nat.* x. p. 143 [1758 : "in America septentrionali."—Carolina (ex Catesby) as typical locality accepted].

Three ♂♀♀ and one young bird from Caroni Swamp, March, and Pointe Gourde, January. We have also a fair series from Tobago.

168. **Agamia agami** (Gm.).

Ardea Agami Gmelin, *Syst. Nat.* 1. ii. (1788) p. 629 [ex Buffon and Daubenton.—Cayenne].

Two ♂ ad. from Caroni Swamp, August and September. They are rather larger than others from Guiana and the Caura River, Venezuela, but not otherwise different.

169. **Nycticorox nycticorax naevius** (Bodd.).

[*Ardea Nycticorax* Linnaeus, *Syst. Nat.* x. p. 142 (1758 : "in Europa australi").]
Ardea naevia Boddaert, *Tabl. Pl. enl.* p. 56 (1783 : ex Daubenton, *Pl. enl.* 939.—*Cayenne*).

One ♀ ad. and one young bird from Caroni Swamp, March.

170. **Cancroma cochlearia** Linn.

Cancroma Cochlearia Linnaeus, *Syst. Nat.* xii. 1. p. 233 (1766 : ex Brisson.—Cayana).

2 ♂ ad., 1 ♂ juv. and 1 ♀ juv. from Caroni Swamp, March. They are apparently not different from Cayenne skins.

171. **Butorides virescens** (Linn.) an subsp. ?

Ardea virescens Linnaeus, *Syst. Nat.* x. (1758) p. 141 [ex Sloane (Jamaica) and Catesby (Carolina)].

Three immature birds from Caroni, March, and Chaguaramas, January.

As far as I know, this species has not been taken before on the island of Trinidad ; but since Mr. André sent only young birds, I cannot determine to which of the numerous subspecies they should be referred. I may remark, however, that the Tring Museum received from Tobago a good series of what appears to be true *B. virescens*.

172. **Ardetta erythromelas** (Vieill.).

Ardea erythromelas (err. typ.) Vieillot, *Nouv. Dict.* xiv. (1817) p. 422 (ex Azara No. 360.—Paraguay).

1 ♀ ad., ♂ juv., and a young bird not sexed, all from Caroni Swamp, March and April. The adult specimen agrees well with others from S. Paulo and Surinam.

173. **Botaurus pinnatus** (Wagl.).

Ardea pinnatus Wagler, *Isis* 1829. p. 662 ("in Brasiliae provincia *Bahia*").

A single adult ♂ from Caroni Swamp, killed March 14, 1902. "Iris golden yellow." It agrees with another adult ♂ from Annai, British Guiana.

174. **Plotus anhinga** Linn.

Plotus anhinga Linnaeus, *Syst. Nat.* xii. 1. p. 218 (1766 : ex Maregrave, Brazil ; and Brisson Cayenne).

A single ♂ from Caroni Swamp, February.

175. **Podilymbus podiceps** (Linn.).

Colymbus Podiceps Linnaeus, *Syst. Nat.* x. p. 136 (1758 : ex Catesby.—*Carolina*).

A single ♀ from Caroni Swamp, February.

176. **Rallus longirostris longirostris** (Bodd.).

Rallus longirostris Boddaert, *Tabl. Pl. enl.* p. 52 (1783 : ex Daubenton, *Pl. enl.* 849—Cayenne).

6 ♂♂ ♀♀, from Caroni and Caroni Swamp, March and April.

Unfortunately there are no Cayenne skins available for comparison.

Several specimens from Western Ecuador, collected in February and September, differ at a glance by their much paler, pure olive-grey upper parts, without any trace of the brownish tint to be seen in the Trinidad series. They agree well with Taczanowski's description of *R. cypereti*,* which therefore has to stand as a distinct subspecies. I am not so confident as to the distinctness of *R. l. crassirostris* Lawr. of Eastern Brazil, for one specimen from S. Paulo does not show the characters assigned to this form by Mr. Sharpe, but a good series may prove it to be another recognisable race. The distribution of the three forms, then, would be as follows :

1. *R. longirostris longirostris* (Bodd.).

Cayenne, British Guiana, Trinidad.

2. *R. longirostris crassirostris* Lawr.

Eastern Brazil : Bahia, Pernambuco, S. Paulo : Iguapé (spec. in Mus. Tring).

3. *R. longirostris cypereti* Tacz.

West Ecuador : Vacqueria (Mus. Tring) ; N.W. Peru : Tumbez (Stolzmann).

177. **Limnopardalus maculatus** (Bodd.).

Rallus maculatus Boddaert, *Tabl. Pl. enl.* p. 48 (1783 : ex Daubenton, *Pl. enl.* 775—Cayenne).

1 ♂ from Caroni, April, and another ♂ from Caroni Swamp, March.

Identical with specimens from Surinam and British Guiana.

178. **Aramides axillaris** Lawr.

Aramides axillaris Lawrence, *Proc. Philad. Acad.* 1863. p. 107 (Baranquilla, North Colombia).

1 ♂, 2 ♀♀, from Caroni, May ; and 1 ♀ juv. from Chaguaramas, January.

The adults agree with another old male from Mérida, Venezuela, in every respect; but I have not been able to compare topotypical skins from Northern Colombia.

The sexes of this species do not differ in size or in colour.

179. **Aramides cajanea** (P. L. S. Müll.).

Fulica cajanea P. L. S. Müller, *Naturvst. Suppl.* (1776) p. 119 (ex Daubenton, *Pl. enl.* 352—Cayenne).

1 ♂ ad. from Caroni Swamp, March. In addition to it, the Tring Museum possesses an adult ♀ from Savannah Grande, collected in February by Dr. Percy Rendall.

These specimens agree very well with others from Surinam and British Guiana.

* *P. Z. S.* 1877, p. 747 (Tumbez, N.W. Peru).

180. Gallinula galeata galeata (Licht.).

Crex galeata Lichtenstein, *Verz. Dubl.* p. 80 (1823—San Paulo).

One ♂ ad. from Caroni, April; and another ♂ from Caroni Swamp, March.

They agree in colour and dimensions with several examples from South Brazil. *G. g. garmani* Allen, of Lake Titicaca, Peru, is easily known by its much larger size, stouter and larger bill, and generally blacker plumage.

181. Porphyriola martinica (Linn.).

Fulica martinica Linnaeus, *Syst. Nat.* xii. 1. (1766), p. 259 ("in Martinicae inundatis").

1 ♂ ad. and 1 ♀ juv. from Caroni, March and April.

182. Parra jacana jacana (Linn.).

Parra Jacana Linnaeus, *Syst. Nat.* xii. 1. (1766) p. 259 [(excl. quot. Hernandez) ex Marcgrave and Edwards.—*Surinam*: ex Edwards].

One ♂ and two young birds from Caroni Swamp, April, and a single ♀ ad. from Seelet, April, agreeing best with specimens from Valencia, Venezuela. Typical skins from Surinam are perhaps rather lighter on the back, but are otherwise not different. *P. j. melanopygia* Scl. and *P. j. variabilis* Linn. are undoubtedly but geographical representatives of *P. j. jacana*, and thus more properly designated by trinomials. Strange to say, one of them (*variabilis*) has been made the type of a separate genus, *Asarcia* Sharpe!! which, we trust, will only be recognised by those affected with *furor genericus*.

183. Arenaria interpres (Linn.).

Tringa Interpres Linnaeus, *Syst. Nat.* x. p. 148 (1758: "in Europa et America septentrionali."—We accept *Sweden* as typical locality: ex *Fauna suec.* 154).

1 ♀ from Seelet, April.

184. Ochthodromus wilsonia rufinucha (Ridgw.).

[*Charadrius wilsonia* Ord: in Wilson, *Amer. Orn.* ix. (1814), p. 77. tab. 73, fig. 5 ("Cape Island New Jersey").]

Aegialitis Wilsonius var. *rufinucha* Ridgway, *Amer. Nat.* viii. (1874), p. 109 (Jamaica).

4 ♂ ad. and 2 ♀ ♀ from Seelet, April.

All the males have a **broad black jugular band,** slightly mixed with pale rufous, and a black patch on the crown just behind the white forehead. The sides of the head are bright rusty. In the females the blackish crown patch is wanting, and the jugular cross-band is bright rusty like the cheeks and ear-coverts.

This bird is by no means only a winter visitor to the tropics, as Mr. Sharpe seems to think, for Mr. Hartert found it breeding in numbers on the islands Aruba and Bonaire, Dutch West Indies.

185. Aegialitis semipalmatus (Bp.).

Charadrius semipalmatus Bonaparte, "Obs. Wilson, 1825, No. 219."*

3 ♂♂, 1 ♀, from Seelet, April.

* I have not been able to verify the above quotation.

186. Symphemia semipalmata (Gm.).

Scolopax semipalmata Gmelin, *Syst. Nat.* 1. ii. p. 659 (1788—"in Noveboraco").

Two ♀♀ from Seelet, April.

187. Totanus flavipes (Gm.).

Scolopax flavipes Gmelin, *Syst. Nat.* 1. ii. p. 659 (1788: "in Noveboraco").

1 ♂ and 5 ♀♀ from Caroni Swamp, March.

188. Totanus macularius (Linn.).

Tringa macularia Linnaeus, *Syst. Nat.* xii. 1. p. 249 (1766: ex Edwards—Europa (errore!), "et America septentrionali," sc. Pennsylvania (fide Edwards).

A small series of both sexes from Pointe Gourde, January; Seelet, April; Caroni, March; and Chaguaramas, January.

189. Bartramia longicauda (Bechst.).

Tringa longicauda Bechstein, *Lathams Übers. Vögel* iv. (1811), p. 453 (Nordamerika).

A single ♂ from Seelet, April.

190. Ereunetes pusillus pusillus (Linn.).

Tringa pusilla Linnaeus, *Syst. Nat.* xii. 1. p. 252 (1766: ex Brisson—Domingo).

3 ♂♂ and 1 ♀ from Seelet, April; and 2 ♀♀ from Caroni Swamp, March.

191. Ereunetes pusillus occidentalis Lawr.

Ereunetes occidentalis Lawrence, *Proc. Acad. Philad.* 1864. p. 107 ("Pacific Coast, Oregon, and California").

Seven specimens (♂♂ and ♀♀) from Seelet, April.

192. Tringa minutilla Vieill.

Tringa minutilla Vieillot, *Nouv. Dict.* xxxiv. (1819) p. 466 ["à Halifax, et dans la Nouvelle-Ecosse").

Two ♀♀ from Seelet, April.

193. Querquedula discors (Linn.).

Anas discors Linnaeus, *Syst. Nat.* xii. 1. p. 205 [1766: "in America septentrionali": ex Brown (Jamaica) and Catesby (Carolina).]

1 ♂ and 3 ♀♀ from Caroni Swamp, October.

194. Nomonyx dominicus (Linn.).

Anas dominica Linnaeus, *Syst. Nat.* xii. 1. p. 201 [1766: "in America meridionali": ex Brisson, Dominica, and Hernandez, Mexico].

One ♂ ad. and one young bird from Caroni Swamp, March.
The old bird agrees exactly with another from Pernambuco.

195. Sterna fluviatilis Naum. (an subsp. ?).

Sterna fluviatilis Naumann, *Isis* 1819. p. 1848 (no locality).

A single ♀ from Seelet, March.

The form inhabiting the tropical portions of South America is perhaps separable as a subspecies. (Cfr. Hartert, *Ibis* 1893. p. 309.)

196. Phaëtusa magnirostris (Lcht.).

Sterna magnirostris Lichtenstein, *Verz. Dubl.* p. 81 (1823—Brazil).

Three immature ♀♀ from Port of Spain, June, agreeing with mainland specimens in corresponding plumage.

197. Rynchops nigra cinerascens Spix (?)

[*Rynchops nigra* Linnaeus, *Syst. Nat.* x. p. 138 (1758: "in America."—We accept Carolina (ex Catesby) as typical habitat).]
R. cinerascens Spix, *Av. Bras.* ii. p. 80. tab. cii. (1825: "in locis ripariis flum. *Amazonum*").
R. melanura auct.

One nearly adult ♂ and two young birds marked ♂ and ♀ from Port of Spain, June.

The specimen in most advanced plumage agrees with the adult male from Caicara, Orinoco, spoken of by Berlepsch and Hartert,* in having pale whitish ashy under wing-coverts and broad white tips to the secondaries. An adult bird from Manáos, Amazons, which doubtless represents typical *R. cinerascens*, has much darker, smoky brown under wing-coverts, and very narrow whitish apical margins on the secondaries. One ♂ from Cumaná is quite similar, and therefore I doubt the possibility of separating the Venezuelan form as a different subspecies.

198. Larus atricilla Linn.

Larus atricilla Linnaeus, *Syst. Nat.* x. p. 136 (1758: "in America," sc. *Carolina*—ex Catesby).

One pair of adults and one immature ♂, all obtained at Port of Spain harbour, June 1903. Mr. André sent also a good series from Tobago.

II.—LIST OF THE SPECIES OCCURRING ON THE ISLANDS OF MONOS AND CHACACHACARE, BUT NOT FOUND ON TRINIDAD.

Unfortunately, we know as yet very little about the ornis of the small islands lying between Trinidad and the Paria peninsula. It is not improbable that some of the species treated of in the next chapter might yet be discovered on one of these islets. So far as I am aware, the only naturalists who ever visited them were Chapman and Taylor. The former collected several birds on Monos Island, the latter spent a few days on Chacachacare. Both collectors obtained a number of species which have never been taken on Trinidad, but are common residents on the opposite coast of Venezuela.

* *Nov. Zool.* ix. (1902) p. 132.

1. Spinus cucullatus (Swains.).

Chapman observed two specimens on Monos Island. The Tring Museum received a large series from the state of Cumaná, Venezuela. There is no record of its occurrence in Trinidad. The "Trinidad" specimens in the British Museum are of the well-known "Orinoco"-make, and came certainly not from the island.

2. Phaeomyias incomta (Cab. & Heine).

Myiopatis semifusca Chapman, *Bull. Amer. Mus.* vi. (1894) p. 38 (Monos Island).
Phyllomyias semifusca Taylor, *Ibis* 1864. p. 86 (Trinidad).

Chapman found this species only on Monos Island. Its occurrence on Trinidad proper requires confirmation.

About the nomenclature of the species cfr. *Nov. Zool.* ix. (1902) p. 41.

3. Sublegatus fasciatus glaber Sel. & Salv.

Sublegatus glaber Chapman, *Bull. Amer. Mus.* vi. (1894) p. 39.

Found by Chapman on Monos Island.

4. Empidochanes fuscatus cabanisi (Léotaud).

Empidochanes cabanisi Chapman, *Bull. Amer. Mus.* vi. (1894) p. 41 (Monos Island).

Chapman found it on Monos Island not uncommon. Léotaud had only a single specimen before him, which perhaps was also obtained on one of the outlying islands.

Chapman (*Bull. Amer. Mus.* vi. p. 42) separated the Tobago form as *E. c. canescens* [= *virenoninus* Ridgw. 1886! ex Tobago], but the differences pointed out by him do not exist. We have both from the Orinoco (Altagracia) and from Tobago brown-backed specimens with pale yellow underparts as well as grey-backed ones with a nearly white belly. The same observation has been made by Count Dalmas (*Mém. Soc. Zool. France* xiii. 1900, p. 139 : *E. arenaceus*).

5. Formicivora intermedia intermedia Cab.

Taylor, *Ibis*, 1864. p. 85 (Chacachacare).

H. Taylor found it "abundant in the low, dry bush of the small island Chacachacare," though he did not find it elsewhere.

We have a large series from Cumaná. On Tobago it is represented by the much larger and darker *F. intermedia tobagensis* Dalmas (*Mem. Soc. Zool. France* xiii. 1900, p. 141).

III.—HYPOTHETICAL LIST.

In the following pages I give a critical list of those species which have erroneously been recorded for Trinidad, or the occurrence of which has yet to be proved. Some of them observed by Léotaud may be occasional stragglers from the mainland, others may yet be discovered in the mountains of the northern part of the island.

1. Turdus flavipes venezuelensis (Sharpe).

Merula venezuelensis Sharpe, *Monogr. Turd.* ii. (1900) p. 83 [Venezuela].
M. melanopleura, idem, *l.c.* p. 87 ["Trinidad"—errore !]
Turdus flavipes (nec Vieillot !) Taylor, *Ibis* 1864. p. 80 ; Léotaud, *Ois. Trinidad*, p. 199.

Léotaud states that the species **does not breed on the island** and occurs only between the months of August and April. It is strange that neither Chapman nor André's collectors ever met with it.

I have shown* that specimens similar to that described by Sharpe as *M. melanopleura* may be found in Venezuela as well as in South Brazil, the distinguishing characters of the supposed species being only those of the very adult male. Having examined the type in the British Museum, the last doubts as to its identity with *venezuelensis* are now removed, for **the type turns out to be a skin of the well-known "Orinoco"-make, and certainly never came from Trinidad!**

2. Turdus xanthoscelus Jard.

Turdus xanthoscelus Jardine, *Ann. Mag. Nat. Hist.* xx. (1847) p. 329 [Tobago].

According to Léotaud, this species is an occasional visitor to Trinidad, but neither Chapman nor André collected it on the island. This thrush is strictly confined to Tobago. The specimens from the Roraima Mts., British Guiana, referred by Sharpe to *T. xanthoscelus*, differ from the typical Tobago series by their much smaller size (wing 110—112, instead of 117 ; tail 83—88, instead of 98 mm.), weaker and shorter bill and much more glossy plumage. They are perhaps not separable from *T. leucops* Tacz., but a better series should be examined.

3. Euphonia nigricollis (Vieill.).

Although Léotaud says it is pretty common, it has not been met with by any of the more recent travellers who visited the island. It is also included in Taylor's list with the remark : "much less abundant than on the main."

4. Piranga testacea faceta Bangs.

Piranga faceta Bangs, *Proc. Biol. Soc. Wash.* xii. (1898) p. 141 [Santa Marta, Colombia].
Pyranga hepatica (nec Swainson !) Léotaud, *Ois. Trinidad*, p. 291 [Trinidad].
Piranga haemalea (nec Salvin & Godman !) Chapman, *Bull. Amer. Mus.* vi. (1894) p. 30 [Trinidad]; Allen, *Bull. Amer. Mus.* xiii. (1900) p. 168 [Santa Marta].

I have not seen as yet any authentic Trinidad specimen, but Léotaud describes a bird which seems to belong to the above species, of which there is a good series from Cumaná in the Tring Museum. It is easily known from *P. t. testacea* by its much lighter, orange-vermilion underparts, and is in no way to be confounded with *P. t. haemalea* of the Roraima Mountains, British Guiana, as has been done by Allen and Chapman. The latter differs very little from typical *testacea*, while *P. t. faceta* is much paler and brighter everywhere than its two allies.

Léotaud adds that this species is only a visitor to the island.

* *Journ. f. Ornith.* 1902, p. 67.

5. Sporophila bouvronides (Less.).

Pyrrhula bouvronides Lesson, *Traité d'Orn.*, 1831. p. 450 [no locality given].
Spermophila lessoni Finsch, *P. Z. S.* 1870. p. 582 [" Trinidad "—errore !].
Spermophila trinitatis Sharpe, *Cat. Birds Brit. Mus.* xii. (1888) p. 132 [" Trinidad "—errore !].
S. bouvronoides Léotaud, *Ois. Trinidad*, p. 318 (Trinidad).

Neither Chapman nor André collected this species, and the type of *S. trinitatis* Sharpe did also not come from Trinidad, but is of the usual " Orinoco "-make. The only authority for its occurrence on the island is Léotaud, who says that it is found in company with *S. minuta*, but less common.

I cannot see any reason for not accepting Lesson's term *bouvronides*. The description answers well to the species with uniform black pileum (cfr. " tête et con noir "), no mention being made of a white crown stripe. Even if Lesson's name should be rejected, then Finsch's designation *lessoni* would have precedence over *trinitatis* Sharpe.

S. bouvronides is certainly only a straggler from the mainland, but an adult male, collected by Léotaud, on Trinidad, is preserved in the Paris Museum.

As I will show in another paper, *S. ocellata* and *S. amazonica* are identical with *S. bouvronides*, which, however, appears to be specifically distinct from *S. lineola*, both species being found together at various localities. For want of material, these birds are very unsatisfactorily treated of in the *Catalogue of Birds*.

6. Carduelis phoeniceus Bonap.

Erroneously recorded from Trinidad in the *Cat. Birds*, xii. p. 166. The Tring Museum received a large series of both sexes from the vicinity of Cumaná. The species is not known to occur elsewhere, unless *C. granadensis* Lafr. of New Granada be the same.

7. Mionectes olivaceus Lawr.

Elania striaticollis Léotaud, *Ois. Trinidad*, p. 238 (Trinidad).
Mionectes olivaceus Chapman, *Bull. Amer. Mus.* vi. (1894) p. 38.

The claims of this species to be included in the avifauna of Trinidad rest upon the single specimen recorded by Léotaud. It has been examined and identified by Chapman. In the Tring Museum there is a good series of *M. olivaceus* from Cumaná.

8. Pachyrhamphus albogriseus Scl.

Taylor, *Ibis* 1864. p. 87 (" Trinidad ").

There can be no doubt that the bird obtained by Taylor has been wrongly identified as *P. albogriseus*. This species occurs only in the Andes of Colombia and Ecuador, and its occurrence on Trinidad is simply impossible. I suppose the specimen really belonged to *P. rufus* (Bodd.) (= *cinereus* auct.), of which there is an adult male from Cumaná in the Tring Museum. In the *Catalogue of Birds* two ♂ ad. of this species are recorded from Trinidad, but they are most probably so-called " Orinoco " skins, which, in many collections, are labelled " Trinidad."

Neither Chapman nor André met with any *Pachyrhamphus* of this group, hence the occurrence of *P. rufus* remains to be confirmed.

9. **Dendrocolaptes altirostris** Léotaud.

Ois. Trinidad, p. 166.

The description of this species, as given by Léotaud, agrees well with *Dendrornis susurrans susurrans* (Jard.), so far as coloration is concerned, but the bill is said to be "blanc de corne." I do not know what to make of this bird; I can hardly believe, however, that there is a species of *Dendrocolaptes* on Trinidad, not found again since Léotaud's time.

As the type is now in the collection of the Boston Society of Natural History, the matter could easily be settled by our American fellow-workers.

10. **Dendroplex picus** (Gm.).

Although Léotaud says it is common, it has not been obtained by any of the recent collectors.

11. **Cercomacra maculicaudis** (Scl.) [= *nigricans* Scl.].

There cannot be the slightest doubt that this species has been wrongly assigned to Trinidad. It occurs only on the western slopes of the Andes in Ecuador and Colombia, extending northwards to Panama.

12. **Campylopterus ensipennis** (Swains.).

In the *Catalogue of Birds* xvi. p. 290, and again in the *Tierreich*, Trochilid. p. 31, this species is recorded from Trinidad, evidently on the strength of some specimens in the British Museum labelled "Trinidad." These are skins of the so-called "Orinoco"-make, and the occurrence of *C. ensipennis* on the island is not yet proved, although it is common both on the Paria coast and on Tobago.

13. **Agyrtria albiventris** (Less.).

The two examples in the British Museum from "Trinidad" are also so-called "Orinoco" skins (cfr. Salvin, *Cat. B.* xvi. p. 186: *Agyrtria viridissima*). As yet there is no proof that the species ever occurs in Trinidad, nor is it found on the Paria coast.

14. **Chrysuronia oenone oenone** (Less.).

This species has without doubt been wrongly indicated as occurring in Trinidad, although Lesson described it from that island. The examples in the British Museum labelled "Trinidad" are again so-called "Orinoco" skins.

15. **Thalurania refulgens** Gould.

In nearly all works on Humming-birds we find Trinidad as the only locality mentioned for this species, but as neither Léotaud nor any of the more recent collectors ever met with it there, we may safely exclude it from the ornis of the island. The Tring Museum received a very large number of skins from the state of Cumaná, N.E. Venezuela, and this is the only exact place known hitherto.

16. **Chaetocercus jourdani** (Bourc.).

Calothorax enicurus (nec Vieillot!) Léotaud, *Ois. Trinidad*, p. 143 (Trinidad).

Léotaud's bird belonged without doubt to the above species, as may easily be seen from the description of the tail: "rectrices noires; **du roux sur la barbe**

interne de la base au milieu . . .; la plus extérieure est courte et finit en pointe."

This can never refer to *Calliphlox amethystina* with which Chapman and Salvin identified Léotaud's description.

Besides Léotaud's, we have no other record of this species occurring on Trinidad. The only specimens with exact localities I have seen are those in Tring (1 ♂, 1 ♀), which were collected near Cumaná by one of Mr. André's men.

17. **Chaetura spinicauda** (Temm.).

Chapman, *Bull. Amer. Mus.* vi. p. 58 (Trinidad).

I have not seen any specimens from Trinidad, and I greatly doubt its occurrence there. It is not obvious from Chapman's account whether he got an example of the species, and its claims to be included in the fauna of Trinidad cannot be considered as established.

18. **Cypseloides rutilus** (Vieill.).

Neither Chapman nor André's collectors ever met with this remarkable bird, but according to the former ornithologist, there is one specimen in Léotaud's collection. The French naturalist, however, leaves it an open question whether it breeds on the island or not, and after all it may be only a straggler there.

19. **Chordeiles acutipennis acutipennis** (Bodd.).

Although Léotaud (p. 76) says that this species is the most common of all Goatsuckers, it has not been observed either by Chapman or André. From his observations it is evidently only a winter visitor.

20. **Podager nacunda** (Vieill.).

According to Léotaud (p. 79) it is a common winter visitor between the months of July and October.

21. **Chrysoptilus punctigula** (Bodd.).

Erroneously recorded from Trinidad in the *Cat. Birds* xviii. p. 116. The species occurs only in Cayenne and Surinam. On the Orinoco River and in Venezuela, near Valencia, a nearly allied form, *C. p. punctipectus* Cab. & Heine, takes its place.

22. **Coccyzus pumilus** Strickl.

This species, although described as coming from "Trinidad," is now ascertained to be only an inhabitant of the upper Orinoco valley and the eastern slopes of the Andes in Colombia. I have seen a large number of Bogotá skins. The original locality was doubtless erroneous.

23. **Urochroma hueti** (Temm.).

According to Léotaud (p. 332) this species, "est de passage ici, et encore ne vient-elle nous visiter qu'à de long intervalles." I have never seen a specimen from Trinidad.

NEW *DREPANULIDAE, THYRIDIDAE, URANIIDAE,* AND *GEOMETRIDAE,* FROM BRITISH NEW GUINEA.

BY W. WARREN, M.A., F.E.S.

THE insects were collected by A. S. Meek at the Angabunga River, an affluent of the St. Joseph River, British New Guinea, at an elevation of 6000 ft. and upwards, from November 1904 to February 1905. It is a marvellous collection, the number of new species being beyond all expectation.

Family *DREPANULIDAE.*

1. **Callidrepana discipunctata** spec. nov.

Forewing: rather deep yellow; from two-thirds of inner margin a band of three lines runs straight and oblique to below vein 8; the central line broadly brown, the inner and outer slender, the pale interval before the outer slightly lustrous; below 8 the inner and central lines are retracted to costa and the outer bent outwards; dark spots on the veins represent the submarginal line; apex and fringe above it brownish fulvous; cell-mark formed of two brown-edged annuli.

Hindwing: with the band central, but not reaching above vein 4; costal area paler yellow.

Underside fulvous yellow, paler towards inner margins; both wings with a round brown cell-spot, and traces of a straight brown outer line, running from apex in forewing, and from three-fourths of costa in hindwing, hardly reaching below middle.

Thorax, abdomen, and legs like wings; upper half of face black, lower half yellow.

Expanse of wings: 50 mm.

1 ♀.

2. **Callidrepana superba** spec. nov.

Forewing: pale unspeckled ochreous; from three-fifths of inner margin an oblique olive-brown band runs straight to below vein 7; this band consists of a dark olive fine line on the inner edge, separated by a pale interval from a broader and paler olive line, which is edged externally by a somewhat diffuse line of silvery scales; before vein 7 the inner dark line is widely retracted to costa and becomes obsolete; the outer line develops into a wide shallow red-brown costal blotch with paler centre, the lustrous line forming a large bright spot below it; submarginal line represented by a series of olive-brown wedge-shaped marks on the veins, the whole marginal area, especially towards apex, slightly deeper tinged; apex and fringe dark olive-brown, the fringe becoming paler towards anal angle; cell-spot double, formed of a bent line of silvery scales on the upper arm of discocellular, and a spot at the lower end.

Hindwing: with the olive band central, not reaching above vein 6; the submarginal spots more distinct, the marginal area beyond them distinctly olive-brown.

Underside with the band umber-brown, very thick on hindwing, not reaching inner margin in either wing, filling up the apex of forewing, the inner edge forming a pale-centred loop on costa followed by a round pale spot ; submarginal line visible only in forewing and there not below vein 2 ; a brown marginal line on forewing to vein 2, broader on hindwing ; fringe brown on forewing, pale on hindwing ; costa of forewing towards base yellowish.

Head, thorax, abdomen, and legs ochreous ; upper half of face brown ; forelegs tinged with brown.

Expanse of wings : 60 mm.

1 ♀.

Hyalospectra gen. nov.

Forewing : costa curved ; apex depressed, bluntly rounded ; hindmargin bluntly elbowed in middle, concave above, oblique below.

Hindwing : bluntly angled at middle of hindmargin.

Antennae pectinated in ♀, with stiff parallel pectinations to two-thirds, apical third simple ; palpi quite short ; tongue and frenulum present ; hindtibiae with two spurs only.

Neuration : forewing, cell more than half as long as wing ; upper and lower third of discocellular vertical, middle oblique ; first median nervule at one-half, second at four-fifths, both curved downwards at origin ; lower radial from the lower angle of discocellular ; 6 stalked with 7, 8, 9, from the depressed end of subcostal ; 10 and 11 close together from cell, 10 anastomosing with 8, 9 ; hindwing, 7 from long before end of cell, shortly anastomosing with 8.

Wings sparsely scaled, with large hyaline discal patches.

Type : *Hyalospectra grisea* spec. nov.

3. **Hyalospectra grisea** spec. nov.

Forewing : hyaline ; the basal area, the costal area above subcostal vein, and the hindmarginal border clothed with sparse grey scales ; at about one-third from base a dark paler-edged lunulate-dentate line, toothed outwards on the veins ; in the grey marginal area a lunulate-dentate dark line, running out from costa at three-fourths and below middle forming the limit of the hyaline space ; this space is roughly four-lobed, comprising the outer half of cell and the inner half of all the intervals between veins 2 and 8 ; a round hyaline marginal spot between 3 and 4, and the marginal area below apex semihyaline ; a dark grey marginal line, spotted on the veins ; fringe pale grey.

Hindwing : grey, with the base, an angled band beyond middle, and the marginal spot between 3 and 4 hyaline.

Underside hyaline, the marginal area grey, the basal only showing through.

Head, thorax, and abdomen dark grey, face and antennae paler.

Expanse of wings : 30 mm.

1 ♀.

4. **Oreta patiens** spec. nov.

♂. *Forewing :* dark fawn-grey, with numerous transverse darker striae and speckles ; costa with two blackish blotches, one nearly at middle, the other at two-thirds ; from the first a diffuse dark central shade arises, which is bent at end of cell ; from the second a fine outer line arises, angled at vein 6 then

oblique inwards (in the type ♂ this line is very indefinite); discal mark a line of faint bluish shining scales; along vein 5 a pale chestnut-brown streak extends to an oblique submarginal whitish mark; a dark blotch at anal angle; this blotch, as well as the apical area, is studded with flaky white scales; fringe rufous brown, tipped in places with shining white scales.

Hindwing: redder, with a broad darker central band, and with dark specks between the veins; fringe deep red-brown.

Underside deep dull reddish, coarsely black-spotted between the veins; the black outer line on forewing and central on hindwing well marked, as well as the white submarginal streak.

Head, thorax, and abdomen dark red-brown; underneath and legs reddish.

♀. Much larger and paler, with scarcely any red tinge; the outer line on forewing black and well defined, produced as a central line across hindwing; underside pale whitish brown, with coarse black speckling and black thick oblique line.

Expanse of wings: ♂ 30 mm.; ♀ 40 mm.

1 ♂, 1 ♀.

Family *THYRIDIDAE.*

5. **Addaea maculata** spec. nov.

Forewing: yellowish straw-colour, with some faint pale brownish striae between the veins; costal edge brown dotted with pale; base of cell brown; a broad brown band from just beyond middle of costa to before middle of inner margin, followed below middle of wing by a grey-brown blotch reaching anal angle; traversed at middle by a narrow darker band, the upper part of which starts faintly from costa just beyond middle shade; a series of brown triangular spots along margin; fringe straw-colour.

Hindwing: with central shade thick, unaccompanied by a blotch; in marginal area one brown and three paler lines visible.

Underside yellower, with the bands and markings pale red-brown and very regular.

Head, shoulders, and base of patagia deep brown; thorax and abdomen straw-colour; fifth dorsal segment deep brown, sixth brownish.

Expanse of wings: 26 mm.

1 ♀.

6. **Banisia quinquelineata** spec. nov.

Forewing: pale ochreous, rather glossy; traversed by very fine grey wavy lines or striations, and by five brown lines or thin bands, oblique outwards from costa, angled on subcostal vein, then oblique inwards and waved; down the pale intervals between them a darker central line forming small black patches between the veins; a series of large marginal brown spots; fringe brown.

Hindwing: with only the two inner lines clear; fringe brown.

Underside with the straw ground-colour paler, and the brown lines and black speckling much brighter.

Head and forelegs dark brown; vertex, thorax, and abdomen straw-colour.

Expanse of wings: 34 mm.

3 ♂♂.

7. **Brixia quartaria** spec. nov.

Forewing: ochreous, uniformly suffused, except along costa, with pale brown; crossed by four or five darker bands more or less interlacing laterally, two antemedian and two postmedian being plainer, and brown-edged on costa; the paler intervals with faint traversing lines; fringe pale.

Hindwing: with the costal area above median vein like forewing; below with three broad deep brown bands, basal, median, and marginal, the intervals whitish with a pale line in middle; fringe ochreous, darker at base, especially towards anal angle.

Underside of forewing suffusedly pale brown, showing no markings; of hindwing with the pale and dark markings amplified and very distinct.

Head, thorax, and abdomen ochreous, sometimes tinged with pale brown; dorsum marked with brown; face, palpi, pectus, legs, and underside of abdomen deep brown.

Expanse of wings: ♂ 22 mm.; ♀ 26 mm.

2 ♂♂, 1 ♀.

8. **Letchena satelles** spec. nov. and ab. **coeca** nov.

Forewing: fawn-colour in ♂, with obscure dark transverse striae and reticulations; dull brick-red in ♀, with the striae developed into dull lines and bands; costal edge with pale linear intervals; between veins 2 and 3 at middle of wing a large hyaline patch, generally elongate and oblong, sometimes shortened and nearly round, in one case divided into two by a vertical middle line; with two small spots one above the other in the interval beneath, sometimes confluent; fringe dark brownish or reddish grey. In 1 ♀, ab. *coeca*, the hyaline spots are entirely absent.

Hindwing: like forewing, but without hyaline spots; fringe with apical half white; inner margin and fringe pinkish ochreous.

Underside of forewing with a diffuse brownish postmedian cloud and submarginal spot; hindwing pink; inner margin of both wings pale.

Thorax and abdomen concolorous with wings; head generally darker; forelegs dark brown, with pale joints; hindleg with tuft of hair internally fuscous.

Expanse of wings: 40 mm.

4 ♂♂, 3 ♀♀.

Microbelia gen. nov.

Forewing: elongate; costa straight, convex only before apex, which is slightly prominent; hindmargin somewhat bulged at middle, very oblique below.

Hindwing: narrow, oblong; the apex rounded to a slight elbow at 7; hindmargin bulged at middle and inbent on each side; inner margin very short.

Palpi obliquely porrect upwards; second segment thick, rough-haired, terminal short; antennae lamellate, thick; legs long; neuration simple.

Differs from *Banisia* in having the terminal segment of palpi short.

Underside of forewing without metallic or hairlike scales.

Type: *Microbelia curvinota* spec. nov.

To this group belong *intimalis* Moore, *compunctalis* Warr., and *ulterior* Warr.

9. **Microbelia curvinota** spec. nov.

Forewing : ochreous, with five subquadrate brown costal patches, the commencement of fasciae which in and below the cell become black-brown ; costal edge dotted light and dark ; the pale intervals between the bands each traversed by a brown line, that beyond the second band palest and most prominent ; the third and fourth bands unite to form a Y-shaped mark ; the fifth becomes black and is bent round at right angles to margin at vein 4 ; veins towards margin fulvous, the intervals with vertical brown-black striae ; fringe ochreous, chequered with black beyond veins below middle, and at vein 7.

Hindwing : with basal third pale straw-colour or whitish, with a brown-black band near base and limited by another running from above anal angle to midwing, followed by a dark fulvous mark at anal angle ; rest of wing paler, as in forewing.

Underside with all the tints, both pale and dark, much brighter and clearer.

Head, thorax, and abdomen, fulvous ochreous ; metathorax and anal half of dorsum black-brown ; palpi and legs ochreous.

♀ with the markings fulvous brown instead of black, except the bent mark to middle of hindmargin : the pale costal spaces dotted black and white ; hindwing with base more largely pale, the basal band being slender ; head, thorax, and abdomen rich fulvous.

Expanse of wings : ♂ 20 mm. ; ♀ 26 mm.

1 ♂, 1 ♀.

10. **Pharambara basalis** spec. nov.

Forewing : whitish ochreous with pale red-brown reticulations ; the markings dark chestnut ; basal two-fifths deep chestnut edged by a vertical line ; an interrupted postmedian fascia formed by a dependent bar from costa and a bifurcate mark from before anal angle ; hindmargin narrowly chestnut-brown, with oblique Y-shaped streaks running into it ; costal area brown, with pale rounded intervals dotted with dark on costal edge ; all the dark markings more or less connected laterally along subcostal vein and inner margin ; in the paler spaces the veins are pale reddish ; fringe pale ochreous with brown mottling.

Hindwing : with three brown bands near base running into inner margin, the third broad and double ; the hindmargin red-brown, with two more, partially double, streaks running into it, with single lines between.

Underside the same, with the dark brown markings all clearer, and with some bluish silvery scales along subcostal area.

Head and thorax grey-brown ; abdomen brown, the anal tuft of ♂ ochreous ; face deep brown ; palpi and forelegs deep brown with the joints pale ; antennae annulated brown and ochreous.

Expanse of wings : ♂ 18 mm. ; ♀ 22 mm.

1 ♂, 1 ♀.

11. **Siculodes fumiceps** spec. nov.

Forewing : white, traversed by numerous contorted bronzy grey lines and reticulations, which cut up the white ground into rounded spots or blotches of irregular size and shape : costal edge minutely dotted with dark ; subcostal vein with white spots alternating with bronzy-grey intervals ; some short oblique lines along hindmargin running out grey into the white fringe.

Hindwing : similar ; many of the spots appearing as if embossed, as a few of those in the forewing also do.

Underside of forewing similar; of hindwing white with the markings showing through; costa of forewing uniformly dotted black and white, with a yellowish streak below it.

Head and prothorax smoky grey ; metathorax and abdomen white.

Expanse of wings : 20 mm.

1 ♂.

12. **Siculodes nigrithorax** spec. nov.

Forewing : glossy white, with very indistinct grey-brown reticulations, except towards hindmargin, where they become dark brown and complicated ; a fine black-brown marginal line swollen into spots at the veins, which project into the white fringe ; a large brown spot at base of discocellular, and another below it on sub-median vein, forked obliquely towards inner margin ; costal streak dark-brown ; costal edge dotted with orange ; subcostal vein with white spots.

Hindwing : with a hyaline central space; the rest of the wing with bosses of white scales arranged in rows between the veins ; a black spot on inner margin at middle, and some dark markings towards hindmargin; marginal line as in forewing.

Underside white, glossy, the markings as above ; costa of forewing gilded yellow, speckled with black, and with a deep yellow line running into apex.

Head and prothorax black-brown ; metathorax, apical half of patagia, and abdomen white ; dorsal segments, except basal, banded with brown ; abdomen beneath, pectus, and legs silvery white ; foretarsi black, with white joints.

Expanse of wings : 26 mm.

2 ♀♀.

13. **Siculodes subauratalis** spec. nov.

Forewing : snow-white ; the costa finely dotted with dark ; the base with thick purplish spots and striae between veins; the marginal area with some longer and more angular marks as well ; the space from apex to end of cell and the middle of inner margin remaining pure white ; large dark marginal spots at the vein-ends below middle ; fringe white.

Hindwing : with thick irregular markings except along costal area; marginal spots at the vein-ends throughout.

Underside like upper, but most of the markings of hindwing and many on forewing pale instead of dark ; costa of forewing broadly gilded yellow ; costa of both wings black-dotted.

Thorax and abdomen white ; dorsum with black spots ; the head and prothorax are discoloured, but appear to have been grey ; foretarsi black, with joints white.

Expanse of wings : 20 mm.

1 ♂.

Family *URANIIDAE.*

Subfamily MICRONIINAE.

14. **Cyphura pardata** spec. nov.

Forewing : cream-white ; the costal area above subcostal vein crossed by stout black striae, those in the apical portion more variable in shape and size, sometimes forming a few long streaks, sometimes more numerous and short, reaching as far as

vein 4 ; three olive-fulvous, brown-edged, funnel-shaped bands cross the wing from costa ; the inner edge of the first from base of costa to before middle of inner margin, the outer from one-sixth of costa to three-fifths of inner margin ; inner edge of the second from one-fourth of costa to three-fourths of inner margin, the outer from middle of costa to four-fifths of inner margin ; the inner edge of the third from three-fifths of costa to anal angle, the outer edge not defined by a line but only marked by a darker shade, which joins the inner edge at anal angle ; a broad velvety black submarginal line not reaching costa and ending in a point before anal angle ; fringe with basal half black, outer half whitish.

Hindwing : white, with a bright fulvous suffusion in the outer half of wing from vein 4 to anal angle, containing five black submarginal spots, a large one on each side of vein 3, a smaller one on each side of the submedian fold and a smaller one still below vein 1 ; a broad abbreviated submarginal black stripe from vein 5 to 2, and a shorter fine one close before margin from 6 to 4 ; fringe white from apex to the end of tooth, thence to anal angle fulvous, tipped with grey and with a velvety black basal line interrupted at the veins ; fringe of inner margin fulvous in outer half, white in basal half of wing.

Underside of forewing white with two broad blackish oblique streaks, corresponding to the two outer dark lines of upperside, the inner not reaching below middle ; some dark brown specks and striae on costa before apex, and a grey linear shade before hindmargin from apex to middle ; fringe grey-brown, the basal half darker ; hindwing with the fulvous area more restricted ; the submarginal black stripe from 5 to 2 broader and continued to anal angle, including the three smaller spots.

Palpi white, with second segment black above ; face white with a black spot above ; vertex, antennae, and collar white ; shoulders and patagia pale fulvous ; thorax and abdomen white with a broad black dorsal stripe ; abdomen below and legs white ; forelegs with a black line in front.

Expanse of wings : 56—65 mm.

6 ♂♂, 2 ♀♀.

The largest example has an additional short brown middle line on hindwing from vein 4 bent round to inner margin above anal angle.

15. **Stesichora pura** spec. nov.

Fore- and hindwings, above and below, and all the parts of the body pure white, except the upper half of face, the tips of the palpi, and the front of the forelegs, which are blackish.

Expanse of wings : 40 mm.

1 ♂.

16. **Stesichora strigifera** spec. nov. and ab. **crassistriga** nov.

Forewing : white, covered with irregular pale brown strigae ; those on costa and subcostal vein fine and black ; marginal line pale brown ; fringe white with a faint brownish tinge ; besides the striae there are sometimes traceable three more or less continuous pale grey-brown lines across wing, antemedian, median, and postmedian ; of these the median is generally the most prominent, and in certain cases developed into a broad conspicuous band, ab. *crassistriga*.

Hindwing : with the strigae confined to the marginal area ; the median and

postmedian bands generally well marked, the latter sometimes angulated below middle: marginal line fine, black-brown, interrupted at the slight tooth, which contains an oval black spot; fringe white, tinged with brown. In the aberration the fringes are darker in both wings.

Underside uniformly white.

Head, thorax, abdomen, and legs all white; face and palpi black, whitish below; forelegs dark grey in front.

Expanse of wings: ♂, 48 mm.; ♀, 52 mm.

4 ♂♂, 2 ♀♀, one of these being the aberration *crassistriga*.

Subfamily EPIPLEMINAE.

17. **Dirades corrasa** spec. nov.

Forewing: pale grey, freckled with darker; a dark cell-spot followed by a larger dark spot above vein 7, edged with ferruginous externally; a row of submarginal black lunules between the veins from apex to vein 2; a dark marginal line; fringe grey with a pale basal line.

Hindwing: dark brown above vein 4; white and without markings, except on vein 1, below it; costa with a silvery white blotch from base to apex, where it is narrowed off to a point; across the middle a double dark brown line with yellowish scales between; along hindmargin from vein 7 to 4 a leaden, blue band edged inwardly by black white-edged lunules; fringe brown to vein 4, white below it.

Thorax and abdomen pale grey: vertex white; face and palpi black.

Expanse of wings: 22 mm.

1 ♂.

Hindwing with a tooth at vein 7, and the inner margin below vein 3 lobed; an elongate hyaline fovea near base of wing beneath the median vein.

18. **Dirades niveicosta** spec. nov.

Forewing: cinereous grey, striated with darker; the lines fuscous, interrupted; first curved, at one-third; second at two-thirds, outcurved below middle, where it is thickened: a cloudy dark cell-spot; an apical short streak of three black lunules; costal edge distinctly speckled black and white; fringe grey.

Hindwing: similar; but the costa with a broad silvery white streak from close to base to outer line, where it is bluntly rounded; the inner edge of this white streak is perfectly straight, and contains three black spots, one at base, a small one at middle, and a third at the end, these last forming parts of the inner and outer lines; a row of leaden-blue dark-edged lunules along margin from vein 7 to 2.

Underside of forewing grey, of hindwing whitish; costa of hindwing with two tufts of dark scales, a large one at base and smaller one at apex.

Thorax and abdomen grey like wings: vertex white; face, palpi, and forelegs black.

Expanse of wings: 22 mm.

2 ♀♀.

Near *D. albibasis* Warr. from Fergusson Island, but the white streak of hindwing is not jagged below.

19. **Diradopsis alberta** spec. nov.

Forewing: pale grey, clouded and speckled with dark grey; costa minutely dotted black and white; lines dark with paler edge; first outcurved from one-third of costa to median vein, second from three-fifths of costa to vein 4, both interrupted below middle, but really joining the edges of a dark brown blotch on inner margin beyond middle; this blotch is narrower and rounded at summit in the ♂, broader and flattened in the ♀; a row of black submarginal spots from apex to anal angle; a dark grey triangular cloud on costa beyond outer line, and a slighter one at anal angle; fringe brown.

Hindwing: browner; outer line in ♂ nearly straight from middle of costa to vein 4, where it is bluntly angled and becomes obsolete, in the ♀ curved above middle, straight below, with a blunt tooth on vein 4, dark brown edged with pale; in the ♀ below 4 the marginal space is whitish grey nearest the line, the rest dark grey with submarginal dark spots between veins; fringe brown with pale tips; in the ♂ the submedian interval is whitish, without scaling; in the ♀ whitish speckled with black; in both sexes the veins of hindwing are sometimes pale.

Underside dull brownish with black speckling, whiter towards base of hindwing.

Thorax and abdomen grey; vertex pale grey; face, palpi, and forelegs black.

Expanse of wings: ♂, 22 mm.: ♀, 23 mm.

4 ♂♂, 4 ♀♀.

20. **Epiplema canibrunnea** spec. nov.

Forewing: liver-brown, dusted at base, along costa, and before hindmargin with bluish grey scales; costal edge ochreous with slight brown dots; the lines finely pale; first from one-fourth of costa, obliquely curved outwards to median, then oblique and straight inwards; second line straight from just beyond middle of costa to beyond middle of inner margin; the interval between the lines deeper brown, forming a fascia, the veins across it paler; a pale dark-edged lunulate line from near apex, curved to hindmargin at submedian fold, enclosing a darker brown marginal area widest beyond cell, edged inwardly with bluish grey; a fine bluish grey marginal line; fringe broadly brown at base, paler and mottled towards tips.

Hindwing: with the two lines curved and parallel; the lunulate submarginal line entire from apex to anal angle, enclosing a dull leaden-blue band; fringe as in forewing.

Underside of forewing purplish grey, with darker speckling; of hindwing white with purplish speckles along hindmargin; fringes grey chequered with purplish.

Vertex white; shoulders and patagia pale bluish grey, powdered with dark scales; abdomen brown with pale rings; anal tuft ochreous; face, palpi, and forelegs brown-black; antennae ochreous.

Expanse of wings: 17 mm.

1 ♂.

Hindmargin of forewing entire, with slight indentation beyond cell; of hindwing with slight blunt teeth at 4 and 7; costa of hindwing fringed with hair; antennae with clavate teeth.

21. **Epiplema casbiata** spec. nov.

Forewing: ochreous or whitish grey, densely covered with fine short striae; cell-spot blackish, in a cloud of dark striae; the lines accompanied by shades of dark striae; inner line marked by a dark spot above and below median vein; outer

line by small brown lunate marks between veins at two-thirds, parallel to hindmargin ; a black spot before apex above vein 7 ; fringe concolorous.

Hindwing : cell-spot white, followed by a cloud of striae which extends towards anal angle ; outer line faintly expressed, bluntly angled on vein 4 ; an oval leaden-blue, somewhat embossed spot, edged with yellowish, on hindmargin below lower tooth.

Underside white, slightly discoloured in forewing, with numerous blackish striae between the veins ; a black spot before lower tooth.

Thorax and abdomen like wings ; vertex whitish ; face and palpi black.

Expanse of wings : 38 mm.

2 ♀♀.

Forewing with hindmargin simple ; hindwing slightly toothed at 7, 6, and 4, the last finer and longer.

22. **Epiplema cinereella** spec. nov.

Forewing : ash-grey with a slaty tinge, and covered with indistinct dark striae ; costa dotted with dark grey ; lines darker, but indistinct, and interrupted ; first at one-third, bent in middle ; second from two-thirds of costa to three-fourths of inner margin, inbent below middle ; both plainest at their extremities ; a blackish marginal blotch from apex to vein 3, inwardly edged by a black line, bluntly angled basewards on vein 5 ; fringe grey.

Hindwing : with equally indistinct curved lines ; a dark marginal lunate-edged shade between teeth.

Underside uniform dull dark grey.

Thorax and abdomen grey ; vertex white ; shoulders whitish grey ; face, palpi, and forelegs blackish.

Expanse of wings : 16 mm.

1 ♀.

Forewing indented slightly beyond cell ; hindwing with small teeth at 4 and 7 ; cell of forewing very short ; vein 5 from below upper angle of cell.

23. **Epiplema configurata** spec. nov.

Forewing : pinkish ochreous, thickly dusted with grey, at base and along costa ; the central fascia and anal region below middle and the hindmargin suffused with black ; lines velvety black ; first at one-third, acutely angled outwards on median vein, then oblique inwards, broadly edged internally with ferruginous, the costal portion above cell almost obsolete ; outer line from three-fifths of costa to four-fifths of inner margin, forming a small projection outwards on vein 7 and a prominent blunt one on vein 4, then incurved, and vertical from vein 3, edged externally finely with ferruginous ; a line of black dots from apex, limiting the black hindmargin, toothed inwards on vein 5 ; fringe black-brown.

Hindwing : black ; the lines edged with ferruginous conversely as in forewing ; the inner at one-third angled outwards on both folds, the outer on vein 4, and marked by white dots at veins ; the submedian interval diffusely white with black speckling, the anal region below vein 3 whitish ; the lunules along margin obscurely edged with ferruginous ; fringe black.

Underside of forewing smoky fuscous with black striae ; costa whitish with black dots ; inner margin whitish ; hindwing dull white, grey-tinged towards costa and apex ; the fringe brown.

Face, palpi (which are long and porrect), and forelegs black; vertex snow-white; shoulders and patagia grey-brown; abdomen whitish, the basal half of dorsum black, the anal grey; abdomen beneath and legs white.

Expanse of wings: 27 mm.

1 ♀.

Hindmargin of forewing simple; of hindwing with two longish teeth at veins 4 and 7, and a shorter one at end of 6.

24. **Epiplema dealbata** spec. nov.

Forewing: glossy stone-grey, finely dusted with dark scales; costa marked with grey; lines starting from costa at two-fifths and three-fifths; first very obscure, passing over a linear chestnut-brown discal spot; second outcurved, reddish grey with a paler limiting line, incurved at 4, joining the edges of a large flattened pale-centred chestnut-brown blotch at middle of inner margin; a chestnut-brown narrow shade before margin from apex to vein 3, broken into two lunules above vein 6; a submarginal grey cloud running into anal angle; fringe grey.

Hindwing: inner line straight, chestnut-brown, its middle formed by the discocellular mark ending in a round blotch between the origin of veins 3 and 4; outer line brown, with paler edge, waved and bent on vein 4, ending in a square brown blotch between 3 and 4; a dark, pale-edged lunular line before teeth; submedian interval cream-white without markings, which reappear on vein 1.

Underside white, slightly discoloured in forewing, with a few dark specklings towards hindmargin.

Vertex, thorax, and abdomen like wings; face and palpi brown-black.

Expanse of wings: 27 mm.

1 ♂.

Forewing simple; hindwing toothed at 4 and 7.

25. **Epiplema despecta** spec. nov.

Forewing: pale grey, thickly covered with grey-brown striae; lines dark brown and fairly distinct; first well curved at one-third; second from just beyond middle of costa to two-thirds of inner margin, projecting outwards on the two folds, angularly beyond cell and bluntly on the submedian; a browner grey marginal shade from apex to vein 3, prominently projecting inwards between 4 and 6, where it is edged by two black lunules, and above vein 6 by another black lunule nearer margin; fringe grey.

Hindwing: a brown line near base; a faint ochreous line along median vein joined by a faint brown mark on discocellular; outer line sinuous, brown edged with paler, bluntly angled or rounded on vein 4; a leaden-grey shade along margin from upper to below lower tooth, with a sinuous darker inner edge cut by a whitish dash on vein 4, with a whitish edge between 3 and 4.

Underside of forewing dull brownish grey with darker freckling and a dark shade at base; of hindwing much paler, becoming greyer and freckled only towards hindmargin.

Vertex, antennae, thorax, and abdomen grey; face, palpi, and forelegs black.

Expanse of wings: 25 mm.

1 ♂.

Hindmargin of forewing entire; of hindwing toothed at 4 and 7, with a blunt tooth at 6; submedian fold scaled like the rest of wing.

26. **Epiplema detecta** spec. nov.

Forewing : as in the last species, pale grey with slightly darker striae ; no distinct lines ; in their places slight diffuse olive shades ; a darker marginal space, not so prominently projecting beyond cell, edged by a single obliquely curved black line, with two dark lunules above, one on each side of vein 7 ; the pale grey fringe with darker specks at base beyond veins.

Hindwing : with a double brown spot on median vein near base, a distinct thick brown streak on discocellular, and no ochreous line along median vein ; outer line fine, acutely angled outwards on vein 4 ; the submedian interval whitish, without markings ; the dark marginal space from upper to lower tooth narrower and with straight inner edge ; three small brown-edged lunules below lower tooth, with a fine white dash on vein 4.

Underside as in *despecta*, as well as the parts of the body.

Expanse of wings : 23 mm.

1 ♀.

Hindmargin of hindwing between teeth straight, with no tooth at vein 6.

27. **Epiplema eupeplodes** spec. nov.

Forewing : pale pearl-grey towards base and along costa, speckled with brown and dark grey, with a diffuse brown cloud on hindmargin below middle ; the veins throughout marked paler ; costa finely brown ; the lines red-brown, darker on costa ; first at one-third, oblique outwards, sharply angled on subcostal, then sinuous inwards, marked by brown spots on the veins and fold ; outer line from before two-thirds, oblique outwards, and bent on the subcostal, then waved to inner margin at two-thirds, parallel to inner line ; a brown lunate-edged streak along excision, with two black spots above it ; fringe brown, except at apex ; cell-spot formed of two black semi-confluent spots.

Hindwing : with costal margin, the cell, and central space to inner margin whitish ; the veins yellow ; three short black curved lines with yellow between them on inner margin near base ; an outer pale brown-bordered line acutely angular above vein 4 ; two black spots on discocellular ; marginal area lilac-grey, with white black-edged submarginal spots between 4 and 6, and a dove-coloured blotch below 4 containing a black dot.

Underside of forewing pale brown, coarsely black-speckled, pale grey towards apex and along inner margin ; cell-spot black ; hindwing white, with black costal spots, a black discal mark, and scattered black speckles ; a brown-black marginal border, broad at costa, narrowing downwards to vein 2, containing white marginal patches.

Vertex, thorax, and abdomen pale pearl-grey, the dorsum with slight black and yellow markings ; face, palpi, and forelegs deep brown ; antennae and fillet yellowish.

Expanse of wings : 26 mm.

2 ♂♂.

Hindmargin of forewing excised between 7 and 4, straight and oblique below, the apex depressed ; of hindwing shortly toothed throughout, with a long slender tooth at vein 4 and slightly excised above it ; antennae with distinct clavate teeth.

28. **Epiplema falcigera** spec. nov.

Forewing: lilac-grey, speckled with black, most thickly along inner margin; first line indicated by a brown oblique streak from costa at one-third, second by a brown cloud at two-thirds; patches of black scales between veins before hindmargin below middle, and a larger patch on inner margin at two-thirds; a black discal spot; fringe ferruginous.

Hindwing: with the costal half suffused with wood-brown, the whole irregularly spotted and striated with dark; a black spot before margin below lower tooth; fringe brown.

Underside of forewing dull smoky brown with black strigae, the costal area pale grey; hindwing pale yellowish grey, coarsely black-speckled, with a black discal dot and slight submarginal shade.

Face, palpi, and forelegs black; vertex and shoulders pale pearl-grey; thorax brownish grey; abdomen paler.

Expanse of wings: 35 mm.

1 ♀.

Forewing with falcate apex, and a deep excision between it and vein 4, straight and oblique below; hindwing crenulate, with longer teeth at veins 4 and 7; antennae with short clavate teeth.

29. **Epiplema flexifascia** spec. nov.

Forewing: pale grey, with dark grey suffusion and strigae, sometimes with a reddish tint; lines thick, blackish: first at one-fifth, bent in cell, then oblique, the upper arm almost obsolete; second from quite two-thirds of costa, oblique inwards to median, then curved outwards to three-fourths of inner margin: the area from base to this line darker grey, especially in the ♀, and with dark striae along inner margin; outer line curved from apex to submedian fold, enclosing a semi-oval marginal space of dark grey; the area between second and third lines pale, with slight striations and a central dark cloud below middle running into anal angle; fringe dark grey, pale above anal angle.

Hindwing: dark brown; a deeper brown, pale-edged outer line, bluntly rounded in middle, not angled, towards hindmargin; basal line abbreviated, confined to costal half; a dark brown thick line along median vein and vein 4, interrupted by an oblique white mark, where the dark discocellular line joins it; a dark brown lunular line before margin from upper to below lower tooth, on each side of which it is swollen, preceded by a white spot below vein 6; fringe brown, with a paler base; space along the fold from base pale in both sexes.

Underside yellowish ochreous in forewing and costal half of hindwing, with dark brown strigae, lines, and suffusion; the veins also dark; inner-marginal half of hindwing whiter.

Head, thorax, and abdomen pale or dark grey; face, palpi, and forelegs black: vertex white; collar black; antennae ferruginous, with thick, rather long, clavate teeth in the ♂, simply lamellate in ♀; anal tuft in ♂ pale ochreous.

Expanse of wings: ♂ 22 mm.; ♀ 24 mm.

2 ♂♂, 2 ♀♀.

Hindmargin of forewing entire, but faintly indented beyond cell; of hindwing with two small teeth at veins 4 and 7, concave between, with a blunt tooth at vein 6.

The ♀, as a rule, is darker than the ♂.

30. **Epiplema innocens** spec. nov.

Forewing: whitish, densely striated with pale lilac-grey; the lines a little darker, but obscurely marked and interrupted; first at two-fifths, curved; second from three-fifths of costa to three-fourths of inner margin, slightly outcurved above; a slightly darker marginal space from apex to vein 3, edged inwardly by a dark waved line, prominent on vein 6: fringe pale grey, beyond some faint whitish dots at the ends of veins.

Hindwing: first line curved close to base; second forming a long blunt projecting beak on vein 4; some dark grey marginal lunules from upper to lower tooth.

Underside lilac-whitish; forewing with a faint grey tinge.

Thorax and abdomen grey like wings; vertex and shoulders whitish; face dark brown above, whitish at base.

Expanse of wings: 17 mm.

1 ♂.

Forewing with hindmargin entire; hindwing incurved between 4 and 7, with minute blunt teeth at their ends.

31. **Epiplema planimargo** spec. nov.

Forewing: dull purplish grey, this tint being formed by darker grey striae on a paler ground; lines fine and distinct, olive-brown; first curved, from quite one-third of costa to fully middle of inner margin: second from two-thirds of costa to three-fourths of inner margin, forming a beak outwards on vein 4, then incurved and parallel to inner line; fringe dark grey, the margin before it also diffusely dark.

Hindwing: with the outer line only distinct, a little curved.

Underside uniform pale lilac-grey, slightly darker in forewing.

Head, thorax, and abdomen concolorous with wings; vertex whitish; face and palpi dark brown.

Expanse of wings: 21 mm.

1 ♀.

Margins of both wings simple; hindwing with a scarcely perceptible bend at veins 4 and 7.

32. **Epiplema taminata** spec. nov.

Forewing: dull white, with a bluish tint; the lower outer half of wing suffused with pale brownish; costa finely dotted black and white; the whole wing with a few dark striae; lines purplish black, interrupted; first at about one-third, angled bluntly on median vein; second from a dark costal mark at two-thirds, bent in below vein 4 and interrupted throughout; the central space below vein 6 filled in with brown striae; a submarginal line of black spots from apex to vein 2, the margin beyond it purplish; fringe black-chequered at base, pale towards tips, with a pale basal line.

Hindwing: white, brown-speckled; the two lines curved, blackish, interrupted, the outer angled on vein 4; two distinct black spots at the ends of discocellular; a brown black-edged marginal shade, cut by a pale line before lower tooth.

Underside of forewing washed with pale brown: the submarginal line marked; the fringe chequered black and pale; hindwing white, with a few dark freckles; two black discal dots and black lunules before the excision between the teeth.

Vertex, thorax, and abdomen white; face, palpi, and forelegs dark brown; legs white, tarsi and spurs brown-mottled.

Expanse of wings: 15 mm.

1 ♂.

Hindmargin of forewing simply indented beyond cell; of hindwing with short teeth at 4 and 7; antennae with clavate teeth.

33. **Epiplema vialactea** spec. nov.

Forewing: deep liver-colour, crossed by two deeper brown shades, one at one-third, the other from three-fourths of costa to two-thirds of inner margin; costa and all the veins dotted with white; beyond the outer shade between veins 4 and 6 a large white crescent-shaped blotch of coalescent white spots, these spots lying between, as well as on, the veins; the spots above it on vein 7 and in the interval below also being larger but not confluent; a row of white submarginal dots between the veins, those above vein 4 large and conspicuous; a marginal row of white spots between veins, above vein 4 running out into the fringe, which is liver-brown.

Hindwing: similar; the spots beyond cell and those in the whole lower outer half of wing larger and more numerous, but not forming a crescent, and coalescing along submedian fold; marginal white spots between veins throughout.

Underside of forewing pale liver-colour freckled with white, of hindwing white freckled with brown; the fringes chequered white and liver-colour.

Head, thorax, and abdomen dark liver-colour; dorsum with white points; vertex and shaft of antennae snow-white; abdomen beneath and legs whitish; pectus and forelegs liver-colour.

Expanse of wings: 26 mm.

1 ♀.

Hindmargin of forewing simple; of hindwing prominent, but hardly toothed, at veins 4 and 7.

Family *GEOMETRIDAE.*

Subfamily OENOCHROMINAE.

Dicyclodes gen. nov.

Forewing: costa straight, with a faint curve at base and before apex; apex minutely produced; hindmargin strongly gibbous above, oblique below, in the ♀ faintly indented below apex.

Hindwing: with apical angle and hindmargin rounded; anal angle rectangular.

Thorax woolly; antennae of ♂ uniseriate pectinate for two-thirds; of ♀ filiform; forehead protuberant; palpi stout, upturned, short, terminal segment indistinct; frenulum and tongue present; hindtibiae not thickened, with four spurs.

Neuration: forewing, cell longer than half wing; discocellular oblique inwards to near median vein, then sharply angled at the lower fork and oblique outwards; first median nervule at four-fifths, second close before end; radials normal; 7, 8 stalked from end of cell, 9, 10 stalked a little before them, 9

anastomosing subsequently with 8, 11 from cell; hindwing with discocellular angled outwards in middle, the radial from the angulation; 6, 7 and 3, 4 from angles of cell, 7, 8 approximating near base.

Type *Dicyclodes hieroglyphica* spec. nov.

Allied to *Sarcinodes* Guen.

34. **Dicyclodes hieroglyphica** spec. nov.

Forewing: dark pearly grey, along the costa beyond middle deep garnet-red, shading below into deep olive; costa with two snow-white streaks; one antemedian curving in towards cell-spot, then apparently bent inwards and marked by black dashes on the median and submedian veins: a broad olive subbasal band; cell-mark garnet-red; a very fine dark outer line, lunulate-dentate, the teeth pointing inwards, parallel to hindmargin, at two-thirds, starting below the postmedian white costal streak; a silvery white submarginal line, edged inwardly with black, from costa just before apex, bent inwards and sinuous below vein 4, to inner margin close to outer line; marginal area a mixture of shining grey and rosy, becoming olive along the margin itself: the veins whitish and bearing arrow-headed points before the margin; fringe dark olive.

Hindwing: with a broad central olive band, outwardly edged by a darker sinuous line, containing a sinuate hyaline cell-mark; a wavy grey submarginal line, preceded and followed by olive clouds; fringe dark olive.

Underside of forewing silvery whitish, with transverse olive-brown striae; suffused with olive towards anal angle: a broad straight central olive shade and an oblique outer line of spots on veins starting from a costal streak at four-fifths; hindwing pearly white only along abdominal margin, the rest olive-brown flushed with red, paler before the dark antemedian line; an indistinct waved line beyond cell-spot; submarginal line lunulate-dentate, edged with grey at costa, forming white teeth on veins 2, 3, and 4, followed by two crimson blotches.

Head, thorax, and abdomen pearl-grey tinged with pale olive; abdomen beneath broadly blotched with crimson: legs brown with pale joints; pectus and femora woolly, pale grey and pink.

Expanse of wings: ♂ 48 mm.; ♀ 48—52 mm.

5 ♂♂, 3 ♀♀.

35. **Noreia pulverosa** spec. nov.

Forewing: pale mouse-grey, dusted with fuscous; costal edge brown; lines dark brown; first nearly straight, at one-third, hardly reaching costa; second from just before apex, and apparently retracted to costa, to two-thirds of inner margin; cell-spot dark; submarginal line indicated by dark spots between veins.

Hindwing: with outer line only.

Underside pale grey in forewing, whitish grey in hindwing; the outer lines dark; the cell-spots marked; costa of forewing yellowish brown; hindwing speckled with grey.

Thorax and abdomen dark grey; fillet fulvous; face dark brown; palpi and legs grey marked with reddish.

Expanse of wings: 38 mm.

1 ♂.

Subfamily PSEUDOTERPNINAE.

36. **Hypochroma purpurissa** spec. nov.

Forewing: pale bluish white, shaded with purplish slate-colour and with greenish slaty striations; costa with purple striae and four black blotches at even distances apart; lines black; first outcurved above and below median to quite one-third of inner margin, preceded there by a purplish shade; outer lunulate-dentate, from the third costal spot, outcurved above and incurved from 4 to middle of inner margin, where it approaches inner line; a large purplish black ear-shaped cell-spot beneath the second costal spot; submarginal shade cloudy purplish, darker and outcurved beyond cell and between 1 and 3, the marginal area at apex and between 3 and 4 pale bluish white; black marginal lunules; fringe pale blue with black chequering beyond veins, its base beyond the lunules white; close to base of wing are three purplish spots, indicating a basal line.

Hindwing: more thickly striated; no basal line, but a short dentate line on discocellular; the rest as in forewing; inner margin and fringe golden yellow.

Underside deep dark purple, the apex of forewing and a broad band just beyond middle of hindwing pale bluish white, the band showing slightly on inner margin of forewing; lines and cell-spots indistinctly deeper purple; inner margin of hindwing more broadly yellow.

Palpi externally and lower half of face purplish black; upper half of face and vertex slaty white; shoulders and base of patagia the same; tips of shoulders and a broad band reflexed to sides of patagia velvety black; thorax and dorsum pale slaty blue, the segments with pairs of lateral black spots; anal segments and sides and underneath of abdomen golden yellow; tarsi black with yellow spots.

Expanse of wings: 52 mm.

1 ♂.

In *Nov. Zool.* x. p. 350 mention was made of 3 ♀♀ from the Upper Aroa River (which were there referred to *saturataria* Wlk.), in which the usual green upperside of that species had acquired the slaty coloration of the underside; the last mentioned of the three certainly, and the other two probably, should be referred to the present species. I am also inclined to keep *H. caesia*, from Fergusson and Ron Islands, distinct from the New Guinea species.

Subfamily GEOMETRINAE.

37. **Anisogamia albifusa** spec. nov.

Forewing: hyaline green; the basal third, the discocellular and space beyond, and the three outer lines of distinct conjoined lunules powdery white; across the green central area the veins are strongly dotted green and white; costa fuscous, irregularly mottled with white; marginal white dots at the ends of the veins; fringe green flecked with whitish.

Hindwing: mottled all over with white scales from base, without any central green space; all the veins throughout uniformly dotted green and white.

Underside whitish green, iridescent; apical half of costa of forewings and marginal dots of hindmargin below apex bronzy fuscous.

Head, thorax, and abdomen green speckled with white; fillet narrowly white;

face green above, the lower half white; abdomen beneath, pectus, and legs white, foretarsi brownish.

Expanse of wings: 30 mm.

2 ♂♂.

38. **Anisogamia albiseriata** spec. nov.

Forewing: dark green; costal edge white, with dark brown flecks, thickened towards apex; lines represented by series of white spots; first from one-fourth of costa to one-third of inner margin, consisting of small spots, on the folds as well as on the veins; middle line of larger spots, two somewhat diffuse on each side of vein 7, a partially double quadrate spot beyond cell, a large one on inner margin at middle, with sometimes a smaller one above it on the fold; exterior series placed on the veins, those on veins 4 and 5 coalescing into a blotch and displaced basewards; submarginal series more elongate and diffuse, situated between the veins, those on the folds larger; fringe pale green with distinct white mottling beyond veins.

Hindwing: without basal series of spots: the middle series often enlarged into a broad white band, containing two dark green spots on discocellular: fringe of inner margin white.

Underside whitish green, the white spots showing through; costa of forewing yellowish.

Head, thorax, and abdomen deep green; dorsum with conspicuous white spots; fillet white; antennae greenish white; abdomen beneath, pectus, and legs white; forelegs greenish.

Expanse of wings: 19 to 24 mm.

5 ♂♂.

Hindmargins without crenulations; hindwing slightly elbowed at veins 4 and 6.

39. **Anisogamia batis** spec. nov.

Forewing: dull grass-green; costa broadly brown, speckled with ochreous; marginal line thick, purplish brown, finely edged externally with flesh-coloured ochreous, which below apex is swollen into spots between the veins; fringe pale grey with a purplish grey basal line; hindmargin marked with two flesh-coloured ochreous blotches, edged and centred with purplish brown; one rounded between veins 3 and 5, the other flattened and elongate at anal angle below vein 2.

Hindwing: with the middle marginal blotch much smaller; cell-spot white.

Underside pale blue-green, the marginal blotches showing white; costa of forewing fuscous speckled with pale.

Head, thorax, and abdomen green; palpi externally, vertex, fillet, and antennae reddish varied with paler; dorsum with more or less coalescent patches of flesh-coloured ochreous and grey scales; abdomen beneath, pectus, and legs whitish; forelegs pinkish brown, with pale joints.

Expanse of wings: 28 mm.

3 ♀♀.

40. **Anisogamia commaculata** spec. nov.

Forewing: semi-transparent, deep green, with snow-white blotched lines; a white blotch at base of costa; an oblique one on inner margin near base and a quadrate white blotch on costa at one-fifth; a spot before middle of inner margin

and an irregular white blotch in end of cell, connected with a white blotch on costa before it, represent a middle line; three series of broad white lunular blotches before hindmargin, not reaching costa, and all interrupted between veins 2 and 3; veins beyond cell dotted alternately green and white; costal edge fuscous, irregularly interrupted by white marks; fringe grey cut by white flecks from the white marginal dots at the vein-ends.

Hindwing: with a large white blotch at base of cell, one on discocellular, and three below cell; followed by the three series of lunules as in forewing; fringe paler; veins near base deep green.

Underside pale green, with the white markings showing through; costa of forewing broadly fuscous marked with white, towards apex projecting toothlike into the green area; marginal dots between veins large, fuscous; a fuscous subapical spot on hindwing.

Head, thorax, and abdomen green; abdomen with silvery white dorsal and subdorsal blotches; fillet and lower half of face white; abdomen below, pectus, and legs white; foretarsi mottled fuscous and white.

Expanse of wings: 34 mm.

1 ♂.

41. **Anisogamia decorata** spec. nov.

♂. *Forewing:* semi-transparent, grass-green; costal edge dark brown freckled with cream-colour, extending across base nearly to inner margin; first line starting from a cream-coloured costal spot at one-fourth to two-fifths of inner margin, lunulate outwards, dentate inwards, pale above median vein, fuscous below; outer line lunulate-dentate, from nearly three-fourths of costa to two-thirds of inner margin, obscurely marked across wing, but from costa to vein 6 edged with white, and followed by a dull whitish blotch containing pinkish scales and outwardly shaded with black scales; submarginal line marked on the outside edge of this blotch by two white lunules and below by spots of pinky brown between the veins, ending in a flattened blackish blotch at anal angle, containing some reddish scales beyond outer line: cell-spot a white crescent; white marginal spots at the vein-ends; fringe rufous grey.

Hindwing: with only the two outer lines; a large blotch of smoky black and pink scales at apex, the submarginal line marked across it by three black pale-centred wedge-shaped marks.

Underside pale iridescent green; costa of forewing yellowish, speckled with dark brown; two brown costal blotches before apex, with a yellowish space between them; a blackish blotch at anal angle, and a large oval black blotch at apex of hindwing; fringes green tipped with brown; brown marginal spots below apex of forewing.

Head, thorax, and abdomen dark green; thorax and metathorax marked with dark and light grey scales, with a green space in the centre; second and third dorsal segments with small white spots, fifth and sixth with large grey blotches; anal tuft pale ochreous; face with two white spots below; fillet whitish; palpi externally dark brown; abdomen beneath, pectus, and legs whitish; foretarsi blackish, with white joints.

♀. *Forewing:* with costal edge more broadly but paler brown, thickly speckled with white; first line fine, simply waved; outer line finely white, forming two large lunules to vein 4, along which it runs out to close to hind-

margin, skirting this to vein 2, then curving inwards to inner margin before anal angle, where it is followed by dark grey scaling; the square apical blotch is filled up with rufous grey externally, separated by three green pale-edged lunules from the pale edging of the outer line : marginal line dark, swollen into spots between veins.

Hindwing : like forewing, the apical blotch consisting of dark and light grey scaling.

Underside with the black blotches larger, the forewing with a single pear-shaped blotch before apex.

Dorsum wholly reddish grey, except the basal segment, which alone is green.

Expanse of wings : ♂, 40 mm. ; ♀, 36 mm.

3 ♂♂, 3 ♀♀.

42. **Anisogamia flavilinea** spec. nov. and ab. **albinata** nov.

Forewing : semihyaline deep green ; costal edge narrowly fuscous, uniformly dotted with pale : the lines pale yellowish ; first from one-third of costa to two-fifths of inner margin irregularly zigzag ; outer somewhat irregularly dentate-lunulate, from three-fourths of costa to two-thirds of inner margin, bent inwards below vein 3, and above it followed by a blotch of pale scales ; a submarginal line of yellowish spots between veins, that between 3 and 4 biangulate, almost obsolete below : a row of praemarginal wedge-shaped yellowish spots between veins, that between 3 and 4 large, obsolete below ; yellowish white marginal spots at the vein-ends ; fringe grey-green, finely chequered with yellowish ; in the basal and median areas are traces of yellowish cross-lines marked by vein-dots only ; across the discocellular and reaching vein 2 is a diffuse grey cloud.

Hindwing : similar, without basal line or central cloud, but with a small grey patch at apex.

Underside pale iridescent green, the lines showing through ; costa of forewing yellow, with fine brownish speckling, underlined before apex by three deep green blotches ; a brown spot at apex.

Head, thorax, and abdomen deep green ; dorsum with white spots, a patch of brown scales on the penultimate segment, and the anal tuft whitish ; face with two white dots, one on each side below ; antennae red-brown with basal segment white ; palpi externally pale red-brown ; forelegs red-brown with white joints ; abdomen beneath, pectus, and legs white.

Expanse of wings : 40 mm.

5 ♂♂, 4 ♀♀.

The aberration *albinata* has all the lines white, generally much less marked than in the type form, except between veins 3 and 4, where the expansion of the three lines forms a conspicuous whitish patch. It is also, on the average, a little smaller than the type form.

6 ♂♂, 1 ♀.

In the single ♀ the white markings are greatly reduced, while the brown apical blotch of hindwing is amplified.

43. **Anisogamia griseonotata** spec. nov.

Forewing : dull grass-green, semi-transparent ; costal edge fuscous, with fine white striations ; the lines very fine, whitish ; first from one-fifth of costa to one-third of inner margin, lunulate-dentate, the teeth pointing inwards, followed

by a dull fuscous shade; outer line from two-thirds of costa to two-thirds of inner margin, lunulate-dentate, the teeth pointing outwards and marked by white dashes on veins, preceded by a fuscous shade; a submarginal row of white spots between the veins; a row of large white marginal dots at the vein-ends; fringe green; cell-mark a fine white crescent, outwardly edged with fuscous.

Hindwing: with some white spots on veins near base; the rest as in forewing, but the outer line ends in a large white spot on inner margin.

Underside pale iridescent green; costal edge of forewing yellow with fine black specks; a dark speck at apex.

Head, thorax, and abdomen deep green; centre of thorax and metathoracic tuft fuscous; abdomen with white dorsal spots; lower half of face white; terminal segment of palpi brown with pale tip; antennae annulated brown and white.

Expanse of wings: 30 mm.

8 ♀♀.

44. **Anisogamia iridescens** spec. nov.

Forewing: hyaline green, the wing membrane being covered with very fine hairlike scales; costal edge fuscous, uniformly cut with white dots; all the veins deeper green alternated with pale points, representing the dark and light lines crossing the wing, which, however, are not visible except on the veins; the only visible lines are an inner interrupted line from one-fourth of costa to near middle of inner margin; an outer line of pale lunules from four-fifths of costa to two-thirds of inner margin, followed by a similar submarginal line and a series of pale marginal spots, the spots of these three lines all lying in the intervals; a deep green marginal line containing white points at the vein-ends; fringe mottled green and white.

Hindwing: the same, but without any basal line.

Underside pale iridescent green, the markings merely showing through; extreme costal edge towards apex brown.

Head, thorax, and abdomen green sprinkled with white scales; face with white cheeks; abdomen with whitish dorsal spots; antennae fuscous; pectus and legs whitish green; forelegs fuscous with white joints.

Expanse of wings: 29 mm.

1 ♂.

45. **Anisogamia scintillans** spec. nov.

Forewing: deep green, sprinkled with flaky white scales, which in some lights are scintillating; costa narrowly white; its inner edge with some brown striae, which towards apex reach the costal edge; first line marked by white dots on folds as well as veins; a white dot on discocellular and another on vein 5 beyond cell; an exterior and submarginal row of white spots between the veins, forming each a white lunule on submedian interval and a white spot on inner margin; the spots beneath vein 5 large and displaced basewards; the apical spot of the submarginal row large; on each side of the last series a series of white dots on the veins; fringe green with conspicuous white chequering.

Hindwing: without basal line.

Underside pale green; the forewing darker except on hindmargin; costa of forewing yellow.

Head, thorax, and abdomen deep green; fillet broadly snow-white; dorsum with snow-white spots; underside of abdomen, pectus, and legs white; foretarsi fuscous with pale joints; antennal shaft white, the pectinations green.

Expanse of wings: 28 mm.

1 ♂.

46. **Anisogamia seminivea** spec. nov.

Forewing: deep green, irregularly freckled with white; costal edge white, with slight oblique fuscous striae; basal and subcostal areas powdered with bluish white; an ill-defined oblique line near base, marked by white spots on veins and folds upon a deep green space; median area occupied by diffuse white blotches below costa, and above inner margin containing deep green granular speckling: outer line acutely lunulate-dentate, the lunules on the folds only showing white; marginal area filled with white and green speckling; a dark green marginal line; fringe pale green chequered with white.

Hindwing: white speckled with green, except on costal area; a distinct white lunulate-dentate outer line, preceded by a deep green shade; cell-spot deep green.

Underside whitish green, deeper green towards costa of forewing, which is white.

Head, thorax, and abdomen deep green; palpi beneath, fillet, antennal shaft, and dorsal spots white; antennal pectinations and forelegs greenish; abdomen beneath, pectus, and legs white.

Expanse of wings: 28 mm.

1 ♂, 1 ♀.

47. **Anisogamia triseriata** spec. nov.

Forewing: grass-green; the costal edge finely but conspicuously white; inner line close to base, very indistinct, outcurved above and below median vein, and ending in a white spot on inner margin; discal spot dark, preceded by a few white scales; outer line deeply lunulate-dentate, the white lunules appearing as an interior line and the white teeth as an exterior line; large marginal white spots at the vein-ends; fringe concolorous.

Hindwing: similar, but without basal line.

Underside pale bluish green, the fringe showing rather darker.

Head, thorax, and abdomen grass-green; fillet white; dorsum with small white spots; antennae with shaft white, and pectinations greenish ochreous; abdomen beneath, pectus, and legs white; forelegs greenish.

Expanse of wings: 34 mm.

2 ♂♂.

The palpi, especially the terminal segment, much shorter than usual.

48. **Anisogamia viridissima** spec. nov.

Forewing: very deep green, the costal edge whitish at base, then reddish brown: lines bluish white, very slender; first close to base, dentate inwards on veins, lunulate outwards; outer line at four-fifths, dentate-lunulate, the teeth marked on veins, outcurved from costa to submedian fold, then vertical: in the middle of wing, from subcostal vein to submedian fold, a broad greenish black blotch; fringe deep green; cell-spot black.

Hindwing: without inner line.

Underside glossy bluish green ; costa of forewing yellow.

Head, thorax, and abdomen dark green ; fillet and dorsal spots white ; abdomen beneath, pectus, and legs white ; foretarsi green ; palpi green externally.

Expanse of wings : 28 mm.

1 ♀.

49. **Chlorochroma discata** spec. nov.

Forewing : deep apple-green, frosted with paler; costal edge snow-white, underlined by a fawn-coloured streak ; the two lines lunulate-dentate, slightly paler, edged conversely with deeper green ; first from one-fifth of costa to beyond one-third of inner margin, obscurely toothed inwards on the veins ; the outer from three-fourths of costa to two-thirds of inner margin, outcurved above ; cell-spot a large round brown disc with deep smoky black centre ; deep red marginal spots at ends of veins ; fringe yellow.

Hindwing : the same, the cell-spot somewhat larger.

Underside shining whitish green, deeper green below costa of forewing, which is snow-white underlined with fawn-colour ; fringes whitish ; marginal dots showing only below apex of forewing.

Head, thorax, and abdomen green ; vertex white, edged behind with pink ; abdomen with yellow dorsal line ; antennae whitish green ; palpi above and forelegs in front tinged with fawn-colour ; abdomen beneath, pectus, and legs white.

Expanse of wings : 36 mm.

3 ♂♂.

Hindmargin of forewing straight and vertical, anal angle square-cut.

50. **Chlorochroma flavilimes** spec. nov.

Forewing : grass-green ; costal edge white, underlined with yellow, reddish at base ; lines fine, yellowish white, plainer towards inner margin ; first from one-sixth of costa to one-third of inner margin, bluntly angled on median vein ; outer parallel to hindmargin, from three-fourths of costa to two-thirds of inner margin ; fringe yellow, beyond minute red dots at the ends of the veins ; cell-spot black.

Hindwing : the same, but the outer line slightly curved.

Underside pale green, deeper towards costa of forewing, which is yellow.

Head, thorax, and abdomen dark green ; fillet broadly silvery white ; basal segment and shaft of antennae white, the pectinations greenish ; a yellowish white dorsal line down thorax and abdomen ; anal segment white ; abdomen beneath and legs whitish green, forelegs green-tinged.

Expanse of wings : 40 mm.

1 ♂, 3 ♀♀.

51. **Chlorochroma geminipuncta** spec. nov.

Forewing : deep sea-green, semi-transparent ; costal edge finely dull red ; lines very faint, marked by the difference of tint : first oblique from one-sixth of costa to before middle of inner margin ; second lunulate-dentate, from two-thirds of costa to three-fifths of inner margin, preceded, as the inner line is followed, by a deeper green tint ; cell-spot black, small, preceded by a reddish streak on upper arm of discocellular ; fringe yellowish.

Hindwing : similar.

Underside paler green.

Thorax and abdomen green; face, palpi, and collar red; vertex snow-white; antennae reddish; palpi and face below paler; forelegs in front reddish.

Expanse of wings: 35 mm.

1 ♀.

52. **Chlorochroma laticostata** spec. nov.

Forewing : dull grey-green, subtransparent; costa broadly white, before apex underlined with red; lines dentate-lunulate, very faint, the teeth minutely whitish on the veins; first from one-sixth of costa to one-third of inner margin, dentate inwards; second from three-fourths of costa to two-thirds of inner margin; cell-spot small, brown: marginal line vinous red, interrupted at the vein-ends: fringe yellow.

Hindwing : like forewing.

Underside whitish green: costa of both wings yellow.

Head, thorax, and abdomen green: fillet and antennae white, apical third red; abdomen beneath, pectus, and legs white.

Expanse of wings: 26 mm.

1 ♂, 5 ♀♀.

53. **Chlorochroma latistriga** spec. nov.

Forewing : blue-green, frosted with paler; costal edge white, underlined throughout with fawn-colour; a narrow pale inner line from one-fifth of costa obliqne to one-third of inner margin; an outer nearly straight broad pale yellowish line from three-fourths of costa to two-thirds of inner margin, widening downwards; cell-spot black, large; marginal spots black, triangular; fringe pale yellow.

Hindwing : similar: the cell-spot short and linear; outer line broad, slightly curved.

Underside pale green, the broad outer line showing through; costa of forewing yellow, dusted with dark; marginal black spots.

Head, thorax, and abdomen green; vertex white: antennae greenish white; abdomen beneath, pectus, and legs white; forelegs green in front; palpi externally red.

Expanse of wings: 45 mm.

1 ♂, 2 ♀♀.

54. **Chlorochroma obsoleta** spec. nov.

Forewing : darker greyer green than *punctilligera*; the two lunulate-dentate lines almost equally indistinct; costal edge more broadly and distinctly yellow; cell-spot green, not black; marginal dots smaller, darker; fringe yellowish.

Hindwing : like forewing.

Underside whitish green; costa of forewing yellow.

Head, thorax, and abdomen deep green; fillet white; antennae greenish; anal tufts and sides of prae-anal segments white; abdomen beneath, pectus, and legs whitish; forelegs greenish in front.

Expanse of wings: 44 mm.

1 ♂, 1 ♀.

The apex of forewing is minutely produced.

55. **Chlorochroma punctilligera** spec. nov.

Forewing : dull pale green, the same tint as in *C. minor* Warr. ; the costal edge white at base, pale fawn-colour beyond ; lines dentate-lunulate, but scarcely perceptible : cell-spot a red-brown point on a grey bent line ; marginal points minute, reddish ; fringe pale yellow.

Hindwing : similar : the lines rather more plain.

Underside uniform pale green.

Thorax and abdomen green like wings, with a fine yellowish dorsal line ; face and palpi deep green ; vertex and antennae white ; abdomen beneath, pectus, and legs whitish ; forelegs greenish.

Expanse of wings : 40 mm.

3 ♀♀. One of these is smaller, measuring only 35 mm.

56. **Chlorochroma ruficosta** spec. nov.

Forewing : grass-green, the marginal half paler ; costa rufous with fine dark speckling ; an obscure pale line from costa near base to nearly one-third of inner margin, the green beyond it deeper ; a straight pale line, parallel to hindmargin, from two-thirds of costa to three-fifths of inner margin, where it is plainer, inwardly edged with darker green ; marginal line dull dark pink, still darker at the vein-ends ; fringe paler pink.

Hindwing : similar.

Underside pale green ; costa of both wings pale, yellowish ; fringe yellowish.

Face, thorax, and dorsum green ; thorax and dorsum with a pinkish yellow central line ; vertex snow-white ; collar crimson ; abdomen laterally and beneath, also the whole anal segment, pectus, and legs whitish green ; forelegs tinged with pink.

Expanse of wings : 40 mm.

1 ♂.

Hindwing with hindmargin bluntly elbowed at middle.

57. **Chlorochroma rufistriga** spec. nov.

Forewing : pale green, frosted with whitish-green scales ; costal edge white, finely underlined towards base with fawn-colour ; inner line from costa close to base to one-fourth of inner margin, straight and oblique, whitish outwardly edged with fawn-colour ; outer line parallel to hindmargin from three-fourths of costa to two-thirds of inner margin, white internally edged with fawn-colour ; a fawn-coloured linear mark on discocellular, bent below middle and marked with a darker spot at the bend ; fringe fawn-colour with slightly paler base.

Hindwing : like forewing ; the cell-spot green.

Underside whitish green ; forewing towards costa speckled, and at base suffused, with fawn-colour.

Head, thorax, and abdomen green, face deep green ; fillet and antennae white, the former edged behind with crimson ; shoulders at sides pink ; abdomen with broad yellowish dorsal line becoming white towards end, where the anal segments are themselves white ; palpi above and forelegs in front tinged with fawn-colour.

Expanse of wings : 44 mm.

2 ♀♀.

Hindwing with hindmargin rounded.

58. **Chlorochroma vestigiata** spec. nov.

Forewing: dark grass-green, the same tint as in *C. mediotincta* Warr., but not quite so dark; costa yellowish white; lines marked by whitish vein-dots, on a faint, scarcely perceptible line; first oblique, from one-sixth of costa to one-third of inner margin; second line at three-fifths, slightly angled on vein 6, and bent on vein 4; fringe yellowish; cell-spot green.

Hindwing: like forewing, with distinct dark marginal dots; the outer line angled on vein 4.

Underside whitish green; marginal dots distinct on both wings.

Head, thorax, and abdomen dark green; dorsum with small white dots; fillet and antennae white; abdomen beneath, pectus, and legs whitish.

Expanse of wings: 35 mm.

2 ♀♀.

Differs from *C. mediotincta* Warr. in the lines, the fringe, and the dorsal spots.

59. **Comostola flavifimbria** spec. nov.

Forewing: pale apple-green; costal edge finely yellow, with a few brown speckles towards apex; a very obscure curved line near base, and a dentate-lunulate inwardly darker-edged line beyond middle; a triangular red-brown cell-spot with some lustrous scales on it; a thick red-brown marginal line, interrupted by yellow dots at the vein-ends, overlaid with shining scales; fringe yellow.

Hindwing: with the cell-spot larger, pyriform.

Underside pale green, with the fringes and costa of forewing yellowish; a red-brown spot at apex of forewing.

Face red above, whitish below; fillet and antennae white; vertex yellowish; thorax and abdomen green; abdomen beneath pale green; legs whitish; forelegs tinged with reddish.

Expanse of wings: 22 mm.

1 ♀.

Closely allied to *C. albifimbria* Warr., from the Khasias.

60. **Comostola rufimargo** spec. nov.

Forewing: pale apple-green; costa deep pink, freckled with shining dark scales; hindmargin and fringe pink; thick red marginal lunules between veins, overlaid with lustrous scales; a pink yellow-edged spot on inner margin before one-third indicates the inner line; a similar, but larger, spot at two-thirds ends the outer line, which is marked across wing by small white vein-dots, starting from a dark costal spot; discal spot like those on inner margin.

Hindwing: the same, but without the spot indicating inner line

Underside pale shining green, the fringes pinkish tinged.

Face, palpi, vertex, and basal half of dorsum deep pink; fillet white; antennae reddish; thorax, patagia, anal half of abdomen, and its base laterally green; underside and legs pale greenish white.

Expanse of wings: 16–18 mm.

4 ♂♂, 4 ♀♀.

61. **Comostolodes castaneata** spec. nov.

Forewing: apple-green; costal area paler, the costal edge pale fawn-colour; lines bright chestnut-brown, double, starting from subcostal vein; first vertical at one-fourth, the two arms divergent above middle; median beyond middle, waved, bent inwards along vein 2, then vertical to middle of inner margin; space between the arms in both lines green; a brown marginal shade, obliquely swollen at apex, forming an inward triangle on vein 4, and swollen into a large blotch before anal angle, which touches middle line as a roundish blackish blotch, externally edged by a white spot, the red-brown above it nearly reaching vein 3; a row of deeper brown dashes between veins along margin: fringe brown, faintly chequered with greenish; cell-spot black.

Hindwing: with only the brown border, which is much swollen at apex and anal angle, containing a pale pink blotch above vein 4, between which and vein 2 the green ground-colour runs out nearly to hindmargin: inner margin narrowly brown nearly to base.

Underside dull green, with all the brown markings showing through.

Head and palpi mixed, red-brown and whitish; sides of metathorax, tips of patagia, and abdomen red-brown: thorax otherwise green; abdomen beneath, pectus, and legs pale green; forelegs red-brown mottled with pale.

Expanse of wings: 22 mm.

2 ♂♂.

62. **Comostolodes viridifimbria** spec. nov.

Forewing: grass-green, rather thinly scaled; costal edge pale brown; lines denoted by white dots on veins, the lowest in each series, on vein 1, being larger and ringed with brown; first line marked otherwise only by a dot on median vein at the origin of vein 2; the outer line at four-fifths, parallel to hindmargin, angled on vein 6 and starting from a white spot at three-fourths of costa, with the spot on vein 4 like that on vein 1; white marginal dots at the ends of the veins; fringe green: cell-spot brown.

Hindwing: without lines; cell-spot brown: marginal spots white, large, that at anal angle ringed with brown.

Underside paler green: the spots of outer line of forewing showing through.

Head, thorax, and abdomen green: fillet and front of shoulders whitish.

Expanse of wings: 20 mm.

2 ♂♂.

63. **Gelasma imitans** spec. nov.

Forewing: dull grey-green; costal edge finely speckled, fuscous and white; lines white, lunulate-dentate; first from one-fifth of costa to two-fifths of inner margin, dentate inwards on veins; outer line from five-sixths of costa to two-thirds of inner margin, running parallel to hindmargin to vein 2, then running in basewards; the lunules on each side of vein 4 broadly white and displaced basewards, followed by a similar double white lunule touching hindmargin; marginal spots large and white; fringe pale green; cell-spot dark green.

Hindwing: like forewing, but with no basal line.

Underside pale green, the white lunules showing through; costa of forewing yellow.

Head, thorax, and abdomen green ; antennae white ; fillet slightly paler green.

Expanse of wings : 40 mm.

1 ♀.

In the greater development of the white markings at middle of hindmargin of both wings this species mimics several species of *Anisogamia*.

64. **Gelasma invidens** spec. nov.

Forewing : dull greyish green : costa fuscous speckled with white ; lines white, distinct, dentate-lunulate ; first from one-fifth of costa to two-fifths of inner margin, dentate inwards on veins ; outer line from three-fourths of costa to two-thirds of inner margin, the lunules on the folds stronger ; cell-spot dark green ; fringe pale green, paler at tips.

Hindwing : without inner line.

Underside paler green.

Head, thorax, and abdomen green ; fillet and antennal shaft white, the pectinations greenish ; dorsum with white dots ; forelegs greenish.

Expanse of wings : 38 mm.

1 ♂.

65. **Gelasma spumata** spec. nov.

Forewing : semi-transparent, pale dull green frosted with white scales : a slightly curved inner and an oblique broader postmedian band of unspeckled green ; a fine waved submarginal line ; cell-spot dark green ; fringe pale green.

Hindwing : similar, but the outer band narrow, and acutely angled on vein 4 ; cell-spot large, black.

Underside whitish green.

Face and palpi above olive-green ; thorax and abdomen pale green speckled with whitish ; vertex whitish, with a few green scales ; abdomen beneath, pectus, and legs whitish ; forelegs olive-green in front.

Expanse of wings : 35 mm.

1 ♀.

66. **Iodis bicolor** spec. nov.

Forewing : semi-transparent hoary green ; the costal edge narrowly fawn-colour, green at base ; lines lunulate-dentate, indicated only by the difference of colour ; first vertical, from one-fourth of costa to one-third of inner margin, dentate inwards on veins, followed by a deep green shade ; second from two-thirds of costa to two-thirds of inner margin, the teeth on veins 3 and 4 projecting, preceded by a deep green shade ; fringe green ; cell-spot black.

Hindwing : without basal line.

Underside pale green, with the cell-spots and outer band showing through.

Head, thorax, and abdomen green ; antennae greenish white ; abdomen beneath, pectus, and legs whitish ; forelegs greenish.

Expanse of wings : 22 mm.

3 ♂♂.

Very much like *I. fragilis* Warr., but rather smaller ; the cell-spots black, not green.

67. **Iodis commixta** spec. nov.

Forewing: deep moss-green, varied along middle of central fascia and along hindmargin with whitish striae; costal edge finely fawn-colour; two broad diffuse dark shades, the first curved at one-third, the outer at two-thirds; on the outer side of this last can be seen a lunulate-dentate line, with the teeth marked white on the veins; a fine dark marginal line; fringe paler green; cell-mark green.

Hindwing: like forewing.

Underside whitish green, deeper beneath the dark bands.

Head, thorax, and abdomen green; fillet and antennae snow-white; abdomen beneath, pectus, and legs white; forelegs greenish in front.

Expanse of wings: 29 mm.

2 ♀♀.

Larger than *I. fragilis* Warr., with more confused markings.

68. **Pyrrhorachis ruficeps** spec. nov.

Forewing: bright apple-green; costa, hindmargin, and fringe deep pink; the costal streak freckled with fuscous; the hindmargin with some grey scales and inwardly edged with yellowish.

Hindwing: with the hindmargin and fringe pink from before apex to above anal angle.

Underside pale green; fringes and costa of forewing pale pink.

Upper half of face, vertex, and dorsal streak deep pink; antennae pink and white; lower half of face and fillet white; patagia and sides of abdomen green; abdomen beneath, pectus, and legs whitish; forelegs pink.

Expanse of wings: ♂, 17 mm.: ♀, 22 mm.

3 ♂♂, 1 ♀.

69. **Rhomborista exililinea** spec. nov.

Forewing: deep emerald green; costal edge snow-white; lines very fine, pale green; first from near base of costa obliquely curved to one-third of inner margin: outer line from two-thirds of costa to two-thirds of inner margin, irregularly crenulate, the teeth on veins 3 and 4 projecting outwards, running in strongly along vein 2, and again obliquely outwards, parallel to inner line; cell-spot deep green; marginal spots white and large, between the veins; fringe purplish grey, with a whitish middle line.

Hindwing: like forewing.

Underside almost white; costa of forewing yellowish; fringe white with the outer half purplish grey and with purplish grey spots beyond the vein-ends.

Head, thorax, and abdomen deep green; dorsum with silvery white spots; sides of the prae-anal segments and anal segment itself white; fillet and antennal shaft white, the pectinations greenish; abdomen beneath, pectus, and legs shining white; forelegs tinged with green in front.

Expanse of wings: ♂, 40—44 mm.: ♀, 44 mm.

6 ♂♂, 2 ♀♀.

This species stands quite alone, and will probably require a new genus for its reception.

70. **Thalassodes zebrata** spec. nov.

Forewing: green, crossed obliquely by three pairs of broad greenish white bands; two near base, two in middle, broader and coalescent below median vein, separating again towards inner margin, containing above a dark green crescentic cell-spot; two towards hindmargin, ending above anal angle: fringe green; costal edge brownish ochreous: the inner edge of the outside band is obscurely lunulate, outlined by a dentate line which is only clear below middle, running in basewards above vein 2, and again angulated outwards on vein 1.

Hindwing: almost wholly greenish white; a curved dark green line from near base of costa to one-third of inner margin, which is dark green throughout; a dark green streak from beyond middle of costa, angled on vein 4, becoming dentate-lunulate and narrow to two-thirds of inner margin, bounded outwardly by a greenish-white line; marginal area frosted with greenish white; a dark green discal line.

Underside mealy whitish green; costa of forewing yellowish.

Head, thorax, and abdomen green; fillet and lower part of face white; abdomen beneath, pectus, and legs white; forelegs greenish.

Expanse of wings: 44 mm.

1 ♀.

Subfamily STERRHINAE.

71. **Perixera** (?) **bisecta** spec. nov.

Forewing: greyish stone-colour, dusted with fine dark atoms and tinged with pale fawn; first line curved, close to base, and marked by dots on veins: second at five-sixths, similarly marked; marginal dots minute; cell-spot hardly marked; median shade represented by a brown-red straight line a little beyond middle; fringe paler.

Hindwing: similar; cell-spot whitish; outer line plainer.

Underside whitish, slightly rosy-tinged, especially in the forewing; median band and outer line marked; dark marginal triangles.

Head, thorax, and abdomen like wings; face fuscous above, whitish below; palpi reddish above; abdomen laterally with some red marks.

Expanse of wings: 35 mm.

2 ♀♀.

72. **Perixera** (?) **festiva** spec. nov.

Forewing: pale pearl-grey, darker at base, with numerous purplish speckles; first line obscure, marked by dark points on veins and folds, and when visible outcurved above and below median vein, olive; median shade olive, thick, incurved below median; irregularly lunulate-dentate: cell-spot blackish, small; outer line marked by purple spots on veins; praesubterminal shade marked by three olive clouds, at costa, beyond cell, and above inner margin; marginal spots purple; fringe concolorous.

Hindwing: like forewing, but the cell-spot is ferruginous, with some pale scales in centre, the whole within a dark purplish ring.

Underside whitish: forewing suffused and speckled with dull reddish; outer line and cell-spot dull red; marginal line purplish; hindwing with costa and cell-spot red; outer and marginal lines purplish.

Head, thorax, and abdomen like wings, the abdomen tinged with vinous: face and palpi deep red-brown; abdomen beneath whitish; legs in front reddish.

Expanse of wings: 34 mm.

4 ♀♀.

73. Perixera (?) indigens spec. nov.

Forewing: greyish stone-colour, dusted with grey; basal line very obscure, marked by dark dots on veins; cell-spot a small dark point; median shade from two-thirds of costa, curved to submedian fold, then vertical; outer line at five-sixths, marked by dark dots on veins; marginal spots black; fringe concolorous or slightly paler.

Hindwing: the same; in one example the cell-spots edged with black scales.

Underside pale stone-colour, with slight rosy suffusion in forewing; outer line marked in both wings; black marginal triangles in both.

Head, thorax, and abdomen like wings; face above dark fuscous, pale below; palpi reddish fuscous above, pale below; abdomen at sides with rosy stains.

Expanse of wings: 35 mm.

2 ♀♀.

74. Perixera (?) stabilata spec. nov.

Forewing: stone-colour, tinged with pale fawn and finely dusted with dark atoms; basal line marked only by minute dots on veins; outer line from three-fourths of costa to two-thirds of inner margin lunulate-dentate, but only the dark teeth on the veins distinct, preceded by a faint darker median shade parallel to it, and followed at the same distance by the shade preceding submarginal pale line, marked by slight dark dots between the veins, more conspicuous on each side of vein 5 and forming on the submedian fold a black V-shaped mark; the shade following the submarginal line being also marked with dark scales above inner margin; cell-spot small, pale, with a few dark scales round it; marginal dots black; fringe concolorous.

Hindwing: similar; hindmargin with fine dark dots at the ends of veins as well as between.

Underside paler, with fine dark striations; cell-spot of forewing dark; only the outer line distinct, marked with black points on veins.

Head, thorax, and abdomen concolorous with wings; face and palpi dark fuscous above.

Expanse of wings: 48 mm.

1 ♀.

75. Perixera subrosea spec. nov.

Forewing: dull brick-red, thickly dusted with olive fuscous; basal line generally obscure, marked by darker points on veins and slightly curved outwards above and below median; cell-spot whitish, surrounded with a few dark scales; median shade at three-fifths, incurved below middle, obscurely lunulate-dentate; outer line at five-sixths, marked by distinct black vein-dots; black marginal dots between veins; fringe concolorous.

Hindwing: similar: the cell-dot sometimes ringed with black scales from subcostal vein.

Underside deep dull rosy, somewhat paler, more yellowish, in hindwing, especially towards abdominal margin; the hindmargin with dull red triangles between veins; the outer line alone marked.

Head, thorax, abdomen, and antennae concolorous; palpi below, extreme base of face, abdomen beneath, and legs pale yellowish; forelegs red; hindtibiae with a thick fringe of red hairs, the femora with yellower hairs.

Expanse of wings: 35 mm.

4 ♂♂, 4 ♀♀.

76. **Problepsis magna** spec. nov.

Forewing: white; costa grey; markings as in *Problepsiodes conjunctiva* Warr. from India; the ocellus large, nearly round, the outer orbit olive ochreous; its interior above vein 4 white, with fine black scales; the lower part velvety-black, crossed by the ochreous veins 3 and 4; a cloudy grey median shade, visible at middle of costa, runs vertically from the ocellus to three-fifths of inner margin; the base of inner margin largely spangled with silvery scales; outer line ochreous-grey, followed by a macular grey band; a thin grey shade before the very fine black marginal line; fringe silvery-white.

Hindwing: with outer half of ocellus only, the orbit being simply exterior; the inner edge straight and formed of silvery scales; the outer area also silvery, but mixed internally with a few brown scales; the orbit continued to two-thirds of inner margin, where there are some silvery scales.

Underside white.

Palpi and face white below, black above; vertex black; thorax white; abdomen grey above with brown semi-lustrous dorsal spots, white below; antennae ferruginous.

Expanse of wings: 46 mm.

3 ♂♂.

77. **Ptychopoda bipartita** spec. nov.

Forewing: glossy whitish ochreous overlaid with pale grey; the outer line and two submarginal shades sinuous and distinct; the basal curved and obscure; a red-brown straight line at middle touching the black cell-spot; fringe pale, with dark dots at base beyond veins.

Hindwing: similar; the brown line in front of the cell-spot.

Underside pale ochreous, with the lines broadly greyer; median shade olive-brown, hardly touching cell-spot in forewing; in hindwing angled at cell-spot.

Thorax and abdomen like wings, but darker grey; face and palpi black.

Expanse of wings: 17 mm.

1 ♂, 2 ♀♀.

78. **Ptychopoda exempta** spec. nov.

Forewing: shining greyish ochreous; basal line curved, at one-fourth; median oblique from two-thirds of costa to before middle of inner margin, preceded by a black cell-spot; outer line finely lunulate-dentate; praesubmarginal shade swollen and lunate below middle; fringe paler, with dark dots beyond veins at the base.

Hindwing: without basal line; cell-spot large, black; outer line strongly insinuate on the folds.

Underside yellow ochreous, with the lines and shades grey ; cell-spots black, distinct.

Vertex, thorax, and abdomen like wings ; face and palpi black.

Expanse of wings : 16 mm.

3 ♀♀.

Subfamily HYDRIOMENINAE.

79. **Anticlea semiflava** spec. nov.

Forewing : purple, the lines green ; edge of basal patch formed by a slightly curved green line with a fine purple centre ; inner edge of central fascia sharply angled inwards on median vein, and as sharply outwards on the two folds, green like the basal line, with a purple line near its outer edge ; outer edge of fascia sharply indented on vein 7, insinuate beyond cell, with a blunt double projection on vein 3, vertically waved from vein 2, the green band following with its inner edge white ; a vertical whitish band with a waved purple line on its outer edge from middle of costa to median vein, enclosing the linear black cell-spot, and joining three greenish streaks between submedian fold and vein 4 ; submarginal line waved, greenish, very faint, preceded and followed in upper half of wing by a large greenish patch with a bluish-white centre ; pairs of black spots at the end of veins ; fringe purple mottled with green.

Hindwing : deep yellow, with base greenish and fringe dark grey.

Underside of forewing mouse-colour, dusted with pale along costa, the inner margin whitish ; cell-spot a blackish curved line ; hindwing mouse-colour tinged with reddish and thickly dusted with yellowish ; a dark curved submarginal line ; cell-spot dark.

Head and thorax green ; abdomen purple sprinkled with green ; vertex, collar, shoulders, and patagia green with spots of purple ; abdomen beneath and legs purplish sprinkled with green scales.

Expanse of wings : 30 mm.

2 ♂♂.

80. **Chaetolopha** (?) **antennata** spec. nov.

Forewing : cream-colour, covered with pale green scales ; the lines violet ; basal line at one-fourth, angled outwards on median vein, and incurved below ; edges of central fascia composed of narrow violet bands ; the inner curved, at two-fifths, projecting slightly basewards at median and submedian veins ; the outer from three-fourths of costa to two-thirds of inner margin, toothed outwards on veins 3 and 4, then incurved, the fascia below middle wholly violet ; some violet scales along the course of submarginal line.

Hindwing : paler, with a single violet line across middle.

Underside like upper, but less distinct.

Head, thorax, and abdomen pale varied with green ; dorsum with indications of violet bands.

Expanse of wings : 15 mm.

1 ♂.

The single example is much worn : I have placed it temporarily in *Chaetolopha* from its superficial likeness to *C. splendens*, but it will probably require a separate

genus : the hindmargin of forewing is sinuate and crenulate, the antennae long, with angled segments, and long cilia. The anal segments of abdomen are swollen, as often in *Chaetolopha*, but the neuration is that of *Eucymatoge*.

81. **Chaetolopha flexilinea** spec. nov.

Forewing : brownish fawn-colour, the cell and space beyond to hindmargin paler ; a slight brown line at one-fifth, vertical, inbent on costal and submedian veins ; inner and outer lines parallel throughout to each other, from costa at two-fifths and two-thirds, oblique inwards above subcostal and below median veins, bent outwards between, dark brown, edged conversely with white, the space between them darker brown : cell-spot dark brown, vertical ; submarginal line forming dark brown lunules, interrupted beyond cell and below costa ; a dark marginal line interrupted by the veins ; fringe concolorous, the tips white-spotted.

Hindwing : whitish ochreous, browner along hindmargin, with a faint outer line ; fringe dark grey.

Underside duller, the hindwing speckled : cell-spots and outer lines plain in both wings.

Head and thorax like forewings ; abdomen paler, more speckled.

Expanse of wings : 24 mm.

2 ♀♀.

82. **Chaetolopha fulgurata** spec. nov.

Forewing : bright fulvous, suffused with darker ; the cell and space beyond to submarginal line paler ; a slight spot at base and a narrow waved vertical line near base brown with a few white scales ; inner line at one-third, snow-white, outwardly edged with black-brown, minutely dentate outwards on the veins ; outer line at two-thirds, parallel to hindmargin, but with a strong shoulder on vein 4, snow-white, inwardly edged with black-brown ; submarginal line brown-black, marked by an oblique snow-white dash above vein 6, and below vein 4 acutely dentate, followed by some white brown-speckled scaling, the veins across it brown ; above vein 4 the line itself is interrupted, but followed by horizontal brown streaks between the veins ; fringe whitish, with brown chequering beyond veins ; cell-spot dark brown, vertical.

Hindwing : fulvous, much paler towards base, with a darker angled middle line and traces of a submarginal line, especially at apex, which is speckled with grey.

Underside dull fulvous, the lines showing brown, and only the subapical dash white ; hindmargin grey-brown, with pale dusting ; hindwing with large brown cell-spot and brown angled postmedian line ; the marginal area brown with grey dusting, and a dark submarginal line : the brown-grey scales form a shade also along submedian fold.

Head, thorax, and abdomen deep fulvous ; metathorax with a snow-white vertical line ; first segment of dorsum brownish.

In the ♂ the basal two-thirds of hindwing beneath is clothed with fine furry hairs.

Expanse of wings : 26 mm.

5 ♂♂, 1 ♀.

Superficially greatly resembling *Chaetolopha leucophragma* Meyr. from Australia, but in that species the subapical white mark is horizontal.

83. **Chaetolopha pictipennis** spec. nov.

Forewing: purple plum-colour; the markings deep brown, edged with orange and yellow lines; basal patch with the edge vertical; inner edge of central fascia nearly parallel to it; outer edge sinuous, from three-fourths of costa to three-fourths of inner margin, bent in below vein 6; submarginal line waved, orange, from costa just beyond outer edge of fascia, outcurved and reaching inner margin before anal angle, preceded by a plum-coloured band, the inner edge of which is convex basewards and runs to apex, crossing and interrupting submarginal line, with a yellow spot at apex and another where the lines separate on vein 6: fringe plum-colour.

Hindwing: coppery red, dusted with blackish fuscous; a straight dark postmedian line, edged by an unspeckled space of red before the dark hindmargin; fringe dark.

Underside dull coppery red, the markings brown-black edged with brighter red.

Head, thorax, and abdomen purple.

Expanse of wings: 22 mm.

6 ♂♂.

84. **Chaetolopha rectilineata.**

Perizoma rectilineata Warr., *Nov. Zool.* v. p. 246 ♂ (1898).

This species must be transferred to *Chaetolopha*.

85. **Chaetolopha ruptistriga** spec. nov.

Forewing: dull chestnut-brown; a large wedge-shaped area of dull purplish grey running through wing from base of cell to hindmargin, interrupting the lines; a snow-white inwardly oblique bar at base, edged with black-brown, from costal to median vein; inner and outer lines at two-fifths and two-thirds, snow-white, edged conversely with black-brown, oblique from costa to subcostal vein, reappearing below median vein, as similar, but more oblique, streaks to inner margin; submarginal line denoted only by a more obscure white streak from inner margin; veins close to hindmargin chestnut, interrupting the dark marginal line; fringe dark grey, the outer half whitish.

Hindwing: pale ochreous, with a curved grey central line, becoming pale fulvous before the darker hindmargin.

Underside dull grey-brown, greyer along hindmargins; costa of forewing fulvous; hindwing with two bent brown lines, the space between them fulvous.

Head, thorax, and abdomen dark brown; a snow-white, partially interrupted, line from tips of palpi along face, thorax, and dorsum.

Expanse of wings: 24 mm.

2 ♂♂, 1 ♀.

In the ♀ the brown is paler and brighter.

86. **Chaetolopha splendens** spec. nov.

Forewing: glossy pale straw-yellow; lines and veins bright brown, also the costa at base; basal line vertical at one-fourth; inner edge of central fascia at two-fifths, outcurved on submedian fold; outer edge at two-thirds, projecting bluntly at vein 4, and insinuate below, the two edges closely approximated on the fold; space between, like the basal patch, with brown suffusion and lines; space beyond basal patch traversed by a brown line, a thick submarginal line, forking at

vein 6 to apex, followed by an obscurely edged line of bright lunules ; fringe glossy yellow with brown lines beyond veins.

Hindwing: pale yellow, lines of underside showing through ; fringe pale yellow.

Underside of forewing flushed with pale tawny ; costa black-speckled ; the lines fulvous ; hindwing with three equidistant fulvous lines, the outermost forked to apex.

Head, thorax, and abdomen pale yellow flushed here and there with brown ; tarsi deep brown with pale joints.

Expanse of wings : ♂ 18 mm. ; ♀ 22 mm.

1 ♂, 2 ♀♀.

87. **Chaetolopha tristriata** spec. nov.

Forewing: pale olive-grey, dusted with darker ; a dark olive-green shade at one-third, inwardly darker and edged with pale, outwardly diffuse ; a similar shade at two-thirds, slightly nearer first on inner margin than on costa ; a submarginal irregularly waved dark line, inwardly pale-edged ; veins towards hindmargin dull pink ; fringe pinkish ochreous, with darker chequering beyond veins ; costal edge and subcostal vein dull pink ; cell-spot olive.

Hindwing: dull greyish pink, more olive towards base, crossed about middle by a thick dark paler-edged shade ; fringe pink.

Underside of forewing pinkish brown, the veins pinkish brown, those below middle reaching margin as wedge-shaped marks ; hindmargin between the veins olive-green speckled with whitish scales, at apex more whitish ; middle line showing on costa as a yellowish streak, outer line as a row of white spots ; fringe brown-pink with dark chequering : hindwing white, in basal area densely sprinkled with olive scales, the white showing clear only before the dark brown cross-line, which is followed by a brownish ochreous and then an olive shade ; marginal area olive, with a dark waved submarginal line preceded by a whiter space ; inner margin with its fringe brown.

Head and thorax grey ; dorsum dull red, with the margins of segments and anal segment greyish white ; legs red-brown, with pale joints.

Expanse of wings : ♂ 26 mm. ; ♀ 30 mm.

1 ♂, 3 ♀♀.

The ♀ is a little paler than the ♂. The species is much like *Propithex alternata* Warr. from Ron Island, but larger.

88. **Coenocalpe angustipennis** spec. nov.

Forewing: greyish white, the costal half diffusely fawn-brown ; the subcostal vein with splashes of white to middle ; crossed by obscure oblique dark lines, lunulate outwards and dentate inwards on the veins, and only distinct towards inner margin ; the veins faintly dotted dark and light ; the three principal lines double ; a paler costal space in centre of fascia containing the small black cell-spot ; in the outer line a black dash on submedian fold ; marginal festoon dark ; fringe chequered dark and light grey.

Hindwing: whiter, with no fawn-coloured suffusion ; the lines fairly distinct ; fringe whitish.

Underside fawn-grey, shining ; costa whitish ; lines dark only on costa of forewing ; fringes white with dark mottling.

Head, thorax, and abdomen like wings ; the head and thorax somewhat darker ; abdomen beneath, pectus, and legs whitish ; foretarsi blackish, with the joints pale ; palpi externally dark.

Expanse of wings : 30 mm.

4 ♂♂.

The wings are peculiarly narrow for the genus.

89. **Coenocalpe hirtivena** spec. nov.

Forewing : pale fawn-grey, dusted with dark atoms ; crossed by a succession of brownish grey lines all lunulate outwards and dentate inwards on the veins ; the inner, outer, and praesubmarginal double and accompanied each by a brownish grey shade ; the lunules along the costal area all clear and well-defined ; all the lines forming blackish dashes across the veins, alternating with the paler interspaces ; median vein with linear patches of raised black scales to the end of cell ; cell-spot black, oblique ; submarginal line wavy, whitish, sometimes with a darker shade on both sides ; marginal festoon black, joined between the veins by black dashes with the teeth of submarginal line ; fringe concolorous.

In the ♀ the shade beyond outer line forms a dark blotch beyond cell.

Hindwing : similar ; the hindmargin strongly crenulate.

Underside much paler, especially towards base, with two postmedian and a submarginal dark curved shade ; cell-spots black ; costa of forewing cream-colour.

Head, thorax, and abdomen like wings.

Expanse of wings : 38 mm.

1 ♂, 3 ♀♀.

The costal shoulder of forewing is roughly fringed with hairs.

90. **Coenocalpe semirufata** spec. nov.

Forewing : pale vinous ; the lower half of central fascia fuscous, also the marginal area between veins 4 and 5 ; marginal area between veins 2 and 4 white ; inner edge of central fascia from one-third of costa, outcurved above median and slightly again below, then oblique inwards to one-third of inner margin ; outer edge from three-fourths of costa, lunulate-dentate, the teeth pointing basewards, to three-fourths of inner margin, roundly bilobed between 2 and 4 ; closely preceded and followed by the darker line of the pale fasciae ; submarginal line marked by white dots between the veins ; marginal line crenulate, dark red, interrupted by pale spots at the veins and preceded there by patches of pale scales ; fringe vinous.

Hindwing : with the central fascia much broader, only its edges fuscous.

Underside grey, glossy ; cell-spots and lines darker ; fringe vinous.

Head, thorax, and first two segments of abdomen pale vinous ; rest of abdomen fuscous and vinous mixed, the third segment sharply blackish fuscous ; face and palpi deep vinous ; legs externally fuscous, the tarsi black, with pale joints.

Expanse of wings : 33 mm.

3 ♂♂.

91. **Coenocalpe ustimacula** spec. nov.

Forewing : dark ashy grey, the costal half blackish grey, with the pale intervals forming white costal patches ; cell-spot black, lying in the middle pale space ; lines all lunulate outwards and dentate inwards, the outer and praesubmarginal blackest,

forming black points towards inner margin ; submarginal pale, preceded and followed by black sagittate markings ; fringe black beyond veins, paler between.

Hindwing : with costal half pale grey, inner-marginal half blackish.

Underside shining, iron-grey ; costa of forewing pale ; cell-spot and the ends of lines of costa black ; fringe black and white.

Head, thorax, and abdomen blackish ; basal segment of abdomen and metathorax pale grey, the metathorax with a thick black angular mark ; shoulders and patagia with a pair of minute white dots ; basal half of abdomen beneath, pectus, and legs white ; foretarsi black, with white joints.

Expanse of wings : 32 mm.

2 ♂♂.

In the type specimen the costa of forewing and centre of hindwing are tinged with reddish fawn-colour.

92. **Coenocalpe xylinata** spec. nov.

Forewing : wood-brown, the markings slightly darker, but very indistinct ; the lines forming dark and pale dashes on the veins ; a paler brownish space at apex ; submarginal line marked by pale dots between veins, followed by black dashes to the margin ; fringe brown.

Hindwing : paler, with the lines more plain ; two before the dark cell-spot and two beyond, closer together, followed by a blackish band projecting outwards in middle ; three outer lines also angled and marked black and light on veins ; fringe brown.

Underside greyish ochreous ; the lines all darker and the cell-spots black.

Head, thorax, and abdomen pale and dark brown ; palpi and face below blackish ; anal segment of abdomen paler.

Expanse of wings : 35 mm.

1 ♀.

93. **Collix examplata** spec. nov.

Forewing : fuscous, with darker fuscous lines and shades ; all the markings confused ; the darker lines forming blackish dashes on veins alternating with pale ochreous ones ; cell-spot large and black ; the base of veins 3 and 4 shows as a pale ochreous space ; the submarginal line is preceded by blackish patches at costa, beyond cell, and towards inner margin ; a paler space from outer line runs between veins 6 and 7 towards apex ; black curved marginal lines between veins, with a pale dot at the veins ; fringe dark fuscous.

Hindwing : with less dark suffusion, and the markings therefore plainer ; a curved dark antemedian line followed by a sinuate black cell-spot ; three waved central lines, followed by a pale band with dark centre ; marginal area dark fuscous with obscure pale submarginal line ; the disc reddish tinged.

Underside rufous ochreous ; cell-spots black ; two outer series of dull blackish semi-confluent spots on veins ; the outer one interrupted between 3 and 4 ; fringe blackish.

Palpi reddish grey, terminal segment and the base of second segment fuscous head, thorax, and abdomen like wings.

Expanse of wings : 40 mm.

1 ♀.

94. **Crasilogia dispar** ab. **simplex** nov.

Along with a fair number of typical *C. dispar* Warr. of both sexes I find 2 ♂♂ of remarkably aberrant structure ; of these one, of normal size, has the forewing exactly like that of the ♂ type, the other, much smaller, has the forewing almost exactly like that of the ♀ ; in both cases, however, the hindwings are shaped and coloured as in the ♀, without a sign of any of the secondary sexual characters that appear in the normal ♂, and their neuration is that of the ♀. In both cases the retinaculum of the forewings and the fine frenulum of the hindwings is distinct ; besides which the condition of the two insects precludes any suspicion of mending.

95. **Crasilogia? fumipennis** spec. nov.

Forewing : ochreous, suffused throughout with brownish grey ; the basal area and central fascia brownish fuscous, the lines of the latter forming three dark bands with fainter intervals ; the edges crenulate, the outer deeply insinuate beyond cell and projecting on vein 3, finely edged with whitish ; three dark waved lines alternating with paler ones before the submarginal, which is yellowish and lunulate-dentate, both the lunules and teeth projecting outwards ; a black blotch before it between veins 6 and 7, passing into apex, and the lines before it blackened and confluent between 3 and 4 ; the spaces between 5 and 6, and 2 and 3 filled with black and white scales ; pairs of square black spots at the ends of the veins, which are yellowish ; fringe chequered pale and dark brown ; cell-spot black ; the dark inner edge of central fascia extended to basal patch above submedian.

Hindwing : smoky fuscous, with the postmedian area fulvous ; traces of two or three curved shades from inner margin ; costal area whitish.

Underside ochreous, suffused in forewing with grey, with all the lines dark grey, becoming black on the costa, which is yellowish ; hindwing clear ochreous, with three thick grey lunulate shades separated by finer lunulate lines.

Head, thorax, and abdomen brownish fuscous intermixed with paler ; abdomen beneath and legs ochreous ; fore and middle tibiae and tarsi black, with yellow joints.

Expanse of wings : 39 mm.

1 ♀.

Though very different in appearance above from *Crasilogia dispar*, I refer it to the genus from the great resemblance in the marking of the underside.

96. **Diactinia intromissa** spec. nov.

Forewing : with the lines snow-white, the basal patch and central fascia blackish fuscous ; the former edged by a fine white line, and in one specimen crossed by a whitish line ; the edges of central fascia broadly white, meeting on the submedian fold, then separating again and forking symmetrically to inner margin, as a double curve denticulate inwards on vein 1 ; the inner edge is also dentate into the fascia along the cell-fold ; the interval between basal patch and fascia, and the lower portion of the fascia itself, are olive-grey speckled with black ; below costa beyond the fascia the commencement of a line is shown by two white angulated marks filled in with blackish, continued below as an olive ochreous somewhat lunulate shade edged by a black cloud ; between veins 7 and 4 on the margin is a bilobed blackish blotch edged by a white line, which runs out into the fringe between 3 and 4, and appears again as a narrower line curving to anal

angle : marginal line dark, interrupted at the veins ; fringe olive ochreous, with dark middle line and dark mottling beyond veins.

Hindwing : whitish, tinged with olive ochreous, and striated with grey ; traces of dark lines on inner margin and a thick streak before margin from anal angle to vein 4.

Underside yellowish speckled with blackish ; forewing with inner margin whitish.

Head, thorax, and abdomen whitish ochreous speckled with olive ; underside of abdomen like that of wings ; legs black and yellow.

Expanse of wings : 34 mm.

1 ♂, 1 ♀.

The ♀ is somewhat paler than the ♂. In the forewing the hindmargin is slightly indented from vein 7 to 4.

97. Ochyria dilataria spec. nov.

Forewing : basal patch and central fascia dark brownish fuscous, their edges deeper ; the intervals slaty grey ; the central fascia broader than in *O. fulvistriga*, its edges more waved, and margined by first a lustrous grey and then a ferruginous orange line ; from this line above vein 6 a narrow ferruginous streak runs obliquely to apex ; centre of fascia dull violet-grey, containing a rather large blackish cell-spot surrounded with dull rust-coloured scales ; submarginal line waved, dull bluish, preceded by a darker cloud at costa ; fringe (worn) slaty grey.

Hindwing : pale grey, darker towards hindmargin.

Underside pale grey, darker in outer half of wing, without distinct markings.

Head, thorax, and abdomen dark fuscous ; segmental rings of abdomen deep ferruginous.

Expanse of wings : 17 mm.

1 ♂.

The neuration is abnormal ; vein 11 appears to form the continuation of 10, and is joined to 12 by a bar ; vein 9 is coincident with 10, and subsequently anastomoses with 7, 8.

98. Ochyria fulvistriga spec. nov.

Forewing : basal patch, central fascia, and praesubmarginal band dark fuscous ; the intervals dull purplish grey ; all the dark markings edged by broad dull ferruginous violet lines ; centre of central fascia traversed by a broad band of purplish grey, containing the black cell-spot ; a ferruginous violet oblique streak above vein 6 from outer to submarginal line, which is waved and dull blue ; marginal line black ; fringe fuscous, with the basal half darker.

Hindwing : purplish grey.

Underside dull slaty cinereous ; hindwing slightly sprinkled with bluish scales, with a black cell-spot, and traces of lines.

Head, thorax, and abdomen dark fuscous, like wings.

Expanse of wings ; ♂ 16 mm. ; ♀ 18 mm.

3 ♂♂, 5 ♀♀.

99. Ochyria pulchella spec. nov.

Forewing : pale olive-green, crossed by broad white slightly lustrous lines ; two, indistinct, near base ; two on each side of the middle of wing, bent outwards above, then vertical ; and one submarginal, interrupted by the veins ; the pale lines

are preceded irregularly by dull lustrous purplish scales, which beyond cell form a blotch before the submarginal; fringe pale green; cell-spot linear, oblique, purplish.

Hindwing: whitish grey, darker and reddish tinged towards hindmargin.

Underside dull rosy, speckled with grey; forewing with white submarginal line; hindwing more speckled, with dark cell-spot and three dark white-edged lines.

Head, thorax, and abdomen pale olive-green.

Expanse of wings: 16 mm.

1 ♀.

100. **Ochyria rubecula** spec. nov.

Forewing: pale brick-red; the markings very dark green, minutely edged with white, the basal patch small; the central fascia broad, swollen below median, with two outward-projecting teeth between 2 and 4, and much narrowed on inner margin; the centre of the band preceding it is slightly marked with green on costa and inner margin, and a large costal blotch with a smaller one below it on vein 6 precedes the submarginal line, which is finely white, the lunules followed also by some dark green scales above inner margin; a very fine dark marginal line inwardly white-edged; fringe brick-colour.

Hindwing: pale grey; the fringe pinkish.

Underside of forewing dull pinky grey, with the markings showing through; hindwing with faint grey antemedian, postmedian, and submarginal bands alternating with paler spaces each intersected by a fine line.

Head and abdomen pale brick-red; palpi, thorax and forelegs blackish green.

Expanse of wings: 17 mm.

1 ♂.

101. **Ochyria subcaesia** spec. nov.

Forewing: slaty grey; the basal patch and the central fascia dark fuscous; the paler bands sprinkled with greenish yellow scales; the edges of the dark markings dull bluish; central fascia crossed also by two dull bluish lines: submarginal line waved, dull blue; fringe like the intervals greenish grey; sometimes a dark shade precedes the submarginal line.

Hindwing: dull slaty grey; fringe as in forewing.

Underside of forewing dull blurred cinereous; costal and hindmargin with some bluish scales; lines visible along costa only; hindwing sprinkled with dull blue scales, forming a double outer and waved submarginal line; the dark lines clear across wing; cell-spot blackish.

Head, thorax, and abdomen like wings, all sprinkled with bluish scales.

Expanse of wings: ♂ 16 mm.; ♀ 18 mm. One small ♂ expands only 13 mm.

5 ♂♂, 3 ♀♀.

102. **Ochyria unitaeniata** spec. nov.

Forewing: purplish fuscous, crossed by some fine wavy darker lines; at one-fourth from base is a slightly paler band, bent on subcostal, separating basal patch from central fascia, which contains a large cloudy dark cell-spot, and is edged at four-fifths by a dark line followed by a white line and a pale green band; marginal area beyond dark purplish fuscous; a pale green patch at anal angle, separated from the green band by a narrow dark space edged by the whitish

waved submarginal line, which is not visible above middle of wing; some dark marginal lunules before the grey fringe.

Hindwing: greenish white, without markings except on inner margin below the median and vein 3, the band above anal angle being prominently dark.

Underside of forewing dull grey; the outer line pale; the marginal area darker; hindwing whitish green, crossed by six waved grey lines, of which the outermost is dark before anal angle; cell-spot black.

Head, thorax, and abdomen fuscous.

Expanse of wings: 18 mm.

1 ♂.

Spectrobasis gen. nov.

Forewing: costa straight, but with a faint shoulder at base fringed with hair, and curving before apex, which is blunt; hindmargin simply curved.

Hindwing: with hindmargin well rounded; both angles rounded.

Antennae of ♂ bipectinate to near apex; of ♀ simple, the segments angulate; palpi rostriform, porrect, rough-haired, the terminal segment smooth, decumbent; tongue slight; frenulum present; hindtibiae with four spurs.

Neuration: forewing, cell about half of wing; discocellular vertical; all three median nervules rising close together; radials normal; 7, 8, 9 stalked; 10, 11 separate, 10 anastomosing with 11 and again with 8, 9, forming a double areole: hindwing, discocellular biangulate, the radial from the lower angulation; 7, 8 anastomosing for three-fourths of cell; 6, 7 stalked; vein 2 from nearer base than in forewing.

In the ♂ the space between base of 7 and 8 contains an elongate hyaline fovea.

Type: *Spectrobasis rufa* spec. nov.

An endemic genus without any apparent close affinities.

103. Spectrobasis rufa spec. nov.

Forewing: dark olive-grey; with obscure darker cross-lines, visible chiefly on costa, which at base is dull brick-red to median vein; basal patch, central fascia, and centre of band between them rather darker; the pale bands edging them pinkish white on costa, with a darker central line; the outer edge of central fascia from just beyond middle of costa curved outwards below middle to two-thirds of inner margin; submarginal line wavy at costa only; a dark cell-spot; fringe dull pink, with dark olive-grey mottling.

Hindwing: dark olive-grey, without markings; fringe as in forewing.

Underside of forewing blurred purplish grey; the costa and hindmargin red-brown, the submarginal line showing white teeth below costa; costa from base more ochreous in ♂: hindwing red-brown speckled with pale, with darker antemedian and median reddish bands; a waved submarginal line with red-brown blotch above anal angle, and showing white spots between veins; in the ♂ the basal half is flesh-coloured ochreous speckled with brown; a flesh-coloured blotch on inner margin beyond middle band, and often a second towards costa; fringe reddish.

Head parts reddish mixed with pale; thorax and abdomen dark olive, the dorsal segments often broadly pale.

Expanse of wings: 26 mm.

A long series.

104. **Spectrobasis viridis** spec. nov.

Forewing: reddish and olive-grey, the tints much mixed, the lines and bands being darker and the intervals on costa whitish; costa at base dull moss-green, beyond dotted, dark green and pale; a dark cell-spot; outer edge of central fascia from two-thirds of costa, outcurved, to two-thirds of inner margin; fringe whitish with dark green chequering.

Hindwing: dull greenish grey, with a reddish tinge, paler along costal area, the bands of underside showing through; fringe as in forewing.

Underside of forewing blurred; the costal and hindmargins green, with paler markings; hindwing white sprinkled with green, forming three green bands separated by whitish bands, the green bands often varied with dark purplish scales. In the larger ♀ the costal and hindmargin of forewing and most of the scaling of hindwings is reddish instead of green.

Head and abdomen pinkish grey, with dark speckling; thorax mainly dark green, varied with paler.

Expanse of wings: 26 mm.; the redder ♀ 28 mm.

2 ♂♂, 2 ♀♀.

Evidently a very variable species.

105. **Xanthorhoë albiapicata** spec. nov.

Forewing: blackish fuscous from base to outer edge of central fascia, the band beyond basal area always greyer, sometimes with pale dots along its edges; the band beyond central fascia brightly white to below vein 4, where it joins a white lunule in the submarginal line, sometimes running pale to hindmargin and out into the fringe; submarginal line rarely distinct; the lunule above vein 6 always pale, bluish grey; marginal line black; fringe blackish, mottled with paler; the marginal area round apex, beyond cell, and broadly below vein 3 dark fuscous, sometimes blackish. In the ♂ the white of the pale band is more extensive than in the ♀.

Hindwing: dull blackish fuscous, with the lines obscure, but paler on inner margin.

Underside glossy cinereous, sprinkled with whitish in hindwing; the lines all dark but the submarginal, which is represented by white spots, that below 4 large.

Head, thorax, and abdomen blackish fuscous.

Expanse of wings: 26 mm.

A long series of both sexes.

106. **Xanthorhoë bifulvata** spec. nov.

Forewing: with basal patch, central fascia, and shade preceding submarginal line brownish fuscous; basal patch edged and crossed by a darker shade; central fascia edged with darker fuscous, with a deeper band on its inner edge and two wavy dark lines before the outer, with paler grey lines between; basal patch and central fascia edged by silvery grey bands with a dark centre; space between the inner two filled up with fulvous grey; band before submarginal line fulvous tinged in its inner half, paler between veins 3 and 4; submarginal line wavy, pale grey, broadly silvery grey just below middle; marginal area dark and light grey; a row of dark marginal lunules between veins; fringe mottled dark and light grey.

Hindwing: dark fuscous, with traces of curved wavy lines, which are clear only on inner margin, where the paler intervals are sometimes silvery grey ; fringe of inner margin whitish.

Underside of forewing dull olive fuscous, tinged with blue-grey ; the lines showing darker ; hindwing with all the intervals dull bluish white, the shades olive fuscous.

Head, thorax, and abdomen fuscous, varied with bluish grey scales ; metathorax blue-grey.

Expanse of wings : 28 mm.

5 ♂♂, 3 ♀♀.

107. **Xanthorhoë cerasina** spec. nov.

Forewing: with basal patch and central fascia velvety blackish fuscous, the interval between them and the marginal area bright cerise ; the blackish areas are finely edged with white ; in the antemedian band are three fuscous grey lines, and the fascia is followed by three ; the extreme hindmargin beyond the waved submarginal line is fuscous grey, and all the lines and shades of the marginal area are fuscous at costa ; marginal spots black, followed by pink spots running out into the fuscous fringe ; cell-spot deep black.

Hindwing: fuscous, with the lines of central fascia darker, as far as outer line, then dull cerise ; the apical half smoky fuscous, and all the lines waved.

Underside dark fuscous, with all the lines indicated ; the outer lines marked pale across wings, and white on costa of forewing.

Head, thorax, and abdomen all dark fuscous ; anal tuft of ♂ black.

Expanse of wings : 44 mm.

A long series of both sexes.

Both surfaces are glossy.

108. **Xanthorhoë coeruleata** spec. nov.

Forewing: dark fuscous, crossed by three bright bluish white double lines : one close to base, the second at one-third, both incurved in middle of wing ; the third at two-thirds, almost interrupted between 2 and 4 by the projection of the central fascia ; submarginal line single, whiter between 3 and 4 and preceded there by a fulvous patch ; dark marginal lunules, followed by white spots at the base of the fuscous fringe ; the spot between 3 and 4 and that below apex large and white, running through the fringe, and each preceded by a submarginal whitish spot ; a faint pale line at middle of central fascia.

Hindwing: greyish fuscous, with traces of pale and dark lines on inner margin only ; fringe dark, with the two white spots at middle and apex.

Underside of forewing blurred greyish fuscous ; fringe with two white spots ; hindwing with faint bluish white markings ; two diffuse lines at base, a double waved postmedian, and a single submarginal line.

Head, thorax, and abdomen brownish fuscous, the tips of shoulders and patagia and the segmental rings of abdomen with bluish white scales.

Expanse of wings : 30 mm.

1 ♂.

109. **Xanthorhoë fulvinotata** spec. nov.

Forewing: white ; the markings grey and black, the basal patch and central fascia darkest ; basal patch edged and crossed by black lines ; pale band following

with more than its inner half dark grey, the outer half with a grey thread : central fascia narrow at inner margin, both edges irregularly lunulate-dentate, its centre often blue-grey, containing a black cell-spot and two dark lines and a pale one before outer edge ; pale band following very distinct, interrupted between 3 and 4 by a fulvous patch ; submarginal line white, preceded by blackish blotches on costa, beyond cell, and above inner margin ; followed by a dark blotch at apex, and by grey ones beyond cell and above inner margin ; marginal space between 3 and 4 generally paler; black marginal crescents between veins ; fringe whitish, mottled with dark grey.

In the ♀, as usual, the central fascia is broader, and the fulvous patch beyond outer line more extensive.

Hindwing : dark grey, with the lines darker, the intervals on inner margin white.

Underside pale, speckled with grey in hindwing, suffused with dark grey in lower half of forewing ; all the lines indicated.

Head, thorax, and abdomen dark and light grey, the thorax mixed with blackish; palpi externally fuscous ; tarsi blackish, with the joints ochreous ; segmental rings of abdomen white.

Expanse of wings : ♂, 26 mm. ; ♀, 28 mm.

5 ♂♂, 4 ♀♀.

110. **Xanthorhoë interrufata** spec. nov.

Closely akin to *X. cerasina*, but the dark areas paler fuscous; the central fascia showing the two dark lines and the edges and cell-spot plainer ; the cerise tints are confined to the pale bands edging the fascia, and even these are duller ; the band before submarginal line is fuscous as well as the margin beyond.

In the hindwing the whole surface is fuscous, the cerise tints of the outer pale band being restricted to the inner margin.

Underside fuscous, with all the pale cross-lines plainer.

Head, thorax, and abdomen fuscous; anal tuft white.

Expanse of wings : 44 mm.

A long series.

The wings are all glossy, as in *cerasina*.

111. **Xanthorhoë monastica** spec. nov.

Forewing : blackish fuscous, with all the lines darker ; the central fascia with three dark lines and edged with whitish, which at costa is white and conspicuous ; fringe concolorous.

Hindwing : wholly dark fuscous, paler beyond outer edge of fascia; pale dots along margin at the ends of the veins.

Underside dark glossy fuscous, the outer line marked by whitish dots on veins, and the submarginal at costa only.

Head, thorax, and abdomen all blackish fuscous.

Expanse of wings : 40 mm.

A long series, not varying *inter se*, except a pair apparently dwarfed, the ♂ of which expands 30 mm. only and the ♀ 28 mm.

112. **Xanthorhoë plumbilinea** spec. nov.

Forewing: basal patch and central fascia dark fulvous fuscous, edged by broad dull leaden-grey lines; the fascia narrow, with a leaden-grey line down its centre, generally broken up into spots; the broad bands on each side of fascia greyish olive; submarginal line fine, waved, leaden-blue, with the lunules filled up with dark fuscous, sometimes only those beyond cell and on the submedian fold; a dark oblique streak from apex, the apex above it generally paler; marginal area and fringe dark fuscous.

Hindwing: brownish fuscous, with a few indications of lines on inner margin.

Underside greyish fuscous, paler beyond the outer edge of fascia.

Head, thorax, and abdomen dark fuscous.

Expanse of wings: 27 mm.

3 ♂♂, 3 ♀♀.

113. **Xanthorhoë urbana** Meyr.

♂. *Forewing:* grey, with a slight mixture of brownish, and speckled with dark grey; a small dark basal patch with rounded edge; the grey band beyond it traversed by three darker lines; central fascia occupying middle third of wing, the inner edge curved, the outer bluntly projecting in middle of wing; two lines beyond inner edge and two before outer form bands filled up with darker grey; in these bands and in the basal patch some brown scales occur below median and vein 4; below middle the bands unite and form annuli; a paler grey band follows with a grey line down it; submarginal line obscure, preceded and followed by darker tints, especially at apex; a black marginal festoon interrupted at veins; fringe grey varied with paler.

Hindwing: with base dark grey, followed by three blackish waved lines, plain on inner margin, not reaching costa; submarginal line and shades more distinct.

Underside pale grey, darker towards margin, with all the lines blackish.

Head, thorax, and abdomen dark grey, like basal patch.

Expanse of wings: 24 mm.

5 ♂♂.

Very near to *X. subidaria* Guen. from Australia, for which I at first mistook it. Two examples exactly like the present were received previously from the Aroa River and referred to *subidaria*; but with these 5 ♂♂ there have now come 6 ♀♀ not distinguishable from the dark grey ♀♀ which Meyrick referred to *subidaria* as a probable variety under the name of *urbana*; in both sexes the wings are greyer and darker than in *subidaria* proper.

Subfamily ASTHENINAE.

114. **Acolutha canicosta** spec. nov.

Forewing: whitish yellow: the costal area above median vein sprinkled with white scales, the lines across it dark brown; all the markings interrupted below middle, reappearing much paler on inner margin; these marks are two brown bands near base; a central fascia just beyond middle, angled outwards on vein 6, and a darker brown submarginal line angled on vein 7 towards apex, and reappearing before anal angle as an upright brown bar; fringe pale yellow.

Hindwing: with four obscure curved brownish grey lines; the antemedian

and median narrow, containing a black cell-spot between them ; the postmedian and submarginal broader and distinctly double.

Underside pale yellow ; only the costal half of forewing dull brown.

Head, thorax, and abdomen pale yellow ; face with a broad brown bar in middle and a narrow one at top: vertex brown with a pale line in middle; shoulders brown.

Expanse of wings : 26 mm.

1 ♀.

Near *pictaria* Moore.

115. **Asthena argentipuncta** spec. nov.

Forewing : pale yellow, tinged with deeper yellow along costa and hindmargin; crossed by bands of round dull silvery spots ringed with brown-red ; in the ♀ these spots are small and separate except along subcostal vein ; in the ♂ they are large, with the brown rings thicker, and therefore more or less confluent, especially in basal half; there are four antemedian series, including one at base itself ; one postmedian and one submarginal ; in the postmedian the two spots on vein 3 and 4 are displaced outwards ; a larger discal spot, with costal spot above it ; a marginal line of deep brown dashes between veins ; fringe yellow.

Hindwing : with the two outer series only ; the cell-spot and two joined spots below it.

Underside of forewing irregularly brown along costa ; only the outer and submarginal lines represented as brown spots, not reaching inner margin ; of hindwing with the outer lines marked only on costa; both wings with fine marginal line ; in the ♀ the lines are not shown, and the brown along costa is much reduced.

Face deep yellow ; vertex white ; thorax and abdomen yellow, the dorsal segments deep yellow marked with silvery spots ; anal segment and underneath with legs pale yellow.

Expanse of wings ; ♂ 24 mm., ♀ 26 mm.

3 ♂♂, 4 ♀♀.

The double areole is very narrow. Antennae of ♂ with fine long fascicles of cilia.

116. **Asthena subditaria** spec. nov.

This is almost a reproduction of the preceding species, but smaller in size and paler in colour ; the spots, in proportion, larger and more coalescent in both sexes ; the outer line more sinuous ; the marginal line of dashes absent.

Expanse of wings : 22—24 mm.

1 ♂, 2 ♀♀.

117. **Hastina viridata** spec. nov.

Forewing : greenish white, the lines dark green, all wavy, and in the main parallel to hindmargin ; two near base, two in middle, and two towards hindmargin form darker bands, separated by pale spaces, each traversed by paler green lines ; all alike are darker on the veins, followed by paler dashes : the median band generally shows two deeper areas, one beyond cell, the other above inner margin ; a dark green marginal line preceded by pale spaces between the veins ; fringe whitish, chequered with green at the vein-ends.

Hindwing : without the basal lines.

Underside pale greenish, with the darker tints of upperside showing through.

Head, thorax, and abdomen green, mottled with whitish; face with lower half whitish, upper half olive-brown ; tips of palpi brown.

Expanse of wings : 22 mm.

6 ♂♂, 2 ♀♀.

118. **Hydrelia papuensis** spec. nov. and ab. **dorsinotata** nov.

Forewing: pale greyish ochreous, tinged with darker, and crossed by a succession of slightly darker lunulate-dentate lines, the teeth all pointing inwards and forming slight brown points on veins, the lunules of the outermost series also marked at their apices with a brown point between the veins; a row of large brown marginal spots ; the line marking the outer edge of central fascia is more strongly expressed and followed closely by two grey lines, forming together a narrow band ; between veins 3 and 4 the outer of these three lines and the two praesubmarginal lines are marked, sometimes strongly, with brown-black scaling ; cell-spot small, black ; fringe pale ochreous.

Hindwing: similar, without the basal lines, and with no dark scaling between 3 and 4.

Underside paler, the lines much fewer, but darker, and only the outer ones distinct ; cell-spots black, also the marginal spots, those of forewing being much swollen.

Head, thorax, and abdomen dusky grey ; dorsal segments with dark middle spots, second segment with a pair, one on each side.

Expanse of wings : 26 mm.

4 ♂♂.

The species is nearest to *H. atrostrigata* Warr. from Queensland.

It should be noted that though I have placed this species in *Hydrelia*, as having apparently a single areole, the areole is actually double, vein 10 running into 11 close to its origin, so forming one very small triangular inner and a large outer areole. I am inclined to think that this small inner areole, situated as it is far basewards, is often overlooked.

In the aberration a large black-brown sinuous blotch rises from middle of inner margin of forewing, where it is broad, and is bent outwards at lower end of cell between veins 2 and 4.

1 ♂.

119. **Poecilasthena paucilinea** spec. nov.

Differs from *P. thalassias* Meyr. in two respects ; the hindwings of *thalassias* are at most bluntly elbowed at vein 4 ; in *paucilinea* the hindmargin is distinctly angled, vein 4 forming a short tooth ; secondly, in *thalassias* the lines forming the central fascia are four in number ; in the present species they are but three; the pale band on each side of the central fascia is traversed along its centre by a green waved line in *thalassias* ; in *paucilinea* the bands themselves are broader, the traversing line keeps close to the edge farthest from the fascia, which is therefore limited by a broader space of pale ground-colour. In all other points the species appear to agree.

2 ♂♂, sent along with a series of the true *thalassias* Meyr.

Subfamily TRICHOPTERYGINAE.

120. Anthierax aroensis.

Anisocolpia aroensis Warr., *Nov. Zool.* x. p. 382 ♀ (1903).

♂. *Forewing:* whitish, with grey suffusion and fine blackish lines, the lines placed as in the ♀, but the whole wing much paler; the band before submarginal line as far as vein 4, and the edges of central fascia towards costa alone showing fuscous with a slight greenish tinge; the cleft in hindmargin between veins 2 and 3 runs in for one-third of wing, the part below it being produced into an acutely pointed lobe, reaching well beyond the upper portion of hindmargin; the distortion below at middle of inner margin at the extremity of vein 1 is strongly marked, and the lobe clothed with white hairs.

Hindwing: white, with a large basal lobe, a fulvous grey twisted middle lobe, and a dark grey anal projection.

Hindlegs shortened and swollen, with tufts of ochreous hair; the abdomen also roughened with hair below. Antennae fulvous, darker at base; palpi pale grey speckled with darker, second segment rough-haired, third spatulate.

Expanse of wings: 35 mm.

1 ♂.

121. Episteira delicata spec. nov.

Forewing: white; basal area with six irregularly waved thick greyish olive lines, mainly vertical, the costal vein with three fine black dashes; some black scales along inner margin at base of all the lines; cell-spot linear, black, in a narrow pure white central space; four postmedian olive-grey dentate lines, of which the first two are marked with black and the third is thick and diffuse; a partially double blackish dentate submarginal line; a marginal row of black swollen spots between the veins, and a row of large black spots beyond them in the white fringe.

Hindwing: very pale grey, slightly darker before hindmargin.

Underside olive-grey, paler in hindwing and along inner margin of forewing; fringe white.

Palpi and antennae blackish; face dark brown; vertex olive-grey; fillet, collar, and tips of shoulders whitish grey; thorax grey, with a black lateral line, thickened behind; abdomen olive-ochreous.

Expanse of wings: 26 mm.

1 ♂.

Megaloba gen. nov.

Forewing: large; costa straight for four-fifths, then strongly convex; apex minutely produced; hindmargin gibbous or elbowed in middle; anal angle distinct.

Hindwing: narrow, elongate; the apex truncate; hindmargin crenulate; in the ♂ with a large ear-shaped lobe reaching half-way down inner margin, the lobe itself edged with a scale-bearing flap, which at the base forms a small additional lobe.

Abdomen in ♂ long and slender, with a stout keel beneath at base, in ♀ stout; antennae simple, lamellate; palpi porrect, long, second segment long-haired, third short and smooth; tongue and frenulum present; legs long and slender; hindtibiae in ♀ with terminal spurs; in ♂ thick, the femur, tibia, and tarsus of equal length, without spurs.

Neuration: forewing, cell quite half as long as wing; discocellular oblique; first median nervule just beyond middle, second at six-sevenths; lower radial from

above middle of discocellular, upper from upper end of cell in ♀, stalked with 7, 8, 9 in ♂; 10, 11 coincident, 10 anastomosing with 8, 9; hindwing, costal and subcostal anastomosing to near end of cell, 6, 7 long-stalked in ♂, short-stalked in ♀; discocellular biangulate, the radial from the lower outward angulation, vein 2 absent in ♂, 3 and 4 short; veins 2, 3, 4 at equal distances in ♀.

Type *Megaloba rubripicta* spec. nov.

The large suberect lobe in the ♂ hindwing is something like that in *Tympanota* Warr., but in that genus the costal and subcostal are separate but united by a bar.

122. **Megaloba leucocyma** spec. nov.

Forewing: sage-green, with darker and paler waved bands, all edged more or less distinctly with bluish-white lines, which on the dark green costa form snow-white spots; the bands on each side of central fascia paler than the rest, having an interrupted white line along their centre; submarginal line forming white crescents; a line of large black crescents along margin at the ends of the veins, edged with white scales; fringe pale green.

Hindwing: pale brownish grey, paler towards base, with dark linear cell-mark, curved postmedian line with paler edge and dark spots in fringe beyond the veins.

Underside of forewing greyish olive, with the lines faint; the submarginal shown by a curved row of white spots: hindwing without the olive tinge; cell-spot and postmedian line dark.

Palpi pale olive, the tips of each segment whitish; face green, with the lower part white; a snow-white dot in front at the base of each antenna, and one in the middle of the crown; one behind each eye and one at the base of each of the patagia; a white curved line on thorax and metathorax, and a white mark on basal segment of abdomen; abdomen fawn-grey, the basal and anal segments olive-green; antennae greenish above, rufous below; pectus and femora olive-green; tibiae and tarsi blackish, with snow-white joints, the hindtibiae grey.

Expanse of wings: 44 mm.

1 ♀.

123. **Megaloba? rhododactyla** spec. nov.

Forewing: olive-green, crossed by waved and crenulate lines of shell-pink; along the costa the edges of the green bands become blackish green; basal patch olive, with three pinkish-white lines, with some black scaling above and below the submedian vein; central fascia with four pinkish-white lines, the dark cell-spot lying in the first; the inner band with a dark blotch on the submedian fold, the outer edge irregularly crenulate and marked by black spots on the veins; both pale bands shell-pink, the outer more vividly, with an olive-grey central line; submarginal line lustrous white, rosy tinged, preceded by a black line swollen into teeth between the veins and externally tipped with black; a marginal row of black truncated crescents at end of veins alternating with spaces of shell-pink; fringe pale olive, with white spots beyond the veins.

Hindwing: pearly cream-colour towards base, gradually becoming pale green towards hindmargin; fringe rufous beyond a dark marginal line.

Underside of both wings olive, the markings showing through.

Palpi olive-green, with the tips of each segment white; face green, with the sides below white; base of antennae, a spot before each, and a spot before each eye white; collar, thorax, and abdomen olive mixed with shell-pink and white;

antennae deep red beneath and at sides, above annulated with red-brown and white ; pectus white ; femora and underside of abdomen olive ; foretarsi black, with white joints ; foretibiae bright red.

Expanse of wings : 30 mm.

1 ♀.

The position of this very beautiful insect is doubtful ; it agrees with *Megaloba* in neuration, and in the slightly produced, pointed, not rounded, apex of forewing.

124. **Megaloba rubripicta** spec. nov.

♂. *Forewing :* dark green, with blackish green lines and shades ; a dark shade close to base, followed by a paler grey-green band ; then a broad outwardly oblique band, its edges dark, outcurved externally above submedian vein ; next a thin band of pale bright green, mixed with bluish-white scales ; central fascia with inner edge dark, above submedian blackish and projecting towards inner band so as nearly to touch ; outer edge irregularly dentate, angled below vein 4, then concave inwards, preceded by two dark green lines, the inner edge followed by one, all interspersed with bluish-white scales ; cell-spot dark green ; the fascia is followed by a narrow band of bluish-green scales, straight from costa to below vein 4, then incurved and lunulate ; submarginal line pale bluish green, edged outwardly with blackish and preceded by a dark green shade, which forms a blackish blotch beyond cell ; small blackish angled spots at ends of veins ; fringe green.

Hindwing : basal half and lobe whitish, scaleless ; outer half reddish fuscous, with the veins and fringe bright red ; flap of the lobe with olive-green scales.

Underside of forewing bronzy olive-green, with the veins and hindmargin rust-red ; costa from near base broadly bright ferruginous ; fringe pale yellow-green ; hindwing like upperside, but paler ; the veins and fringe red.

Head and thorax green like forewing ; abdomen yellow-green ; terminal segment of palpi brownish with the tip white ; legs pale olive-green or ochreous ; foretarsi black-brown with the joints ochreous ; antennae annulated with green.

♀ much gayer ; the dark edgings of the inner band and central fascia of forewing, and the band preceding submarginal line broadly deep dark green ; the intervals bright pale green with ochreous edging ; the submarginal line white ; cell-spot large, crescentic ; fringe red ; hindwing bright red, more ochreous towards base, with two postmedian waved grey lines and the margin dark.

Underside bright ferruginous, mixed in forewing with greenish, the marginal area green with the fringe ferruginous ; forewing with six dark shades, hindwing with two postmedian lines and marginal border.

Head, palpi, shoulders, and patagia olive-green ; metathorax and base of abdomen red-brown ; tips of patagia red ; metathoracic tuft bright pale green ; antennae annulated with red ; antennae beneath and legs bright ferruginous.

Expanse of wings : ♂ 35 mm. ; ♀ 40 mm.

The difference between the sexes is remarkable.

1 ♂, 2 ♀♀.

125. **Remodes parviplaga** spec. nov.

Forewing : greenish white, with a succession of waved and dentate green lines crossing from base to margin, exactly as in *R. lobata* Warr. from Padang, and *R. pallidiplaga* Warr. from Java ; the only dark markings are the spots on margin

at the ends of the veins, and two or three dashes above the submedian vein in central fascia, as in *lobata*; the pale band beyond the fascia ends in a bright whitish fleck on margin above the end of the submedian, smaller and whiter than the blotch in *pallidiplaga*.

Hindwing: whitish grey, with the outer margin greyer; the terminal lobe and the upper folded edge of the middle lobe still darker grey: the lobe at base quite small; this agrees with *pallidiplaga*, but not with *lobata*.

Underside olive-green, becoming reddish grey towards hindmargin; the fringe of the two outer lobes of hindwing blackish.

Abdomen with lateral spreading tuft of hairs on second segment and upcurved tuft from sides of penultimate segment; hindlegs twisted, with dull ochreous tuft of hairs on femora; antennae olive-green externally, blackish internally.

Expanse of wings: 35 mm.

1 ♂.

I have seen a pair before from the Upper Aroa River, which I at the time referred to *lobata*.

126. **Sauris atrilineata** spec. nov.

Forewing: olive-green, crossed by darker angled waved lines, all thickly marked with black except in the interspace between veins 3 and 4 and the costal area above vein 6, where the lines are finer and greenish black; the line close to base and the central threads of the two pale bands are also dark green; all the lines are angled outwards in cell and beyond, incurved below middle, and again inclined obliquely outwards towards inner margin; beyond the green basal area are two pairs of black lines; the bands of central fascia consist of three and four lines each, and there are two dark lines before the submarginal; marginal spots at ends of veins square and black, followed by square white spots in the blackish fringe.

Hindwing: grey, paler at base; the small lobe with a black dash on its upper edge near base.

Underside dark smoky-grey with the markings showing through; cell-spot and marginal spot of forewing blackish.

Head, thorax, and abdomen olive-green, the last with black dorsal marks; patagia black; tibiae and tarsi black with pale joints; hindlegs paler.

Expanse of wings: 26 mm.

1 ♂.

Neuration of hindwing as in *griseolauta*.

127. **Sauris griseolauta** spec. nov.

Forewing: pale green; the transverse lines and shades dark olive-green, in parts olive-brown, edged and alternating with pearl-grey lines, which are paler in ♂ than in ♀; a dark green patch at base, followed by a pale band; a broad dark green band of three diffuse lines, the intervals grey, followed by the usual pale band with darker centre before the central fascia, its outer edge pearl-grey; central fascia formed of two bands of three lines each, dark green and brown, alternating with pearl-grey, followed by the usual pale band: a double dark green band before the pearl-grey submarginal line, which is followed by a single dark green shade; marginal spots at end of veins dark green, subquadrate, alternating with pearl-grey spots which project into the pale green fringe.

Hindwing: pale grey, whiter towards base.

Underside greenish cinereous.

Head and thorax green; palpi paler green with whitish tips; abdomen greenish ochreous; antennae ochreous, more rufous beneath; a white spot behind each eye.

Expanse of wings: ♂, 30 mm.; ♀, 34 mm. One dwarf paler ♂ measures only 26 mm.

3 ♂♂, 1 ♀.

Th ♀ is always darker than the ♂.

♂. Hindwing: cell barely one-fourth of wing, broad; discocellular angled; costal and subcostal approximating well beyond cell; 6, 7 stalked, 7 anastomosing and becoming coincident with 8; 5 and 4 close together from end of cell; 1, 2, 3 absent.

128. **Steirophora violacea** spec. nov.

Forewing: pale olive-green, crossed by darker green waved and angulate lines, all more or less marked with blackish, except the dark green thread of the two pale bands; the disposition of the lines is almost identical with that in *S. auratisquama* Warr. from Java; but the gilded yellow scales of that insect are less conspicuous; instead the present species is characterised by a violet shade, which suffuses the submedian interspace and the outer pale band, and sometimes encroaches on the outer half of central fascia, but not above vein 6.

Hindwing: grey with a distinct violet tinge, the outer half darker with a paler curved postmedian band; a small grey cell-spot.

Underside cinereous olive, with the markings showing through.

Head and thorax green; patagia grey with black scales; abdomen greenish ochreous, sometimes with darker patches along dorsum; metathorax and two basal segments of abdomen with a broken black lateral line; palpi green dusted with darker.

Expanse of wings: ♂ 30—35 mm.; ♀ 35 mm.

5 ♂♂, 1 ♀.

S. punctatissima Warr. from S. Celebes is also like this species, but has narrower, more pointed forewings.

Subfamily TEPHROCLYSTIINAE.

129. **Adeta confusa** spec. nov.

Forewing: dark olive-fuscous; the lines pale, greenish, very faint; basal patch quite small, the usual space beyond it broad, of the same dark grey tint, edged by a pale line, which forms a strong angle above median and a fainter one below it, followed by the broad blackish inner band of central fascia; the white centre of the fascia makes the three preceding areas appear to form one large basal patch; outer edge of central fascia at two-thirds, crenulate, oblique outwards to below 4, then inwards, preceded by three dark lines, forming its outer band, and followed by a pale greenish band with darker centre; submarginal line pale greenish grey, preceded and followed by a dark band; the outer one with a pale spot between 3 and 4; a dark marginal line; fringe mottled dark and light.

Hindwing: similar, but the paler green intervals broader.

Underside dark greenish cinereous, paler in hindwing, the dark shades showing through.

Head, thorax, and abdomen dark and pale green ; vertex paler.

Expanse of wings : 22 mm.

1 ♀.

Distinguished by the dark ground-colour and white central streak.

130. **Aniserpetes fasciata** spec. nov.

Forewing : dull green ; the central fascia dull violet ; the whole wing with minute black dusting ; first line curved, black, at one-fourth ; outer line at two-thirds, crenulate, outcurved above, followed by a white line ; submarginal line faint, waved, preceded by a violet-grey band, which is darker at costa, beyond cell, and above inner margin ; marginal line black ; fringe greenish grey.

Hindwing : the same ; marginal area with a large square white spot between 3 and 4, which is merely a pale patch in forewing.

Underside pale greenish cinereous with dark bands.

Head, thorax, and abdomen green and violet.

Expanse of wings : 20 mm.

1 ♂.

131. **Ardonis dentifera** spec. nov.

Forewing : bright pale green, crossed by wavy green lines ; basal patch marked by a black costal spot, with a tuft of raised black scales on it, and a dark point on submedian vein ; inner edge of central fascia marked by a black tooth-shaped blotch, its apex bearing a large tuft of raised black scales above the black cell-spot ; outer edge formed by a small triangular black blotch, the lines edging the fascia marked across wing by slight black dots on veins ; submarginal line white, wavy, the lunules slightly filled with dark scales ; fringe mottled pale and dark green, beyond slight dark marginal spots.

Hindwing : green, paler towards costa, with the lines alternately green and whitish green, the edges of the central fascia shown by black dots ; a double black spot at anal angle, and the marginal lunules black ; costa of forewing of ♂ shining white with an oval patch of black scales beyond middle.

Underside green, with the black markings distinct and neat ; ♂ with inner margin of forewing glossy white, with an oval patch of rough black scales.

Head, thorax, and abdomen green, the last with a blackish band on second segment ; shoulders black-spotted laterally.

Expanse of wings : 23 mm.

1 ♂, 2 ♀♀.

132. **Chloroclystis cuneilinea** spec. nov.

Forewing : greenish white, the intervals all reddish on costa ; crossed by a succession of pale grey-green lines ; the bands limiting the central fascia rather paler green ; central fascia slightly greyer green, the lines towards its outer edge reddish ; the outer edge itself marked by black wedge-shaped spots on veins ; inner edge also with black points on median and submedian ; submarginal line pale green, waved, preceded by a grey-green band of two lines, tinged in parts with red ; the margin grey-green ; marginal line black, interrupted by the veins ; fringe glossy pale green.

Hindwing : paler ; the fascia without reddish scaling ; the spots and all the lines very delicately marked.

Underside of forewing greenish grey, except the inner margin, which, like the hindwing, is pale green, with thick outer and black marginal line.

Head, thorax, and abdomen pale green; abdomen with a pink spot on sides of third segment; forelegs dark green with pale joints.

Expanse of wings: 16 mm.

1 ♂, 1 ♀.

133. **Chloroclystis semiscripta** spec. nov.

Forewing: whitish green; the markings grey; band edging basal patch at one-fourth, curved; inner edge of central fascia at two-fifths parallel to basal line, marked with some brown below middle: both these reach the inner margin; outer edge at two-thirds, dark at costa, then forming pairs of grey dots on veins to 4; praesubmarginal band dark grey to 4; submarginal line of the pale ground colour, followed by grey diamonds on veins; fringe grey; all the pale intervals crossed by pale grey lines dotted on veins; below vein 4 the outer markings are pale and blurred.

Hindwing: whitish green, with a faint grey cloud at anal angle.

Underside whitish green, with the markings only showing through.

Head, thorax, and abdomen whitish green; dorsum brownish-tinged at base, and with a black dot at side of second segment; forelegs blackish, with pale joints.

Expanse of wings: 23 mm.

1 ♀.

134. **Eucymatoge albicristata** spec. nov.

♂. *Forewing:* purplish brown, the two pale bands and centre of fascia whitish at costa; basal patch with a dark vertical edge; inner edge of central fascia crenulate and nearly vertical, outer edge crenulate, inangled on vein 7, insinuate beyond cell, projecting on vein 4, and followed by a white spot on veins; the outer band of fascia dark throughout, the inner band dark at costa only, both containing three crenulated lines; cell-spot linear, black; marginal area purple-brown; all the lines marked on veins by dark and light dashes; marginal line black; fringe reddish, mottled with brown; the whole wing below median darker than above.

Hindwing: grey, darker along hindmargin, with traces of grey postmedian and submarginal lines; pale dots at the vein-ends; fringe dark grey.

The ♀ is slightly paler, and has the middle of central fascia above median vein white.

Underside dark grey, paler towards base, with black cell-spots and dark outer line.

Head, thorax, and abdomen like wings, purplish brown with paler speckling; metathoracic tuft white.

Expanse of wings: ♂ 26 mm.; ♀ 30 mm.

1 ♂, 1 ♀.

135. **Eucymatoge albimedia** spec. nov. and ab. **brunneotincta** nov.

Forewing: chalk-white, the basal and marginal areas dark purple; basal patch edged by a thick velvety black shade, outcurved from costa to submedian fold, vertical on inner margin; inner band of central fascia curved parallel to edge of basal patch, starting from a purplish triangle on costa and ending in a smaller one on inner margin, always interrupted between veins 1 and 2, the costal part

joined horizontally above median vein with the elongated purplish discal spot; outer band uninterrupted, of uniform width, deep purple-black, finely edged externally by a lunulate whitish-yellowish line; the white band beyond basal patch has two grey middle lines, only visible above median vein, where they are bent, and is interrupted between submedian fold and vein by a brown cloud, which in a manner unites the basal patch to the lower part of central fascia; the white area of the fascia is traversed by three lines, marked mainly by dark spots on veins, the outermost immediately preceding the outer band; the usual pale band beyond fascia is filled up with purplish above middle and with brown below; submarginal line indicated only in lower half of wing, followed by a pale grey patch at apex, between veins 3 and 4, and below vein 2; marginal white dots at end of veins; fringe purple-black, paler beyond the three pale spaces, with two dark lines and dark spots beyond veins.

Hindwing: purplish black, paler in basal half; small white dots at end of veins, and sometimes traces of a postmedian line.

Underside dark purplish, dusted with bluish white; inner margin of both wings whitish; cell-spots dark: basal area paler; outer area with the veins marked dark and light; fringe as above.

Face, palpi, and inside edge of collar, shoulders, and patagia snow-white; base of each segment of palpi purple; thorax, shoulders, patagia, and antennae purple; abdomen purplish mixed with whitish; dorsal band and crests purple; legs purple with the joints white.

Expanse of wings: 30—32 mm.

5 ♂♂.

In the aberration *brunneotincta* only the interrupted band before fascia is white; the white of the fascia itself, except at the costal edge, being suffused with brown, and the outer band of the fascia is narrowed.

1 ♂.

136. **Eucymatoge brunneata** spec. nov.

Forewing: suffused with pale brownish flesh-colour; the markings brownish fuscous and black; basal patch darkest, the edge curved outwards to submedian fold, along which it runs shortly inwards, then vertical to inner margin; inner edge of central fascia parallel to it, angled outwards in cell before cell-spot and inwards on submedian vein; outer edge acutely inangled on vein 7, forming a double lobe outwards on vein 4, then incurved, wavy, dentate; the fascia crossed by five minutely crenulate blackish lines and containing a vertical black linear cell-spot; the pale band beyond narrow, flesh-coloured, with white teeth inwardly on veins, and wholly white at costa; marginal area beyond it filled up with dark fuscous above vein 4, and brownish flesh-colour, with the lines dark, beneath; paler altogether between veins 3 and 4; the submarginal line pale and waved; a dark marginal line interrupted at the veins; fringe brownish with dark chequering.

Hindwing: grey, with wavy outer and submarginal lines, the marginal border darker; fringe grey, spotted with dark beyond veins.

Underside dark grey, with the cell-spots black and the outer lines indicated.

Vertex, palpi, thorax, and abdomen blackish fuscous; face, fillet, and collar whitish.

Expanse of wings: 26 mm.

1 ♂.

137. **Eucymatoge constellata** spec. nov.

Forewing: dark brown, dusted with pale ochreous; lines shown by series of round pale ochreous spots; three larger costal spots at one-fifth, two-fifths, and two-thirds, from which the three series start; a black cell-spot in an ochreous patch; a submarginal line of spots, starting from three-fourths of costa and bent on vein 6, followed on costa by an intense black shade, which reappears above anal angle; minute orange dots at the vein-ends; fringe brown, dark-chequered beyond veins, with the tips pale.

Hindwing: dull creamy-white, with the dark postmedian and submarginal lines of underside showing through; fringe with a rufous tinge, chequered with dark brown.

Underside of forewing paler, blurred: the spots yellowish ochreous; hindwing yellowish ochreous with brownish speckling; a black cell-spot; a brown cloudy postmedian shade starting from a dark brown costal blotch, and a macular submarginal line.

Head and thorax brown, with pairs of yellow spots; abdomen ochreous with brown dorsal marks; anal segment above and praeanal segment below black-brown; legs ochreous, with black tarsi.

Expanse of wings: 18 mm.

A long series of ♂♂, without a single ♀.

138. **Eucymatoge contaminata** spec. nov.

Forewing: dirty white; the markings in the main the same as in *E. rufilunata*, described below, but all the cross-lines, which are pale grey in that species, are here pale rufous, the whole wing having a tinge of rufous over it; the edge of the basal area is evenly curved, not projecting in the middle, and the tooth of outer edge of central fascia between veins 3 and 4 is much sharper and longer; instead of the chestnut streak of *rufilunata* this species has a black or blackish brown mark, followed by a diffuse dark cloud; cell-spot generally broken up into two dots.

Hindwing: dirty white, with an ochreous tinge.

Underside dirty ochreous grey, without any distinct markings.

Head, thorax, and abdomen as in *rufilunata*, but the white scales all discoloured.

Expanse of wings: 27 mm.

4 ♂♂.

The difference in the undersides will serve to distinguish the two species.

139. **Eucymatoge discinota** spec. nov.

Forewing: deep velvety brown; the veins towards margin reddish, running out into the reddish fringe; some bluish-white scales at base, along subcostal vein, and inner margin; a white spot at base of wing; lines marked by snow-white spots; five spots in a curve close to base, on the folds as well as on the veins; three larger spots in an oblique line to middle of inner margin, lying between the veins, the middle one largest; discal spot large and bent, finely edged with pale, with a round white spot on costa above it; a costal spot with one or two smaller ones below it, and a large double spot below median followed by a dot on inner margin represent outer line; a row of submarginal and marginal white spots between the veins; three costal spots before apex; a pale blurred wedge-shaped space reaches from base through cell to hindmargin.

Hindwing: dull whitish, with grey postmedian line and marginal border, the space between paler.

Underside of forewing dull brown, speckled with whitish; the two large costal spots and the corresponding pair above inner margin white; also the series before marginal line: hindwing thickly speckled with brick-red; postmedian line and veins red; marginal border dark brown.

Head, thorax, and abdomen deep brown with white dusting; thorax with four large white spots.

Expanse of wings: ♂ 21 mm.; ♀ 24 mm.

4 ♂♂, 4 ♀♀.

140. **Eucymatoge disrupta** spec. nov.

♂. *Forewing:* greenish white; the markings black, shaded with violet and very dark green; basal patch of the ground-colour, edged by a black shade which is angled in middle of wing, interrupted below, and ending in a broad blotch on inner margin; inner edge of central fascia interrupted, parallel to edge of basal patch, marked by blotches on costa and inner margin and spots on veins between: outer edge at three-fourths, prominently angled at veins 6 and 4, interrupted between 2 and 4 and marked on 3 by a black spot; cell-spot black, large and vertical; two lines of black vein-spots across fascia; traces of three dark lines along inner pale band at costa; some faint clouds along costa, before the cell-spot, and in the interrupted part of outer band; submarginal line preceded by a violet and olive band, edged with blackish, especially on veins, and interrupted between veins 3 and 4 and partially above 6; some violet clouds along margin above vein 4 and below vein 3; pairs of black dots at the vein-ends, followed by olive chequering in the pale fringe.

Hindwing: pale grey, darker towards hindmargin, with an angled postmedian and curved submarginal line marked darker on veins; fringe whitish, mottled with dark.

Underside dark grey, with cell-spots dark and fringes white with dark mottling.

Head, thorax, and abdomen greenish white; centre of shoulders, patagia, and thorax blackish green; intermediate segments of dorsum dark green with whitish-green sagittate marks, the basal and anal segments wholly pale green; segments of palpi with their bases green.

♀ whitish, without the green tint; all the dark markings and shadings more developed and intense, the pale bands before and beyond the central fascia filled in with dark scales.

Expanse of wings: ♂ 24—26 mm.; ♀ 30 mm.

3 ♂♂, 1 ♀.

141. **Eucymatoge distorta** spec. nov.

Forewing: dull brown, finely pale-speckled; three large white costal spots at one-fifth, two-fifths, and two-thirds, three corresponding small white spots on inner margin; a white dot at base of wing; a white spot near base of cell; a large white spot in submedian interspace below base of vein 1, and a double spot beyond on each side of vein 1; cell-spot linear, dark; a blurred pale brown wedge-shaped mark from base of cell to hindmargin; submarginal line showing as white dots only above and below this space; a very fine dark marginal line; fringe rufous, with white tips, and chequered with brown beyond veins.

Hindwing: white, with broad brownish marginal border ; fringe paler brown.

Underside of forewing blurred, much paler; all the white spots shown: hindwing redder brown, thickly speckled with pale ; the marginal border darker; the central space generally paler ; a dark cell-spot ; the veins often pale.

Head, thorax, and abdomen brown with pale dusting; dorsum marked with white spots.

Expanse of wings : 24 mm.

3 ♂♂.

Closely allied to, but quite distinct from, *E. discinota*. The hindmargin of forewing is clearly indented just below vein 4.

142. **Eucymatoge griseata** spec. nov.

Forewing: ashy grey ; the lines darker grey; basal patch dark grey, crossed by two darker lines and edged by another, which is only slightly curved; inner edge of central fascia curved parallel to it, not waved or projecting into the fascia as in most of the allied species, blackish throughout; outer edge at two-thirds, forming two sharp teeth between veins 2 and 4, and blackish beyond cell ; submarginal line pale grey, preceded by a darker grey band ; dark grey marginal spots at ends of veins ; fringe grey ; all the pale spaces traversed by waved darker lines ; cell-spot blackish.

Hindwing: greyish white, grey along hindmargin, with traces of two waved lines and two more before them on inner margin only.

Underside dull grey, the cell-spots black, the outer line indistinct.

Head, thorax, and abdomen pale grey, thickly speckled with dark grey ; palpi and face blackish, the extreme tip of palpi whitish.

Expanse of wings : 30 mm.

1 ♀.

143. **Eucymatoge lichenosa** spec. nov.

Forewing: pale lichen-green, the markings moss-green, mixed in places with violet ; basal area pale green, crossed by two waved dark lines, marked with violet at costa and edged by a violet band, which projects shortly below subcostal and submedian veins and is interrupted above the submedian; inner band of central fascia, outcurved in middle, darker on costa and inner margin, where it is marked with violet and black scales, interrupted below middle, followed by three moss-green lines, the outermost of which is sharply dentate outwards beyond the linear black cell-spot ; outer band of three lines, partially filled in with moss-green, the outermost marked with blackish and strongly wavy dentate, with a prominent sharp tooth between veins 3 and 4 ; the pale band before fascia with a double line of moss-green scales, that beyond it with a single line, its outer half beyond cell occupied by a broad red-brown patch ; submarginal line pale green, preceded by a deep violet and green band, which is strongest at costa and beyond cell, and on the veins is marked by a strong pale green dash ; veins towards margin violet ; pairs of dark spots at ends of veins ; fringe greenish white, mottled with olive-brown beyond veins ; all the lines form blackish green spots on the costa.

Hindwing: whitish in basal half, with a dark grey curved border, in which the veins are marked with alternate dark and pale dashes, indicating three lines,

preceded by an angulated postmedian line; fringe whitish, with dark dashes beyond veins.

Underside dark grey, with the outer angulated lines and cell-spots clear, as in *E. rufilunata*.

Head, thorax, and basal segment of abdomen pale green like wings, sprinkled with moss-green and violet scales, especially the thorax; second segment of palpi externally, and base of terminal segment dark green; abdomen a mixture of pale green and violet-fuscous scales, the second segment brownish, the dorsal crests large, olive-green; fore and middle tibiae and tarsi black, with the joints white; pectus white.

Expanse of wings: 26 mm.

1 ♂.

144. **Eucymatoge nigribasis** spec. nov. and ab. **mediotaeniata** nov.

Forewing: greenish grey; basal patch black-green, finely white-edged; three black linear costal marks; the first indicating the origin of the dark centre of the pale band that precedes the central fascia; the second the central fascia itself, of which only faint traces are visible; the third is continued across wing as a dark shade filling up the lunules of the waved white submarginal line; fringe grey with pale marks.

Hindwing: paler grey, darkening towards hindmargin, with a dark postmedian line.

Underside of forewing dull greenish grey, with the markings darker and pale-edged, visible only towards costa: hindwing paler at base, more speckled; a dark line beyond middle with paler band beyond it.

Head, thorax, and basal segment of abdomen black-green; rest of abdomen like wings; pectus and forelegs blackish.

Expanse of wings: 17 mm.

7 ♂♂, 1 ♀.

In the aberration the central fascia is completely black-green from costa to inner margin.

8 ♂♂.

There appear to be no intermediates.

145. **Eucymatoge placens** spec. nov.

Forewing: whitish green, overlaid with grey; the lines black; edge of basal patch black, close to base; band beyond it broad, especially towards costa, its centre filled up with dark grey; inner edge of central fascia at one-third, angled strongly in cell and less so on submedian fold; outer edge at three-fifths, indented below subcostal, projecting on veins 4 and 3 and lunulate-dentate inwards; both edges black, and starting from black costal spots; cell-spot black, small; two grey lines traverse the fascia; outwardly it is edged with a pale green band with darker centre, which is followed by a pinkish lilac band, not always clear; submarginal line pale green, waved, filled up with blackish grey scales; the marginal area dark green mixed with pinkish; both it and the praesubmarginal shade, as well as the line itself, are interrupted between 3 and 4 by a white blotch; marginal festoon black; fringe mottled dark and light grey.

Hindwing: whitish grey, with traces of lines, and a paler submarginal band.

Underside of forewing glossy cinereous, of hindwing whitish ; the lines all shown, but much more clearly in hindwing.

Head, thorax, and abdomen grey mixed with green and pink scales.

Expanse of wings : 22—24 mm.

2 ♀♀.

146. **Eucymatoge rufilunata** spec. nov.

Forewing : white, dusted with grey ; the lines grey, darker on the veins ; basal patch dark grey or brown-grey, edged by a brown-black band with a slight projection outwards above median, and crossed by two dark lines ; bands of central fascia tinged with grey, darker towards costa, where the inner band forms a triangular blotch ; the inner band curved parallel to edge of basal patch, the outer insinuate beyond cell and forming a beak projecting between 3 and 4, interrupted by the pale ground-colour above 6 ; the pale bands on each side and the fascia itself crossed by waved grey lines ; the outer half of outer pale band beyond cell marked by a chestnut-brown curved streak ; submarginal line whitish, waved, preceded by a dark grey band above middle, paler below, its lunules followed by blackish streaks to margin above middle, and grey ones below ; the veins swollen into brownish spots between them ; pairs of black marginal spots at the vein-ends ; fringe white, grey-mottled ; cell-spot blackish, linear.

Hindwing : whitish, with angled grey postmedian and curved submarginal line, the margin itself grey ; marginal spots dark grey ; fringe white.

Underside of forewing dark grey, of hindwing whitish ; cell-spots, outer lines, and marginal clouds distinct.

Head and palpi white, the base of each segment externally black ; thorax and abdomen white speckled with blackish ; the basal segments of dorsum dark grey.

Underside of abdomen dark grey like the legs ; fore- and middle tibiae and tarsi black, with white joints ; pectus white.

Expanse of wings : 27 mm.

4 ♂♂, 1 ♀.

147. **Eucymatoge subrubescens** spec. nov.

Forewing : dull green ; basal patch and central fascia dark fuscous, with fine black waved lines along their edges followed by an equally fine white one ; edge of basal patch slightly curved ; inner edge of central fascia at two-fifths, outer edge projecting outwards at vein 4 ; the outer portion of fascia green from vein 5 to inner margin, the fuscous-scaled portion narrowing to margin ; a black cell-spot and two dark wavy lines across it ; green bands preceding and following fascia with their centres grey ; submarginal line indistinct, wavy, whitish, preceded by a reddish grey band, with grey beyond it ; marginal festoon black ; fringe reddish grey.

Hindwing : rufous grey, without markings, except a dark cell-spot.

Underside of both wings rufous, with a greenish tinge towards base ; outer line grey, angled in middle on forewing, curved and wavy on hindwing.

Head, thorax, and abdomen pale green, speckled with dark ; second dorsal segment with a black metallic ring ; dorsal tufts of radiating black hairs.

Expanse of wings : 22 mm.

2 ♀♀.

148. **Gymnoscelis crassifemur** spec. nov.

Forewing: smooth pale green, with pale violet shading; the lines black; inner line at nearly one-third, angled outwards on each fold, to inner margin near base; followed by a broad curved violet band; outer edge at two-thirds, angled on 6 and 4 and insinuate between, then inwardly oblique to three-fourths of inner margin, preceded by some violet shading, the interval with one or two violet lines; submarginal line green, dentate, the teeth filled up with dark; the marginal area violet; a fine dark marginal line; fringe violet,

Hindwing: with the base violet; the rest as in forewing; veins in both wings dotted with black scales.

Underside pale green, overlaid with violet-grey in forewing, except along inner margin, with two dark curved outer lines and cell-spot, all much plainer in hindwing.

Head, thorax, and abdomen green, more or less obscured by violet-grey scales. Underside of abdomen, and the legs shining greenish white; fore-femora heavily clothed with rust-coloured furry scales.

Expanse of wings: 17 mm.

1 ♂.

Micromia gen. nov.

Forewing: costa with a prominent shoulder at one-fourth from base, thence incurved to nearly three-fourths; hindmargin curved; inner margin convex.

Hindwing: with well-rounded hindmargin.

Abdomen with short dorsal tufts; metathoracic tuft erect, bifid; forehead with a bifid tuft; palpi porrect, first and second segments hairy beneath, second twice as long as first, third half as long as second, slender, pointed, from the top of second; antennae simple, in the ♂ scarcely pubescent; tongue and frenulum present; hindtibiae with four spurs.

Neuration as in *Tephroclystia* and *Cosmorhoë*—the areole simple; in the hindwing 3, 4, and 6, 7 from the cell, not stalked.

Type: *Micromia fulvipuncta* spec. nov.

149. **Micromia fulvipuncta** spec. nov.

Forewing: deep olive-green; the basal patch, the bands forming the edges of central fascia, and the praesubmarginal band still darker green, especially at costa, where they widen out; costa along the paler intervals whitish; inner band of central fascia swollen on inner margin as well as on costa; the dark green markings finely edged with whitish green; the praesubmarginal band with a round fulvous spot between veins 4 and 6, and two smaller spots on veins 1 and 2; submarginal line indistinct, showing some paler green lunules; marginal line fine, black-green, with blackish dashes between veins to the submarginal lunules, those beyond cell strongly marked; fringe green, in the outer half mottled dark and light.

Hindwing: grey, darkening to margin; black lunules between veins at margin; fringe grey.

Underside shining grey, with traces of lines; costa of forewing pale fulvous, darker at the lines; hindwing with five dark curved crosslines.

Head and thorax green; metathorax paler; abdomen dull fulvous with dark dorsal markings; underside of abdomen pale; tarsi dark, with pale joints.

Expanse of wings: ♂ 24 mm.; ♀ 26 mm.

5 ♂♂, 1 ♀.

Polysphalia gen. nov.

♂. *Forewing:* costa rough-haired and forming a prae-apical lobe; apex rounded; hindmargin obliquely curved.

Hindwing: narrow; hindmargin indented beyond cell.

Antennae lamellate; palpi porrect, decumbent; hindtibia with four spurs.

Neuration of *Chloroclystis*, but distorted; the cell-fold raised above and furrowed below towards hindmargin, the lower radial being obscured; veins 12 with 11 and 10, running into the lobe, 9 and 8 into the costa at its end, and 7 into apex; the median vein is thickened and contorted at base, the wing membrane beneath it partially hyaline; the fold in cell bears a ridge of black erect scales.

Neuration of hindwing, and of both wings in ♀, normal.

Type: *Polysphalia cristigera* spec. nov.

150. **Polysphalia cristigera** spec. nov.

Forewing: pale greyish green, with numerous waved greyish lines across it; four in basal area, the fourth being the inner edge of central fascia, angled on median and marked by blackish dots on veins; outer line at two-thirds, excurved above, marked by blackish teeth inwardly on veins, preceded by two grey lines; submarginal line pale, waved, the teeth filled up with dark grey, blackish below costa and beyond cell; margin between 3 and 4 slightly paler; marginal lunules black; fringe chequered green and greenish white. In the ♂ the cell-fold bears a ridge of black scales in cell, and the furrow beyond is marked with rough reddish scales.

Hindwing: with a dark bar at base; the rest as in forewing; the outer line with its black vein-dashes distinct and followed by a pale green band with dark centre.

Underside grey-green in forewing, whitish green in hindwing, with the lines dark.

Head, thorax, and abdomen green, speckled with dark; the face and vertex clearer.

Expanse of wings: ♂ 15 mm.; ♀ 20 mm.

1 ♂, 1 ♀.

The ♀ is more thickly speckled with grey.

Prosthetopteryx gen. nov.

Forewing: with neuration of *Tephroclystia*, the areole large and single; the structure of wing normal.

Hindwing: in ♀ normal also; in ♂ subject to numerous variations of structure. In the typical section, including *caesiata* and *rotundata*, a deep cleft runs up towards base below vein 3, forming a large triangular anal lobe, like an additional wing; this lobe is densely fringed, and below covered with woolly hair; median vein at base with a pencil of hairs; the wing above vein 3 rounded. In another section, comprising *cavilinea* and *barbata*, a second cleft, less deep, occurs below vein 6, so that the wing is divided into three parts, all more or less contorted and hairy, the wing in one case, *parvipennata*, being quite dwarfed; or again, as in *viridisecta*, the lower cleft becomes a short rounded excision and the anal lobe is quadrate and bifid. Again, in a third section, *latistriga*, the cleft is short and below vein 2, and the upperside of wing is hairy.

In the typical section vein 8 anastomoses with subcostal to near end of cell;

veins 6, 7 are stalked ; the discocellular has a long oblique lower arm, and the radial (vein 5) is stalked with 4 from the lower end of cell, vein 3 rising much nearer base, veins 1 and 2 being left in the anal lobe ; the neuration is the same, as far as can be seen, in the second section ; but in the third vein 3 rises closer to the stalk of 4, 5, and vein 2 some distance before, vein 1 alone passing into the anal lobe. In all alike the cell is broad at extremity and veins 6, 7 curved downwards and divergent. In the hairier forms, such as *barbata*, the abdomen beneath is tufted with hairs.

Type : *Prosthetopteryx caesiata* spec. nov.

In *Tripteridia* Warr., which also has the hindwing divided into three lobes, the forewing too has a deep cleft in hindmargin.

151. **Prosthetopteryx barbata** spec. nov.

Forewing : dull green ; the markings dark green : viz. the basal patch with its edge oblique outwards ; the central fascia broad, oblique outwards to middle, then inwards, its inner edge approaching basal patch on inner margin ; the pale green space between them with dark green centre, broad at costa and narrowing to a point at inner margin, angled outwards in cell like the fascia itself ; beyond the pale green band edging the fascia externally is a dark fascia with a rufous tinge before the indistinct pale submarginal line ; fringe probably green.

Hindwing : deeply three-lobed ; all the lobes dingy grey and fringed with long curled hairs ; the middle lobe pointed and darker grey, with a curled wisp of ochreous grey hairs on its inner edge.

Underside of forewing pale greenish, with the dark markings showing through : hindwing with the middle and inner lobe thickly covered as well as fringed with long fine woolly hair ; a wisp of black hairs at the end of the short upper cleft.

Head, thorax, and abdomen greenish.

Expanse of wings : 28 mm.

1 ♂.

The apex of forewing is acute.

152. **Prosthetopteryx caesiata** spec. nov.

Forewing : deep brown-black, with a slight reddish tinge ; the lines blackish, indistinct, except in certain lights ; a curved line near base ; another, double, at about one-third ; an outer line, also double, and dentate outwards ; a dentate submarginal line ; fringe dark brown.

Hindwing : bluish slate-colour, the fringe included ; the inner lobe with its fringe shining white.

Underside of forewing dull brown overlaid with dull bluish slate ; the lines darker in costal half ; fringe brown with paler mottlings ; hindwing slaty blue, with dark cloudy cell-spot and curved outer line ; the anal lobe white as above ; median vein with a pencil of purple hairs.

Head, thorax, and abdomen like wings ; anal tuft blackish ; underside of abdomen, legs, and pectus whitish ; dorsal tufts erect, long, bluish black.

Expanse of wings : 22 mm.

2 ♂♂.

The hindmargin of hindwings is curved from costa to end of vein 5, where it is bluntly angled, and again incurved to base of anal lobe ; in one example the angle is much more prominent than in the other.

153. **Prosthetopteryx cavilinea** spec. nov.

♂. *Forewing:* pale green; the markings reddish brown; the lines blackish; first line near base; inner edge of central fascia oblique outwards and forming a small projection into the fascia above median vein, then oblique inwards; outer edge oblique outwards to below vein 4, then oblique inwards, followed by a pale green band with darker line in it, the fascia filled up with dark, and between 3 and 4 overlaid by a red-brown shade which extends to submarginal line, obscuring the markings; a dark patch before submarginal line beyond cell; marginal area green; some dark marginal spots before the green fringe. The inner margin is very strongly lobed beyond middle.

Hindwing: with the anal lobe grey, darker towards margin, where it is fringed with very long dark grey hairs; the other portion of wing with a slight cleft below vein 6, the inner part twisted over and fringed with long grey erect spatulate hairs.

Underside of forewing with the dark markings showing through on a dull green ground, the inner margin pale: hindwing blackish in outer lobe, the anal lobe whitish, clothed with very long yellowish-white hairs, and dark only in the fringe at end.

Head, thorax, and abdomen greenish; the anal segment dark grey.

♀. *Forewing:* paler green; the fascia at costal end darker; the whole of the markings cut off below vein 4, leaving only their edging lines rufous; the basal patch blackish and edged by a straight line.

Hindwing: pale green, with grey marginal border.

Underside of forewing with all the lines diffusely dark grey and wavy on a pale green ground, not reaching below middle, except the submarginal lines: hindwing with the base grey, then with two simple and two double curved and wavy grey lines.

Head, thorax, and abdomen pale green; the head and thorax much mixed with fuscous scaling; the abdomen with dark dorsal spots.

Expanse of wings: 26 mm.

1 ♂, 1 ♀.

Neither example is in good condition, and the description is necessarily deficient.

154. **Prosthetopteryx latistriga** spec. nov.

♂. *Forewing:* greenish brown, towards hindmargin more greenish grey; basal patch dark, edged by a black line; inner edge of central fascia bluntly angled outwards in cell, then vertical, blackish; the centre of the band between it and basal patch grey-brown, edged on each side by a pale greenish line; outer edge of fascia oblique and nearly straight outwards to below vein 4, then oblique inwards to before anal angle; the fascia is dark brownish fuscous, crossed by one or two dark lines and with a black cell-spot; band beyond fascia uniformly broad, pale green to vein 5, then dark green, almost hidden below by a blackish patch, which includes the lower outer half of central fascia and the praesubmarginal shade; this last is edged by the pale waved submarginal line, and is interrupted along with the line by an elongate flesh-coloured oblique streak running from vein 6 to apex; marginal area and fringe greenish grey.

In the ♀ the green spaces are all more prominent, and the broad green outer band complete; a marginal line of black dashes.

Hindwing: pale olive-grey in costal half, dark purplish or bluish grey in the inner half, including the anal lobe, which has the fringe greenish grey; the dark part of the apical portion covered with woolly hair. In the ♀ the wing is pale grey, with three darker grey central lines and broad dark grey margin; an interrupted dark marginal line; fringe mottled dark and light grey.

Underside dull greenish grey, rather shining; the markings obscure in the ♂, paler and regular in the ♀.

Head, thorax, and abdomen dull greenish; the patagia blackish; centre of basal segments of abdomen and the pracanal segments blackish; anal tuft of ♂ white.

Expanse of wings: 28 mm.

1 ♂, 3 ♀♀.

155. **Prosthetopteryx parvipennata** spec. nov.

♂. *Forewing:* pale green; markings dark fuscous; basal patch narrow, the edge oblique; edges of central fascia fuscous, the inner slightly bent outwards on median, the outer angled below 4, showing a deep indentation on vein 7; some indistinct lines across it, especially a dark one near inner edge; on each side of fascia a pale green band with darker thread; praesubmarginal shade brownish, darker below costa; submarginal line very obscure; black marginal triangles; fringe chequered dark and pale greenish grey. In the ♀ the wing is altogether greener, the bands being inconspicuous, and grey-green edged with blackish.

Hindwing: in ♂ minute, whitish ochreous with a greenish tinge, fringed with white; in ♀ normal, greenish grey, with traces of lines on inner margin only, the outer line clear.

Underside of forewing dull greenish, with all the lines grey; of hindwing in ♀ whitish, with five curved grey lines, of which the postmedian is distinct, and a marginal border.

Head and thorax pale greenish, the patagia with black scaling; abdomen pinky ochreous, more fulvous on dorsum.

Expanse of wings: ♂ 17 mm.; ♀ 21 mm.

1 ♂, 3 ♀♀.

In hindwing of ♂ the anal lobe is quite small and rounded, the cleft only reaching halfway; the cleft below vein 6 is slight, the lobes inconspicuous.

156. **Prosthetopteryx rotundata** spec. nov.

♂. *Forewing:* dark brown, with the intervals paler, more reddish, than in *caesiata*, and towards the costa greenish; the band beyond basal patch and a semi-oval patch on hindmargin above middle, containing a black blotch beyond cell, dull pinkish; the intervals on costa in middle indistinctly paler, with a dark line in each.

Hindwing: greyer, not so bluish as in *caesiata*, the extreme hindmargin and fringe whitish; hindmargin rounded, not angled, at vein 5.

Underside much as in *caesiata*.

♀. *Forewing:* with the dark spaces much clearer, and the green and reddish intervals distinct.

Hindwing: pale grey, darker along the hindmargin, which is limited by a curved submarginal line.

Underside pale grey, without any blue or slaty tinge, with all the lines fairly distinct, dark grey.

Head, thorax, and abdomen paler in ♀ than ♂, the anal half of abdomen entirely red-brown.

Expanse of wings: ♂ 22 mm.; ♀ 20 mm.

1 ♂, 2 ♀♀.

157. **Prosthetopteryx viridisecta** spec. nov.

♂. *Forewing:* dull purple-brown, with darker markings, and mixed in places with pale green; a dark curved line near base, followed by a paler brown space before the curved and waved inner edge of central fascia, which is succeeded by a broad pale green and white band from middle of costa to three-fourths of inner margin, which leaves only the costal half of the outer edge of central fascia to appear beyond it; an indistinct dark brown praesubmarginal shade, paler in the middle; submarginal line indistinct, the margin beyond it pale greenish brown; fringe brown and greenish, mottled.

Hindwing: brownish grey; the cleft before anal lobe not running up to base, but only halfway and wide; the anal lobe not triangular and large, but small and bifid at end, each tail upturned and rough-fringed; a slight cleft below vein 6, the middle lobe so formed contorted and hairy at extremity.

Underside dark grey, hindwing more brownish; forewing with traces of lines.

Head and shoulders pale brownish; thorax dark brown; abdomen redder brown; the anal tuft whitish ochreous.

In the ♀ the paler intervals of forewing are tinged with green; the green band is more clearly divided into an inner green and outer pale half, and the outer edge of central fascia is shown by a fine pale green line; the submarginal line is paler, waved and greenish, and the marginal space greener, except the dark apex, which is edged by an oblique line to central fascia.

Hindwing: of normal structure, rather narrow, with hindmargin indented beyond cell; pale grey, darkening to hindmargin, with faint traces of lines; fringe pale.

Underside dark grey, with a paler middle band; hindwing with two curved paler bands separated by a dark curved line and with a faint line at middle of each.

Head, palpi, and shoulders greenish; thorax greenish, with the patagia dark; abdomen with basal half and anus dark, the praeanal segments greenish.

Expanse of wings: 26 mm.

1 ♂, 1 ♀.

Ptychotheca gen. nov.

A development of *Chloroclystis*.

The forewing of the ♂ has the membrane from base of cell nearly to hindmargin folded longitudinally so as to form a double pocket: on the upperside this pocket is open towards costa, on the underside towards inner margin; the veins beyond cell are partially distorted; the fold is much more prominent beneath, appearing as a double pleat with a furrow in the middle.

Type *Ptychotheca pallidicirens* Warr., described from the ♀ only as a *Chloroclystis*, *Noc. Zool.* x. p. 378 (1903).

Of this species 6 ♀♀ and 1 ♂ have been received.

Pycnoloma gen. nov.

Forewing: costa strongly shouldered near base and curved throughout; apex prominent, but blunt; hindmargin oblique, not curved.

Hindwing: narrow; apex bluntly rectangular; hindmargin vertical to vein 4, then oblique to anal angle.

Forehead with a cone of scales; palpi porrect, rough-scaled, terminal joint depressed; tongue and frenulum present; antennae broken.

Costa of hindwing convex and thickened, with a bed of mealy scales on its upperside near base.

Neuration as in *Chloroclystis*; the cell of forewing short.

Type *Pycnoloma rufibasalis* spec. nov.

158. Pycnoloma rufibasalis spec. nov.

Forewing: grey-green; basal patch quite small, its edge marked by black dots on veins; inner edge of central fascia dark grey, oblique outwards from one-fourth of costa, angled in cell, then oblique, marked by black dots on veins; outer line from three-fifths of costa to middle of inner margin, angled on vein 4, and marked by vein-dots; fascia followed by a rather wide pale green band with grey centre; submarginal line waved, preceded by a grey-green band, the lunules at costa, beyond cell, and above inner margin slightly blackish; a blackish marginal line interrupted at the veins; fringe green.

Hindwing: whitish, tinged with green, with traces of lines.

Underside of forewing greenish grey, of hindwing pale green, with the whole basal area dull pink.

Head, thorax, and abdomen pale green.

Expanse of wings: 15 mm.

1 ♂.

159. Syncosmia colorata spec. nov.

Forewing: pale green; the markings brownish, edged or varied with fuscous; a spot at base of costa; a brown basal band slightly curved; inner edge of central fascia broad at costa and double, only the outer dark line reaching inner margin; outer edge marked only by a black line, often obscured; bands on each side green with a faint line down them, slightly paler than fascia itself; praesubmarginal band brown, in costal half double and edged by waved black lines: submarginal line acutely dentate, whitish green; marginal line fine, blackish; fringe pale, broadly chequered with brown.

Hindwing: of ♂ dirty ochreous, without markings; of ♀ ochreous grey with darker marginal border, and traces of curved lines.

Underside greenish grey, with the markings of forewing showing through.

Palpi externally ferruginous, above with long green and metallic black hairs; vertex, collar, and shoulders pale green; thorax and abdomen greenish ochreous brown; metathorax edged with metallic black scales; dorsal segments ringed with black; dorsal tufts of radiating metallic black hairs.

Expanse of wings: ♂ 21 mm., ♀ 23 mm.

2 ♂♂, 6 ♀♀.

160. **Tephroclystia albibisecta** spec. nov.

Forewing: deep brown-black, with darker but very indistinct cross-markings; a curved line near base, and a second, geminate, at about one-third; from just beyond middle of costa to beyond middle of inner margin a broad straight white line, dark-bordered on each side, followed by a thicker dark line; outer line double, forming black angular markings outwardly, interrupted, like the lines before it, between veins 2 and 4; submarginal line represented by a row of small white spots, often obscured, except those on each side of vein 6, which are larger; fringe concolorous; the intervals between the lines are tinged in certain lights with reddish, especially along costa.

Hindwing: pearly-white, becoming grey towards hindmargin; marginal line black, interrupted by pale spots at the vein-ends; fringe pale grey.

Underside dull brownish grey, paler towards inner margin, the pale cross-line and the submarginal spots showing through; hindwing as above.

Head, thorax, and abdomen blackish; the two segments beyond middle dull reddish. In the ♀ these segments are pale ochreous and swollen.

Expanse of wings: 20 mm.

2 ♂♂, 2 ♀♀.

In one ♀ the white bar is bent inwards at costa and swollen on inner margin.

161. **Tephroclystia coerulescens** spec. nov.

Forewing: deep velvety brown, towards costa paler and brighter brown; basal patch edged by a shining white band, interrupted below median, and yellowish at inner margin; central fascia broad, crossed by paler and darker shades, which at costa are marked with pale shining scales; the subcostal vein marked at intervals by bluish silvery scales; central fascia edged outwardly by an obscure paler band, marked with cream-colour on costa and beyond cell, and by a double blue and whitish line on inner margin; submarginal line formed of bluish spots or lunules; interrupted black marginal dashes, preceded in places by pale ochreous scales; an oblique ochreous apical streak; fringe deep brown, its apical half with small whitish spots, the spots at apex, between veins 5 and 6, and 3 and 4 large, square, and running to base of fringe.

Hindwing: brownish fuscous; fringe brown, with pale spots at base.

Underside of forewing blurred grey-brown, the costal and hindmargins bright brown with bluish spots; fringe as above: hindwing brown, crossed by curved double bands of spots of blue scales.

Head, thorax, and abdomen dark brown dotted and spangled with blue scales; palpi paler brown; abdomen beneath and legs dark brown sprinkled with blue; the joints of the legs pale ochreous.

Expanse of wings: ♂ 20 mm., ♀ 24 mm.

9 ♂♂, 1 ♀.

162. **Tephroclystia curvimacula** spec. nov.

Forewing: olive-green; the edges of the usual markings blackish, angulated and interrupted; costa dotted with black at the commencement of all the lines; basal patch crossed and edged by a thick black line; inner edge of central fascia angled in cell, and thickened below median; a similarly angled thin line through the band before it; outer edge forming a large quadrate black blotch from vein 7 to 5,

with a curve from its inner edge to vein 4, a black spot on 3, and blotch from 2 to 1; submarginal line acutely dentate, the teeth filled up with dark green preceded by a fulvous shade which runs obscurely to apex; a fulvous streak above median along cell, and one along inner margin; marginal festoon blackish; fringe green; a small black cell-spot; fringe of inner margin green dusted with black scales.

Hindwing: pale grey, darker towards hindmargin.

Underside of forewing cinereous, pinkish along costa, with the lines obscure; hindwing paler towards base, with an angled median and waved submarginal dark line.

Head and thorax green spotted with black; abdomen flesh-colour.

Expanse of wings: 26 mm.

3 ♀♀

There is a remarkable superficial resemblance between this species and *Micromia falcipuncta* Warr.

163. **Tephroclystia decens** spec. nov.

Forewing: pale green, with the markings light purplish grey; these are the band limiting the basal patch, the central fascia, and a costal blotch before apex; outer edge of basal patch from one-fourth of costa to one-third of inner margin, angled on subcostal vein; inner edge of central fascia from one-third of costa to two-fifths of inner margin, bent on subcostal, and preceded by a fine dark line in the green band; outer edge of fascia at nearly two-thirds, outcurved beyond cell; the fascia contains a dark cell-spot and is traversed by two or three waved dark lines; the green band beyond has a dark line down the middle; submarginal line very obscure, preceded by a very faintly darker band from the grey costal spot; a slight dark marginal line; fringe greenish rufous.

Hindwing: pale greenish grey, darker towards hindmargin; fringe paler.

Underside of both wings dull pale green, with the markings faintly showing; fringe paler.

Head, thorax, and abdomen pale green; thorax and abdomen slightly varied with purplish grey; forelegs purplish with the joints greenish.

Expanse of wings: 21 mm.

1 ♀.

164. **Tephroclystia flavicorpus** spec. nov.

Forewing: deep velvety brown, slightly paler at base and extreme apex: markings pale buff or cream-colour, edged with silvery white; interval between basal patch and central fascia represented by two triangular marks at one-third, one on costa reaching the median, the other from inner margin reaching submedian fold; outer edge of fascia indented in cell and bulged at middle, followed by a silvery white line edged above and below the bulge with buff; a silvery whitish submarginal line of points; two yellowish oblique streaks from outer line above vein 6, one to apex, the other to costa before apex; a buff marginal spot between veins 3 and 4; marginal lunules dark brown followed by white spots at the base of fringe, which is brown, its outer half dotted with white.

Hindwing: dark grey.

Underside of forewing blurred brown; subcostal streak orange; apex tinged with fulvous, with some white and bluish spots: hindwing brown sprinkled with blue scales forming four double curved lines.

Head, thorax, and abdomen pale ochreous, tinged with fulvous; dorsum fulvous, the segmental rings broadly white; abdomen below and legs dark brown speckled with blue.

Expanse of wings: ♂ 18 mm.; ♀ 20 mm.

4 ♂♂, 2 ♀♀.

165. **Tephroclystia ornatipennis** spec. nov.

Forewing: dark brown, with an admixture of fulvous towards hindmargin; the interspaces cream-colour or white; costa strigulated with white; basal patch crossed by a pale line generally resolved into points; central fascia containing a white bar on discocellular and two lines of whitish points, preceded and followed by a band of cream-colour; the inner band broad, with pale ochraceous centre and brown on costa and inner margin, sometimes interrupted below median vein by the junction of basal patch and central fascia; outer band narrower, tinged with ochraceous on its outer edge, almost interrupted between 3 and 4 by the projecting tooth of central fascia; submarginal line waved, white, outbent between veins 6 and 2; a fulvous apical blotch; a slight marginal line of dark lunules; fringe brown with broad flecks of white between veins.

Hindwing: dull whitish, tinged with pale grey and ochreous; markings of underside showing through.

Underside of forewing with basal two-thirds blurred; an orange subcostal streak: hindwing white, thickly brown-speckled, and with five darker bands, often more or less obscure, three central and marked chiefly towards inner margin, a submarginal before the white line, and a marginal.

Head, thorax, and abdomen dark brown, speckled with white; segmental rings white; abdomen in ♀ fulvous, sometimes the head and palpi also.

Expanse of wings: ♂ 22 mm.; ♀ 23 mm.

5 ♂♂, 3 ♀♀.

166. **Tephroclystia stabilis** spec. nov.

Forewing: grey-green; the bands edging basal patch and central fascia double, blackish, dentate inwards on veins and marked throughout by raised scales; the green intervals with a dark waved central line; praesubmarginal shade also double, blackish, but without raised scales; submarginal line waved, whitish, followed by a dark cloud at apex; marginal lunules black; fringe mottled pale and greyish green.

Hindwing: pale grey with a slight reddish tinge, and traces of dark lines; lunules along margin black and prominent.

Underside greenish grey, with all the lines in both wings dark grey, waved, and distinct; hindwing reddish-tinged.

Head, thorax, and abdomen olive-green; metathoracic and dorsal tufts large, of erect hairs.

Expanse of wings: 25 mm.

1 ♀.

167. **Tripteridia albimixta** spec. nov.

Forewing: dark olive-brown, crossed by two shining white lines; the first at one-third, the second before two-thirds; both starting narrow at costa and widening below it; the first angled outward in cell, reaching inner margin as a dark shade edged by two fine lines; outer line indented below middle and running straight

to inner margin near inner line; joined to inner line by a whitish smudge below median vein, which is continued obliquely across outer line to apex; the basal patch, therefore, is entire; the central fascia is broadly interrupted below middle; the dark marginal area forming a triangular costal blotch before apex (through which the beginning of the wavy white submarginal line is visible) and a square blotch before anal angle, the margin between being paler brown; fringe chequered dark and light.

Hindwing: yellowish white, paler in costal half; the **middle** lobe with black scales down its centre.

Underside yellowish; the dark markings diffusely dull olive; hindwing without markings.

Head, thorax, and abdomen olive-brown, the last at sides and beneath mixed with paler.

♀ with the pale markings amplified; two double pale curved lines near base; a pair of curved pale lines in central fascia from costa; space between veins 2 and 4 pale buff, blurring all markings alike; outer line distinctly double, white with a thin brown centre, reappearing on inner margin, like the two paler lines in the fascia; submarginal line visible throughout, but not waved, the veins across the praesubmarginal space pale, continued obliquely as a small blurred space to margin below apex; marginal lunules black, distinct, fringe brown, chequered with cream-colour; hindwing whitish yellow, with a grey marginal border.

Underside straw-colour, with the dark and light cross-lines showing, but interruptedly.

Abdomen pale ochreous, the dorsum yellower.

Expanse of wings: 17 mm.

2 ♂♂, 1 ♀.

Xenoclystia gen. nov.

Agreeing in neuration with *Tephroclystia*, 10 and 11 being stalked, and 10 anastomosing with 8, 9, forming a long simple areole; but the antennae of the ♂ are bipectinated, the pectinations well separated and stiff, ciliated laterally and apically; in the ♀ with angulated segments; abdomen of ♂ laterally tufted towards anus, the anal segment cut square and ending in a dorsal projection, which is especially conspicuous in the ♀.

Type: *Xenoclystia delectans* spec. nov.

168. Xenoclystia delectans spec. nov.

Forewing: brightly coloured, brownish grey on a whitish ground, crossed by numerous minutely waved dark and light lines, two of which form in the middle of the central fascia a darker space containing the oblique black cell-mark, and widening basewards below the middle; lines edging the fascia and basal patch bright green and white; submarginal line lunulate, brightly white, preceded by a dark band of three lines, the innermost much darker; some green scales before margin; fringe pale grey, with a dark dividing line and triangularly chequered beyond veins.

Hindwing: whitish, with grey marginal border; crossed by faint wavy lines and a pale band before the border.

Underside of forewing blurred for two-thirds from base; hindwing whitish, thickly peppered with brown, with three dark wavy lines and paler interspaces.

Head, thorax, and abdomen brown marked with white and green ; metathoracic tuft green ; segmental rings of abdomen white.

Expanse of wings : ♂ 22 mm. ; ♀ 26 mm.

6 ♂♂, 5 ♀♀.

169. **Xenoclystia delicata** spec. nov.

Forewing : pale grey, tinged with vinous, especially along costa ; the markings red-brown, edged with a deeper line ; basal patch obliquely edged ; central fascia broad above, narrow on inner margin, the inner edge indented in cell, the outer excurved at middle ; both, as well as basal patch, edged by a pale grey band with dark central line ; space between the two inner pale bands grey ; cell-spot linear, black in a central pale space ; marginal area dark grey, with only the teeth of submarginal line shown, white in lower half of wing, blackish above ; fringe reddish, with black chequering beyond veins and black lines at the vein-ends.

Hindwing : quite pale grey, with a faint reddish tinge ; a dark cell-spot and curved postmedian and submarginal line ; fringe reddish beyond pairs of dark marginal points.

Underside of forewing dull red, with the lines greyish on costa and a dark blotch before hindmargin beyond cell : hindwing whitish, red-speckled, with black cell-spot and outer row of black spots.

Face and palpi above white ; palpi externally dark fuscous ; vertex reddish with a black speck at middle ; thorax grey ; abdomen reddish with white segmental rings and pairs of black dorsal spots.

Expanse of wings : 17 mm.

2 ♂♂.

One of these is much darker and less red than the other.

170. **Xenoclystia humerata** spec. nov.

Forewing : almost exactly the same as in *X. unipuncta*, described below ; the metallic lines are not so strongly marked, and the white spot in submarginal line is less conspicuous.

Hindwing : dark grey, with no traces of lines, and the fringe grey, not rufous.

Underside of forewing darker and of hindwing paler than in *unipuncta*.

Head, thorax, and abdomen all dark.

Expanse of wings : 20 mm.

5 ♂♂.

As far as markings go, this species might well be treated as a form of *X. unipuncta*, but the hindwing of the ♂ is strongly shouldered at base and the costal and subcostal veins are curved upwards and bent parallel to it ; while in *unipuncta* the costal edge is perfectly straight.

171. **Xenoclystia unipuncta** spec. nov.

Forewing : vinous grey ; the cross-markings vinous brown ; the edge of basal patch, at one-fourth, the bands edging central fascia, at about one-third and two-thirds, and to a less extent the praesubmarginal band, are dark brown, all in the main parallel to hindmargin, but the outer edge of the central fascia projecting below middle ; all the dark markings are edged with a broad line of dull metallic scales ; the basal patch and central fascia are traversed at middle by a band of paler ground-colour, in the former case with a dark middle line ; the lower part of the middle

of central fascia is clothed with metallic scales ; submarginal line formed of the same scales, and a few before the black marginal line; fringe dark brown with paler tips; the submarginal line shows a small white spot between veins 3 and 4. In one ♀ the middle of central fascia is flesh-colour, showing a faint dark cell-spot.

Hindwing : grey, darkening towards outer margin, with two obscure dark lines before margin ; marginal line black ; fringe bright rufous.

Underside of forewing dark blurred grey, reddish towards costa and hind-margin ; the lines slightly visible, especially on costa : hindwing greyish ochreous tinged with red, with two dark grey lines ; fringe rufous.

Head, thorax, and abdomen dark brown.

Expanse of wings : 20 mm.

6 ♂♂, 4 ♀♀

Subfamily DEILINIINAE.

172. **Borbacha carneata** spec. nov.

Forewing : deep flesh-colour; the costal edge snow-white; all the markings, which are much as in *B. pardaria* Guen., greenish-grey finely edged with purple; the veins in marginal area thickly greenish-grey, except vein 5 ; in the broad outer fascia its outer edge is preceded by a series of purple lunules, and between veins 3 and 4 the submarginal line contains a purple blotch ; a row of purple marginal triangles ; cell-spot purple ; fringe flesh-colour, grey beyond veins ; two purple dots near base, one on each side of the median vein.

Hindwing : with a grey bar with lunulate edges near base ; marginal area between veins 2 and 4 greenish-grey ; the purple lunules less conspicuous.

Underside pale yellowish, with all the markings dull purple.

Vertex, upper half of face, and palpi above dull brown-red ; shoulders and base of patagia greenish-grey ; rest of patagia flesh-colour, marked with purplish ; thorax and abdomen greenish-grey, with flesh-coloured dorsal spots and edges of segments ; the metathorax wholly flesh-coloured ; fillet and shaft of antennae snow-white.

Expanse of wings : 48 mm.

1 ♀.

173. **Syntaracta albibasis** spec. nov. and ab. **plumbea** nov. and **atriplena** nov.

♀. *Forewing :* yellow, suffused with orange-red and thickly speckled with brown-grey ; the costal area and the lines brown-grey ; the lines and shadings almost precisely as in *S. clathrata*, described below, the yellow ground-colour showing only, as the ochreous in that species, as a line before first line and after the outer and submarginal.

Hindwing : similar.

Underside paler, more ochreous, with all the markings dull greyish orange.

Head and palpi yellow and orange ; shoulders and base of patagia like costal streak ; thorax orange and yellow; abdomen red-brown with the white bar at base, as in *clathrata*, but no pale dorsal marks.

Expanse of wings : 40 mm.

2 ♀♀.

This species may be distinguished from the corresponding type form of *clathrata* ♀ by the orange-red tinge, as well as by the absence of the pale dorsal spots of abdomen ; no ♂ of this form was received.

The aberration *plumbea* is analogous to the aberration *fasciata* of *clathrata*, the inner and outer lines being swollen into dull leaden-grey bands only about half as wide as those in *fasciata*, the outer band edged inwardly with blackish, a streak of the same grey filling up the interval between veins 3 and 4 to the margin, and another streak, but much narrower, running along vein 6; the space between this band and submarginal line being filled in with deep red-brown; the costa is of the same tinge as the bands.

Head, thorax, and abdomen as in the type form.

3 ♀♀.

While the type form and its aberration *plumbea* are represented only by ♀♀, the aberration *atriplena* is a ♂ only.

Forewing: yellow, dotted with orange, and with the veins orange; costal area brownish grey with dark speckling; the lines swollen into bands, as in the ab. *plumbea*, but the outer one twice as broad, and both suffused with black, which to a great extent obliterates the leaden-grey tints; the bands as well as their extensions to the hindmargin are more conspicuous owing to the paler ground-colour.

Hindwing: the same.

Underside pale ochreous, with the black bands both shown.

Abdomen orange-red with black bars at the hinder edge of each segment.

Expanse of wings: 38 mm.

1 ♂.

I have no doubt that the ground coloration of this ♂ is the normal ground-colour of the ♂ in all its forms; and it is possible that the aberration *atriplena* may be the corresponding ♂ form to the ♀ aberration *plumbea*; though in that case the difference in the coloration of the sexes is much greater than in the corresponding aberration of *clathrata* and its type form.

The antennae of the ♂ of both *albibasis* and *clathrata* differ from true *Syntaracta* in being serrate, with short fascicles of cilia, these being much shorter in *albibasis* than in *clathrata*.

174. **Syntaracta clathrata** spec. nov. and ab. **fasciata** nov.

♂. *Forewing:* pale ochreous, speckled with rusty-edged brown granules; the veins and lines brown; costal area above subcostal vein dull grey-brown, the costal edge dotted with ochreous and brown; first line thick, curved, at one-third, lunulate-dentate, toothed inwardly on the veins and outwardly between them, preceded by a pale ochreous space; outer line at two-thirds, parallel to hindmargin, also double and lunulate-dentate, followed by a line of unspeckled ochreous; submarginal line single, indented on submedian fold, followed by a pale space; all three lines start from the subcostal vein; veins 3, 4, and 6 thickened to hindmargin; a dark fine marginal line; cell-spot black; fringe ochreous, chequered with brown beyond veins.

Hindwing: without basal line.

Underside quite pale ochreous, with all the markings dull grey.

♀ suffused with grey-brown, the lines and veins grey-brown; only the three pale edges of the lines remaining clear ochreous, the rusty speckling being much thicker; costa ochreous grey, dusted with black.

Face, vertex, and palpi yellow and fulvous; shoulders concolorous with costa; patagia fulvous; dorsum marked with brown saddle-shaped marks with pale

centres ; basal segment with a snow-white bar ; anal segment and abdomen beneath and legs pale ochreous, the legs dusted with grey.

Expanse of wings : ♂ 42—44 mm. ; ♀ 44—48 mm.

4 ♂♂, 4 ♀♀.

In the aberration *fasciata* the inner line is expanded into a broad red-brown or grey-brown band, and the whole space between outer and submarginal line filled up with red-brown, forming a still broader band, extending to hindmargin below apex and beyond cell, and on inner margin uniting with the inner band ; these bands show paler on the underside.

3 ♂♂, 5 ♀♀.

The coloration of the sexes differs as in the type-form.

175. **Syntaracta fulvata** spec. nov. and ab. **tephrospila** nov.

♂. *Forewing :* dull deep yellow, covered with more or less confluent dull fulvous granular dots, and towards hindmargin speckled with blackish ; costal area dull fulvous brown, dusted with darker ; lines formed of hoary-grey scales ; first from one-fourth of costa to one-third of inner margin ; second from three-fourths of costa to two-thirds of inner margin ; both dentate-lunulate, the teeth finely blackish, pointing inwards in the first, outwards in the second ; a similar, but less distinctly outlined submarginal line ; space between veins 3 and 4, and a narrow streak along vein 6, darker ; small dark marginal spots at the ends of the veins ; fringe dull yellow ; cell-spot black.

Hindwing : similar ; fringe of inner margin and the margin itself narrowly whitish. In the ♀ the grey scales of the lines are much less distinct, and on the other hand the black dusting is much stronger, and the black teeth of all the lines and the marginal spots larger and conspicuous.

Underside dull ochreous, with the lines and speckling grey.

Head, thorax, and abdomen dark and light fulvous ; shoulders and base of patagia grey-black ; metathorax and abdomen with pairs of grey or black spots, which become confluent towards anus, with oblique divergent markings grey or dark fulvous ; abdomen laterally and beneath, pectus, and legs pale ochreous.

Expanse of wings : ♂ 38 mm. ; ♀ 40 mm.

2 ♂♂, 2 ♀♀.

The ♀ to which I give the name *tephrospila* ab. has on each wing between vein 4 and the inner margin a large grey blotch with cloudy blackish edges, across which the black teeth of the second line are visible ; the blotch is equally marked on the underside. On the dorsum the spots on second segment are swollen into a grey and black belt.

1 ♀.

176. **Syntaracta nigrellata** spec. nov. and ab. **scutigera** nov. and ab. **semifascia** nov.

Forewing : yellowish straw-colour, covered with dull greyish fulvous spots : costa brownish fulvous, the edge dotted pale and dark ; lines and markings exactly the same as in *S. fulvata* ; but, owing to the paler ground-colour, the lines are more distinct, and in all cases the black spots at the teeth and the marginal spots are large and black.

Hindwing : like forewing.

Underside pale straw-colour, with the lines distinct, dark grey.

Head, thorax, and abdomen pale and dark yellowish ochreous ; shoulders brownish fulvous with a dark line ; base of patagia black ; dorsum with pairs of dark brown or fulvous spots.

Expanse of wings : ♂ 40 mm. ; ♀ 40—46 mm.

3 ♂♂, 4 ♀♀. One of these males is a dwarf, 30 mm., without black dots or spots.

In the aberration *scutigera* the second segment of dorsum bears a black cruciform blotch and the anal segment a black spot, the others being marked merely with fulvous. In one example the submarginal line of both wings bears a large black blotch beyond cell, which is followed by another beyond the line, and in the forewing there are two smaller blotches below costa.

3 ♂♂.

In the aberration *semifascia* the second segment of dorsum is marked as in ab. *scutigera*, and the other segments also bear smaller black marks of a similar form ; the forewing between outer and submarginal lines is filled in with a black blotch reaching from vein 4 to inner margin ; in this example, as in the dwarf specimen of the type-form, there are no black marginal spots or scales denoting the teeth of the lines.

1 ♂.

Subfamily PLUTODINAE.

177. **Plutodes connexa** spec. nov.

♂. *Forewing :* pale yellow and red-brown ; the costal area above subcostal vein yellow, with two rounded blotches depending from it and reaching median vein, one at one-fourth, small, the other at one-half, larger ; extreme hindmargin and fringe yellow, more widely at apex and anal angle ; on the inner margin beyond middle another rounded yellow blotch reaching vein 2 ; the edge of the brown area is ferruginous throughout ; the large brown blotch at hindmargin is edged with a line of dull lustrous scales, and is traversed throughout by a dark paler-edged waved submarginal shade, extending as a small projection to inner margin before anal angle ; the fringe is tinged with brown between veins 3 and 4, and slightly also below apex.

Hindwing : with the basal area red-brown, connected along vein 1 by a narrow streak with the marginal blotch, which is irregularly crescentic, with a yellow indentation at anal angle ; inner margin and fringe whitish.

In the ♀ the dark areas are more extensive, and grey-brown in tint rather than red-brown.

Underside paler yellow, with only the marginal blotches marked, and these reduced in size, the other dark areas only showing through.

Face, thorax, and dorsum concolorous with the dark areas of the wings ; shoulders, vertex, antennae, palpi beneath, pectus, legs, and underside of abdomen yellow ; palpi above ferruginous-tinged.

Expanse of wings : ♂, 34 mm. ; ♀, 36 mm.

1 ♂, 1 ♀.

In the irregularity of outline of the marginal blotch this species resembles *P. nilgirica* Hmpsn.

Subfamily BRACCINAE.

178. **Arycanda commixta** spec. nov.

Forewing: dark purplish slate-colour; the lines purplish black; the paler spaces thickly striated with black; a diffuse dark patch at base; a thick double antemedian band, the arms separating towards costa; central fascia formed of a pair of double bands uniting below middle, separating towards costa, the outer arms lunulate-dentate; a double submarginal band, and a row of marginal lunules; along the course of the two folds and between veins 3, 4 and 6, 7 in the outer arm of the submarginal band are patches of dull olive-fulvous scales; fringe purplish.

Hindwing: without the basal lines.

Underside dull purplish slate-colour, with dull black cell-spots.

Head and thorax like wings; three basal segments and the anal segment of dorsum black, the rest bright yellow: abdomen beneath, pectus, and legs slaty fuscous. In the ♀ the anal segment of dorsum remains yellow.

Expanse of wings: ♂, 52 mm.; ♀, 60 mm.

2 ♂♂, 3 ♀♀.

179. **Arycanda fulviradiata** spec. nov.

Forewing: dark purplish blue, covered with long slender black striations; two black spots on costa at one-fifth and one-fourth indicate a curved inner line; a spot before middle and two beyond indicate the beginning of the curved inner and double lunulate-dentate outer band of central fascia; an indistinctly double submarginal line, and a thick marginal line of confluent lunules; from the base of cell a bright fulvous streak runs along the fold as far as submarginal line, filling up the lunules on each side of vein 5; cell-spot bright fulvous; along the submedian fold a broad dull fulvous-olive shade runs, and a patch of the same colour lies on submarginal line between veins 3 and 4; fringe purple, with pale base and broad dark middle line.

Hindwing: with a straight pale band close to base, broadly edged on each side with black, purplish at the extremities and fulvous between; the other dark bands as in forewing, without fulvous streaks, but the cell-spot and a large spot between 3 and 4 before hindmargin are bright orange; basal line of fringe orange.

Underside deep purple slate-colour, with the cell-spots black.

Head, thorax, and abdomen dark purplish fuscous; dorsum marked with deeper black spots in middle, containing pale scales; underside and legs slaty fuscous.

Expanse of wings: 58 mm.

1 ♂.

180. **Bursada radicata** ab. **flavifrons** nov. and ab. **carens** nov.

In a lengthy series of *B. radicata* Warr., in which the size and shape of the three yellow blotches of the forewing vary considerably, two extreme forms single themselves out.

In the one the yellow markings are broader than in the average typical form, and the face as well becomes yellow; in the other the opposite tendency is seen, and one or other, sometimes all three, of the yellow blotches becomes nearly or quite obsolete. For these two forms I propose the names ab. *flavifrons* and ab. *carens* respectively.

181. **Bursada velata** spec. nov.

Forewing: velvety brown-black, with two yellow spots; one round and small, near base of cell, generally clear yellow, the other forming an elongated blotch beyond cell from subcostal vein to vein 2, overclouded with brown scales; fringe concolorous, with the extreme tips pale.

Hindwing: bright yellow, with thick black margins, that along costa and round apex twice as broad as the rest.

Underside of forewing with both spots clear yellow; hindwing as above, but the inner margin above anal angle with a small quadrate projection towards apex.

Head, thorax, abdomen, and legs all black.

Expanse of wings: 30—32 mm.

3 ♀♀.

182. **Craspedosis costimacula** spec. nov.

Forewing: brown-black, with traces of obscure fulvous lines across wing, somewhat more plainly marked on costa; one from one-fourth of costa to one-third of inner margin, one at two-thirds, and two beyond it; cell-spot white, linear; just beyond it a broad white blotch from costa to vein 3, its outer edge curved, edged on both sides by a thick black line, the outer one strongly incurved to submedian fold; obscure fulvous marginal spots between veins, that between 3 and 4 white, preceded by fulvous marks and another white one; fringe concolorous.

Hindwing: deeper black, with traces of fulvous lines on inner margin only; marginal yellowish dots between veins; fringe black.

Underside slaty black, without lines; the white blotch of forewing yellowish on costa; the marginal spot between veins 3 and 4 marked.

Head, thorax, abdomen, and legs all black.

Expanse of wings: 35 mm.

1 ♀.

Subfamily ASCOTINAE.

183. **Alcis concinna** spec. nov.

Forewing: white, thickly black-speckled; lines black, thick; first from one-fourth of costa to one-third of inner margin, bluntly bent in cell, with some black scaling before it; outer line from two-thirds of costa to three-fifths of inner margin, bent on vein 6, and insinuate on submedian fold, thickened at veins; a black median line, obsolete below middle, bent out round the black cell-spot; submarginal line preceded by blackish shading that fills up the lunules from costa to vein 6, and vein 3 to inner margin, followed by a double black blotch between 4 and 6 and a small one above vein 2; large black marginal lunules; fringe black and white, wholly black towards apex.

Hindwing: with the black speckling much finer; a fine ill-marked black outer line and black cell-spot; a black marginal festoon; fringe white, thinly chequered with dark.

Underside the same.

Head and thorax white; abdomen with the white almost hidden by broad black dorsal belts, the basal segments only spotted: anal tuft white; legs black mottled with white.

Expanse of wings: 24 mm.

1 ♂.

The forewing has an unusually large hyaline fovea.

184. **Alcis irrufata** spec. nov.

Forewing: whitish, irrorated with olive scales; basal area greyer; first line obscure, at nearly one-third, angled in cell, then oblique, preceded by an olive-grey shade; outer line black, sinuous, from two-thirds of costa to three-fifths of inner margin, projecting at vein 5 and insinuate below it, and there blackest, followed by a broad olive brownish shade; median line brown, diffuse and interrupted, approaching outer line on inner margin; submarginal line whitish, waved, preceded and followed by brown shades, the interior marked with black scales below costa, beyond cell, and in lower third; the dark edgings of the lunules connected by dark scales with the black marginal spots; fringe pale; no distinct cell-spots.

Hindwing: without first line; a dark cell-spot immediately following ante-median line; the rest as in forewing.

Underside dingy whitish; the markings and speckling of the upperside showing through; a grey submarginal shade before apex of forewing.

Head, thorax, and abdomen like wings; tips of shoulders brown; face above olive, below whitish; palpi fuscous; forelegs black, with white joints.

Expanse of wings: 44 mm.

1 ♀.

Distinguished from *Chogada semidiscata*, which it greatly resembles by the difference in the discal spots of hindwing.

Atmoceras gen. nov.

Forewing: costa slightly sinuous; apex blunt; hindmargin curved below.

Hindwing: narrow; apex bluntly rectangular; hindmargin slightly indented beyond cell, obliquely rounded below, running into inner margin without forming a distinct anal angle.

Palpi upcurved, rough-haired, terminal segment obscure; antennae of ♂ with pedicellate fascicles of cilia, at right angles with the shaft; each fascicle double, forked at apex, symmetrically ciliated laterally and at apex, the ciliations interlacing and forming a film; tongue and frenulum present; hindtibiae of ♂ much swollen, with a pencil of fluffy hairs.

In the forewings 10 and 11 are coincident.

Type: *Atmoceras plumosa* spec. nov.

Allied to *Paralcis*.

185. **Atmoceras plumosa** spec. nov.

Forewing: fawn-colour, irrorated with olive fuscous, when fresh with a slight pinkish tinge; lines olive fuscous; first from before one-third of costa to one-third of inner margin, outcurved above and below median, toothed inwards on the veins, preceded by an exactly similar line; median line lunulate-dentate, the teeth pointing basewards, outcurved above round the deep green cell-spot to middle of inner margin; outer line at two-thirds, angled on vein 6 and marked by dark spots on veins, running parallel to median line, followed by a greenish shade

which is distinct and separate only at costa and on inner margin; submarginal line forming sharp whitish teeth, filled up inwardly with dark green, except between 3 and 4, and followed by dark streaks to the dark marginal spots; fringe fawn-colour, mottled with green.

Hindwing: dull fawn, grey-speckled, showing a cell-spot, a median line, an outer, and a submarginal.

Underside with the dark markings indistinctly showing through.

Head, thorax, and abdomen fawn-colour; vertex and parts of thorax mottled with green; palpi externally dark; abdomen and face fawn-colour.

Expanse of wings: ♂ 35 mm.; ♀ 35—40 mm.

6 ♂♂, 2 ♀♀.

186. **Chogada compectinata** spec. nov.

Forewing: white, with slight grey speckling, chiefly along costa; lines black, fine; first from one-fourth of costa to one-fifth of inner margin, rounded in cell, slightly indented on submedian fold, preceded by a macular grey shade; outer line at two-thirds, lunulate-dentate, uniformly distinct, followed by a shade formed of grey lunules, from which it is separated by a white line; median line fine, strongly projecting outwards in cell, and less strongly on submedian fold, blacker on median and submedian veins; cell-spot formed of raised white scales within the projection; praesubmarginal shade grey, lunular, interrupted between veins 3, 4, and 6, 7, the lunules blackened on each side of vein 5; the shade following submarginal line much interrupted, black from 6 to below 5, and forming a quadrate deep black spot on margin between 6 and 7, running out into the white fringe; marginal spots black.

Hindwing: like forewing, but without inner line; a straight line from the white cell-spot to the submedian fold; no marginal black blotch.

Underside white, greyer towards apex of forewing, where the outer lines and subapical blotch are marked; costa of forewing striated with black.

Head, thorax, and abdomen greyish white; face with a black bar across middle; vertex sometimes whitish; fringe on basal segment of abdomen white; dorsal segments with pairs of black spots; the segments following basal flecked with red.

Expanse of wings: 30—34 mm.

5 ♂♂, 3 ♀♀.

The ♀♀ are slightly greyer than the ♂♂. The pectinations of the antennae of the ♂ are interlaced.

187. **Chogada semidiscata** spec. nov.

Forewing: white; the costa shortly and neatly marked with brown striae; a brown-black spot on costa close to base; the four lines starting also from brown-black costal spots at one-fourth, two-fifths, two-thirds, and five-sixths respectively; first line black, slender, outcurved above median to one-fifth of inner margin, preceded by a slight rufous cloud; outer line black, sinuous, ending at middle of inner margin, projecting on vein 5, insinuate below it at the origin of veins 3 and 4, and followed by a rufous shade, which is deep brown between 3 and 4; median line rufous, excurved, and projecting on each side of vein 2, below median running close to outer line; submarginal line waved, white, preceded and followed by shades of brown striae, mixed with black scales below costa, beyond cell, and below vein 3,

and between 3 and 4 swollen into a white blotch; marginal spots distinct, black; fringe pale brown, chequered with whitish; no distinct cell-spot.

Hindwing: with a brown-edged crescentic cell-mark; a black antemedian and postmedian line; the rest as in forewing.

Underside dull whitish, the markings showing through and discolouring the forewing.

Palpi dark brown, the third joint ochreous; face ochreous, brown above; vertex, thorax, and abdomen white speckled with brown; tips of shoulders brown; dorsal segments with pairs of brown dots.

Expanse of wings: 40 mm.

1 ♂.

188. **Myrioblephara adumbrata** spec. nov.

Forewing: pale grey, dusted with fawn-colour; basal third paler, but the costa grey-brown; inner line brown, with a slight angle outwards on submedian fold, and inwards on submedian vein; outer line brown, at two-thirds, faintly lunulate-dentate, incurved across submedian interval; followed by a fainter, but more strongly dentate line, beyond which the space between 3 and 4 is filled with deep black and dark grey scales; from before middle of costa to before middle of inner margin a black-brown thick median line runs, followed by a broad brown shade, incurved across submedian interval, where it all but touches the angle of inner line; space between 3 and 4 at base filled with whitish scales; submarginal line waved, pale, the lunules filled in with brown; marginal area darker fawn-colour, blotched with brown beyond cell and towards anal angle; fringe pale fawn, beyond some slight blackish marginal spots.

Hindwing: the same, without inner line, or black blotch beyond outer line; base whitish.

Underside paler, with all the lines grey-brown.

Face and palpi dark brown; vertex and thorax dark grey; abdomen paler, like hindwing, with a double brown band at middle; legs pale fawn; foretarsi black, with pale joints.

Expanse of wings: 32 mm.

1 ♀.

189. **Myrioblephara complicata** spec. nov.

Forewing: dark olive, with the veins fulvous; the lines formed of contignous white irregular blotches; basal patch olive, the base of inner margin pale, and traces of a pale line running round the foveal pustule; edged from one-third of costa by three white blotches between veins, that on inner margin running in basewards; central space olive-green, with a small round white spot marking discocellular, edged from three-fifths of costa by a curved white blotch to vein 4, and a spot below beyond the rise of 3 and 4; a broad white band from apex bifurcating below vein 6 and reaching inner margin as two series of irregular lunules, separated by a widening dark olive space; vein 4 with a white blotch to margin; the ends of veins 1, 2, 3 broadly rusty fulvous between the black marginal lunules; fringe dark grey, with white chequering between the veins, the apex broadly white; the costa is dark olive flecked with pale, all the white markings commencing from the subcostal vein.

Hindwing: yellowish ochreous, with a greenish tinge, with a cell-spot and

three waved lines beyond middle, greenish grey; fringe yellow ochreous, chequered with olive beyond veins 2 and 3.

Underside yellowish ochreous, in the forewing with the markings of upperside showing through; in hindwing with cell-spot, outer line, and two interrupted submarginal lines, and a lot of striae at apex dull olive-green.

Head and thorax mixed, dark olive-green and ochreous; abdomen ochreous with brownish dorsal belts; legs mottled dark olive and ochreous.

Expanse of wings: 35 mm.

1 ♂.

190. **Myrioblephara fulvivena** spec. nov. and ab. **defulvata** nov.

Forewing: white, speckled with dark brown atoms; all the veins thickly fulvous; a macular basal band; a double macular band at one-fourth, of which the inner arm is browner and the outer marked by black spots; a double outer band at two-thirds, of which the inner arm is black-spotted on veins and the outer brownish; median line fine, oblique outwards from a dark costal spot above the blackish cell-spot, then recurved, joining inner band in a large blotch on inner margin; submarginal line white preceded by blackish blotches at costa, beyond cell, and on inner margin; marginal spots black; fringe with basal half fulvous, outer half whitish, with black mottlings beyond veins.

Hindwing: white, with grey curved antemedian, postmedian, and submarginal lines, ending in thick oblique black streaks on inner margin; the postmedian dotted on veins and followed by a grey shade; the submarginal with the lunules filled up with dark grey; marginal area and fringe fulvous; cell-spot grey.

Underside fulvous white, paler in hindwing, where the markings are prominent; costa of forewing fulvous with black speckling.

Head, thorax, and abdomen fulvous, the thorax with olive and pale scales intermixed; tarsi fuscous with the joints pale.

In the aberration *defulvata* the veins are without any fulvous tint and the whole wing much less gay; the fringes are also dark and light grey; the underside grey, without any fulvous tint.

Expanse of wings: 30 mm.; the aberration only 28 mm.

2 ♂♂, 2 ♀♀, of the type form; 2 ♀♀ only of the aberration.

191. **Myrioblephara inquinata** spec. nov.

Forewing: dull white, speckled with dark grey; base of wing and costa at base blackish-grey; a black dash on median vein at base; inner line outcurved from costa at one-third, closely followed by a somewhat waved median line; outer line marked by black wedge-shaped marks on veins pointing basewards, angled at vein 6 and below 3; the space between inner and outer lines blacker, especially along costa; the inner line is preceded and the outer followed by a thick fulvous brown shade; submarginal line wavy, white, between blackish shades; the marginal area pale at anal angle and again between 3 and 4; marginal spots black; fringe mottled black and pale grey.

Hindwing: with extreme base black, a double antemedian line and black cell-spot; the rest as in forewing; both wings, except along marginal area, have a slightly rufous tint.

Underside dull whitish, grey in the forewing; the lines rather darker grey; marginal border grey.

Head and thorax blackish; collar whitish; base and anal half of abdomen blackish, third and fourth segments whiter.

Expanse of wings: 30 mm.

1 ♀.

192. **Myrioblephara lucidata** spec. nov.

Forewing: white, with slight olive and fuscous speckling; the shading olive, but more linear and condensed, the lines blackish, less waved, than in the allied species; basal line almost touching base; inner line nearly straight, vertical, preceded by a narrow olive band; median shade olive, angled beyond the black cell-spot, to two-fifths of inner margin, followed by a second shade; outer line at two-thirds, slightly bent out beyond cell and inbent across submedian interval, accompanied by a well-defined olive band; submarginal line broadly white, waved, preceded and followed by distinct olive shading except between 3 and 4, where the shading is grey, and the line itself flattened inwards; marginal lunules black; fringe with the basal half brownish grey, the apical half whitish.

Hindwing: white, without speckling; a black antemedian and postmedian line less sinuous than in other species, each followed by a pale olive-brown shade; submarginal line white, waved, between two olive-brown shades.

Underside fawn-grey, darker in forewing, with all markings clear, but the lines not waved nor sinuous.

Head and palpi dark olive; thorax whitish dusted with olive; abdomen broken off.

Expanse of wings: 31 mm.

1 ♀.

193. **Myrioblephara olivacea** spec. nov. and ab. **albiviridis** nov.

Forewing: white speckled with dark atoms; the shadings olive; the lines black; costa very finely dotted black and white; lines and shades almost precisely as in *M. fulvirena*, but the shading olive instead of fulvous; the whole wing paler; fringe white spotted with grey; cell-mark black, but small.

Hindwing: with more than the costal half whitish; the lines as in *fulvirena*, but less distinct.

Underside dirty whitish with a faint fawn-coloured fringe, especially in forewing; markings all grey, but finer, less numerous than in *fulvirena*.

Head, thorax, and abdomen whitish-grey speckled with olive.

Expanse of wings: ♂ 30 mm.; ♀ 32—35 mm.

1 ♂, 2 ♀♀.

This appears to be really a distinct species, though in markings so much like *fulvirena*.

The aberration *albiviridis* has the ground-colour greenish white, with the olive shading developed, forming a broad shade occupying the second fourth of inner margin and nearly reaching costa; the underside greenish white.

194. **Myrioblephara submarginata** spec. nov.

Forewing: whitish, thickly dusted with grey; all the lines and shades dark grey; basal line close to base, with a spot at base; inner line at one-fourth, curved to submedian fold, then inbent, preceded by a similar shade; outer line at two-thirds, lunulate-dentate, uniformly curved, and insinuate on submedian fold,

more strongly marked on veins, followed by a thick dark grey shade ; median shade well marked, outcurved round the black cell-spot, a little before middle; submarginal line pale, wavy, preceded and followed by dark grey shading, which pales off at anal angle ; the marginal area pale grey between 3 and 4, preceded by a darker blotch ; marginal spots black ; fringe white, with dark grey chequering.

Hindwing : with antemedian line thick, straight; the rest as in forewing.

Underside whitish grey, the base greyer ; lines and cell-spots black and distinct ; both wings with smoky-black marginal band.

Head, thorax, and abdomen like wings.

Expanse of wings : 29 mm.

1 ♂, 1 ♀.

Paralcidia gen. nov.

Forewing : elongate; costa shouldered at base, slightly curved before apex, which is rectangular ; hindmargin vertical above middle, oblique below.

Hindwing : with upper half of hindmargin vertical, slightly indented beyond cell, lower half oblique; costa straight.

Antennae lamellate, flattened, without pubescence ; forehead protuberant ; palpi obliquely porrect upwards, with appressed scales, second segment long, terminal depressed ; tongue and frenulum present; abdomen of ♂ elongate, with large anal tufts.

Neuration : forewing, cell longer than half of wing ; discocellular vertical ; first median nervule at five-eighths, second at seven-eighths ; radials normal ; subcostal vein deflexed at extremity ; 7, 8, 9 stalked ; 10, 11 separate ; hindwing, costal and subcostal shortly approximated near base ; 7 and 3 from before angles of cell.

Scaling smooth and fine.

Type : *Paralcidia errabunda* spec. nov.

195. **Paralcidia errabunda** spec. nov.

Forewing : pinkish ochreous, but the basal four-fifths of wing is suffused with dark olive-fuscous, as far as the lunulate-dentate submarginal line, which rises at three-fourths of the costa and runs obliquely outwards to vein 6, cutting off a small olive costal blotch beyond ; the pale ochreous ground-colour of the marginal fifth is striated with olive, and shows the veins across it pink ; along vein 4 this pale ground projects inwards to cell, where it is joined by an oblique pale streak from before middle of costa, which is incurved from vein 5 and runs vertically to the submedian fold ; the cell-spot ochreous ; along inner margin are some fine ochreous striae, and an ochreous spot at one-fourth suggests the termination of an inner line; costa with fine ochreous points; the lunules of the submarginal line contain externally some olive-green spots, from which streaks of green scales run to the dark olive marginal line; fringe pinkish ochreous, mottled with olive beyond veins.

Hindwing : pinkish ochreous, with the dark markings of underside showing through ; fringe ochreous.

Underside of forewing pinkish ochreous, with the dark olive area showing through ; costa striated with olive : hindwing tinged and striated with olive as far as a thick deep olive crenulated outer line ; cell-spot dark olive ; abdominal margin below fold ochreous.

Head, shoulders, patagia, and a broad lateral streak on abdomen dark olive; thorax and abdomen above and below, and tips of palpi pinkish ochreous; legs ochreous dappled with green.

Expanse of wings: 27 mm.

1 ♂, 4 ♀♀.

196. **Paralcidia marginata** spec. nov.

Forewing: olive-green as far as submarginal line, which is much nearer the margin than in *errabunda*; the pale pinkish ochreous area therefore narrower; the line runs obliquely out from three-fourths of costa and is bluntly bent at vein 6, slightly indented on both folds; the marginal area sprinkled with green scales, the veins pink; at anal angle the ochreous tint runs in along inner margin to near base; fringe pinkish ochreous, with slight green chequering; discal spot dark, obscure.

Hindwing: pinkish ochreous, appearing grey to near margin from the dark area beneath.

Underside of both wings dull olive, blurred in forewing, deeper in hindwing; cell-spots dark; marginal area and fringe pinkish ochreous with slight green speckling.

Head, shoulders, patagia, abdomen beneath, the segmental divisions, and top of anal segment dark olive; thorax and abdomen ochreous.

Expanse of wings: ♂, 27 mm.; ♀, 32 mm.

3 ♂♂, 1 ♀.

197. **Paralcidia rufivenata** spec. nov.

Forewing: green thickly speckled with pink and grey scales; the veins deep pink; costa dotted, pink and green; lines white, edged with deep green; first from beyond one-third of costa, oblique outward and curved round at end to median above the rise of vein 2, continued between median and submedian as a vertical white lunule much nearer base, and below submedian by a white oblique streak nearer still; followed by deep green shades between the veins; in the mottled basal area are a dark green spot in cell and another obliquely below it near base; outer line from two-thirds, obliquely curved outwards to 6, insinuate beyond cell and in submedian interval, outcurved between, below submedian sharply oblique basewards, edged internally by dark green lunules; in the marginal area are three green blotches; one on costa, broad, reaching to vein 6; one at anal angle reaching vein 2, narrow; the third towards margin between them, separated by hoary grey scaling; dark marginal lunules between veins; fringe pink, chequered with green.

Hindwing: whitish ochreous, becoming grey towards hindmargin; the veins at extremity and the fringe pink; a grey cell-spot and waved postmedian line.

Underside of forewing blurred cinereous-green to outer line, which is dark; costa pink striated with green; the veins pink; marginal area paler than basal: hindwing speckled with green up to the thick dark green outer line, which is lunulate-dentate; cell-spot dark; abdominal margin paler, more broadly in ♂.

Face and palpi deep pink; palpi externally dark green; vertex, shoulders, and patagia deep green; thorax and abdomen pinkish grey; abdomen below and legs pink; terminal curl of hindtibia shining olive; antennae pink.

Expanse of wings: 30 mm.

2 ♂♂, 2 ♀♀.

The ♂ of the species, while in general structure it agrees with typical *Paralcidia*, differs in three particulars: the costa of hindwing is convex and roughly haired; the hindtibiae are much swollen towards extremity and fringed with hair, and at the end bear a curled tuft of shining hairs; and thirdly the antepenultimate segment of the abdomen beneath bears an abrupt projection, and is clothed with tufts of rough hair.

198. **Paralcis coerulescens** spec. nov.

Forewing: mixed fulvous brown and purplish grey, irrorated with bluish grey scales; the veins fulvous, the median broadly so; lines velvety black; first at one-fourth, angled outwards in cell and on submedian fold, and swollen on costa, median vein, and inner margin; outer line crenulate, outcurved, at two-thirds, thickened on veins; median line similar, nearer outer than inner line; cell-spot round and black, with a linear blue-grey centre; the outer line is edged with bluish grey scales, and followed from costa to middle by a black shade; submarginal line blue-grey, preceded by black blotches between the veins; interrupted between 6 and 7 and 3 and 4; marginal black spots between veins; fringe purplish grey.

Hindwing: dark slaty grey; the cell-spot, postmedian, and submarginal line showing darker; veins towards margin fulvous; fringe slaty gray with a fulvous sheen.

Underside dark slaty cinereous, the fringe and cell-spots deeper; apex of forewing pale.

Head and thorax purplish; abdomen shining dark cinereous.

Expanse of wings: 38 mm.

2 ♂♂.

199. **Paralcis curvilinea** spec. nov.

Forewing: dark reddish brown, overlaid with a purplish shade in the central area; first line at one-fifth, black, angled outwards in cell, then oblique inwards, with a paler inner edge; outer line from two-thirds of costa to four-fifths of inner margin, outcurved from below costa to submedian fold, where it is indented, black with a pale outer edge; a black median line, waved, and projecting just below median vein, followed by the black cell-spot; submarginal line very obscure, grey with a black edging, preceded by a black blotch on inner margin beyond outer line; the apex bluish grey, with some black scaling along hindmargin beneath it; marginal spots black; fringe brown.

Hindwing: dirty whitish ochreous, speckled with grey, with a dark cell-spot, and a strongly curved grey postmedian line; fringe pale.

Underside of both wings like upperside of hindwing, the forewing blurred.

Head olive-ochreous; base of shoulders, patagia, and a lateral line on thorax purplish black; tips of shoulders, thorax, metathorax, and basal segments of abdomen pale ochreous; abdomen greyish ochreous with dull brown-grey dorsal blotches; tarsi mottled brown and ochreous.

Expanse of wings: 34 mm.

2 ♀♀.

At the base of forewing, in the usual place of the fovea, there is visible a small pustule.

200. **Paralcis deformis** spec. nov.

Forewing: pale wood-brown, smeared with greyish fuscous as far as outer line; first line at one-fourth, black and interrupted, bent in cell; outer line from two-thirds of costa to three-fourths of inner margin, blackish, outcurved from 6 to submedian fold; cell-spot large and black; traces of a median shade, plainest on costa and above inner margin; submarginal line pale, waved; the lunules filled in with blackish; marginal area tinged with deeper brown; some black marginal dots; fringe brown.

Hindwing: pale brown, with grey speckling; a black cell-spot and grey postmedian line.

Underside darker; both wings dark grey to outer line; cell-spots black.

Head and thorax brown varied with black; abdomen like hindwings.

Expanse of wings: 36 mm.

1 ♂.

The single example is considerably worn.

201. **Paralcis discata** spec. nov., and ab. **alterata** nov., and ab. **albiclausa** nov.

Forewing: dull olive-brown, generally densely covered with bluish grey and olive scaling, so that the dark ground-colour is lost; a large oval blackish cell-spot; a dark blotch at extreme base; lines darker, but obscure; first at one-fourth, bent in cell, then vertical; outer from three-fifths of costa to two-thirds of inner margin, oblique outwards to vein 5, then inwards to submedian fold, then again outwards; submarginal line obscure, parallel to outer line, preceded by darker scaling in the lunules and with the whole marginal area beyond dark brown, except between 3 and 4, where the blue-grey mottling runs through to margin; marginal lunules black, edged outwardly with pale; fringe brownish grey; median shade always obscure.

Hindwing: dull greyish white, speckled with olive-grey; a blackish cell-spot, a sinuous dark outer line, and traces on inner margin only of antemedian and submarginal lines; fringe concolorous, beyond a dark marginal festoon.

Underside like upperside of hindwing; cell-spots black; the lines indicated on forewing; costa of forewing distinctly striated with dark.

Head and thorax like forewing, abdomen like hindwing.

Expanse of wings: 30—35 mm.

A long series, all ♀♀.

In the aberration *alterata* the broad central and narrow marginal areas are of the brown ground-colour, unspeckled by white; but the intervals preceding and following the fascia become altogether bluish grey or whitish, and the submarginal line shows more broadly white; in these cases the dark central area is broader than in typical *discata*, the brown suffusion not only including the space between inner and outer lines, but also extending to the dark shades which precede the inner and follow the outer lines, and which in the typical form are more or less obsolete; median shade distinct and black.

Expanse of wings: 28—36 mm.

4 ♀♀.

The aberration *albiclausa* is the extreme form of ab. *alterata*, in which the brown central fascia is bordered on each side by broad white bands.

2 ♀♀.

202. **Paralcis fulvisecta** spec. nov.

♂. *Forewing:* olive-grey sprinkled with blackish and reddish scales in basal two-thirds, beyond dark olive-fuscous; the lines black; first from one-fifth of costa to one-fourth of inner margin, oblique outwards above and angled both above and below median, preceded by a distinct whitish line following patches of dark olive between the veins; traces of inner dark blotches; outer line at two-thirds, distinctly lunulate-dentate above middle, angled bluntly on vein 4 and thence simply waved, followed by a whitish line; cell-mark vertically oblong, large and black, with a pale linear centre; above it a median line, thick and black, rises, running outwards obliquely to 6, then lunulate-dentate, parallel to outer line to vein 3, thence incurved to middle of inner margin, the space between it and outer line above middle whitish; a broad curved cream-coloured band from apex to inner margin before anal angle, meeting an arm from three-fourths of costa, both more or less dusted with rufous-olive scales; submarginal line fine, white, sinuous, from costa before apex, approaching hindmargin above vein 4, then toothed inwards on veins and broadly lunate between them; median vein fulvous throughout, this tint broadened along vein 4 nearly across the interval between it and 3; the other veins fulvous in places, ending as dull fulvous lunules on hindmargin alternating with the black marginal lunules; fringe yellowish ochreous, broadly mottled with olive-fuscous beyond veins, and with a dark dividing line.

In the ♀ the discal spot is much larger, velvety-black, scarcely showing the pale centre, and followed by a quadrate white blotch; the curved white band from apex is absent, being represented by an obscure band of olive; the apical space between submarginal line and the oblique outer edge of the band is white, and the pale fulvous marginal area runs in as a rounded pale-scaled tooth between veins 3 and 4; fringe darker.

Hindwing: cinereous, darker along hindmargin; with a thick dark postmedian line, edged with white on inner margin, traces of a submarginal line, and a dark cell-spot; fringe dark cinereous beyond black marginal lunules.

Underside dark slaty cinereous with an olive tinge; apex of forewing and inner margin of hindwing paler; in the ♀ blackish, with large diffuse black cell-spots followed by white patches, that in forewing large; apex of forewing white.

Head and thorax dark olive and fuscous; abdomen cinereous; palpi externally, pectus, and forelegs black.

Expanse of wings: ♂, 40 mm.; ♀, 44 mm.

5 ♂♂, 6 ♀♀.

203. **Paralcis junctilinea** spec. nov. and ab. **punctata** nov.

Forewing: fawn-drab, slightly dusted with darker; lines fuscous, fine; first at one-fourth, nearly straight; outer from three-fourths of costa to middle of inner margin, parallel to hindmargin, but slightly bent in on submedian fold; cell-spot blackish with grey centre, followed by a brown median line, approximated to outer line on inner margin; a blackish submarginal line from costa to vein 5, forming slight black lunules between veins, edged with white from 6 to 4, the uppermost largest, and followed by a slight brown cloud to apex; fringe concolorous; a row of black dots between veins just before margin; a brown horizontal streak running from cell to submarginal line above vein 4.

Hindwing: with the two brown lines wider apart at costa, the outer more sinuous, approximating on inner margin; cell-spot small, black.

Underside whity-brown with the lines faint; cell-spots black; three or four black spots before apex.

Head, thorax, and abdomen concolorous; face darker; anal segment paler.

In the aberration *punctata* the ground-colour is darker; the lines are represented by black spots on veins, the median shade being a diffuse cloud; the submarginal line is more distinct across wing, with the white spots larger, coalescing above; in the ♀ developing into a whitish apical blotch; the cell-spots are larger in the ♀.

There is no trace of the dark horizontal line of the type-form.

Expanse of wings: ♂, 30 mm.; ♀, 34 mm.

2 ♂♂ of the type-form; 1 ♂, 1 ♀ of the aberration.

204. **Paralcis latimedia** spec. nov.

Forewing: sepia-brown with dark striae; costa with black striations; a blackish blotch at base; first line thick, velvety-black, projecting outwards above and below median, from before one-fourth of costa to one-fourth of inner margin; the area beyond it suffused with brownish fuscous deepening to black at the outer edge, which runs from two-thirds of costa to four-fifths of inner margin, irregularly waved and forming a bifid projection on veins 3 and 4, edged first by a pale and then a dark brown line; in the outer third of fascia a dark line runs parallel to outer edge beyond a blackish vertical linear cell-spot; submarginal line obscured by cloudy brown marginal shading, which is interrupted between 3 and 4; a fine marginal festoon, connecting the black spots; fringe brown.

Hindwing: dirty whitish, dusted with dull grey; a dark grey waved post-median line from two-thirds of costa to inner margin above anal angle, with traces of two other grey lines from the angle; a dark lunulate marginal line; fringe pale, with a reddish tinge.

Underside of both wings like upperside of hindwing; basal half of forewing, except along inner margin, dull cinereous.

Head, thorax, and abdomen brownish grey; palpi and shoulders black; patagia and dorsal blotches of abdomen brown-black; face brown.

Expanse of wings: 44 mm.

2 ♀♀.

205. **Paralcis pallidimargo** spec. nov.

Forewing: pinkish ochreous flushed with pale brownish in the ♂, paler ochreous flushed with olive-grey in the ♀; a slight dark brown patch at base; a double black basal line, the interval filled in with brown, irregularly bracket-shaped; outer line black, lunulate-dentate, at two-thirds, indented below costa, running outwards to vein 5, forming a blunt projection between 5 and 4, then inwards, followed by a thick dark brown shade; median line from two-fifths of costa, sinuate outwards to cell, then incurved, and again below middle running outwards; space between median and outer lines partially filled with brownish black and with a patch of hoary grey scales on discocellular; submarginal line waved, preceded on costa by a double brown lunulate blotch, by two smaller brown lunules beyond cell, and by a prominent black-brown spot on inner margin; marginal area black-brown from 4 to near apex, below 4 brown in the ♂, olive

or olive-ochreous in the ♀ ; marginal spots large, black ; fringe dark brown with ochreous flecks in the ♂ ; ochreous with brown flecks in ♀.

Hindwing : ochreous at base, becoming grey-speckled and darker to the dark grey submarginal line, containing a grey cell-spot and fine waved postmedian line ; marginal area ochreous with slight speckling, and some dark marginal spots ; fringe ochreous.

Underside of forewing dull dark brown to three-fourths, the marginal area ochreous, and some patches of ochreous along costa ; hindwing as above, with a dark cell-spot.

Abdomen ochreous speckled with brown ; face and palpi black-brown ; vertex and thorax brown mixed with ochreous ; antennae ochreous spotted with brown.

Expanse of wings : ♂ 35 mm. ; ♀ 35—40 mm.

1 ♂, 3 ♀♀.

The two larger ♀♀ are much paler in tint throughout than the other ♀ and the type ♂, but the markings are identical.

206. **Paralcis ruptilinea** spec. nov.

Forewing : dark brown tinged with purplish grey ; costa spotted with yellowish ; lines blackish brown ; basal from one-fourth of costa to before one-third of inner margin strongly outcurved above median ; outer line at three-fifths, angled outwards on vein 4, concave above, marked chiefly by black vein-spots ; a black cell-spot, over which a cloudy median line runs, approaching outer line on inner margin ; submarginal line sinuous, indistinct, but marked by the deeper tinge beyond it ; an oblique angular line from apex to submarginal line at vein 6, edged outwardly with deep black ; the included costal triangle sometimes white, sometimes like ground-colour.

Hindwing : slaty bluish, ferruginous at anal angle, above which there are traces of lines.

Underside dull slate-colour, the costa of forewing yellow-spotted ; cell-spots black ; apical triangle concolorous with upperside.

Head and thorax like forewing ; abdomen greyer ; antennae whitish.

Expanse of wings : 35—40 mm.

2 ♀♀.

Most probably with other variations.

207. **Paralcis venusta** spec. nov.

♂. *Forewing :* pearl-grey, bluish grey at base and along costa, cream-colour before submarginal line ; costa thickly striated with black ; first line at one-fourth, bracket-shaped, vertical between the folds and retracted at each end, with a grey shade before it tinged with rosy brown below median ; outer line from two-thirds of costa, sinuous, being incurved below middle and again outcurved before inner margin, black, sharply dentate on veins, followed by a rosy brown shade ; median line also black and dentate, more outcurved from costa, closely approximated to outer line, which it touches forming a black blotch, on submedian fold ; a large brown diffuse patch on discocellular lies within its upper curve ; submarginal line waved, interrupted ; from costa to vein 7 edged inwardly with black, and distinct, passing through the grey costal shading, more or less obliterated below by the cream-coloured area, which between 3 and 4 projects to hindmargin, inter-

rupting the brownish grey marginal area; marginal spots large and black, joined by black streaks between 7 and 4 to the lunules of submarginal line, and to each other by a fine marginal line; fringe mottled dark and light grey.

Hindwing: bluish grey, with a dark basal mark, an indistinct grey antemedian line and small dark ocellus on discocellular; the rest as in forewing, but the pale submarginal space not so wide and greyer, not interrupting the marginal area.

Underside dark slaty fuscous with a greenish tinge; lines hardly visible; fringes and apex of forewing pale grey.

Palpi black; head, thorax, and abdomen dark grey; basal segment of abdomen black, second whitish, third with a pair of black spots; abdomen beneath and legs slaty fuscous; foretarsi blackish, with the joints pale.

♀. Suffused throughout with purplish grey and brown, and thickly black-speckled, especially along the veins, so that the whole wing surface assumes a mottled appearance, the underside becoming black.

Expanse of wings: 40 mm.

1 ♂, 2 ♀♀.

Subfamily SELIDOSEMINAE.

208. **Tolmera albibasalis** Warr.

When this species was described, *Nov. Zool.* x. p. 404 (1903), only the ♂ was known. Now along with 7 ♂♂ a single ♀ has been sent; in this sex of this species the antennae are bipectinate, the pectinations thicker and shorter than in the ♂.

Both wings are paler brown, and the outer line is not so near the hindmargin as in the ♂.

209. **Tolmera marcescens** spec. nov.

♂. *Forewing:* white, washed with pale brown and speckled with black; the veins pale; lines white; first at one-fifth, acutely angled below subcostal vein, and oblique inwards, edged outwardly (and in ♂ inwardly also) with dark; outer line from three-fifths of costa, below which it is incurved slightly, parallel to inner line as far as submedian fold, then outcurved to two-thirds of inner margin, inwardly edged with dark: the space between the lines with a dark central shade; submarginal line waved, the lunules filled up with dark; a dark oblique blotch beyond it to apex from vein 6, the apex itself paler; dark marginal lunules; fringe pale chequered with dark brown.

In the only ♀ seen, and of which the ground-colour is paler, being more mixed with white, the second line starts from nearer middle, forms two concavities inwards, and two outward teeth on the median and submedian veins.

Hindwing: pale ochreous, slightly speckled; cell-spot and curved outer line grey; marginal spots dark.

Underside of forewing pale ochreous, yellower towards costa, which is spotted with brown; outer and submarginal lines brown towards costa; marginal lunules and chequering of fringe black-brown: hindwing yellowish, paler towards abdominal margin, speckled with brown, and with brown outer line and cell-spot.

Palpi ochreous, brown externally; face pale ochreous with two brown spots; vertex, shoulders, and patagia pale brown, black-speckled; abdomen pale ochreous without any speckling; legs pale brown, black-mottled; ♀ with vertex white.

Expanse of wings : ♂ 35 mm. ; ♀ 38 mm.

4 ♂♂, 1 ♀.

The ♀ differs from the ♀ of *T. albibasalis*, the type species, in having the antennae not bipectinate, but simple, all the segments sharply angulate, with a bristle from each angulation.

210. **Trochistis albivertex** spec. nov.

Forewing: fawn-colour speckled with black ; costa striated with black ; a blackish dot at base of submedian vein ; three brownish outwardly oblique lines from costa at one-fifth, two-fifths, and two-thirds to one-fifth, one-half, and four-fifths of inner margin respectively ; the inner line waved, incomplete ; the second followed by a small black cell-spot ; the third a little waved below middle, followed by a pair of black spots, one on each side of vein 3 ; a cloud of black striae at apex, in which the commencement of a submarginal line is visible ; marginal dots black ; fringe paler.

Hindwing: with dark central line ; the outer line not visible, though the two black spots are present, but duller, beyond it.

Underside whity-brown, black-speckled ; marginal dots black.

Head, thorax, and abdomen like wings ; palpi with terminal segment black, its tip white ; vertex snow-white ; antennae annulated black and brown ; basal segment white.

Expanse of wings : 37 mm.

1 ♀.

211. **Trochistis asinina** spec. nov.

Forewing: dull fuscous, speckled with dark ; the lines darker ; the costa with a few very fine white markings, distinct only in the ♂ ; three outwardly inclined dark lines at one-fifth, two-fifths, and two-thirds, and a broader but more diffuse submarginal line ; in the ♂ these are partially accompanied by white scaling, and the submarginal line is followed by a patch of white scales from costa to vein 4 ; the marginal dots white ; in the ♀ all these are absent, the marginal dots being minute ; cell-spot black.

Hindwing: without inner line ; cell-spot white ; in the ♂ the postmedian is accompanied by bright white scales as well as the submarginal and marginal lines ; fringe with pale tips.

Underside of forewing dull olive-fuscous dusted with pale, the costa and hindmargin darker ; cell-spot and outer line marked : hindwing whitish dusted with dark, the outer line and hindmargin only fuscous ; all the tints darker in ♀ than in ♂.

Head, thorax, and abdomen like wings ; tips of palpi and anal tuft of ♂ pale ochreous ; antennae black, the shaft annulated ; pectinations of ♂ plumose.

Expanse of wings : 35 mm.

1 ♂, 5 ♀♀.

212. **Trochistis rufoliva** spec. nov.

Forewing: deep red-brown, with an oval snow-white cell-spot ; costa in ♂ blotched with olive-green, in ♀ with paler green, the green spaces with brown striations ; three outwardly inclined thick red-brown lines at one-fifth, two-fifths,

and two-thirds, most distinct in the ♀ ; from the green intervals lines and bands of pale green scales run across the wing between and edging the lines, plain only in the ♀, the middle space being broad and pale throughout; a submarginal row of green or grey-green spots on veins, and a marginal series of smaller green spots round the black spots, these last showing also in the ♂ ; fringe red-brown flecked with greenish white.

Hindwing : with the two outer series only plain, the greenish white speckling being more scattered ; cell-spot small, white.

Underside whitish ochreous, greyer in forewing, grey-speckled; a grey submarginal shade, slight in forewing ; white spot of forewing showing through ; the coloration deeper in the ♀.

Head, thorax, and abdomen red-brown ; palpi tipped with pale ; abdomen dusted with greenish white ; anal tuft of ♂ ochreous, red beneath ; antennae black and pale ; pectinations in ♂ short and stiff.

Expanse of wings : 37 mm.

4 ♂♂, 4 ♀♀.

213. **Trochistis vulpina** spec. nov.

Forewing : rufous brown, peppered with blue-grey scales in the ♂, and with black spots and striae in the ♀ ; costa black-brown ; lines dark brown, all obliqne outwards, from costa at one-fifth, two-fifths, and two-thirds to one-fourth, one-half, and three-fourths of inner margin respectively, the outer line twice bent; in the ♀ all the lines become black at inner margin ; submarginal line in ♀ preceded and followed by a black shade from costa to vein 4, and with one on inner margin before it ; in ♂ not marked ; marginal spots blue-grey in ♂, black in ♀ ; fringe concolorous ; cell-spot minute, black.

Hindwing : similar ; the markings much clearer in ♀ ; cell-spot black in a grey ring.

Underside whitish with a pink tinge and grey-speckled ; apex of forewing rufous ; fringe rufous ; marginal and cell-dots black ; ♀ with the markings stronger, the fringe deep red.

Head and palpi deep brown, tips of palpi ochreous ; thorax and abdomen like wings ; abdomen in ♂ speckled with blue-grey, in ♀ with black; anal segment in ♂ with a white black-edged dorsal blotch and the tufts ochreous, the ♀ with a black blotch and one at base ; abdomen beneath, pectus, and legs pinkish white ; antennae black, the shaft in ♂ annulated with white ; the pectination full.

Expanse of wings : 35 mm.

1 ♂, 1 ♀.

Subfamily SEMIOTHISINAE.

214. **Gonodela papuensis** spec. nov. and ab. **densinotata, ochrimixta, albisparsa,** and **caesiata** nov.

♂. *Forewing :* fawn-colour, dusted with grey ; costa finely dotted dark and yellowish ; lines brown, somewhat indistinct : first at one-fifth, right-angled on subcostal vein ; second at one-half, angled on vein 6, then vertical, parallel to first ; outer at three-fourths, also angled on vein 6, then incurved to two-thirds of inner margin, thick and dark brown, followed by a pale and then a dark line, before the dark brown marginal area, the upper edge of which runs obliquely from angle of

outer line to below apex; a cloudy waved darker submarginal shade; marginal black spots between veins; fringe dark brown; cell-spot small, black.

Hindwing: without basal line; antemedian incurved in cell before the cell-spot; outer double line straight, at three-fifths; the marginal brown area paler.

♀ without the dark brown marginal area; often with a double black blotch before outer line from 5 to 3, with a single black blotch beyond it between 3 and 4.

Underside of forewing of ♂ brown along costa and in marginal area; basal half ochreous spotted with brown; middle and outer lines brown; some dashes of bluish white before apex and bluish-white spots at base of fringe: hindwing bluish white speckled with brown, with the lines brown and fulvous, the veins fulvous; in the ♀ the bluish-white tint is much more developed in both wings; cell-spots black.

Head, thorax, and abdomen fawn-colour; face and palpi mottled with brown; antennae ciliated.

Expanse of wings: 30 mm.

7 ♂♂, 4 ♀♀.

The aberration *densinotata* occurs in the ♀ only; all three lines are distinct, thick and brown-black or black; the outer is followed by dark blotches between veins, interrupted between 4 and 6 in the forewing, less marked but not interrupted in hindwing; the ground-colour is pale lilac-grey, or whitish, or pinky ochreous, with more evident speckling; underside more variegated, the lines more prominent.

3 ♀♀.

In ab. *ochrimixta* the ground-colour in both sexes is dirty whitish speckled with darker; the ♂♂, as in the type form, with darker marginal areas.

3 ♂♂, 3 ♀♀.

In ab. *albisparsa*, confined to the ♀♀ only, the ground-colour is white, more or less densely powdered with grey; the marginal area darker grey with a whitish blotch above vein 6; the lines dark from costa, and often marked by dark dashes on veins; the black blotches of outer line nearly always present, and in some instances largely developed and laterally confluent; the underside much whiter.

8 ♀♀.

Lastly, the ab. *caesiata*, which is restricted to the ♂♂, has the whole upperside slaty purplish; the lines dark, tinged with ferruginous: the underside with fewer whitish scales.

3 ♂♂.

215. **Iulocera albinigra** spec. nov.

Forewing: uniform dark purplish slate-colour; costa with fine pale dots; lines blackish; first at one-fifth, slightly bent at median vein; second before one-half, angled below subcostal, and touching the black cell-spot; outer line at two-thirds, bluntly bent at vein 5, preceded by yellowish scales, thickened between 3 and 4 and followed by a dark cloud; a white subapical spot above vein 6; fringe concolorous, with white spots along base beyond the black marginal spots.

Hindwing: with antemedian and outer lines close together and parallel, the outer edged internally with yellow scales; cell-spot black; submarginal line pale, very indistinct.

Underside with the lines and bands dark, the intervals paler, with a few bluish-white specks, all much more prominent and numerous in the hindwing; subapical spot of forewing and basal spots of fringe white and largely developed.

Head, thorax, and abdomen concolorous.

Expanse of wings : 26 mm.

1 ♂.

216. **Petrodava gibbosa** ab. **subradiata** nov.

This form is distinguished at once by the underside of the wings, which have both folds marked from base with snow-white streaks, the cell-fold in the hindwing being white from base to margin, and the submedian being often accompanied by another on each side : in some cases the intervals between veins towards hindmargin are also streaked with white and black scales.

3 ♂♂, 2 ♀♀.

Subfamily ENNOMINAE.

217. **Azelinopsis amaura** spec. nov.

Forewing : pearl-grey, largely suffused with olive and darker grey ; basal patch quite small, olive ; band following it broad on costa, narrow on inner margin, dull pearl-grey with a darker centre ; inner edge of central fascia from one-fourth of costa to one-fourth of inner margin, bent in cell ; a similar median line ; outer edge of fascia from two-thirds of costa to three-fourths of inner margin, minutely dentate, edged with pale ; all three lines olive, starting from triangular costal blotches ; costa whitish between the lines, dark-speckled ; space between median and outer lines pearl-grey ; marginal third olive-brown, with a waved dark pale-edged submarginal line and a yellowish blotch on each side of it beyond cell ; fringe olive-brown.

Hindwing : pale grey, speckled with darker ; marginal area olive-grey ; a curved median and lunulate-dentate grey submarginal line, both starting from dark brown blotches on inner margin ; cell-spot grey.

Underside dark olive-brown, with blackish speckling, the forewing greyer and blurred ; all the lines dark brown.

Head, thorax, and abdomen olive-brownish.

Expanse of wings : 30 mm.

1 ♀.

Differs from typical *Azelinopsis* in not having hyaline cell-spots ; the excision in hindwing oblique, and reaching only from vein 1 to 2. In forewing, veins 7, 8, 9 are stalked, but rise near end of cell ; and veins 10, 11 are coincident, not separate.

Epitherapis gen. nov.

Forewing : narrow ; costa faintly arched and slightly inbent beyond middle ; apex blunt ; hindmargin oblique outwards with faint crenulation to vein 6, thence curved inwards ; anal angle obtuse.

Hindwing : ample, broader than forewing, with rounded crenulate hindmargin.

Abdomen (♂) long, slender ; anal tuft bifid ; antennae plumose, the extreme apex simple ; palpi short and broad, the terminal segment minute ; tongue and frenulum present ; hindlegs broken off ; forewing with fovea at base.

Neuration : forewing, cell half as long as wing ; discocellular vertical, curved ; first median nervule at four-fifths, second close before third ; radials normal ; 7, 8, 9 stalked ; 10, 11 stalked : hindwing, costal and subcostal closely approximated for half of cell ; veins 7 and 3 from before angle.

Type : *Epitherapis stramineata* spec. nov.

218. **Epitherapis stramineata** spec. nov.

Forewing: straw-colour, washed here and there with pale ochreous; costal edge pale, with oblique dark streaks and grey-speckled towards base; first line at one-fourth, angled on median, marked by black spots on veins; outer line from just before apex, oblique to vein 4, then still more oblique to inner margin before middle, black, with deeper black points on veins; followed closely by a dark smoky grey shade from vein 7 to 1; submarginal line shown by whitish wedge-shaped marks between veins, those above middle followed by black scaling; a grey-brown triangle on hindmargin from apex to vein 6, the costal space before apex whitish; cell-spot brown; a slight brownish median shade, and a brown flush before submarginal line.

Hindwing: with single obscure antemedian line; the brown cell-spot followed by a diffuse triple grey postmedian shade, bent outwards on submedian fold; submarginal line preceded by a row of brown patches between veins; the margin grey-brown; fringe greyish ochreous; inner margin and fringe grey-brown.

Underside paler, with all the brown markings distinct.

Head, thorax, and abdomen straw-colour flushed with pale brown; palpi externally and forelegs blackish.

Expanse of wings: 48 mm.

1 ♂.

219. **Garaeus papuensis** spec. nov.

Forewing: rich chestnut-brown; costa white at base, and with white patches beyond all the lines; the brown area with transverse blackish striae; lines broad, dark grey, varied with pale grey and whitish scales: first from one-fourth of costa to one-third of inner margin, with dark spots on veins; outer line from three-fourths of costa, oblique outwards and angled on vein 6, then oblique inwards, widening downwards, to two-thirds of inner margin, lunulate-dentate externally, the teeth marked with white-pointed black spots on veins, followed on costa by a snow-white streak; the costa towards apex blackish, traversed by a submarginal white line, finely waved, to a yellow spot above vein 6, then diffusely blackish and ending in a zigzag whitish grey streak at anal angle; a deeper brown median shade, angled at the black cell-spot, then oblique; fringe bright chestnut, with a yellow spot below apex.

Hindwing: greyer, mixed with blue-grey scales, and whitish along inner margin; a broad red-brown median shade, and a wide brown band above anal angle, traversed by a bluish white lunulate-dentate submarginal line.

Underside dark brown thickly sprinkled with bluish scales; basal patch of forewing, and median shades of both wings brown; outer lines blue.

Head, thorax, and abdomen chestnut-brown; vertex and shaft of antennae ochreous.

Expanse of wings: 36 mm.

1 ♂.

220. **Heterodisca castanea** spec. nov.

Forewing: bright chestnut-brown, with thick darker brown transverse striae; but the paler ground-colour is only visible in the lower half of central area, all the rest being clouded with deep brown; lines marked by black white-tipped dots on veins; first nearly straight from one-fifth of costa to one-third of inner margin; outer straight and oblique from five-sixths of costa to two-thirds of inner margin; a

dark blotch on discocellular; costa strigulated with dark brown and yellow; fringe brown, pale spotted in apical half.

Hindwing: fuscous tinged with reddish, with a slightly curved line just beyond middle, marked by black dots on veins; fringe red-brown.

Underside of forewing like upperside of hindwing, with dim dark striae except on inner-marginal half: hindwing redder; costal area and cell with black and grey striae; inner margin paler, with dark striae; a curved postmedian dark line and black cell-spot; veins and parts of hindmargin red.

Head and thorax woolly, deep chestnut; abdomen duller red with a grey tint.

Expanse of wings: 36 mm.

1 ♀.

Lobophysa gen. nov.

A development of *Gonophaga*, characterised by the presence of a lobe at base of inner margin of hindwing in the ♂, reaching about one-third, and preceded at base by a double hyaline elongate space on each side of vein 1, which is swollen.

Type: *Lobophysa vagilinea* spec. nov.

Gonophaga straminea Warr., *Nov. Zool.* x. p. 408, must be removed to this genus.

221. **Lobophysa vagilinea** spec. nov., and ab. **obsoleta** nov., **perstrigata** nov., and **colorata** nov.

Forewing: pale fawn-colour (when faded, greyish white), sparsely black-speckled; lines blackish, sharply defined; first bracket-shaped, at one-fourth, vertical from subcostal to submedian vein, both extremities retracted; outer line from three-fourths of costa oblique and slightly curved to vein 7, thence oblique inwards with a slight curve to before middle of inner margin, preceded below middle by the median line, of which the upper portion is obsolete; the angle of outer line at 7 touches the apex of a brown-grey triangular blotch on hindmargin extending from apex to vein 4; submarginal line hardly marked except by a black blotch at anal angle; a row of dark dots just before margin; fringe concolorous; cell-spot annular, small.

Hindwing: with a dark mark at base, a diffuse dark line of scales from cell to end of lobe on inner margin; a black median line, generally curved inwardly round the annular cell-spot, joined on inner margin by an outcurved postmedian line, which is sometimes completely lunulate-dentate, at others marked only by the dark teeth on the veins; submarginal line from apex to anal angle, angled between 4 and 6 and outwardly paler margined, with black spots on the veins.

Underside paler, with the lines, cell-spots, and speckling blacker; submarginal lines wavy; apex of forewing whitish; a short brown line from origin of vein 2 to inner margin, and a curved brown line from two-thirds of costa to three-fourths of inner margin.

Head, thorax, and abdomen concolorous; palpi externally black; face browner; shoulders brown; metathorax with a pair of black spots; some black spots on middle dorsal segments.

Expanse of wings: 40 mm.

In the aberration *obsoleta* the lines are more or less obscured; the basal line being represented by dark dots; a brown blotch edged by two black lines

from inner margin to submedian fold represents the ends of the median and outer lines ; and in one instance the submarginal line is marked by a large black-brown blotch at anal angle and another beyond cell on the edge of the brown triangle; the hindwing and underside remain as in the type.

The aberration *perstrigata* is much more abnormal : the ground-colour is pale pearl-grey ; all lines and markings are nearly absent; a thick double brown-black streak, well-defined basewards but diffuse outwards, runs from just below apex of forewing to middle of inner margin, and is produced across hindwing as a broad band occupying the second fourth of the wing, with the black cell-spot on its outer edge ; underside the same ; the dorsum with a broad brown band across third and fourth segments.

2 ♂♂ of the type form ; 5 ♂♂ of ab. *obsoleta* ; and 1 ♂ of *perstrigata*.

The two brown lines of the underside of forewing are visible above only in worn specimens.

In the third aberration, *eolorata*, of which a single ♂ only has been sent, the colour, instead of being uniform as in the others, is varied ; the ground-colour is pale grey striated with olive ; the basal area and most of the marginal area beyond outer line are dull green ; the blotch on inner margin at the end of the fine outer line is pale brown, while the cell-spot is rufous and the hindmarginal blotches are rufous brown ; in the hindwing only the base and the space between outer and submarginal line are pale, all the rest being tinged with rufous and olive, the antemedian line and the inner edge of submarginal being ferruginous.

Underside pale pearly grey with all the lines shown distinctly.

1 ♂.

Moneta gen. nov.

Forewing : costa curved at base and shortly before apex, which is bluntly produced ; hindmargin oblique outwards to vein 4 with two deep excisions, and blunt teeth at apex and veins 6 and 4 ; below 4 oblique inwards and crenulate.

Hindwing : with well-rounded crenulate hindmargin.

Antennae simple in both sexes ; palpi stout, obliquely porrect upwards, third segment short ; forehead slightly prominent; tongue and frenulum present, slight ; thorax and pectus hairy ; hindtibiae swollen, with four spurs ; abdomen of ♂ slender, with slight lateral tufts.

Neuration : forewing, cell half as long as wing ; discocellular oblique ; first median nervule from one-half, second shortly before end ; subcostal vein strongly bent down at extremity to meet the discocellular; vein 5 from the top of discocellular, vein 6 long-stalked with 7, 8, 9 from the bend, 10, 11 coincident, 10 subsequently anastomosing shortly with 8, 9, these last two veins separating quite close to costa : hindwing with costal and subcostal shortly approximated at base ; 3 and 7 before ends of cell.

Type : *Moneta plenicolor* spec. nov.

222. **Moneta plenicolor** spec. nov.

Forewing : deep red-brown, the ground-colour, which only shows through here and there, being bright red-brown ; costa deep orange, spotted with brown ; first line oblique, from one-sixth of costa to one-third of inner margin, interrupted, running from subcostal vein to median, and from submedian fold to inner margin, white, with orange edging ; outer line oblique and straight, from costa close before

apex to three-fourths of inner margin, also interrupted, from vein 6 nearly to 4, and between 3 and 2, where visible, lunulate-dentate; both lines slightly toothed on veins; an obscure dark cell-spot; fringe brown, tipped with yellow.

Hindwing: vinous red, deeper in outer half and black-speckled; cell-spot dark; traces of an obscure lunulate-dentate postmedian line; fringe dark, with pale yellow tips.

Underside paler; forewing blurred brown, with fuscous speckling; cell-spot and spots on veins along outer line blackish; marginal area dull yellowish in ground-colour; apex grey: hindwing deep brown in marginal area and along inner margin; inner area sprinkled with lilac-grey and coarsely black-speckled; a large black cell-spot; spots of outer line black.

Head and thorax like forewing; abdomen like hindwing; shoulders and palpi tipped with orange; tarsi rich brown, mottled with orange.

Expanse of wings: 48 mm.

7 ♂♂, 1 ♀.

223. **Nadagara cuneigera** spec. nov.

Forewing: fawn-grey, in the ♂ sometimes with a reddish tinge, covered with blackish speckles; the costal edge slightly darker, and the subcostal vein pale whitish; lines dark brown edged with whitish, the inner inwardly, the outer outwardly; both start from subcostal vein; first at about one-third, oblique outwards to two-fifths of inner margin; outer from three-fourths of costa to fourth-fifths of inner margin, its white edging diverted along subcostal to apex; a fine submarginal white line forming wedge-shaped marks between veins, between 3 and 4 filled in with dark scales; fringe fawn-colour; a black cell-spot.

Hindwing: without basal line; the outer curved.

Underside whitish grey, speckled with darker; the lines and cell-spots dark.

Head, thorax, and abdomen concolorous; face, shoulders, and dorsum darker grey in ♀, ferruginous in ♂; patagia paler.

Expanse of wings: 34 mm.

4 ♂♂, 4 ♀♀.

224. **Prionia pulchricolor** spec. nov.

Forewing: in ♂ pearl-grey, in the ♀ darker, with a reddish brown suffusion, and in both sprinkled with black; basal area darker grey, followed at one-third by a deep green band, which above median is narrow and funnel-shaped, and below it swells out into an oblong sometimes rounded blotch; this lower part in some cases becomes quite pale green, or yellowish grey: the band is edged with pale and sometimes preceded on costa by a dark spot; cell-spot blackish green; submarginal line dark grey or dark olive, lunulate between the veins, connected with apex by an oblique streak; from three-fourths of costa a dark green streak curves outwards to vein 6, where it is sharply angled, and runs obliquely to two-thirds of inner margin; this outer line is rarely plain; fringe deep olive, with pale flecks beyond the veins.

Hindwing: bright rosy in costal half, grey-green below median and along margin beyond the waved submarginal line; from end of cell to inner margin a dark green band, crossed by the pale veins.

Underside of forewing blurred reddish fulvous along inner margin, ochreous with dark brown striae along costa; marginal border and outer line filled with

hoary grey, with a yellow patch between them; in the ♀ the ochreous is suffused with tawny brown: hindwing with base ochreous and outer half tawny brown with dark striations; the margin as in forewing; ♀ wholly suffused with tawny; fringe in both wings dark brown with pale tips.

Face blackish green; head and thorax dark grey, the vertex paler; abdomen pinkish grey, darker towards base; in ♀ all the parts are darker, more suffused with reddish grey; palpi, pectus, and legs bright fulvous.

Expanse of wings: ♂ 28 mm.; ♀ 32—35 mm.

5 ♂♂, 4 ♀♀.

TWO NEW *AGARISTIDAE*.

By KARL JORDAN.

1. Aegocera leighi spec. nov.

♂. Side of palpus and the forecoxa chocolate; head grey, a dot between antennae brown, centre of frons and the crest of hairs at eye chocolate; thorax chocolate above, densely irrorated with grey and pale yellow scales; abdomen orange above, with central row of black spots, grey washed with chocolate on underside; tibiae orange on upperside, fore- and midtibiae with two black dots each; tarsi black, tips of segments white; bases of abdominal side-tufts chocolate beneath.

Wings, *upperside*.——Forewing chocolate, densely irrorated with buffish grey scales; an irregular streak on median vein somewhat as in *rectilinea* Boisd. (1836), irregularly sinuose, creamy white, not quite reaching a short costal creamy white band which extends from lower angle of cell obliquely to costa; submarginal area with an indistinct flexuose creamy line; a row of minute admarginal chocolate dots.——Hindwing orange; a small dot on cross-veins and a row of submarginal spots black, the middle spots of the row minute.

Underside orange, apices of both wings somewhat washed with chocolate; forewing with a black dot in cell near apex and another on cross-veins; hindwing with a black spot on cross-veins and three or four submarginal spots, which are much smaller than above, situated from anal angle forwards.

R^2 of forewing from apex of areole, as in *A. rectilinea*; areole longer than in that species.

Length of forewing: 15 mm.

Hab. Durban, Natal, October 1904 (G. F. Leigh); three specimens.

2. Argyrolepidia pamphila ombiranus.

♀. Wings, *upperside*; blue scaling reduced to a few dots on forewing and a minute spot in centre of hindwing.——Forewing white, cell-spot minute; white discal band very much broader than in *p. pamphila*, widening behind, stopping short at M^2, measuring 3 mm. in width at M^1.

Underside: blue scaling also reduced, but not so much as above; central spot of hindwing isolated.

Hab. Obi, Moluccas (J. Waterstradt); one ♀.

ON A NEW PARASITIC TINEID MOTH FROM QUEENSLAND, DISCOVERED BY P. F. DODD.

By the HON. WALTER ROTHSCHILD, Ph.D.

SINCE Westwood* published an account of a Chinese moth of which the larva is parasitic on *Fulgoridae*, several instances of such parasitism have been recorded from Central America, New Mexico, India, and Japan. So far no such parasitic larvae have been found in Africa, but it is highly probable that they occur all through the tropical and subtropical countries. Some years ago Mr. P. F. Dodd, who has added so much to our knowledge of the early stages of Queenslandian Lepidoptera, discovered also a parasite of this kind in Queensland. He has sent us an interesting account of this discovery, which we append here in full. The insect is closely allied to that figured by Westwood, but quite distinct. Dyar† places these moths among the Tineids, and we perfectly agree with what he says.

Epipyrops doddi spec. nov.

♂ ♀. Legs and shaft of antenna luteous. Wings olive above, the scales of the forewing partly silver grey, especially on disc; no distinct markings; underside drab-brown.

Neuration: nine veins from cell of forewing, b^1 of Westwood's figure being absent and b^3 very weak near cell; cell of hindwing much narrower than in Westwood's figure, without inner spur (x of Westwood's figure), only five veins from cell, b^2 of Westwood's figure being absent, upper cross-vein straight, oblique.

Length of forewing: 4 to 6 mm.

The mandible of the larva is bifid, as in Westwood's figure; but the second lobe is more hook-shaped than in that figure, being widest in centre. The abdominal legs have a complete ring of hooks, the anterior hooks of each ring being much smaller than the posterior ones; the anal leg has a posteriorly open half-ring of large hooks, instead of a complete ring.

Mr. Dodd found this insect on several species of *Fulgoridae*, since identified by Mr. W. L. Distant as *Dictyophora praeferrata* Dist., *Olonia* spec., and a species of the subfamily *Flatinae*.

Mr. Dodd's observations on the parasite are as follows:—

"Upon June 15th, 1903, I received my copy of the *Entomologist* for May, and was very pleased to read Mr. Kirkaldy's instructive 'Current Notes' therein. Those in connection with parasite moths were of absorbing interest to me, for I have been observing a carnivorous caterpillar here, breeding out the moth for some time, and hoped I had a great surprise in store for entomologists. I have had my account of its history, so far as I knew it in June, almost ready for some weeks, but had delayed its completion and despatch until I could obtain the necessary larvae upon pupae of the *Fulgoridae*, so as to give fuller particulars concerning the development of the white coating, for I had not been satisfied with my observations upon those on the winged insects, owing to the great difficulty in obtaining even a temporary view of a larva before its larger growth. Whilst it is small it is not easily examined, as it is partly hidden, and the hosts object to

* *Trans. Ent. Soc. Lond.*, p. 519. t. 7 (1876). † *Proc. Ent. Soc. Washingt.* v. p. 43 (1902).

close scrutiny, becoming restless and often winding up with an aggravating hop when least desired. However, I have since obtained the requisite specimens, and have ascertained much that I wished to know.

"My larvae are certainly parasitic. I have kept them with their hosts for several weeks, and, though I have had many, I have never detected the slightest movement in any of them. A web is spun upon their hosts to cling to, and there they remain motionless once they commence to develop the white covering. The very young larvae are usually very close up to the thorax, and may sometimes lie across the abdomen; but, as they become larger, and require more space, change their position and lie parallel to it, the head being directed towards the end. The body presses closely down upon the host, and the head is drawn in very much, generally resting upon the edge of a segment. As a larva grows, the wings of the homopteron are forced outwards and upwards a little. The abdomens of many of the parasitised 'hoppers' are usually much shrunken or depressed where the larvae adhere. The snouted Fulgorid produces fine large caterpillars, and it will be noticed that it possesses very little indeed of the waxy substance. The pupae, as well as the imagos, of the black and the green species carry the caterpillars, yet the former has little or no 'wax' at the pupal stage; therefore it cannot for a moment be conceived that there is anything else than the juices of the *Fulgoridae* for the caterpillars to live upon.

"The moths, like various carnivorous species with which I am acquainted, soon become greasy.

"I may mention that I had not the faintest idea that the species of moths referred to by Mr. Kirkaldy were known to exist, nor had I ever seen or heard of the Japanese publication, the *Insect World*.

"Some four years ago, during a visit to Mr. H. Tryon, our State Entomologist, in Brisbane, he drew my attention to a small white cocoon, which he had found attached to a twig in his garden, and which he aptly compared to a rosette. The moth therefrom also was shown to me. I had not seen the species before, nor, I believe, had Mr. Tryon. Not long afterwards I came to Townsville, some 800 miles north of Brisbane, and, during my entomological wanderings here, have found similar cocoons at intervals, and obtained moths therefrom. The cocoons usually were upon narrow blades of grass, but I did not search for the larvae, considering any attempt to find them as utterly hopeless. However, during April this year, I found several of the cocoons upon grass, under some shrubs, and having during the previous year (1902) discovered that a caterpillar, which constructs a somewhat similar cocoon, and passes the earlier part of its existence upon certain homopterous insects (adhering to them and much resembling small bloated ticks, and undoubtedly imbibing their juices), I at once commenced a careful search amongst the several species of Homoptera in the vicinity. Ere long I noticed a small whitish Fulgorid, with wings somewhat apart, and looking decidedly uncomfortable; upon boxing this I found, to my extreme gratification, that there was attached to it a stout, oval, and almost snow-white lepidopterous larva, which I felt confident was the insect I was seeking for. Soon after several more of these 'frog-hoppers,' each with a larva attached, were taken, the larva being under the wings and a little upon the side of the abdomen. The caterpillar upon the first hopper crawled off that night, and next morning proceeded to construct its charming little cocoon. The moth emerged early in the afternoon thirteen days later.

"Many hours were spent during the ensuing few weeks in searching for these strange caterpillars, which were also found upon three other species of *Fulgoridae*; some more cocoons, too, were discovered, but three-fourths of these, and of others collected later, produced small jumping ichneumons, six, eight, or even twelve emerging from a cocoon, according to its size. Presumably the larvae are stung after leaving their hosts—in all probability whilst spinning, for none of those that I have taken from time to time proved to be victimised; maybe they are safe under the wings of the hoppers, though, as they approach maturity, they cause some displacement of the wings, and though easily seen may present no weak point to be attacked.

"The larvae are not rare, but there are only special localities where I obtain them; small shrubs where ants abound are productive, the hoppers often being numerous in such places, even where the green *Oecophylla* ants are. The ants do not fraternise with these *Fulgoridae*, like they do with so many species of *Jassidae*, *Psyllidae*, etc.; but they do not molest them, and pass by in scores without seeming to notice their presence. I have seen the green ants traversing branches where there were no less than three species of *Fulgoridae* dotted along them.

"I have never found two larvae of the same size upon a hopper, but not infrequently have noticed two of different sizes, the second, in every case, being very much smaller than the other, and upon the opposite side. With but few exceptions, all the larvae I have seen were upon winged insects, the exceptions, as already stated, being upon pupae of the green and the black species only. I have kept these for many days, supplying succulent shoots regularly to the hosts, until the larvae changed to white, and finally departed to spin. Upon another page I give particulars of several larvae which I obtained some time ago, two of them when they were exceedingly small, and which I was enabled to carefully observe for many days; the hosts are still alive, one with a second caterpillar upon it, but, as the larger portion of my material was despatched five weeks ago, I cannot delay my notes any longer, or would give fuller particulars concerning these. (*Note.*—I kept my notes back for seven weeks, by which time two of the hosts had died, the third dying several days after despatch of notes.)

"A full-grown caterpillar is in reality a very small creature, with a thick, even coating of a waxy-white and light-as-down substance covering the dorsal surface, the sides, and extending well underneath; it is so thick that the caterpillar appears to be double its real size. This coating parts slightly at the segments when the insect is in motion or curled up,—when parted from the host, if touched or alarmed, it curls up almost into a ball, and can easily roll from whatever it may be upon, and generally dangles by a thread, and thus suspended bears a strong resemblance to a round hanging egg-bag of a spider. The head and adjoining segment are only slightly covered with this white matter, but are drawn closely to the thickly clothed segments, leaving the face alone visible; when the insect is extended the head can be seen.

"I have collected larvæ of various sizes, some being exceedingly small, evidently not long from the egg, and, owing to their colour, scarcely discernible, the lens revealing their presence. Very young specimens are much the colour of orange pulp. In about ten days this gradually alters to dull purplish red, after which it daily becomes paler until almost colourless; then the skin slowly assumes a whitish hue, as if caused by a thin deposit, and becomes somewhat distended, and the head is raised a little; it is now perceived that a moult is about to take

place. As the skin whitens, and about the second, or early on the third day, it bursts underneath, but is not thrown off for some time, the period depending greatly upon the host, which, if lively and inclined to hop, or open and close its wings freely, may loosen it and cause it to fall after the third or fourth day, but it may remain attached to the larva's back for a week. As the old skin bursts, and is forced outwards and upwards, only a portion of the new one can at first be seen, but that which is exposed is perfectly naked, and the colour is temporarily darker; **the whole new skin is at this time bare, for I have lifted the old one to make sure**, and, as the old one comes away at the sides, in the course of a few hours the gradual whitening process is repeated, this time, however, developing into the unique and dense coating. It is impossible to ascertain how long this is in forming, once it becomes quite white, but it evidently takes several days, for by then the larva appears to have doubled its size. During this development the old skin is slowly pushed and folded up along the sides, but it retains its shape above, and comes away when the new covering admits of its being dispensed with. This extraordinary growth is doubtless intended for various protective purposes, several of which I may suggest, as follows: as the naked larva, secure under the ample and close-fitting wings of the host, increases in growth, it would probably open the protecting wings a little, and thus be rendered liable to the attentions of ichneumons, so though the waxy growth opens the wings, in some cases considerably, before they are actually apart, the coating has become sufficiently dense to effectually shield the larva from those insects; being a soft little thing, it may require some protection from the wing pressure, which the covering affords; further, it keeps the larva dry in all weathers, assists to whiten the cocoon and render it waterproof, and gives it, when parted from the host, the appearance when moving of a mealy bug, or when still of a waxy scale. Upon removing and examining some of this waxy coating it is found to compare with that borne by various species of *Fulgoridae*, and with which several of them cover their ova deposits; if touched with a pointed instrument it comes away in little tufts; these viewed through a lens prove to be composed of numbers of delicately thin, short, and glistening white hairs, which, rubbed between the fingers, leave the merest trace of white—are almost rubbed out of existence.

"A blade of grass, a thin twig, or a leaf, may be selected to spin the cocoon upon; the larva could drop there by a thread; however, the overloaded host is often in the grass,—perhaps tumbles there in essaying a leap. So the larva spins upon whatever it may drop or crawl on to. It is very sluggish, and not meant for much wandering, a distance of several inches being the usual extent of its journeys; it often remains for hours in the one spot. Many times I have disturbed a larva when in the act of spinning, causing it to cease instantly, work in some cases not being resumed for a few (up to fifteen) hours; only lately a large larva which, through being shaken, ceased spinning late one afternoon, when the sides and ends only of the cocoon were finished, did not resume operations until 11 a.m. next day; these long stoppages have invariably included all the hours of night.

"The cocoon is a pretty and neat little object, which requires the powerful glasses, and the pen, of the advanced entomologist to view and describe it and its construction in a satisfactory manner; however, I shall attempt the task. It may pass equally well for a waxy scale, a mealy bug, or a little flower; perhaps it is best compared to a flower, for the ornamentation certainly suggests one,

with two petals expanded and several others partly opened; these differ in number, the total varying from four to six. After preparing the foundation of the cocoon the caterpillar quickly builds up the sides; after these one end, or the first "petal" is spun, then, turning about, it spins another, thus forming the other end. Commencing about half way down one of these, a portion of the top of the cocoon is added, the web being continued on and outwards to form the third "petal." Finally, there are generally five of these, the centre two being as if about to open. This ornamental work ends in the centre, the last two petals, which are somewhat curled, being drawn together and fastened. The spinning of the "flower," after completion of the foundation, takes some ninety or a hundred minutes, rather longer by the larger larvae, but there are several stoppages, for the insect in its various turnings pays much attention to the bottom and ends of the structure. So far this web is composed of row after row of loops, or rings; each row runs very evenly, and is spun under the preceding one, and joined to it all along about or a little below the centre, so that a row scarcely projects half its height beyond the one spun before. When a row of loops is finished the next is commenced where that ended,—the work going on alternately from side to side. The web is formed at a rapid rate, 95 to 115 loops being spun per minute by small larvae, a lesser number by larger. When spinning, the actions of the larvae are so peculiar that they cannot fail to attract attention, for the head, in moving up and down, is thrown much farther back, and thrust much more underneath, than apparently necessary; but it is soon ascertained that these extended movements are made with a special object, and that is to give a partial coating of the waxy substance to the web, for it will be seen that the head is supplied with short hairs, and as it is thrown back they touch the wax—already becoming slightly loosened, and in woolly-looking tufts, owing to the insect's various twistings and turnings,—and little masses are caught upon them, which gradually transfer the substance to the loops by being purposely and regularly brought into contact with them as the head moves up and down. A little of the stuff, here and there, also becomes dislodged, and adheres to the fabric wherever it touches. By the time the "flower" is completed the waxy matter has disappeared from the first thickly clothed segment, and often quite from the next, as well as small portions from the sides. The whole of the balance is then worked into the threads of the cocoon proper underneath; not a particle seems to be left upon the larva when the spinning is completed. When the "flower" is finished the larva can be seen but indistinctly, therefore its actions cannot be followed, but the restricted space would scarcely admit of the headwork referred to, so the waxy matter must be rubbed or pressed between the threads as the cocoon progresses.

"Should a cocoon be knocked sharply, or torn asunder, little clouds of white powder fly off, or a cocoon will leave patches of white upon anything with which it comes in contact. The ichneumons all issue from the one hole, and the earlier ones to emerge are finely powdered.

"It will be noted that the cocoon has a wide "frog-mouthed" slit, and that the pupa shell protrudes therefrom. The mouth is forced open by the pupa, but closes down upon the end segments, holding them securely enough to enable the moth to burst the shell and escape. Several other species, including the one referred to in these pages, which I have bred, but which, however, are ant associates, form these "frog-mouthed" cocoons, and the moths emerge in a similar manner.

"The moths emerged from thirteen to eighteen days from the time they commenced to spin, appearing about midday. They expand from 5 mm. in ♂♂ up to 14 mm. in the larger ♀♀. Those from the white Fulgorid are smaller than examples from the others.

"It is most difficult to cause the larvae, or the little white waxy *Fulgoridae*, to adhere to card, but by rubbing the thin deposit from the latter they can be fastened down on their backs, with wings spread to show the attached larvae. The larvae with their hosts will not sink in formalin solution; owing to the lightness of the "wax," and to its being impervious to moisture, they float like corks, so can only be thrust under and held there: a piece of wadding pushed down upon them in the tubes keeps them immersed."

"The caterpillars do not appear to cause the death of their hosts (or, if so, not for some weeks), which, when free from them, become as lively and healthy-looking as ever; then does not the presence of the second caterpillars on some specimens help to bear this out? Many times, when a matured larva has departed to spin, I have found a much smaller one, of whose presence I had not been aware; but there is another parasite, an external ichneumon, which exists upon the black Fulgorid and several larger species (there are usually three to five, each enclosed in a thin dark shell), and when they break through their shells and drop off the host dies. I have actually had one of these parasites upon a Fulgorid carrying a fair-sized moth larva, but mislaid it or inadvertently sent it away. (*Note.*—These ichneumons remained in pupae about four months; one is now sent with other specimens—July 1905.)

"I have yet to learn where the eggs* of the moths are deposited. If adjacent to spots where hoppers may then be, the newly hatched larvae would frequently have to wander for some distance to find them, for they would scarcely remain stationary for days; besides, the larvae are too soft and sluggish to be fitted for much wandering, so I believe that it will eventually be ascertained that the eggs are deposited, singly only, upon the hoppers; however, the snouted and black species average many more larvae in proportion to their numbers than the white, and about as many as the green, moreover they are not such stationary insects as the last two. The white species is extremely common, the green and the black much less so, and the snouted one is comparatively quite rare. The last I meet with upon two kinds of small trees only, seldom more than three or four upon a tree, and usually far apart, yet it is the most productive species for caterpillars. Again, there is a fifth Fulgorid, which is common, and often in company with the white and green insects, yet I have never found a larva upon this one; so, if the young things have to search for their friends, it seems strange that this species should escape, for it is rather a stationary one. Again, out of six snouted insects on one tree, four were taken possession of by fine large caterpillars; and another tree, whereon were green hoppers, also furnished a number of large specimens, all of these two lots being very even in size. If the eggs are deposited on leaves or twigs, of course by various moths and at different periods, why is it that **several** larvae of different sizes are not often met with on the same host? or how can the tiny larvae distinguish between the suitable and unsuitable specimens of species of *Fulgoridae*? one never carrying larvae, and, of the four favoured species, only

* The egg is about twice as long as wide, ovate, being narrowest at the micropyle end, widest at the opposite pole; apart from the circular groove at the micropyle pole, the egg is smooth but not polished.

the pupae of two also being burdened with them. Pupae of the white insect are evidently too small and rounded to be patronised, and though the pupae of the snouted insect are rather too rare to admit of a decided opinion being formed, they would not, I think, make suitable hosts. I have examined likely foliage and twigs, and also many of the hoppers, without finding eggs; those sent were from my boxes. In support of my belief I may add that the caterpillars of the other parasitical lepidopteron, referred to several times, are found promiscuously on larvae, pupae, and imagos, all being likely to carry several of different sizes, some of the imagos having as many as **six** or even **eight** affixed to them; but the moths lay their eggs on the trees where the hosts abound, and the little caterpillars are active, and often travel considerable distances to find their friends. These caterpillars have **two** stages, the first being passed on Homoptera in the open air, the **second** being passed in ants' nests underground, where they live, still by suction, upon the ant larvae.

"I now give particulars of three Fulgoridae, with attached larvae, which I kept in glass jars for several weeks for the purpose of close investigation. Though I often changed the jars, to ensure pure air for hosts and parasites, and supplied succulent shoots regularly for the former, the long imprisonment evidently affected the caterpillars, and doubtless somewhat shortened the lives of the hosts. It will be observed that the caterpillars abandoned the hoppers within a week of their final moult, but many quite white examples, which were taken in the bush, have not left to spin until ten or even twelve days after their capture.

"No. 1. PUPA OF GREEN FULGORID.*

1903.

July 12. Taken with large white caterpillar.
„ 15. Caterpillar left and spun cocoon.
Aug. 8. Host died.

"No. 2. ALSO PUPA OF GREEN FULGORID.*

July 8. Taken with reddish larva. Perhaps age about 12 to 14 days.
„ 10.) Paler.
„ 11.)
„ 12. Very much paler.
„ 13. Skin whitish and distended.
„ 14. „ „ „ very much distended.
„ „ 3 p.m. Skin split underneath, partly exposing naked new one.
„ 15. 9 a.m. Skin opened a little more, naked parts whitening.
„ 16. „ Skin further opened and rising. Exposed parts of new one well whitened.
„ 17. „ Skin adhering only at terminal segments. New one; very white.
„ 19. Larva dropped by a thread and spun cocoon.
Aug. 10. Host still alive.
„ 12. „ sickly.) Paper was despatched on 10th instant, these particulars
„ 13. „ died.) being sent on afterwards.

* Belonging to the subfamily *Flatinae*.

"No. 3. SNOUTED OR CLEAR-WINGED FULGORID IMAGO.*

July 8. Taken with pale reddish larva near thorax. Estimated age 13 or 14 days.
„ 9. Lying lengthways.
„ 10. Paler. Curled against thorax.
„ 12. Larva again lengthways, nearer extremity of host's abdomen.
„ 13. 9 a.m. Head raised; moulting.
„ 14. Skin whitening and distended. A small object, which I could scarcely discern for several days, now proves to be a caterpillar.
„ 15. Head lowered, skin burst; a little of new one showing.
„ 16. Old skin rising. Exposed parts of new one whitening. 2 p.m., skin off.
„ 17. Very white.
„ 20. Abandoned host and commenced to spin.
„ 22. Small larva noticed on 14th instant now darkening; it cast a skin five days ago, which lies under the wings and is not obtainable.
„ 23. Preparing to moult.
„ 26. Skin cast.
„ 29.–30. Moulting again.
Aug. 2. Skin cracked underneath and raised from head. Host died, and with larva preserved in formalin.

"The pupae possessed a good deal of the waxy matter during and after the presence of the caterpillars, and one twice put forth two white wavy and delicate tails, which in time fell away and adhered in fragments to the leaves in the jars.

"I omitted to mention that I had never seen *frass* of the caterpillars, but in all probability the discharges are liquid, and would at once roll off the waxy bodies of the hosts. The other parasitical caterpillar, to which I have referred more than once, emits only liquid matter."—Frederick P. Dodd.

* *Dictyophora praeferrata* Dist.

Mr. Dodd is to be heartily congratulated on these very interesting observations.

NOTES ON THE *SIPHONAPTERA* FROM THE ARGENTINE DESCRIBED BY THE LATE PROFESSOR DR. WEYENBERGH.

By K. JORDAN, Ph.D., and the HON. N. CHARLES ROTHSCHILD, M.A., F.L.S., F.E.S.

WEYENBERGH in 1881 * described seven species of fleas. Though every name is enumerated in the *Zoological Record* (of the Zoological Society of London), they have all been overlooked by subsequent authors. The descriptions in question do not give those characters which are essential for the recognition of species, the absence of all figures being, moreover, a great disadvantage in this publication. We have, therefore, abstained in former papers from trying to identify any of Weyenbergh's species with those we have from South America.

Professor Dr. Doering, of the University of Cordoba, Argentina, has most kindly sent us a set of cotypes of all the species described by Weyenbergh, and we take this opportunity of reiterating our thanks to him. The specimens were glued on cardboard, as was formerly the custom. In order to examine them carefully we had them mounted in balsam. Some of Weyenbergh's names, as we expected, refer to species described later by other authors, while some others apply to species already described before Weyenbergh, one other again designating a species which has not been rediscovered.

In the present paper we discuss in detail all the following species described by Weyenbergh as new in the paper mentioned and in a previous one: †

Pulex grossiventris,
Ceratophyllus rufulus,
,, *isidori*,
Pulex (*Hectopsylla ?*) *testudo*,
Pulex nasuae,
,, *obscurus*,
,, *concoloris*,
,, *cavicola*.

Family *SARCOPSYLLIDAE*.

The family comprises three genera: *Dermatophilus* Guér. (= *Sarcopsylla* Westw.); *Echidnophaga* Olliff (= *Argopsylla* Enderl. = *Xestopsylla* Baker), and *Hectopsylla* Frauenf. (= *Rhynchopsyllus* Haller).

Karsten (1864) employed the name *Rhynchoprion* Oken instead of *Dermatophilus* (= *Sarcopsylla*) for the Chigoe, and Baker followed suit in 1904 and 1905, calling the family *Rhynchoprionidae*. We remark (1) that *Rhynchoprion* Oken is preoccupied by *Rhynchoprion* Herm. ‡), and (2) that *Rhynchoprion* Oken was not a term proposed for the Chigoe, but for mites—the Chigoe, which Oken knew only from figures and descriptions, being provisionally put into the same genus, not as *Rhynchoprion penetrans*, but as *Pulex penetrans*. Whatever rules of nomenclature one adheres to, *Rhynchoprion* cannot possibly be retained for Linné's *Pulex penetrans*. Baker calls *Rhynchoprion* "the older and only correct name"; but did he compare Oken, *Natury*. iii. p. 402 (1815)?

* *Periódico Zoológico* iii. pp. 261-77 (1881).
† *Bol. Ac. Nat. Cienc. Argent.* iii. p. 188 (1879).
‡ 1804. *Mémoire aptérologique*. The name is proposed for certain mites.

Our *Sarcopsyllidae* comprise Baker's *Rhynchoprionidae* and *Hectopsyllidae*, Baker's family distinctions being erroneous, as we have pointed out in a paper on the *Sarcopsyllidae* now in press. Weyenbergh described one species of this family as *Pulex* (*Hectopsylla ?*) *testudo*. The species is the same as Frauenfeld's *psittaci*.

1. Hectopsylla psittaci.

Hectopsylla psittaci Frauenfeld, *Sitz.-Ber. K. Ak. Wiss., Math. Naturw. Classe* xl. p. 462 (1860).
Pulex (*Hectopsylla ?*) *testudo* Weyenbergh, *Periód. Zool.* iii. p. 267 (1881).
Rhynchopsylla pulex, Taschenberg, *Die Flöhe* p. 56. t. 1. fig. 6. 6a. 7 (1880) (partim ; *H. psittaci* = *R. pulex*, mistake).

The species is easily recognised by the non-angulate head, the comparatively short maxillae, which are somewhat curved forward, and by the legs. The fifth segment of the fore- and midtarsi bears on each side seven or eight spines, the number being on the hindtarsus sometimes reduced to six. The two specimens of *testudo* which we received differ from other specimens in the first hindtarsal segment bearing on the hinder side a pair of bristles beyond the middle, these bristles being, however, absent from one hindtarsus in one of the two specimens. As the individuals which Frauenfeld described as *psittaci* have no hindtarsi preserved, it is not possible to say if typical *psittaci* possess those bristles or not. There are perhaps two geographical races, one inhabiting Chili and Northern Argentina (*psittaci* = *testudo*) and the other found in Brazil. However, the material we have is not sufficient to decide the question.

The insect described by Haller as *Rhynchopsyllus pulex*, though belonging to the genus *Hectopsylla*, is very different from *psittaci*.

H. psittaci has been found on American birds (*e.g.*, *Psittacus* ; *Strix perlata*). In the aviary of the Zoological Gardens in London the species has been found on Shama and Dhyal birds, the insect doubtless having been introduced with some American bird.

Family *PULICIDAE*.

Genus MALACOPSYLLA.

Malacopsylla Weyenbergh, *Periódico Zool.* iii. p. 271 (1881) (type : *grossiventris*).
Megapsylla Baker, *Journ. N. York Ent. Soc.* vi. p. 53 (1895) (type : *grossiventris* + *agenoris*).

The genus was proposed by Weyenbergh for *Pulex grossiventris* Weyenbergh. This species has not been recognised with certainty by any of the authors who have written on the genus *Malacopsylla*. We have a *male* and two *females* from Weyenbergh's collection, and possess also types or cotypes of all the other species hitherto described, and are therefore able to revise the genus. We propose giving a short review of what has been written about this genus after Weyenbergh's publications. The first author who had an opportunity of examining specimens of *Malacopsylla* was Baker (1898). Not being aware that there was a valid generic name for these peculiar Siphonaptera, Baker created the generic title *Megapsylla* for the same, basing his description on what he called *Pulex grossiventris* Weyenb. This *grossiventris* of Baker, however, consisted of two species, one with a thoracic comb and one without such a comb. Baker erroneously believed this difference to be sexual, his *female* having a comb and his *male* being without it. We pointed

out this mistake in 1904, describing a comb-bearing species as *Malacopsylla agenoris* and a combless species as *androcli*, adding that these species were presumably the same as Baker's. We had some doubts about *androcli* being distinct from Weyenbergh's *grossiventris*; but as we could not be certain from the description whether our insect agreed with *grossiventris* or not, we thought it wiser to consider it new rather than to describe it as *grossiventris*, and thus perhaps render the synonymy of the latter more involved. On now comparing Weyenbergh's specimens with ours, we find that there is no difference whatever between *grossiventris* and *androcli*.

The year before we published the descriptions of *M. agenoris* and *androcli* (= *grossiventris*) another *Malacopsylla* had been described by Wahlgren as *Megapsylla inermis*. We have a pair of this *inermis*, cotypes, received from the Stockholm Museum. Though the author described the head of *inermis* as not being armed with a frontal tubercle, we find that the tubercle is present. We fail to detect any differences between *inermis* and *grossiventris* (= *androcli*).

In a recent paper on American Siphonaptera, Baker enters into the question of the specific distinctness of *agenoris*, *grossiventris*, *inermis*, and *androcli*. He agrees with us that the comb-bearing *agenoris* stands quite apart, but we do not understand his statement that what he originally called the *male* of *grossiventris* "turns out to be *agenoris*"; for in 1898, and again in 1904, it was said to be the *female* which had a prothoracic comb. We gather from the remark "a proper *male* was found for the *female* previously called *grossiventris*" that the material referred to as *grossiventris* by Baker in 1898 and 1904 consisted of both sexes of two species. The non-combed species Baker accepts in 1905 to be the true *grossiventris*. The assumption appears to be correct according to Weyenbergh's specimens before us. He is further right in considering *inermis* Wahlgren to be identical with *grossiventris*. But Baker is in error when treating *androcli* as distinct from *grossiventris*. His opinion is based on two points: the rostrum of *androcli* is said by us to reach almost to the apex of the forecoxa, which is not the case in *grossiventris*. Now, we were misled to make that statement by a mounted *female* in which the labial palpi reach, in consequence of pressure, beyond the apical third of the forecoxa. The rostrum of *androcli* is not longer than that of *grossiventris*. The second distinguishing character on which Baker relies refers to the genitalia. The finger of *grossiventris* is said by Baker to be obliquely truncate, while that of *androcli*, according to our figure, "evenly narrows to a rounded tip," Baker adding that the figure given by Wahlgren exactly "represents this condition of *grossiventris*." Our figure and that of Wahlgren are indeed very different, but the finger in the specimens of *inermis*, *androcli*, and *grossiventris* is nevertheless the same. We find our figure quite correct, except that the finger is a trifle too long. Wahlgren and Baker did not see the proper outline of the finger. What they considered to be the ventral outline of the finger does not belong to the finger. We give here a diagram taken from a cotype of *inermis*. Apart from some detail not shown in our previous figure, it will be observed on comparison that there is no difference.

In June 1905 a fifth specific name for a *Malacopsylla* was published by

Enderlein for a species supposed to be different from *grossiventris* (and *androcli*). The figures accompanying the description of this *M. tolypeutis* are very good, although there are some errors in the details—as, for instance, the wrong position of the dorsal bristles of the hindtibia in the ♂, the cylindrical shape of the second and third foretarsal segments, the absence in the ♂ of a line of separation between the eighth abdominal tergite and sternite, the number of bristles in the pronotum, etc. The finger is drawn essentially as in our figure (of 1904), but the ventral line is a little too straight, and hence the ventral distal angle rather too pronounced. This *tolypeutis* is again the same as *grossiventris*. By the description of *tolypeutis* our attention has been drawn to an inaccuracy in our figure of the fifth tarsal segment of *grossiventris* (= *androcli*). We described the segment as bearing on the dilated apical portion a bristle, a spine, and a subapical bristle ; instead of this spine there is in the figure a slender bristle. We regret not having noticed the mistake when correcting the plate.

The result of our comparison of types and cotypes of all the *Malacopsylla* described is that so far only two species are known to exist: one with a pronotal comb—*agenoris*, and one without—*grossiventris* ; the synonymy of *grossiventris* being as follows :—

2. Malacopsylla grossiventris.

Pulex grossiventris Weyenbergh, *Bol. Ac. Nat. Cienc. Argent.* iii. p. 188 (1879) ; Taschenb., *Die Flöhe* p. 101 (1880).

Malacopsylla grossiventris Weyenbergh, *Period. Zool.* iii. p. 271 (1881) ; Rothsch., *Nov. Zool.* xi. p. 603 (1904) ; Baker, *Proc. U. S. Nat. Mus.* xxix. p. 125 (1905).

Sarcopsylla grossiventris, Baker, *Can. Ent.* xxvii. p. 21 (1895) (partim).

Megapsylla grossiventris, id., *Journ. N. York Ent. Soc.* vi. p. 53 (1898) (partim) ; id., *Proc. U.S. Nat. Mus.* xxvii. p. 376 (1904) (partim).

Megapsylla inermis Wahlgren, *Arkiv Zool.* i. p. 194. t. 9. fig. 11–15 (1903).

Malacopsylla androcli Rothschild, *Nov. Zool.* xi p. 604. no. 2. t. vii. fig. 10, t. viii. fig. 11. 12. 14. 15 (1904) ; Baker, *Proc. U.S. Nat. Mus.* xxix. p. 125 (1905).

Malacopsylla tolypeutis Enderlein, *Zool. Anz.* p. 139. fig. 1–6 (1905).

The species has been found in Argentina and Brazil on *Dasypus sexcinctus*, *conurus*, and on *Canis griseus*.

Genus RHOPALOPSYLLUS.

Rhopalopsyllus Baker, *Proc. U.S. Nat. Mus.* xxix. p. 128 (1905) (type : *lutzi*).

The genus is characterised by Baker as follows :—

"Head without ctenidia, broadly rounded above and in front. Labial palpus four-jointed. Pronotum without ctenidial spines. Legs stout and thick-set ; hindcoxa on innerside without a comb of minute teeth. Female with one antepygidial bristle on either side."

This definition covers a great many Old and New World *Pulicidae* which are by no means nearly related to one another. We think a classification of such a difficult group of insects as the Pulicids should be based on the examination of the greater proportion of the species so far known, not on a portion of the American Siphonaptera only, as is practically the case in Dr. Baker's paper. However, no harm is done by the creation of a number of generic terms as long as they are accompanied by some kind of definition and the indication of the type

species. At our present state of knowledge of the existing forms of Siphonaptera any detailed classification of the fleas must be premature. We know only such a small percentage of the species actually in existence that to try to divide the Order into a series of families and subfamilies must sooner or later prove itself to be but an abortive attempt.

Dr. Baker, however, in differentiating his *Rhopalopsyllus* from Enderlein's *Parapsyllus*, does so only by the number of the segments of the labial palpus. We are, in fact, presented with a puzzle, both nomenclatorially and morphologically. *Rhopalopsyllus* is said to be characterised by a "four-jointed" labial palpus, and *Parapsyllus* by a five-jointed one. Now, the type of *Rhopalopsyllus*, namely *lutzi*, is described by Baker as having apparently a six-jointed labial palpus! Therefore the position is this: (1) The American *Pulex* are certainly generically different from *irritans;* (2) The character by which *Rhopalopsyllus* is said to be distinguished from the nomenclatorially older genus *Parapsyllus* does not exist in the species specified as type.

The confusion has further been intensified by treating, as Baker does, all American *Pulex* without genal and thoracical combs as having a "four-jointed" labial palpus, regardless of the descriptions. Now, of the nine species enumerated by Baker under *Rhopalopsyllus* only one single one has a four-jointed labial palpus. In our descriptions of *cocyti*, *australis*, etc., it has been expressly stated that the labial palpus consists of five segments. We did not mention the rostrum of *cleophontis* in our description. We now add that the labial palpus of this species has six segments, the underlip itself being very short. In one of the specimens the fourth segment is further divided on the hinder side only, indicating that there may exist specimens of *cleophontis* with seven segments in the labial palpus.

As we do not know Baker's *lutzi*, we are not in a position to give a rectified diagnosis of Baker's *Rhopalopsyllus*. We also abstain from proposing a new generic term for any of the eight American *Pulex* we have before us. The erection of new genera in this order of insects should be limited as far as possible; at any rate, the characterisation of new genera should not be attempted without comparison of the various allied species from different faunistic regions. In this regard we are in perfect agreement with what Dr. Baker says on p. 123 of his recent paper.*

Weyenbergh described one species of the group of *Pulicidae* under discussion. We have two *females* of this *Pulex cavicola*, which, on examination, prove to belong to the species which we have described in 1904 as *Pulex concitus* from two *females* obtained at Sucre, in Bolivia, the synonymy being as follows:

3. Pulex cavicola.

Pulex cavicola Weyenbergh, *Periód. Zool.* iii. p. 274 (1881).
Pulex concitus Rothschild, *Nov. Zool.* xi. p. 615. n. 10. t. 10. fig. 38. 40 (1904).

Weyenbergh's specimens were obtained off *Cavia leucopyga* Bl., while ours were found on *Herodon boliviensis*. We take the opportunity of supplementing and correcting the descriptions. The rostrum reaches well beyond the trochanter of the foreleg, the labial palpus consisting of five segments. The third segment of the maxillary palpus is about one-third the length of the fourth, or a little over one-third, the fourth being a little longer than the second. The frons of the head bears a groove near the oral angle, appearing as an incrassation of the skeleton in

* *Proc. U.S. Nat. Mus.* xxix. p. 123 (1905).

a side-view (on slide). In this groove, which is present in all the species we have from America, there is an acute, somewhat heart-shaped, tubercle, which lies, in most species, usually concealed in the groove, but often projects a little when the specimen is compressed. There is one (not two) long bristle beneath the eye near the ventral edge of the head.

The fifth segment of the foretarsus is oblong, being hardly half as long again as it is broad. The basal projection of the claw of this segment is very large, being at least half the length of the claw. There are ten bristles on the outer surface of the hindtibia.

We do not know the *male*.

Pulex lutzi Baker, *Proc. U.S. Nat. Mus.* xxvii. pp. 378 and 380 (1904), from Sao Paulo, off *Grison vittata*, appears to be a closely allied species. The second and third abdominal tergites, however, are described as bearing no minute apical teeth, and the anterior row of bristles on the abdominal tergites 3 to 7 is described as being represented by only one or two bristles on each side.

Genus CTENOCEPHALUS.

Ctenocephalus Kolenati, *Fauna Altvat.* p. 66 (1859).

This genus comprises only the dog and cat fleas. After having pointed out the differences between these two insects [see *Ent. Rec.* xiii. p. 126 (1901) ; *Nov. Zool.* xi. p. 192 (1905)] we are rather surprised to see in Baker's recent paper a note to the effect that he is convinced that *canis* and *felis* are the same insect. As the differences in the head of these two fleas are so very conspicuous that they can be distinguished at a glance from each other, we can explain Baker's contrary opinion only by assuming that he has seen but one of the two fleas—probably *C. felis*.

Weyenbergh had specimens of both *canis* and *felis*. We have received two specimens labelled as *canis*. They belong to the short-headed species—*i.e.* they are true *canis*. We have not seen specimens named *felis* by him in *Periódico Zool.* iii. p. 276. No less than *four* of his new species, however, belong to *felis*, according to the specimens received ; the synonymy being as follows :

4. Ctenocephalus felis.

Pulex felis Bouché, *Nova Acta Ac. Leop. Carol. Ges. Nat.* xvii. 1. p. 505 (1835).
Pulex parviceps Weyenbergh, *Bol. Ac. Nac. Sc. Aryent.* iii. p. 202. (1879) (nom. nud.).
Ceratopsyllus rufulus id., *Periódico Zool.* iii. p. 265 (1881) (on *Cervus rufus* ; "*P. parviceps* this species").
Pulex nasuae id., *l.c.* p. 272 (1881) (on *Nasua socialis*).
Pulex obscurus id., *l.c.*, p. 273 (1881) (on *Canis azarae* and *gracilis*).
Pulex concoloris id., *l.c.*, p. 274 (1881) (on *Felis concolor*).

As the insect varies a good deal in size and depth of colour, Weyenbergh was led astray by such individual distinctions. Weyenbergh laid also too much stress on the general outline of the body, describing the fleas much in the same way as beetles, for instance, are described. The descriptions accompanying the above-quoted names contain many inaccuracies, though Weyenbergh apparently examined the specimens microscopically. What he calls the comb of the metanotum is of course that of the pronotum.

We have received a *female* of *rufulus*, two *females* of *nasuae*, a pair of *obscurus*,

and a pair of *concoloris*. All these specimens have the long pointed head of *C. felis*. The *female* of *obscurus* shows an interesting anomaly, the spine at the apex of the genal process being double on one side of the head.

Family *CERATOPSYLLIDAE*.

Ceratopsyllidae Baker, *Proc. U.S. Nat. Mus.* xxix. p. 124 (1905).

The bat fleas are so different in organisation from the other Siphonaptera, and *inter se* so much alike, that we agree with Dr. Baker in treating them as a distinct family. There is only one genus of bat fleas recognised at present. The first valid name for this genus is *Ischnopsyllus* Westwood. Hitherto Curtis's name *Ceratopsyllus*—altered into *Ceratopsylla* by most authors (philologically perhaps a correction, but nomenclatorially a misspelling)—has been employed instead, Kolenati being usually cited as author of *Ceratopsyllus*. As nobody appears to have looked up the literature on this point, accepting without protest the erroneous nomenclature for the bat fleas, we quote here what Curtis wrote about *Ceratopsyllus* and Westwood about *Ischnopsyllus* in 1833, 1838, and 1840. Criticising Curtis's genus *Ceratophyllus* in *Ent. Mag.* i. p. 359 (1833), Westwood states that *Ceratophyllus* can scarcely be considered to be well founded, the distinctions based on the antennae not holding good. And he proceeds to say, on page 362: "The species, however, figured by Mr. Curtis, *C. elongatus*, as well as *C. vespertilionis*, and probably *C. bifasciatus* and *Pulex musculi* Dng., together with a Chinese species, which has been kindly presented to me by the Rev. Leonard Jenys, exhibit a general form so different to that of the other fleas, that I cannot help thinking them, on that account, entitled to form a distinct group, for which (as the name *Ceratophyllus* must likewise be rejected in consequence of having been previously employed in botany) the generic name *Ischnopsyllus* may not be deemed inapplicable; the characters of which I propose to detail in a memoir, upon which I am at present occupied, upon Bat Parasites." This promised memoir was never completed, only a monograph of the genus *Nycteribia* appearing in 1835 (*Trans. Zool. Soc. Lond.*). But we find a more precise statement of what *Ischnopsyllus* was meant to stand for in Westwood's *Introd. Classif. Ins.* ii. p. 124 (1840). There we read:

"*Obs.*—Ceratopsyllus *Curt.* (Ceratophyllus *Curt., B.E.*) consists of species in the type of which the antennae are inserted on each side of the head, concealed in a cavity behind the eye when at rest, and as long as the head, four-jointed"; but other species introduced into the genus are described by Curtis as differing entirely in this respect, hence the character derived from the antennae appears to me to be merely specific. Some of the species, however (*P. vespertilionis* and *elongatus*) being of a much more slender general form, I have proposed for them the generic name of *Ischnopsyllus* (*Ent. Mag.* No. 4)."

Meanwhile (1838) Curtis had altered the original spelling of the name *Ceratophyllus* into *Ceratopsyllus*; this explains the appearance of "Ceratopsyllus *Curt.*," in the above quotation from Westwood's book. In volume xv. of the *British Entomology* Curtis says,* under Errata and Addenda:†

"Folio 417 for *Ceratophyllus* read *Ceratopsyllus*. This name, which was compounded to express the peculiar structure of the horned fleas, was misprinted

* *British Entomology* xv. Index p. 2 (1838).

† In a letter dated Sept. 26th, 1901, Mr. G. A. Verrall drew my attention to this note.—N. C. R.

when the genus was established in this work, and it was not corrected, as the author intended, in the Guide."

From these quotations it will be clear (1) that *Ceratopsyllus* was merely a well-meant correction of the term *Ceratophyllus*; (2) that *Ceratopsyllus*, therefore, is an absolute synonym of *Ceratophyllus*, the type being stated by Curtis to be *C. hirundinis*;* and (3) that the correct name for the bat fleas is Westwood's term *Ischnopsyllus*.

Dr. Baker gives *Ceratopsyllus* priority over *Ischnopsyllus*, dating the former erroneously 1832. He quotes in *Proc. U.S. Nat. Mus.* xxvii. p. 432 (1904) as follows :—

> 1832. *Ceratopsyllus* Curtis, *British Entomology* x.
> 1833. *Ceratopsyllus* Westwood (*Ischnopsyllus*), *Ent. Mo. Mag.*, I. p. 359.

Both quotations are wrong. There is no reference to a bat flea in *British Entomology* x., which appeared in 1833, not 1832. Westwood in the *Entomological Magazine* (not *Ent. Mo. Mag*, the first volume of which was published in 1864-5) does not mention the term *Ceratopsyllus*, which, as said above, dates only from 1838.

Weyenbergh described one species of *Ischnopsyllus* :

5. Ischnopsyllus isidori.

Ceratophyllus isidori Weyenbergh, *Periód. Zool.* iii. p. 271 (1881).

The species is closely allied to *I. wolffsohni* Rothsch., *Nov. Zool.* x. p. 321. n. 5. t. 9. fig. 13, t. 10. fig. 14. 15. 16 (1904). The frons of the head is rather longer and more pointed; the posterior row of bristles of the metanotum of the ♂ is normal, being similar in the sexes; the metanotum and first abdominal tergite are devoid of the two short spines standing in *wolffsohni* on each side at the apex of these segments, etc.

Found on *Vespertilio isidori* Gerv.

* Baker, *Proc. U.S. Nat. Mus.* xxix. p. 129 (1905), erroneously makes *gallinae* the type of *Ceratophyllus*.

NEW SPHINGIDAE.

By the HON. WALTER ROTHSCHILD, Ph.D., and KARL JORDAN, Ph.D.

1. Protoparce fosteri spec. nov.

♂. Close to *P. lichenea* Burm. (1856). No sharply defined line on mesothoracic tegula. Abdomen beneath pure white, mesial dots black; side-patches of tergites white, large. Pulvillus of claw-segments present, but small.

Wings, *upperside*.——Forewing narrower than in both *lichenea* and *florestan*; the interspaces between the black lines purer white; hairy patch at base restricted, more extended white; black longitudinal discal streaks R^3—M^2 rather longer than in *lichenea*; first and second discal line heavy, merged together as in *lichenea*, interspace between second and third line white from costal to inner margin, the third line crenate, well marked; interspace between third and fourth lines buffish white, especially the posterior portion of this interspace much purer buffish white than in the allied species; fifth line widened at costal margin to a large triangular patch; interspace between this patch and the oblique apical line buffish white. ——Hindwing more elongate than in *lichenea*; white from base to first band, except a large patch between cell and SM^2, this patch brown-black, continuous with the first band; interspaces between the three brown-black bands white posteriorly, sharply defined, the white colour gradually shaded over with brown anteriorly, but the interspace remaining distinct to costal margin.

Underside.——Forewing deeper black-brown than in *lichenea*; cell more washed with grey; two rather distinct brown-black lines on disc, the interspace between them and a band at the distal side of the second line greyish white, distinct; submarginal area also more extended grey than in *florestan* and *lichenea*. ——Hindwing: greyish-white; a heavy black line touching cell, curved basad on abdominal fold, more proximal behind than the corresponding line of the allied species; just outside this line a second one, dentate, rather thin, joining the first line at M^1; a third line farther distad, thin, partly obsolescent between the veins, very strongly dentate; marginal band well defined, about 5 mm. broad in middle, paler brown-black than first line; interspace between the marginal band and the third line about as wide as the band.

Tenth tergite broader vertically than in the allied species. Harpe in shape similar to that of *lichenea* and *florestan*, rather smaller, emarginate ventrally, its edge slightly irregular, non-dentate. Tooth of penis-sheath longer than in the allied species.

Length of forewing: 64 mm.

Hab. Sapucay, Paraguay, January 22, 1905 (W. Foster).

One ♂.

2. Euryglottis albostigmata basalis subspec. nov.

Euryglottis albostigmata Rothschild & Jord., *Nov. Zool.* ix. Suppl. p. 98 (1903) (partim; S.E. Peru).

♀. We received this form when our revision of the *Sphingidae* was in press. On comparing again typical ♀♀ of *albostigmata* we now find that the Peru

individuals differ in the hindwing being all white from the base to the first discal line, the costal area excepted.

Hab. S. Domingo, Carabaya, S.E. Peru, 6000 ft., March 1901 (G. R. Oekenden).

Two ♀♀.

3. **Protambulyx xanthus** spec. nov.

♂. *Upperside:* forewing as in *P. eurycles* Herr.-Sch. (1854), but posterior subbasal patch narrower, more oblique.——Hindwing: very pale chrome, paler than in *eurycles* and *euryalus*; lines as in *euryalus* R. & J. (1903), but the first line broader, standing closer to cell, and the marginal band narrower.

Underside deep maize-yellow; discal lines faint, except the first which is strongly marked on both wings; marginal band of forewing as in *eurycles*, extending to hinder angle as in that species, being much wider between R^1 and R^2 than in *euryalus*, and tapering to a point, ending at tip of SC^5.

Eighth sternite with short obtuse mesial lobe. Patch of friction-scales on clasper obliquely transverse, widest dorsally, similar to that of *eurycles* but longer.

Length of forewing: 60 mm.

Hab. Tuis, Costa Rica.

One ♂.

Perhaps a northern form of *eurycles*. Easily distinguished from *eurycles* by the third line of the hindwing above being curved as in *euryalus*, *sulphurea*, and *astygonus* (see *Nov. Zool.* ix. Suppl. p. 176 ff.), differing from the latter insects especially in the marginal band of the forewing being shaped as in *eurycles*.

4. **Compsogene panopus celebensis** subspec. nov.

♂♀. Forewing, *above:* interspace between subbasal band and patch of cell-bars narrower at costal margin than in Malayan and Indian specimens, the proximal bar of that patch more straight and heavier; brown marginal border symmetrical, evenly tapering at both ends, the black line bordering it non-dentate, the olive proximal border of this line much wider and much more evenly rounded; black discal band more oblique, almost parallel to margin, crossing subcostals distally of base of SC^5.

Underside: the proximal subapical costal spot larger, the line extending from this spot to inner angle less distinct or vestigial; marginal band almost evenly rounded, being much less strongly narrowed from R^2 forward and backward.

Hab. Tondano and Sawangan, North Celebes.

Two pairs.

5. **Polyptychus anochus** spec. nov.

♂. Upperside of palpus, head and thorax grey, of abdomen buffish grey; underside pale vinaceous cinnamon; tibiae grey on upperside, the grey streak of midtibia sharply defined, interrupted before middle. Legs, palpus, and antenna similar to those of *P. andosa* Walk. (1856) in structure.

Wings, *upperside*.——Forewing: apex strongly produced, distal margin deeply concave below apex, convex behind middle, inner angle projecting backwards; pinkish grey, markings clayish vinaceous cinnamon; a broad antemedian band consisting of several lines with the interspaces filled in, narrower behind, about as broad as the grey median interspace; this interspace denticulate, being bordered by

a thin brownish crenate line which curves costad ; the whole area between this line and distal margin clayish vinaceous cinnamon, bearing a row of ill-defined and rather indistinct grey patches which are situated proximally of a second discal crenate line ; this line extremely faint, being accentuated by vein-dots ; one small subbasal dot ; stigma a small ring with grey centre.——Hindwing pale salmon-buff, greyish at anal angle, indistinctly marked with brown ; anal angle more produced than in *P. andosa*.

Underside clayish salmon-buff ; two brown lines on disc of each wing, parallel, denticulate, curving costad.

Neuration : SC^2 and R^1 of hindwing on a very short stalk ; D^2 almost four times as long as D^3, very obliqne, slightly angulate ; D^3 a little shorter than D^1 ; lower angle of cell acute.

Genitalia : tenth tergite very different from that of the other species of *Polyptychus* in being completely divided into two very slender, pointed processes, which stand widely separate; tenth sternite broken, apparently broad, rounded-truncate. Clasper with elongate-ovate friction-patch dorsally ; no friction-scales on inner side of eighth tergite ; clasper strongly narrowed apicad, ending in an acute point which is bent downwards ; harpe with two processes ; one ventral, reversed, beak-shaped, being curved upwards and pointed ; the other much longer, irregularly triangular, obliquely longitudinal, tapering, somewhat irregular, curved inward. No distinct armature on penis-sheath.

Length of forewing : 28 mm.

Hab. Sierra Leone.

One ♂.

Similar in colour to *P. andosa*, *compar*, and *consimilis* (see *Nov. Zool.* ix. Suppl. p. 250), but widely different in the genitalia. Apex of forewing much more produced.

Libyoclanis gen. nov.

♀. Palpns much slenderer than in *Clanis* and *Pseudoclanis*,* segments 1 and 2 nearly equal in length, the joint between them not open. Antenna cylindrical. Tibiae spinose at apex ; spurs much shorter than in allied genera mentioned ; two pairs to hindtibia, the short spur a little shorter than the tibia is broad, half the length of the long one ; cell of hindwing truncate, both the upper and lower angles being about 90° ; SC^2 and R^1 on a short stalk.

Antevaginal ridge asymmetrical, produced into a process on each side, the processes being unequal in size.

Type : *L. bainbridgei* gen. nov.

Here belongs also *Clanis bicolor*, from Sierra Leone,† which we left provisionally in *Clanis* when revising the *Sphingidae*.

6. **Libyoclanis bainbridgei** spec. nov.

♀. Body tawny olive above, wood-brown beneath, sides of abdomen somewhat creamy, with an ill-defined white patch at base, upperside of tibiae and tarsi mummy-brown, stiff hairs at tip of abdomen yellow.

* See Revision of *Sphingidae*, in *Nov. Zool.* ix. Suppl. p. 220 (1903).

† *L.c.* p. 219.

Wings, *upperside*.——Forewing produced at apex into a prominent lobe, which is about 5 mm. long, measured from tip of SC^5; greenish clay-colour (more green when alive?); two faint straight oblique parallel lines, greyish, the second a little beyond base of M^2, the first about 6 mm. distant from it, these lines being the proximal borders of indistinct clay bands, a pale band across cross-veins, from costal to inner margin, widest between R^1 and R^3, including a small transparent stigma bordered with brown; an oblique brown line from apex to R^2, ending here in an indistinct brown patch; a small brown subapical patch at bend of costal margin preceded by a cloud of glossy grey scales; a small rosy red basal spot at inner margin.—— Hindwing rosy red, costal margin creamy white, distal margin tawny olive, this marginal band gradually widening behind and becoming paler, extending along abdominal margin to base, the hairs at base being creamy white.

Underside greenish buff, paler than upperside, creamy towards base.—— Forewing rosy red centrally from base beyond apex of cell; a brown line from apex obliquely beyond R^2.——Hindwing with large rosy red patch along abdominal margin; two greenish yellow lines across disc, at R^3 the distances between these lines, cell and distal margin, about equal; R^2 from centre of cell.

Vaginal ridge raised into a triangular tooth on each side, the right tooth being longer and broader than the left one.

Length of forewing: 67 mm.

Hab. Sierra Leone (Major Bainbridge).

One ♀.

We name this fine species in honour of the collector, from whom we have received several interesting captures.

7. **Pholus vitis fuscatus** subspec. nov.

Pholus vitis vitis, Rothschild & Jord., *Nov. Zool.* ix. p. 494. n. 418. a. (1903) (partim; St. Vincent; Grenada).

Having received a series of fresh specimens, we now propose a separate name for the form from the Lesser Antilles.

♀. Wings, *upperside*: pale markings of forewing more or less washed with brown, therefore less contrasting with the greenish olive-brown markings than in nearly all Continental specimens; subbasal band not distinctly edged with white; brown line situated within oblique grey discal band less distinct; marginal band broader, not edged with white.

Hab. Santa Lucia (S. Branch), *type*; Grenada; St. Vincent.

A series of ♀♀.

8. **Deilephila placida salomonis** subspec. nov.

Deilephila placida placida Rothschild & Jord., *Nov. Zool.* ix. Suppl. p. 512. n. 430. a. (1903) (partim; Guadalcanar and Florida).

♂. More uniformly olive, the markings less prominent; subbasal patch of forewing, *upperside*, hardly deeper olive than the ground-colour; median band less oblique than in *pl. placida*; its proximal edge less curved.

Hab. Solomon Islands; N. Georgia, *type*; Choiseul; Guadalcanar; Florida, 4 ♂♂, collected by A. S. Meek.

9. **Temnora angulosa** spec. nov.

♀. Body russet-brown above, tawny-olive beneath.——Wings, *upperside*: forewing russet-brown, this area sharply limited on disc, indented on the veins, dilated before and behind R^3, reaching posteriorly to inner angle and costally a little beyond apex of cell; disc outside the russet-brown area fawn-colour, apex washed with mars-brown; a thin brown line outside the basi-discal area, nearly following the curve of the outer edge of this area, which it joins behind M^1; distal margin biconcave, strongly angulate at R^2, the angle somewhat rounded.——Hindwing mummy-brown, entire.

Underside tawny olive, washed with mummy-brown.——Forewing mummy-brown in centre from base to disc; a faint line on disc; an equally faint line obliquely from apex, bordering a faint marginal band which is slightly deeper brown than the distal portion of the disc.——Hindwing with a faint denticulate line on disc, curved like distal margin, but standing farther away from it in front than behind.

Length of forewing: 32 mm.

Hab. Luluabnrg, Kassai, Congo Free State, September 1902 (Landbeck). One ♂.

10. **Xylophanes fosteri** spec. nov.

♂♀. Head and thorax olive above, with a pinkish grey side-stripe extending from tip of palpus to apical edge of mesothoracical tegula, edged with white behind, a brownish grey mesial streak on thorax only; a central line on tegula tawny; abdomen wood-brown above, greyish at base, clayish towards apex; this dorsal area bordered by an olivaceous line which somewhat widens basally; three indistinct dorsal lines; underside creamy buff in middle, buff shaded with tawny at sides. Outer spur of midtibia half the length of the inner.

Wings, *upperside*.——Forewing wood-brown shaded with sepia-colour; apex acute, distal margin entire, concave below apex; seven lines between cell and distal margin, first and second from inner margin to R^2, heavy, more or less merged together, the second being continued costad, but the upper portion very thin, third line thin, fourth accentuated by minute vein-dots, the line distinct from R^3 to apex of wing, fifth also distinct from R^3 to apex, indistinct from R^3 backwards, the upper portions of these two lines more or less contiguous, sixth feeble, seventh vestigial, lines 4 to 7 converging to tip of wing, lines 2 and 3 not reaching costal edge, disappearing in a pale wood-brown costal subapical space; a small black stigma; outside apex of cell a brown cloud which is continued behind R^2 to lines 4 and 5; a small blackish costal dot distally of subcostal fork, this dot being the costal portion of the first line.——Hindwing blackish brown; a dirty pinkish band on disc from anal angle to costal edge, which it does not quite reach, palest behind, being more or less washed with brown in front.

Underside pale ochraceous, with a faint tint of pink, irrorated with wood-brown.——Forewing brown centrally from base beyond apex of cell; a row of conspicuous black-brown vein-dots parallel to margin, curving costad in front, between this row and the cell a more or less vestigial line; distal marginal area pale wood-brown, this border angulate at R^2, reaching here the line of dots.——Hindwing: a wood-brown line at lower angle of cell, parallel to distal margin, curving costad in front, the line broad but rather faint; distally of this line and parallel with it a vestige of

a second line and then a row of small but distinct dots; distal marginal band wood-brown, tapering behind, brown behind M^2, the veins being more or less of the ground-colour.

Tenth tergite sinuate at apex, sternite long, with rounded apex. Harpe short, slender, tapering, with the apex curved upwards; a few very minute teeth at tip. Penis-sheath with an oblique row of teeth, the central portion of the row situated on a slightly elevated ridge, the portions at the right situated at the edge of an obtuse short process. Friction-scales large.

Length of forewing: ♂, 30 mm.; ♀, 33 mm.

Hab. Sapucay, Paraguay, February and October 1903 (W. Foster).

One pair.

Near *X. turbata* Edw. (1887) and *robinsoni* Grote (1865).

11. **Xylophanes dolius** spec. nov.

♂. Body as in *fosteri*, pale buff beneath. Outer spur of midtibia less than half the length of inner.

Wings resembling in shape those of *X. hydrata* R. & J. (1903). *Upperside* of forewing wood-brown, washed with olive, lines in the same position as in *X. hydrata*, fourth thin, deeper brown in upper half than the others, fifth vestigial between R^2 and M^2, ending anteriorly in a brown spot situated at apex; costal marginal area paler at apex than rest of wing; a rather large black stigma.——Hindwing: black-brown, with a narrow buff band from anal angle to costal margin, which it does not quite reach, being shaded with brown anteriorly.

Underside pale buff, somewhat pinkish on disc, irrorated with brown.——Forewing black-brown centrally from base beyond apex of cell; a rather heavy line just distally of lower angle of cell, somewhat incurved behind M^1, thin in front, ending in a costal dot; parallel with this line a row of dots, the costal dot being situated halfway between first line and apex; a marginal spot below tip of wing, produced discad into an oblique line; a heavy marginal double spot M^1—SM^2; all these lines and spots deep brown.——Hindwing: a curved line and a row of dots on disc; distal margin brown.

Clasper with about seven large friction-scales. Harpe very slender, curved upwards at apex, tapering, denticulate distally. Tenth tergite and sternite long, the latter with almost parallel sides and rounded apex.

Length of forewing: 31 mm.

Hab. Zamora, Ecuador (O. T. Baron).

One ♂, somewhat faded.

12. **Xylophanes cosmius** spec. nov.

♂. Body as in *X. amadis* Stoll (1782); basal lateral patch of abdomen less distinct, quite gradually fading away; abdominal tergites irrorated with brown scales, without line or dots. External spur of midtibia one-third shorter than inner.

Wings, *upperside*.——Forewing: apex produced, distal margin obtusely denticulate, deeply concave below apex, strongly convex in middle; wood-brown, washed with green, costal marginal area, a triangular space at outside of discal line from R^2 to apex, and inner margin more distinctly green than rest of wing; three greenish brown lines in basal half, curved, not reaching inner margin, outer two close together; a black stigma, outside which there is a greenish black patch,

transverse, rounded distally, straight proximally; a very conspicuous line from tip of wing to middle of inner margin, continued along the latter to base, apically more curved than in *amadis*, crossing R^3 at one-third the distance from cell to outer margin, greenish black, edged with grey proximally; traces of two lines proximally of it, these additional lines accentuated at costal edge by a spot each; a submarginal row of black vein-dots; fringe black at veins.——Hindwing black, a greenish buff band from anal angle to costal margin, which it does not reach, slightly incised at the veins; distal margin narrowly green; fringe spotted black at posterior veins.

Underside ochraceous salmon-buff, irrorated with brown; markings as in *amadis*, distal marginal band rather wider; black fringe-spots conspicuous on both wings.

Tenth tergite feebly spatulate, truncate; sternite triangular, with the apex rounded. Seven large friction-scales on clasper. Harpe slender, tapering, curved upwards at apex faintly denticulate at tip. Penis-sheath with a broad streak of numerous minute teeth on left side, the convex area on which this streak is situated rounded at apex and at right side produced into an obtuse process, which is as broad as long, being covered all over with teeth and being directed proximad.

Length of forewing: 40 mm.

Hab. La Union, Rio Huacamayo, Carabaya, S.E. Peru, 2000 ft., November 1904, wet season (G. R. Ockenden).

One ♂.

13. **Xylophanes chiron lucianus** subspec. nov.

Xylophanes chiron chiron, Rothschild & Jord., *Nov. Zool.* ix. Suppl. p. 699. n. 652. b. (1903) (partim; Sta. Lucia).

Having now seen several specimens from Santa Lucia, we find that this island is inhabited by a special subspecies, which, though similar to the one found in Jamaica, differs in several points.

♀. Upperside of body and forewing green, as in ordinary Continental individuals of *X. chiron chiron*; a brown or black mesial patch anteriorly on mesonotum. External spur of midtibia a little shorter than internal.

Wings, *upperside*.——Forewing broader than in the Jamaica and Continental forms; a green vestigial line from apex, proximally of this line a row of transverse black-brown dots on the veins from SC^5 to M^2, followed at inner margin by a triangular black-brown patch as in the other forms, these vein-dots partly connected with one another by vestiges of a brown line; no trace of a clayish patch either at costal margin or on disc.——Hindwing with three spots on disc, a fourth, anterior spot being faintly indicated; the anal and subanal spots as in the other forms.

Underside similar to that of the Continental subspecies. One heavy line on disc of forewing, the proximal line of the other two subspecies not being marked; brown proximal edge of marginal band heavy, the costal interspace between this band and the discal line wider than in the other forms.——Hindwing: a brown line on disc accentuated by vein-dots, a vestige of a second line close to cell; marginal band as broad as in the Continental subspecies.

Hab. Santa Lucia (S. Branch).

Several ♀ ♀.

14. Xylophanes chiron cubanus subspec. nov.

Xylophanes chiron nechus, Rothschild & Jord., *l.c.* p. 698. n. 651. a. (1903) (partim ; Cuba).

Fresh material from Cuba shows that there are several points of difference between Cuban and Continental specimens.

♂♀. Smaller than the Continental form ; antenna pinkish ; underside of body more rufous.

Wings, *upperside*.——Forewing proportionately shorter, the costal and discal clayish patches much smaller.——Hindwing : discal spots smaller, buffish.

Underside : on the whole more extended rufous ; the costal discal luteous patches of the forewing more restricted, the latter patch replaced by a dot.

Hab. Holquin, Cuba (Tollin ; Parish).

A small series.

15. Xylophanes pyrrhus spec. nov.

♂♀. Closely resembling *X. thyelia* L. (1758). Much larger. Forewing, *above* : the pale band bearing the double line wider than in *thyelia*, the line bordering this band distally gradually widening from tip of wing to R^3 ; distal margin less rounded than in *thyelia*.

Underside.——Forewing : with three lines across disc, the first heavy, curved in front, reaching costal margin about 4 mm. beyond subcostal fork, the second and third thin, close together but separate, curving costad in front, more proximal than in *thyelia*, the third being at SC^5 about 3 mm. distant from oblique apical line ; posterior portion of third line slightly dentate, the luteous streak standing at its distal side more irregular than in *thyelia* and thinner.——Hindwing : proximally of the double line a vestige of another line.

Length of forewing : 33 to 37 mm.

Hab. S. Domingo, Carabaya, S.E. Peru (G. R. Ockenden), a long series ; Merida, Venezuela (Briceno), one ♂.

We have a series of *X. thyelia* from various places, the range extending from S.E. Peru to Colombia, and eastwards to the Guianas and Trinidad.

NOTES ON BAT FLEAS.

By the Hon. N. C. Rothschild, M.A., F.L.S.

I.

In 1856 Kolenati described and figured an eight-combed flea which he had off various species of bats. The figure represents a ♂ bearing a mane of long hairs on the thorax. This species, named by Kolenati *octactenus*, is commonly found on the Continent and in England on the pipistrelle (*Vesperugo pipistrellus*), which is one of the hosts mentioned by Kolenati.

When Wagner, in 1898, published the result of his examination of the Siphonaptera contained in the Imperial Museum at St. Petersburg, where some of Kolenati's specimens are preserved, he made a mistake in respect to *octactenus* Kolen. Wagner found in the collection a ♀ of an eight-combed bat flea from Kolenati's collection. This ♀ he considered to be a typical specimen, which it may be. Now, Wagner had in his own collection two closely allied species of bat fleas—namely, a pair of one species and a single ♂ of the other. The pair Wagner identified with the above-mentioned ♀ from Kolenati's collection, while he described the single ♂ as a new species under the name of *C. jubata*. In this he was wrong. His *jubata* is the maned species figured in 1856 by Kolenati as *octactenus*.

Following Wagner, we have in some previous papers recorded the true *octactenus* (with the maned ♂) as *jubata*, and the other species as *octactenus*, both occurring in England. This second species being without a name, we now propose to call it

Ischnopsyllus simplex,

the synonymy of the two insects being as follows:

1. Ischnopsyllus octactenus.

Ceratopsyllus octactenus Kolenati, *Paras. Chiropt.* p. 31. t. 3. fig. 31 (1857); Rothsch., *Nov. Zool.* v. p. 543. n. 6. t. 14. figs. 7. 9 (1898).
Ceratopsylla jubata Wagner, *Hor. Soc. Ent. Ross.* xxxi. p. 584. n. 4 (1898).

2. Ischnopsyllus simplex spec. nov.

Ceratopsylla octactena Wagner (*non* Kolenati), *l.c.* p. 580. n. 1 (1898).

The differences between the ♂♂ of this species and the preceding have been ably described and figured by Wagner. The ♀♀ of the two species are best recognised by the difference in the length of the apical bristles of the metathoracical epimerum. This plate bears in *I. octactenus* Kol. one long and two short bristles, while there are in *I. simplex* one long and one short bristle.

The *Pulex vespertilionis* of Dugès (1832) is an eight-combed bat flea which may be identical with one of the later-described species. But Dugès's description is quite insufficient for recognition.

II.

In 1903 we described two North American bat fleas as *Ceratopsylla insignis* from Ontario, and *Ceratopsylla palposus* from British Columbia. Dr. Carl Baker, in his recent paper,* has added a third, named *Ceratopsyllus crosbyi*, from Missouri. This insect is shortly described in a "key" to the American bat fleas. As this "key" is misleading, we hope Dr. Baker will not take it amiss that we make the following comments. The insect is characterised by Dr. Baker as follows :—

"Ctenidia on segments I—VII of abdomen ; metatarsal article I with spines 7—8, and this segment as long as segments II, III and IV together ; mesonotum nearly twice the length of metanotum on the dorsal line."

Now, taking the characters in the same order as in this short diagnosis of *crosbyi*, we find that in the description of *insignis* the abdomen is stated to bear seven combs of modified bristles. The mesonotum of *insignis* we figured as being about twice the length of the metanotum. The tarsi were not described, as they did not present any striking differences from the other American species. On re-examination we find that the hindtarsus of *insignis* agrees with Baker's description of the hindtarsus of *crosbyi*. Therefore the diagnosis of *crosbyi* as it stands in Baker's paper offers nothing which does not also apply to *insignis*. Baker himself differentiates *insignis* from *crosbyi* by erroneously attributing only four abdominal combs to *insignis* instead of seven, as stated in our description. It is quite possible, however, that *crosbyi* is not identical with *insignis*.

III.—A New Bat Flea from Italy.

Ischnopsyllus gestroi spec. nov.

This species is allied to *I. martialis* Rothsch.,† but differs in many essential points.

Thorax.—There are fewer bristles on the meso- and metanotum than in *I. martialis*, there being no bristles immediately above the pleural plates. The metanotum and the first and second abdominal tergites bear one short apical spine on each side. The metathoracical epimerum has five or six bristles (2 or 3, 2, 1).

Abdomen.—On the abdominal tergites 2 to 6 there is one bristle below the stigma and another above it, and two more bristles on each side on the back some distance from the one standing above the stigma. In front of the dorsal bristles there are one or two small hairs on each side. The seventh tergite bears one or two more bristles on the back than the preceding segments do. There is one long apical bristle on each side of this tergite, accompanied in the ♀ by two small hairs, there being in the ♂ a row of short apical hairs in between the two long apical bristles.

Legs.—The mid- and hindcoxae bear posteriorly at the apex one long and one very short bristle. The mid- and hindfemora have two ventral and two lateral bristles at the apex on the outer side, there being, besides, on the hindfemur five short bristles situated in the basal fourth. The midtibia has on the outer side one lateral row of six bristles, and on the inner side only one or two bristles. The hindtibia bears a lateral row of eight or nine bristles on the outer side and

* *Proc. U. S. Nat. Mus.* xxix. p. 137 (1905).
† *Nov. Zool.* x. p. 322. n. 6. t. 10. fig. 17-20 (1903).

a row of six or seven on the inner. There are only one or two small hairs at the ventral edge of the mid- and hindtibiae, apart from the apical bristles. The bristles of the tarsi are much less numerous than in *I. martialis*. The first midtarsal segment bears four or five short bristles on one edge and five or six at the other, while there is one single row of six hairs on the ventral surface, and a row of three or four on the dorsal side. The first hindtarsal segment has also only one row of hairs each on the dorsal and ventral surfaces.

Modified segments.—♂. The eighth tergite is sinuate at the apex, the edge below the small sinus being somewhat undulate (Fig. 1, viii. t.) There are about nine bristles between the stigma and the apical edge. The eighth sternite (Fig. 2, viii. st) is truncate, bearing a row of four bristles on each side ventrally at the

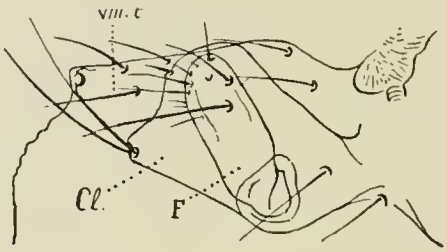


FIG. 1.

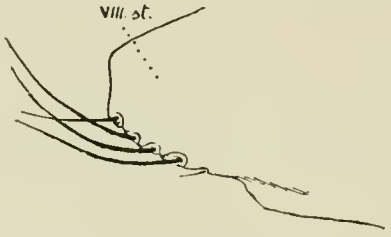


FIG. 2.

apex. The clasper (Fig. 1, Cl) is oblong, as in *I. martialis*, being widest at the apex ; its upper angle is strongly rounded, while the lower angle is somewhat produced, bearing a pair of long bristles. The finger (Fig. 1, F) is about two-and-a-half times as long as it is broad, being of nearly even width throughout. It bears a number of bristles at and near the apex, which is rounded. The exact length and number of these bristles we cannot clearly make out from the single mounted specimen we have.

♀. The seventh sternite is distinctly but slightly emarginate ventrally at the apex. The eighth tergite resembles that of *I. martialis*. There are ten stout bristles on the outer side and no short hairs. On the inner side the row of five or six short spine-like bristles found in *martialis* is represented in the new species by one or two bristles only.

Dr. R. Gestro, director of the Museo Civico at Genoa, sent us two pairs of this flea taken off *Nyctinomus cestonii* at Genoa. Dr. Gestro has kindly given us one pair.

TWO NEW SATURNIIDAE.

By the HON. WALTER ROTHSCHILD, Ph.D.

1. Dysdaemonia fosteri spec. nov.

♀. Body cream-colour; antenna, head, palpus and legs chestnut.

Wings, *upperside*, cream-colour, olivaceous green in distal area, basal area feebly washed with green.——Forewing: lines and bands green; a straight line from costal to inner margin at base of M^2, obtusely angulate at SM^2; a shadowy band outside this line; two transparent spots at cross-veins, the upper one small, both with green proximal border; a band from costal to inner margin, touching second transparent spot, slightly curving proximad between R^3 and SM^2, sharply defined proximally, gradually shading off distally; a line between this band and distal margin as in *boreas*, but a little more curved, brown behind; hinder angle of wing more rounded than in *boreas*.——Hindwing: transparent spot encircled with green; a minute green dot at upper angle of cell; two lines on disc as in *boreas*, both obtusely angulate, but the angle of the first line more obtuse than the angle of the second; first line green, broad, gradually shading off distally, widened to a band behind, second line green in front, brown behind; outside the second line a brown band irrorated with grey from tail backwards, as in *boreas*.

Underside cream-colour, washed with green; two lines on disc of each wing, both faint.

Hab. Sapucay, Paraguay, January 7, 1905 (W. Foster); one ♀.

2. Bunaea macrothyris spec. nov.

♀. Body hair-brown, thorax and abdomen densely irrorated or washed with ochraceous, anterior part of mesonotum, collar, forecoxa and head almost uniformly brown, collar edged with ochraceous; antenna russet.

Wings, *upperside*, hair-brown, densely irrorated with ochraceous.——Forewing: basal area bordered by a blackish hair-brown line angulate-sinuate upon M and again at SM^2; along this line a broad white band gradually shading off distally, the white scaling extending at costal margin to submarginal line; a large transparent spot, rounded distally, straight proximally, 10 mm. long, thinly edged with black, this ring followed by a broad red ring which is widened to a half-crescent proximally, bordered externally by a pinkish white line which is regularly elliptical in shape, being broader proximally than distally; distally of this spot a broad blackish brown line from costal to inner margin, very distinct within the white costal area, becoming faint farther back, evenly curving costad in front, slightly angulate between M^2 and SM^2; a second blackish brown line parallel to distal margin from costal edge to R^2, being hardly vestigial farther back, 8 mm. from distal margin at R^1.——Hindwing: base washed with ochraceous; an antemedian line white, widening behind; a white line parallel to distal margin, 11 mm. distant from margin, edged with blackish brown on distal side; area between the two white lines without ochraceous irroration; distal marginal area

densely irrorated with ochraceous ; eye-spot a little longer than broad, 13 mm. long, consisting of a minute subtransparent bar, a black central spot of 6 mm. diameter, a broad orange-red ring, edged outside with a pinkish white line.

Underside : both wings densely irrorated with white from base to submarginal line, the veins being more or less ochraceous ; distal marginal area blackish brown, irrorated with ochraceous.——Forewing : posterior area hair-brown from base to discal line ; eye-spot as above, the black line bordering the transparent spot heavier ; blackish brown discal line tapering behind, distinct, except from M^2 backwards, more proximal between R^1 and M^1 than above, not standing distally of eye-spot, but being interrupted by it ; area between discal and submarginal lines slightly washed with maroon between SC^5 and M^1.——Hindwing : a broad black line from costal to abdominal margin, crossing eye-spot, convex ; eye-spot much smaller than above, consisting of a black central patch bearing a semi-transparent bar, a red ring edged with pinkish white, the ring much narrower than above and of the same deep red colour as in forewing ; wool at abdominal margin yellowish ; interspace between discal and submarginal lines whitish at abdominal margin.

Length of forewing : 82 mm.

Hab.: Chissamba, Bihé, Angola, November 16, 1904 (Dr. W. I. Ansorge); one ♀.

NOVITATES ZOOLOGICAE.

Vol. XIII. JULY, 1906. No. 2.

NEW *NOCTUIDAE* FROM BRITISH NEW GUINEA.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S.

IN continuation of my descriptions of the new species of Mr. Pratt's collections from the Owen Stanley Range, and of a portion of Mr. Meek's collections, I am now able to add those of the *Noctuidae*, omitting the last section, viz. the *Deltoidinae*, which I propose to deal with later on. The number of new species sent us by Mr. Pratt is beyond our most sanguine expectations. Mr. Meek's collections have already received their well-earned praise. Each have in their own lines of work done magnificently, and both these well-tried collectors are to be highly congratulated on the results of their expeditions. I have again to thank Sir George Hampson for constant help. My measurements are taken by doubling the distance from the centre of the thorax to the tip of the primary.

I must make a correction in my previous paper. I was informed at the last moment, after the proofs had been all corrected, that there was no description for Fig. 42, Pl. VI., vol. xi., and in the absence of all papers, being away from home, I wrote the description of No. 168, p. 429 (*Collusa ekeikei*); the insect had, however, been described on p. 403 as *Anthela ekeikei*, and this description and generic name is correct; the description on p. 429 sinks to the earlier one, and the legend on Plate VI. for Fig. 42 should be *Anthela ekeikei*.*

NOCTUIDAE.

1. Amphipyra bicolora spec. nov.

♂. Head and collar very dark purplish brown, collar tipped broadly with paler brown; thorax and abdomen brown, legs very hairy, pale brown with dark tarsi palely ringed. Primary with two or three dark basal dots followed by a short curved costal line, a spot at the end of the cell laterally edged with darker brown; three strongly serrate dark postmedial lines close together, followed by a subterminal interrupted irregular line; termen darkly and finely dotted. Fringes brownish grey. Secondary with the basal two-thirds yellow; terminal third dark brown, slightly iridescent at certain angles. Undersurface: primary uniform brown with a dark cell-spot; secondary as above.

♀. Like the male, but larger.

Expanse: ♂ 44—46 mm.; ♀ 48—50 mm.

The type is in my collection. The species flies from January to March.

Hab. Ekeikei and Aroa River.

2. Protagrotis rufalis spec. nov.

♂. Palpi pale reddish, head darker, antennae pale buff-colour, collar reddish buff, thorax reddish brown with bright red patagiae darkly edged, abdomen pale yellowish

* The name on the label of the specimen figured was *Collusa ekeikei*. The name *ekeikei* recurring so frequently in Mr. Baker's article, I did not suspect that *Collusa ekeikei* was the same as *Anthela ekeikei*.—K. J.

brown, forelegs red with darker tibiae palely ringed, mid and hind pair pale buff-colour. Primary brightish red up to the postmedial line, dark reddish grey beyond; antemedial line double, the outer one the darker, both interrupted at the subcostal vein, beyond which is a small pale red round spot darkly but finely encircled; outside this a band of dark shading curved from the costa to the lower margin of the cell, whence to the inner margin it is obliquely straight; beyond this the reniform stigma shows slightly grey in a paler red area, which is sharply margined by a double postmedial irregular subdentate line, the rest of the wing being reddish-brownish grey, in which is the subterminal obscure recurved row of dark dots, which have an obscure trace of a reddish external edging; termen pale, fringes dark. Secondaries pale yellowish grey with the terminal area pinkish. Underside of both wings quite pale, with the postmarginal area darker.

Expanse: 40—41 mm.

Hab. Ekeikei, where the species flies from January to April.

Type in my collection.

3. **Protagrotis novaguinensis** spec. nov.

♂. Head greyish brown, face pale ochreous grey, palpi dark brown, the scales at the tip of the second segment palely edged, third segment paler with a dark patch below; collar brownish grey, thorax darker; patagiae brownish grey with a dark central stripe from the shoulder, below which is a broad pale stripe; abdomen pale greyish, the last segment but one dark brown, the neighbouring segments being also suffused with that colour. Primary greyish brown, darker along the costa to the lower margin of the cell, an obscure pale stripe extending from near the apex, where it rises in a small pale apical patch, to the inner marginal area, which is also slightly paler than other parts of the wing; a subbasal patch of raised pale scales from the costa to the inner margin of the cell, antemedial line broken and obscure, postmedial line irregular, strongly incurved towards the end of the cell, beyond which is a curved row of dark spots; termen darkly dotted; orbicular stigma obscure; reniform evanescent (in pale specimens, especially females, both these stigmata are moderately distinct); cilia pale with a darker central line. Secondary uniform dark brownish grey, somewhat lustrous with paler fringes.

Undersurface: Primary dark grey with a broadish reddish costa and a very broad whitish inner margin. Secondary whitish, with costa slightly irrorated with reddish; apex and termen blackish brown, broad at the apex, but rapidly tapering to vein 1.

♀. Like the male, but the primary ochreous grey above; in all other respects just like the male above and below.

Expanse: ♂ 44—46 mm.; ♀ 40—44 mm.

Hab. Ekeikei, January to April.

Type in my collection.

This species differs somewhat *inter se*; the males are sometimes paler, and the females slightly reddish. I have one specimen of the latter of a decided reddish ochre colour.

Epa gen. nov.

♂. Head roughly haired; eyes smooth, lashed; antennae finely, very shortly ciliate: palpi upturned, end segment minute, deflexed, not reaching the vertex of

the head, first and second segments clothed with long hair, with metathoracic crest ; abdomen crested ; legs with the tarsi of each spined for all their length ; midtibiae with one pair of spurs, hindtibiae with two pairs of spurs ; femora and tibiae of all legs densely haired.

Neuration : Primary with veins 3, 4, and 5 from close to the lower angle of the cell, vein 6 from below the upper angle, 8 and 9 stalked from a very short stalk close to the areole. Secondary, 5 from near the lower angle, 6 and 7 stalked from well beyond the cell.

Type : *Epa pratti* B-B.

4. **Epa pratti** spec. nov.

♂. Frons greenish yellow, caput greenish grey, collar and thorax greyish green, patagiae edged and bisected with black, abdomen cream-coloured. Legs and femora yellowish grey, tibiae blackish grey, tarsi chestnut-red ; the femora and tibiae are clothed with longish greenish-grey hairs. Primary with a basal and subterminal suffusion of yellowish green, the median area pale dirty grey up to the upper margin of the cell ; costa and subapical area black ; termen pale grey, basal line roughly U-shaped, from the costa to the lower margin of the cell ; beyond the greenish suffusion and extending into it a broad black patch, which is invaded by the grey median area ; beyond this a fine double slightly interrupted black median line, followed by a similar postmedial one, edged externally with white ; this line is very irregular and strongly projected outwards above vein 5 ; a quadrangular deep black patch at the end of the cell, a subterminal pale line in the greenish area, four white points on the costa in front of the apex. Secondary whitish grey, termen broadly dark grey. Underside of both wings creamy greyish with terminal area dark grey. In the primary the terminal area is invaded by a pale line, and in the secondary there is a dark postmedial line.

Expanse : ♂ 36 mm.

Hab. Dinawa, September.

Type in my collection.

Yula gen. nov.

Head rough, vertex with short projecting tuft of hairs, antennal sockets fringed with longish hairs, antennae shortly and finely ciliated ; palpi upturned, almost erect, first and second segments thickly scaled with hairs, end segment short, slightly deflexed ; eyes smooth-lashed, proboscis fully developed ; legs with midtibiae with one pair, hindtibiae with two pairs of spurs, all the tarsi strongly spined the whole length, fore- and midtibiae with a tuft of hairs below the femoral joint ; thorax with a central prothoracic tuft, a pair of tufts and a central tuft on the metathorax ; abdomen with the proximal segments tufted.

Type : *Yula novaeguineae* B-B.

5. **Yula novaeguineae** spec. nov.

♂. Frons grizzled brown, vertex creamy white, palpi dark red-brown with end of second segment ringed with whitish, end of third segment tipped with whitish ; collar metallic brassy bronze, prothoracic and metathoracic tufts bronzy chestnut, patagiae shining creamy, slightly bronzy, edged with dark brown with brassy scales intermixed ; abdomen dark brown, with the proximal segments laterally creamy whitish ; anal segments brownish cream-colour ; legs dark brown ringed with whitish. Primary with a general metallic bronzy lustre all over, varying from

silvery and pale greenish into dark steely brown. Basal area pale greenish with blackish interrupted fine basal line followed by a large blackish costal patch into the cell, below which, extending as far as the cell, is a shining silvery oblong patch intersected by the fine medial dark line ; postmedial area dark bronzy brown, with a small round pale greenish spot at the end of the cell followed by a largish silvery somewhat irregular squarish patch ; the postmedial excurved crenulate line defines this area, and is followed by a narrowish paler line, apical patch dark bronzy brown, tornal area, and extending up to vein S dark bronzy brown ; terminal area pale greenish cream-colour separating the dark patches just mentioned ; termen very finely black intersected at the veins. Secondary brownish, becoming cream-coloured at the base.

♀. Like the male in the primary, but with the dark parts blacker; in the secondary the wings are blackish instead of brownish.

Expanse : ♂, 31—33 mm. ; ♀, 35—38 mm.

Hab. The type is in my collection from Ekeikei. I have specimens also from the Kebea Range, Dinawa, and other localities, where Mr. Pratt collected. The species is, however, rare apparently, only a few having been taken in each place. It flies in March and April and again in July and August ; but there is no difference in colour in the two broods.

6. **Perigea dinawa** spec. nov.

♂. Head, palpi, and thorax reddish brown, abdomen paler ; legs reddish brown with darker tarsi palely ringed. Primary reddish brown, with a subbasal whitish costal point followed by a second below it, beyond which are two more whitish points below each other; an indistinct pale waved antemedial line, beyond which in the cell the orbicular stigma is palely but indefinitely visible, reniform distinct pale, with whitish dots ; postmedial line pale, strongly curved outwards, obscurely darkly edged laterally ; subterminal line distinct, composed of a series of indefinite whitish spots almost confluent, the central ones edged darkly internally ; termen darkly scalloped between the veins, where it is intersected by whitish points ; costa with two whitish dots, one nearly over each stigma, beyond which are three finer points nearer the apex. Secondary pale uniform reddish brown.

Expanse : 37—39 mm.

Hab. Dinawa, September; Kebea Range and Aroa River, March and April.

Type in my collection.

7. **Perigea aroana** spec. nov.

♂. Head and thorax mottled greyish, abdomen greyish. Primary pale grey with dark grey irrorations all over, a small white costal basal spot, an antemedian white waved line ; reniform whitish, preceded by some black markings ; a postmedial whitish band interrupted by the veins; a fine subterminal dentate irregular line, edged internally in fresh specimens by blackish short dashes. Secondary white with broadish dark-grey termen.

Expanse : 30 mm.

Hab. Aroa River, March and April.

Type in my collection ; other specimens in the Tring Museum.

This species is somewhat near *P. confundens* Wlk.

8. **Euplexia viridacea** spec. nov.

♂. Head ochreous, collar greenish, thorax and abdomen reddish ochreous, patagiae greenish, legs brownish ochreous with the tibiae darkly spotted, tarsi darkish, palely ringed. Primary pale bronzy green, with a dark subbasal patch edged with white, an antemedial white line edged finely with black; medial area dark brownish, with an irregular white M-shaped mark below vein 10, with a greenish spot between the two outer lines of the letter; below vein 2 a white inverted V-shaped mark; this dark area is edged with a fine crenulate double line of black and white; termen darkly spotted, preceding which (spots) is a series of spearhead marks finely outlined with white; along the costa are three dark dashes with fine white centres, two being before the end of the cell and one beyond the cell. Secondary with the basal three-fifths greyish with a dark lunule at the end of the cell, the terminal two-fifths pale bronzy-green. Undersurface: Primary ochreous grey tinged with green, with a dark spot in the cell and a dark postmedial line; secondary ochreous with a dark spot at the end of the cell and a dark postmedial line. In fresh specimens the dark patches of the primary are covered with a greenish lustre.

Expanse: 33—36 mm.

Hab. Dinawa, Ekeikei and the Kebea Range.

Type in my collection.

9. **Euplexia smaragdina** spec. nov.

♂. Frons ochreous slightly tinged with green, palpi ochreous, head pale green, collar and thorax bright green, patagia with two grey stripes, abdomen ochreous. Primary pale emerald green, with a short costal basal blackish diagonal dash with a fine white internal edging; below this a second similar dash invading the cell, a blackish subbasal patch interrupted by the veins from the costa to well below the cell edged externally with a > -shaped white line, a curved line of green below it, followed by two blackish dashes, each edged internally finely with white; latter half of cell covered with a blackish irregular subquadrate patch, edged externally with white, in the centre of this patch a fine diagonal ⊂-shaped mark; reniform stigma beyond the cell marked out with white, beyond which is a wedge-shaped dark brown patch ascending to the costa, where its broad end is, a dark spot on the costa in front of the apex, confluent with this; below, nearer the base, between veins 1 and 2, a black dash edged externally with white, a terminal series of black spear-head marks increasing towards the tornus.

Secondary golden yellow without marks. Undersurface of both wings ochreous yellow.

Expanse: 35 mm.

Hab. Kebea Range, March and April.

Type in my collection.

10. **Euplexia dinawa** spec. nov.

Head and frons ochreous, collar dark olive-greenish, thorax dark brown with dark olive-green patagiae and tufts, abdomen greyish with orange dorsal tufts, legs darkish grey with reddish tarsi. Primary brown, with a small dark brown basal patch bisected by a pale <-shaped mark, a dark brown spot below the cell, outer half of cell occupied by a broad dark brown stripe in which is placed a broad

U-shaped mark ; at the end of the dark stripe the paler postmedial line extends right across the wing ; below the green mark are two small dark spots ; terminal area pale bronzy green edged internally with a broad tapering patch of dark velvety brown, tinged with bronzy green ; termen dark brown, inner margin dark brown tinged with green with a green spot a third from the base. Secondary brownish grey, paler at the base. Fringes of both wings green. Undersurface : Primary brownish grey, with a subterminal row of small pale dots ; secondary, basal half pale grey with a dark spot in the cell and a broad dark very serrated postmedial line, outer half closely irrorated with dark grey.

Expanse : 34 mm.

Hab. Dinawa, September; Avola, August ; Aroa River, January ; Kebea Range, March and April.

Type in my collection ; other specimens in the Tring Museum.

A rare species, the series sent home being very short.

11. **Eurois dinawa** spec. nov.

♂. Head and thorax pale ochreous brown, collar with a dark line across the middle, abdomen reddish ochreous, legs chestnut-colour with dark tarsi palely ringed. Primary pale ochreous brown, with a fine basal line in the cell and on the costa, a double medial line from the inner margin into the cell, the inner line being obscure, strongly serrate, forming a double v; beyond this is a dark patch edged partially by a dark line, reniform stigma pale with a white spot on its exterior, and a dark v-shaped patch on its interior ; above this the costa is darkly spotted, postmedial line only visible from the inner margin to vein 3; from the lower part of the reniform a double dark dash extends to the termen. Secondary pale greyish with a darker terminal area.

Expanse : 42 mm.

Hab. Dinawa, August.

Type in my collection.

12. **Ancaroides kebea** spec. nov.

♂. Head, palpi and thorax dark rich red-brown, palpi pale chestnut internally, thorax and patagiae mottled with still darker velvety brown and interspersed with pale spatulate scales ; on the prothorax is a central tuft of raised dark hairs and scales; abdomen chrome yellow with the terminal segments dark brown and a series of dark dorsal tufts on the yellow segments, legs dark brown encircled with pale chestnut-colour. Primary dark reddish brown with a large darker brown patch below the cell and another occupying the tornal and terminal areas up to vein 5 ; the basal and antemedial lines represented by irregular series of dark dots, the orbicular and reniform stigmata distinct, finely encircled with pale yellow, postmedial line distinct, double, acutely angled externally above vein 5, from whence the double line is filled in with pale yellow and margins in an arc the dark tornal area ; from the reniform stigma a fine pale chestnut line runs above vein 5 to the termen, a subterminal curved line extends from vein 5 to the tornus, below the apex is a patch void of the large rough scales that cover most of the wing (this patch is in some specimens pale rusty chestnut-colour), the costa is darkly dotted where all the lines commence. Secondaries pale chrome yellow with very broad brown apical and terminal areas tapering rapidly towards the tornus ; a dark sex-patch nearly fills the space between veins 2 and 3, invading well into the yellow

area. Underside: Primary brown, inner margin broadly pale yellow, cell closed by a dark spot beyond which are somewhat obscure dark postmedial and subterminal lines. Secondary as above, but paler, with a dark spot closing the cell, and the sex-patch pale yellow invading into the dark terminal area.

Expanse: 50 mm.

Hab. Kebea Range, July; Ekeikei, January and February; Aroa River, March.

Type in my collection.

13. **Ancaroides griseola** spec. nov.

♂. The primaries differ from *A. kebea* in that both stigmata and the area below them are filled in with pale grey, there is no angled postmedial line, there are no dark patches on the wings, whilst the subterminal line is fairly distinct from near the apex to the tornus, and is strongly serrate; in the secondaries the dark border extends somewhat up the inner margin.

Expanse: 56 mm.

Hab. The type is in my collection, and was taken at Ekeikei in March or April.

This may possibly be a variety of the previous species, *A. kebea*, but the large grey area and the difference in the subterminal lines give it quite a distinct appearance, which coupled with the fact that I have several from this one neighbourhood makes me think it advisable to name it.

14. **Dipterygia kebeae** spec. nov.

♂. Head ochreous grey; collar dark grey, palely irrorated; thorax pale greyish, with the prothoracic tuft pale ochreous brown; patagiae blackish; abdomen dark grey. Primary blackish, with the costa broadly dark grey, increasing slightly near the end of the cell, with three pale dashes beyond the cell; inner margin greyish, broadly greyish for the posterior third and at the tornus, where it is invaded by the black area; from near the base is a broad palish dash finely margined with black. Secondary white, with the apex and termen broadly blackish brown, decreasing rapidly at the tornus.

♀. Like the male, but not quite so dark.

Expanse: ♂ and ♀, 44 mm.

Hab. The species occurs at Mount Kebea and Ekeikei in March and April: a long series was taken by Mr. Pratt; other specimens are in the Tring Museum from the Aroa River, taken at the same time.

The type is in my collection.

15. **Dipterygia babooni** spec. nov.

♂. Head and thorax ochreous grey; collar intersected with two dark lines irrorated with white-tipped scales; abdomen brownish grey. Primary ochreous grey, with a trace of a subbasal strongly serrated fine line, the postmedial line having an outward curve at the end of the cell, and then receding in a waved nearly perpendicular line to the inner margin; reniform stigma pale whitish grey, below which from the costa is a dark oblique stripe having a deep curve in the postmedial area, but ascending to the middle of the termen; a white dash below the costa in the apical third; from near the base of the inner margin is a broadish pale dash darkly margined. Secondary white, broadly margined with brownish, tapering towards the tornus.

♀. Like the male, but with a subterminal very strongly serrated line edged outwardly with whitish.

Expanse : ♂ and ♀, 44 mm.

Hab. The type from Babooni is in my collection ; other specimens in the Tring Museum. The species occurs in September, and I have a good series from all the localities that Mr. Pratt collected in. I believe this insect is a variety of the previous one, and that it will prove to be the autumn brood of *D. kebeae* ; but it is so distinct in general coloration that it is obviously advisable to name it.

16. **Acronycta crenulata** spec. nov.

♂. Head and thorax irrorated pale and dark grey, abdomen greyish. Primary pale grey, with a dark, double, oblique, obscure in parts, antemedial line, and a blackish finely crenulate postmedial line, edged internally with white, outwardly curved above vein 3, below which it recedes in a deep curve to the inner margin, beyond this is an indistinct stripe of pale shading ; orbicular a whitish distinct round spot, reniform rather obscure, between these two a dark costal patch. Secondary pale grey, darker at the termen.

Expanse : 42 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

17. **Acronycta ekeikei** spec. nov.

♂. Head and thorax whitish grey, finely irrorated with pale green ; abdomen grey, rapidly deepening into reddish brown ; legs pinkish grey, with blackish tarsi. Primary pale whitish grey, more or less finely irrorated all over with pale green ; a small dark costal patch near the base followed by a dark dot, a dark costal patch above the end of the cell extending into a green spot closing the cell, two small costal spots, followed by a longer dash on the costa in front of the apex, a trace of an antemedial irregular whitish line, and a faint trace of two pale postmedial lines, the outer one dotted white ; a broad blackish dash below vein 2, distinctly black along the vein edged with white above, which (white) curves down nearly into the tornus, intersecting the black dash which extends to the termen ; the postmedial area beyond the cell-spot is darker along the costa to the apex and down to the tornus than the rest of the wing ; termen finely black. Secondary reddish brown, whitish and somewhat diaphanous towards the base. Undersurface : Primary lustrous reddish brown, white below the cell and vein 2, with a trace of a dark postmedial line. Secondary whitish with costa and apex broadly reddish brown, and a distinct red-brown irregular postmedial stripe from the costa to the inner margin.

Expanse : 38 mm.

Hab. The type from Ekeikei is in my collection. The species flies in March and April.

18. **Acronycta dinawa** spec. nov.

♂. Head and thorax pale olive green, abdomen pale brownish tinged with red, anal extremity greenish, legs dark red-brown, palely spotted. Primary pale olive green, costa spotted with black, the spot above the end of the cell large and extending down to vein 5 ; a short black basal dash along the lower margin of the cell and a black dash along vein 2 to near the termen ; a trace of an antemedial

line, and a more definite trace of a curved black dotted postmedial line; terminal area mottled, fringe crenulate. Secondary reddish brown, paler towards the base. Undersurface: Primary red-brown, whitish below the cell and vein 2. Secondary cream-coloured, with the costa and upper part of termen and apex broadly red-brown, a dark spot at the end of the cell, and a very irregular postmedial line to vein 1*b*.

♀. Like the male, but with the pattern and especially the black dashes and spots decidedly more definite and rather larger. Secondary uniform reddish brown.

Expanse: ♂ 37, ♀ 42—43 mm.

Hab. The type is in my collection from Dinawa; other specimens from the Kebea Range. The insect flies in May and June.

19. **Ilattia aroa** spec. nov.

♂. Head, thorax and abdomen dull brown. Primary dull brown, with a trace of a basal and antemedial dark line rising in a white costal dot; a white costal spot over the white reniform, the latter being pupilled with an ochreous spot darkly encircled; postmedial line very fine, finely crenulate, a subterminal irregular line of dark shading from a white apical spot, three white costal points in front of the apex, termen with fine black points. Secondary uniform greyish brown, slightly paler at the base.

Expanse: 32 mm.

Hab. The type is in my collection from the Aroa River; other specimens in the Tring Museum from the same locality. The species will come next *I. renalis* Moore.

20. **Berresa rufa** spec. nov.

♂. Head and thorax pale reddish brown, abdomen greyish. Primary pale reddish brown, with an indistinct curved dark antemedial line across the shining sex-mark, an obscure dark median band meeting the dark palely edged postmedial serrate irregular line about vein 2, where the latter is decidedly incurved; a dark irregularly waved subterminal line; termen with fine creamy points. Secondary pale brownish grey.

Expanse: 29 mm.

Hab. The type is in my collection from the Aroa River, where it occurred in March.

21. **Berresa meeki** spec. nov.

♂. Head and thorax pale pinkish grey, abdomen grey. Primary uniform purplish dull brown, with obscure excurved antemedial and less curved median dark lines; postmedial line white, sharply crenulate, a trace of a pale subterminal line; costa dotted with white. Secondary sooty grey, very dark at the termen.

Expanse: 23 mm.

Hab. The type from the Aroa River is in my collection, other specimens in the Tring Museum from the same locality being taken in March.

22. **Thyria aroa** spec. nov.

♂. Head and thorax sepia brown strongly and finely irrorated with pale greyish brown; abdomen yellow with dark dorsal tufts. Primary sepia brown with pale basal stripe and a patch of pale greenish scales; antemedial line fine, pale, evenly excurved in the fold with a pale costal fine dash to the base of the orbicular, which

is dark and palely encircled ; reniform obscure with a patch of pale bronzy greenish rough scales above and below it ; postmedial line pale waved and scalloped, a rich dark broad subterminal band with three whitish external spots by the apex ; termen darkly dotted. Secondary yellow with very broad brownish terminal area.

Expanse : 38 mm.

Hab. Aroa River (March).

Type in Tring Museum.

23. **Dissolophus ochraceus** spec. nov.

♂. Head and thorax ochraceous, abdomen ochreous grey. Primary pale ochreous grey, with a trace of a dark basal line, an irregular waved antemedial line rising in a small dark costal patch ; a postmedial pale line gently waved with dark edging followed by an irregular line of dark shading ; a trace of a subterminal serrate line ; termen darkly dotted. Secondary pale greyish brown.

♀. Like the male, but the secondary is dark brown with ochreous fringes.

Expanse : 25 mm.

Hab. The type is in my collection from the Aroa River, where the species occurs in February and March. Other specimens are in the Tring Museum from the same locality. The species will come next *D. aluensis* Btl., but the shape and position of the antemedial and postmedial lines differ.

24. **Elusa dinawa** spec. nov.

♂. Head reddish pink ; thorax red with pinkish chestnut collar ; thorax ochreous. Primary red, with two whitish yellow spots at the end of the cell, the lower of which is oval and larger than the upper one ; the basal, antemedial, medial, and postmedial dark grey lines are somewhat irregular and confluent, the postmedial line being the broadest and suffused, and the wing is spotted between each of the lines with pale yellowish spots, one at the apex being more prominent than the others ; the termen is dark red, almost crimson red. Secondary pinkish brown, quite pale towards the base.

Expanse : 30—31 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in September.

25. **Elusa incertans** spec. nov.

♀. Head and collar pinkish chestnut ; thorax reddish ; abdomen brownish grey Primary red, with antemedial, medial, and postmedial lines of dark grey. Secondary pinkish brown.

Expanse : 30 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in August ; other specimens in the Tring Museum from the Aroa River.

26. **Elusa pratti** spec. nov.

♂. Head and thorax reddish brown ; abdomen pale brown. Primary brownish with a very slight reddish tinge ; antemedial and postmedial lines dark grey and irregular, medial line broader, somewhat indefinite ; a twin white spot at the end of the cell ; a subterminal row of dark dots. Secondary uniform pale brownish.

♀. Exactly like the male, except that it is decidedly darker, and has no tinge of rufous colour.

Expanse : ♂ and ♀, 32—33 mm.

Hab. The type is in my collection from Dinawa; other specimens from Ekeikei. The species flies in September and in April.

27. **Caradrina subpartita** spec. nov.

♂. Head, thorax and abdomen cinnamon-brown, finely irrorated with grey. Primary cinnamon-brown with fine dark lines; basal line only discernible on the costa; antemedial line with two sharp serrations projected inwardly; medial line broad, indefinite, oblique from the costa to the end of cell, then vertical; postmedial line crenulate, followed by a band paler than the ground-colour; subterminal line irregular; termen finely dark, interrupted at the veins. Secondary pale whitish grey, subhyaline darker at the apex.

Expanse : 30 mm.

Hab. The type is in my collection from the Kebea Range, where it flies in March and April; other specimens in the Tring Museum from the Aroa River.

This species is near *C. partita* Walker; but the lines differ, especially the median line in its strong angle.

28. **Caradrina unipunctata** spec. nov.

♂. Head and thorax dull brown, abdomen slightly darker, legs pale greyish with dark tarsi palely ringed. Primary narrow, dull brown, very slightly lustrous; antemedial line fine, black, irregular and obscure, medial line dark curved outwardly, postmedial line very slightly waved then straight to the inner margin, pale distinct, darkly and obscurely edged on each side, subterminal line dark waved palely edged externally, a small dark spot above vein 5 between the postmedial and subterminal lines, termen very finely darkly dotted. Secondary subhyaline grey.

Expanse : 33 mm.

Hab. The type from Ekeikei is in my collection.

29. **Caradrina funerea** spec. nov.

♂. Head and thorax dull brown with a tinge of red, abdomen paler. Primary rather narrow, dull slightly reddish brown; a fine dark antemedial line, a band of dark shading at the end of the cell from the costa to the inner margin, a small pale ochreous dot at the end of the cell with three whitish points below it placed as it were at the three points of the triangle, a very fine dark crenulate postmedial line followed by a line of paler shading, a subterminal row of fine irregular dark points, termen very finely pale. Secondary subhyaline pale grey, except at the apex and the termen, where it is darker.

Expanse : 36 mm.

Hab. The type is in my collection from the Kebea Range. The species flies in May and June.

30. **Caradrina insignifica** spec. nov.

♂. Head and thorax greyish brown, abdomen paler. Primary greyish brown, with a dark fine irregular antemedial line, a dark medial line of shading produced forward by the lower margin of the cell, a postmedial pale line slightly curved outwards, an irregular somewhat serrate subterminal line of dark shading edged

by a paler external line, terminal area paler. Secondary subhyaline, whitish grey, darker at apex and termen. On the undersurface of the secondaries, the costa is ochreous grey finely darkly irrorated; there is a distinct trace of a postmedial line.

Expanse: 30 mm.

Hab. The type is in my collection from the Kebea Range, where the species flies in May and June; other specimens are in the Tring Museum from the Aroa River.

31. **Caradrina gemini** spec. nov.

♂. Head, thorax, and abdomen pale grey, palpi pale grey with a dark brown spot on the first and lower half of second segment. Primary pale grey, very finely but sparingly irrorated with dark grey, giving the wing a rough appearance; three dark points on the costa, two near the base, one nearer the apex, all the lines obsolete, a dark brown twin spot in the postmedial area, divided by vein 4; termen with a distinct dark point at the end of each vein. Secondary uniform pale grey.

Expanse: 33 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in March and April.

32. **Caradrina crenulata** spec. nov.

♂. Head and thorax ochreous grey, abdomen pale grey, palpi grey with a dark spot on the first and basal three-fifths of second segment. Primary pale ochreous grey, with a fine dark antemedial line with three lunules between the costa and the lower margin of the cell, a medial grey band of shading receding basewards above the lower end of the cell with two whitish dots at the base of veins 3 and 4, and a pale small spot above them, the postmedial line fine, sharply crenulate, the crenulations ending in a blackish point, terminal area greyish nearly up to the postmedial line, a dark point between veins 3 and 4, two blackish spots divided by vein 5, above which are traces of three black spots to the costa; termen slightly crenulate, very finely dotted with blackish between the veins. Secondary, subhyaline brownish grey, slightly darker at the apex and termen, veins showing dark. Undersurface, both wings much paler than above, with the postmedial line marked out by a series of fine distinct blackish dashes right through both wings.

Expanse: 37—38 mm.

Hab. The type is in my collection from the Kebea Range, where the species flies in July.

33. **Caradrina pratti** spec. nov.

♂. Head and thorax greyish brown, abdomen pale grey. Primary greyish brown, antemedial dark line waved, preceded by a broadish band of paler ground-colour, medial band of dark shading indefinite and angled by the cell, at the upper angle of which are two pale dots, the lower one being shifted inwards, postmedial dark line curved, an indefinite waved subterminal line. Secondary brownish grey, with a large tuft of dark brown longish hairs on the underside of the inner margin; the thorax also has a similar heavy lateral tuft below.

Expanse: 31—33 mm.

Hab. The type from Dinawa is in my collection, and was taken in August. I have a specimen taken in September of the same year which is much paler in colour and has a distinct dark spot near the end of the cell.

ACONTIINAE.

34. **Dipthera kebeae** spec. nov.

♂. Frons pinkish, slightly tinged with green, with three horizontal dark spots ; palpi reddish brown, palely ringed at each segment, end of third segment pale. Head and thorax pale yellowish green, patagiae darkly tipped and darkly spotted behind the collar, tuft darkly tipped ; abdomen pale greyish brown with slight dorsal tufts darkly tipped, anal tuft pale ; legs dark reddish brown palely spotted at all the joints, tarsi palely ringed. Primaries yellowish green with a short very dark irregular dash from the base along the lower margin of the cell, three dark small costal spots near the base and four nearer the apex ; between the two series of spots is a large dark mark extending across the end of the cell, in front of the apex a short diagonal dark line on the costa ; between veins 4 and 6 are two whitish spots outwardly edged with dark brown followed by a similar pair nearer the termen ; between the lower margin of the cell and the tornus is a dark brown irregular mark bisected and edged outwardly with whitish, with a whitish line between it and the basal dash ; inner margin darkly dotted. Fringes intersected greenish and dark brown. Secondaries creamy white, more or less suffused with pale pinkish brown for the terminal half.

Undersurface, both wings creamy white. Primaries suffused with pinkish brown along the costa and in the medial area, whitish along the inner margin ; secondaries suffused with pinkish brown broadly along the costa and in the apical area, with a dark costal patch towards the base and a curved dark interrupted postmedial band.

Expanse : 39—40 mm.

Hab. The type is in my collection from the Kebea Range ; the insect flies in March and April.

Diptheroides gen. nov.

Palpi upturned, first and second segments thickly clothed with longish hair, end segment moderately long, slightly deflexed ; antennae very minutely ciliated, collar erect, large ; thorax with large central metathoracic tuft ; abdomen with small tufts on proximal segments. Neuration : Primary with vein 6 below the upper angle of cell, 7 anastomosing with 10 to form the areole, which is most minute, 8 given off from 9 near the apex, 9 given off from 10 well beyond the areole. Secondary normal.

Type : *Diptheroides kenricki* B-B.

35. **Diptheroides kenricki** spec. nov.

♂. Head pale greenish blue, palpi cream-coloured, dark above, collar dark grey at base with ochreous centre and green tip ; thorax bluish green, with a black stripe below the collar on the patagia, which are also tipped with black ; metathoracic tuft with black stripe at base and almost bluish tip ; abdomen creamy grey, with green dorsal spot next to thorax followed by two black spots and another black spot on anal segment. Primary bluish green, with a black costal patch at base, followed by a white dash, another larger black costal patch and another short white dash ; subbasal black line irregular and interrupted, the median black line rising in a large black costal patch forms a black spot at the end of the cell and recedes beneath it, whence it is irregular and has a second black interrupted line

rather nearer the base below the cell ; the postmedial line fine, rising in a small black costal spot, is irregular and follows roughly a similar course to the median line ; the subterminal line, edged externally with white and rising in a black triangular costal patch in which are two white points, is irregular with an indefinite black dash to the termen above vein 5 and on vein 2. Between the costa and the cell the ground-colour is whitish ; there is a white spot on the interior of the black spot at the end of the cell. Termen black to vein 7. Fringes green, intersected with black. Secondary darkish grey, broadly yellowish cream-colour along the inner margin and at the base.

♀. Like the male, but the colour is a delicate lavender blue shaded slightly with greenish in the median and terminal areas, with all the black lines sharper in outline.

Expanse : ♂ 47 mm. ; ♀ 49—50 mm.

Hab. The type is in my collection from Dinawa, and was taken in August ; another specimen from Ekeikei was captured in January or February ; other specimens are in the Tring Museum from the Aroa River.

36. **Diptheroides serrata** spec. nov.

♂. Frons ochreous, caput lavender-colour, collar ochreous at base, then broadly dark grey edged with greenish grey, with the extreme tip lavender-grey ; thorax lavender-grey, patagiae tipped with ochreous grey, tuft tipped in the centre with reddish ochreous ; abdomen creamy ochreous, with a reddish proximal small dorsal tuft followed by a darker one, central segments banded with black. Primary dull greyish lavender-colour, with a basal costal black patch enclosing a small lavender spot ; subbasal line irregular, rising in a large black costal dash ; antemedial, medial, postmedial and subterminal lines fine, very frequently and strongly serrated, the antemedial line being interrupted in the cell, the subterminal rising in a large black costal patch and being followed by a row of spear-point marks, the one at the tornus being heavy, termen finely black. In the cell is a small round whitish spot, cell closed by a thick black line which is edged internally by a double whitish spot. The large black patch in which the subterminal line rises extends obliquely to the termen, thus enclosing an oval apical lavender-grey patch. Fringe lavender-grey intersected with black. Secondary dark grey, with base and inner margin pale ochreous.

Expanse : 47—48 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in August ; other specimens are in the Tring Museum from the Aroa River.

Lasiosceles gen. nov.

Palpi upturned, second segment reaching nearly to the vertex thickly scaled, third segment long and smooth ; antennae minutely ciliate ; proboscis fully developed ; thorax tufted, both pro- and metathorax ; abdomen with long proximal tuft ; legs spined, femora thickly clothed with long hair, tibiae clothed with long hair, with a large expanding tuft on the tibial joints of both the mid- and hindlegs, whose tarsi are also finely spined. Neuration : Primary, vein 3 from the lower angle, 4 and 5 from close to the lower angle, 6 from immediately below the upper angle, 7 from off 8 at the end of the areole which anastomoses with 9, which is given off 10 to form the areole. Secondary, veins 3 and 4 from the lower angle, 5 from near the

middle of the discocellulars, 6 and 7 from the upper angle. Wings: costa nearly straight, depressed at the apex; apex acute, termen very slightly excavated to vein 5, produced outwards at 4 to form a slight angle from whence it recedes rapidly to the tornus; wing broad, secondaries comparatively small, termen evenly rounded to vein 2, where there is a slight angle. Termen of both wings slightly crenulate.

Type: *Lasiosceles pratti* B.-B.

37. **Lasiosceles pratti** spec. nov.

♂. Head and thorax red-brown lined with white; the collar has two lines right across, and is tipped with white; the patagiae are edged with white, and have a central white line; abdomen orange-yellow, proximal tuft dark red-brown. Primary reddish brown, with the space below the cell pale ochreous greyish; all the veins are white, very prominently so beyond the cell, the three main veins being pale ochreous greyish up to that point; the basal cellular and costal area is tesselated with white lines; below the cell there is a short deep red dash edged with white, followed by a curved white streak edged with deep reddish; the reniform is edged with white, its internal edge being a broadish straight white dash; above it is a short costal streak; postmedial line curved broadly white, subterminal line straight oblique, broadly white from the apex well beyond the tornus; termen finely white, between this and the oblique stripe there is a dentate white line from vein 5 to the tornus. Secondary pale orange-brown, the base almost yellowish orange.

♀. Like the male, but the secondaries are darker.

Expanse: ♂ 44, ♀ 46 mm.

Hab. The type is in my collection. The species occurs at Ekeikei and the Kebea Range in March and April, and in July.

Reticulana gen. nov.

Palpi with second joint heavily scaled, long, reaching above the vertex, third joint long, smooth; antennae minutely and finely ciliate in both sexes; all the legs thickly scaled to the end of the tibiae; head with short projecting tufts from the base of the antennae; collar with a high erect tuft; abdomen tufted on the proximal segment. Neuration: Primary with vein 2 from the basal side of the centre of cell, 3 and 4 below the angle, 5 from the angle, 6 from below the upper angle, 7 from 8 at the end of the areole; 8 and 9 stalked, given off from 10 by a bar to form the areole; 11 from basal side of the centre of cell. Secondary with 3 and 4 from the angle, 5 from just below the centre, 6 and 7 from the angle. Costa straight, slightly depressed at apex; termen receding very gradually to the tornus.

Type: *Reticulana costilinea* B.-B.

38. **Reticulana costilinea** spec. nov.

♂♀. Head blackish brown, with white tufts from the antennae; thorax blackish brown, collar and patagiae edged broadly with whitish grey; metathoracic tuft small, edged with grey; abdomen dark greyish, with proximal tuft on dorsum. Primary dark grey, costa blackish with a series of short oblique whitish dashes, a small subbasal blackish spot ringed with whitish grey, a blackish very irregular median oblique area edged and invaded by whitish grey lines, a posterior series of blackish spots interrupted by the vein-space of vein 2, edged with whitish grey, a subterminal smaller series, and a complete terminal series of similar spots;

termen whitish crennlate. Secondary dark greyish brown, with a short darkish terminal dash above the tornus and a short white dash from the termen between veins 1*a* and 2.

Expanse: 44 mm.

Hab. Ekeikei, March; Babooni and Dinawa, September; Aroa River. Type in my collection; other specimens in the Tring Museum.

39. **Perciana bistrigata** spec. nov.

♂. Head and thorax pale pinkish brown, patagiae dark purplish brown, abdomen greyish with dark purplish dorsal tufts. Primary pale pinkish brown, with antemedial and postmedial creamy lines, the former curved and very oblique, the latter erect, enclosing an area of dark purplish brown below the cell; the postmedial is excurved and very fine above the lower angle of the cell, a dark band of shading in the postmedial area. Secondary uniform brownish.

Expanse: 30 mm.

Hab. The type is in my collection from Dinawa, and was captured in September.

40. **Perciana meeki** spec. nov.

♂. Head and thorax dark purplish brown, abdomen greyish. Primary purplish brown, with a nearly erect antemedial line and an incurved medial creamy line, enclosing a dark area below the cell between them; a trace of a postmedial creamy line in the costal area, with a broad stripe of very dark purplish beyond it; termen irrorated with pale lilac. Secondary darkish brown.

Expanse: 38 mm.

Hab. The type is in my collection from Owgarra.

Vittappressa gen. nov.

Palpi upturned, thickly scaled; first segment with longish hairs, second segment somewhat thickened at the end, third segment small, reaching beyond the vertex of the head; antennae of ♂ finely ciliated; thorax with a short metathoracic tuft; abdomen tufted on second segment.

Neuration: with vein 6 from below the angle of the cell, 7 given off from 8, which anastamoses with 9, which is given off from 10 to form the areole, beyond which 10 is appressed to 9 to form a spurious areole beyond, whilst 11 is appressed on to the areole proper and forms a spurious areole above the cell, lying touching vein 10 to the end of the false areole nearer the apex. Secondary with 3 and 4 on a very short stalk, 5 from just below the centre of the discocellulars, 6 and 7 from the angle of the cell.

Type: *Vittappressa rufiplaga* B-B.

This genus is allied to *Perciana* Wlk.

41. **Vittappressa rufiplaga** spec. nov.

♂. Frons pale grey; vertex reddish, thorax pale grey with small tuft reddish; abdomen pale grey with red tuft, and a reddish dorsal patch on segments 5 to 7. Primary pale whitish grey, with two dark points on the costa before the centre and beyond it, three fine costal dashes in front of the apex; a small reddish dash closes the cell; beyond the dark postmedial line from vein 6 the outer part of the wing is reddish brown, with a grey patch at the tornus and in

the middle of the termen ; subterminal pale line crenulate, somewhat indistinct. Secondary pale whitish grey, with a red-brown irregular patch on the inner margin extending obliquely upwards with an ochreous short stripe near its inner margin ; a trace of a white medial crenulate line, with slight darker shading beyond it, margin dotted with red. Termen and fringes of both wings crenulate.

♀. Similar to the male in all particulars.

Expanse : ♂ 32, ♀ 34 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in September.

42. **Borbotana kebeae** spec. nov.

♂. Head, antennae and thorax reddish umber-brown, abdomen pale ochreous grey, dorsal tufts tipped with reddish brown. Primaries dark somewhat lustrous brown, with a broadish creamy white basal stripe, with a prominent projection on the outer margin below the cell and a very slight one above the cell, a postmedial oblique rather irregular narrow whitish stripe very finely intersected in the centre ; beyond this the ground-colour is paler with a very irregular outer edge, beyond which it is quite dark to the termen, which is spotted with blackish between the veins ; between the white postmedial stripe and the apex are three fine white points on the costa followed by a short white very fine W-shaped mark, an obscure dark dot at the end of the cell. Secondaries whitish with brownish costa and termen, which latter tapers rapidly to the tornus. Undersurface : Primaries somewhat lustrous brown with a whitish dash at the upper angle of the cell but beyond it ; secondaries whitish, densely irrorated with reddish brown along the costa and the termen tapering rapidly to the tornus ; in front of the apex there is a distinct dentate short line on the costa with a trace of a continuation towards the inner margin.

♀. Just like the male, only more mottled in the brown colour of the primaries.

Expanse : ♂ 31 mm., ♀ 33 mm.

Hab. The type is in my collection from the Kebea Range ; it flies in March and April ; other specimens from Ekeikei.

This is no doubt a local race of *B. nivifascia* Walker, but all the New Guinea specimens are uniform in their narrow, almost even, postmedial line.

43. **Borbotana ekeikei** spec. nov.

♀. Head, thorax, antennae and palpi reddish brown, abdomen pale brownish grey. Primary very dark brown for the basal half, with a very broad whitish antemedial band slightly curved on its inner margin, but with two projected blunt dentate marks on its outer margin, the one at the lower margin of the cell being much the larger ; the dark area is margined by a fine white line, with a sharp toothlike projection at the end of the cell inclosing a small whitish spot ; posterior half of the wing very pale pinkish brown, darker towards the termen, with an oblique short reddish brown dash from the apex. Secondary pale reddish brown, becoming whitish towards the base. Undersurface : Primary uniform lustrous pinkish brown ; secondary as above, but with a postmedial dark line.

Expanse : 28 mm.

Hab. The type is in my collection from Ekeikei. This insect flies in March and April.

44. **Borbotana dinawa** spec. nov.

♂. Head, thorax, antennae and palpi blackish brown, abdomen pale brown with dark dorsal tufts. Primary very dark blackish brown, with a paler dash below the costa at the end of the cell, and the terminal area paler, termen narrowly very dark; from the base of the costa a white-toothed very oblique dash extends to the lower margin of the cell about halfway along, and is slightly toothed at the costa, on the outside more strongly before its centre and yet more strongly at its lower extremity where it is broadest; at the upper end of the cell is another dash almost hook-shaped at its inner end; secondary whitish, dark towards the termen.

Expanse: 27—28 mm.

Hab. The type is in my collection from Dinawa, and the species flies in September.

45. **Tarache kebeae** spec. nov.

♂. Head white, collar white finely divided in the centre with black and with a broad central black tip, thorax white, patagiae with a black lateral dash, abdomen grey, almost black below with a white abdominal patch; legs blackish, a white spot at the femoral and tibial joints. Primary white with a short basal black dash in the cell, a subbasal black point on the costa followed by a black wedge-shaped spot beyond which is a large irregular wedge-shaped black patch, with a small squarish spot beyond it, followed by a black point, an apical black patch, touching a black spot on the termen, a black patch at the tornus, and a black wedge-shaped patch nearer the base with a small black spot between the two. Secondary blackish grey, whitish on the inner margin and at the base, fringe whitish except in the apical area, where it is blackish. Undersurface, both wings sooty black. Primary with a white costal spot before the apex, and on the termen below the apex and above the tornus; secondary, innermarginal and basal areas whitish.

Expanse: 32 mm.

Hab. The type is in my collection from the Kebea Range, where the insect flies in March and April.

46. **Bagada dinawa** spec. nov.

♂. Head and thorax pale ochreous grey darkly irrorated, abdomen brownish. Primary pale ochreous grey, irrorated in parts with darker pinkish grey; the antemedial, medial and postmedial lines are present in the costal area, but are not continued below the cell; a large dark pinkish grey patch occupies the end of the cell and beyond the cell, in which the reniform stigma shows as an orange spot, and the orbicular stigma precedes it and is palely encircled, a darkish dash from the apex to the dark patch. A subterminal serrated grey line is obscurely discernible at the end of the patch previously mentioned, three dark dots above the tornus. Secondary pinkish grey, with a darker termen and a pale costa.

Undersurface: Primary pinkish, with a dark subcostal stripe and a darkly spotted postmedial line, terminal area grey. Secondary greyish, darkly irrorated in parts with an irregular dark postmedial line.

Expanse: 28 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in August. The species will come next to *B. spicea* Guen.

47. **Bagada fuscostrigata** spec. nov.

♂. Head and palpi reddish brown, collar grey, patagiae reddish, abdomen brownish grey. Primary reddish with the inner margin slate grey, an oblique dark grey stripe from just below the apex to the middle of the inner margin, outside which the ground colour is greyish, the termen between veins 3 and 6 being paler; the red area has a mottled appearance, the orbicular and reniform stigmata being pale with a paler spot below the latter, whilst above them on the costa is an indefinite patch of grey, and a pale spot at the apex. Secondary uniform dark grey.

Expanse: 42 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in March and April. The species will come next to *B. lignigera* Walker.

48. **Bagada incertissima** spec. nov.

♂. Frons pale ochreous mixed with pink, head reddish mixed with pale greenish scales, collar reddish with two grey lines across, thorax reddish ochreous with greenish patagiae, abdomen pinkish brown with an ochreous extremity. Primary chestnut brown with a pale subbasal patch below the cell, below which is a dark dash followed by a pale dash on the inner margin; near the centre of the costa are three short dark broad lines to the cell; posterior half of wing darkly blotched, with the orbicular and reniform stigmata more or less distinct, with a creamy white narrow quadrate spot emitted just beyond the latter; posterior line dark and dentate, followed by a broader pinkish line; tornus to middle of inner margin and termen green; termen above the centre paler, tinged with green; on the costa above the whitish quadrate mark is a pale patch. Secondary uniform brown with a slight lustre.

Undersurface: Primary brown, costa paler, inner margin quite pale; a trace of a postmedial dark line, followed by a paler one; a distinct creamy subterminal dentate line. Secondary pale, with an interrupted dark postmedial line, beyond which the wing is rather darker, with a pale termen darkly spotted; a dark spot at the end of the cell.

♀. Like the male, but darker, with the exception that in the primaries the pale ochreous parts in the male are green in the female, and the green parts of the male are ochreous in the female.

Expanse: ♂ and ♀ 38—40 mm.

Hab. The type is in my collection from Ekeikei. Its general time of flight is in March and April; but I have specimens taken in January and also in July. Other specimens are in the Tring Museum from the Aroa River.

This species is most variable, scarcely two specimens being alike. I have specimens quite dark all over, with dark green patches as described and a large pale apical patch. Again, others are strongly suffused with green, and have an almost black apical patch. I have a male which is pale ochreous with no green at all, the only constant mark apparently being the small whitish quadrate spot just beyond the reniform stigma; this appears in all the specimens that we have received.

49. **Bagada nigrostrigata** spec. nov.

♂. Head and thorax ochreous, patagiae tinged with pink, collar broadly edged with dark brown, abdomen ochreous grey. Primary pale ochreous, tinged

with pinkish in parts; basal line very obscure, almost obsolescent, except across cell; a double antemedial interrupted line, curved and waved, the outer line darker than the inner; reniform stigma pale greenish, above it a dark costal patch with a blackish spot in front of the upper part of the reniform; postmedial line interrupted, serrate; termen slightly fuscous to this line; subterminal line distinct, waved and irregular with a pale exterior edging; a blackish dash between veins 3 and 4 from the reniform stigma to the termen; fringes darkly dotted at their extremities. Secondary pale brownish.

Expanse: 38 mm.

Hab. The type is in my collection from Dinawa.

50. **Xanthoptera dinawa** spec. nov.

♂. Head and thorax ochreous grey, abdomen darker grey. Primary ochreous grey, finely irrorated with blackish scales; basal, antemedial and medial lines suffused, interrupted and angled about the cell; postmedial suffused for the costal part and angled on vein 7, from which it recedes to the inner margin in a double line and is crenulate; a dark grey subapical patch; a dark grey subterminal spot below vein 3; termen darkly dotted. Secondary pink, with a dark spot closing the cell; a dark postmedial line; termen broadly dark grey; fringes to both wings ochreous.

♀. Similar to the male, but paler.

Expanse: ♂ 29—32 mm.; ♀ 36—37 mm.

Hab. The type is in my collection from Dinawa, where the species fly in August and September.

51. **Cosmia inconspicua** spec. nov.

Head and prothorax greyish white tinged with pink, patagiae ochreous grey, abdomen pale brownish ochreous, legs grey, tarsi ringed with white. Primary ochreous pale grey, sparingly irrorated with dark grey, with a dark medial and postmedial line projected outwards in the cellular area, the interspace being darkly filled in; an obscure grey serrated subterminal line; the terminal area brownish ochreous, with a broad dash of the same colour between veins 5 and 7 into the postmedial line; termen finely darkly dotted; fringes tipped with grey; an obscure grey spot on the costa before the apex. Secondary pale subhyaline greyish, ochreous near the termen.

Expanse: 32 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in March and April.

52. **Acontia aroa** spec. nov.

♂. Head and thorax very pale canary-yellow, the latter with a red fawn-colour central stripe; abdomen yellowish grey. Primary pale canary-yellow, with a reddish fawn-colour central stripe expanding gradually from the base into the apex, and nearly into the tornus at the termen; a slight shading of the same colour along the inner margin. Secondary yellowish cream-colour.

Expanse: 46 mm.

Hab. The type is in my collection from the Aroa River. It will come next to *A. emboloscia*, but it entirely lacks all transverse lines.

53. **Zalissa ekeikei** spec. nov.

♂. Head pinkish buff, collar purplish red-brown with a central triangular patch of pale cinnamon-brown, thorax pale cinnamon-brown with pale whitish grey patagiae mottled with chocolate-brown, abdomen yellowish. Primary warm cinnamon-brown with a fine pale costa, inner margin broadly purplish brown, irrorated with whitish, with a pure white internal line extending round the tornus in a small angle, termen broadly purplish, confluent with the inner margin, the terminal area being pale, irrorated with whitish (but to a less extent than the inner margin), and margined internally by a curved dark purplish line, which is again edged internally by a broader and darker stripe of the same colour, having an almost straight internal border ; termen finely dark. Secondary yellow with a dark brown termen very broad at the apex, tapering narrowly to the tornus, where are two short waved pale lines. Fringes white for the apical half, dark below vein 3.

Expanse : 44 mm.

Hab. Ekeikei, where the species flies in March and April ; we have it also from other localities.

The type is in my collection.

54. **Zalissa kebeensis** spec. nov.

♂. Differs from *B. ekeikei* in that the primary is pink above the cell, gradually toning down into a pale yellowish olive ; the borders are similar to the previous species, but darker. The secondary is yellow with the termen broadly brown from vein 6, increasing in width slightly at the tornus. The underside is uniformly pale yellow in both wings with only a narrow darkish termen, but having none of the dark pattern of *ekeikei*.

Expanse : 45 mm.

Hab. Kebea Range, Aroa River, February and March.

Type in my collection ; other specimens in the Tring Museum.

55. **Rivula aroa** spec. nov.

♂. Head and collar whitish, thorax tinged with grey, abdomen ochreous grey. Primary ochreous grey, with antemedial and postmedial pale lines excurved at the cell, reniform dark spotted with black, subterminal line dotted, terminal area darkish, termen preceded by a fine whitish line. Costa finely dark, with three whitish points before the apex. Secondary greyish, darker near the termen.

Expanse : 30 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was captured in March.

The species comes near *R. ommatopis* Hpsn.

56. **Rivula meeki** spec. nov.

♂. Head and collar sepia brown, thorax lavender grey, abdomen grey. Primary, base very restricted greyish, a large median sepia-brown patch with a lavender centre ; this patch does not extend over the cell ; a small sepia-brown costal patch with lavender-grey edging precedes the large patch ; postmedial and subterminal whitish irregular lines enclosing a lavender-grey band ; subapical area with dark dashes ; termen with dark dashes edged internally with white. Secondary greyish.

Expanse : 20 mm.

Hab. The type is in my collection from the Aroa River ; other specimens are in the Tring Museum from the same locality in March.

57. **Tathodelta aroensis** spec. nov.

♂. Head, thorax and abdomen pale lilac brown. Primary pale lilac brown, with olive-brown bands and lines ; an irregular antemedian and median line, the latter broadly edged externally with a band of slightly paler olive brown. Position of reniform marked by two small blackish spots ; a darkish irregular subterminal band of shading ; termen broadly olive brown. Secondary pale greyish.

Expanse : 26 mm.

Hab. Aroa River, March.

Type in the Tring Museum.

Eublemmoides gen. nov.

Palpi upturned, thickly clothed with long hair ; third segment minute, reaching above vertex of head ; antennae minutely ciliate. Legs short, stout, with tufts of long hair on tibiae, and to a less extent on tarsi of the hind pair ; both mid- and hindtibiae with two pair of spurs. Wings : costa of primary depressed before apex, which is strongly excised below, making it almost falcate, produced into a point between veins 3 and 4, and again excised slightly to the tornus. Secondary angular, with costa nearly straight, termen rapidly receding to tornus. Neuration : Primary, veins 6 and 7 from the angle ; 8, 9 and 10 stalked from in front of the angle. Secondary with cell very short, not more than a quarter of the wing ; veins 3 and 4 on a short stalk, 5 from below the centre, 6 and 7 from the angle.

Type : *Eublemmoides dinawa* B-B.

58. **Eublemmoides dinawa** spec. nov.

♂. Head and collar dark red-brown ; thorax and abdomen whitish grey. Primary ochreous grey for the basal half of the wing margined by the medial line, which is darkly dotted, obliquely produced externally to beyond the cell, whence it recedes in an angle to the inner margin ; a trace of a subbasal line below the costa ; outer half of wing darker grey, with a brown fine postmedial line followed by a row of whitish points, and a band of yellowish brown shading. Secondary whitish grey, slightly darker towards the termen, with termen rather broadly yellowish brown. Both wings are finely but sparsely irrorated with dark scales.

Expanse : 24 mm.

Hab. The type is in my collection from Dinawa, where it was taken in the month of August.

This genus appears to be most nearly allied to Hampson's Section III. of *Eublemma* Hb.

59. **Magulaba nigra** spec. nov.

♂. Head, thorax, and both wings dark slaty grey, with an interrupted dark subbasal line ; a blackish postmedial line excurved beyond the cell, interrupted by the paler veins ; reniform darkly outlined, a subterminal irregular line of darkish shading ; termen with fine dark points. Secondary with a dark postmedial line,

with a paler external edging, beyond which is a short similar line in the tornal area only.

Expanse : 24 mm.

Hab. Aroa River, March.

Type in my collection; other specimens are in the Tring Museum.

60. **Zagira bicolora** spec. nov.

♂. Head and collar dark grey, thorax creamy white, abdomen grey. Primary with a broad creamy white costal stripe ; the rest of the wing dark grey, in which is a postmedial waved whitish line, edged internally by a dark line ; a trace of a dark subterminal line ; both these lines are carried through the secondaries. Secondary with very restricted whitish base, the rest of the wing being dark grey.

Expanse : 21 mm.

Hab. The type is in my collection from the Aroa River, where it occurred in March ; other specimens are in the Tring Museum from the same locality. Two of the Tring specimens differ somewhat from my type ; in one the costal stripe is snow-white, and in the other almost rusty white.

61. **Zagira pratti** spec. nov.

♂. Differs from *bicolora* in that the postmedial line is broadly white, with a fine dark central line in it ; the subterminal line is pale, projected forwards on vein 4, and slightly curved inwardly above and below it ; the shape of the secondaries is much more angular.

Expanse : 21 mm.

Hab. The type is in my collection from Dinawa, where it occurred in August.

62. **Corgatha bipunctata** spec. nov.

♀. Head dark grey with a few pink scales intermixed, thorax pinkish ochreous pale brown, abdomen pinkish ochreous pale brown with the anal half blackish on the dorsum. Primary pinkish ochreous pale brown, with the costa blackish for the basal half and two white costal spots near the centre ; three black points from the first white costal spot marking the course of the absent antemedial line ; a trace of the medial line from the second white spot ; a trace of the postmedial line in a series of black points with white externals, the two points near the inner margin being larger and suffused ; three black terminal dots below the apex with a blackish grey internal suffusion ; below the apical dots are four black terminal points on the veins. Secondary similar in colour to the primary, with an antemedial dotted line and a postmedial dotted line, as also a dotted termen as in the primary ; a strong blackish suffusion in the tornal area, developing mainly in two serrated short innermarginal lines.

Expanse : 29 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September.

63. **Corgatha pulchra** spec. nov.

♂. Head and thorax lavender grey, abdomen brownish. Primary with base pale lavender grey, with a double dark antemedial line filled in with lavender grey ; the outer line is waved below the cell ; median area bright orange-red, edged externally by an irregular double postmedial line, the inner line of which is blackish

and the outer serrate and dark ; this is followed by an irregular indefinite area of bright orange-red ; subterminal line irregular, with a large apical lavender-grey patch edged darkly internally ; below this the tornus is duller reddish. Secondary orange-brown with double medial and postmedial lines, which are irregularly waved ; termen crenulate with fine dark points.

Expanse : 22 mm.

Hab. Aroa River, March.

Type in my collection. Other specimens in Tring Museum.

The Tring Museum has one specimen which is quite dull purplish in tone of colour.

64. **Corgatha albolineata** spec. nov.

♀. Head, thorax, and abdomen chocolate-brown, the former irrorated with grey ; both wings chocolate-brown. Primary, base with a short white dash ; antemedial dark line with pale grey indefinite margins ; postmedial pale line waved, irregular ; an oblique white line from the inner margin near base to upper margin of cell and continued along vein 7 ; veins 8 and 9 outlined with whitish grey, a white spot in the cell crossing the white line, a white curved line from the costa enclosing a mottled apical patch, at the top and bottom of which is a white spot ; from the lower edge of the white curved line the subterminal pale serrate line descends to near the tornus ; termen dotted with black, costa dotted with white, cilia tesselated with cream below the apex. Secondary with restricted white base ; a black dot in the cell ; medial and subterminal pale lines waved and irregular ; termen with a row of fine black points edged internally with fine white points just in front of it ; inner margin creamy white.

Expanse : 26 mm.

Hab. Aroa River, January.

Type in the Tring Museum.

This species will come next to *C. plagiostola* Hpsn.

65. **Corgatha mediopallens** spec. nov.

♂. Head, thorax, and abdomen pale pinkish grey with a central prothoracic spot of rusty reddish ; abdomen rusty reddish on the proximal segment. Both wings pale slaty-grey. Primary mottled with rusty reddish, edged by a dark line ; reniform dark with a dark angled dash to the costa ; postmedial line indistinct, incurved on the fold ; a rusty-reddish patch at this point and a large rusty-reddish patch in front of the apex, with an irregular white subapical curved line ; termen darkly dotted. Secondary with an obscure trace of a medial and postmedial line ; termen with fine dark points.

Expanse : 24 mm.

Hab. Aroa River, March.

Type in the Tring Museum.

66. **Corgatha nigropunctata** spec. nov.

♂. Head and thorax pale umber-brown. Both wings pale umber-brown ; a trace of an antemedial, medial, and postmedial line, the two latter excurved over the cell ; one or two blackish basal points ; a black spot in the cell ; subterminal indistinct line, rising from a white waved short costal stripe ; termen with fine

black points. Secondary with the lines as in primary, carried through, and the termen with fine black points.

Expanse : 24 mm.

Hab. Aroa River, February.

Type in the Tring Museum.

67. **Oruza dinawa** spec. nov.

♂. Head, thorax, abdomen, and both wings pale reddish brown. Primary with a broad inwardly oblique dark purplish brown stripe, beyond which is the irregular fine subterminal darkish line ; termen angled between veins 3 and 4. Secondary like the primary, but the brown broad line is slightly outwardly oblique.

Expanse : 31 mm.

Hab. Dinawa, August.

Type in my collection.

68. **Oruza aroa** spec. nov.

♂. Head, thorax, and abdomen dull reddish brown ; collar very pale, pinkish ochreous grey. Both wings dull reddish brown, with an oblique dark stripe carried through both wings. Primary with a trace of a waved irregular fine dark line, which is scarcely perceptible in the secondary.

Expanse : 26 mm.

Hab. Aroa River, March.

Type in my collection ; also specimens in the Tring Museum.

69. **Oruza variegata** spec. nov.

♂. Head, thorax, and abdomen ochreous, densely covered with purplish pink. Both wings yellow ochre, densely irrorated all over with purplish red, except in the primary ; a subtriangular costal patch over the cell and a large apical patch ; an antemedial fine line, a medial oblique broad darker stripe, a postmedial fine serrate line. Secondary with basal ochreous, a broad medial darker stripe followed by an innermarginal ochreous patch, a reddish irregular postmedial line edged externally with ochreous ; an ochreous tornal area.

Expanse : 24 mm.

Hab. Dinawa, August ; Aroa River, January.

Type in my collection ; also specimens in the Tring Museum.

70. **Oruza unipunctata** spec. nov.

♂. Head, thorax, abdomen, and both wings pale pinkish. Primary with slightly waved antemedial and postmedial ochreous lines ; reniform rusty reddish brown. Secondary with a waved postmedial ochreous line ; a dark spot in the cell.

Expanse : 22 mm.

Hab. Aroa River, February.

Type in the Tring Museum.

71. **Phanaspa ochracea** spec. nov.

♀. Head, thorax, and abdomen ochreous grey. Both wings ochraceous. Primary with a fine dark antemedial line, a median dark obscure clondy band, a fine crenulate dark postmedial line ; subterminal line pale irregular dentate.

indefinitely edged laterally on each side with dark grey, with a small apical dark patch; termen with black dot. Secondary with greyish base, a dark dot in the cell, a crenulate waved dark postmedial line; termen very broadly darkish grey, with a pale crenulate line in it; termen with black dots.

Expanse: 30 mm.

Hab. Dinawa, September; Aroa River, February.

Type in my collection; also specimens in the Tring Museum.

72. **Phanaspa rubra** spec. nov.

♂. Head, thorax, and abdomen pinkish ochreous. Primary pinkish ochreous, with a trace of a basal dark line; an irregular fine dark antemedial and medial line, an obscure postmedial line terminating in a blackish spot above the tornus, an obscure subterminal line; termen with fine black points; a black dot in the cell. Secondary pinkish, with obscure medial, postmedial, and subterminal lines; termen crenulate, with fine black points.

Expanse: 22 mm.

Hab. Aroa River, February.

Type in the Tring Museum.

This species will come next to *P. ustula* Hpsn.

73. **Phanaspa punctata** spec. nov.

♂. Head, thorax, and abdomen greyish. Both wings pale ochreous greyish, with the lines marked out by blackish dots; two submedian blackish dots in the cell, two blackish dots at the end of the cell; a curved line of postmedial dots incurved on the fold; an interrupted row of subterminal dots; termen dotted. Secondary with median, postmedian, and terminal row of dots.

Expanse: 31 mm.

Hab. Aroa River, January.

Type in the Tring Museum.

74. **Phanaspa dinawa** spec. nov.

♂. Head, thorax, abdomen, and both wings very pale cinnamon-brown. Primary with a trace of a pale subbasal line; postmedial line obscure, pale, crenulate, excurved at the cell; between it and the very irregular subterminal line is another indefinite pale serrate line; subterminal line darkly edged, and with a dark patch at the inner margin; one or two dark points in the cell; termen with blackish dots. Secondary with two dark points across the cell; a pale medial dentate line, followed by an indefinite similar line; postmedial pale line crenulate; termen with dark points; on the inner margin above the tornus are three dark chocolate spots.

Expanse: 28 mm.

Hab. Dinawa, August; Aroa River, January.

The type is in my collection; other specimens in the Tring Museum.

75. **Pseudacidalia unilineata** spec. nov.

♂. Thorax, abdomen, and both wings pale dull cinnamon-brown. Primary with a fine outwardly oblique antemedial dark oblique line, a broad inwardly oblique dark postmedial line palely edged externally; termen with fine black points; cell with a dark point. Secondary exactly like the primary, but without

the antemedial line and with a small ochraceous patch from the obliqne line by the cell.

Expanse : 25 mm.

Hab. Aroa River, January.

Type in the Tring Museum.

The species will come next *P. albicosta* Moore.

76. **Microeschus parva** spec. nov.

♂. Both wings creamy whitish. Primary with traces of antemedial and postmedial lines, the latter being fairly distinct ; reniform darkly edged internally with a dark costal dash over it ; termen dark. Secondary with traces of antemedial and postmedial lines ; termen dark.

Expanse : 12 mm.

Hab. Aroa River, January.

Type in the Tring Museum.

PALINDIINAE.

77. **Dinumma hades** spec. nov.

♂. Head, palpi, and thorax dark brown ; abdomen greyish, with dark brown tufts on the dorsum. Primary dark brown, with a slightly paler antemedial, strongly dentate line having a fine dark linear outer edging ; postmedial line excurved slightly crenulate ; a trace of a fine pale grey subterminal line; a fine terminal series of blackish short lunular lines in the vein interspaces. Secondary uniform greyish brown, with a pale broad band across the medial part of the cell which is interrupted by the veins.

Expanse : 31 mm.

Hab. The type is in my collection from Dinawa, where the species flies from May to July ; other specimens in the Tring Museum.

78. **Dinumma mediobrunnea** sp. nov.

♀. Head and thorax chocolate-brown finely irrorated with greyish, abdomen greyish with chocolate-brown dorsal tufts. Primary with basal area pale greyish, a very small purplish brown basal costal patch, antemedial line waved irregularly, postmedial line pale tortuous, the area between these lines uniformly dark purplish brown; following the postmedial line is a band of pale reddish chestnut, beyond which the area is paler lilac brown with a dash of reddish above the two deep black spots below the apex and above the tornus near the termen ; a pale spot edges the former spot below ; subterminal line pale and crenulate ; in front of the termen is a row of silvery white spots, termen finely pale. Secondary greyish brown, slightly paler basewards.

Expanse : 32 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in July.

79. **Callyna biplagiata** spec. nov.

♂. Head and collar deep chocolate-brown, the latter finely tipped with lilac-brown, thorax lilac-brown, abdomen brown. Primary pale lilac-brown with an irregular subbasal costal patch, extending just below the cell, and a large costal

patch from the end of the cell nearly to the apex of deep chocolate-brown ; the latter has an evenly curved interior margin, and both are palely edged ; the antemedial line forms the outer edge of the dark subbasal patch, and is projected forwards to the inner margin; the medial line consists of an indefinite band, somewhat curved, of darker brown ; the postmedial line consists of the margin to the large costal patch nearly to its middle, when it descends perpendicularly to the inner margin ; three dark spots edged externally with whitish are below the outer edge of the large patch ; the orbicular and reniform stigmata are edged with whitish ; there is a small white apical patch ; fringes white by this patch, brown below it. Secondary uniform dark brown, slightly paler from the end of the cell up to the costa.

Expanse : 43 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in January and February.

80. **Callyna fuscantaria** spec. nov.

♂. Head and thorax reddish brown sparingly irrorated with pale grey, abdomen greyish brown, legs brownish palely ringed. Primary reddish brown, with the antemedial line waved and outwardly oblique ; the postmedial line is excurved and crenulate ; both of these lines rise in a pale costal dot ; between the two, crossing the end of the cell, is an angled band of dark brown somewhat indefinite as to its margins ; a large dark reddish brown patch extends from the apex along the termen almost to the tornus ; immediately in front of the apex is a trace of a round spot obscurely outlined with pale grey. Secondary uniform dark brown, slightly lustrous.

Expanse : 30—38 mm.

Hab. The type is in my collection from Ekeikei. The species flies in March and April.

81. **Westermannia longiplaga** spec. nov.

♂. Head pale grey with a pair of dark grey patches, collar pale lavender-grey, darker at the tip, thorax dark smoky grey with whitish grey patagiae and metathoracic tuft, abdomen grey. Primary very pale lavender-grey with a trace of a medial and postmedial lines which are slightly oblique ; the whole of the cell and expanding somewhat to the termen is dark greyish bronzy brown, with an interior blackish grey stripe to well beyond the cell, whence it ascends obliquely to the apex ; below the angle of this stripe is a whitish dotted line to the inner margin, with which a subterminal row of similar spots is roughly parallel. Secondary whitish grey, darker at the termen.

Expanse : 50 mm.

Hab. The type is in my collection from Dinawa, where the species flies in August.

The species is nearest *W. argentea* Hamps.

82. **Homodes punctistriga** spec. nov.

♂. Head, thorax, and abdomen dull brick-red. Primary dull brick-red, with antemedial, medial, postmedial, and subterminal spotted lines of silvery lead colour ; between the two latter are two lines of darker red ; all the lines are somewhat

waved; termen finely black with preceding fine black dashes. Secondary exactly like the primary without the postmedial line.

Expanse: 30 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in March and April.

SARROTHRIPINAE.

83. **Earias uniplaga** spec. nov.

♂. Head, thorax, and primaries palest sulphur yellow, abdomen whitish. Secondary white, somewhat hyaline. Primary with the costa at the base deep reddish brown; an orange spot at the end of the cell, somewhat of the shape of a figure 8, margined with deep rusty red.

♀. Like the male, but without the spot at the end of the cell.

Expanse: ♂ and ♀ 32 mm.

Hab. Dinawa, the Kebea Range, July and August; Aroa River, February and March.

Type in my collection, and in the Tring Museum are other specimens.

84. **Earias rufopunctata** spec. nov.

♂ and ♀. Similar to *E. unoplaga*, but somewhat paler and with no dark costa at the base of the primary, whilst instead of the peculiar spot at the end of the cell the primary has a very pale round slightly rusty spot.

Expanse: 30 mm.

Hab. Dinawa and Aroa River, July.

Type in my collection, and other specimens in the Tring Museum.

85. **Earias novoguineana** spec. nov.

♂ and ♀. Head, thorax and primary chrome yellow; abdomen whitish tinged with sulphur. Secondary whitish tinged with sulphur-colour. Primary with a dark rusty-red round spot at the end of the cell, preceded by two obliquely placed dots, a trace of an obtusely angled posterior line having a dark point below the costa, another at the apex of the angle, and two more near the inner margin.

Expanse: ♂ and ♀, 38 mm.

Hab. Dinawa and Kebea Range, July and August.

Type in my collection.

86. **Hylophila rubromarginata** spec. nov.

♀. Head and collar slightly tinged with green; thorax greenish white, abdomen yellowish white. Primary white, with the least greenish tinge at the base and in the postmedial area, with oblique yellowish antemedial and postmedial lines, the latter being very oblique and straight; this last point is constant in all our specimens (a good series). In *H. orientalis*, its nearest ally, this line is curved. Costa and inner margin narrowly pink; termen deep pink and somewhat wider. Secondary pure white.

Expanse: 36 mm.

Hab. The type is in my collection from the Kebea Range, where it occurred in March and April. Other specimens are in the Tring Museum from the Aroa River.

87. **Gadirtha costipallens** spec. nov.

♀. Head ochreous grey, collar greenish; thorax pale grey with greenish patagiae; abdomen pale ochreous grey. Primary grey, with a slight suffusion of greenish; a blackish subbasal patch, within which is a small ochreous short dash; apical two-thirds of costa broadly whitish grey, median dark line fine, very obscure, with a dark dot in the cell; reniform pale brown, darkly pupilled and finely encircled; postmedial line linear black, waved, produced rapidly outwards to vein 6, receding rapidly to inner margin from vein 2, beyond which the ground-colour is pale reddish, a dark dash below the apex, a row of subterminal obscure short white dashes. Secondary dark grey with paler inner margin.

Expanse: 42 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs in January and February.

88. **Gadirtha inconspicua** spec. nov.

♀. Collar pale chocolate-brown finely irrorated with dark grey; thorax and abdomen pale grey irrorated with dark grey. Primary pale olive-grey for the basal half, with the costa pale chocolate-brown, terminal half pale chocolate-brownish, the inner margin being strongly oblique, a trace of a subbasal line, subterminal line dark, very irregular, angled, rising in a whitish grey costal patch; apex with an oval whitish-grey patch from which descends the serrate subterminal interrupted line. Secondary dark grey, pale in the basal area.

Expanse: 40 mm.

Hab. The type is in my collection from the Kebea Range, where the insect flies in May and June.

89. **Ochthophora turneri** spec. nov.

♀. Collar grey, very broadly banded for its upper edge with dark purplish grey; patagia ochreous grey with the metathoracic tuft darker. Primary lilac grey with the base ochreous grey, palest on the costa; subbasal area dark grey, margined by the irregular serrated fine antemedial line; a small raised dull chestnut spot in the cell followed by a larger similar one at the end of the cell; postmedial line broadly serrate, very irregular, receding inwards and encircling irregularly the larger raised spot, below which it recedes to the inner margin; a subterminal row of fine dark spear-shaped marks palely infilled, interrupted in the nerve spaces, followed by a row of fine dark dashes. Termen darkly dotted. Secondary pale grey, paler towards the base and inner margin.

Expanse: 40 mm.

Hab. The type is in my collection from Babooni, where the species flies in September.

This species is near *O. sericina* Turner, but differs in the pale base and dark subbasal area, and the subterminal line is quite different.

90. **Labanda viridescens** spec. nov.

♀. Head brown, collar dark brown with frontal of green scales; thorax greyish brown; abdomen ochreous. Primary greyish brown, with a suffusion of green scales all over the wing with the exception of the median area, where it is scanty; this suffusion is most prominent in the basal and postmedial areas, also over the

cell; the subbasal line is whitish in the costal area and greenish below; the dark postmedial line is palely edged, or greenish in parts, very irregular and strongly serrate; in the postmedial area there is a dark band of the ground-colour and a smallish dark apical patch. Secondary orange-yellow, with termen finely dark and apex somewhat more broadly dark.

Expanse: 35 mm.

Hab. The type is in my collection from Mount Kebea, where it was taken in the month of July.

91. **Labanda crenulata** spec. nov.

♀. Head and thorax grey, darkly irrorated; abdomen darker grey. Primary grey, very finely irrorated with darker grey; basal line dark, irregular, with a pale grey exterior edging; medial dark line oblique dentate, with a pale grey interior edging; posterior line excurved, crenulate, with a fine exterior paler edging; subterminal line pale, interrupted, above the tornus a blackish patch between the two latter lines, above which is another smaller blackish patch over vein 6; in front of the apex a pale grey patch on the costa, with a dark small patch on its inner edge; termen blackish. Secondary uniform dark grey.

Expanse: 30 mm.

Hab. The type from Ekeikei is in my collection. The species flies in March and April. In the Tring Museum are other specimens from the Aroa River.

This insect is near *L. griseonigra*, but the lines all differ, especially the basal and medial ones.

92. **Alibama kebea** spec. nov.

♂. Head and thorax russet brown, collar banded with dark brown, abdomen greyish brown. Primary russet brown, with darker brown lines and markings; basal line short and irregular, antemedial line bluntly dentate, medial line almost obsolete; postmedial line strongly excurved and serrate for its costal half, receding in a deep arch from vein 5; a series of blackish dashes in the terminal area edged by short pale cream-coloured lines; between the postmedial and antemedial lines is a large very dark indefinite patch, inner margin broadly dark; the position of the reniform stigma is marked by an obscure cream-coloured exterior edging. Secondary uniform dark brown.

Expanse: 31 mm.

Hab. The type is in my collection, being taken in the Kebea Range in March.

93. **Barasa griseola** spec. nov.

♂. Head grey, collar dark grey broadly tipped with white, thorax pale grey, darker on the metathorax, abdomen pale greyish. Primary whitish grey for the basal two-fifths, brownish grey for the terminal three-fifths; antemedial black line fine and interrupted, broadly serrated; postmedial line waved and crenulate; a trace of a strongly angled indefinite subterminal line; a large pale brownish patch immediately precedes the crenulate line. Secondary subhyaline whitish, greyish at the termen, more broadly so at the apex.

♀. Like the male, but paler.

Expanse: 34 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in March and April. I have other specimens from higher up in the Kebea Range captured in May and June.

94. **Barasa pura** spec. nov.

♀. Head white, finely irrorated with pale ochreous brown, thorax and collar white with fine ochreous scaling, abdomen whitish grey. Primary white with very pale fine ochreous scaling in the median and postmedian areas ; costal half of base pale chestnut-brown edged by an oblique black line ; medial black line irregular and interrupted in the cell, postmedial black line projected outwards very obliquely from the costa to vein 5, whence it recedes irregularly to the inner margin ; an indistinct subterminal curved line, two black dots on the costa before the apex, an apical dark rufous brown patch extending to the postmedial line, a palish rufous brown spot at the tornus ; the subterminal area is slightly greyish. Fringes white, darkly intersected. Secondary subhyaline white, termen dark brown, broad at apex, tapering rapidly to vein 1*b*.

Expanse : 32—34 mm.

Hab. The type is in my collection from Dinawa, where the species flies in September. Other specimens I have are from Ekeikei and other localities, taken in January and February.

95. **Barasa nigrescens** spec. nov.

♀. Head and thorax dark mottled grey, abdomen paler grey. Primary dark grey, thickly irrorated with black ; basal area dark, margined externally with an irregular black line ; medial line serrated, somewhat obscure, postmedial line projected forwards from the costa to vein 7, from whence it descends slightly receding to the inner margin as a dotted line ; beyond this is the subterminal line, broad from the costa to the angle of vein 7, along which it extends considerably and descends in a waved line to the tornus, indefinitely margined with palish grey ; termen dark, a short blackish dash at the end of the cell. Secondary subhyaline white, termen dark grey, broad at the apex, rapidly tapering to vein 1*b*.

Expanse : 34 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in May and June.

96. **Blenina owgarra** spec. nov.

♀. Head and thorax whitish grey, collar irrorated with cinnamon-colour, abdomen cinnamon-grey, both wings almost pure white. Primary with base dark grey ; median and postmedian lines irregular, nearly parallel, and enclosing a dark grey area ; subterminal line very irregular, preceded by a darkish grey shading ; termen darkly dotted with a rusty red stripe in front of it ; a rusty red broad indefinite stripe from the end of the cell to the termen. Secondary pure white with a dark grey termen and broad dark apex.

Expanse : 38 mm.

Hab. The type is in my collection from Owgarra.

97. **Blenina nigrans** spec. nov.

♂. Head pale grey mixed with green, collar and thorax blackish, abdomen greyish brown with dark dorsal tufts. Primary blackish grey ; apical area, in an oblique line from vein 3 across the end of the cell, pale greyish ; basal black

line interrupted; medial double line interrupted, traceable below the cell; postmedial line more distinct, edged for the costal half broadly with white; subterminal line distinct, irregular dentate, behind which the costa is pale, followed below by a broad short band of dark greenish; a suffusion of very dark green at the base. Fringes green with white extremities, intersected with black. Secondary dark brownish grey, with dark fringes except between veins 2 and 4, where they are whitish.

Expanse: 32—34 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September. Other specimens are in the Tring Museum from the Aroa River.

98. **Blenina nigrans varians** ab. nov.

♂. Differs from *nigrans* in that the base of the primary is bright grass-green; the black basal line has a broad white external edging to the lower margin of the cell; the median area is rusty brown with a broad edging of darker green, beyond which is a broad band of whitish mixed with rusty grey, followed by a considerable suffusion of green in front of the subterminal line; the thorax and collar are pale grey largely intermixed with green.

Hab. The type from Dinawa is in my collection. We have a fair series of both forms.

99. **Blenina viridata** spec. nov.

♂. Head and thorax green; abdomen dark yellowish. Primary green, paler and mixed with white for the basal half, darker and mixed with blackish for the outer half; basal line interrupted, medial line very irregular; postmedial line irregular and interrupted, followed by broad obscure dashes of blackish between the veins; subterminal line irregular and dentate, obscurely palely edged; area beyond very dark; near the middle of the inner margin is a whitish patch. Secondary dark brownish grey, yellowish at the inner margin and near the base.

♀. Similar to the male, but with an admixture of grey in the medial and postmedial areas.

Expanse: ♂ 32 mm., ♀ 34 mm.

Hab. The type is in my collection. The species was captured at Ekeikei (1500 ft.) flying in January and February, and from high (6000 ft.) in the Kebea Range in March and April. Other specimens are in the Tring Museum from the Aroa River.

100. **Blenina babooni** spec. nov.

♀. Head, thorax, and abdomen dark grey. Primary dark slaty grey, with a subbasal costal pale grey patch; basal line indistinct; medial, postmedial, and subterminal lines edged with dark ochreous, each being somewhat interrupted and irregular; between the two latter is a curved darkish line; the ochreous edging is prominent in the subterminal area. Secondary dark brownish grey.

Expanse: 28 mm.

Hab. The type is in my collection from Babooni, where the species flies in September.

101. **Blenina smaragdina** spec. nov.

♂. Head, collar, and thorax pale green barred with black; centre of thorax whitish; abdomen dark grey. Primary pale green with a basal black dash; a subbasal black costal spot, followed by a white spot; medial line black, interrupted,

edged internally with white, and with a broad white dash below the cell, in a line with which, on the external side of the medial line, is a broad black dash, edged above with white to the postmedial line, which is very irregular and edged externally finely with white, a black mark at the end of the cell confluent with the postmedial line : this mark is also edged with white internally ; a broad subterminal white band to the tornus, where there is a black spot edged with green externally ; an apical and subapical black patch and a small black spot on the termen about vein 3 ; fringes pale greenish, intersected with white and with black. Secondary darkish grey, paler near the base.

Expanse : 40 mm.

Hab. The type is in my collection from Babooni, where the species flies in September.

102. **Hypothripa distincta** spec. nov.

♀. Head white with tips of scales pink ; thorax whitish with an admixture of pink, barred with black : abdomen grey. Primary white, with a suffusion of pale brownish pink in the antemedial and postmedial areas and a suffusion of dull lilac in the lower part of the terminal area ; two blackish spots at the base and a blackish dash near the base on the inner margin ; a broad oblique blackish invaded band across the median area ; a blackish patch, followed by a small black spot on the costa beyond its centre ; a black waved subterminal line, a dark suffused patch at the apex and just below it, a white costal spot immediately in front of it. Secondary whitish, darker grey at the apex and termen.

Expanse : 22 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in September.

103. **Cletthara multilinea** spec. nov.

♀. Head and thorax whitish, abdomen grey. Primary whitish grey, with a subbasal black irregular and serrate line ; medial black line very strongly dentate, connected by two oblique dashes with the very irregular postmedial line ; subterminal black line strongly waved ; termen black with spearhead marks ; fringe white, intersected with grey. Secondary whitish grey, pale at the base.

Expanse : 24 mm.

Hab. Aroa River, March.

Type in the Tring Museum.

104. **Sarrothripa aroa** spec. nov.

♂. Head, thorax, and abdomen blackish, the thorax barred with white. Primary white with black lines ; base darkish with a basal black line ; antemedial line oblique, serrate, almost touching the double medial line at the inner margin ; medial lines rise in a black costal patch ; postmedial line double dentate, rising in a black costal patch and ending in a dark cloud ; subterminal line very irregular, strongly serrate and dentate in part ; beyond this is a grey line of shading nearer the termen ; termen with a fine black line. Secondary greyish, darker near the termen.

Expanse : 22 mm.

Hab. Aroa River, February.

Type in my collection. Other specimens are in the Tring Museum.

This species will come near *S. mesoplaga* Hpsn.

105. **Sarrothripa brunneicosta** spec. nov.

♂. Head and thorax greyish, abdomen darker. Primary darkish grey with a broad white serrate costal line; a fine double dentate median line, a double irregular dentate postmedial line—both these two double lines filled in with whitish; a serrate subterminal line rising in a whitish apical patch; from this patch an oblique pale area crosses the wing; reniform darkly outlined; costa broadly brownish grey with a dark grey spot touching the reniform. Secondary grey, pale at the base.

Expanse: 24 mm.

Hab. Aroa River, January.

Type in the Tring Museum.

This species will come next *S. grisea* Hpsn., but the medial and postmedial lines differ.

106. **Sarrothripa arcuosa** spec. nov.

♀. Head, thorax and abdomen grey, collar brownish grey. Primary dark grey, with a considerable suffusion of dark olive-green scales; near the base is a fine arc of whitish, beyond which the ground-colour is dark olive-green; two dark dots in the cell, in a patch of pale greyish; postmedial line dark greenish, irregular, and produced outward beyond the cell, edged below with whitish; following the postmedial line is a row of dark dashes on the veins, subapical area whitish grey; subterminal line somewhat indistinct in the tornal area. Secondary dark grey.

Expanse: 26 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in August.

107. **Sarrothripa kebea.**

♂. Head whitish; collar brownish at base, black beyond tipped with white; thorax whitish, largely patched with blackish; abdomen dove-grey. Primary blackish, with an antemedial and medial oblique bar of whitish invaded and serrated by the black ground; extreme base whitish; two oblique costal dashes of white at the apex, the hindmost of which touches nearly at right angles a white dash beyond the cell; subterminal line obscure; tornal area up to vein 5 pale grey. Secondary white for basal half, becoming dark grey beyond.

Expanse: 30—32 mm.

Hab. The type is in my collection from the Kebea Range, where the species occurs in March and April. I have specimens from other localities taken in August.

108. **Sarrothripa avola** spec. nov.

♂. Head and thorax white, slightly tinged with green and finely barred with black; abdomen pale grey. Primary greenish white, with about eight very fine oblique irregular dentate or serrate black lines; the innermarginal and terminal areas are darker greyish; the termen is spotted alternately with black and white. Secondary white for the basal half, becoming dark grey beyond.

Expanse: 29 mm.

Hab. The type is in my collection from Avola, where the species occurs in August.

109. **Dendrothripa venalis** spec nov.

♂. Head and collar white mixed with ochreous, the latter with a darkish patch on each side; thorax and abdomen grey. Primary dark grey of a speckled appearance; basal line very obscure; medial line somewhat waved, but angular; postmedial line irregular, projected outwards into an acute angle about vein 3; innermarginal area between these two lines filled with whitish into the angle just mentioned; postmedial line somewhat palely edged, followed by a band similarly angled of very dark brownish grey; subterminal line irregular, edged externally with whitish. Secondary greyish.

Expanse: 22 mm.

Hab. The type is in my collection from Dinawa, where the insect occurs in September.

110. **Exyra dinawa** spec. nov.

♂. Head ochreous intermixed with dark brown scales, collar ochreous with a dark brown band; thorax ochreous intermixed with dark brown scales; abdomen ochreous grey with a fine dorsal ridge of dark brown. Primary pale greyish ochreous, with interrupted lines of dark brown scales; medial line waved, pale, edged with crimson brown on its lower external side; a pale ochreous brown patch on the costa over the cell edged with whitish, the outer edging being part of the postmedial line, which is interrupted and has on its inner side a pale dark brown curved mark; a pale whitish costal patch adjoining the postmedial line, beyond which the whole wing is very dark, with the subterminal line irregular, very dark edged palely as to its upper portion. Secondary pale greyish brown, darker towards the terminal area.

Expanse: 22 mm.

Hab. The type is in my collection from Dinawa, where it was taken in August.

111. **Ingura pratti** spec. nov.

♂. Head, frons purplish, vertex pale brown; collar pale brown broadly tipped with lilac; thorax brownish lilac; abdomen lilac-brown. Primary pale lilac up to the median line and up to the postmedial line along the costa; postmedial area brownish; terminal area pale greyish for the apical half, pale brownish for the tornal half; basal and median lines very fine, almost obscured; postmedial line double, dark brown, projected outwards rapidly from the costa to below vein 7, receding along vein 5 and descending irregularly to the middle of the inner margin, where there is a dark grey patch on the outside of the line; a faint trace of a subterminal pale line. Secondary darkish grey, slightly paler near the termen.

♀. Like the male, but greyer.

Expanse: ♂ 33—36, ♀ 35—36 mm.

Hab. The type is in my collection. The species occurs in the Kebea Range and Babooni in March and April, and again in August and September.

The lilac colour appears to fade rapidly, for we have some specimens which are very much paler and greyer than the types: the species will come next *cyanescens* Turner.

112. **Ingura costistrigata** spec. nov.

♂. Head and collar pale chestnut-brown, the latter barred with slate-grey; thorax darker chestnut-brown, sparingly mixed with slate-grey; abdomen dark slate-grey. Primary pale chestnut-brown, with the base, and the costa broadly

purplish slate-colour; medial line dark brown, fine; postmedial line projected outwards into an acute angle about veins 6 and 7, receding rapidly in a dentate line to the middle of the inner margin, with a small grey patch on the margin on the outside of the line; apex with a whitish lilac patch; subterminal line dotted. Secondary greyish brown, with a paler, somewhat pinkish, termen, with a row of dark points.

♀. Exactly like the male.

Expanse: ♂ 34, ♀ 36—37 mm.

Hab. The type is in my collection from Dinawa, where the species occurred in August; we have specimens from other localities in January and February.

113. **Callingura kebeae** spec. nov.

♂. Head lilac-grey, crested; collar lilac-grey, narrowly barred with purplish brown and broadly tipped with pale ochreous brown; thorax purplish slate-colour; patagiae with a triangular shoulder-patch of ochreous cream-colour; abdomen pale silvery grey, pale straw-colour beneath. Primary dark olive-green, with a broad horizontal ochreous cream-coloured stripe, edged above with greenish, and for its outer half edged above also with a curved pink stripe; a third from the base, on the inner margin, rises a broadish strongly curved ochreous cream-coloured stripe, meeting and coalescing with the horizontal one: both these stripes are finely margined internally with black; termen broadly pinkish lilac with a fine double darker line. Secondary pinkish brown, pale at the base.

♀. Like the male, but paler, and green more ochreous.

Expanse: ♂ and ♀, 34—36 mm.

Hab. The type is in my collection. The species occurs high (6000 ft.) in the Kebea Range in March and April, other specimens from Dinawa being taken in August. In the Tring Museum are others from the Aroa River, taken in February and March.

114. **Targalla catephioides ekeikei** subspec. nov.

Differs from Hampson's species in its melanism; the base up to the median line is very dark blackish brown, and the rest of the wing is dark brown; the reniform stigma has a greenish hue in fresh specimens, degenerating into ochreous brown. The secondary is blackish grey, with a small white basal innermarginal patch.

In quite fresh specimens there is a dark bronzy-green scaling over the thorax and abdominal tufts, and to a less extent over the primary, but this evidently soon wears off. This melanic form is quite constant in all the collections received, and has evidently developed into a local race.

Hab. All the localities in New Guinea.

Type is in my collection, and in the Tring Museum are other specimens.

115. **Targalla pratti** spec. nov.

♂. Head whitish grey; thorax grey, barred with dark grey; patagiae with a white line across, followed by a broader brown band; thorax grey, darker on the proximal segments. Primary pale grey; base very dark grey, margined externally by the antemedial black line; medial line represented by an obscure line of darker shading produced outwards at the end of the cell and then receding somewhat; postmedial line double, the inner one fine black, beyond which is a small triangular

dark patch on the costa, which is the origin of an interrupted subterminal dark line edged externally with whitish ; termen crenulate, finely blackish. Secondary whitish grey with dark veins, termen broadly darkish grey.

Expanse : ♂ 36, ♀ 37 mm.

Hab. The type is in my collection from Ekeikei.

116. **Eutelia hampsoni** spec. nov.

♀. Head greenish grey and thorax greenish grey, with patagiae rusty-red ; abdomen dark brownish. Primary of a general tone of greenish grey or brown ; base dark, followed by a pale band, succeeded by a broad dark band ; median area pale dirty olive-green, with two fine darker lines, that near the base reaching only to vein 1 ; this pale area is margined externally by a broadish indefinite line of very dark greenish brown ; postmedial line irregular, edged externally with white, produced into a sharp acute angle on vein 3 ; a trace of a subterminal line interrupted, white in the costal area ; apex up to postmedial line whitish green. Secondary dark grey, with a trace of a medial line.

Expanse : 22 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in January and February.

117. **Eutelia mediofusca** spec. nov.

♂. Head greyish pinkish ochreous, collar pinkish ochreous, thorax pinkish ochreous with pinkish patagiae, abdomen dark grey. Primary pale ochreous grey, upper part of base narrowly dark ; median area dark brownish, receding slightly below the greenish-reniform stigma, edged laterally with greenish brown ; a white point in the cell : postmedial area whitish, intersected by the oblique dark line edged with white from the costa to the termen on vein 2 ; the lower half of this line is edged with pale ochreous grey, a dark triangular spot is above it on the costa ; termen broadly greyish, crenulate, with a linear blackish edging. Secondary greyish, paler towards the base.

Expanse : 25—28 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in September.

118. **Eutelia olivaceiplaga** spec. nov.

♂. Palpi rusty-red for the basal third, lilac-grey for the apical two-thirds ; head lilac-grey tipped slightly with rufous ; thorax lilac-grey with a rufous central stripe ; abdomen rufous brown. Primary pale pinkish lilac, with a short basal white stripe ; antemedial line at an opposite angle rufous brown, edged internally with white ; median line broad, rufous, angled outwards at the cell ; postmedial line rufous, edged externally with ochreous ; orbicular stigma olivaceous, pupilled with ochreous ; reniform olivaceous, outlined finely with ochreous ; a whitish round patch on vein 2 outside the postmedial line, and a triangular olive-brown costal patch edged with white, below which are two obliquely placed similar coloured dashes reaching nearly to the termen above vein 3, above which the apical area is pale lilac-grey. Secondary pinkish grey, pale greyish at the inner margin and base.

Expanse : 28 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in September.

119. **Eutelia dinawa** spec. nov.

♂. Head pale chestnut-brown, thorax chocolate-brown, abdomen paler than thorax. Primary purplish brown, paler at base with an olivaceous costal mark; antemedial line olivaceous, broad, irregular, and serrate; medial line represented by a broad band of darker shading; postmedial and subterminal lines olivaceous, serrate, the former almost crenulate in the radial area, the crenulations being marked by white points; both these lines rise in a triangular costal patch, which is edged with ochreous, margined on the inner edging with white; a white point in the cell followed by the olivaceous reniform stigma. Secondary brown with pinkish fringes; the fringes of both wings are crenulate.

♀. Like the male, but paler and greyer.

Expanse: ♂ 31, ♀ 28 mm.

Hab. The type is in my collection. This species was taken at Ekeikei in January and February, and Dinawa in September. In the Tring Museum are other specimens from the Aroa River.

The species is near *E. apifascia* Hamps., but it lacks the ochreous spot beyond the reniform, and the lines differ in direction.

120. **Eutelia kebeae** spec. nov.

♂. Head crimson-brown; thorax and abdomen dark purplish brown, the latter reddish beyond the middle. Primary dark purplish brown, with traces of basal, antemedial, and medial lines on the costa, the latter two of which develop below the cell into broad irregular dentate very dark brown lines with pale interiors; adjoining the medial line is an oblique band of pale pinkish ochreous extending into the olive-green reniform stigma, edged internally with white; postmedial line double, very dark, with ochreous interior, angled outwards about vein 7, followed by a fine dark line roughly parallel with it; subterminal line obscure, rising in a dark subapical costal triangular patch darkly dotted below; apex and the whole of the tornal and radial areas lilac grey; a white dot in the cell in front of the reniform; termen with white points at the end of the veins. Secondary dark greyish brown, pale towards the base; termen with white points at the ends of the veins.

♀. Like the male.

Expanse: ♂ 30, ♀ 29 mm.

Hab. The type is in my collection. This species occurs in the Kebea Range and Ekeikei in March and April.

121. **Eutelia albicomma** spec. nov.

♂. Head ochreous tipped with dark crimson, thorax and abdomen dark crimsonish brown. Primary sepia brown, with pale basal and antemedial lines, very irregular, subdentate and somewhat obscure; a broad pale pinkish medial band, followed by a fine double dark postmedial line angled outwards beyond the cell, followed by a fine whitish interrupted line in which is a large white comma at the tornus; a trace of an anteterminal line close to the previous one, both of which arise in a dark triangular white-edged costal patch; terminal area dark; termen with white points alternating with dark lunular marks; a white point in the cell in front of the pale greenish reniform stigma, which is edged internally with white. Secondary brownish grey, pale at the base; a trace of a pale waved

line at the end of the cell ; termen with white points ; fringes somewhat crenulate.

Expanse : 30 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs in January and February.

122. **Eutelia purpureonigra** spec. nov.

♀. Head, thorax, and abdomen rich purple brown intermingled with crimson scales. Primary rich dark crimson brown for the basal half, with slightly paler purplish base ; subbasal and medial lines dark, the latter waved, postmedial line double, somewhat waved, and produced outwards beyond the cell, followed by a fine crenulate line ; subterminal line arising in a dark costal triangular patch, serrate, somewhat obscured near the tornus ; reniform stigma somewhat ochreous. The terminal half of the wing is paler and purplish ; termen with white points at the ends of the veins. Secondary dark greyish brown with crimsonish fringes.

Expanse : 34 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs in January and February.

123. **Eutelia viridata** spec. nov.

♀. Head and collar greenish, thorax and abdomen pale ochreous brown. Primary pale yellowish green, with a small greyish patch margined by the basal and by the double antemedial line ; medial line marked by an indefinite line of grey, produced outwards at the cell ; postmedial line of the same shape, blackish near the inner margin ; apex pale bluish white with a dark dash in it, a small pale brownish patch between veins 5 and 6 ; the whole of the medial area is very pale whitish ochreous brown, margined laterally by the antemedial and postmedial lines ; reniform stigma greenish ; termen finely dark with white points at the veins. Secondary darkish grey, pale at the base, with an obscure pale medial line.

Expanse : 26 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in August.

I am doubtful if this species is a *Eutelia* ; the end segments of the palpi are as long as the second ; the thorax and abdomen are quite slight in build ; the wings, *i.e.* the primaries, are narrow, expanding considerably towards the termen. As I have only one sex, and that the female, I refrain from creating a new genus for it at present.

124. **Eutelia deletoides** spec. nov.

♀. Head grey, collar grey mixed with ochreous, thorax grey, abdomen grey with black dorsal marks. Primary pale grey, with darker obscure basal line; median line from a dark cell-spot to the inner margin, a small dark dot precedes this spot : postmedial line broad, somewhat indefinite, slightly brown, especially at the inner margin ; subterminal line broad, dentate and waved, edged externally with whitish ; termen finely dark ; fringes whitish, intercepted with blackish. Secondary dark grey, paler at the base. Fringes white intercepted with black.

Expanse : 24—29 mm.

Hab. The type is in my collection from Ekeikei, where the insect occurs in March and April ; other specimens in the Tring Museum, from the Aroa River, February.

125. **Eutelia ochreiplaga** spec. nov.

♂. Head, thorax, and abdomen brownish grey, with short ochreous dashes. Primary brownish grey, with an ochreous line along the fold; base with an ochreous spot, an irregular dark subbasal stripe; median line dark, produced outward at the cell, then obliquely basewards; postmedial line excurved beyond the cell, with ochreous patches on each side of it. Secondary brownish grey, paler towards the base.

Expanse: 27 mm.

Hab. Aroa River, February and April.

Type in Tring Museum.

This species comes near *E. ocularis* Btl.

126. **Penicillaria meeki** spec. nov.

♂. Head, thorax, abdomen, and primary dark purplish grey, the latter with an oblique straight line darkly centred; an indistinct angled (near the costa) postmedial line; a short fine pale curved dash in front of the apex and at the tornus. Secondary pure white, with a very broad purplish termen and a dark spot in the cell.

Expanse: 24 mm.

Hab. Aroa River, April.

Type in Tring Museum.

127. **Penicillaria dinawa** spec. nov.

♂. Head, collar, thorax, and abdomen pale uniform lilac-brown. Primary pale lilac-brown, with a double dark oblique median line. Reniform stigma dark; postmedial line dark, angled outwards on vein 7, thence descending obliquely into the tornus; apex with a short curved white stripe across it; tornus with an obscure whitish erect line from vein 1 to vein 3. Secondary white, with a dark spot in the cell; termen broadly pinkish grey.

Expanse: 26 mm.

Hab. The type is in my collection, from Dinawa, where the species flies in September.

Tibiocillaria gen. nov.

Differs from *Penicillaria* or *Eutelia* in that the second segment of the palpus is fringed with a long brush of hair; end segment short and thickly clothed with hair; collar developed into a pyramidal prominent tuft, standing high above the thorax and extending over it; thorax with a metathoracic tuft; abdomen with a tuft on the proximal segment and a long tubular tuft on the anal segments. The fore- and midtibiae have each a very long and heavy tuft of hairs—a tuft on the end of the hindtibia is small; mid- and hindtarsi tufted. Wings: primary, apical part of termen nearly erect to vein 3, where it is angled and somewhat excavated below. Secondary, vein 2 produced into a slight tooth, excavated slightly below.

Type: *Tibiocillaria pratti* B.-B.

128. **Tibiocillaria pratti** spec. nov.

♂. Head purplish, tufted with chestnut brown; tufted collar and thorax deep purplish plum-colour, deep reddish brown or purplish brown; abdomen dark grey; legs deep purplish, with the long tibial tufts pale chestnut; purplish below at the

base of the underside; tarsi ringed with white. Primary deep purplish or purplish grey; outer half of costa and cell, also the apex and termen to vein 6, finely dusted with ochreous; lower part of base dark rusty-red; medial and postmedial lines, each double, finely whitish lilac, strongly angled externally about the upper margin of the cell, the latter slightly angled in the opposite direction on vein 2; a dark velvety spot at the apex; a curved dark broad dash above vein 3, with an inner deep rusty-red dash, both interrupted by the postmedial line; an erect curved whitish obscure line from the tornus to vein 2. Secondary white with a dark cell-spot; termen broadly deep purplish, becoming grey at the apex.

♀. Exactly like the male, but the tufts are smaller.

Expanse: ♂ and ♀, 35—36 mm.

Hab. The type is in my collection, from the Kebea Range, taken in July; other specimens from Dinawa, August. I have specimens also from the former locality that were taken in March and April.

129. **Tibiocillaria aureiplaga** spec. nov.

♂. Head, collar, and thorax purple, abdomen ochreous, legs and tufts purplish, tarsi ringed with white. Primary purple, with a trace of a basal line; medial and postmedial lines obscure for their costal portion; a bright golden yellow patch in the middle of the inner margin and in front of the apex; beyond the former the ground colour golden yellow finely irrorated with superimposed purple scales; a curved white line in front of the apex on the costa, and also one rather obscured rising from the tornus to vein 2. Secondary white with a dark cell-spot; termen broadly purple with a white line and a yellowish patch at the tornus.

♀. Like the male.

Expanse: ♂ 25, ♀ 27 mm.

Hab. The type is in my collection, from Ekeikei, where the species occurs from January to April.

130. **Tibiocillaria dinawaensis** spec. nov.

♂. Head reddish chestnut, thorax reddish orange, abdomen pale brownish. Primary pale reddish with an oblique straight dark median line confluent with a dark cell-spot; postmedian line fine, dark, produced outwards beyond the cell; termen purplish; a yellow patch in the middle of the inner margin, a yellow curved line before the apex, a white line rising out of the tornus to vein 2. Secondary white, no spot in the cell; termen broadly purplish, with a white spot in the tornus below an orange one.

Expanse: 26 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in September. Other specimens are in the Tring Museum from the Aroa River, March.

131. **Maceda rufescens** spec. nov.

♀. Head, thorax, and abdomen uniform fuscous. Primary purplish grey, with base, costal part of apex, and tornal area orange red; in the latter is a dark dash at the tornus; a basal dark line; antemedial line bordering the red area angled inwards and broadly dark; postmedial line serrate, bordering inwardly both the other orange-red areas, between which is a patch of dark purplish grey expanding

to the termen ; a dark point in the cell. Secondary dark brownish grey, paler in the cell, which has a dark spot ; fringes white from vein 5 to vein 2.

Expanse : 38 mm.

Hab. The type from the Kebea Range is in my collection. The species flies in March and April ; and in the Tring Museum from the Aroa River are other specimens.

132. **Risoba delicata** spec. nov.

♂. Head very pale greenish ; collar white, with intermixed green and grey scales ; thorax very delicate and pale green, barred with white ; abdomen pale grey. Primary white, suffused with very delicate pale green ; subbasal area suffused with pale green ; basal line very obscure ; a short fine black basal costal dash ; reniform greenish ; postmedial line very finely dark and crenulate, beyond which is a short serrated black line from below the costa, and a short broad erect blackish dash from before the tornus ; apex darker green, with an internal black dash ; a row of fine black scallops in front of the termen ; fringes grey intersected with white. Secondary white with a dark cell-spot ; termen broadly dark, tapering somewhat to the tornus.

Expanse : 39—40 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September.

133. **Risoba viridata** spec. nov.

♂. Head bright green ; collar pale brown, with a fine black basal stripe surmounted with a broad bright green band interrupted in the middle ; thorax green, barred finely with black, with a prothoracic brown patch ; abdomen pale brownish, greenish laterally ; dorsum green in front of the anal segments. Primary, base bright green, with a black basal serrated line, followed by a broad whitish area, beyond which the wing is mainly grey, with the reniform green ; a broad green dash above vein 1 and beyond the reniform, from whence up to the apex the ground is suffused with green ; postmedial line finely dark, crenulate ; a more or less obscure green subterminal stripe ; a row of short dark dashes in front of the termen. Secondary creamy white, with a dark cell-spot and a broad dark termen.

Expanse : 40—42 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in May and June.

134. **Risoba kebea** spec. nov.

♂. Head greenish brown ; collar greenish brown, with greenish base ; thorax brown, with greenish patagiae ; abdomen pale brownish, darker laterally. Primary olive-brown, with traces of greenish suffusion in parts ; base whitish, with a short black dash at base of cell, below which is a pale brownish patch ; reniform greenish, edged with white, below which is a white stripe darkly edged externally ; beyond the reniform is a pale greenish ochreous stripe, with a fine internal white line almost confluent with the dark apical patch, which is edged below with white ; a subterminal row of dark dashes edged internally with white. Secondary creamy white, with a dark cell-spot and a very broad dark termen.

♀. Similar to the male, but much paler and without the white stripe below the reniform.

Expanse : ♂ 42, ♀ 44 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July : other specimens from Dinawa, August, and in the Tring Museum from the Aroa River, January to April.

135. **Risoba avola** spec. nov.

♂. Head and collar very pale lavender-brown, the latter edged with rusty-red ; thorax greyish ; patagiae edged with white ; abdomen greyish, with a reddish tuft. Primary pale brown, suffused with greenish—below the cell this suffusion is almost absent ; base narrowly and obliquely whitish ; a trace of a dark serrated medial line, followed by a second not extending below the cell ; beyond the cell (not extending above it) is a broadish white stripe, edged by a fine dark line, beyond which the radial area is slightly rufous ; a dark apical patch, edged externally by an irregular whitish line and below by a curved greenish line ; the usual row of dark subterminal dashes, edged internally with white. Secondary subhyaline white, with a dark cell-spot and a slight dark short broadish termen.

Expanse : 34—35 mm.

Hab. The type is in my collection from Avola, where it occurs in August. Other specimens are in the Tring Museum from the Aroa River, February.

136. **Risoba olivens** spec. nov.

♂. Head and collar lilac-grey ; thorax dark grey, with pale patagiae ; abdomen dark lilac-grey. Primary uniform olive-green, except at the base, which is white with an olive-green innermarginal patch, and beyond the cell, where it is grey up to the dark green apical area ; reniform finely encircled and pupilled with dark brown : apical area edged internally with a dark curved broadish stripe, below which is a short fine serrated dark line ; below the apical patch the ground colour is dashed with white ; the usual subterminal row of dark dashes ; the postmedial line is finely serrated and strongly curved inwards below the cell. Secondary creamy whitish, with a dark cell-spot and a broad dark termen.

Expanse : 36 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in September ; and in the Tring Museum from the Aroa River, March, are other specimens.

137. **Risoba grisea** spec. nov.

♀. Head and thorax grey, patagiae whitish, abdomen greyish. Primary with base narrowly and obliquely white ; the rest of the wing grey, darker near the base ; a dark dot in the cell ; reniform finely and darkly encircled and pupilled ; postmedial line waved oblique, slightly serrated, on each side of which the area is somewhat whitish ; apex brown, edged internally with white, which edging has a dark internal streak below it ; two dark dashes from the apex ; subterminal area pale brownish ; the usual subterminal row of dark dashes. Secondary subhyaline creamy-white with no cell-spot, the broad dark termen evenly curved internally.

Expanse : 33 mm.

Hab. The type is in my collection from Ekeikei, where it occurs in March and April ; other specimens are in the Tring Museum from the Aroa River, January to March.

138. **Risoba pratti** spec. nov.

♂. Head brownish, collar pale brownish grey with a rufous base surmounted by a greenish band, thorax greyish brown, abdomen pale brown-grey laterally. Primary greyish brown, with an oblique chestnut-red base : a broad creamy white subcostal stripe ; costa greenish ; reniform obscure greenish with an oblique white stripe below it, edged externally by the postmedial fine oblique dark line, palely edged externally below, with its costal half edged broadly with greenish ; apical dark area small with a whitish suffusion below it ; the usual subterminal row of dark dashes very distinctly edged internally with white. Secondary creamy whitish with a dark cell-spot and very broad dark termen.

Expanse : 41 mm.

Hab. The type is in my collection from Dinawa, where it occurs in August and September ; other specimens are in the Tring Museum from the Aroa River, March.

139. **Stictoptera ekeikei** spec. nov.

Head and thorax very dark brown, abdomen blackish brown. Primary rufous brown, with a dark costa ; medial, postmedial, and subterminal lines very fine and obscure, finely crenulate ; the terminal half of the wing has the appearance of having a series of these finely crenulate lines over it ; the costal area is dark. Secondary opalescent hyaline, with termen broadly blackish.

Expanse : 34 mm.

Hab. The type is in my collection from Ekeikei, where it occurs in March and April.

140. **Stictoptera rufa** spec. nov.

♂. Head and thorax dark reddish brown, abdomen sooty brown. Primary pale rufous, with antemedial, medial and postmedial darker oblique lines, the latter slightly waved ; a trace of a subterminal line of darker shading. Secondary dark uniform sooty grey.

Expanse : 32 mm.

Hab. Aroa River, February.

Type in the Tring Museum.

141. **Stictoptera meeki** spec. nov.

♂. Head and thorax pale rufous, collar deep crimson, abdomen sooty grey. Primary with base orange, very bright at its margin with the oblique antemedial line ; rest of wing reddish, inclined to orange in the postmedial area ; medial line waved ; postmedial line waved inwardly dentate opposite the reniform, which is somewhat obscure ; subterminal line dentate, irregular. Secondary sooty black.

Expanse : 38 mm.

Hab. Aroa River, February.

Type in the Tring Museum.

142. **Sadarsa purpurascens** spec. nov.

♂. Head and collar deep purplish black, metathorax purplish grey, abdomen purplish black. Primary with the basal two-fifths of costa broadly deep purplish black, paler beneath ; remainder of costa broadly pale fawn-brown tinged with purplish ; innermarginal outer three-quarters purplish ; a medial line excurved on

the cell ; a postmedial waved line ; a trace of a subterminal and terminal dotted line ; termen finely blackish. Secondary dark greyish brown, paler in the cellular area.

Expanse : 30 mm.

Hab. Aroa River, March.

Type in the Tring Museum.

Subfamily GONOPTERINAE.

143. **Cosmophila kebeensis** spec. nov.

♂. Head and thorax pinkish red, abdomen grey. Primary grey suffused more or less with red, especially on the outer two-thirds ; medial line fine dark grey from the upper margin of the cell, slightly waved below the cell ; postmedial line almost straight from the darkish reniform ; a fine waved line from the costa to vein 4, where it is angled sharply inwards, ending abruptly on vein 3 ; beyond this is a slight grey scaling. Secondary uniform pale brown.

Expanse : 37 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July ; other specimens are in the Tring Museum from the Aroa River, March.

This species is near *C. vitiensis* Btl.; but, irrespective of the difference in colour, the shape and direction of the lines differs also.

144. **Cosmophila aroa** spec nov.

♂. Head and thorax cinnamon-brown, abdomen brown with dark grey anal tufts. Primary cinnamon-brown, sparingly irrorated with dark brown ; the dark medial line oblique, slightly curved up to the lower margin of the cell, above which it recedes and is V-shaped, the point of the V being basewards ; postmedial line broadish oblique, slightly curved, being angled slightly outwards about veins 8 and 9; a slight subterminal shading from before the apex to veins 3 or 4 ; the orbicular is a small white spot ; the reniform is represented by a darkish dash with a black external dot. Secondary uniform pinkish brown.

♀. Like the male, but paler, the primary being pale ochreous brown.

Expanse : ♂ 40 mm. ; ♀ 43 mm.

Hab. The type is in my collection from the Kebea Range ; other specimens from the Aroa River, taken in March or April from both places.

145. **Cosmophila angulata** spec. nov.

♂. Head, thorax and abdomen greyish ochreous. Primary greyish ochreous with yellowish brown lines ; medial line angulated sharply from the costa to the lower margin of the cell, whence it descends in a slight curve to the inner margin ; postmedial line obtusely angled at vein 9, whence it descends obliquely inwards to near the lower angle of the cell, below where it takes a slight curve to the inner margin ; beyond this line the ground colour is paler ; a subterminal stripe of darker shading roughly parallel with the termen, which is yellowish brown. The wing is slightly irrorated with brownish. Secondary pinkish brown, paler towards the base.

♀. Like the male, but paler.

Expanse : ♂ 44 mm. ; ♀ 41 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

146. **Cosmophila subpurpurea** spec. nov.

♂. Head and collar ochreous pink, the latter with fine brown edging palely tipped; thorax reddish brown; abdomen greyish brown. Primary pinkish brown, with pale sepia brown shading bordering internally all the lines; medial line fractured at the lower margin of the cell, below where it takes an irregular curve, but is shifted inwards above the cell-margin, and ascends obliquely to the costa; postmedian line oblique, nearly straight, except at the costa and inner margin, where there is the least bend; from the costa to vein 3 is a curved line, slightly angled from the costa at vein 9; subterminal line with an outward bend between veins 3 and 5, from whence it recedes gently to each margin; a white point in the cell. Secondary pinkish, becoming cream-coloured on the inner margin and towards the base. Underside pinkish purple, except at the inner margins, which are cream-coloured.

Expanse: 46 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September. I have specimens from other localities taken in July and also in March; and in the Tring Museum are some from the Aroa River, February.

147. **Cosmophila ekeikei** spec. nov.

♂. Head and thorax orange-red; abdomen pinkish brown. Primary orange-red; antemedial line grey, with a slight outward curve, beyond which the ground colour is less bright; medial line waved, descending from the prominent dark reniform to the inner margin and receding slightly basewards; an irregular fine postmedial line from the costa to vein 2 or 3; in the type it terminates on vein 3; a subterminal indefinite line of grey shading, orbicular, a white dot darkly encircled. Secondary uniform brownish pink.

Expanse: 53 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs in January and February. I have specimens from other localities taken in March and April high in the Kebea Range (6000 ft.), also from lower places in July.

The reniform occasionally is almost white instead of dark grey.

148. **Cosmophila mafalui** spec. nov.

♂. Head rufous ochreous; thorax warm reddish brown; abdomen pinkish brown with pale laterals. Primary with the basal half of the wing purple-brown, roughly margined by the medial line, beyond which the colour is paler cinnamon-brown, rather darker in the terminal area; an obscure grey basal line with an outward curve; medial line from the upper margin of the cell very irregular and finely serrated; postmedial line from the costa to vein 3, very irregular; a subterminal oblique indefinite stripe of darker shading; a white point in the cell; reniform obscurely outlined, followed by a blackish point beyond its upper extremity, and by two blackish points beyond its lower extremity. Secondary uniform brownish red.

♀. Like the male, but with but little purple suffusion.

Expanse: 60 mm.

Hab. The type is in my collection from Mafalu, where it was taken in August. I have specimens from other localities taken in March and April.

Sinariola gen. nov.

Palpus, second segment well scaled, long, reaching above vertex; third joint very long, nearly bare, club-shaped; antennae finely shortly ciliate; legs, middle with one, hind with two pairs of spurs. Neuration: Primary with veins 3, 4 and 5 from close to the lower angle, 6 from the upper angle, 7, 8, 9 and 10 stalked, 11 long from below the middle of the cell. Secondary, veins 3 and 4 from the angle, 5 directly above the angle, 6 and 7 from the upper angle, 8 bent down to touch the cell before its middle.

Costa of primaries depressed about the middle and again at the apex, below which it is excavated, after which the termen is strongly produced forward, receding gently from vein 4 to the tornus.

Type: *Sinariola owgarra* B-B.

149. **Sinariola owgarra.**

♀. Head and thorax very dark umber-brown, abdomen dark brownish grey. Primary very dark uniform umber-brown, with a trace of a dark waved medial line and of a pale postmedial waved line incurved at vein 3. Secondary pale greyish, becoming dark towards the tornus and less dark at the apex; tornus and terminal area irrorated with lavender-grey.

Expanse: 60 mm.

Hab. Owgarra, British New Guinea.

Type in my collection.

150. **Sinariola rufa** spec. nov.

♂. Head and thorax pale rufous, abdomen greyish, antennae with white scales at their base. Primary dull uniform rufous, with an excurved waved antemedial line; postmedial line oblique with a short angle directly below the costa; this is followed by a similar fine almost parallel dotted line; terminal area darker; reniform palely outlined. Secondary pale reddish greyish towards the base.

Expanse: 50 mm.

Hab. Owgarra.

Type in my collection.

151. **Pseudogonitis pratti** spec. nov.

♀. Head, thorax and abdomen dull chocolate-brown. Primary dull chocolate-brown, with a trace of a whitish basal line; a whitish point at the orbicular, and two such points at the reniform; postmedial line whitish, strongly serrate; a trace of a dark subterminal line with three black points on veins 4, 5 and 6; apex whitish grey. Secondary dark grey, slightly paler towards the base.

Expanse: 42 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

Paragonitis gen. nov.

Differs from *Pseudogonitis* in the palpi being porrect, the third segment being very long and expanded at the tip, whilst veins 3, 4 and 5 of the secondary are from the lower angle of the cell.

Type: *Paragonitis strigocrenulata* B-B.

152. **Paragonitis strigocrenulata** spec. nov.

♂. Head and collar bright chestnut-red, thorax reddish brown, abdomen brownish grey. Primary uniform reddish brown, with the antemedial dark line fractured at the lower margin of the cell, the longer and lower part being almost in the median area; postmedial line fine dark crenulate, edged externally with ochreous grey, followed immediately by a straight oblique dark line, edged externally with pale ochreous grey; an ochreous point at the orbicular; reniform ochreous grey, with two black internal dots and the ochreous grey colour suffused outwards between veins 3 and 6 to the oblique line; a slight grey costal scaling in front of apex, and a trace of a subterminal irregular stripe of darker shading just beyond the oblique line. Secondary reddish brown, becoming cream-coloured basewards.

Expanse: 45 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

Gonopteronia gen. nov.

Palpi porrect, thickly scaled, second segment reaching above vertex, end segment minute, proboscis well developed; legs, tibiae clothed thickly with long hair, midtibiae with one pair of spines, hindtibiae with two pair. Wings: Primary, underside of cell clothed with long hair; costa excavated at the base, then produced forward into a shoulder, after which a slight excavation occurs again, with another shoulder with a slight depression to apex, which is produced acutely; termen crenulate, excised immediately below apex, produced to a point about vein 4, and excised below slightly to tornus. Secondary long, with costa straight, receding rapidly from the apex to the tornus, before which it is slightly excised. Neuration: Primary with veins 7, 8 and 9 stalked, 9 given off from 10 to form the areole. Secondary with 5 from near lower angle, 3 and 4 and 6 and 7 from their respective angles. Genital organs prominently exposed.

Type: *Gonopteronia albopunctata* B-B.

153. **Gonopteronia albopunctata** spec. nov.

♂. Head and collar chestnut-red, the latter tipped with ochreous; thorax rather darker red; patagiae slightly tipped with ochreous; abdomen pinkish brown. Primary pale reddish brown, slightly ochreous at base, and with an ochreous patch below the angle of vein 2; medial line dark, fine, outwardly oblique, irregular, and strongly dentate; postmedial line from near the lower angle of the cell to the inner margin waved, bordering externally the ochreous patch; a fine dark line from the second costal shoulder to vein 3 dentate, preceded by some red patches between veins 6 and 3, followed by a trace of a dark subterminal shading; termen slightly dashed (horizontally) with reddish; the orbicular is a prominent small white spot; the reniform red, with a blackish dot beyond its upper margin and two such dots beyond its lower margin. Secondary uniform brownish pink.

Expanse: 57 mm.

Hab. The type is in my collection from Ekeikei, where it was taken in May. We have specimens from other localities in July and also in March and April, and in the Tring Museum are others from the Aroa River.

154. **Gonopteronia fulminans** spec. nov.

♂. Head and collar crimson-brown; thorax deep crimson-brown; abdomen slate-brown, pinkish brown laterally; third segment of palpi moderately long.

Primary dark red-brown, slightly crimson at the base, with a trace of a dark basal line of shading from in front of the first costal shoulder, which (shoulder) is very prominent; medial line from this shoulder outwardly oblique, with a short semicircular curve in the middle; postmedial line inwardly oblique from the reniform, slightly waved, bordering a small orange-red patch below vein 2; beyond this is a very irregular jagged fine dark line from the costa to vein 2: an obscure subterminal band of dark shading, a white point in the cell. Secondary dark brownish grey.

♀. Like the male.

Expanse: ♂ and ♀ 60—62 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in March and April. In the Tring Museum are other specimens from the Aroa River.

155. **Capotena albicosta** spec. nov.

♂. Head and thorax dark lilac-grey; abdomen dark grey, with anal segment pinkish white. Primary pinkish lilac-grey, with the costa narrowly but prominently white; two oblique pale parallel lines from one-third and two-thirds of the costa, the inner line straight, the outer one curved just above the tornus to the inner margin; a subapical curved series of four black dots, followed below by two more such dots. Secondary dark grey, paler below the cell.

♀. Like the male.

Expanse: ♂ and ♀, 46 mm.

Hab. The type is in my collection from Ekeikei, where it was taken in March; other specimens from the Kebea Range, July.

This species is a close ally to *C. elaina* Swinhoe, which we have from the same localities; but the dull lilac-colour and the marked whitish costa will easily differentiate them.

156. **Capotena subflava** spec. nov.

♂. Head and collar dark grey-brown, eyelashes rufous brown; prothorax dark grey-brown, with a short pale yellow central line; patagia pale grey, with a dark grey patch on its inner fore edge; metathorax rufous brown; abdomen velvety black, with fine grey segmental divisions; anal segment white; thorax and abdomen entirely whitish grey below. Primary pale lavender-grey, with the lower part of the base suffused with greenish brown, followed by four oblique straight bands of greenish olive-brown, the fourth band before the apex being short; all these bands are indefinite, the brown being suffused over the ground colour, but the first oblique band is definite on its outer edge, and the third and fourth on their inner edges; the whole wing is finely irrorated, and is also finely streaked with short olive-brown dashes; fringes whitish for the inner half, tipped with olive-brown. Secondary blackish, pale grey and subhyaline below the cell.

Underside: Primary black, with the costa, apical area and termen bright orange-yellow. Secondary blackish, subhyaline between veins 1 and 2; a hyaline spot beyond the cell; costa and apex bright orange-yellow.

♀. Like the male.

Expanse: ♂ and ♀, 55—56 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in March and April; other specimens from Dinawa, August.

157. **Capotena albotessellata** spec. nov.

♂. Head dark reddish brown; collar orange-brown; thorax red-brown, with metathorax edged finely with white; abdomen grey. Primary red-brown, extreme base white; a white streak along the fold to the tornus, where there is a white patch; two white outwardly oblique nearly parallel lines, the inner one straight from the costa near the base, the outer one from a third from the apex, angled at vein 4, where it curves back into the white fold streak; termen finely white; a dark dot at the reniform. Fringe white at apex, brown below. Secondary dark grey, pale between veins 1*a* and 2.

♀. Like the male, but darker.

Expanse: ♂ 52, ♀ 45 mm.

Hab. The type is in my collection from Babooni, where it was taken in September; I have other specimens from Dinawa, where the species occurred from May to July.

Sphingiforma gen. nov.

Differs from *Capotena* in the third segment of the palpi being long. Neuration: primary, veins 6 and 7 from the areole; a bar from 7 to 10 to form the areole; 8, 9 and 10 stalked from beyond the areole. Secondary with two internal veins; cell very long, deeply excavated, especially in the male; veins 3, 4 and 5 in the male not stalked as usual, but given off together from the common origin, as in anastomosis; in the female they are stalked as usual; 6 and 7 joined by a short bar; wing excavated in male beyond vein 3 to near the tornus.

Type: *Sphingiforma pratti* B.-B.

158. **Sphingiforma pratti** spec. nov.

♂. Head, thorax, and abdomen dark brownish grey, the latter with anal segment pale lavender-grey; the genital organs have long lateral whitish retractible tufts. Primary lilac-grey, dull and dark for the basal half, paler for the outer half; the whole of the wing is finely irrorated with blackish; a trace of a dark medial line; a dark point in the cell; beyond this a dark, nearly quadrangular costal spot; a subterminal row of dark points. Secondary dark grey.

♀. Similar in colour to the male, but the primary has an irregular oblique dark basal line; a broad oblique dark median band, angled outwards about vein 1*a*, and reaching the termen above the tornus—this stripe is very broad and dark in the radial area; a broad oblique band from the costal spot bent round about vein 4 to meet the median band; a short waved dark oblique stripe from in front of the apex.

Expanse: ♂ 58, ♀ 52 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September; other specimens from Ekeikei in January.

Parelydna gen. nov.

Differs from *Pseudelydna* in the third segment of the palpi being moderately long, in the abdomen of the male being short; the tibiae have no tufts of long hair; the midtibiae have one pair and the hindtibiae two pairs of spurs; veins 2 and 5 of the secondary from close to the lower angle; veins 3 and 4 stalked. The primary is broad, expanding considerably near the termen. The secondary is ample, has the apex sharply angled, is excised slightly below it, and has a waved termen.

Type: *Parelydna mirabilis* B.-B.

159. **Parelydna mirabilis** spec. nov.

♂. Head and thorax greenish yellow; abdomen smalt blue, with white anal segment. Primary a peculiar yellowish green, with a small oval patch of raised scales in the cell; a broad white postmedial stripe edged with a small blue patch at the tornus, above which the stripe is finely edged with green, from whence to the termen the colour is Indian red; fringes whitish, blue at the tornus. Secondary uniform smalt blue. Underside, both wings blue; secondary with a white apex.

♀. Exactly like the male.

Expanse: ♂ 32, ♀ 38 mm.

Hab. The type is in my collection from Ekeikei, where it occurred from January to April. The species occurred at Mafalu (over 6000 ft.) in August, and is a common species, as we have a long series from the various localities. Other specimens in the Tring Museum from the Aroa River.

The species is a close ally of *Pseudelydna cyanea* Snell., but is a different colour, and the termen is quite different. *P. cyanea* should be referred to this genus, as it is not cogeneric with *Pseudelydna rufoflava*.

160. **Carea parallelaria** spec. nov.

♂. Head and thorax crimson-red, abdomen brownish. Primary crimson-red, slightly lustrous, with darker red oblique median and postmedian parallel lines; the latter from the inner margin to a dull redder cloud right across the wing. Secondary pale reddish, with greyish base and inner margin.

♀. Much greyer and paler than the male, with the medial line curved obliquely and not parallel with the postmedial line, and with two dark points in the cell, of which there is but the least trace in the ♂.

Expanse: ♂ 37, ♀ 38 mm.

Hab. The type is in my collection from the Kebea Range; it was taken in March and April. Other specimens from Ekeikei were captured in the same months.

161. **Carea unipunctata** spec. nov.

♂. Head and thorax reddish chestnut; abdomen yellowish, with reddish anal segment. Primary reddish chestnut, with the dark medial and postmedial lines oblique and somewhat waved, with a dark spot at the end of the cell; subterminal area paler; termen dark purplish, apex acute, slightly falcate. Secondary orange-yellow, paler on the inner margin.

♀. Just like the male, but darker.

Expanse: ♂ and ♀, 40 mm.

Hab. The type is in my collection from the Kebea Range, where the species occurs in March and April, and in July.

162. **Carea flava** spec. nov.

♀. Head and thorax pale buff-colour, abdomen pinkish. Primary, basal half of wing pinkish; terminating obliquely in this area is a short oblique blackish costal dash near the base; a broad greenish dash below the cell and two dark dots in the cell; between this pink area and the postmedial line is a triangular patch of yellow, the costa being the base of the triangle and the apex in front of the tornus; in this beyond the cell is a short double greenish black dash with an indefinite

greenish shading above and a little in advance of it; postmedial line double, with a white centre, nearly erect, but slightly hollowed, and extending basewards along the costa for a short distance; from this line nearly to the termen the ground colour is pale lilac-pink; termen yellowish. Secondary uniformly yellow, slightly paler at the base; fringes reddish.

Expanse: 48 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

This species is near *C. rhodophila*; but I believe that it is not a true *Carea*, but should be placed in the genus *Careades*, a new genus, described later on in this paper.

163. **Carea pratti** spec. nov.

♂. Head and collar velvety dark greenish brown, thorax and abdomen pale ochreous. Primary pale ochreous with a broad dark oblique straight greenish brown band from before the middle of the inner margin into the apex, beyond which the ground is pinker; the inner costal angle of the oblique band is filled in with pale greenish brown; termen greenish brown, tapering finely to vein 2. Secondary pale yellowish orange, deeper towards the termen.

♀. Exactly like the male in all particulars.

Expanse: 46 mm.

Hab. The type is in my collection from the Kebea Range, where the species occurs in July.

Careades gen. nov.

Differs from *Carea* in that both the mid- and hindlegs are densely clothed with long hair, the mid pair being clothed down to the end of the first segment of the tarsus, the hind pair down to nearly the end of the tarsus; in the female the hair is but little longer than usual. The costa (♂) of the primary is strongly waved; the apex is shortly falcate; termen excavated below the apex, then produced outwards in a bold curve. Secondary strongly excavated in front of the fold, which (fold) is produced outwards into a slight lobe; below, lying in the fold, is a long tuft of silky hair.

Neuration with veins 6 and 7 from the areole, 8 and 9 forked, the latter given off from 10 to form the areole. Secondary with veins 3 and 4 strongly curved from the angle, lying touching each other for a short distance. Both cells very short.

Type: *Careades sanguinea* B-B.

164. **Careades sanguinea** spec. nov.

♂. Head and thorax deep crimson, abdomen dark grey. Primary dull magenta brownish pink, the area between the antemedial and the oblique lines being quite pale; antemedial line fine, irregular, finely toothed inwardly on the upper margin of the cell, with an outward curve below this; an oblique broad dark stripe, margined outwardly with blackish, beginning before the middle of the costa and ending almost in the tornus; a trace of an erect line of dark dentate shading from in front of the apex into the tornus; terminal area greenish brown; a fine black point in the cell. Secondary basal half dark greyish brown, outer half red; beneath in the innermarginal fold is a long tuft of dark red silky hairs.

♀. Like the male in general colour and pattern, except that the oblique line

is reversed, being slightly oblique in the reverse direction, whilst the secondaries are uniformly brown.

Expanse : ♂ 48 mm., ♀ 43 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in March and April.

165. **Careades ekeikei** spec. nov.

♂. Head, collar and prothorax dark bronzy greenish grey, rest of thorax pale ashy grey ; abdomen ashy grey, darker for the anal portion, with a buff anal tuft. Primary, a peculiar shade of pale olive grey, with a fine lunulate antemedial line, and a very broad dark bronzy greenish oblique line, edged outwardly by a double line, the first blackish, the second very pale ashy grey ; beyond this the ground colour is rather darker and greener, with a trace of an erect line of dark shading in front of the termen, which is tinged with greenish grey ; the oblique line is shorter and less oblique than in the previous species. Secondary uniform very dark grey ; beneath, lying in the fold, is a long tuft of long pinkish hairs.

♀. Like the male, except that the oblique line is nearly erect, and in front of it is a large area of dark bronzy greenish colour.

Expanse : ♂ and ♀, 44 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in March and April.

166. **Careades falcataria** spec. nov.

♂. Head and thorax deep crimson, abdomen dark grey. Primary very dark blackish crimson ; the antemedial line double, distinct on the costa, obscure below ; the double oblique line, with a paler centre, is almost angled near the costa, below which it is slightly waved into the tornus ; beyond this the ground colour is decidedly paler, except in the costal angle made by the oblique line ; the apex is strongly hooked, and the termen much produced near veins 3 and 4. Secondary palish bright orange-red ; beneath, lying in the fold, a long tuft of carmine hairs. Underside rufous in both the wings ; in the secondaries there is a long tuft of red silky hair.

Expanse : 48 mm.

Hab. The type is in my collection from Ekeikei, where the insect occurs in January and February.

167. **Careades fulva** spec. nov.

♂. Head and thorax reddish fawn-colour, the latter with a pale central stripe ; abdomen dark greyish. Primary reddish fawn-colour with two dark dots in the cell ; no antemedial line ; the postmedial line dark, palely edged, externally angled on vein 6 to the costa ; beyond this line there is a broadish stripe of silvery lilac shading. Secondary dull pinkish red with the fold dark greyish, in which beneath lies a long tuft of ochreous hairs.

♀. Similar in colour to the male, but pinker, with a fine slightly darker antemedial line ; the posterior double line is evenly curved to below vein 2, where it is angled inwards, and proceeds somewhat obliquely to the inner margin ; the lilac shading is whiter and is freckled rather than simple shading. The secondaries are paler than in the male.

Expanse : ♂ 50 mm. ; ♀ 45 mm.

Hab. The type is in my collection from the Kebea Range, where the insect occurs in March and April, and also in January and February ; I have other specimens from Ekeikei captured in the same month.

168. **Careades obliqua** spec. nov.

♂. Head and thorax pale reddish, abdomen dark grey. Primary pale yellowish red, with the antemedial line irregular and curved outwardly ; the medial line oblique from the costa before the middle straight into the tornus, beyond which the ground colour is paler ; a subterminal erect interrupted line of dark grey shading from the costa into the tornus ; a dark point in the cell. Secondary orange reddish with the marginal fold dark grey, in which beneath lies a long tuft of bright red hairs.

♀. Like the male but darker, with the second line, and the postmedial one not oblique but gently waved.

Expanse : ♂ 41 mm., ♀ 38 mm.

Hab. The type is in my collection from the Kebea Range, where the species flies from March to June.

169. **Careades subrubra** spec. nov.

♂. Head and thorax dark red, abdomen lilac-grey. Primary lilac-grey, with the base dark to beyond the antemedial line, which is slightly angled at the lower margin of the cell ; postmedial line oblique, bent at the upper margin of the cell ; two dark points in the cell ; an irregular band of pale subterminal shading ; termen dark bronzy brown. Secondary dull brick-red, with a dark grey fold in which beneath lies a long tuft of deep crimson hairs.

♀. Similar to the male but redder, and both the lines are double, the postmedial one being less oblique with its inner costal angles filled in with orange reddish.

Expanse : ♂ and ♀, 40 mm.

Hab. The type is in my collection, from Mount Kebea, where it was taken in July ; I have other specimens from Dinawa captured in September.

170. **Careades rubricosa** spec. nov.

♀. Head and collar deep crimson, abdomen dark grey. Primary dark crimson, with the antemedial line slightly curved and waved ; the postmedial line double, slightly receding as in the previous species, but also somewhat hollowed internally ; this line has a broad internal patch of darker dull red, the rest of the ground colour being slightly shining ; termen dark red. Secondary uniform dark grey with red fringes.

Expanse : 42—44 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs in March and April.

Paracarea gen. nov.

Differs from *Careades* B-B. in that the third segment of the palpi is very long, nearly as long as the first and second together, and that it gradually thickens to the tip, forming a slight club. The neuration of the primary is similar to *Careades*, but in the secondary veins 3 and 4 are stalked.

Type : *Paracarea rubiginea* B-B.

171. **Paracarea rubiginea** spec. nov.

♀. Head and thorax bright red, abdomen reddish ochreous. Primary uniform bright red, with a faint oblique antemedial line ; postmedial line faint, curved and slightly waved ; a trace of a subterminal greyish shading ; two dark dots in the cell. Secondary reddish orange, with the base creamy ochreous.

Expanse : 40 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in August. I have specimens also from the Kebea Range, in July.

SUBFAMILY QUADRIFINAE.

172. **Catocala dinawa** spec. nov.

♀. Head, thorax and abdomen grey. Primary grey, finely irrorated with blackish; antemedial line obscured below the cell ; postmedial line strongly angled beyond the cell, very deeply serrate, obscure below vein 5 ; a whitish irroration is on the costa near both these lines. Secondary yellow, with a curved broad blackish termen from the costa to the tornus, tapering rapidly below vein 4 ; a small white terminal patch below the apex.

Expanse : 67 mm.

Hab. The type is in my collection from Dinawa, where it was taken in August.

Erygansa gen. nov.

♂. Palpi, second segment reaching vertex, heavily scaled ; third segment long, smooth ; antennae of ♂ with very fine short bristles ; thorax and prothorax with a large spreading tuft, metathorax smoothly scaled ; abdomen with slight tufts on proximal segments, anal tuft moderately large ; legs with all the tibiae heavily clothed with hair ; mid- and hindtibia spined ; hindtarsi fringed with long hair to the end segment. Neuration : Primary, veins 3, 4 and 5 from close to the angle. Secondary, veins 3 and 4 stalked, 5 from the angle ; termen of both wings crenulate.

Type : *Erygansa kebea* B-B.

173. **Erygansa kebea** spec. nov.

♂. Head and thorax brown, mottled with dark brown ; abdomen dark grey. Primary umber-brown, with the veins, except veins 1 and 12, broadly lined with dark grey ; a short double basal pale line on the costa ; antemedial line double and dark to about vein 1 ; medial dark line double, interrupted below the cell ; postmedial line dentate, produced outwards beyond the cell, beyond which are two faint dentate lines ; a subterminal row of dark spots palely edged on the exterior ; termen finely pale ; all the lines are somewhat difficult to trace. Secondary dark grey, with the basal half paler ; fringes unevenly dark and pale alternately.

Expanse : 48 mm.

Hab. The type is in my collection, from the Kebea Range, where the species occurs in March and April.

174. **Erygia avola** spec. nov.

♀. Head and thorax brown, slightly rufous, barred with black ; abdomen brown, with tufts slightly reddish. Primary brown, tinged with rufous ; base dark margined by a double dark line ; medial line faint, slightly angled at each

margin of the cell, beyond which the area is pale ochreous brown, extending deeply outwards along vein 3 up to 4, whence it recedes gently to the costa; this area is margined indefinitely with black, very broadly so below vein 3; subterminal line black, irregular, somewhat spotted, angled outwards about vein 4, from whence it takes a rough curve to the apex and the tornus; a subterminal row of dark spots palely edged externally. Secondary brownish, ochreous along the costa, with a dark line crossing the cell, followed externally by two similar lines, the outermost one palely edged for the tornal half; termen darkly spotted; fringes strongly crenulate. Underside: both wings somewhat ochreous, the secondary strongly irrorated with four dark lines across the wing, the third serrate, the fourth very broad.

Expanse: 53 mm.

Hab. The type is in my collection, from Avola, where it was taken in August.

175. **Erygia kebeensis** spec. nov.

♀. Differs from *E. arola* in that it has no pale patch; the postmedial line is double, and only exists below the cell, beyond which is a patch of a greenish olive colour, and above which on the costa is a large dark brown patch; subterminal line irregular, blackish, taking an inward curve from the apex to vein 5, from where it proceeds in a dentate line close to the termen into the tornus; the reniform is large and ochreous. On the underside the secondary has but two transverse waved lines, which are more definite than in the previous species.

Expanse: 58 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

176. **Sypna angulilinea** spec. nov.

♂. Head and thorax dark brown, collar with a pale creamy basal line, patagiae palely edged. Primary dark umber-brown, with a pale basal line to vein 1; medial pale line, deeply angled outwards below the cell; postmedial line confluent with the medial at its angle, thus enclosing two large roughly triangular patches of the dark ground, whose bases are respectively the costa and the inner margin; almost adjoining this line is a broadish pale brown line projected outwards along vein 4 to 5, whence it rises erectly to the costa; from this line to the termen the ground-colour is paler. Secondary greyish brown, with two dark transverse bands; a pale terminal spot below the apex and several smaller ones near the tornus.

Expanse: 60 mm.

Hab. The type is in my collection from Dinawa, where the species flies in August. Other specimens are in the Tring Museum from the Aroa River.

177. **Sypna bella** spec. nov.

Head and thorax warm chocolate-brown, the latter barred slightly with greyish, having two large lateral tufts and a small central metathoracic one; abdomen brownish, with grey segmental divisions. Primary warm rufous brown, with a basal grey curved line; a double antemedial bluish-grey broadly scalloped line with a somewhat paler infilling, an irregular bluish-grey postmedial line followed by one or two obscured lines, a large patch of olive-greenish occupying all the rest of the wing except above vein 6, which is rufous brown; a subterminal more or less obscure serrate line; termen with internervular bluish dashes. Secondary duller brown, darker beyond the postmedial serrate indistinct line, with a darker tornal

cloud. Apex with three creamy white spots through the fringe, below which are internervular pale bluish dashes.

Expanse : 70 mm.

Type in my collection from Mafalu. August.

The greenish patch appears to be somewhat evanescent.

178. **Ercheia certa** spec. nov.

♀. Head and thorax sepia brown, with a paler central stripe through each ; abdomen dark grey, with sepia brown dorsal tuft. Primary sepia brown, with the main veins dark grey, thus the basal area is mostly dark grey ; an obscure trace of a postmedial dotted line, and traces of a double serrated line beyond it ; subterminal line pale evanescent in the apical paler half, but visible below vein 5 ; a darkish apical costal patch ; a pale triangular small patch about vein 4, showing plainly in the dark terminal area ; inner margin rather paler than the ground colour. Secondary dark grey, with a good-sized white central spot ; fringes dark, white between veins 1 and 2 and between veins 5 and 6.

Underside : Primary dark, with a broad, postmedial pale band ; termen pale chestnut brown. Secondary, basal half pale ochreous with a dark cell-spot and a dark waved median band ; outer half dark grey.

Expanse : 56 mm.

The type is in my collection from Dinawa, where it occurred from May to July.

179. **Ercheia ekeikei** spec. nov.

♂. Head and thorax dark slate-grey, abdomen grey. Primary pinkish ochreous above vein 1 ; outer half of wing somewhat smoky, below vein 1 dark lilac-grey ; a basal line bordering a slightly darker area ; a strongly excurved dark postmedial line to vein 4, outside which is a darker smoky triangular costal patch ; reniform large, whitish grey ; subterminal line pale to vein 5, darker below ; a small dark spot at the apex, and a dark indefinite curved band from half along vein 1 up to vein 5 on the termen, in which below the origin of vein 2 is a pale creamy yellow dash ; the innermarginal grey area is edged above by a whitish line. Secondary dark grey, with three pale spots.

Expanse : 54 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in January and February. I have specimens also from the Kebea Range taken in July.

The species is somewhat near *E. umbrosa* Btl., but can be readily recognised therefrom.

180. **Ercheia styx** spec. nov.

♂. Head brown, thorax dark brown with a paler central stripe, abdomen dark grey. Primary purplish brown, with a broad central stripe along the cell and nearly into the termen of a pale mauve-grey, all the lines except the postmedial being more or less interrupted by it ; antemedial blackish line serrated on the costa, medial line obsolescent, postmedial line strongly produced outwardly beyond the cell, below vein 5 broad and dark ; subterminal line pale, similar in shape, receding to the inner margin, where it is almost white ; below the cell is a paler dash finely margined with dark brown ; beyond this is a short pale creamy dash, from which

a dark stripe extends to the termen ; termen with a pale spot about vein 4. Secondary dark grey, with a small central creamy spot. Fringes dark, pale between veins 1 and 2 and between 5 and 6.

Expanse : 46 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in March and April.

This species will come next to *E. charon* Btl.

181. **Ercheia kebea** spec. nov.

Head dark brown ; collar and thorax pale chestnut-brown, darkly irrorated, a dark central prothoracic spot; abdomen dark grey, with a dark chestnut tuft on the proximal segments. Primary brown ; basal area dark purplish to the lower margin of the cell, below which it is pale ochreous at the base, shading into dark irrorated chestnut-red brown, the whole edged by the wavy dark antemedial line, at the end of which the inner margin is produced into a lobe deeply excavated on the exterior; beyond this line the area is paler, with a slight lavender-grey suffusion, with a dark spot below the angle of vein 2 ; postmedial line faint, produced well forward to vein 4, where it recedes to the inner margin ; beyond this line the ground colour is darker, sepia brown, very dark on the costa up to the apex ; two creamy points at the end of the reniform ; termen finely dotted with blackish. Secondary dark grey, with an interrupted pale medial band from the cell to the inner margin, beyond which the colour is very dark ; fringes blackish, creamy from vein 1 to 2 and from 5 to 6.

Expanse : 58 mm.

Hab. The type is in my collection from Mount Kebea, where the insect occurs in March and April. We have specimens from other lower localities in January and February, and from the high localities in May and June. In the Tring Museum from the Aroa River are others.

182. **Hypocala kebeae** spec. nov.

♀. Head and thorax dull rufous brown ; abdomen alternately banded black and yellow. Primary uniform dull rufous brown, with a darker shading beyond the cell ; sparingly irrorated with black points edged internally with grey ; a small bluish grey spot at the tornus with a black pupil, above which is a whitish point ; termen palely dotted. Secondary black, with a double yellow spot at the tornus ; a yellow streak in the cell expanding into a spot beyond it ; a yellow stripe on the fold, separated from the yellow cell by the black ground colour.

Underside black, reduced, especially on the secondary, where it is but a small spot in the cell and a bar at the tornus.

Expanse : 49 mm.

Hab. The type is in my collection from the Kebea Range, where the species flies in March and April.

183. **Hypocala pratti** spec. nov.

♂. Head and central stripe of thorax pale cinnamon-brown, thorax purplish brown, abdomen yellow with narrow dark grey dorsum. Primary reddish fawn-brown, redder below the cell ; a short double basal line, an oblique antemedial

double line strongly excurved in the fold, postmedial line double, strongly excurved beyond the cell and slightly crenulate ; both stigmata darkly filled in and encircled ; subterminal line whitish subcrenulate, apical half of termen whitish grey. Secondary pale yellow with very broad black termen tapering down at the tornus, a white terminal patch below vein 7.

Expanse : 40 mm.

Hab. The type is in my collection from Dinawa, where the species occurred in May and June ; it is also in the Tring Museum from the Aroa River in March.

Pseudozalissa gen. nov.

Palpi upturned, end segment erect, reaching above the vertex, third segment scaled. Neuration : Primary, veins 3 and 4 near the angle, 5 from below the middle of the discocellulars, 6 from directly below the upper angle, 7 from just above the angle, bent down at a third and slightly depressed to the termen ; 8 and 9 on a short stalk given off from 10 to form the areole. Secondary, with 3 and 4 from the angle, 5 from below the middle of the discocellulars, 6 and 7 from the upper angle.

Type : *Pseudozalissa bella* B-B.

184. Pseudozalissa bella spec. nov.

♂♀. Head pinkish cinnamon, collar dark red fawn-colour, thorax pale cinnamon-brown with palest greenish-white shining patagiae ; abdomen yellow with banded dark and pale terminal segments. Primary pale lilac grey with waved dark antemedial line, outside which is a dark spot ; postmedial line irregular, arising in a small snow-white triangular costal patch ; inside this line is a patch of rich dark purplish red colour extending down towards the inner margin, an apical patch of very pale greenish grey, subterminal line serrate, white ; termen below vein 6 dark purplish, between veins 4 and 5 a purplish spear-shaped dash. Secondary pale yellow with a very broad dark termen tapering down to the anal angle, a subapical white terminal narrow patch.

Expanse : 50 mm.

Hab. The species occurred at Dinawa and Ekeikei in March and April, and again in August.

The type is in my collection ; it is also in the Tring Museum, from the Aroa River.

184. Nyctipao dentifascia obscura subspec. nov.

Similar to *N. dentifascia* Wlk., but entirely without any white stripe or white spots on either wing.

Hab. Ekeikei (1500 ft.), May.

We have the ordinary form of *N. dentifascia* Wlk. from the mountains, but all the specimens from the low districts are of this dark form.

185. Polydesma pratti spec. nov.

♀. Frons and palpi reddish brown ; collar brown tipped with pale green ; thorax pale green ; patagiae with a brown stripe across near the tips ; abdomen pale greyish brown ; legs dark brown ringed with cream, a pale green patch on the fore- and midtibiae. Primary pale pea-green, with two brown basal points ; an

irregular tapering subbasal brown patch, widest on the costa, edged with white externally, followed by an irregular white antemedial line ; a triangular brown patch above the end of the cell, edged with white internally, from which is an irregular white line to the inner margin, which is edged internally by a brown line, with brown spots near the margin and short brown dashes by the cell ; a postmedial irregular white line rising from a dark costal dot; a large brown patch at the apex, and a smaller one at the torous ; termen finely dark. Fringes pale greenish, intersected with pale brown, slightly crenulate. Secondary brown, paler near the base, with an interrupted pale terminal line.

Undersurface dark brown ; primary with a pale costal patch in front of the apex and a postmedial darker line ; secondary, a dark spot in the cell and a medial and postmedial dark line.

Expanse : 46 mm.

Hab. The type is in my collection from the Kebea Range ; the species flies in March and April.

186. **Polydesma brunneistriga** spec. nov.

Head, thorax, and abdomen greyish. Both wings whitish grey. Primary with two small rusty-brown basal spots, an interrupted double antemedial rusty-brown line ; a rusty-brown broad dash into the reniform ; an irregular costal short streak before the extremely broad and irregular postmedial area of rusty brown ; termen with fine dark points. Secondary with no marks except the very broad postmedial area as in the primary.

Expanse : 55 mm.

Hab. Aroa River, February and March.

Type in my collection, and other specimens in the Tring Museum.

188. **Panilla aroa** spec. nov.

♂. Head, thorax, and abdomen ochreous grey. Primary ochreous grey, with an antemedial and medial line enclosing a slightly darker area with centre paler ; costa darkly clouded ; postmedial pale line irregular, edged externally with a dark costal patch, below which is a second similar patch ; subterminal pale line serrate , an anteterminal row of dark points. Secondary with the basal two-thirds ochreous grey ; terminal third pinkish, with a broad dark medial stripe with two blackish dashes across the cell, followed by a pale greyish area ; postmedial line very obscure ; an anteterminal row of black points.

♀. Like the male, but olivaceous grey with the markings generally somewhat obscured.

Expanse : ♂ 24 mm., ♀ 28 mm.

Hab. Aroa River, February and March.

Type in the Tring Museum.

189. **Catephia rufostrigata** spec. nov.

♂. Head and thorax dark reddish brown, irrorated with chocolate brown ; patagiae with a blackish line edged with rusty-brown ; metathoracic tuft greyish ; abdomen dark brownish with reddish dorsal tufts. Primary dark reddish brown, with a broad rusty stripe from the base through the cell to the termen, slightly

angled at the lower end of the cell; this stripe interrupts all the markings; basal line slightly rusty and obscure; a trace of an antemedial and postmedial stripe, but it is obscure; subterminal rusty stripe dentate; below the cell there is a velvety blackish shading, and the wing is more or less mottled with similar coloured spots or patches. Secondary blackish, with a white central patch to beyond the cell.

Expanse: 52 mm.

Hab. The type is in my collection from Ekeikei, where it was taken in January and February.

190. **Catephia alboplagiata** spec. nov.

♂. Head and thorax dark mottled brown, the latter with a large white tuft on the metathorax; abdomen dark brownish grey with a white dorsal ridge on the proximal segments. Primary dark brown, somewhat mottled with blackish; antemedial line double, dentate, with its centre paler; medial line obscure, postmedial line double, dentate with a paler brown centre; subterminal line obscure; a large creamy white oval spot below veins 10 and 11, below it on the inner margin a greyish white smaller spot. Secondary blackish, with a central white patch to beyond the cell.

Expanse: 53 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in March and April.

191. **Catephia mediogriseata** spec. nov.

♀. Head and thorax mottled dark brown; abdomen blackish grey. Primary base dark brown spotted with velvety blackish, the spots finely edged with reddish; the whole of the median area greyish white, grizzled with dentate lines, with a black dot in the cell followed by the black reniform; beyond this area the wing is paler reddish brown, with the dentate postmedial line on its inner edge obscured; the subterminal line irregular and paler; termen palely dotted. Secondary blackish with a white central patch to beyond the cell.

Expanse: 46 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in January and February.

192. **Catephia dinawa** spec. nov.

♂. Head and thorax olive-brown, sparingly irrorated with whitish; metathoracic tuft slightly chestnut-colour; abdomen pale grey with reddish brown tufts Primary, base dark greyish; rest of wing slate-grey; both areas somewhat shaded in parts with olivaceous. Antemedial dark line bordering the dark basal area very irregular, projected outwards below the cell, then receding rapidly; postmedial line black, strongly dentate in parts; subterminal line angled below the apex and becoming obsolescent; reniform darkly outlined; termen finely dark and darkly dotted Secondary with basal half white; terminal half blackish grey.

Expanse: 34 mm.

Hab. The type is in my collection from Dinawa, where it was taken in August; we have specimens also from other localities.

The species is near *C. perdricipennis* Moore, but differs in the shape and position of both the antemedial and postmedial lines.

193. **Catephia pulchristrigata** spec. nov.

♂. Head and thorax purplish brown, abdomen purplish grey. Primary dark velvety purplish brown, with a short basal line into the cell; antemedial line pale ochreous brown, with a dark centre; sharply waved and oblique from the costa into the cell, where it is very acutely angled, the angle being formed by a short inward curve, after which it curves outwardly to the inner margin; beyond this is a broad median band of cream-colour, shading into crimson at the two margins and edged externally by a white evenly curved line; postmedial line broad, dark, finely edged with ochreous brown, oblique to vein 6, where it is angled suddenly and acutely inwards; at vein 5 it assumes an oblique direction to about vein 2, where it is acutely angled by a sharp inward curve to the inner margin; a steely-blue ocellus with an olive iris and encircled finely with blackish occupies this curve up to the tornus; a large subapical costal patch is edged finely with ochreous brown, followed by three smaller similar oval spots below it; terminal area broadly pale purplish; termen finely ochreous, preceded by a fine double dark waved line. Secondary blackish grey, with a broad median oblique band of bluish white into the tornus; fringes dark, with a white patch below the apex.

♀. Like the male, but paler; all the lines whitish and very distinct, the pale median band represented only by a white line; the internal middle angle of the postmedial line has two small ocelli somewhat below it, obliquely placed.

Expanse: ♂ 80, ♀ 87 mm.

Hab. The type is in my collection from the Kebea Range, where the species flies in March and April; other examples from Dinawa in the same months, and in August from various localities; and in the Tring Museum from the Aroa River are other specimens.

194. **Catephia splendens** spec. nov.

♂. Similar in its main pattern to the previous species, but the area between the white curved line and the postmedial, instead of being filled in with deep velvety purplish brown, is slightly cream-coloured at first, shading rapidly into a beautiful pale olive; near the white line in this area is a dark purplish C-mark; the purplish pale terminal area is broader than in the previous species.

♀. Precisely the same differences between the sexes obtain as in *O. pulchristrigata* B-B., but the area outside the white curved line up to the postmedial line is whitish blue with the same dark C-mark as in the male.

Expanse: ♂ 81, ♀ 83 mm.

Hab. The type is in my collection from Babooni, where the species occurs in July to September, and again in March and April; other examples from Ekeikei, taken in the same months. It is a rare species.

195. **Catephia hampsonia** spec. nov.

♂. The general pattern of the primary is as in *O. pulchristrigata* B-B., except that the broad creamy median band is reduced to a cream-coloured curved line, whilst the acute angle of the antemedial line is extended outwards into this line; in the secondary the bluish-white band is altered to a large bluish-white patch. The sexes are both exactly the same in every particular, and the insect is decidedly smaller than either of its allies.

Expanse : ♂ and ♀, 74 mm.

Hab. The type is in my collection from the Kebea Range, where the insect occurred in July ; other specimens from Babooni taken same month ; also from other high localities in July and August.

These three beautiful species are closely allied, but I have no doubt they are distinct ; we have both the sexes represented in each case, and in a long series of *pulchristrigata* there are no intermediate forms.

196. **Aedia melas** spec. nov.

♂. Head, thorax and abdomen darkly mottled brown, thorax and abdomen with chestnut-coloured tufts. Primary dark reddish brown ; antemedial line waved, beyond which the medial area is very dark ; postmedial line almost crenulate ; obliqne from the costa to about vein 5, where it is sharply angled, and from where it descends to the inner margin, receding basewards very slightly ; beyond this line the costal area is pale reddish brown ; apex darkish brown ; subterminal line pale red-brown, white below vein 6 and interrupted ; a whitish spot just above the tornus ; reniform greyish, from whence there is a pale greyish band to the termen. Secondary black, with a white central patch to beyond the cell ; fringes black, white at the tornus and below the apex.

Expanse : 37 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in March and April ; other examples in the Tring Museum from the Aroa River.

197. **Aedia costiplaga** spec. nov.

♀. Head and thorax grizzly brown ; abdomen brown. Primary lilac-brown ; base finely irrorated with pale grey scales slightly raised ; two subtriangular umber-brown patches on the costa at the middle and before the apex ; at the base of the costa and midway between it and the central patch is a dark point ; below the former on vein 2 is a similar coloured small spot. Secondary uniform darkish brown.

Expanse : 36 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in January and February.

198. **Cyclodes pulchra** spec. nov.

♂. Frons whitish ochreous ; vertex of head ochreous brown ; collar pale brown tipped with whitish ; thorax brownish, barred with lilac-grey ; metathorax and tips of patagia yellowish brown, barred with whitish ; abdomen whitish grey with fine dark segmental divisions, with a triangular reddish brown dorsal patch. Primary greyish brown, with bronzy green irrorations over the basal half ; the outer half is paler and strongly irrorated with lilac-grey ; a bronzy green ocellus below the costa encircled successively with fine lines of bluish, of black and of greenish white, edged externally by the antemedial pale line, which is angled and double below the ocellus ; a small patch of bluish scales is also below the ocellus ; medial line darkish, slightly obscure ; postmedial line strongly waved and irregular to vein 3 ; edged indefinitely internally by whitish ; a broad blackish stripe angled in the middle from the end of the costal vein to vein 3 on the termen ; a dark subterminal

line, a whitish patch above the tornus. Secondary with base pale lavender-grey, followed by a broad dark transverse band with golden-brown hairs ; a broad pale lavender-grey band, in which is a curved dark line, followed by a broad blackish area nearly up to the termen, with a shortish whitish-grey tornal stripe ; termen lavender-grey, in which is a fine black subterminal line ; fringes golden brown. Underside with the pectus orange. Secondary strongly irrorated with lavender-grey, with a postmedial dark sinuate line ; lower margin and end of cell sharply outlined with black.

♀. Like the male but darker, and all the lines more defined, especially the subterminal, which in that sex is very evanescent.

Expanse : ♂ 84, ♀ 97 mm.

Hab. The type is in my collection from Mafalu, where the insect occurs in August.

Paragarista gen. nov.

Palpi with second segment reaching the vertex scaled, end segment long, smoothly scaled ; antennae simple ; legs with tibiae spined. Neuration : Primary with vein 4 from the angle, 3 and 5 close to angle, 6 from the upper angle ; 7, 8 and 9 stalked, the latter given off from 10 to form the areole. Secondary with veins 3 and 4 from the lower angle, 5 from close to the lower angle, 6 and 7 from the upper angle.

Type : *Paragarista albostriata* B-B.

199. **Paragarista albostriata** spec. nov.

♂. Head and thorax blackish, collar with greyish irrorations and broadly edged with deep yellowish ; thorax with centre entirely deep yellow and proximal segment of abdomen deep yellow, rest of abdomen black with white anal tuft. Primary black with short subbasal bluish-white line ending in a white spot in the fold, medial curved line pale bluish, ending in a small whitish spot and edging internally, a brown pear-shaped mark which adjoins a deep black ovate patch edged finely with pale bluish, a large white patch on the inner margin confluent with a pure white postmedial stripe expanding broadly into the tornus, having a black patch on the inner margin, an irregular bluish white line from the apex into the white stripe at vein 2 ; secondary wholly black.

Expanse : 58 mm.

Hab. Aroa River ; March.

Type in my collection ; other specimens in the Tring Museum.

200. **Ophiusa kebea** spec. nov.

♂. Head and thorax cinnamon-brown ; abdomen pale ochreous brown. Primary pale cinnamon-brown ; antemedial line fine, oblique ; postmedial line curved outwards to about vein 4, then receding rapidly basewards almost to meet the antemedial line ; subterminal line pale lilac, with a dark edging on each side, slightly oblique, nearly straight ; termen with a fine scalloped line close to it ; terminal area slightly lilaceous ; the whole wing is sparingly and finely irrorated with black ; the area beyond the postmedial line is darker ; reniform distinct, darkly outlined. Secondary pale ochreous grey, with a broad dark postmedial area tapering towards the tornus, but not extending up to the termen.

Expanse : 64 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July ; other examples in the Tring Museum from the Aroa River in February.

This species is somewhat near *O. certior* Walker.

201. **Ophiusa lilacea** spec. nov.

♂. Head and thorax pale cinnamon greyish brown ; abdomen greyish brown. Primary with the area up to the medial line suffused with pale lilac, without any lines ; medial line dark, crossing the end of the cell, slightly oblique, quite straight, followed by a pale line which is edged by a dark line, slightly interrupted beyond the cell ; this is edged by a fine lilac line up to vein 5, where it is produced forward and is angled nearer the costa, becoming finely brown ; the wing is cinnamon-brown beyond this line, but shades very gradually into pale lilac-grey at the termen ; three white points on the costa before the apex ; a dark spot between veins 6 and 7 below the third white point. Secondary pale greyish to the end of the cell, from whence it is dark to the apex, there being a pale short tornal stripe ; termen whitish up to vein 6.

Expanse : 66 mm.

Hab. The type from the Kebea Range is in my collection, where the insect occurs in July.

202. **Ophiusa subumbra** spec. nov.

♀. Head and collar cinnamon-brown, finely and sparingly irrorated with black ; thorax pale brownish grey, finely irrorated with black ; abdomen brown. Primary, base pinkish brown, becoming greenish brown in the median area and quite dark at the postmedial line. A trace of a fine short basal line, and also of an indefinite medial line ; postmedial line slightly oblique, double, the inner one being dark reddish and the outer one dark grey ; the line is curved slightly from vein 7 to the costa ; a trace of a pinkish serrate double-angled subterminal line ; area beyond the postmedial line darkish grey ; termen deep umber-brown, except at the apex. Secondary uniform dark brown. Underside, both wings dark umber-brown, without any lines or marks.

Expanse : 66 mm.

The type is in my collection from the Kebea Range, where the species occurs in July.

203. **Ophiusa ekeikei** spec. nov.

♂. Head and thorax pale greyish brown, abdomen pale brownish grey. Primary with base up to medial line ochreous brown, irrorated with pale grey ; a short basal line from the costa into the cell ; medial line outwardly oblique, waved, double, with its centre pale ; beyond this line the wing is pale lilac-grey, shading rapidly into brownish ; postmedial line consisting of three or four golden-brown serrated indefinite lines, edged externally by a fine blackish line ; the whole is very broad and darkish, and is strongly excurved from about vein 7 to vein 2 ; a trace of a dentate pale subterminal line ; termen lilac-grey ; the costa is broadly irrorated with ochreous grey to well beyond the postmedial line. Secondary blackish, paler at the base, a broad oblique medial stripe ; termen with a white patch above the apex, and

below it, and also at the tornus ; the latter, with the medial stripe, is slightly blnish in parts.

Underside : Primary with a broad whitish, slightly interrupted, oblique band; secondary strongly irrorated with grey, and with a blackish patch at the tornus.

Expanse : 65 mm.

Hab. The type is in my collection from Ekeikei, where the species flies in March and April.

This species is probably a local race of *O. melicerte* Drury, but the colonr differs considerably, whilst the composite postmedial band is also diverse.

204. **Ophiusa serratilinea** spec. nov.

♂. Head and thorax reddish brown, with a plum-colonred bloom over all ; abdomen slate-grey. Primary pale reddish brown, with a purplish suffusion, more or less over all the wing, but specially over the basal half; a short waved pale chestnut stripe with a dark centre ; antemedial line irregular, broad, waved and indented, nearly erect ; postmedial line serrate, angled about vein 9, followed by a similar fine dark reddish line, with a pale external edging with whitish points at each crenulation on the veins ; apical patch as in *O. illibata* Fab. ; termen broadly bright lavender, barely reaching the tornus. Secondary dark blackish grey, with a steely blue reflection ; a pale medial stripe angled at vein 2 ; termen bright lavender, not extending quite to the apex.

♀. Like the male, but altogether darker.

Expanse : ♂ 75, ♀ 80 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs from January to April. We have specimens from all the localities, but it is by no means common.

205. **Ophiusa dentilinea** spec. nov.

♀. Head and thorax dark purplish brown, finely irrorated with greyish ; abdomen greyish brown. Primary dark reddish brown ; basal line short, whitish from the costa ; antemedial and medial lines whitish, waved, parallel, enclosing a white dot in the cell ; postmedial line whitish, dentate, strongly produced outwards on vein 7, receding rapidly below, and produced forwards again to a less extent to vein 2, below which it again recedes to the costa ; area between medial and postmedial lines very dark, area beyond the latter paler and purplish brown ; a dark oblique dash from the apex ; a dark spot on veins 3 and 4, below one another, and a dark spot near the tornus on vein 1 ; termen finely edged by a dark scalloped line. Secondary uniform dark brown.

Expanse : 52 mm.

Hab. The type is in my collection from the Kebea Range, where the species occurs in March and April.

206. **Ophiusa acutissima** spec. nov.

♀. Head, thorax and abdomen greyish brown. Primary with base dark nmber-brown, edged by a whitish strongly waved line ; median area, basal part pale pinkish grey, gradnally shading into darkish olive-brown, and edged externally ; the dark

postmedial line is edged by a whitish line; this line is very acutely angled along vein 6, where it is highly produced outwards, receding in a short curve, and being produced forward to a less extent between veins 4 and 5, below where it recedes to vein 2, and is again angled forwards on vein 1; area from this line greyish brown, with a creamy whitish patch on the costa above the acute angle; subterminal line interrupted, obscure, with a small dark patch at the apex and a smaller one below it; reniform dark grey. Secondary dark greyish brown, with a broad indefinite medial line and a dark straight oblique postmedial line from the tornus to about vein 6, the ground-colour being very dark on the inside of this line and pale greyish on the outside, being edged with whitish near the tornus.

Expanse: 46 mm.

Hab. The type is in my collection from Ekeikei, where the insect flies in January and February.

207. **Ophiusa subacuta** spec. nov.

♂. Head and thorax olive-brown, abdomen with a greyish tinge. Primary with base olive-brown, edged by a double line, the first being dark, the second pale pinkish; a short basal line on the costa; median area pinkish, edged internally by the antemedial line, but extending over the medial dark curved line, beyond where the area gradually shades into olive brown, becoming very dark on the postmedial line, this line being produced strongly forward into a very acute angle about vein 6, where it recedes in an irregular curve, and is obtusely angled forwards about vein 2; area from this line pale pinkish brown, a dark dash from the apex into the acute angle; termen edged by a fine scalloped dark line. Secondary uniform dark brown, with a short tornal whitish dentate dash in a darker subterminal area.

Expanse: 52 mm.

Hab. The type is in my collection from the Kebea Range, where the species occurs in March and April.

208. **Ophiusa insignifica** spec. nov.

♂. Head and thorax dull olive-brown, abdomen greyish brown. Primary purplish brown, darker from the medial to the postmedial line, reddish beyond the latter; antemedial line waved, slightly oblique, followed by a white dot in the cell; medial line dentate near the costa, waved below the cell; postmedial line dark, sharply defined, edged externally with white, angled obtusely outwards about vein 6; apex dark, with a dark dash to the angle; termen pale lilac, edged with a fine dark purplish scalloped line. Secondary uniform dark brown.

Underside with a crenulate postmedial line in the primary. Secondary with three lines across the wing, the postmedial being strongly crenulate.

Expanse: 44 mm.

Hab. The type is in my collection from the Kebea Range, where the species occurs in March and April; other examples are in the Tring Museum from the Aroa River.

209. **Ophiusa vulgaris** spec. nov.

♀. Head and thorax pale brown, abdomen greyish brown. Primary pale lilac-brown up to the end of the cell, becoming bronzy-brown and very dark at the postmedial line, beyond where the wing is whitish lilac-grey, except at the apex,

which is lustrous chestnut-brown ; antemedial dark line straight, slightly oblique ; postmedial line whitish, curved near the costa, then straight to the inner margin. Secondary dark greyish with a medial whitish line ; a whitish small patch on the termen near the tornus ; fringes pure white below the apex.

Expanse : 50 mm.

Hab. The type is my collection from Ekeikei, where the species occurs in January and February.

210. **Ophiusa medioalbata** spec. nov.

♀. Head and thorax bright orange, abdomen dark brown. Primary dark brown with two small basal whitish spots ; a broad white median band and a white subreniform small costal patch midway between the white band and the apex ; fringes white. Secondary uniform blackish brown, with white fringes.

Expanse : 48 mm.

Hab. The type is in my collection from Dinawa, where the insect occurs in May and June.

This species will come between *O. frontinus* Drury and *latizona* Btl.

211. **Ophiusa sublutea** spec. nov.

♀. Head and thorax pale orange-brown, abdomen orange-yellow with a large triangular black dorsal patch in front of the anus. Primary deep reddish with an indefinite black basal line not lower than the cell, a grey dot in the cell ; reniform grey for its lower half ; an interrupted deeply serrated pale subterminal line, ending in a suboval pale grey tornal patch ; a black spot in the deep serration below the apex, and a smaller one in the angle below vein 4. Secondary uniform chrome-yellow, with two black confluent spots on veins 5 and 6.

Expanse : 66 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs in March and April ; other examples are in the Tring Museum from the Aroa River. I have a male from Mafalu (6000 ft.), but the primaries are creamy colour ; it has, however, every appearance of being worn, and I have therefore described the fresh female. The species will come next to *O. discriminans*.

212. **Ophiusa kenricki** spec. nov.

♂. Head and thorax bright chrome-yellow, the latter with a broad central stripe of purplish red ; abdomen yellow. Primary chrome-yellow, with the orbicular a small grey spot finely encircled with red ; reniform grey, finely encircled with red ; a reddish purplish patch on the costa by the apex ; a much larger similar coloured patch at the tornus, in which is an oval greyish sharply defined patch occupying the tornus itself ; the purplish reddish colour extends along the inner margin, tapering rapidly basewards to a fifth from the base ; terminal area between the two patches very broadly pale reddish ; termen spotted with grey ; a few grey spots in front of the apex representing the subterminal line. Secondary pure spotless chrome-yellow.

Expanse : 78 mm.

Hab. The type is in my collection from Mafalu, where it occurred in August ; it is a very beautiful insect, and a rare one.

213. **Ophiusa pallida subplaga** subspec. nov.

♂. Similar to *O. pallida* Walker, but in the secondary there is no broad black band, its place being partially occupied by a largish black oval patch in the postmedial area between veins 3 and 6.

Hab. Mafalu, 6000 ft., August.

Type in my collection.

214. **Lagoptera pratti** spec. nov.

♂. Head and thorax greenish black, with metathoracic tuft tipped with red; abdomen chrome-yellow, with three anal segments blackish. Primary deep black, with a small basal whitish spot; a creamy ovate spot in the cell, followed by a larger subovate spot at the lower angle of the cell, above which is a similar coloured dash. Secondary with the basal two-thirds chrome-yellow, terminal third black.

Expanse: 98 mm.

Hab. Mafalu, 6000 ft., August.

Type in my collection.

Pseudophyx gen. nov.

Palpus roughly scaled, second joint reaching vertex of head; third joint smoothly scaled, of moderate length; antennae long, very finely and minutely ciliate; proboscis fairly developed; legs hairy, hindlegs with retractile tufts on the femora and tibiae; thorax smoothly haired, abdomen without dorsal tufts. Neuration: Primary with vein 2 from about the middle of the cell, 4 from the angle, 3 from well before, 5 from directly above the angle, 6 from below the angle, 7, 8, 9 and 10 stalked; areole minute, vein 7 from its extremity, 8, 9 and 10 being on a long stalk, 11 lying close above 10, touching it for some distance. Secondary with two internal veins, 4 from the angle, 5 directly above the angle, 6 from the upper angle, 7 from above the angle, 8 bent down near the base to touch 7, then rising immediately in a bold curve. Primary of male with a large cell on its undersurface between veins 1*a* and 2, filled with long downy soft hairs; a fine pencil of coarser hairs between veins 2 and 3. Secondary of male with a large tuft of long hairs from the underside of the costa, and on the upperside a large horny glabrous patch occupying the basal and median areas to below vein 2. Primary with costa straight, then slightly depressed, rising rapidly to the apex; termen slightly produced to vein 6, then receding greatly to the tornus at vein 1*a*, which is considerably shortened. Secondary with costa strongly curved to vein 7, where an obtuse angle is formed; termen gently curved from that point to the tornus.

Type: *Pseudophyx pratti* B-B.

This genus is probably near *Ophyx* Guenée.

215. **Pseudophyx pratti** spec. nov.

♂. Head and thorax darkish reddish, collar deep crimson-brown, abdomen greyish. Primary pale rufous ochreous, somewhat mottled; three fugitive darkish subbasal spots; orbicular small, finely encircled; a dark irregular postmedial patch, edged internally by a curved dark line, which crosses the obscure reniform; subterminal line (edging externally the aforementioned patch) crenulate, deeply excised below vein 3, adjoining which is a very dark broad stripe confluent at

the tornus with the equally dark outer half of the inner margin; termen broadly dark, with a pale spot below vein 7 well inwards and a pale streak between veins 4 and 2 edging the excised part of the previous band; apex slightly paler. Secondary with a glabrous patch occupying the basal and medial area; termen and abdominal fold mottled dark and paler rufous.

♀. With head reddish, thorax and dorsum of prominal segments pale orange-reddish, abdomen dark grey. Primary with base and medial area orange-fawn-colour; postmedial area dark reddish, edged by a fine irregular line of white scales; terminal area broadly reddish orange, mottled with brown. Secondary, orange-fawn; medial and postmedial area reddish, edged by an irregular line of whitish scales; terminal area very broadly reddish orange mottled with brown.

Expanse: ♂ 62; ♀ 64 mm.

Hab. Mafalu, Babooni, Ekeikei, and Aroa River, March, August, and September.

Type in my collection, and other examples in the Tring Museum.

Thoracolophotos gen. nov.

Palpi upturned, second segment reaching above vertex, thickly and closely scaled, end joint moderately long, scaled; antennae of male long, fasciculate; thorax tufted from the prothorax, spreading widely out over the metathorax; legs thickly scaled; midtibia with a tuft at the femoral joint. Neuration: Primary, vein 2 from near middle of cell, 3 and 5 from close to the angle, 4 from the angle, 6 from the upper angle, 7 from 8 at the end of the areole, which latter is given off from 10 to form the areole, 9 absent; discocellulars very deeply recessed from the upper angle; cell covered with a tuft of hairs. Secondary, cell very short, not more than a third; vein 2 from near end of cell, 3 and 4 from angle, 5 from just above the angle, 6 and 7 from upper angle; costa straight to near apex, suddenly depressed to apex, which is acute; termen straight, oblique. Secondary fairly ample; termen evenly rounded.

Type: *Thoracolophotos ekeikei* B-B.

216. **Thoracolophotos ekeikei** spec. nov.

♂. Head and thorax lavender-grey, with a few pale ochreous scales; thorax with a large crest from the prothorax spreading widely backwards; abdomen greyish. Primary lavender grey, sparingly irrorated with ochreous, more abundantly on the fold and inner margin; a trace of a dark basal line; two antemedial fine dark lines angled in the cell; three more or less obscure similar medial lines; an obscure postmedial one; subterminal line dentate, rather palely edged externally, a small whitish patch below vein 2 at about midway; a large subtriangular dark purplish brown cloud from midway along the costa to vein 3, and up to the costa about a quarter from the apex. Secondary greyish, darker towards the termen.

Expanse: 51 mm.

Hab. The type is in my collection, from Ekeikei, where the species occurs from January to April.

217. **Isoura pratti** spec. nov.

♂. Head and collar dark umber-brown, the latter finely tipped with whitish; thorax pale brownish with a slight lilac reflection; abdomen yellowish, darker towards the anal segments. Primary uniform pale brownish, with a slight lilac reflection; antemedial line waved, oblique, obscure; postmedial line nearly straight

to vein 9, where it curves slightly to the costa ; a black spot is in this line on vein 1 ; termen with black points ; reniform just visible as a slightly darker line ; the wing is very sparingly irrorated with fine dark points. Secondary yellowish with termen broadly dark grey, tapering rapidly to the tornus below vein 2, fringe yellow.

Expanse : 52 mm.

Hab. The type is in my collection from Ekeikei, where the species occurred in March and April.

218. **Hypaetra pratti** spec. nov.

♂. Head and thorax deep crimson-brown, abdomen dark greyish brown, with deep crimson tuft on the proximal segments. Primary, base and postmedial area purplish brown with lilac irrorations ; a small costal dark red subbasal spot with a smaller one below it : a large triangular deep velvety red-brown patch, occupying the lower basal half of the wing, edged with white externally ; above its apex a similar coloured costal spot almost confluent with it ; a broad oblique medial band olive-green for its lower half, becoming pinkish towards the costa ; in this band is a waved crimson line, a large inverted triangular deep velvety red postmedial patch with its base on vein 6 ; above its inner angle is a costal spot, and from its outer angle rises a short line to the costa ; area from vein 6 to the costa crimson ; this is all margined by the broad pale lilac-grey postmedial area ; termen broadly olive-brown. Secondary uniform darkish brown.

Expanse : 54 mm.

Hab. The type is in my collection, from the Kebea Range, where the species occurs in March, April, May and June. We have it also from other localities.

219. **Hypaetra novoguineana** spec. nov.

♂. Head and thorax pale reddish brown, collar with pale lilac irrorations, abdomen brownish. Primary reddish purplish brown, at the base, between the spots on the costa and in the postmedial area, especially on veins in the latter part ; a subbasal and a postmedial large deep velvety red-brown patch mostly edged with creamy whitish ; above these patches to the costa the colour is crimsonish brown, between them it is pale cinnamon red ; the postmedial waved grey line edges externally the latter spot ; subterminal line grey with two deep angles, the lower of which has its apex about vein 5, from where it takes a curve to the tornus ; termen with fine black points. Secondary uniformly brown, with a trace of a pale postmedial line, apex and tornus, with fringes palely spotted.

♀. Just like the male in all particulars.

Expanse : ♂ 46 mm. ; ♀ 50 mm.

Hab. The type is in my collection from Ekeikei, where the insect occurs from January to April. We have it from other localities, and other examples are in the Tring Museum from the Aroa River. This species is one of the commonest in British New Guinea.

220. **Hypaetra subpunctata** spec. nov.

♂. Head and thorax greyish brown, abdomen brownish. Primary brownish grey with a tinge of lilac in it ; base irrorated with pinkish lilac, with a small dark costal spot ; a deep red-brown broad subbasal stripe expanding rapidly below the cell, and paler in the cell ; the external edge of this stripe is straight, nearly erect

and palely edged; medial greyish line obscure, very irregular, immediately followed by the fine dark interrupted highly irregular dentate postmedial line, which is strongly produced forwards about vein 8 and rises in a small costal triangular dark patch; beyond this the ground-colour is finely irrorated with whitish grey; subterminal line sharply serrate; termen with a fine scalloped dark line. Secondary uniformly brown.

Undersurface: Both wings uniformly brown, the secondary with four dark dots beyond the cell, a small one on the costa, and another between veins 7 and 8, between 5 and 6, and below vein 1*b*.

♀. Like the male, but darker, and frequently has no dark dots on the undersurface of the secondary.

Expanse: ♂ 48 ♀ 52 mm.

Hab. The type is in my collection from Ekeikei, where the insect occurs from January to April; other specimens in the Tring Museum from the Aroa River.

Lasiopoderes gen. nov.

Palpus with second segment upturned, heavily haired, reaching above the vertex; third segment moderately long, naked; antennae minutely bipectinate; legs heavily haired, mid- and hindtibiae with large heavy tufts. Neuration: Primary with vein 3 from well before the angle, 4 from the angle, 5 from just above, 6 from a little below the upper angle, 7, 8, 9 and 10 stalked. Secondary with two internal veins, 2 from the middle of the cell, 3 from three-quarters, 4 and 5 from the lower angle, 6 absent. Wings triangular, expanding widely at the termen. Termen produced outwards at vein 7, then receding gently to tornus; inner margin hollowed below the cell. Secondary small, with a tuft of long hairs from the costa; the greater part of the underside occupied by a patch of thick androconia.

Type *Lasiopoderes pratti* B-B.

221. **Lasiopoderes pratti** spec. nov.

♂. Head greyish, thorax dark brown; abdomen greyish brown. Primary greyish brown, with the area below the cell; the median and postmedian areas dark brown, deeply hollowed twice at the outer margin, and with a paler costal patch, with dark antemedial and medial lines. Secondary uniform pale brownish.

Expanse: 55 mm.

Hab. Babooni, September; Aroa River, March.

Type in my collection, and other examples in the Tring Museum.

Hirsutipes gen. nov.

Palpi with second segment heavily fringed with hair reaching above the vertex, third segment long, smoothly scaled; antennae of male with very minute and fine hairs, so fine as to appear simple except under a strong lens; legs, forefemora and tibiae heavily haired; mid- and hindfemora and tibia of male densely clothed with very long hairs; midtarsi clothed with similar hairs, spined to the end of the tarsi. Neuration: Primary, vein 4 from the lower angle, 5 from just above, 6 from the upper angle, 7 from just beyond the angle, 8, 9 and 10 stalked, the latter from about midway between the angle and the apex, 8 to below apex, 9 into apex, 10 bent down and approximating to 8 just beyond 7; no areole. Secondary, 4 and 5 from lower angle, 6 and 7 from upper angle.

Type: *Hirsutipes trifasciata* Swinh.

222. **Hirsutipes trifasciata** Swinh.

This species was described by Swinhoe as a *Hypaetra*, but it does not really belong to that genus, and I can find no genus similar to it.

Hab. New Guinea, Kebea Range, and Aroa River, March and April; specimens in my collection and in the Tring Museum.

223. **Baniana costiplaga** spec. nov.

♂. Head and collar dark red-brown, finely freckled; thorax and abdomen pale chocolate-brown. Primary pale lilac-brown, with two dark chocolate-brown triangular patches on the costa, from which rise the antemedial and postmedial lines; the former is nearly perpendicular, but slightly irregular, the latter is angled sharply outwards from the dark patch, receding basewards from the angle; the area between these lines has a slight reddish tinge; termen darkly spotted; orbicular represented by a dark point in the cell, and the reniform by two dark dots. Secondary uniform cinnamon-brown.

Expanse: 32 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September.

224. **Acantholipes bilineata** spec. nov.

♂. Head, thorax, and abdomen pale ochreous grey. Primary pale brownish ochreous; antemedial line indistinct, angled inwards in the cell, with dark points at each angle and on the costa; postmedial line more distinct, darkly pointed, projected strongly forward up to vein 6, receding rapidly below vein 4; a pale irregular subterminal line of shading, from which up to the termen the ground colour is rather darker; termen darkly dotted; reniform large and dark. Secondary whitish ochreous, with a dark spot in the cell; termen darkly dotted.

Underside: both wings pale ochreous grey. Primary with a large dark oval ring at the end of the cell; secondary with a dark cell-spot and a dark waved postmedial line.

Expanse: 26 mm.

Hab. The type is in my collection from Ekeikei, where the species occurs in March and April.

225. **Acantholipes ochreovenata** spec. nov.

♀. Head and collar pale chestnut-red, thorax pale ochreous grey with a dark central line. Primary pale ochreous grey; antemedial line whitish, angled outwards in the cell, edged externally by a broadish stripe of sepia-brown interrupted at the veins; postmedial line whitish, angled outwards along vein 7, receding slightly to 3, then erect to the inner margin; a largish costal sepia-brown patch edges internally this line and also fills the interior of the angle, but is interrupted at the veins; a subterminal dentate line of pale shading; in front of the apex the costa is finely dark, with three pale intersecting dots; termen rather darkly shaded, and darkly dotted; all the veins stand out pale ochreous, interrupting all the marks except the whitish lines. Secondary uniform pale brownish.

Expanse: 25 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September.

226. **Acantholipes dinawa** spec. nov.

♂. Head, thorax, and abdomen cream-colour; both wings creamy white, with a broad dark brown oblique stripe from the apex of the primary carried through both wings, but beginning in the secondary at vein 7. Primary with a double ochreous external edging to the brown stripe; a subterminal line of dark shading; termen with fine dark points; cell with two terminal black points below each other. Secondary with lines exactly as in the primary.

Expanse: 30 mm.

Hab. Dinawa, September; Aroa River, March.

Type in my collection, and other specimens in the Tring Museum.

227. **Acantholipes aroa** spec. nov.

♂. Head, thorax, and abdomen and both wings pale whitish yellow. Primary with a trace of an angled medial line and an obscure darkish subterminal line inclined inwards at vein 3 or 4; two dark dots at the end of the cell below each other. Secondary paler and clearer than the primary.

Expanse: 25 mm.

Hab. Aroa River, January and March.

Type in my collection; other examples in the Tring Museum.

228. **Acantholipes hampsoni** spec. nov.

♀. Head, thorax, and abdomen pale greyish. Primary pale ochreous grey, with basal and antemedial lines obscure; medial and postmedial line oblique dark, the ground between them being darkly filled in; beyond the latter is a broad pale grey stripe, edged obliquely externally by three lines—the first darkish grey, the second pale ochreous, the third finely dark brown; beyond this the ground colour is darkish, edged by a fine double line of pale and darker shading; termen darkly dotted; fringes silvery grey, with a darker central line. Secondary paler than the primary, with all the primary markings carried more or less distinctly through.

Expanse: 29 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September.

229. **Acantholipes purpurascens** spec. nov.

♂. Head and thorax purplish reddish brown, abdomen greyish. Primary purplish chocolate-brown, with the antemedial and postmedial lines pale, interrupted and obscure; a broadish median band of paler ground-colour; subterminal line whitish, waved, bordering the dark ground colour, from whence the terminal area is lilac-grey; termen darkly dotted. Secondary pinkish brown, paler towards the base.

Expanse: 24 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September.

230. **Acantholipes aroana** spec. nov.

♂. Head, thorax, abdomen, and both wings pale rufous, more or less finely irrorated with darkish grey. Primary with a basal white point, three subbasal white points in a greyish line, a medial slightly angled grey line, a postmedial

row of white dots in a grey line, a pale rufous dentate subterminal line, termen with black dots. Secondary with a medial grey line, postmedial grey line with a row of white dots, a terminal row of black dots, inside which is a scalloped grey line.

Expanse: 38 mm.

Hab. Aroa River, February.

Type in my collection. There is a specimen in the Tring Museum which is very dull in colour, with but little of the red tone in it.

231. **Acantholipes alboserrata** spec. nov.

♂. Head, thorax, and both wings greyish brown, with a basal white point; an antemedial dark line, edged internally with white on the fold; medial dark line irregular; reniform with two black points; a broad white serrate irregular postmedial line, a subterminal pale dentate line; termen with black points. Secondary with a medial grey line, a serrate white postmedial line; termen with black points.

Expanse: 34 mm.

Hab. Aroa River, March.

Type in the Tring Museum.

232. **Acantholipes nigriplaga** spec. nov.

♂. Head and thorax reddish ochreous, abdomen blackish; both wings reddish ochreous. Primary with blackish antemedial spots on the costa and inner margin, connected together by a fine line; a reddish irregular medial line; two black dots in the reniform; three large blackish postmedial spots, connected by a fine crenulate dark line; a pale reddish subterminal line, with small blackish spots on the external edge; termen with black dots. Secondary with a grey medial indefinite line, a postmedial crenulate line strongly marked with blackish, a pale subterminal line; termen with black dots.

Expanse: 37 mm.

Hab. Aroa River.

Type in my collection.

233. **Fodina kebea** spec. nov.

♀. Head and thorax deep velvety reddish brown, patagia and tufts tipped with a double line of crimson and white, abdomen reddish brown. Primary with the basal four-fifths deep velvety reddish brown, edged above externally with pale cream-colour; the costa is broadly pinkish up to the cell, which colour makes an irregular deep excavation into the dark area at and beyond the end of the cell; terminal area pinkish lilac. Secondary uniform orange vermilion.

Expanse: 46 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

234. **Ischyja kebeae** spec. nov.

♀. Head and thorax greyish brown, abdomen darker. Primary dull umber-brown, darkish up to the oblique straight medial line; a trace of an antemedial line on the costa; an oblique chestnut-red patch from the apex expanding inwards, and descending in a dentate fascia to vein 3, edged outwardly with blackish.

Secondary, base pale brownish, termen and inner margin very broadly blackish, a large central patch of white.

Expanse : 104 mm.

Hab. The type is in my collection from the Kebea Range, where the species occurs in July.

This species will come next to *I. ebusa* Swinh.

235. **Platyja argenteopunctata** spec. nov.

♂. Head and thorax dark purplish brown, finely but very sparingly irrorated with grey. Primary very dark purplish brown, almost blackish ; a double silvery grey dot on the costa near the base, followed by another farther out in the cell, beyond and above which are three similar dots on the costa below each other in a curve, two dots at the end of the cell and one small one in the middle, below which on vein 1 is another ; a curved postmedial line of small silvery grey spots terminating in a larger dash on the inner margin ; a fine dentate subterminal silvery grey line. Secondary uniform dark brown.

Expanse : 58 mm.

Hab. The type is in my collection from Dinawa, where the insect occurs in August.

236. **Platyja porphyrodes** spec. nov.

♂. Head and thorax dark chocolate-brown, with a few fine whitish scales; abdomen dark greyish brown ; legs densely haired, dark purplish brown with a few whitish scales ; tarsi encircled with cream-colour. Primary dark greyish brown, with a slight purplish lustre ; antemedial line short, irregular, brownish ochreous, represented below the cell merely by a single small spot on vein 1*b* ; medial line represented by two ochreous brown dots on veins 1*b* and 2 ; a small ochreous brown spot above the cell near the end ; a fine postmedial crenulate ochreous brown line, terminating in a black-edged ochreous brown blotch between veins 2 and 4 ; fringes ochreous yellow. The wing is sparingly and finely irrorated with minute whitish scales. Secondary dark brown with a slight purple lustre confined below and in the cell for the basal three-quarters ; a fine crenulate and dotted ochreous brown postmedial line from the inner margin to vein 6. Fringes pale ochreous yellow.

Expanse : 69 mm.

Hab. The type is in my collection from the Kebea Range, where the species flies in March and April.

237. **Platyja pratti** spec. nov.

♂. Similar to *P. porphyrodes* B-B., but in the primary there are three antemedial ochreous brown spots, a medial waved scalloped line from the angle of vein 2 to the inner margin, with an ochreous brown spot at each scallop, the spot above the cell as in *porphyrodes* ; the postmedial line is broader, and edged with black internally ; the termen is finely dotted with ochreous brown, and the fringes are black. In the secondary the whole wing is suffused with purplish ; the postmedial line is broader, edged internally with black ; and the fringes are black.

♀. Like the male.

Expanse : 68 mm.

Hab. The type is in my collection from Ekeikei, where the species flies from January to April. I have other examples from the Kebea Range.

It is a close ally to *P. porphyrodes*, but is without doubt a distinct species.

Plasmaticus gen. nov.

Palpi with second segment thickly scaled reaching to the vertex ; end segment short, shortly scaled ; antennae simple ; legs roughly scaled, spined. Wings : costa curved for the basal fifth, straight for three-fifths, highly arched at a fifth from apex ; apex acute ; termen excavated below apex to vein 5, which is prolonged, and below which the termen is angled, receding gently obliquely to the tornus. Secondary with termen straight from vein 7 to vein 2, where it is angled in an upward curve to the tornus at 1*b*. Neuration : Primary with veins 3, 4 and 5 from close to the lower angle ; vein 5 ascending to well above the middle of the termen. Secondary with veins 2, 3, 4 and 5 from the lower angle.

Type : *Plasmaticus angulata* B-B.

I have ventured to diagnose this new genus from the female moth as far as possible, there being no doubt that though somewhat near *Platyja* it is quite distinct from it.

238. **Plasmaticus angulata** spec. nov.

♀. Head and thorax chocolate-brown with scattered white scales ; abdomen dark grey. Primary chocolate-brown, sparingly irrorated with fine white scales ; a basal costal patch of white scales, another patch at a third, and another patch darkly centred at three-fifths ; a white spot in the cell ; a trace of an antemedial line ; postmedial line waved below vein 4, dark, a broadish paler area beyond it ; a subterminal row of white dots ; three small greenish grey patches of scales by the apex, placed in a triangle ; a larger patch between veins 3 and 5, and another below 2. Secondary brownish grey ; termen with lavender scales below vein 3, edged internally broadly with reddish ; a white dash in the angle between veins 1*b* and 2.

Underside lavender-grey, with a postmedial and subterminal ochreous grey spotted line in both wings, the postmedial in the secondary being bisected by a dark dividing line.

Expanse : 58 mm.

Hab. The type is in my collection from Dinawa, where the insect flies in August.

239. **Episparis angulatilinea** spec. nov.

♂ and ♀. Head, thorax, and abdomen pale cinnamon-brown ; both wings pale cinnamon-brown. Primary with a slightly darker small basal costal patch ; submedian line twice highly angulated above the lower margin of the cell, then strongly oblique basewards ; a black point in the cell, two snow-white small spots at the end of the cell, the lower one the larger of the two ; an irregular indefinite angled dark line ; postmedial line whitish, rising by a white costal dash angled at vein 9 ; below where it is irregularly curved outwards to vein 2, where is a slight internal angle ; beyond this line a slightly curved band of whitish, the area outside which is pale below vein 6, and has a darkish crenulate subterminal line in it. Secondary with a dark dash closing the cell, an angled crenulated dark medial line followed by the darkish postmedial line, with a white centre, which is angled between veins 3 and 4, subterminal area greyish in the excised area.

Expanse : ♂ and ♀, 58 mm.

Hab. The type is in my collection from Dinawa, where the insect occurs in the month of May. We have specimens from other localities also; and in the Tring Museum, from the Aroa River, are other examples.

Parepisparis gen. nov.

Palpi small, sealed; third segment minute; antennae of male bipectinate; legs with forefemora expanded at base and hollowed; a tuft of longish hairs at the tibial joint. Neuration: Primary with vein 3 from before the angle, 4 from the angle, 5 from the centre of the discocellulars, 6 from the upper angle, 7 from the end of the arcole, 8 and 9 stalked, given off from 10 to form the areole, 10 anastomosing with 11, forming a spurious areole, 11 anastomosing with 12 shortly. Secondary with vein 3 from before the angle, 4 from the angle, 5 from the centre of the discocellulars, 6 from the angle, 7 behind the angle, 8 touching 7 to half the cell. Primary, costa nearly straight; termen excavated below apex, angled slightly at veins 6 and 5, receding rapidly to tornus. Secondary with termen crenulate, strongly so at veins 4 and 6.

Type: *Parepisparis crenulata* B-B.

240. Parepisparis crenulata spec. nov.

♂. Head and thorax greyish lilac, abdomen lilac-grey; both wings greyish lilac, with very dark olive markings. Primary with two subbasal spots, one near the costa and the other on vein 1; two short outwardly oblique costal dashes, one near the middle and one beyond; an inwardly oblique fine line from the apex slightly curved below the cell to the inner margin, with spots on each side of it in the fold; from the tornus upwards two pair of spots—viz., one pair between veins 1 and 2 and the other on each side of vein 3—and a pair of small spots well beyond the cell near the termen; a small dark spot at the end of the cell. Secondary with a submedial indefinite waved line, a medial almost crenulate line, three small spots above the tornus; most of the wing is finely irrorated with grey.

Expanse: 45 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

241. Eugorna alboarcuata spec. nov.

♂. Head slate-brown, thorax reddish brown, abdomen sooty grey. Primary reddish brown, with a creamy white costa extending into a broad white arc across the postmedial area into the tornus, margined externally by a chocolate-brown curved line, with a second obscure line beyond; apex and terminal area dark greyish brown, paler and tinged with lilac above the tornus. Secondary black, with a white tornal patch; on the underside the white arc is yellow.

Expanse: 65 mm.

Hab. Aroa River, March.

Type in the Tring Museum.

242. Ophideres dinawa spec. nov.

♂. Palpi and antennae bright carmine-red, head and thorax dark crimson brownish, abdomen brownish. Primary darkish lilac-pink up to an oblique line from the apex to a third from the base, beyond which the colour is pale greenish golden brown, except for a triangular red patch below vein 2 in the angle made

by the oblique line; in front of the apex there is also a triangular costal pale red patch; a trace of an antemedial reddish line; reniform deep crimson; fringes golden greenish brown. Secondary dark brownish grey.

♀. Like the male, but darker, whilst the golden brown colour is less golden and paler.

Expanse: ♂ 74, ♀ 69 mm.

Hab. The type is in my collection from Dinawa, where it occurs in August.

243. **Plusia kebea** spec. nov.

♂. Head and thorax beaver-grey, abdomen pale greyish. Primary beaver-grey, with two subtriangular dark bronzy lines; the larger one, enclosing the larger triangle of the ground colour, is from the costa, and meets the base of the innermarginal one on vein 2; the terminal area is very strongly suffused with dark bronzy colour nearly up to these lines. Secondary dark grey, becoming creamy at the base.

Expanse: 33 mm.

Hab. The type is in my collection from the Kebea Range, where the insect flies in March and April; other examples are in the Tring Museum from the Aroa River.

244. **Plusia dinawa** spec. nov.

♂. Head and thorax lilac-grey, abdomen grey. Primary, basal area pale lilac-grey margined; a slightly oblique antemedial line from the inner margin extending up into a silvery ⊂ mark, behind which is a silver spot, and margined costally by a very oblique line extending into the upper stroke of the silvery ⊂ mark; postmedial line waved, angled inwards on the fold; the median area between these lines is dark and suffused with rich bronzy brown; a large terminal suffusion of the same colour from the apex to vein 5, terminating along vein 2; tornal area pale lilac-grey; the subterminal line is distinct near the tornus, but very obscure in the dark area. Secondary greyish brown.

Expanse: 35 mm.

Hab. The type is in my collection from Dinawa, where the insect occurs in August.

245. **Plusia ekeikei** spec. nov.

♂. Head and thorax pale golden brown; patagia pinkish brown, with white scales; abdomen pale ochreous brown. Primary, basal area pale pinkish buff, mottled with golden brownish; the area from the termen to the cell below the angle of vein 2 brilliant pale golden, divided by the postmedial and subterminal lines, which are deep golden reddish, with a dash along vein 5 connecting the two; reniform dark golden brown. Secondary ochreous at the base, broadly dark grey beyond the cell.

Expanse: 38 mm.

Hab. The type is in my collection from Ekeikei, where the insect occurs in July.

246. **Plusia babooni** spec. nov.

♂. Head and thorax darkish grey, abdomen somewhat paler. Primary dark bronzy grey, with oblique subbasal stripe angled near the costa; postmedial stripe oblique, slightly waved, shortly angled above the inner margin; subterminal area

with a very large and irregular cloudy patch of dark bronzy brown in a paler area; a small silvery spot near the angle of vein 2. Secondary dark brownish grey, with the basal half somewhat paler.

Expanse: 34 mm.

Hab. The type is in my collection from Babooni, where it was taken in September.

247. **Polychrisia kebeana** spec. nov.

♂. Head pale grey, thorax and collar dark brownish grey, thoracic tuft pale chestnut-brown; abdomen dark brownish grey, ventral tufts reddish brown. Primary with basal area pale grey up to the whitish subbasal line which terminates on the lower margin of the cell; from this line up to the angled and irregular postmedial line the colour is dark brassy brown, the brassy lustre showing more or less according to the angle of light; a posterior costal patch in this area of pale grey; in the angle of vein 2 a golden U-shaped mark with its internal part also goldenish, followed by a golden spot; tornus with a brassy brown patch; rest of wing pale grey, with a short oblique irregular brassy brown streak from the apex; termen finely whitish with a narrow dark bronzy brown internal edging. Secondaries brownish grey.

Expanse: 48 mm.

Hab. The type is in my collection from the Kebea Range (6000 ft.), where the insect occurs in March and April.

248. **Deva multicolora** spec. nov.

♂. Head chestnut-brown, thorax chestnut-brown tinged with purplish; abdomen greyish brown. Primary golden brown, restricted base lilac, followed by a subtriangular costal patch of golden brown and by an irregular broadish band of metallic silvery brassy colour; median line oblique; reniform distinct, slightly metallic golden brown, the ground colour being tinged with purplish; postmedial line highly angled just below the costa and very oblique, touching which are several silvery brassy patches, a large one up to the tornus, above which is a small one, followed above by another slightly larger; an angled, curved and irregular short line from near the apex to about vein 3, edged externally with golden. Secondary brownish, pale near the base.

Expanse: 39 mm.

Hab. The type is in my collection from the Kebea Range, where the insect occurs in July. This species will come next to *D. caelonota* Koll., which I have from the same district.

249. **Marcipa tripuncta** spec. nov.

♂. Head, thorax, and abdomen grey. Primary mauve grey, with three silver spots at the base; a trace of an antemedial line; reniform palely outlined; postmedial line from near apex very oblique; beyond this the area is paler, and has a fine line near the postmedial slightly waved to about vein 4, where it is highly angled and recedes to the inner margin in a deep curve. Secondary greyish brown.

Expanse: 39 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was taken in March; there is also a specimen in the British Museum from Milne Bay.

Subfamily FOCILLINAE.

250. **Mecodina novoguineana** spec. nov.

♂. Head and thorax dark brownish grey, the latter finely irrorated with brown ; abdomen rather paler. Primary brownish, finely irrorated with whitish grey; a small dark brown costal basal patch ; a pale inwardly dentate antemedial line edged externally with a broad brown band ; a very broad irregular clouded brown band at the end of the median area, edged externally by a pale serrate line ; a white spot beyond this line in the fold ; a subterminal cloudy dark inwardly serrate line edged internally with yellowish ; termen finely brown ; fringes brown intersected with yellowish. Secondary brownish, with a deep velvety black ocellus (above the tornus) having a small white pupil, and being encircled externally with yellowish, the encircling being doubled internally.

Expanse : 46 mm.

Hab. The type is in my collection from the Aroa River; other specimens are in the Tring Museum.

251. **Seneratia albopunctata** spec. nov.

♂. Head and collar fuscous, thorax purplish brown ; abdomen greyish brown. Both wings chocolate-brown. Primary with indistinct basal and subbasal curved waved lines ; a medial broad oblique dark band diffused on its outer edge ; a sinuate crenulate postmedial line ; a sinuate subterminal row of white dots ; termen with a very fine crenulate line. Secondary with all the markings of the primary carried through except the basal and subbasal lines.

♀. Like the male, but with the pattern less defined.

Expanse : ♂ 46 mm., ♀ 48 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was taken in February.

252. **Zethes lilacea** spec. nov.

♀. Head, collar, and thorax pale fawn-brown, head and collar the palest ; abdomen fawn-brown. Both wings lilac-brown up to the obliqne postmedial line, beyond which the colour is pale pinkish lilac, being slightly darker near the termen ; nearly touching the postmedial line is a series of dark dots with a pale grey spot on the costa in the primary only ; reniform darkish. Secondary like the primary.

Expanse : 36 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

253. **Zethes fuscomarginata** spec. nov.

♀. Head, thorax, and abdomen cinnamon-brown. Primary pale cinnamon-brown up to the postmedial line, and narrower along the outer part of the costa to the apex, beyond this line dark sepia-brown ; a trace of a fine basal line; antemedial line fine, waved, and curved ; reniform pale, with a fine oblique dash from it to the costa ; postmedial line oblique, highly angulated just below the costa ; a trace of a pale submarginal irregular line, with a diffused small pale patch between veins 4 and 5. Secondary cinnamon-brown, finely darkly irrorated to the end of the cell ; postmedial line fine, just beyond which is an irregular deep sepia-brown

band from the tornus to vein 6, edged with pale fawn-colour, and with the veins intersecting it with the same colour ; above this, below the costa, are two white spots ; apical area darkly diffused.

Expanse : 51 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in May and June.

The species will come near *Z. shivula* Guen.

254. **Zethes aroa** spec. nov.

Head and thorax pale straw-colour, collar yellowish ; abdomen pale straw-colour. Both wings pale straw-colour. Primary with antemedial, medial, and postmedial lines fine waved, somewhat curved, and the postmedian angled below the costa ; posterior part of wing darkly irrorated, more densely at the termen ; a pale patch at the apex, preceded by a dark angled dash. Secondary with a diffused median band and a curved irregular postmedial line ; from the former the whole of the wing is more or less densely and darkly irrorated, very much so in the terminal area.

Expanse : 51 mm.

Hab. The type is in my collection from the Aroa River ; other examples are in the Tring Museum from the same locality.

255. **Zethes griseistriga** spec. nov.

♀. Head, thorax, abdomen and both wings dull sooty grey. Primary with dark subbasal line angled outwards ; a medial line of dark shading angled outwards below the costa ; postmedial dark line very oblique, angled shortly outwards just below the costa. Secondary with oblique waved medial and straightish oblique postmedial lines.

Expanse : 42 mm.

Hab. The type is in my collection from Dinawa.

256. **Zethes meeki** spec. nov.

♂. Head and thorax lavender-grey, collar tipped with dark brown, abdomen pale reddish grey. Both wings pale greyish. Primary with two subbasal waved lines filled in with pale olive-brown ; a medial irregular and a postmedial angled line, the interspace darkly suffused with brownish, and having a costal patch of reddish brown ; an apical brownish suffusion, an irregular serrated submarginal whitish grey line, followed by a subterminal row of white dots. Secondary with the median suffusion edged by the postmedial oblique line ; terminal area with markings as in the primary ; a dark spot at the tornus, and two dark points in the cell.

♀. Like the male, but without the brownish suffusions in both wings.

Expanse : 38 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was captured in April.

This species will come next to *Z. plumipes* Hpsn.

257. **Zethes megaspila** Warr.

♀. Head, thorax, abdomen and both wings pale bluish grey ; costa with three subdued small brownish patches, the third extending into a large brown patch below it ; a slightly darker apical suffusion on the termen ; a trace of a basal dark

spotted line, a pale waved postmedial line, an irregular serrated submarginal dotted line; termen with black points. Secondary with a black point in the cell; the postmedial and other outer lines as in the primary; a dark spot at the tornus.

Expanse: 42 mm.

Hab. The type from British New Guinea (Le Hunte) is in the Tring Museum. Mr. Meek sent it from the Aroa River, where it was taken in March.

258. Zethes nigra spec. nov.

♀. Head and thorax blackish, collar and patagia greyish; both wings blackish grey. Primary with costa whitish grey to beyond the cell; basal and subbasal lines interrupted, waved; medial line very obscured; postmedial line serrate, produced forwards beyond the cell; subterminal line dark, serrated above the tornus; a white spot in the cell, followed by the creamy reniform; apex whitish. Secondary with the basal area darkly mottled; the postmedial line strongly crenulate, with dark spearhead crenulations; subterminal line very prominent and dark, preceded by a row of pale reddish brown spots touching the line.

Expanse: 34 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was taken in March.

259. Zethes tessellata spec. nov.

♂. Head, thorax and abdomen pale ochreous grey, thorax marked with dark brown; both wings pale ochreous grey with dark brown lines. Primary with a short basal dash confluent into the basal line; antemedial line curved; two angled medial lines enclosing a slightly darker area; reniform darkly outlined and divided; postmedial line angled below vein 5; above the angle is a greyish patch up to the costa, adjoining the irregular subterminal line; terminal area from this line yellowish; termen darkly lunuled. Secondary with antemedial and very obscure medial lines curved slightly inwards; postmedial line straight; subterminal line very obscure; termen darkly lunuled.

Expanse: 39 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was taken in March.

This species will come next to *Z. nigrilinea* Wlk.

260. Zethes ochreistriga spec. nov.

♂. Head and collar pinkish ochreous, thorax crimson ochreous, abdomen crimson grey, laterally ochreous. Primary reddish ochreous, with antemedial line pale ochreous edged with pink; medial line irregular dark reddish, a small ochreous spot in the cell; reniform ochreous with two black dots; postmedial line crenulate, roughly angled outwards opposite the reniform; subterminal line spotted dark grey, with internal ochreous edgings to the spots; angled at vein 5; termen with fine dark points. Secondary crimson irrorated with grey, with ochreous base and a yellow medial stripe from vein 6 to the tornus; postmedial line obscure, with strong grey irrorations in parts beyond it; termen very finely black and crenulate.

♀. Much paler than the male, with the lines finer and greyer.

Expanse: 34 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was captured in March.

261. **Zethes apicebrunnea** spec. nov.

♂. Head and collar pale rusty brown irrorated with grey, thorax and abdomen pale grey ; both wings pale grey. Primary with costa sprinkled with pale rusty brown ; a trace of an obscure medial and postmedial line ; a large apical subtriangular rusty-brown patch occupying nearly half of the costa, with a spot on the termen at its extremity ; orbicular just discernible by its faint encircling ; both wings are sparingly irrorated with darker scales.

Expanse : 42 mm.

Hab. Ekeikei and Aroa River, March and April.

Type in my collection, and other specimens in the Tring Museum.

262. **Zethes multilinea** spec. nov.

♂. Head, thorax and abdomen sepia brown, thorax and abdomen with a dark slaty grey central stripe; both wings dark sepia-brown, with all the veins palely outlined ; termen pale slaty grey, with a fine dark crenulate line ; fringes dark sepia-brown.

Expanse : 42 mm.

Hab. The type is in my collection from Dinawa, where it was taken in August.

263. **Zethes (Cultripalpa) ekeikei** spec. nov.

♀. Head and thorax reddish chocolate-brown, abdomen chocolate-brown ; both wings reddish chocolate-brown. Primary with a narrow creamy white costa; a broken slate-grey subbasal line ; a small slate-grey cell-dot ; a postmedial crenulate slate-grey line projected outwards about veins 3 and 4, inside which projection is a slate-grey roundish patch ; a waved submarginal row of slate-grey dots ; termen with fine points. Secondary greyish in costal area ; a trace of a medial crenulate line; three submarginal grey dots near the tornus ; termen finely dotted ; fringes to both wings whitish.

Expanse : 42 mm.

Hab. The type from Ekeikei is in my collection; the species occurred in January and February.

264. **Zethes (Cultripalpa) rufalia** spec. nov.

♀. Head and abdomen reddish brown, thorax purplish brown ; both wings reddish brown. Primary with base pale buff ; subbasal line dark, edged by a broad median band of purplish brown ; reniform palely outlined ; an indistinct postmedial line, a more distinct and spotted submarginal line ; termen with fine black points ; a costal subapical chocolate triangular patch palely edged. Secondary paler and redder, with the postmedial line dotted with white ; two blackish dots above the tornus ; median and terminal area finely irrorated with dark grey.

Expanse : 37 mm.

Hab. The type is in the Tring Museum from the Aroa River, where the species occurs in April.

265. **Zethes (Cultripalpa) albisigillata** Warren.*

♀. Head reddish, thorax and abdomen pale greyish buff, both wings pale greyish ochreous. Primary with a reddish suffusion beyond the median area ; base with two dark dots ; a broad blackish median band with a silver dot in the

* *Nov. Zool.* x. p. 123 (1903).

cell and a waved silver line closing the cell; a costal subapical blackish triangular patch, a submarginal irregularly waved dotted line: termen with fine black points. Secondary with a trace of a pale spotted medial line and a fine crenulate submarginal line; termen with fine black points; the wing is in parts finely irrorated with grey.

Expanse: 44 mm.

Hab. The type is in the Tring Museum from British New Guinea (Le Hunte) Mr. Meek sent the species from the Aroa River, where it was taken in February.

266. **Zethes (Cultripalpa) albopunctata** spec. nov.

♂. Head, thorax, and abdomen reddish brown. Primary brownish, densely irrorated with dark grey, costa spotted with snow-white, a trace of a subbasal dark line; postmedial line dark, crenulate, with white points at the tips of the crenulations; an indistinct paler subterminal line, termen with black points. Secondary slightly reddish brown, finely and darkly irrorated; subbasal and postmedial lines as in the primary, with an indefinite dark medial line of shading; terminal area as in the primary.

Expanse: 40 mm.

Hab. The type is in the Tring Museum from the Aroa River, where it was taken in February.

267. **Zethes (Cultripalpa) bella** spec. nov.

♀. Head and palpi dark grey, thorax pinkish grey, abdomen pink; both wings pale pinkish with very pale lavender-grey lines. Primary with the costa broadly very pale lavender-grey, edged internally near the base with white; a trace of the medial and postmedial lines on the inner margin; above the latter a large dark grey blotch extending in two lines at the top and bottom through the fringes, and preceded on its inner edge by an interrupted short curved white line margined internally with a pale brown lunule. Secondary with a very restricted white base, a dotted submedial line, the medial and submedial and terminal lines pale lavender-grey, the medial with a series of central white dots in it, the terminal line consisting of a spotted row.

Expanse: 34 mm.

Hab. The type is in my collection from the Aroa River, where the species occurs in March; other specimens are in the Tring Museum from the same locality.

268. **Zethes (Cultripalpa) rubraria** spec. nov.

♀. Head, thorax, abdomen, and both wings reddish ochreous, costa with six white points, submedial line red-spotted; a trace of a similar medial line; postmedial line sinuate, almost crenulate, palely pointed at the crenulations; an irregular waved pale subterminal line, beyond this the termen is darker and with black points. Secondary with the markings of the primary carried through.

Expanse: 36 mm.

Hab. The type is in the Tring Museum from the Aroa River, where the insect occurs in April.

269. **Pangrapta pratti** spec. nov.

♂. Head and collar reddish brown, thorax paler reddish brown, abdomen dark grey. Primary with the costal half reddish brown, lower half dark sepia-brown in the median area; base paler, edged by a pale irregular subbasal line; a medial dark line below the cell; postmedial line white, strongly produced

outwards from vein 6 to 3, where it is deeply excavated to the inner margin with a white suffusion in the excavation; an oblique crenulate paler subterminal line; termen with a dark suffusion about veins 3 to 5. Secondary with the white postmedial line followed by the crenulate subterminal line, the median dark diffusion more or less restricted.

Expanse: 36 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in March and April. We have examples from several localities, and others are in Tring Museum from the Aroa River.

270. **Pangrapta aroa** spec. nov.

♂. Head and collar dark sepia-brown, thorax pale pinkish brown, abdomen darkish grey. Primary with the basal half pale pinkish grey, edged by a broad oblique dark sepia-brown fascia produced outwards at vein 6, with a costal pale buff triangular patch above; the rest of the wing bluish grey with a trace of a dotted subterminal line; a subbasal irregular fine pale line, succeeded by a dark dot in the cell. Secondary with a dark median band, a dark cell-spot encircled with whitish; a white postmedial line edged externally by a diffused dark sepia-brown stripe with white serrations above the tornal area; terminal area bluish grey, with a dark suffusion across it to veins 3 and 4. Margin of both wings crenulate and finely dark.

Expanse: 38 mm.

Hab. The type is in my collection from the Aroa River, where it was taken in March; other specimens in the Tring Museum from the same locality.

271. **Disticta hampsoni** spec. nov.

♂. Head, thorax, abdomen, and both wings cream-colour. Primary with a trace of a greyish medial oblique line, two black points at the end of the cell; postmedial line oblique from the apex, greyish, edged by an external ochreous stripe with a blackish crenulate outer margin; a trace of a subterminal line roughly parallel with the termen, termen with fine black points. Secondary with a black point in the cell, postmedial lines as in the primary; terminal area broadly pinkish with a greyish stripe, and fine black points to the termen.

♀. Like the male, but darker, with all the lines accentuated.

Expanse: ♂ and ♀, 37 mm.

Hab. The type from Ekeikei is in my collection. We have examples also from other localities taken in March and April, and there are several specimens in the Tring Museum from the Aroa River.

272. **Disticta tornopunctata** spec. nov.

♂♀. Differs from *D. hampsoni* in that there are two blackish spots in each wing above and a little inwards from the tornus.

Hab. The type is in my collection from the Kebea Range; and we have the insect from other localities, including the Aroa River.

I am doubtful whether this may not be a variety of *hampsoni* B-B., but it obtains in the same localities as that insect and at the same time; we have a good series of the one, but only a small number of the other; there are, however, no intermediate forms, and as we have the spotted species in both sexes it is probable that it is distinct.

273. **Disticta kebea** spec. nov.

♂. Head, thorax, and abdomen pale pinkish cinnamon-brown ; subbasal line obscure, pale ; a dark point at the base, another in the cell, and a third at the lower margin of the reniform ; an oblique line from the apex basewards, the lower part of which is edged externally with white, a pale costal subapical patch ; a trace of a pale subterminal line with three dark dots from veins 2 to 4 ; termen with fine black points ; all the lines and dots carried through the secondary except the subbasal one.

Expanse : 40 mm.

Hab. The type is in my collection from the Kebea Range, where it was taken in July.

274. **Axiocteta rufa** spec. nov.

♂. Head, thorax, and primary pale reddish brown, abdomen and secondary creamy white. Primary with double antemedial greyish indefinite lines somewhat waved ; medial and postmedial lines obscure ; subterminal line double waved. Secondary with pink fringes and with an anteterminal row of dark points.

♀. Like the male, but lines more distinct, with a white spot on the fold below the end of the cell.

Expanse : ♂ 34 mm., ♀ 33 mm.

Hab. Owgarra and Kebea Range, July.

Type in my collection.

This species will come next to *A. œnoplex* Turner.

275. **Axiocteta turneri** spec. nov.

♂. Head and thorax warm brick-red, abdomen creamy with reddish dorsum. Primary warm brick-reddish, with the postmedian area greyish ; two hyaline spots in the cell, the outer one the larger ; a trace of a subbasal line ; medial line grey, oblique, obscure : postmedial line frequently waved for the costal two-thirds ; subterminal line obscure ; termen white in the upper and lower excision. Secondary creamy white, pink at the tornus and termen.

Expanse : 28 mm.

Hab. Ekeikei, Aroa River, March and April.

Type in my collection, and other specimens in the Tring Museum.

276. **Axiocteta babooni** spec. nov.

♂. Head and thorax dull reddish brown ; abdomen creamy with reddish dorsum. Primary dull reddish brown, with antemedial and postmedial grey lines obscure ; a creamy white spot in the fold below the end of the cell ; reniform obscurely grey with a similar coloured indefinite dash to the costa ; a subterminal row of dark points. Secondary creamy white with pinkish termen.

Expanse : 30 mm.

Hab. Babooni, September ; Aroa River, March.

Type in my collection, other specimens in the Tring Museum.

277. **Axiocteta obliqua** spec. nov.

♂. Head and thorax pale pinkish grey, abdomen greyish white. Primary pinkish grey, with antemedial grey line somewhat curved ; postmedial line straight, oblique ; a creamy white spot at the end of the cell ; a reddish line of postmedial

shading; a grey dotted subterminal line. Secondary creamy white, pinkish at the tornus, termen with a row of fine dark points in front.

♀. Like the male, but paler, and with a pale reddish spot at the end of the cell.

Expanse: ♂ 33 mm., ♀ 36 mm.

Hab. Dinawa, September; Aroa River, February to April.

Type in my collection, and other examples in the Tring Museum.

278. **Axiocteta concolora** spec. nov.

♂. Palpi reddish brown, head and thorax pinkish ochreous, abdomen creamy white. Primary pale ochreous cinnamon-brown, with antemedial, medial, postmedial, and subterminal wavy grey, more or less obscure lines; reniform obscurely grey. Secondary, creamy white for the basal half, pinkish for the terminal half.

Expanse: 33 mm.

Hab. Kebea Range and Aroa River, March and April.

Type in my collection, and other specimens in the Tring Museum.

279. **Axiocteta flava** spec. nov.

♂. Palpi darkish grey, head ochreous, thorax ochreous grey, abdomen creamy whitish. Primary ochreous grey, with cell yellowish, in which the orbicular and reniform are grey; a trace of a grey medial line below the cell; an oblique grey postmedial line; a trace of a serrated yellowish subterminal line; area below vein 3 yellowish; a subterminal series of fine dark points; termen finely dark. Secondary creamy whitish, termen pinkish, especially just below the apex.

Expanse: 36 mm.

Hab. Aroa River, March.

Type in my collection; one specimen only obtained.

280. **Egnasia delicata** spec. nov.

♂. Head, thorax, abdomen, and both wings pale lavender-grey. Primary with a trace of a basal costal spot, a subbasal short dash from the costa, and a broadish dark oblique dash from the inner margin; two short oblique costal dashes, viz. one at the middle and one beyond; costa in front of apex dotted with white; a faint trace of a pale postmedial line; all the dashes are of chestnut brown; a hyaline spot in the cell. Secondary with a large postmedial purple blotch, extending into the tornus; termen strongly crenulate, pale chestnut with white centre.

♀. Similar to the male, but the markings on the primary much more prominent, and with a large blotch from the postmedial line to the termen.

Expanse: ♂ 39 mm., ♀ 44 mm.

Hab. The type is in my collection from Ekeikei, where the species flies from January to March; we have it from other localities also, and examples are in the Tring Museum from the Aroa River.

281. **Egnasia chloroplaga** spec. nov.

♀. Head, thorax, and abdomen pale dove-grey, collar tipped with dark sepia-brown. Both wings pale grey tinged with lilac. Primary with subbasal line waved, somewhat obliquely curved; medial line double waved and irregular; cell filled with pale green between these two lines with a black point; a postmedial

broad diffused band with a short dark serrated line opposite the cell, the costal part of the band being pale greenish ; submarginal line fine, irregular, angled at vein 4, followed by a second line of dark dots, the interspace being faintly greenish, with a small darkish subapical terminal patch. Secondary with a trace of the medial and postmedial lines ; submarginal lines as in primary ; a greenish tornal patch edged externally by a short dark brown line.

Expanse : 45 mm.

Hab. The type is in my collection from Ekeikei, where it was taken in March and April.

282. **Egnasia dinawa** spec. nov.

♂. Head and thorax grizzled pale yellowish grey. Both wings grizzled greyish brown. Primary, with basal and subbasal creamy irregular lines enclosing an olive-brown area ; a diffused median band of dark shading preceded by a blackish dot in the cell and followed by the reniform palely outlined ; postmedial creamy line deeply angled forwards about vein 6 ; a trace of a submarginal serrated fine pale line ; termen with dark points, and clouded with brownish below the apex. Secondary with the postmedial creamy line straight and oblique ; terminal area as in the primary.

Expanse : 47 mm.

Hab. The type is in my collection from Dinawa, where it was taken in September.

Crenularia gen. nov.

Differs from *Aroana* in that vein 7 is free from the end of the areole, 8 and 9 stalked and given off from 10 to form the areole, 11 appressed closely on to 10 at a quarter of the areole, so as to look like anastomosis, becoming free beyond the areole. Costa of primary depressed in the centre, falcate at the apex ; termen excised slightly below the apex, slightly hollowed to vein 3, below where it is excised and crenulate. Secondary produced to a fine point at vein 7, and to a longer point at vein 3, above and below which it is strongly crenulate. Antennae of male bipectinate, ♀ very finely ciliate. Palpi porrect scaled, third segment shortish.

Type : *Crenularia concolor* B-B.

283. **Crenularia concolor** spec. nov.

♂. Head and collar whitish buff, thorax, abdomen, and both wings uniform pinkish grey. Primary with an angled irregular fine dark subbasal line ; orbicular grey, finely encircled by a dark line ; reniform dark grey with a small pale centre ; postmedial line fine, irregular ; a short pale grey fascia before the apex. Secondary with the lines carried through as in the primary.

♀. Dark slate-grey, paler in the postmedial area of the primary, with the lines and markings as in the male.

Expanse : ♂ 32 mm., ♀ 38 mm.

Hab. The type from Ekeikei is in my collection, where the species flies in March and April.

Aroana gen. nov.

Palpi scaled, upturned, second segment reaching above the vertex, third moderately long ; proboscis moderately developed ; antennae very finely and minutely ciliated in ♂. Legs : one pair of spurs on the midtibia, two pairs on the

hind. Neuration : Primary, vein 3 from just below the lower angle, 4 and 5 from the angle, 6 from below the upper angle, 7, 8 and 9 stalked, given off from 10 to form a most minute areole, 11 from well below the middle of the cell and extending to a quarter from the apex. Costa straight; apex excised; termen produced strongly out at veins 5 to 3, excised below 3, and crenulate nearly throughout. Secondary termen produced at vein 7, and strongly produced at 4 and 3, excised and crenulate below.

Type: *Aroana olivacea* B-B.

284. **Aroana olivacea** spec. nov.

♂ and ♀. Palpi red, head purplish black; thorax blackish olive-green; abdomen dark greyish with very dark olive dorsum. Both wings very dark blackish grey with lavender lines. Primary, with fine basal and subbasal internally crenulate lines; a broad dark olive median band angled just below the costa; reniform blackish, finely outlined with lavender; postmedial line serrate, produced outwards about veins 4 and 5, and strongly serrate, receding below; median and postmedial areas olivaceous; subterminal line very dark olive-brown, with an outer margin spotted with lavender; a brownish costal subapical patch. Fringes olivaceous. Secondary with restricted base greyish; antemedial line lavender, edged by a broad dark olive band; median area olive-green with a dark spot in the cell, edged by a double line of dark brown and lavender; postmedian area olive-green; subterminal area dark with a broad band of fine lavender irrorations.

Expanse : 31 mm.

Hab. The type is in my collection from the Aroa River, where it was taken in April; other examples are also in the Tring Museum from the same locality, but taken in March.

285. **Aroana rubra** spec. nov.

♂. Head, thorax, and abdomen brownish pink. Both wings pinkish with olive and golden-brown lines and marks. Primary with a short fine twice-angled basal line; an antemedial fine line shortly angled just below the costa, then nearly straight but slightly outwardly oblique; a dark broad median band edged by a filling in of darker ground colour; reniform irregular, sublunular, very dark, palely encircled, from whence a dark band descends to the inner margin; an interrupted dentate postmedial line; a golden-brown diffused subapical patch from the costa to veins 4 and 5; termen finely dark, subcrenulate. Secondary with a broad oblique median band; a dark sublunular spot in the cell; a fine irregular postmedial line, and a fine dark termen.

♀. Like the male in all particulars.

Expanse : ♂ 28 mm., ♀ 30 mm.

Hab. The type from the Aroa River is in my collection; I have specimens also from Ekeikei, and other examples are in the Tring Museum from the former locality. The species flies in March and April.

Focillodes gen. nov.

Palpus upturned scaled, second segment reaching vertex, third segment short, antennae of ♂ bipectinate to end, of ♀ minutely ciliate. Legs hairy; foreleg with tuft on upperside of femora, and a small pencil of hairs on underside of tibiae; midtibia with one pair of spurs, hindtibia with two pairs of spurs. Neuration :

Primary with vein 2 from just beyond middle of cell, 3 from just below the angle, 4 from the angle, 5 from just above the angle, 6 from the upper angle, 7 anastomosing with 10 to form the areole, 7, 8 and 9 stalked, 11 depressed on to 10, which touches 7 for its greater part. Secondary with veins 3 and 4 from the angle, 5 from well above the angle, 6 and 7 from the upper angle; costa of primary straight, slightly depressed over the cell; apex depressed, almost acuminate: termen slightly angled about vein 5, receding from thence rapidly to the tornus. Secondary with costa straight; termen fairly rounded; wing broad.

Type *Focillodes dinawa* B-B.

286. **Focillodes dinawa** spec. nov.

♂. Head, thorax and abdomen dark purplish sooty brown. Both wings dark slaty brown; primary with a broad pale costal dash at and beyond the centre, below and beyond which is a reddish area; lower part of termen pinkish brown; a dark waved basal line, a dark waved angled medial line; postmedial line oblique, subterminal line waved, orbicular ochreous. Secondary with a reddish median band edged externally by a waved line, beyond which the area is wholly dark slaty grey.

Underside with both wings having the postmedial and terminal area dark grey, edged internally by a pale line.

♀. Wholly pale grey, with lines and costal dash as in the male; subterminal line spotted.

Expanse: ♂ 34, ♀ 40 mm.

Hab. Dinawa, August and September; Aroa River.

Type in my collection, and other specimens in Tring Museum.

287. **Focillodes brunnea** spec. nov.

♂. Head, thorax, abdomen and both wings entirely dull brown. Primary with antemedial dark line waved, medial line angled at the cell; postmedial line less angled than the median, edged palely externally, a dark obscure subapical costal cloudy patch; subterminal line dotted with white. Secondary with a dark medial line, postmedial line as in the primary; a dark dot above the tornus.

♀. Paler than the male, with rusty brown lines as in the male; in the secondary there is a dark dotted subterminal line, which is also present in some specimens of the male. Undersurface with no dark marks or area.

Expanse: ♂ 34, ♀ 40 mm.

Hab. Ekeikei, Mount Kebea, and the Aroa River, March.

Type in my collection, and other specimens in the Tring Museum.

288. **Focillodes griseata** spec. nov.

♂. Head, thorax, abdomen and both wings entirely greyish. Primary with waved and slightly angled obscure lines; postmedial line edged laterally and indefinitely with blackish, shortly angled at the costa; a black dash from the angle to the apex; a white dotted subterminal line; a costal pale obscure small patch outside the angle of the medial and postmedial line. Secondary with median area wholly blackish, edged externally by a blackish line with a pale edging; an obscure dotted subterminal line.

♀. Like the male. Underside with a small apical blackish patch.

Expanse: ♂ 36, ♀ 40 mm.

Hab. Dinawa, August; Kebea Range, May and June; and the Aroa River, March.

Type in my collection, and other examples in the Tring Museum.

289. **Focillodes fulva** spec. nov.

♂. Head, thorax, abdomen and both wings uniform fulvous brown. Primary with basal and medial lines waved and slightly angled; postmedial line edged indefinitely with darker fulvous, oblique, straight, broadly angled below the costa; a fine dotted subterminal line, a white costal apical dash; apex acuminate, strongly angled at vein 5. Secondary with a dark median fine line; a dark broadly waved postmedial line, edged externally with white and internally broadly darker fulvous; postmedian area paler fulvous, with a trace of a fine pointed subterminal line; termen angled at vein 4. Underside: Primary with apex having a whitish patch.

♀. Wholly greyish, with lines as in the male. In the primary the interspace of the postmedial and strongly dotted subterminal is fulvous to vein 2. Secondary with the postmedial area whitish, with a black spotted subterminal line; termen fulvous.

Expanse: ♂ 42, ♀ 41 mm.

Hab. Kebea Range, July; Dinawa, August.

Type in my collection.

290. **Focillodes medionigra** spec. nov.

♂. Head, thorax, abdomen and both wings pale fulvous brown. Primary with an obscure waved basal and medial fine line, the latter excurved across the cell; medial line slightly oblique, shortly curved just below the costa; a black indefinite band of shading edges this line, being very broad internally on the inner margin and extending in a broadish dash into the apex; a pale dotted subterminal line. Secondary with the whole of the median area blackish; deep black at the oblique postmedial line; a pale spotted subterminal line; termen dark fulvous. Underside of primary with a dark apical patch.

Expanse: 40 mm.

Hab. Kebea Range and the Aroa River, March.

Type in my collection, and other specimens in the Tring Museum.

Contortivena gen. nov.

Differs from *Focillodes* in that the areole terminates at the end of the cell; veins 7, 8, 9 and 10 are stalked on a long stalk, 10 being given off nearer the apex than 7; veins 4 and 5 are given off from the angle; 2, 3, 4, 5 are waved and contorted down towards the tornus. The costa is waved and depressed at apex; the primary is more even in width and longer. The secondary has the costa produced into a lobe at the base, and is depressed in the middle.

Type: *Contortivena umbrosa* B-B.

291. **Contortivena umbrosa** spec. nov.

♂. Head, thorax, abdomen and both wings greyish brown. Primary with basal line scalloped; medial line waved; postmedial blackish, angle at vein 7 oblique and straight from that point; orbicular and reniform ochreous, darkly encircled; subterminal area pale ochreous brown, reddish on its inner edge; subterminal row of dots. Secondary with a medial dark line; postmedial line

obliqne, blackish, with pale external edging; subterminal dotted brown, ronghly parallel with the previous line. On the undersurface the stigmata of the primary are blackish brown, palely encircled.

♀. Both wings quite pale grey; lines and pattern as in the male.

Expanse: 42 mm.

Hab. Babooni, September,

Type in my collection.

292. **Capnodes costiplaga** spec. nov.

♂. Head and thorax purplish, collar with a reddish tinge, abdomen greyish. Both wings purplish with pale olive-grey marks. Primary with three large white spots on the costa, the third just beyond the end of the cell; three small obscure subbasal dots; reniform marked by a double spot; an irregular dentate waved dotted postmedial line; an interrupted subterminal line of larger spots, with a small patch in the tornus and at the apex; termen with two rows of points. Secondary with the pattern exactly repeated as in the primary, except as to the white costal spots.

Expanse: 46 mm.

Hab. Kebea Range, March and April.

Type in my collection.

293. **Capnodes minuta** spec. nov.

♂. Head white, thorax and abdomen pale reddish. Both wings pale reddish. Primary with two large white costal spots; a trace of a dark antemedial line at the outer edge of the first spot; a postmedial fine dark line, edged externally with white points; a small dark spot in the cell. Secondary with a dark point in the cell, the wing very finely irrorated in parts with grey.

Expanse: 18 mm.

Hab. Ekeikei, March; Aroa River, January.

Type in my collection, and other specimens in the Tring Museum.

294. **Ceromacra babooni** spec. nov.

♂. Head, thorax, and abdomen greyish brown. Primary pale greyish brown, somewhat paler on the terminal half, with a broadish indefinite darker brown basal band; subbasal line narrower and irregular; median band very broad, followed by a narrow irregular line; postmedial band very broad indeed, and darker, beyond which is an outwardly curved dark line which rises and terminates in the broad postmedial. Secondary greyish brown, pale greyish on the costal and abdominal margins. The secondaries are much distorted below the cell, indicating the presence of a sexual patch; veins 1 and 2 are also distorted, but I can only trace a moderately strong pencil of hairs lying above vein 1, and certainly insufficient to account for the contortion of either the wings or the veins.

Expanse: 56 mm.

Hab. The type from Babooni is in my collection, and was taken in September 1903.

295. **Ceromacra ekeikei** spec. nov.

♀. Head and thorax yellowish brown, patagiae and collar irrorated with grey, abdomen greyish brown. Primary ochreous brown with a broad indefinite greyish band beyond the cell; terminal area paler; antemedial line dark and irregular,

beyond which is a dark dot on the upper margin of the cell ; a white point terminates both the upper and lower angle of the cell, beyond which is a recurved broadish darker indefinite band ; the fine postmedial serrated recurved line lies in the pale greyish band, beyond which is a broadish area of darker ground colour, the outer margin of which is very irregular ; termen fine, very pale grey. Secondary greyish brown with a fine very pale grey termen.

Expanse : 49—50 mm.

Hab. The type is in my collection, and was taken in January or February at Ekeikei.

296. **Ceromacra dinawa** spec. nov.

♀. Head pale brown, thorax brown ; patagiae and collar densely but loosely sealed, the scales being paler tipped at their extremities, giving the thorax an irrorated appearance ; abdomen greyish brown. Primary brown, darker for the basal half and at the termen, leaving the postmedial area broadly pale ; lines purplish brown ; the antemedial, rising on the costa in front of the centre, recedes rapidly to the lower margin of the cell, whence it is angled outwards on to the inner margin ; medial line broader, indefinite, irregular, beyond which the reniform stigma is prominent ; postmedial line strongly serrate (almost crenulate), outwardly produced from the costa, then receding gradually to the middle of the inner margin, beyond which (postmedial line) is a trace of another similar one ; subterminal line very irregular, forming the interior edge of the darker terminal area. Secondary uniform greyish brown.

Expanse : 49 mm.

Hab. The type is in my collection from Dinawa, where the species occurs in May and June.

297. **Ceromacra purpurea** spec. nov.

♂. Head and thorax brown with a purple gloss, thorax with a central compressed metathoracic tuft of strongly metallic purplish scales ; abdomen brown, slightly purplish ; anal tuft tipped with white. Primary purplish brown, with a pale yellowish brown antemedial line ; postmedial line pale, finely but darkly edged internally, beginning on the costa a third from the apex, strongly oblique outwardly to below vein 6, where the dark edging is very strongly serrated twice ; the lower serration receding to below the cell, thence to the inner margin ; beyond the middle the double line is resumed in an outwardly oblique direction ; a trace of a subobscure subterminal line. Secondary blackish brown, slightly paler towards the costa.

Expanse : 40—41 mm.

Hab. The type is in my collection from Ekeikei, where the insect occurs in March and April.

298. **Ceromacra aroa** spec. nov.

♂. Head and thorax olive-brown, abdomen greyish brown. Primary olivaceous brown, with basal, subbasal and three somewhat indefinite medial lines, an oblique broad postmedial dark band of shading, a subterminal dotted line, an obscure terminal band of golden brown. Secondary uniform dark brownish grey.

Expanse : 52 mm.

Hab. Aroa River, February.

Type in my collection, and in the Tring Museum are other examples.

299. **Dierna lilacea** spec. nov.

♂. Head and thorax very pale cinnamon-brown; both wings pale cinnamon-brown; primaries with a double fine oblique dark postmedial line, the narrow interspace filled in with lilac-grey and with a broad indefinite edging of lilac-grey; a dark point in the cell, followed at the end of the cell by a white point. Secondary with the medial double line as that in the primary, and with a similar lilac-grey edging.

Expanse: 46 mm.

Hab. Ekeikei, January; Dinawa, September.

Type in my collection.

Tornosinus gen. nov.

Palpus with second segment long, reaching above the vertex, scaled, fringed above and below with hair; third segment minute, almost globular, fringed with a long tuft of hairs above; antennae simple; legs with fore pair having femora and tibiae heavily fringed with hair, mid and hind pair slightly fringed. Neuration: Primary with vein 2 from middle of the cell, 3 from below the angle, 4 from the angle, 5 from just above the angle, 6 from below the upper angle, 7 from the angle, 8, 9 and 10 stalked, 11 from near base of cell; cell very short. Secondary with two internal veins; cell short; 2 from near base of cell, 3 and 4 from lower angle, 5 from directly above it, 6 and 7 from upper angle, 8 curved strongly upwards towards costa and running parallel therewith. Primary with tornus deeply excavated from vein 3 to middle of inner margin; a heavy tuft of long hair on the underside of inner margin. Secondary moderately ample; termen slightly flattened; tornus shortened, with margin flattened from vein 3.

Type: *Tornosinus niger* B-B.

300. **Tornosinus niger** spec. nov.

♂. The whole insect is sooty black. Primary inclined to greyish beyond the postmedial area, a short subterminal whitish dotted line from in front of the apex, a round white spot at the end of the cell; termen darkly dotted; fringes white at the excavated part of the tornus; tornus deeply excavated from vein 3.

Expanse: 34 mm.

Hab. Aroa River, March.

Type in Tring Museum.

Rectangulipalpus gen. nov.

Palpus with second segment porrect, long, reaching above the vertex, heavily scaled, fringed with long hair; third segment long, at right angles to second, heavily fringed with long hair. Antennae very fine, minutely ciliate; head tufted; legs with forefemora and tibiae scaled, a rose-shaped tuft of long spatulate scales from the base of the secondary below. Neuration: Primary with vein 4 from the angle, 3 and 5 from close to the angle, 6 from the upper angle, 7, 8, 9 and 10 stalked. Secondary with two internal veins, 3, 4 and 5 from close to the lower angle, 6 and 7 from the upper angle. Costa depressed at base, then evenly curved, with a short tuft of hair at the top of the depression on its underside; wing very broad, termen evenly rounded from a subacute apex. Secondary less ample, with termen somewhat flattened; a tuft of hair from the upper side of the costa.

Type: *Rectangulipalpus meeki* B-B.

301. **Rectangulipalpus meeki** spec. nov.

♂. Thorax, abdomen, and primary uniform dull brown, the latter with a small pale ochreous creamy spot at the end of the cell, and a trace of a waved subterminal line. Secondary blackish brown, orange-brown in the median area and in a broad band to the tornus.

Expanse: 32 mm.

Hab. Aroa River, February.

Type in the Tring Museum.

Both these last two genera are like none other with which I am acquainted, but I think their best position will be in front of the *Deltoidinae*, with which they will form a connecting link.

Pseudodeltoida gen. nov.

Palpi with second segment long, well above vertex, thickly scaled so as to be spatulate above; third segment shortish, smoothly and shortly scaled; antennae finely and minutely ciliate. Neuration: Primary with vein 4 from the angle, 3 and 5 from close to the angle, 6 from the angle, 7 given off from 8 before the end of the areole, 8 and 9 stalked near apex, given off from 10 to form the areole, 10 with a short bar from 11 before the end of the areole, which is small. Secondary with 3 and 4 from the angle, 5 from the middle of the discocellulars, 6 and 7 from the angle.

Type: *Pseudodeltoida aroa* B-B.

302. **Pseudodeltoida aroa** spec. nov.

♂. Head and collar greyish; thorax and abdomen pale brownish, the latter blackish on the dorsum for the anal half. Primary pale brownish with a small dark subbasal costal spot; the outer part of the median and the postmedian areas dark brown; cell and fold greyish, invading somewhat the dark area; a dark brown small subapical costal triangular indefinite patch; a waved dark subterminal line somewhat obscure; costa with three ochreous points before the apex; termen with black points. Secondary brownish grey, darker beyond the cell.

Expanse: 30 mm.

Hab. Aroa River, February.

Type in the Tring Museum.

ON THE BIRDS OF THE ISLAND OF BABBER.

By Dr. ERNST HARTERT.

HAVING returned to the East once more, our valued correspondent Mr. Heinrich Kühn has again commenced to collect birds on the less known islands of the great Eastern Archipelago.

In *Nov. Zool.* 1904. pp. 174—221 I gave a list of the birds collected by Mr. Kühn on the South-West Islands, and, as I said on p. 176, collections were not made on the more eastern islands, Sermatta, Luang and Babber. Mr. Kühn sent a party of Malayan collectors to Babber, who made a collection of 76 species. Unfortunately the collection does not seem to be a complete one, as the work on Babber had suddenly to be terminated, on account of the hostile behaviour of some of the natives.

A few Babber specimens have long ago reached the Dresden Museum, and were duly recorded and partly described as new by Dr. A. B. Meyer. Also Mr. Schädler sent a collection of 31 species (about half of those sent by Mr. Kühn) from Babber to the Leyden Museum, and the latter has been recorded by Dr. Otto Finsch in his valuable article "Systemat. Uebers. der Vögel der Südwest-Inseln" in *Notes Leyden Museum*, xxii. pp. 225—309 (1901).

The ornis of Babber differs considerably from that of the more western islands, being in many instances the same as, or closely allied to, that of the Teninber or Timorlaut group.

1. **Megapodius duperreyii** Less. & Garn.

Cf. *Nov. Zool.* 1904. p. 176.

3 ♂ ad., Tepa, 27. viii., 5, 9. ix., 1905 (Nos. 6788, 6849, 6886).

2. **Turnix maculosus** (Temm.).

Cf. *Nov. Zool.* 1904. p. 176.

1 ♀ ad., Tepa, 20. x. 1905 (No. 7005).

3. **Ptilinopus cincta ottonis** Hart.

Ptilinopus cincta ottonis Hartert, *Nov. Zool.* 1904. pp. 178, 179 (Dammer and Babber. Terra typica: Dammer).

A fine series was obtained near Tepa, on Babber Island, in August and September 1905 (Nos. 6605, 6609, 6622, 6624, 6628, 6640, 6690, 6700, 6703, 6755, 6756, 6816). "Iris burnt sienna (brick-red in most specimens). Feet dark red (chocolate-brown, purplish red, dark purple). Bill: tip yellowish, base dark (olivaceous).

4. **Ptilinopus xanthogaster xanthogaster** Wagl.

Cf. *Nov. Zool.* 1904. p. 179. no. 8.

Eleven examples killed at Tepa in August and September (Nos. 6606, 6615, 6619, 6629, 6630, 6631, 6653, 6737, 6753, 6801, 6801a).

It is interesting to find that *P. x. xanthogaster*, the same as found on Banda, Key, Dammer, Taam, Teoor, Manggoer, Koer and the Timorlaut (Teninber) group, occurs on Babber, and not *P. x. roseipileum* (*Nov. Zool.* 1904. p. 179), which inhabits Roma, Moa, Kisser, Letti and Wetter.

5. Ptilinopus wallacei Gray.

Ptilinopus wallacei Gray, *P. Z. S.* 1858. pp. 185, 195. pl. 136 (Aru Islands).

We have no specimen from Aru, but a large series from the Key and other islands. Kühn's men obtained fifteen specimens in August, September, October (Nos. 6603, 6654, 6662, 6734, 6758, 6781, 6836, 6843, 6887, 6904, 6905, 6907, 6942, 6963, 6998).

6. Carpophaga rosacea (Temm.).

Cf. *Nov. Zool.* 1904. p. 180.

Common near Tepa in August (Nos. 6604, 6636, 6657, 6658, 6692, 6752).

7. Carpophaga concinna concinna Wall.

Cf. *Nov. Zool.* 1904. p. 181.

Very numerous near Tepa in August and September (Nos. 6608, 6618, 6620, 6647, 6698, 6699, 6741, 6751, 6812, 6838, 6847, 6848, 6852, 6944).

8. Turtur tigrina (Temm. & Knip).

Cf. *Nov. Zool.* 1904. p. 182.

This ubiquitous Turtledove was common on Babber Island (Nos. 6744, 6762, 6817, 6823, 6915, 6918, 6921, 6923, 6927, 6928, 6929, 6935).

9. Geopelia maugeus (Temm. & Knip).

Cf. *Nov. Zool.* 1904. p. 182.

Seven specimens were sent (Nos. 6604, 6637, 6675, 6894, 6948, 6952, 6955).

10. Chalcophaps chrysochlora (Wagl.).

Cf. *Nov. Zool.* 1904. p. 183.

A series of specimens from Babber are somewhat intermediate between *C. c. chrysochlora* and *C. c. timorensis*, but few have the hindneck so continuously grey as in our typical *timorensis*. The bill, however, is rather longish, which is more or less characteristic for *timorensis*, and the extent of white on the shoulders varies somewhat. Mr. Kühn sent fifteen specimens, of which, however, very few are adult (Nos. 6617, 6635, 6649, 6659, 6681, 6740, 6794, 6834, 6837, 6839, 6860, 6855, 6861, 6914, 6914 a).

11. Sterna bergii pelecanoides King.

Cf. *Nov. Zool.* 1904. p. 185.

One skin, August 1905 (No. 6678).

I have not heretofore tried to distinguish between the various races of *Sterna bergii*, as our material was not sufficient for a complete study of them; but Mr. Rothschild, inspired by Mr. Bangs' article in *Bull. Mus. Compar. Zool. Harvard Coll.* xxxvi. 1901. p. 257, suggested to me that there were probably as many races of *Sterna bergii* as of other widespread birds, and I find this really to be the case, although these races are closely allied and not recognisable by a confirmed lumper, who has not trained his eye for careful comparison. Probably the name for the *Sterna bergii* form from all these islands is to be *S. b. pelecanoides* King (*Surv. Int. Austr.* ii. p. 422, 1826).

12. Charadrius squatarola (L.).

Cf. *Nov. Zool.* 1904. p. 186.

♀ ad. Tepa, 12. viii. 1905 (No. 6607).

13. Ochthodromus geoffroyi (Wagl.).

Cf. *Nov. Zool.* 1904. p. 186.

Three females, shot in September (Nos. 6986, 6989, 6991).

14. Numenius phaeopus variegatus (Scop.).

Cf. *Nov. Zool.* 1904. p. 186.

Six specimens (Nos. 6912, 6919, 6926, 6975, 6983, 6983 A).

15. Limosa limosa melanuroides Gould.

[*Scolopax Limosa* Linnaeus, *Syst. Nat.* ed. x. p. 147 (1758—"Habitat in Europa." Terra typica: Sweden, ex Fauna Suecica 144), Linnaeus' only quotation.]

Limosa melanuroides Gould, *P. Z. S.* 1846. p. 84 (Port Essington, Australia).

The eastern Black-tailed Godwits are constantly very much smaller (wing one to two inches shorter, bill shorter and not so thick at base) than the European form, so that they must be separated subspecifically. Mr. Kühn sent two moulting specimens, a ♂ and a ♀, shot on September 12th and 29th near Tepa (Nos. 6920, 6982).

16. Totanus hypoleucos (L.).

Tringa Hypoleucos Linnaeus, *Syst. Nat.* ed. x. p. 149 (1758—"Habitat in Europa." Terra typica: Sweden; from first quotation).

Cf. *Nov. Zool.* 1901. p. 187.

Three specimens, August and September (Nos. 6689, 6763, 6970).

17. Glottis nebularius (Gunn.).

Scolopax nebularius Gunnerus, *Leem, Lapp. Beskr.* 1767. p. 251 (Lappland).

Six specimens, August and September (Nos. 6709, 6795, 6815, 6902, 6903, 6906).

18. Heteractitis brevipes (Vieill.).

Cf. *Nov. Zool.* 1901. p. 187.

1 ♂, Tepa, 1. ix. 1905 (No. 6822).

19. Terekia cinerea (Güld.).

Cf. *Nov. Zool.* 1904. p. 187.

1 ♂, Tepa, 12. ix. 1905 (No. 6910).

20. Limonites ruficollis (Pall.).

Cf. *Nov. Zool.* 1904. p. 187.

Six specimens, August and September (Nos. 6765, 6908, 6913, 6917, 6956, 6997).

21. Heteropygia acuminatus (Horsf.).

Cf. *Nov. Zool.* 1904. p. 187.

1 ♀, Tepa, 12. ix. 1905 (No. 6916).

22. **Tringa crassirostris** Temm. & Schl.

Cf. *Nov. Zool.* 1904. p. 187.

1 ♂, Tepa, 12. viii. 1905. "Iris dark brown ; feet dark slate ; bill black." (No. 6608.)

23. **Stiltia isabella** (Vieill.).

Cf. *Nov. Zool.* 1905. p. 202.

We did not receive specimens from the other South-West Islands. Six specimens were sent from Tepa, on Babber (Nos. 6638, 6648, 6832, 6895, 6947, 6958).

24. **Lobivanellus miles** (Bodd.).

Cf. *Nov. Zool.* 1905. p. 200.

This species too was not received from the other South-West Islands. One female was shot at Tepa on September 5th (No. 6851).

25. **Esacus magnirostris** (Vieill.).

Cf. *Nov. Zool.* 1904. p. 187.

1 ♂ ad., Tepa, 19. viii. 1905 (No. 6668).

26. **Ibis molucca** Cuv.

Cf. *Nov. Zool.* 1905. p. 203.

1 ♂ juv., 1 ♀ ad., Tepa, August and September (Nos. 6677, 6923). No ibis was obtained by Mr. Kühn on the other South-West Islands.

27. **Platalea regia** Gould.

Cf. *Nov. Zool.* 1904. p. 188.

1 ♂, Tepa, 11. ix. 1905 (No. 6909).

28. **Demiegretta sacra** (Gm.).

Cf. *Nov. Zool.* 1904. p. 188.

Two grey examples and one white one, August 1905 (Nos. 6759, 6761, 6874).

29. **Notophoyx novaehollandiae** (Lath.).

Cf. *Nov. Zool.* 1904. p. 188.

1 ♀ ad., Tepa, 24. viii. 1905 (No. 6742).

30. **Nycticorax caledonica** (Gm.).

Cf. *Nov. Zool.* 1904. p. 188.

2 ♂♂, 1 ♀, September 1905 (Nos. 6821, 6829, 6833).

31. **Plotus novaehollandiae** Gould.

Plotus novae hollandiae Gould, *P. Z. S.* 1847. p. 34 (S. Australia).

♂ ♀, 17. viii., 1. ix. 1905 (Nos. 6661, 6818).

32. Pelecanus conspicillatus Temm.

Pelecanus conspicillatus Temminck, *Pl. Col.* v. Taf. 276 (1824 : Australia).

1 ad., Tepa, August 1905 (No. 6805). We received no pelican from the other South-West Islands.

33. Haliastur indus intermedius Guru.

Cf. *Nov. Zool.* 1904. p. 189.

3 ad., 2 juv., Tepa, August and September (Nos. 6600, 6639, 6666, 6680, 6984). The adult birds are typical *intermedius*, having black shafts to the white feathers of the underside.

34. Astur albiventris polionotus (Salvad.).

Urospizias polionotus Salvadori, *Aggiunte Orn. Papuasia* i. p. 19 (1889 : Timorlaut).

1 ♂ ad., 1 ♀ ad., 1 ♀ juv., Tepa, August and September (Nos. 6641, 6899, 6957). "Iris, ♂ ad. orange, ♀ ad. brown ; feet sulphureous, bill black."

The adult female agrees perfectly with our specimens from Tenimber, Banda, and Dammer, while the male differs from our single male (from Banda) in having only the jugular region vinous, the lower breast and abdomen as well as the thighs white, with barely a tinge of vinous and an indication of bars on the sides of the abdomen. Whether this is an individual character, or peculiar to all Babber examples, cannot be guessed without more material. Possibly both *albiventris* from the Key Islands and Manggoer and *polionotus* may eventually be looked upon as subspecies of *A. torquatus*, but it requires more time than I can at present afford to study the relations of these forms at full length.

35. Tinnunculus moluccensis occidentalis Mey. & Wigl.

Cf. *Nov. Zool.* 1904. p. 190.

The Kestrel of the South-Western Islands is *T. m. occidentalis*, and the specimens, four in all, sent from Babber agree with those from Kisser, Letti, and Moa, showing no approach to the darker *T. m. moluccensis* (Nos. 6632, 6819, 6827, 6911).

36. Tinnunculus cenchroides (Vig. & Horsf.).

Falco cenchroides Vigors & Horsfield, *Trans. Linn. Soc. Lond.* xv. p. 183 (1826 : Australia).

We did not receive this species from the other South-West Islands. Kühn's hunters obtained 1 ♂, 2 ♀♀ at Tepa, 24, 29. viii., and 1. ix. 1905 (Nos. 6735, 6796, 6820). "Iris brown ; feet sulphureous ; bill slate with black tip."

37. Falco peregrinus ernesti Sharpe.

Falco ernesti Sharpe, *Ibis* 1894. p. 545 (Borneo).

1 ♀ ad., Babber, 25. ix. 1905. "Iris brown ; feet chromeous ; bill slate-colour." (No. 6953.)

Cf. *Nov. Zool.* 1904. p. 190, where I recorded a young female from Wetter as *F. peregrinus melanogenys*! I am now convinced that this is rather *F. p. ernesti* than *F. p. melanogenys*.

The Falcon from Babber is a very interesting specimen. It agrees with the specimens of *F. ernesti* from Borneo, N.W. Luzon, New Guinea and Mallikollo

in having grey (not ochraceous) under tail-coverts, with wide slaty-blackish bars, very grey (not ochraceous) flanks, with very wide bars, though the breast is not quite as grey as in the males of *ernesti*. The adult female in the British Museum and the one in Tring (from New Guinea) are still darker grey on the flanks and more cinnamon-rufous on the chest, than our Babber specimen, but in all essential characters they agree.

38. **Ninox boobook cinnamomina** subspec. nov.

Formis *Ninox boobook boobook* et *Ninox boobook ocellata* appellatis similis sed multo minor et colore lacte cinnamomino an rufo-cinnamomeo, nec grisescente, nec brunneo, nec rufo.

The four specimens from Babber, obtained at Tepa in August and September, are almost alike, and their colour above is bright cinnamon, lighter on the neck, darker and more brownish on the crown. The scapulars and greater upper wing-coverts are rufous-cinnamon, with white or whitish bars and round spots. The tail is rufous-cinnamon, with more or less ill-defined, sometimes, however, rather distinct brown bars to the inner webs, which are generally much paler. The auricular region is covered with a large, very conspicuous slaty-brown patch. The under-surface varies from light reddish cinnamon with darker longitudinal patches and whitish spots on the abdomen to whitish with rufous-cinnamon longitudinal patches. Wing 209—213, tail about 120—130 mm. "Iris chromeous or whitish yellow; feet whitish; bill dull black or slate with yellow or whitish tip." Type of *Ninox boobook cinnamomina*: ♂ ad., Tepa, 22. viii. 1905 (No. 6606).

It is particularly interesting to find on Babber an apparently very constant distinct form of the *boobook*-group of owls, as the birds from Moa, Letti and Roma are much nearer to *N. boobook boobook* and *N. boobook ocellata*. Cf. *Nov. Zool.* 1904. p. 191, and 1905. p. 210. It must be said that Australian specimens vary enormously in coloration and size. Some small specimens from Derby and other places in N.W. Australia are hardly larger than my *cinnamomina*, and some are quite pale cinnamon, but not bright rufous-cinnamon. I have, however, not seen any series of specimens from one place that are alike *inter se* (we received five examples from Babber), that are so bright rufous-cinnamon, or so small. It is, therefore, not only advisable but necessary to name the Babber form. We received five skins, four marked as males, one doubtful (Nos. 6606, 6607, 6611, 6868, 6892).

39. **Eos reticulatus** (S. Müll.)

Psittacus reticulatus S. Müller, *Verh. Land- en Volkenkunde*, pp. 107, 108 (Moluccas, no exact locality).

Not known from the more westerly islands of the group, but already obtained on Babber by Schädler (cf. Finsch, *Notes Leyden Museum* xxii. p. 285), and on Dammer by Heinrich Kühn. On Babber it is evidently quite common, as Kühn's collectors sent thirteen specimens obtained near Tepa in August and September (Nos. 6612, 6644, 6646, 6650, 6652, 6656, 6665, 6743, 6748, 6807, 6809, 6810, 6872). "Iris burnt sienna (brick-red); bill red; feet blackish."

40. **Trichoglossus euteles** (Temm.).

Cf. *Nov. Zool.* 1904. p. 193.

Mr. Kühn sent four specimens from Tepa (Nos. 6615, 6622, 6625, 6789). Schädler sent to Leyden from Babber.

41. Tanygnathus megalorhynchos subaffinis Scl.

Tanygnathus subaffinis Sclater, *Proc. Zool. Soc. London*, 1883, pp. 51, 53, 194, 200 (Timorlaut); Finsch, *Notes Leyden Mus.* xxii. p. 290 (Babber).

Mr. Kühn sent seven specimens shot in August and September at Tepa. These birds appear to be all adult males in perfect plumage, with the exception of one (No. 6848) which is an immature male. This last one has the lesser upper wing-coverts dark green, not blue, and the outer edges to the median and greater wing-coverts are narrow and dull lemon-yellow. All the others have the lesser wing-coverts, bend of wing and tips of scapulars and median and greater wing-coverts bright blue, the borders to the wing-coverts broad and of a very bright yellow. They surpass thus in brightness of the wing our series of *T. m. subaffinis* from Tenimber (Timorlaut); but as only a few of the latter are adult males in fresh plumage, and one closely approaches our Babber specimens, I believe that the differences are due to the different season and age of the birds, but not peculiar to the localities. "Iris chromeous; bill scarlet; feet slaty black." (Nos. 6601, 6770, 6806, 6840, 6846, 6945, 6946.)

The home of *T. m. subaffinis* is otherwise Timorlaut (Tenimber). It does not occur on Moa, Wetter, Letti, or Kisser.

42. Alcyone azurea yamdenae Rothsch.

Cf. *Nov. Zool.* 1904. p. 196.

What I said (*l. c.*) about two specimens from Roma applies exactly to two examples from Tepa, Babber Island. They may be said to agree with the type of *A. a. yamdenae*, except that their wings are slightly longer, measuring 73 and 75·5 mm., while the wing of the type of *A. a. yamdenae* measures about 70·5 mm. It is very probable that the type of *yamdenae* is an exceptionally small specimen of the same subspecies, but more material from Tenimber is necessary to decide this question finally.

43. Halcyon australasia dammeriana ?

Cf. *Nov. Zool.* 1904. pp. 196, 197.

The specimens from Babber are rather puzzling. They are as dark cinnamon below and on the crown and hindneck as *H. australasia dammeriana*. From the twelve specimens of *H. a. dammeriana* before me they differ as follows: the crown, instead of having a fairly large, rarely small, bluish green patch, has generally a rather smaller patch, and four examples have no patch whatever, but have the crown uniform dark cinnamon; the wing is generally somewhat shorter, varying from 75·5 to 79·5, instead of 78 to 84 mm. in *H. a. dammeriana*. The question therefore is: are our series sufficiently large to prove an average of size or more or less largely patched crown in one of these forms or not? I do not wish, at present, to decide, but probably the Babber form deserves a name. Babber lies between the Letti-Moa group and Tenimber, and we should therefore expect either the Letti-Moa form (*H. a. interposita*) or the Tenimber form (*H. a. minor*). But with neither of these do our Babber birds agree; they are darker underneath (and probably smaller) than *H. a. interposita*, and they are much darker on the throat and in the middle of the abdomen and somewhat larger than *H. a. minor*. That the Dammer form should inhabit Babber as well is very strange—but nothing is impossible.

Mr. Kühn's collectors sent twelve specimens killed near Tepa in August and September, of which six are marked as males, six as females—whether correctly or not I cannot say. "Iris dark brown; bill black and white; feet blackish." (Nos. 6612, 6619, 6669, 6679, 6696, 6880, 6881, 6882, 6894, 6940, 6964, 6972.)

44. **Halcyon sancta** Vig. & Horsf.

Cf. *Nov. Zool.* 1904. p. 196.

1 ♀, Tepa, 29. ix. 1905 (No. 6987).

45. **Halcyon chloris chloris** (Bodd.).

Cf. *Nov. Zool.* 1904. pp. 197, 198, 199.

Thirteen specimens from Tepa (Nos. 6624, 6633, 6634, 6683, 6684, 6693, 6760, 6776, 6786, 6798, 6890, 6898, 6959).

46. **Misocalius palliolatus** (Lath.).

Cf. *Nov. Zool.* 1904. p. 201.

1 ♀, 9. ix. 1905 (No. 6891).

47. **Cuculus variegatus** Vieill.

Cf. *Nov. Zool.* 1905. p. 217.

1 ♀, Tepa, 4. ix. 1905 (No. 6845).

48. **Chrysococcyx** spec. an subsp. nov.?

1 ♂ ad., Tepa, Babber Island, 15. ix. 1905. "Iris burnt sienna; bill and feet black." (No. 6939.)

♂ ad. Upper surface dark green with metallic gloss, on the crown a blue tinge. Some of the median upper wing-coverts have white terminal edges and spots, so that an irregular white patch or ring is formed, showing an approach to the Key-Islands form, *C. crassirostris*, which has a large white patch on the wing-coverts. Tail without any rufous colour; only the outermost pair with white crossbars, the next with only a round white spot at the tip of the inner web, central pair without white. Undersurface white with somewhat narrow greenish bronze crossbars, which are few and not very conspicuous on the throat, the feathers there having only one bar instead of two.

Dr. Finsch describes a similar bird from Halmahera, whence Dr. Vorderman described *C. nieuwenhuisi*. Unless the latter is a somewhat younger bird it is not the same as Finsch's! It is quite possible, or rather evident, that a special form inhabits the Moluccas, but whether that extends from Halmahera to Amboina or not is doubtful, and whether the Babber bird is the same or not can only be proved by more material.

49. **Scythrops novaehollandiae** Lath.

Cf. *Nov. Zool.* 1905. p. 219.

A young bird (No. 6769) just from the nest, unable to fly, shot at Tepa 26. viii. 1905, proving that this species is not an accidental visitor, but is hatched on Babber Island. These young *Scythrops* are peculiar and pretty things. Their head and neck is rusty buff, the feathers of the upperside with ashy-grey bases; ear-coverts

light grey ; feathers of back and upper wing-coverts slaty grey with large buffish rust-coloured tips. Rectrices as in the adult birds, as far as visible ; breast and abdomen white with buffy yellow tinge and narrow dark grey crossbars which are very wide apart. "Iris dark brown with a whitish ring ; feet slate ; bill dull brownish."

50. Eurostopus argus Hart.

Cf. *Nov. Zool.* 1904. p. 202.

Seven specimens (Nos. 6856, 6859, 6862, 6863, 6870, 6876, 6877).

51. Caprimulgus macrourus Horsf.

Caprimulgus macrourus Horsfield, *Trans. Linn. Soc.* xiii. p. 142 (1821—Java).

♀ immat., Tepa, 28. viii. 1905 (No. 6791).

This bird certainly agrees better with *C. macrourus* than with *C. macrourus celebensis*, which was received from Wetter (*Nov. Zool.* 1904. p. 202). I come, however, to the conclusion that *C. macrourus*, *manilensis* and *celebensis* are all three only subspecies, and should therefore be called *Capr. macrourus macrourus*, *C. m. manilensis* and *C. m. celebensis*, while on Ceylon we have *C. m. atripennis*, farther north *C. m. ambiguus*, *C. m. albonotatus*, and *C. m. nipalensis*.

52. Pitta vigorsi Gould.

Pitta rigorsi Gould, *B. Australia*, iv. pl. 2. (part II.) (1841—Believed to come somewhere from Australia! Errore. As the terra typica we may accept Banda, the first known exact locality).

1 ♀, Tepa, Babber, 21. viii. 1905 (No. 6695).

53. Hirundo javanica Sparrm.

Cf. *Nov. Zool.* 1904. p. 203.

1 ♂, 3 ♀♀, Tepa, 24, 26. viii. 1905 (Nos. 6738, 6766, 6768, 6773).

54. Petrochelidon nigricans (Vieill.).

Cf. *Nov. Zool.* 1904. p. 204.

2 ♂♂, Tepa, 27. viii. 1905 (Nos. 6778, 6779).

55. Muscicapula hyperythra audacis subsp. nov.

♂. Similar to *M. hyperythra hyperythra* in general appearance, but larger, especially the bill much longer, the metatarsus longer, wing longer. The inner edges to the quills are lighter, more whitish, the under wing-coverts have more buffy-white colour. Wing 63·7—65·4, tail about 42—45, culmen 14—14·5, metatarsus about 20 mm. (Type ♂ ad. No. 6864, Tepa, 6. ix. 1905). "Iris brown, blackish, or whitish yellow." This last statement, however, is probably erroneous. "Feet pale plumbeous, dull black, blackish ; bill black."

5 ♂♂, Tepa, Babber, August, September 1905 (Nos. 6780, 6850, 6854, 6864, 6985).

1 "♀," Tepa, 6. ix. 1905 (No. 6866). Differs from those of *M. h. hyperythra* in having the back and scapulars distinctly greyish, not olive like the head, and the breast buffy rufous, the middle of the abdomen and the under tail-coverts

white, with only a faint tinge of buff; but possibly this supposed ♀ may be a young ♂, in which case the value of these differences is of course doubtful.

Note.—Dr. Finsch (*Notes Leyden Mus.* xxii. pp. 261, 262) places my *Dammeria heurici* (cf. *Nov. Zool.* 1900. p. 14) from Dammer in the genus *Poecilodryas*. I cannot agree with this decision. I readily believe that it is desirable to diminish the genera of *Muscicapidae* very considerably; but if this is done, and *Dammeria* should be suppressed, it would far better be united with *Muscicapula* than with *Poecilodryas*, a genus which inhabits Australia and the Papuan Islands, but not the South-West Islands. Moreover, the structure is different, the tail of *Poecilodryas* being softer and shorter, the bill weaker. The sexes of *Dammeria* differ considerably, as in *Muscicapula*.

56. Gerygone dorsalis fulvescens A. B. M.

Gerygone fulvescens A. B. Meyer, *Isis* 1884. pp. 2, 27 (Babber).

The *Gerygone* from Babber has been separated by Meyer, *l. c.* Undoubtedly all these forms—*i.e. kühni* from Dammer (which is quite different from both *dorsalis* and *fulvescens*), *fulvescens* from Babber, *sequens* from Roma, and others—are representative forms, and Dr. Finsch's surmise, from the comparisons of spirit-specimens, that "*kühni*" as well as *fulvescens* are found on Babber, is erroneous. Dr. Finsch's *kisserensis* (cf. *Notes Leyden Mus.* xx. p. 133, *Nov. Zool.* 1904. p. 205) is merely a synonym of *fulvescens*—at least I cannot separate our specimens from Kisser, Moa, Letti and Babber. Mr. Kühn sent six specimens from Babber.

3 ♂ ad., 1 ♂, 1 ♀ act. med., 1 ♀ juv., Tepa, September 1905 (Nos. 6841, 6844, 6853, 6875, 6969, 6976). "Iris burnt-sienna brown; bill black in adults, brown in young; feet slate-black."

57. Rhipidura fuscorufa Sel.

Rhipidura fuscorufa Sclater, *Proc. Zool. Soc. London*, 1883. p. 197 (Tenimber).

10 ♂ ♀ ad., Tepa, August and September 1905 (Nos. 6688, 6701, 6826, 6873, 6883, 6937, 6955, 6962, 6968, 6971). "Iris blackish; bill black; feet dark brown or blackish."

Dr. Finsch has already made known the fact, that the Babber form is the same as the one from Tenimber (Timorlaut).

58. Rhipidura elegantula reichenowi Finsch.

Rhipidura Reichenowi Finsch, *Notes Leyden Museum* xxii. p. 257 (Babber).
(Cf. *Nov. Zool.* 1904. p. 206, sub nomine *Rh. elegantula*.)

1 ♂ ad., Babber, 28. ix. 1905 (No. 6981).

Dr. Finsch separated *Rh. reichenowi* from *elegantula* on account of its rusty-cinnamon, instead of white, forehead. I ventured (*l. c.*) to unite *reichenowi* with *elegantula*, because among our twenty-nine examples from Moa, Letti, Roma and Dammer I found two specimens which agreed with Dr. Finsch's type of *reichenowi*. Perhaps my conclusion has been too hasty, because the specimen received from Kühn has also a cinnamon forehead. If all specimens from Babber have a rusty-cinnamon forehead, the Babber form would be a subspecies, in spite of the occurrence of single individuals on other islands which are similar in colour. Only more skins from Babber can decide whether *reichenowi* is really separable from *elegantula* or not. I have termed this form *Rh. elegantula reichenowi*, but this nomenclature may not be final; there is little doubt that other forms are

also subspecies of this same species, but I cannot work this question out finally at this moment, and it serves my purpose at present if I show in my nomenclature that "*Rh. reichenowi*" is a subspecies of *elegantula*, if separable at all.

59. Pratincola caprata caprata (L.).

Cf. *Nov. Zool.* 1904, p. 209.

1 ♂, 2 ♀♀, Tepa, August and September 1905 (Nos. 6800, 6951, 6993).

60. Lalage timoriensis (S. Müll.).

Cf. *Nov. Zool.* 1904, p. 208.

1 ♂, 1 ♀, Tepa, August and September 1905 (Nos. 6775, 6938). The males vary with regard to presence or absence of a white superciliary line. In most cases this is indicated, but sometimes it is well developed, sometimes absent.

61. Graucalus melanops (Lath.).

Cf. *Nov. Zool.* 1904, p. 208.

Twelve specimens from Tepa, August and September 1905 (Nos. 6623, 6710, 6797, 6811, 6813, 6824, 6831, 6857, 6869, 6944, 6955, 6960).

62. Heteranax mundus (Scl.).

Monarcha mundus Sclater, *Proc. Zool. Soc. London* 1883, p. 54, pl. xii. fig. 2 (Timorlaut or Tenimber).

Heteranax mundus Hartert, *Nov. Zool.* 1900, p. 14 (Dammer); Finsch, *Notes Leyden Mus.* xxii. p. 267 (Babber, Dammer).

4 ♂ ad., 2 ♂ juv., Tepa, August and September 1905 (Nos. 6664, 6674, 6803, 6930, 6933, 6941).

Dr. Finsch (*l.c.*) declares that this interesting bird is not a Flycatcher, but belongs to the *Laniidae* or *Prionopidae* of Sharpe. This conception is quite erroneous. Dr. Finsch apparently based it only on a superficial comparison of the strange bill; but had he taken into consideration the plumage, style of coloration, strong rictal bristles, etc., combined, he would agree that *Heteranax* is a Flycatcher, and that it is best placed in the neighbourhood of *Monarcha*.

63. Geocichla peronii audacis Hart.

Cf. *Nov. Zool.* 1904, p. 208.

Nine adult birds from Tepa (Nos. 6610, 6782, 6783, 6787, 6787A, 6883, 6900, 6954, 6961).

64. Cisticola exilis (Vig. & Horsf.).

Cf. *Nov. Zool.* 1904, p. 210.

2 ♂♂, 1 ♀, Tepa, August and September 1905 (Nos. 6616, 6835, 6932).

65. Orthnocichla subulata advena subsp. nov.

Subspeciei *O. subulata subulata* dictae similis, sed major, colore supra rufescentiore, rostro nigricantiore haud difficile distinguenda.

Differs from *O. subulata subulata* from Timor by its smaller size, more rufescent colour of the upperside, and darker, blackish, not light brown, upper bill. Wing, ♂ 58, ♀ 57; tail, ♂ 27·5, ♀ 26; culmen, 16; metatarsus, 21·6 mm.

Type No. 6858, Tepa, 6. ix. 1905, ♂ ad.

Mr. Kühn sent only a pair, ♂ ♀, Tepa, 6, 7. ix. 1905. "Iris blackish: feet colourless; bill black, pale below." (Nos. 6858, 6871.)

The occurrence of an *Orthnocichla* so far eastwards is of extreme interest, and we may imagine from this fact, that all the islands between Babber and Timor have forms of *Orthnocichla* as well, either our *adrena*, or undescribed ones. Probably new forms are still to be discovered on Roma and Dammer.

The wings of our *O. s. subulata* measure in the ♂ 55—56·5, ♀ 52—53·3 mm.

66. **Pachycephala melanura tepa** subsp. nov.

This most interesting new form of *Pachycephala* is apparently nearest to and stands between those from Dammer and Wetter. These forms may be distinguished as follows:

Pachycephala melanura dammeriana Hart.

Dammer.—Edges to remiges grey with an olive-green tinge. Tail black with greenish grey-brown tip and greenish outer margins towards the base; bill slender and strongly hooked.

Pachycephala melanura tepa subsp. nov.

Babber.—Edges to remiges greenish. Tail olive-green, with a blackish shaft-line and black anteapical area of variable extent, and an olive-green tip; bill stouter, and, as a rule, not so strongly hooked.

Pachycephala melanura arthuri subsp. nov.

Wetter.—Light grey margins to the distal halves of primaries, broad greenish ones to the secondaries, entirely green tail, bill elongated. Differs from *P. m. calliope* by having a longer bill, culmen 21·7—23·3 mm. (20—21 in *calliope*), and in being more yellowish above, especially on the nape. Named after Arthur Goodson of the Tring Museum.

Pachycephala melanura calliope Bp.

Timor.—Like *P. m. arthuri*, but the bill a little shorter, the upperside less yellowish.

The female of *P. m. tepa* differs also from those of its allies. The top of the head, sides of head, ear-coverts and nape are greyish brown, contrasting with and sharply separated from the olive-brown back; the rump and upper tail-coverts are greenish; tail greenish with blackish shafts; throat white, separated from the breast by a lavender-buff chest-band; abdomen saffron-yellow, sides with a brownish wash. ♂: "Iris dark brown; bill black; feet dark plumbeous grey." ♀: "Iris dark brown; bill black; feet plumbeous or slate-grey."

Type of *P. m. tepa*: No. 6644A, ♂ Tepa, Babber Island, 15. ix. 1905.—Type of *P. m. arthuri*: No. 5498, ♂, Wetter, 14. ix. 1902.

Wing of ♂ *P. m. tepa* 91—94 mm. (12 specimens).

Wing of ♂ *P. m. dammeriana* 90—94 mm. (5 specimens).

Wing of ♂ *P. m. calliope* 87—89 mm. (4 specimens).

Wing of ♂ *P. m. melanura* about 79—84 mm. (5 specimens).

Wing of ♂ *P. m. arthuri* about 88—93·5 mm. (5 specimens).

Mr. Kühn sent twenty specimens, shot in August and September 1905 (Nos. 6621, 6642, 6644A, 6645, 6651, 6660, 6672, 6676, 6702, 6733, 6739, 6757, 6774, 6804, 6808, 6820, 6830, 6889, 6896, 6897).

67. Pachycephala arctitorquis kebirensis Mey.

Cf. *Nov. Zool.* 1904. p. 212.

At last we have received a series from Babber, *i.e.* topotypical *kebirensis*. They bear out what I wrote two years ago (*l. c.*). The females have the crown brownish or rufous grey. Though occasionally examples of *P. a. arctitorquis* approach them, as a rule the two forms are easily separable in the female sex. Mr. Kühn sent from Babber :

4 ♀ ad., 1 ♂ juv., 3 ♀♀, Tepa, August and September 1905 (Nos. 6620, 6697, 6767, 6771, 6777, 6924, 6936, 6943).

68. Zosterops bassetti Sharpe.

Cf. *Nov. Zool.* 1904. p. 214.

(As I have said before, I cannot decide, without a complete study of the genus *Zosterops*, how many forms can be named trinomially, and therefore employ binomials for them at present. As long as we distinguish minutely, our labour will not be lost.)

The specimens from Babber and Luang appear to be quite similar to each other, and I cannot distinguish them from examples from Dammer and Roma (cf. *Nov. Zool.* 1904. p. 214). The bills of the Babber and Luang specimens are as large as in those from Roma and Dammer—some, if anything, even larger. *Z. lettiensis* has a much smaller bill and is more white underneath, and *Z. citrinella* of Timor is still smaller, with a much smaller bill. Mr. Kühn sent twelve *Z. bassetti* from Babber (Nos. 6685, 6686, 6746, 6747, 6792, 6842, 6867, 6901, 6965, 6967, 6979, 6996).

69. Dicaeum mackloti salvadorii A. B. Meyer.

Dicaeum salvadorii A. B. Meyer, *Abh. Isis.* 1884. pp. 7. 38 (Babber) ; cf. Finsch, *Notes Leyden Museum* xxii. p. 274.

In *Nov. Zool.* 1904. p. 214 I enumerated specimens from Roma and Moa as *Dicaeum mackloti* subsp. nov. ?, saying that they were somewhat apparently intermediate between *D. m. mackloti* and *D. m. salvadorii*, of which I had only a single male in poor condition from Dammer, and none from the "terra typica" (Babber), and that the black band surrounding the red throat was "nearly always wider in the Roma birds." Now we have received topotypical specimens from Babber, and I find that I cannot separate the specimens from Moa from those of Babber, while those from Roma have the red of the throat darker (as dark as in the "typical" *mackloti* from Timor), and surrounded by a wide black band, in adult birds ; while in *D. m. salvadorii* this band is absent or indicated, but never wide and well developed.

I distinguish, therefore, the following forms :

Dicaeum mackloti mackloti Müll.

Smaller, ♂ ad., wing about 54·5 to 56·5, abdomen white with a creamy tinge, dark red throat-patch surrounded by a broad black line : Timor and Savu.

Dicaeum mackloti romae subsp. nov.

Larger, ♂ ad., wing about 58—59·5, abdomen yellowish cream-colour, dark red throat-patch surrounded by a broad black line : Roma. Type No. 5399, Roma, 10. viii. 1902, H. Kühn coll.

Dicaeum mackloti salvadorii A. B. Mey.

About as large as *D. m. romae*, wing ♂ ad. about 57—59, abdomen yellowish cream-colour, the somewhat lighter, more fiery red throat-patch not surrounded by a wide black line, but only by an indicated or narrow band, if present at all. Babber and Moa Islands.

The one male we have from Dammer seems to belong to *salvadorii*. Perhaps it does not occur there regularly. The specimen is not in very good condition.

Mr. Kühn sent from Babber 5 ♂♂ and 7 ♀♀ (Nos. 6616, 6618, 6621, 6687, 6691, 6729, 6828, 6865, 6884, 6931, 6973, 6999). "♂ ♀ Iris black, feet black, bill black."

70. **Myzomela boiei annabellae** Scl.

[*Myzomela boiei* S. Muller, *Verh. Land- en Volkenkunde*, p. 172 (1839-44, Banda).]
Myzomela annabellae Sclater, *P. Z. S.* 1883. p. 56 (Lutur, Tenimber).

M. boiei boiei differs from *M. b. annabellae* as follows: It is larger, and the black area limiting the red throat is much wider. Otherwise they agree in all essential characters.

Mr. Kühn sent a fine series from Babber (Nos. 6613, 6614, 6617, 6655, 6663, 6667, 6670, 6671, 6682, 6728, 6731, 6732, 6736, 6749, 6750, 6977, 6980, 6990).

71. **Stigmatops squamata** Salvad. (? subsp.).

Cf. *Nov. Zool.* 1904. p. 215.

The wings of the Babber examples measure from 61 to 71 mm. Probably the smaller specimens are females. About the somewhat doubtful *S. s. salvadorii* and *kobirensis*, a name given to the Babber birds (A. B. Meyer, *Zeitschr. Ges. Orn.* 1884. p. 218), see *Nov. Zool.* 1904. p. 215, and Finsch, *Notes Leyden Mus.* xxii. p. 270. Mr. Kühn sent nine skins from Babber (Nos. 6627, 6785, 6799, 6874, 6962, 6974, 6988, 6995, 7004).

72. **Erythrura tricolor** (Vieill.).

Cf. *Nov. Zool.* 1904. p. 217.

♂ ♀ ad. and juv., Tepa, August and September (Nos. 6613, 6714, 6730, 6793, 6798, 6825, 6966, 6994).

None of these specimens have any blue on the hindneck.

73. **Munia quinticolor** (Vieill.).

Loxia quinticolor Vieillot, *Ois. Chant.* pl. 54 (1805—Finsch, *Notes Leyden Mus.* xxii. p. 277 (one specimen from Babber).

2 ♂ ad. (one worn and both moulting), 1 ♂ med., 2 juv., Tepa, August and September 1905 (Nos. 6772, 6878, 6888, 6949, 6950). The young bird seems to be undescribed; it is in colour exactly like that of *M. pallida*, being above cinnamon, below yellowish buff. The wings are longer than in young *M. pallida*. The adult female differs only slightly from the adult male.

74. **Munia punctulata nisoria** (Temm.).

Cf. *Nov. Zool.* 1904. p. 218.

Tepa, Babber, August, September and October 1905, young birds in moult (Nos. 6754, 6879, 6992, 7000, 7001, 7002).

75. Artamus leucorhynchus (L.).

Cf. *Nov. Zool.* 1904. p. 221.

Tepa, Babber, August 1905 (Nos. 6625, 6626, 6745, 6764, 6784, 6802, 6926, 6978).

76. Corvus latirostris ? subsp.

Corvus latirostris A. B. Meyer, *Zeitschr. Ges. Orn.* i. p. 199 (1884 : Timorlaut).
Cf. *Nov. Zool.* 1901. pp. 173, 174.

The specimens from Babber agree in all essential characters with *Corvus latirostris* from Timorlaut (Tenimber), but they are somewhat larger. They measure : ♂ ad. wing 339, ♂ ad. wing 342, ♀ ad. wing 318, ♀ ad. wing 316 mm., while specimens from Timorlaut measure ♂ ad. wing 328, ♂ ad. wing 317, ♀ ad. wing 322, ♀ jun. wing about 306 mm.

Possibly the Timorlaut specimens are not all correctly sexed. If we accept that the alleged males are all adult males, the Babber form would be a larger, and should be separated subspecifically, but I should like to see a better series before doing this.

Mr. Kühn's four examples from Tepa bear the Nos. 6611, 6623, 6627, 6694. The iris is described as white, bill and feet black. In *Nov. Zool.* 1901. pp. 173, 174, I have discussed this form, which has quite erroneously been united with *C. macrorhynchus*.

ON THE BIRDS OF LUANG.

By Dr. ERNST HARTERT.

WE had hoped that Mr. Kühn's collectors, after their work on Babber, would visit the large island of Sermatta, but unfortunately they chose the little islet of Luang, near Sermatta. They collected there 41 species of birds, mostly of little interest to us. Undoubtedly Sermatta would contain many more species.

1. *Synoicus raalteni* (S. Müll.) (*Nov. Zool.* 1904. p. 177). ♂ 6. xi. 1905 (No. 7031).

2. *Ptilinopus cincta lettiensis* Sch. (*Nov. Zool.* 1904. p. 179) (Nos. 7063, 7066, 7072, 7076, 7093, 7096, 7097). It is interesting to find that *P. c. lettiensis* and not *ottonis* is found on Luang.

3. *Ptilinopus xanthogaster xanthogaster* Wagl. (cf. *antea*) (Nos. 7013, 7026, 7038, 7051).

4. *Carpophaga rosacea* (Temm.) (cf. *antea*) (Nos. 7032, 7092).

5. *Geopelia maugeus* (Temm. & Knip) (cf. *antea*) (Nos. 7028, 7030).

6. *Gelochelidon nilotica* (Gm.) (*Nov. Zool.* 1904. p. 199) (No. 7021). This bird, marked ♂, is very young. It appears to be the European small-billed form, and not *macrotarsa*. Adult birds should, however, be compared, to be certain about this.

7. *Sterna bergii pelecanoides* King. (cf. *antea*) (Nos. 7022, 7091).

8. *Morinella interpres* (L.) (*Nov. Zool.* 1904. p. 186) (Nos. 7045, 7046, 7047, 7049, 7052, 7101, 7103, 7104, 7105).

9. *Charadrius dominicus fulvus* (Gm.) (*Nov. Zool.* 1904. p. 186) (No. 7045A).

10. *Ochthodromus geoffroyi* (Wagl.) (cf. *antea*) (Nos. 7080, 7088).

11. *Numenius phaeopus variegatus* (Scop.) (cf. *antea*) (Nos. 7027, 7068).

12. *Numenius cyanopus* Vieill. (cf. *Nov. Zool.* 1905. p. 201) (Nos. 7048, 7079).

13. *Limosa limosa melanuroides* Gould (cf. *antea*) (Nos. 7082, 7087, 7089).

14. *Totanus glareola* (Gm.) (cf. *Nov. Zool.* 1904. p. 187) (No. 7094).

15. *Totanus hypoleucos* (L.) (cf. *antea*) (Nos. 7006, 7007, 7011, 7025).

16. *Limonites rufieollis* (Pall.) (cf. *antea*) (No. 7090).

17. *Glottis nebularius* (Gunn.) (cf. *antea*) (Nos. 7083, 7084).

18. *Heteropygia acuminatus* (Horsf.) (cf. *antea*) (Nos. 7012, 7014, 7015, 7016, 7017, 7023).

19. *Stiltia isabella* (Vieill.) (cf. *antea*) (Nos. 7018, 7034, 7050, 7102).

20. *Haematopus longirostris* Vieill. (cf. *Nov. Zool.* 1905. p. 200), 1 "♀" ad., 1 "♂" juv. (Nos. 7106, 7107). The bills of these examples are very long, that of the adult bird (? ♀) measuring 90 mm. from the end of the frontal feathering to the tip.

21. *Esacus magnirostris* (Vieill.) (cf. *antea*) (No. 7009).

22. *Demiegretta sacra* (Gm.) (cf. *antea*). Two white and three grey examples (Nos. 7020, 7043, 7044, 7064, 7071).

23. *Notophoyx novaehollandiae* (Lath.) (cf. *antea*) (Nos. 7010, 7032).

24. *Garzetta nigripes* (Temm.). *Ardea nigripes* Temminck, *Man. d'Orn.* 2nd ed. iv. p. 376 (1840: "l'Archipel des Indes").
1 ♀ (?) Luang, 4. xi. 1905 (No. 7019).

25. *Nyeticorax caledonica* (Gm.) (cf. *antea*) (Nos. 7024, 7029, 7069).

26. *Fregata aquilus* (L.)—*Pelecanus Aquilus* Linnaeus, *Syst. Nat.* ed. x. p. 133 (1758—terra typica: Ascension Island). ♀ ad., 12. xi. 1905 (No. 7085). It is interesting to find the large species and not the small one (*ariel*) on these islands.

27. *Phalacrocorax melanoleucos* (Vieill.) (*Nov. Zool.* 1904. p. 189) (Nos. 7035, 7036).

28. *Spizactus limnaëtus floris* Hart. (*Nov. Zool.* 1904. p. 189). 1 ♂ juv. 12. xi. 1905 (No. 7086).

29. *Trichoglossus euteles* (Temm.) (cf. *antea*) (No. 7095).

30. *Eurystomus orientalis australis* Sw. (*Nov. Zool.* 1904. p. 195) (Nos. 7008, 7073).

31. *Misocalius palliolatus* (Lath.) (cf. *antea*). ♀ 9. xi. 1905 (No. 7058).

32. *Cuculus saturatus* Blyth. (cf. *Nov. Zool.* 1904. p. 201). 1 ♂ juv. 13. xi. 1905, seems to belong to this form (No. 7098).

33. *Lalage timoriensis* (S. Müll.) (cf. *antea*). 2 ♂♂ 9. xi. 1905 (Nos. 7056, 7057).

34. *Graucalus melanops* (Lath.) (cf. *antea*). Five specimens (Nos. 7037, 7039, 7040, 7041, 7042).

35. *Graucalus hypoleucus* Gould (cf. Finsch, *Notes Leyden Museum* xxii. p. 250). ♂ ♀ Luang, 11. xi. 1905 (Nos. 7077, 7078)

36. **Locustella ochotensis** (Midd.).

Sylvia (*Locustella*) *ochotensis* Middendorff, *Sibir. Reise* II. 2, p. 185, *Taf.* xvi. 7—8 (1853 : Mouth of the River Ouda into the Sea of Ochotsk).

1 ♂ jun. Luang Island, 14. xi. 1905 (No. 7098). "Iris blackish; feet light brown ; bill dull black, pale below."

37. **Grallina picata** (Lath.).

Gracula picata Latham, *Ind. Orn. Suppl.* p. 29 (1801 : Australia).

1 ♀ ad., Luang, 10. xi. 1905. "Iris black ; feet black ; bill yellowish white." (No. 7067.)

This Australian species is new to the South-West Islands. Mr. Kühn formerly obtained a single specimen on the island of Koer, in the South-East Islands. Probably it straggles occasionally northwards, being as a rule resident in Australia.

38. **Zosterops bassetti** Sharpe.

Cf. *antea*.

2 ♂♂, November 1905 (Nos. 7053, 7075).

39. **Stigmatops squamata** Salvad.

Cf. *antea*.

♂ ♀, Luang, 12, 15. xi. 1905 (Nos. 7081, 7100). Wings : ♂ 72, ♀ 63 mm.

40. **Taeniopygia castanotis insularis** Wall.

Cf. *Nov. Zool.* 1904. p. 218.

Ten specimens obtained on Luang (Nos. 7046, 7054, 7055, 7059, 7060, 7061, 7062, 7065, 7070, 7070A).

41. **Oriolus viridis** Lath.

Gracula viridis Latham, *Ind. Orn. Suppl.* p. xxviii (1801 : Australia).

1 ♂ juv. Luang Island, 11. xi. 1905 (No. 7074). "Iris scarlet ; feet brownish red ; bill blackish."

The occurrence of this species is probably an irregular one on Luang.

CRITICAL NOTES ON THE TYPES OF LITTLE-KNOWN SPECIES OF NEOTROPICAL BIRDS.

By C. E. HELLMAYR.

PART I.

WHEN I began, six years ago, to study the neotropical avifauna and to collect material for my proposed work on the Birds of Brazil, it soon became clear to me that there was a great uncertainty in the nomenclature of many species, and that a thorough revision of those types about which any doubts existed would be very useful; and notwithstanding its many apparent difficulties, I decided to undertake this. Thus, during the last four years, I have carefully examined a great number of types in various museums of Europe, and I intend to publish the results of these studies in a series of papers of which this forms the first instalment.

Remarks on some doubtful or little-known species have already been published by me in various periodicals, also a paper dealing with certain genera of *Fringillidae* in the *Verhandlungen der zoolog.-botan. Gesellschaft*, of Vienna, 1904. pp. 516-37. A more extensive memoir, in which many types of Tschudi, Reinhardt, Cabanis and Pelzeln are discussed, appeared in the *Journal für Ornithologie*, 1905. pp. 1-33, under the joint authorship of Count Berlepsch and myself. An account of the birds described by Spix in his great work, *Avium Brasiliae Species Novae*, has lately been issued; and critical notes on the types of the *Tracheophonae* in the Paris Museum, by Ménégaux and myself, have been published in some French periodicals.*

The main object of the present paper is to clear up a number of the many doubtful and little-known species preserved in the British Museum, but several types belonging to the Museum d'Histoire Naturelle of Paris are also discussed. A special paper will be devoted to many additional types of the French naturalists, chiefly those of Lafresnaye and D'Orbigny.

My conclusions are, wherever possible, based on a large amount of material, for the use of which I am much indebted to several kind friends, particularly Count Berlepsch, Dr. H. O. Forbes, Dr. E. Hartert, Dr. L. von Lorenz-Liburnau, of Vienna, and the Hon. L. W. Rothschild, to all of whom my sincere thanks are due. Neither must I forget to mention the late Professor Oustalet, and Dr. A. Ménégaux, who not only gave me free access to the treasures of the Paris Museum, but also facilitated my work in every possible way. To Mr. Rothschild I am specially obliged for kindly offering to publish these notes in the *Novitates Zoologicae*.

1. Cyanocorax inexpectatus Elliot = C. caeruleus (Vieill.).

Pica caerulea Vieillot, *Nour. Dict.* xxvi. (1818) p. 126 (ex Azara: Paraguay).

Cyanocorax Heckelii Pelzeln, *Sitz.-Ber. Akad. Wien* xx. (1856) p. 163 [Rio Boraxudo, near Paranagua, Paraná].

Cyanocorax inexpectatus Elliot, *Ibis*, 1878. p. 55 ["south of São Paulo"].

1. Mus. Paris, av. juv. "Capt. de St. Paul. M. A. de Saint Hilaire. *C. inexpectatus* Elliot. Type de l'espèce." Wing 197; tail 172 mm.

* *Bull. Mus. Paris*, 1905. pp. 372-81; *Mém. Soc. d'Hist. nat. Autun*, xix. (1906) pp. 43-126; *Bull. Soc. Philom.* Paris, 1906. pp. 21-58.

2. Mus. Vindob. ♀ ad., Rio Boraxudo, near Paranaguá, Paraná, December 1820. Natterer coll. Wing 190 ; tail 170 mm.

3. Mus. Vindob. ♂ ad., Rio Boraxudo, December 1820. Natterer coll. Wing 195 ; tail 174 mm.

4. Mus. Vindob. ♀, Rio Boraxudo, December 1820. Natterer coll. Wing 183 ; tail 160 mm.

(Nos. 2 to 4 types of *C. heckelii* Pelz.)

5. Mus. Tring, No. 697, ♀ ad., Roça Nova, Serra do Mar, Paraná, October 27, 1901. A. Robert coll. Wing 192 ; tail 166 mm.

6. Mus. Tring, No. 718, ♀ ad., Roça Nova, Serra do Mar, Paraná, November 4, 1901. A. Robert coll. Wing 193 ; tail 165 mm.

Besides the above specimens I have examined : 2 ♂♂, 1 ♀, Iguapé, S. Paulo ; one adult, Ypanema, S. Paulo ; 2 ♂♂, 2 ♀♀, Scaramuza ; 3 ♀♀, Ytararé, S. Paulo ; 1 ♂, Jaguaraiba, all collected by Natterer, except those from Iguapé, which were obtained by Mr. Krone, and the one from Ypanema. I compared also a series from Taquara and Arroio Grande, Rio Grande do Sul, and two adults from Blumenau, Santa Catharina (Mus. H. v. Berlepsch).

The examination of this material proves, beyond doubt, that the shade of the blue colour, on which the "species" *C. heckelii* and *C. inexpectatus* have been based, is of no geographical significance, since we find, at the same localities, verditer-blue (*inexpectatus*) and purple blue (*heckelii*) specimens along with typical *caeruleus*. This is especially illustrated by the series from Rio Grande do Sul * in Count Berlepsch's collection. Three skins from Iguapé, and two others from Blumenau, agree perfectly with the types of *C. heckelii*, and I at first thought the latter might be a different form confined to the coast region. Two ♀ ad. from the Serra do Mar (almost topotypes of *C. heckelii*), however, do not belong to this purple-blue form. One (No. 5) is, like the type of *C. inexpectatus*, verditer-blue, the other (No. 6) is typical *caeruleus*! One adult from Ypanema, on the other hand, is exactly intermediate in colour between the purple-blue (*heckelii*) and the *caeruleus* phase, and a female from Scaramuza has the lower parts almost as purple as the types of *C. heckelii*! Moreover, the latter "form" has been lately recorded from Paraguay,† the typical locality of *C. caeruleus*! There is no constant difference in the colour of the throat or in the shape of the frontal feathers ; nor are the dimensions different. The types of *C. heckelii* being in very worn plumage, the throat appears dull brownish, black, without any gloss. I may also mention that the typical specimen of *C. inexpectatus* is an immature bird, with the under parts mainly brownish grey, but some verditer-bluish feathers are just coming out.

I append the measurements of Natterer's series and some other specimens, to show that there is no difference in size.

C. heckelii-phase (purple-blue).

1 ♀ ad., Iguapé. Wing 180 ; tail 152 mm.

2 ♂ ad. (sex ?), Iguapé. Wing 184, 191 ; tail 150, 162 mm.

Intermediate between *heckelii* and *caeruleus*.

Ad., Ypanema. Wing 192 ; tail 175 mm.

♀ ad., Scaramuza, August 2, 1820. Natterer coll. Wing 192 ; tail 180 mm.

* Cf. also Berlepsch, *Zeitschr. ges. Ornith.* ii. p. 127.

† Oberholser, *Proc. U. S. Nat. Mus.* xxv. p. 140.

C. cæruleus-phase. Natterer coll.*

♂, Scaramuza. Wing 205 ; tail 190 mm.
♂, Scaramuza. Wing 203 ; tail 192 mm.
♀, Scaramuza. Wing 201 ; tail 177 mm.
2 ♀♀, Ytararé.* Wing 200, 202 ; tail 175, 176 mm.
♂, Jaguaraiba.* Wing 205 ; tail 190 mm.

2. **Anthus lutescens** Puch.

Anthus lutescens (ex Cuvier, MS.) Pucheran, *Arch. Mus. Paris* vii. (1855) p. 343 ["Brésil"—coll. Delalande].

Mus. Paris, ad. labelled : "Farlouse jaunâtre. *Anthus lutescens* Cuv. type, du Brésil, par M. Delalande." Wing 63½ ; tail 46 ; bill 12 mm.

This is the species called *A. rufus* in the *Cat. B. Brit. Mus.*, as already recognised by Count Berlepsch (*Zeitschr. ges. Ornith.* ii. 1885. p. 114). Mr. Ridgway having recently employed the name *A. parvus* for the small neotropical Pipit, I took the series of the Tring Museum over to Paris in order to settle the question definitely, and found the surmise of the Count fully confirmed.

The type agrees in every respect with a series from Bahia and Rio, but, owing to its having been exposed to the light for nearly a century, the colours have faded and appear rather paler, especially on the back and chest. The markings on the two outer tail-feathers are exactly as in other specimens from S.E. Brazil.

With a considerable series before me, I can find no differences between examples from Rio, Bahia, Pará, Corrientes, and Tucumán. All have a broad blackish stripe along the inner web of the outermost tail-feather, reaching almost to the tip, and there are no dusky shaft-stripes on the sides of the body.

Eight skins from Chiriqui (*A. parvus* Lawr.) differ very markedly in the following points : The outermost tail-feather is almost entirely white, there being only at the extreme base a faint indication of a greyish inner margin ; the blackish shaft-stripes on the lower parts are much coarser, and not confined to the foreneck, but extended over the sides and flanks ; the wings are somewhat shorter.

Specimens from British Guiana and Bogotá collections agree in the coloration of the under parts with *A. lutescens* of S.E. Brazil, but the outermost tail-feather is exactly as in the Panama form. Should additional skins confirm the constancy of their characters, they must be separated as a third race.

According to our present knowledge the following geographical forms of the small Pipit of South America are recognisable :

a. A. lutescens lutescens Puch., Eastern Brazil from Pará to S. Paulo, west to Corrientes and Tucumán, Argentine Republic.

b. A. lutescens subsp., British Guiana (Roraima, Rio Rupununi, Annai) and Colombia (Bogotá coll.).

c. A. lutescens parvus Lawr., Panama, Veragua and Chiriqui.

d. A. lutescens peruvianus Nicholson, Coast region of Western Peru from Trujillo (specimens in Mus. Tring, Baron coll.) to Islay.

* As will be seen from Natterer's itinerary, these localities are not far from Paranagua (Pelzeln, *Orn. Brasil.* iv. p. v).

3. **Haplospiza uniformis** Scl. & Salv. should be **Spodiornis uniformis** (Scl. & Salv.)

Haplospiza uniformis Sclater & Salvin, *Nomencl. Av. Neotr.* 1873. p. 157 [Near Jalapa, Vera Cruz, S.E. Mexico].

Mr. Ridgway was much puzzled about the systematic position of this bird, and suggested that it might prove to be identical with *Acanthidops bairdi* Ridgw. This, however, is not the case, as I satisfied myself by careful examination of the type specimen, but Mr. Ridgway was quite right in supposing that the species had been placed in a wrong genus. Messrs. Sclater and Salvin were deceived by the superficial resemblance between *H. uniformis* and *H. unicolor*, and cannot have examined the structure of the wing, otherwise they would have been led to recognise that the two species were quite distinct, and that the nearest ally of *H. uniformis* was in reality *Spodiornis jardinei*. Both species agree not only in the wing-formula, but also the bill is almost of the same form. *H. unicolor*, on the other hand, has a quite differently shaped wing, as will be seen from the following lines.

Haplospiza unicolor Cab.* : 5 > 1 ≧ 6 ; 3rd and 4th primaries longest, 1st about 5 mm. < 4th.

"*Haplospiza*" *uniformis* Scl. & Salv. : 4 > 1 > 5 ; 2nd and 3rd longest, 4th scarcely shorter ; 1st about 5 mm. > 5th, and only about 1—2 mm. < 4th.

Spodiornis jardinei Scl.† : 4 > 1 > 5 ; 2nd and 3rd longest, 4th scarcely shorter ; 1st about 4—5 mm. > 5th, and but 1—2 mm. < 4th.

The bill in *H. uniformis* resembles very much that of *S. jardinei*, being perhaps a little longer and less curved at the tip, and it also seems that the tomiae at the base of the upper mandible are less turned in. These differences, however, are very trifling. In *H. unicolor* the bill, although of the same general shape, is distinctly stouter and broader at the base.

In coloration there is no difference whatever between the type of *H. uniformis* and a series of ♂ ads. of *S. jardinei*. The Tring Museum possesses an adult ♂ from Carrillo, Costa Rica (Underwood coll.), which differs from the type in being slightly smaller, and of a paler, more bluish slate-grey colour everywhere.

The bill is entirely plumbeous, while the type from Xalapa has the lower mandible whitish grey. Whether these are more than individual variations I cannot say with certainty without series from both localities.

Additional specimens from Central America may perhaps prove *H. uniformis* to be not properly separable from *S. jardinei*, but for the present they must be regarded as distinct. There can be, however, not the slightest doubt that *H. uniformis* has to be transferred from *Haplospiza* to *Spodiornis*. Its synonymy is as follows :

Spodiornis uniformis (Scl. & Salv.).

Haplospiza uniformis Sclater & Salvin, *Nomencl. Av. Neotrop.* 1873. p. 157 (Jalapa, Vera Cruz) ; Salvin & Godman, *Biol. Centr. Americ.* i. (1886) p. 366, pl. 27, fig. 1 (Jalapa) ; Sharpe, *Cat. Birds Brit. Mus.* xii. (1888) p. 627 (Jalapa) ; Ridgway, *Birds North and Middle America*, i. (1901), p. 521 (Jalapa).

Hab. *S.E. Mexico :* Jalapa (De Oca) ; *Costa Rica :* Carrillo (Underwood coll.).

1. Mus. Brit., ♂ ad., Jalapa, S. Mexico (De Oca coll.) 1872. Type of the species. Wings 75 ; tail 50 ; bill 14 mm.

2. Mus. Tring, ♂ ad., "Carrillo, Costa Rica, December 4, 1898." C. F. Underwood coll. Wing 71 ; tail 46 ; bill 14 mm.

* 20 specimens. The 1st primary is either equal to or a little longer than the 6th.

† 14 specimens examined.

For the sake of comparison I append the measurements of *Sp. jardinei*.

2 ♂♂ ad. from Ecuador. Wing 70, 68 ; tail 49, 46 ; bill 13, 12½ mm.

3 ♂♂ from Bogotá coll. Wing 67, 69 ; tail 46, 49 ; bill 12, 13 mm.

1 ♂ jr., from Marcapata, S.E. Peru. Wing 69 ; tail 49 ; bill 13 mm.

1 ♂ jr., from Bolivia (Mus. H. v. Berlepsch). Wing 69 ; tail 50 ; bill 13 mm.

Haplospiza and *Spodiornis* are doubtless very near allies, and must be placed close together, not far from *Phrygilus* ; the pattern of coloration in the females is similar to that of *P. unicolor*, a further proof of their near relations. The latter species, however, cannot be included in the same genus with *Haplospiza unicolor*, as has been done by several American authors, for the shape of the wing is widely different.

4. Crithagra hilarii Bp. = Sicalis a. arvensis (Kittl.)

Fringilla arvensis Kittlitz, *Mém. Acad. St. Pétersb. (sav. étr.)* ii. (1835) p. 134 (Chili).*
Crithagra hilarii Bonaparte, *Consp. Av.* i. (1850) p. 521 (Mus. Paris : ex Brazil.).

Mus. Paris, skin : " No. 27. Mr. St. Hilaire, 23. mai 1821. Critb. hilarii Bonap. (typ.)."—Wing 73 ; tail 53 ; bill 19 mm.

This is by no means *S. a. minor* Cab., with which Bonaparte's name has been doubtfully associated by Sharpe,† but belongs to the large race of *S. arvensis* found in South Brazil. The original specimen agrees perfectly with another from Rio Grande do Sul (Mus. Berlepsch) ; in both there are no white markings on the tail. Unless the South Brazilian form be separable from the typical Chilian birds, *C. hilarii* is to be considered as a synonym of *S. a. arvensis*.

It may be added that the type came from South Brazil : S. Paulo or Paraná, where, according to the registers of the Paris Museum, M. Auguste de St. Hilaire was collecting during the year 1821.

I hope to discuss the various forms of the *S. arvensis* group on a later occasion.

5. Buarremon baeri Oust. should be Compsospiza baeri (Oust.) !

Buarremon Baeri Oustalet, *Bull. Mus. Paris* x. (1904) p. 43 (Lagunita, Tucumán).

This bird, one of Mons. G. A. Baer's discoveries in the district of Tucumán, belongs by no means to the genus *Buarremon*, as supposed by M. Onstalet, but represents a second species of the genus *Compsospiza*, proposed by Count Berlepsch ‡ for a remarkable Finch of the highlands of Bolivia, *C. garleppi*. The type of this species having remained unique in the Count's magnificent collection, the discovery of a second form was of great interest.

C. baeri (Oust.) agrees with the type of the genus not only in the shape of the bill and in the form of the wings and tail, but presents also a close resemblance in coloration. The distribution of the ferruginous and grey colours on the top and sides of the head is absolutely alike in both species, but *C. baeri* differs at once by having only the throat and foreneck and the under tail-coverts ferruginous, while the remaining underparts are pale slaty grey with a slight olive hue on the sides. Moreover, the slate grey of the upperparts is paler, the edge of the wing slate-grey (not ferruginous), and there is no trace of the white apical margins on the two outer tail-feathers. *C. baeri* is also much smaller.

* I have not been able to verify the above quotation.
† *Cat. Birds* xii. p. 384.
‡ *Ibis* 1893. p. 207 pl vi.

Besides the type in the Paris Museum, I examined two ♂♂ in the Tring Museum and one ♂ ad. in Count Berlepsch's collection. All were taken at Lagunita, Tucumán, at an elevation of 3000 mètres, January 31, February 1, 4, 5, 1903. They present the following measurements: Wing 76 to 77½; tail 74 to 75½; bill 13½ to 14½ mm.

6. **Tachyphonus chloricterus** Vieill. should be **Orthogonys chloricterus** (Vieill.)

Tachyphonus chloricterus Vieillot, *Nouv. Dict.* xxxii (1819) p. 360 ["on le trouve au Brésil d'où il a été apporté par M. de Lalande fils"]; Vieillot, *Tabl. enc. méth. Ornith.* ii. (1822) p. 804 ["déposé au Muséum d'histoire naturelle"].

"*Tachyphone à épaulettes bleues*" Lesson, *Traité d'Orn.* (1831) p. 463 [part.: "Femelle: olive jaunâtre. Du Brésil"]; Pucheran, *Arch. Mus.* vii (1855) p. 378.

Tanagra viridis Spix, *Av. Brasil.* ii. (1825) p. 36 tab. xlviii. fig. 2 ["in provincia Rio de Janeiro"—type in Munich Museum examined].

Orthogonys viridis auct.

Mus. Paris; spec. typ., labelled as follows: "*Lamprote icterope* ♀, *Pyranga icteropus Vieill. Tachyphonus chloricterus Vieill.* (*T.*), *du Brésil, par Delalande*," and on the bottom of the perch: "*du Brésil par Delalande* 1816. *Tachyphonus chloricterus Vieill.* (*type*)."—Wing 92; tail 84; bill 19 mm.

This specimen agrees perfectly with an example of *Orthogonys viridis* (Spix) from Paraná, with which I compared it. The lower surface is perhaps rather paler olive yellow and the back duller greenish, both differences being without doubt due to fading, for the specimen was exposed to light since nearly a century.

Vieillot's name, being the earliest, must be accepted for the species commonly called *O. viridis*.

In the *Cat. Birds* xi. p. 193 it was doubtfully referred to the ♀ of *Cyanicterus cyanicterus* (Vieill.).

7. **Nemosia chrysopis** Scl. & Salv. = **Thlypopsis sordida** (Lafr. & Orb.) juv.!

Nemosia sordida Lafresnaye & Orbigny, *Syn. Av.* i. in: *Mag. Zool.* cl. ii. (1837) p. 28 [Yuracares, rep. Boliviana].

N. chrysopis Sclater & Salvin, *P. Z. S.* 1880. p. 155 [Sarayaçu, E. Ecuador].

Spec. typ. in Mus. Brit.; "Sarayaçu, E. Ecuador.—C. Buckley coll. Type—*Nemosia chrysopis* Scl. & Salv."—Wing 66; tail 57; bill 11½ mm.

The type is an immature bird of *T. sordida* in the well-known juvenile dress, as described and accurately figured by D'Orbigny,* and it is difficult to understand how it could be mistaken for "a very distinct species of the section *Thlypopsis*." The Tring Museum possesses a specimen in corresponding plumage from Altagracia, Orinoco, and I have seen others from Babia in Count Berlepsch's collection. D'Orbigny's types from Yuracares, which I examined in the Paris Museum, are also immature, one being exactly like the typical specimen of *N. chrysopis*, the other even younger, in the fluffy plumage of the nestling.

In both, the type of *N. chrysopis* and the older specimen of D'Orbigny's, some of the feathers of the adult plumage are just coming out, so several orange-rufous ones on the pileum, and some creamy-buff ones on the foreneck. The tail-feathers are slightly pointed—an unmistakable sign of immaturity. The top of the head and mantle are yellowish-green as in the juvenile plumage, but rump and upper tail-coverts have already attained the olive-grey colour of the adults; as in the latter,

* *Voy. Amér. mérid. Ois.* tab. 18, fig. 2.

the middle of the abdomen and the under tail-coverts are buffy white, but the chest and sides of the body are olive yellow as in young birds.

That the type of *N. chrysopis* is the young of *T. sordida* and *not* of *T. s. amazonum* is proved by the newly growing feathers on the foreneck being *creamy-buff*, not pure cinereous.

The second specimen, from Santa Cruz, E. Peru, referred to *T. chrysopis* by Sclater,* is quite a young bird of *T. s. amazonum*, the types of which came also from the Ucayali. The range of the two forms is as follows :

1. *Thlypopsis sordida sordida* (Lafr. & Orb.)

East Bolivia : Yuracares (D'Orbigny), San Mateo (G. Garlepp.—Mus. Berlepsch and Coll. Hellmayr). *Brazil :* Goiaz, Cuyabá, Rio Madeira (Natterer coll.†), Chapada (H. H. Smith coll.).—Minas Geraës : Lagoa Santa and Sete Lagoas (Burmeister & Reinhardt coll.‡).—Bahia (trade skins in Mus. Berlepsch, Tring, etc.).—Pernambuco (Forbes coll.)—*Venezuela*, Orinoco R. : Capuchin, El Fraile, Altagracia (Cherrie coll.).§—*East Ecuador :* Sarayaçu (C. Buckley coll.).

2. *T. sordida amazonum* Scl.

N.E. Peru : Lower Ucayali, Santa Cruz, Nauta (E. Bartlett coll.), Pebas (Hauxwell coll.).—*C. Peru :* La Merced, Chanchamayo (J. Kalinowski coll.).

N.B.—The locality " Bolivia " of the *Cat. B.* xi. p. 229 is evidently erroneous.

8. Arremon polionotus Bp.

Arremon polionotus Bonaparte, *Consp. Av.* i. (1850) p. 488 [Corrientes.—Mus. Paris].
Arremon callistus Oberholser, *Proc. Biol. Soc. Wash.* xiv. (1901) p. 188 [Sapucay, Paraguay].

One mounted specimen, in the Paris Museum, is labelled : " Arremon polionote ; Arremon polionotus Pchr., Bp. (T.) ; de Corrientes, par M. D'Orbigny." The stand bears the following inscription : " de Corrientes, par M. D'Orbigny, juillet 1829. Type de la description de M. Ch. Bonaparte dans le Conspectus Avium."—Al. 79½ ; cauda 75 ; rostr. 14½ mm.

This specimen, an adult ♂, agrees in every respect with the original description of Bonaparte, and is undoubtedly the type of the species. Two adult males from Paraguay (*A. callistus*) are in no way distinguishable, as we should have expected from the locality. Most probably Mr. Oberholser, when describing his *A. callistus*, compared the Paraguay bird with specimens from Mattogrosso, which he seems to have considered to be true *A. polionotus*. Having always suspected the identity of the Paraguay form with the latter, I took to Paris some specimens from Mattogrosso and Paraguay, and found my surmise fully confirmed. The type in the Paris Museum has the black jugular band just as broad as the Paraguay birds, and the back is of the same dark slaty grey without any olivaceous tinge ; only the edge of the wing is slightly more mixed with white in the type specimen. The lack of the yellowish-green humeral patch upon which Mr. Oberholser lays so much stress does not seem

* *Cat. Birds* xi. p. 229.

† *Nemosia fulvescens* + *N. sordida* Pelzeln, *Orn. Bras.* iii. (1869) pp. 215, 216.—I have examined these specimens. *N. fulvescens* are the adults, *N. sordida* the young birds. They belong to *T. s. sordida* and *not* to *T. s. amazonum*, as supposed by Sclater.

‡ *Nemosia fulviceps* Burmeister, *Syst. Übers.* iii. p. 159 ; *N. fulvescens* + *N. sordida* Reinhardt, *Vid.-Medd. Kjöbenhavn* 1870. p. 423.

§ *Nov. Zool.* ix. p. 23.

to be a reliable character, for it is present in the Corrientes and Paraguay birds. I may add that in all adult males of *A. polionotus* and of its northern form the head is uniform black with no trace of the grey median stripe which is to be seen in females and young birds.*

Measurements of *A. polionotus*:

1. ♂ ad., Paraguay, November 16, 1893.—Bohls coll. No. 50. Al. 77 ; caud. 70 ; rostr. 14 mm.

2. ♀ ad., Paraguay, November 16, 1893.—Bohls coll. No. 50. Al. 70 ; caud. 62 ; rostr. 14½ mm.

3. ♂ ad., Colonia Risso, Rio Apa, N. Paraguay ; A. Borelli leg., No. 241. Al. 78½ ; caud. 68 ; rostr. 14½ mm.

Specimens from Mattogrosso and Goiaz differ from the typical form in their decidedly narrower jugular band and in having the back of a paler grey with a slight olivaceous suffusion. The black band across the foreneck, which in the type of *A. polionotus* and in the examples from Paraguay is about 10 mm. broad, measures only 7·5 mm. These differences, although slight, seem to be constant, and the form from Central Brazil may be regarded as a distinct subspecies. As I have ascertained by examination of the type specimen, its proper name is

Arremon polionotus devillii Des Murs.

Arremon Devillii Des Murs (ex Bonaparte MS.) in Castelnau, *Voy. Amér. Sud, Ois.* p. 69, tab. xx. fig. 2 (1855) [no locality].

A. devillii Sclater, *P. Z. S.* 1856. p. 81 ["prov. Goiaz in Brazil."—Castelnau & Deville leg.—Mus. Paris].

Arremon polionotus (nec Bp.) Pelzeln, *Zur Orn. Brasil.* iii. (1869) p. 217.

Arremon devillii + *A. polionotus* Sclater, *Cat. Birds* xi. (1886) pp. 274, 278.

Mus. Paris ; mounted in the gallery and labelled as follows : "Arrémon de Deville, Arremon Devillii, Bp. (T.), du Brésil, par MM. de Castelnau et Deville." The stand bears the following inscription : "1846—Cat. gén. No. 972. Arremon Devillei Bonap., type de l'espèce ; individu figuré dans l'atlas du voyage. Province de *Goyas*, Brésil, par MM. Castelnau et Deville."—Al. 71 ; caud. 65 ; rostr. 15 mm.

This specimen is a young bird, as proved by the strong olivaceous tinge of the back, by the presence of the greyish crown-stripe, by the pale brownish wash on the sides of the body, and by the colour of the bill. The lower edges of the upper mandible are dark brownish yellow, not clear yellow as in adult birds, and not so sharply defined against the blackish culminal stripe. The bird differs from adult males of Chapada, Cuyaba, and Goiaz in the same way as does a female of true *A. polionotus* (from Paraguay) from the adult males of the same locality, thus proving that the differences are only due to age or sex. In both examples the back and the ashy stripe along the middle of the occiput show a distinct olivaceous suffusion. In adult males the back is of a clearer slate-grey colour, with only a faint greenish admixture here and there, and the crown-stripe is altogether wanting or but slightly indicated by grey edges to some of the feathers. The sides of the body are also pure ashy grey, whereas they are of a pale brownish tint in females and young males. The ground colour of the under surface in Des Murs' type, however, is pure white, as in adult males. In all other respects the type of *A. devillii* fully agrees with specimens from C. Brazil, and I have not the slightest doubt it is a young male of the northern form of *A. polionotus*.

* The same has been stated by Mr. Allen (*Bull. Amér. Mus.* iii. p. 362 : "A. polionotus").

2 ♂♂ ad. from Chiquitos ex D'Orbigny in the Paris Museum belong also to the form with narrow black jugular band.

Thus we have two subspecies, the distribution of which is as follows :

a. Arremon polionotus polionotus Bp.

Hab. *Corrientes*, Argentina (D'Orbigny). *Paraguay* : Sapucay (Foster) ; Colonia Risso, Rio Apa (Borelli).

b. Arremon polionotus devillii Des Murs.

Similar to the typical form, but distinguishable by its decidedly narrower jugular band, and by having the back of a lighter, paler grey colour, with a slight admixture of olivaceous.

Hab. *Central Brazil* : Goiaz (Castelnau & Deville); Cuyabá (Natterer) ; Chapada (Smith) ; Urucúm and Corumba (Borelli) ;

Eastern Bolivia : Chiquitos (D'Orbigny—Mus. Paris).

9. **Arremon wuchereri** Scl. & Salv. = **A. flavirostris** Sw. ♂ ad.

Arremon flavirostris Swainson, *Animals in Menag.* (1838) p. 347 [" Brazil "].
A. wuchereri Sclater & Salvin, *Nomencl. Av. neotrop.* (1873) p. 278 [Bahia]; Ihering, *Revist. Mus. Paul.*, v. (1901), p. 265 [Jaboticabal, S. Paulo].
A. flavirostris Reinhardt, *Vidensk. Medd. Kjøbenhavn* (1870) p. 421 [Minas Geraës].

As can be seen from Mr. Sclater's key * to the genus, *A. wuchereri* differs from *A. flavirostris* only in lacking the cinereous vertical stripe. This character, however, is very variable, and evidently depends on age, as we learn from the examination of a large series of the allied *A. polionotus*. In this series the adult males, with pure schistaceous upper parts and pure white belly, have the head uniform black, only the young males and females show an olivaceous grey vertical stripe. Through the kindness of Professor von Ihering, of S. Paulo, Brazil, I had the opportunity of comparing some specimens of *A. flavirostris*, collected in the north-eastern part of S. Paulo ; and in the Tring Museum there is one example obtained by Mr. A. Robert in the province of Araguay, Minas Geraës. This series presents the same variation as *A. polionotus*. In three specimens,† two of them marked " ♀ " by the collector, there is a broad olivaceous grey vertical stripe, beginning just above the eye and confluent with the olive-grey colour of the nape, the sides of the body are pale greyish brown or brownish, and in one specimen the chest, below the black jugular band, shows a slight buffy tinge. Both characters are signs of immaturity.

On the other hand, one ♂ (No. 4568, Bebedouro—Mus. Tring), with pure schistaceous nape and pure grey sides of the body, lacks the vertical stripe, some feathers of the hind crown only showing narrow slate-grey margins. This is also the case in the type of *A. wuchereri*, which differs from our specimens (ex Bebedouro) only in its longer wings and in having the black jugular band slightly broader Yet, as will be seen from the measurements given below, one ♂ from Jaboticabal comes very near in the length of the wing, and I have no doubt the type of *A. wuchereri* is nothing but a ♂ ad. of *A. flavirostris*.

Mus. Tring, ♂ ad., Bebedouro, iv. 1904. Wing 75½ ; tail 75½ ; bill 15 mm.

* *Cat. Birds* xi. p. 272.

† No. 4567, Barretos—Mus. Paulist.; No. 4569, Bebedouro—Mus. Berlepsch ; No. 482, A. Robert coll., Rio Jordão, Minas Geraës.

Mus. Tring (♀), Rio Jordão, Minas. Wing 74½; tail 67; bill 15½ mm.

Mus. Berlepsch, ♀, Bebedouro, iv. 1904. Wing 75; tail 68; bill 13½ mm.

Mus. Paulist., ♀, Barretos, May 1904. No. 4567. Wing 74; tail 68; bill 14⅘ mm.

Mus. Paulist., 1240, ♂, Jaboticabal, S. Paulo. Wing 79½; tail 78 mm.

Mus. Brit. (♂) ad., Bahia. (Type of *A. wuchereri* Sel. & Salv.) Wing 82; tail 73; bill 14⅘ mm.

The distribution of *A. flavirostris* is as follows: *Bahia* (Wucherer); *Minas Geraës:* Lagoa Santa and Sette Lagoas (Reinhardt & Lund); Rio Jordão, province Aragnay, 700—900 m. (A. Robert coll.—Mus. Tring); north-eastern *S. Paulo:* Jaboticabal (Lima coll.—Mus. Paulista); Bebedouro and Barretos, Rio Grande (Garbe coll.—Mus. Paulista et Tring); Santa Maria (Behn coll.—Mus. Berlin). The locality Cametá, Lower Amazons (specimen in Mus. Berlin), seems to me a little doubtful.

A. flavirostris is not at all related to *A. silens*, but a very near ally of *A. p. polionotus* and *A. p. devillii*, from both of which it only differs in having the back olive-green (instead of cinereous). *A. silens*, on the other hand, is characterised by its entirely black bill, a black chin-spot, and by the lengthened superciliaries which commence on the front instead of above the eye.

10. Saltator azarae D'Orb. = Saltator coerulescens azarae D'Orb.

Saltator Azarae D'Orbigny, *Voyage Amér. Mérid., Oiseaux* (publ. between 1838 and 1847) p. 287 ["dans les provinces de Moxos et Santa-Cruz de la Sierra en Bolivie"].

Four specimens in the Paris Museum, labelled as follows:

No. 1 (mounted): "Saltator azarae D'Orb. (type) *Mojos.* D'Orbigny (1834—D. 251—317) mâle." Wing 104; tail 92; bill 20 mm.

No. 2 (skin): "D. 317. *Mojos.* Saltator azarae D'Orb. D'Orbigny, 1834." Wing 110; tail 100; bill 20 mm.

No. 3 (skin); "D. 317. *Mojos.* Saltator azarae D'Orb. 251; D'Orbigny, 1834." Wing 111; tail 100; bill 20 mm.

No. 4 (mounted): "Saltator azarae D'Orb. (type). *Sta Cruz*—D'Orbigny, (1834. D. 317—251)—femelle." Wing 102; tail 98: bill 21½ mm.

Nos. 1, 2 and 3 agree very closely with the dark-backed form inhabiting the Upper Amazonian region. Compared with two adult birds from Peru (Iquitos and Chanchamayo) they are a shade paler both on the upper and lower surface, but very much darker than true *S.* c. *coerulescens*. From the latter they are also distinguished by having the outer webs of the remiges dark slate-colour, in which respect they agree exactly with Peruvian specimens.

D'Orbigny's female, No. 4, however, does not belong to this form, but is in every way similar to typical *S.* c. *coerulescens* of Corrientes and Paragnay. The upper surface is olive-grey (not dark slaty olive as in Nos. 1—3), and the breast much paler greyish buff. As in so many other instances, the form found in the plains to the east of the Bolivian Andes proves to be the same as that inhabiting the campos region of the interior of Brazil; while farther to the north, on the tributaries of the Rio Madeira, the Amazonian representative occurs.

The slaty-backed form has been identified in the *Cat. Birds* xi. with *Tanagra superciliaris* Spix. The type of this species, however, agrees perfectly with specimens from Paraguay (typical *S.* c. *coeruleseens*), as will be shown in my forth-

coming paper on Spix types. Although D'Orbigny's so-called female belongs to another subspecies, his diagnosis is clearly referable to the dark-backed form, which accordingly ought to be called *S. coerulescens azarae* D'Orb.

The distribution of the two subspecies is as follows :

a. Saltator coerulescens coerulescens Vieill.

Saltator coerulescens Vieillot, *Nouv. Dict.* xiv. (1817), p. 105 (ex Azara No. 81 : Paraguay).
Tanagra superciliaris Spix, *Av. Bras.* ii. (1825), p. 44, tab. lvii. ("in campis fl. St. Francisci prope pagum *Joazeiro*," Bahia, Brazil).
Saltator azarae (nec D'Orbigny), Pelzeln, *Zur Orn. Bras.* iii. (1869) p. 219 (Mattogrosso).
S. caerulescens Salvadori, *Boll. Mus. Torino* xv. No. 378 (1900) p. 4 (Mattogrosso).
S. Azarae D'Orbigny, *Voyage, Oiseaux*, p. 287 (part. : female ; Santa Cruz de la Sierra, Bolivia).

Hab. Campos region of the interior of Brazil from Joazeiro on the Rio Francisco, Bahia to Mattogrosso (Cuyaba, Villa Bella, San Vicente, Carandasinho, Urucúm), and thence to Santa Cruz de la Sierra in East Bolivia ; southwards through Paragnay (Bohls coll.—in Mus. Tring et Berlepsch) to Corrientes, Argentina (D'Orbigny coll.—specim. in Mus. Paris).

b. Saltator coerulescens azarae D'Orb.

Saltator Azarae D'Orbigny, *Voyage, Oiseaux*, p. 287 (part : deser. ♂ ; Mojos, Bolivia).
S. superciliaris (nec Spix) Selater, *Cat. Birds* xi. p. 291 (part. : Ecuador and Peru).

Hab. N.E. Bolivia (Moxos) ; Upper Amazonia : Central and Eastern Peru, East Ecuador, Bogotá coll. ; N.W. Brazil : Rio Juruá (Garbe coll.—Mus. Berlepsch).

A third closely allied form occurs on the Lower Amazons :

c. Saltator coerulescens mutus Scl.

Saltator mutus Sclater, *P. Z. S.* 1856, p. 72 [Pará].
S. superciliaris (nec Spix) Sclater, *Cat. Birds* xi. p. 291 [part. : Mexiana].

Very much like *S. c. azarae*, but with the anal region and the crissum considerably paler, ochraceous buff (instead of deep ochraceous).

Hab. Vicinity of Pará : Mexiana Island (Wallace), Camolins (Steere coll.—Mus. Tring).

11. Saltator albicollis Vieill. = S. guadeloupensis Lafr.

Saltator albicollis Vieillot, *Nouv. Dict.* xiv. (1817) p. 107 ["Cayenne"—errore !].

Specimen in Mus. Paris, labelled : "Habia albicol, Saltator albicollis, Vieill. (T.), de Cayenne, donné par M. Moussier." On the bottom of the perch : "donné par M. Moussier, 1808. Salt. albicollis Vieill. type. Type de la description de M. Ch. Bonaparte." Wing 94 ; tail 90 ; bill 18½ mm.

Mr. Sclater* says : "I have examined the type of *S. albicollis* of Vieillot at Paris, and believe it to be an immature bird of this species" (i.e. *S. striatipictus* Lafr.).

This statement is quite erroneous, and, I suppose, the examination must have been a hasty one, for otherwise Mr. Sclater would not have failed to recognise the true affinities of the bird. Vieillot's type is by no means immature, but an adult bird in very worn plumage, and belongs to the species inhabiting the islands of Guadeloupe, Santa Lucia, etc. It agrees with specimens from the latter island in

* *Cat. Birds*, xi. p. 295.

having **the whitish superciliary streak continued to the posterior end of the ear coverts.** This character alone would be sufficient to prove that the bird has nothing to do with *S. striatipictus* (= *albicollis* auct.), in which species the superciliaries always end above the eye. Moreover, the lower mandible is pale yellowish, except for the blackish basal half of the sides, just as in a series of 16 specimens of *S. guadeloupensis*, while in 71 examples of *S. striatipictus* (= *albicollis* auct.) the whole lower mandible is deep black, only in a few skins a very small spot at the extreme tip being yellow. In Vieillot's type specimen, also the whole apical half of the upper mandible is yellow, as in some examples from Guadeloupe, Santa Lucia, etc. Most of the specimens of *S. striatipictus* have the whole upper mandible deep black; sometimes there is a minute yellow spot at the very tip to be seen, but never more!

After all, there can be no doubt that Vieillot's type is a specimen of *S. guadeloupensis* with wrong locality. Compared with some examples from Guadeloupe and Santa Lucia, it presents but very slight differences. The back appears rather greyer, since the olive-green apical portion of the feathers is mostly worn off, but on the head the green colour is well to be seen. The same applies to the underparts, which are rather greyer, less greenish, with the middle of the abdomen and the under tail-coverts paler buffy than usual.

The nomenclature of the two species which enter into the question is as follows:

Saltator albicollis Vieill.

Saltator albicollis Vieillot, *Nouv. Dict.* xiv. (1817) p. 107 ["Cayenne"—errore!].
S. guadeloupensis Lafresnaye, *Rev. Zool.* 1844. p. 167 [Guadeloupe].
S. guadeloupensis Sclater, *Cat. Birds* xi. p. 295.

Hab. *Lesser Antilles:* Guadeloupe, Dominica, Martinique, Santa Lucia, Nevis.

Saltator striatipictus Lafr.

Saltator striatipictus Lafresnaye, *Rev. Zool.* 1847. p. 73 [Caly, W. Colombia].
Saltator albicollis Sclater (nec Vieillot!), *Cat. Birds* xi. p. 294.
S. albicollis auct.

Hab. *Colombia, North Venezuela, Trinidad, Western Ecuador, North Peru.*

12. **Polioptila lactea** Sharpe sp. opt.!

Polioptila lactea Sharpe, *Cat. Birds Brit. Mus.* x. (1885) p. 453 [Hab. "unknown": we substitute *S.E. Brazil*, vicinity of *Rio*].

1. Mus. Brit. ex coll. P. L. Sclater (♂) ad. "South America.—Argent" Type of *P. lactea* Sharpe. [The specimen is of the well-known "*Rio*-make."]—Wing 47; tail 46; bill $10\frac{3}{4}$ mm.

2. Mus. Brit. ♂ ad. Rio de Janeiro. Alex. Fry coll. No. 263.—Wing $45\frac{1}{2}$; tail 44; bill $10\frac{1}{2}$ mm.

This is a very distinct species, and easily distinguishable from *P. bilineata* (Bp.), with which I united it in the *Tierreich*, 18. Lief. p. 27, owing to lack of material.

P. lactea agrees with *P. bilineata* in having the lores, cheeks, ear-coverts and broad superciliaries pure white, but differs at a glance by its much darker, slaty-blue (instead of bluish grey) upper surface, entirely white outer tail-feather without any black at the base, and beautiful creamy colour of the breast and

abdomen. The sides of the body show no trace of the bluish grey colour so conspicuous in *P. bilineata*.

No. 2, a fresh skin, has the breast and abdomen of a delicate creamy-yellowish ; in the type, which is slightly faded, these parts are almost white. There can be no longer any doubt that *P. lactea* is an excellent species. It needs no comparison with the other black-headed forms, since the broad white superciliaries serve to distinguish it at once.

13. Curruca olivacea Less. = Vireo chivi (Vieill.)!

Sylvia chivi Vieillot, *Nouv. Dict.* xi. (1817), p. 174 [ex Azara : *Paraguay*].
Curruca olivacea Lesson, in *Voyage Coquille, Zoologie*, Tome I. part ii. (1828), p. 664 ["l'île de Sainte Cathérine au Brésil"].

Mus. Paris. spec. typ. (skin) labelled : "Lesson et Garnot.—Duperrey. Fauvette, Ste Cathérine du Brésil, No. 38. *Sylvia olivacea* Less., Brésil, No. 72." Wing 74 ; tail 56 ; bill 13½ mm. (tip broken off).

This specimen, without doubt the type, agrees in every respect with a topotypical skin from Paraguay (Bohls coll.). The second primary is the longest, the third and fourth hardly shorter ; the fifth about 4½ mm. less than the third and equal to the first. As in the Paragnay example, there is no dusky malar streak.

Several times before I tried to make out the species from Lesson's description, but I never expected that it would turn out to be *V. chivi*!

14. Dacnis salmoni Scl. should be Nemosia salmoni (Scl.).

Dacnis salmoni Sclater, *Cat. Birds Brit. Mus.* xi. (1886) p. 27, pl. ii. fig. 2 (Remedios, Antioquia).

1. Mus. Brit. ♀. Remedios. T. Salmon coll. Type of species.—Wing 58 ; tail (moulting) ; bill 13 mm.

Hartert * has already remarked that this bird had nothing to do with *Dacnis*, but belonged to the genus *Nemosia*. This statement seems to have been overlooked by all later authors, for it is not even mentioned by Ridgway † and Oberholser.‡

The careful study of the type specimen leaves not the slightest doubt that the species is most closely allied to *Nemosia chrysomelas* (Scl. & Salv.), which, though originally assigned to *Tachyphonus* (!!), has since been proved by Mr. Ridgway § to belong to that section of *Nemosia* separated by Cabanis under the name *Hemithraupis*. In fact, both species are practically identical in structure ; perhaps the bill in *N. salmoni* is a very little broader at the base, but otherwise it is of the same shape. In coloration, however, the single known ♀ differs widely from that of *N. chrysomelas*. Whether *N. salmoni* is really the ♀ of *N. rosenbergi* Rothsch. cannot be decided without knowing the ♂, but I notice that the type of the latter species is much larger : wing 70 ; tail 53 mm.

15. Knipolegus unicolor Kaup.

This name was exclusively based on the description of *Fluvicola cyanirostris* Lafr. & D'Orb. from *Corrientes*. The Paris Museum still possesses the skin of an adult male with D'Orbigny's original label, which reads as follows :

"*Ada cyanorostris* Nob. Corrientes. D'Orbigny, juillet 1829. No. 37."—Al. 80 ; caud. 72 ; rostr. 13½ mm.

* *Nov. Zool.* v. 1898. p. 484.
† *Birds North and Middle America*, ii. 1902. p. 391.
‡ *Proc. U.S. Mus.* xxv. 1902. p. 141.
§ *Birds North and Middle America* ii. p. 106.

This specimen agrees in every respect with a good series of *K. cyanirostris* from Paraguay and South Brazil. It is a perfectly adult male in black plumage, with the inner webs of the remiges narrowly margined with white. The allied *K. aterrimus* Kaup. differs at a glance by having the whole basal half of the inner webs pure white as far as the shaft. *K. unicolor* Kaup sinks, therefore, as a synonym of *K. cyanirostris*. The *K. unicolor* auct. (nec Kaup) from the upper Amazons, however, is a very different bird, without any white at all on the quills, and is much nearer *K. orenocensis* Berl. The synonymy of these species is as follows :

Knipolegus cyanirostris (Vieill.)

Muscicapa cyanirostris Vieillot, *Nouv. Dict.* xxi. (1818) p. 447 [ex Azara, No. 181.—Paraguay.] [= ♂ ad.]
M. ruficapilla Vieillot, *l. c.* p. 459 [ex Azara, No. 178.—Paraguay] [= ♀].
Alda cyanirostris D'Orbigny, *Voy. Amér. mérid. Ois.* p. 340 [Corrientes].
Fluvicola cyanirostris Lafresnaye & D'Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837. cl. ii. p. 59 [Corrientes, rep. Argentina].
Cnipolegus unicolor Kaup *Journ. f. Ornith.* 1853. p. 29.
} undè :

Hab. *Paraguay* (Azara) : Sapucay (Foster coll.—Mus. Tring) ; *Corrientes* (D'Orbigny) ; *South Brazil :* Rio grande do Sul, S. Paulo, Espiritu Santo (Mus. Berlepsch).

Knipolegus sclateri nom. nov.

Cnipolegus unicolor (nec Kaup) Pelzeln, *Zur Ornith. Brasil.* ii. (1868) p. 99 [Rio Madeira, Brazil].
Cnipolegus unicolor Sclater, *Cat. Birds Brit. Mus.* xiv. (1888) p. 47 [Pebas, N.E. Peru].

♂ ad. Nearest to *K. orenocensis* Berl. and without any white on the quill-lining, but easily distinguishable by the considerably darker sooty-black colour of the upper parts and much darker, brownish black lower surface. In *K. orenocensis* only the top of the head is dull blackish olive, the back olivaceous-grey, and the lower parts are likewise paler, slaty-olivaceous.

Type in Mus. Vindob. No. 17591, ♂ ad. "Rio Madeira," W. Brazil, November 18, 1829.—coll. J. Natterer.—Al. 77 ; caud. 69 ; rostr. 14½ mm.

Hab. *Upper Amazonia :* Rio Madeira (Natterer) ; Pebas (Mus. Brit.).

16. **Muscicapa cristata** Less. = **Knipolegus cyanirostris** (Vieill.) ♀ !

Muscicapa cristata Lesson, *Traité d'Orn.* (1831) p. 385 [without locality ; descr. mala].
Muscicapa cristata Pucheran, *Arch. Mus. Paris.* vii. (1855) p. 371 (crit.)

One specimen, mounted, without label, but with the following notes on the stand : "Brésil, Mr. de St. Hilaire, août 1822. Muscicapa cristata Less. type."—Al. 73 ; caud. 70½ mm.

M. Pucheran (*l. c.*) already stated that this bird was a female of some species of *Knipolegus*. I was enabled to compare it with the females of the four species which came into the question, and found it perfectly agreeing with that of *K. cyanirostris*. It differs from a female from Rio Grande do Sul (Mus. H. v. B.) only in having the lower parts less densely striated with blackish.

17. **Muscisaxicola striaticeps** Lafr. & D'Orb. should be **Knipolegus striaticeps** (Lafr. & D'Orb.).

There is in the Paris Museum a mounted specimen, labelled as follows :

"*Geositta striaticeps* (d'Orb. et Lafr.). D'Orbigny.—Bolivie" ; and its stand bears the following inscription : "Bolivie, Chiquitos. D'Orbigny 1834.

No. 3921 = 1380. Muscisaxicola striaticeps Lafr. & D'Orb."—Al. 56 ; cauda 53 ; tars. 18 ; rostr. 11½ mm.

It answers very well to the original description and to the plate in D'Orbigny's work, and is no doubt the type of the species. No attempt having as yet been made to identify the name, Count Berlepsch drew my attention to it, suggesting that it might prove to be the female of *K. cinereus* Sel. This supposition I found fully confirmed by the examination of the type specimen, which agrees perfectly with a female of this species in the Tring Museum. It may be described as follows: Forehead and crown pale cinnamon-rufous with narrow blackish shaft-stripes; back pale greyish brown, upper tail-coverts pale cinnamon-rufous. Tail-feathers blackish brown, the inner web of the four outer pairs except at the tip cinnamon-rufous; the outermost with a distinct white margin along the outer web. Lesser wing-coverts greyish brown, like the back; median and greater series dark brown with large white apical spots forming two wing-bands. Quills dark brown, primaries very narrowly edged with greyish, the inner secondaries with broader white margins. Sides of the head buffy whitish; lower parts whitish, with pale greyish-brown shaft-stripes on the breast; under tail-coverts cinnamon-rufous, whitish at the tips. Axillaries and under wing-coverts buffy whitish. Bill brownish horn-colour.

Mus. Tring; ♀ ad. Tapia, Tucuman, 600 m., December 2, 1902, coll. Baer.—Al. 55; caud. 58; rostr. 11½ mm.

This specimen differs from the type only by its slightly longer tail.

The female of *K. striaticeps* bears a certain resemblance to that of *K. cyanirostris*, but besides being very much smaller, it is easily to be distinguished by the white outer web of the outermost tail-feather, the white (instead of rusty-whitish) wing-bands, the much paler greyish-brown back, and by having only the breast very indistinctly streaked with greyish.

The type in the Paris Museum is marked as coming from Chiquitos,* viz. from the lowlands in Eastern Bolivia. This seems much more probable than the locality La Paz (in the high Andes), first indicated by Lafresnaye and D'Orbigny, the more so, as the type of *K. cinereus* was obtained not far from the Bolivian boundary in S.W. Brazil.

The synonymy of the species is as follows:

Knipolegus striaticeps (Lafr. & D'Orb.).

Muscisaxicola striaticeps Lafresnaye & Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837. cl. ii. p. 66 ["La Paz, Bolivia."—the type is marked "Chiquitos."] (= ♀).
Muscisaxicola striaticeps D'Orbigny, *Voyage Ois.* p. 356, tab. 41, fig. 1 (= ♀).
Cnipolegus cinereus Sclater, *P. Z. S.* 1870. p. 58 [Corumba, Mattogrosso] (= ♂).

Hab. *Eastern Bolivia:* Chiquitos (?) (D'Orbigny); San Miguel (Behn).
Mattogrosso, Brazil: Corumbá (Capt. Page).
Argentina: Cordova (Doering); Salta (Durnford); Tucuman (Durnford, Mus. Brit.; G. Baer coll.—Mus. Tring).

* As I learn from a MS. note, supplied by Count Berlepsch, Prof. Behn got a female at San Miguel, in the lowlands of Eastern Bolivia. It was preserved in the Kiel Museum, where it was examined by the Count, and has passed probably into the Berlin Museum—together with the other specimens of Behn's collection.

18. **Anaeretes sclateri** Oust. = **Hapalocercus sclateri** (Oust.).

Anaeretes sclateri Oustalet, *Nouv. Arch. Mus. Paris.* (3) iv. (1892) p. 217, descr. ♂ ad. ["Chili"—errore!]

Hapalocercus hollandi Sclater, *Ibis* 1896. p. 317, descr. orig. ♀ [Santa Elena, Argentina]; Hellmayr *Verhandl. zool. bot. Gesellsch. Wien* 1903. p. 204 [crit.—Pansecco, Mattogrosso].

H. flaviventris Pelzeln (nec Lafresnaye et D'Orbigny !), *Orn. Brasil.* ii. (1868) p. 103 [Pansecco].

	Wing.	Tail.	Bill.	Grad. of tail.
1. Mus. Paris. (♂) ad. Type of *Anaeretes sclateri* Oust. "acquis en 1837, du Chili"	44	48	11	8 mm.
2. Mus. Brit. ♀ Sta. Elena, Argentina, January 15, 1895. Holland coll. Type of *H. hollandi* Scl. . .	41½	45	10½	6 mm.
3. Mus. Vindob. No. 17809. ♂ ad. "Pansecco, Mattogrosso, June 27, 1826." Natterer coll. . . .	41	47	11	6½ mm.
4. Mus. Vindob. No. 17810. ♀ ad. "Pansecco, Mattogrosso, June 27, 1826." Natterer coll. . . .	42	45	10	4½ mm.
5—18. Mus. Tring. ♂♂ ad. Ocampo and Mocovi, near Ocampo, Argentina, November 1905 and December 1903. Venturi coll. . . .	41—44	43—48	10—11	6—10 mm.
19—24. Mus. Tring. ♀♀ ad. Ocampo, Argentina, November and December, 1905. Venturi coll. . . .	40—43	42—46	10—11	6—8 mm.

In the paper quoted above I described the curious wing structure of the ♂ from Natterer's specimen.

Since that time I had the opportunity of examining the type of *Anaeretes sclateri* Oust. in the Paris Museum, and found it to be an adult ♂ of *H. hollandi*, with the fourth and fifth primaries exactly of the same shape. Lately, the Tring Museum has received twenty-two skins of this species, among them fourteen adult ♀♀, all of which show the same peculiarity. Oustalet's type and the series from Argentina agree perfectly with the ♂ from Pansecco in having the **whole bill black** and **no buff superciliary stripe.** The lores, cheeks and sides of the head are dull black, the feathers of the superciliary region with faint whitish edges; the feathers of the pileum are much elongated and narrowed towards the tip, forming a long pointed crest, longitudinally striped with black and ochreous yellow. The back is green, with slight dusky shaft-stripes, more apparent in the freshly moulted than in the worn plumage; the median and greater upper wing-coverts have distinct buffy whitish apical margins; the whole undersurface is bright yellow.

The females differ from the males by the presence of a broad buff superciliary stripe and by having **the lower mandible whitish.** Natterer's specimen from Mattogrosso and the series from Ocampo are practically identical with the type of *H. hollandi*. None of the females show the peculiar shape of the fourth and fifth primaries, which are quite as long as the others, though somewhat narrower.

The range of this species, which ought to be called *H. sclateri* (Oust.), is as follows:

East Argentina : Santa Elena, east of La Paz (Holland), Ocampo and Mocovi (Venturi).

C. Brazil, Mattogrosso : Pansecco (Natterer).

Obs. The original locality "Chili" is doubtless erroneous. Onstalet's type formed part of a collection which contained, among others, *Leptasthenura platensis* (Rchb.), a species only known to occur in the eastern portions of the Argentine Republic.

A very near ally of *H. sclateri* is *H. striaticeps* Salv.,* of which but a single specimen, the type, is known. This is an adult ♂, with the fourth and fifth primaries of exactly the same shape, as in the ♂♂ ad. of *H. sclateri*. It is strange that this peculiarity has not been noticed by Salvin, who never referred to *H. hollandi* when describing the species, but compared it with *H. flaviventris*, with which it has not the least relations ! On comparing Salvin's type with our series of *H. sclateri*, I find not the slightest difference in coloration ; but the bird from British Guiana has a smaller bill **with the under mandible whitish.** Perhaps wings and tail are also rather shorter,† but the specimen being in very worn plumage, I would not lay much stress upon this trifling variation. As 16 ♂♂ of the southern *H. sclateri* have the bill entirely black, I think the pale lower mandible of the Aunai specimen is sufficient to warrant the recognition of a northern form : *H. sclateri striaticeps* Salv.

In the hills near Tucumán another species of the same group is found, the male of which has the same curious wing-structure as *H. s. sclateri* and *H. s. striaticeps*. It differs, however, from both in the following points. The eye region and ear-coverts are not blackish, but dull greenish, and the back is of a much duller, more brownish green, without any trace of the dusky mottling. The most striking difference consists of the form and colour of the feathers of the pileum. While the two forms discussed above have a long pointed crest striped with black and ochraceous, in the Tucumán species the feathers of the pileum are of normal shape and length (as in *H. flaviventris*) and uniform earthy brown, only those of the forehead being narrowly edged with rusty buff. The Tring Museum possesses three ♂♂ ad. of this bird, which has been described by M. Lillo as a new genus, *Pseudocolopteryx dinellianus*. Its proper name is therefore *Hapaloecreus dinellianus* (Lillo).

19. **Leptopogon tristis** Scl. & Salv. = **Phylloscartes ventralis angustirostris** (Lafr. & D'Orb.).

Muscicapa angustirostris Lafresnaye et D'Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837. cl. ii. p. 52 (Yungas, Bolivia).

Muscicapara angustirostris D'Orbigny, *Voyage, Oiseaux*, p. 325 (Yungas, de la Paz).

Leptopogon (?) *tristis* Sclater & Salvin, *P. Z. S.* 1876. p. 254 (Simacu, Yungas of Bolivia).

	Wing.	Tail.	Bill.
1. Mus. Paris. Adult. Type of *M. angustirostris* Lafr. & D'Orb. Yungas, Bolivie, D'Orbigny, 1834	57	59	$11\frac{1}{2}$ mm.
2. Mus. Brit. Av. juv. Simacu, Bolivia. Buckley coll. No. 96. Type of *Leptopogon tristis* Scl. & Salv.	54	54	$11\frac{3}{4}$ mm.
3. Mus. Brit. Adult. Samaipata, Bolivia. G. Garlepp coll.	$55\frac{1}{2}$	58	12 mm.

* *Bull. B. O. C.* vii. (1897) p. xvi. (Aunai, Brit. Guiana).

† Wing $41\frac{1}{2}$; tail 45 ; bill 10 mm.

	Wing.	Tail.	Bill.
4. Mus. Brit. ♂ ad. Chachapoyas, N. Peru, 7300 ft., October 4, 1894. Baron coll.	55	54	$11\frac{3}{4}$ mm.
5—10. Adults of both sexes, Tucumán, N.W. Argentine. Baer & Dinelli coll., Mns. Tring	51—55	54—60	$11\frac{1}{2}$—12 mm.

Having always suspected that there must be some mistake about *Leptopogon tristis*, I was not in the least surprised to find that this species had nothing whatever to do with *Leptopogon*, but was in every respect a typical member of the genus *Phylloscartes*.

The type is an immature bird with some of the fluffy feathers of the juvenile plumage still retained, especially on the nape and lower tail-coverts, but otherwise it agrees in structure and coloration with my series from Tucumán.

When lately in Paris I was so fortunate as to discover among the skins in the collection of the Muséum d'Histoire Naturelle the type of *Muscicapa angustirostris* Lafr. & D'Orb., a species which had never been identified, although the original description was sufficiently clear, the shape of the bill and the characteristic markings of the wings being very accurately described. The type, an adult bird, is exactly like the specimens from Tucumán. The ♂ ad. from Chachapoyas does not differ either.

Phylloscartes ventralis angustirostris (Lafr. & D'Orb.), as this form ought to be called, is practically identical in all structural details with a large series of true *P. v. ventralis* of Eastern Brazil, and differs but slightly in coloration. The upper parts are of a duller, paler, more greyish green; the lower ones rather paler yellow; the throat more mixed with whitish; the yellow wing-bands as a rule a little broader, and the **forehead** always washed with **greyish**. Thus there are two very nearly allied forms recognisable, the range of which is as follows:

1. *Phylloscartes ventralis ventralis* (Temm.). Wood region of *S.E. Brazil*: from S. Paulo to Rio grande do Sul.
2. *Phylloscartes ventralis angustirostris* (Lafr. & D'Orb.) *N.W. Argentina:* Tucumán; *Bolivia:* Yungas of La Paz (D'Orbigny), Simaen (Buckley); *N. Peru:* Chachapoyas (O. T. Baron).

N.B.—The bird mentioned by Lafresnaye and D'Orbigny s. n. *Muscicapa ventralis* (*o. c.* p. 53) is *Capsiempis flaveola* (Lcht.). There are two skins from Guarayos in the Paris Museum, fully agreeing with Bahia specimens.

Specimen *b* of *Leptopogon tristis* (*Cat. Birds* xiv. p. 118) is widely different, and represents a new species of *Pogonotriccus*, which will be described by Count Berlepsch.

20. Leptopogon godmani Scl. = Pogonotriccus ophthalmicus Tacz.

Pogonotriccus ophthalmicus Taczanowski, *P. Z. S.* 1874. p. 135 [Amable Maria, C. Peru].
Leptopogon godmani Sclater, *P. Z. S.* 1887. p. 48 [Sarayaçu, E. Ecuador].

Mus. Brit. Types of *L. godmani* Scl. Sarayaçu, E. Ecuador (Buckley coll.). No. 1. Wing $57\frac{1}{2}$; tail 52; bill 10 mm.; No. 2. Wing $54\frac{1}{2}$; tail 51; bill 10 mm.

This "species" has nothing to do with *Leptopogon*, and is, indeed, very different from all members of that genus, but on comparing it with a series of *P. ophthalmicus* (9) from Central and North Peru, Ecuador and Bogotá, I fail to see any difference. The types are both slightly immature, as manifested by their short and stout bills. Adult specimens have rather longer and more slender bills.

No. 1 agrees perfectly with a ♀ from Pichincha, Ecuador, in shape and size of the bill, while No. 2 has a rather broader and stouter bill. Three other examples

from Pichincha and Corazón, Ecuador, however, are absolutely identical with a topotype from Central Peru, thus proving that this divergency is of no geographical significance. *L. godmani* has, hence, to be relegated to the synonymy of *P. ophthalmicus*.

I may mention that the same difference in the shape of the bill between adult and young birds is observable in many other genera of the *Tyrannidae*, f. e. *Sublegatus*, *Xenopsaris*, *Suiriri* (= *Empidagra*), *Phaeomyias*, etc.

21. **Capsiempis caudata** Salv. should be **Serpophaga caudata** (Salv.).

Capsiempis caudata Salvin, *Bull. Brit. Orn. Cl.* vii. no. 48 (1897) p. xvi [Ourumee, Brit. Guiana].
Serpophaga orenocensis Berlepsch & Hartert, *Nov. Zool.* ix. (1902) p. 40 [Altagracia on the Orinoco R., Venezuela].

Mus. Brit. " ♀ " ad. Ourumee, Brit. Guiana, October 22, 1890. H. Whitely jr. coll. Type of *C. caudata* Salv. Wing 49 ; tail 48 ; bill $10\frac{3}{4}$ mm.

This bird is totally different from *Capsiempis flaveola*, with which it was compared by its describer, but belongs to the genus *Serpophaga*, and has since been redescribed as *S. orenocensis* by Berlepsch & Hartert.

Salvin's type agrees perfectly with some specimens out of the series collected by Cherrie on the Orinoco. The Tring Museum has lately received several skins from the environs of Paramaribo, Surinam.

The systematic position of *S. caudata* has been fully discussed by Berlepsch & Hartert in the paper quoted above. It is certainly a very near ally of *Serphophaga subflava* Scl. & Salv., and a larger series from Pará might even prove their identity. Comparing the unique type of the latter with our series of *S. caudata*, I notice that it has the chin yellow like the whole under-surface (not white), no buff suffusion on the foreneck and no white at all on the tail. The rectrices, however, are extremely worn, and I would not lay too much stress upon the absence of the white markings.

It is very unfortunate that the name *S. orenocensis* has to give way to that of Salvin, who did not recognise the true position of the species.

22. **Tyrannus tuberculifer** Lafr. & D'Orb. should be **Myiarchus tuberculifer** (Lafr. & D'Orb.).

Tyrannus tuberculifer Lafresnaye & D'Orbigny, *Syn. Av.* i. in *Mag. Zool.* 1837. cl. ii. p. 43 [Guarayos, East Bolivia] ; D'Orbigny, *Voyage, Oiseaux*, p. 307.
Myiarchus tricolor Pelzeln, *Zur Orn. Brasil.* ii. (1868) pp. 117, 182 [Rio de Janeiro and Sapitiba : S.E. Brazil].
Myiarchus gracilirostris Pelzeln, *Zur Orn. Brasil.* ii. (1868), pp. 117, 183 [Villa Maria, Mattogrosso].
Myiarchus coalei Ridgway, *Proc. U.S. Nat. Mus.* ix. 1886 (1887), p. 520 ["Orinoco"—male].
M. tricolor + *M. nigriceps* (part.: Colombia, Venezuela, Guiana & Amazonia) Sclater, *Cat. Birds* xiv. p. 258.

	Wing.	Tail.	Bill.
1. Mus. Paris, spec. typ. labelled as follows : "*Myiarchus tuberculifer* (D'Orb. & Lafr.) ♀. Type. D'Orbigny, Bolivie." On the bottom of the perch : "Guarayos. M. D'Orbigny, 1834, No. 126. Cat. gén. 3737*c*. ♀ *Tyrannus tuberculifer* D'Orb. & Lafr. type." . .	77	$73\frac{1}{2}$	$17\frac{1}{2}$ mm.
2. Mus. Vindob. No. 18382. " ♂ alt " Sapitiba, March 28, 1818. Natterer coll. Type of *M. tricolor* Pelz. .	$74\frac{1}{2}$	69	17 mm.
3. Mus. Vindob. No. 18383. " ♀ alt " Rio de Janeiro, December 13, 1817. Natterer coll. Type of *M. tricolor* Pelz.	$69\frac{1}{2}$	63	$17\frac{1}{2}$ mm.

	Wing.	Tail.	Bill.
4. Mus. Vindob. No. 18384. " ♂ " ad. Villa Maria, Mattogrosso, August 24, 1825. Natterer coll. Type of *M. gracilirostris* Pelz.	80½	74½	16 mm.
5. Mus. Vindob. No. 18392. " ♂ " ad. Borba, Rio Madeira, March 1, 1830. Natterer coll.	80½	73½	16½ mm.
6. Mus. H. v. Berlepsch. Bahia-skin	71½	65½	18 mm.
7. Mus. Tring. " ♀ " ad. Igarapé Assu, Pará, January 23, 1904. A. Robert coll. No. 1939	72	64	18 mm.

Count Berlepsch* has already suggested that *T. tuberculifer* might turn out to be the same as *M. tricolor*, and the comparison of the types of both species convinced me of the correctness of his determination.

Pelzeln distinguished a specimen from Mattogrosso s.n. *M. gracilirostris* on account of its smaller, narrower bill, less dusky cap, and larger size. The type is now before me, and I find a specimen from Borba in every respect identical. Both examples differ from the types of *M. tricolor* ex Rio as well as from two skins from Bahia and Pará in their longer wings and tail, narrower bill and brighter yellow belly. The type of *M. tuberculifer* (ex Guarayos, East Bolivia), however, has the bill quite as broad and long, and the belly as pale as those from East Brazil, while in the dimensions it agrees with *M. gracilirostris*.

The coloration of the cap is very variable. In the male type of *M. tricolor* it is decidedly sooty blackish, in the female type dusky, in Nos. 1, 4, 5 and 6 scarcely darker than the back. In a series of fourteen adults from Cumaná the same variation is to be observed.

Specimens from British Guiana, Cumaná, Trinidad, Orinoco, Bogotá and Eastern Ecuador agree in dimensions and colour perfectly with the types of *M. gracilirostris* and *M. tuberculifer*, and belong certainly to the same form. There remains only the question whether the form inhabiting Eastern Brazil (from Rio to Pará) is always distinguishable by its slightly smaller size, in which case it ought to be called *M. tuberculifer tricolor* Pelz. I notice, however, that one specimen from Paramaribo, Surinam, is scarcely larger than the latter (wing 74 ; tail 67½ ; bill 17 mm.).

There can be no longer any doubt that *M. tuberculifer* and *M. gracilirostris* are synonymous, and have nothing to do with *M. atriceps* Cab., which is a much larger bird, with a deep black cap. It may be added that the specimens *m—y* of *M.* " *nigriceps* " apud Sclater (*Cat. B.* xiv. p. 258) are absolutely indistinguishable from the types of *M. tuberculifer* and *M. gracilirostris*, while *M. nigriceps* of West Ecuador and North Peru (Cajabamba, Cutervo, etc.) is readily known by its deep black head.

23. Xenopipo subalaris Godm. = Chloropipo unicolor Tacz.

Chloropipo unicolor Taczanowski, *Orn. Pérou* ii. (1884), p. 335. descr. orig. ♀ [Amable Maria, Peru centr.] ; Berlepsch & Stolzmann, *P. Z. S.* 1896. p. 368 (descr. ♀ ; crit.) [Garita del Sol, Peru centr.].

Xenopipo subalaris Godman, *Bull. Brit. Orn. Cl.* x. no. lxvii. (December 1899), p. xxvii descr. orig. ♂ ♀ [Guayabamba, Peru sept.].

	Wing.	Tail.	Bill.
1. Mus. Brit. " ♂ " imm., Guayabamba, N. Peru, 14. ix. 1894	75	51	11½ mm.
2. Mus. Brit. (♀) imm., Guayabamba, N. Peru, 20. viii. 1894	72	49	12 mm.

[Types of *Xenopipo subalaris* Godm.]

* *Journ. f. Ornith.* 1884. p. 304, and *Ibis*, 1883. p. 141.

	Wing.	Tail.	Bill.
3. Mus. Branicki. " ♀ " ad., Garita del Sol, C. Peru, July 8, 1891. Kalinowski coll.	75	50	13 mm.

[Compared by Dr. Stolzmann with the type of *C. unicolor* Tacz. in the Warsaw University Museum.]

Through the kindness of Dr. Stolzmann I was enabled to examine specimen No. 3, and found it to agree with the female of Godman's *Xenopipo subalaris*, except that the bill is rather longer and the crown decidedly darker green. These differences, however, are very slight and well within the range of the individual variation to be observed in the allied species, and I have not the slightest doubt of their identity. It is hardly to be understood how Mr. Godman could associate this bird with *Xenopipo atronitens* Cab., to which the male has only a superficial resemblance in being of the same glossy black colour. *X. atronitens* is well characterised by its broad, flattened mesorhinium. *C. unicolor*, on the other hand, has a much narrower and quite differently-shaped bill, with the culmen distinctly ridged, like *Chloropipo flavicapilla*. The proportions of the wings and tail are the same as in the latter species, with which it also shares the presence of a large tuft of soft silky white feathers on the sides of the breast. In coloration, however, it is altogether different from the other species of *Chloropipo*, showing the same sexual difference as *Xenopipo atronitens*. Mr. Sclater * put *C. unicolor* as a synonym of *C. uniformis* from British Guiana, but Count Berlepsch and Mr. Stolzmann (*l. c.*) have already pointed out the differences existing between these two birds. The species has thus to stand in future as *Chloropipo unicolor* Tacz. It appears to be an inhabitant of high elevations. O. T. Baron collected it near *Guayabamba*, at an altitude of 4000 to 5500 feet; Kalinowski obtained his specimen at *Garita de Sol*, 11,000 feet; and Jelski found the type at *Amable Maria*, a little over 2000 feet. These localities are the only ones as yet known.

24. **Chloropipo holochlora** Scl.

Cat. Birds Brit. Mus. xiv. p. 287 [type ex Bogotá coll.].

The type in the British Museum is perfectly similar to specimens from Eastern Ecuador and N.E. Peru (Chyavetas). The upper parts are of a deep shining grass-green, the throat, chest and sides of the breast rather duller, more greyish green, and the middle of the abdomen is clear pale yellow. Axillaries and under wing-coverts dull greenish grey.

The specimen from Pasto † (spec. *b* of Sclater's list), however, is very different, and agrees in coloration with a large series from various places in Northern Ecuador. I propose to call this form

Chloropipo holochlora litae n. subsp.

Similar to *C. h. holochlora*, but easily known by having the whole upper surface pale olivaceous green (instead of deep shining grass-green).

Type in Mus. Tring: No. 143. " ♂ " ad. Lita, N. Ecuador, 3000 ft., September 22, 1899. Collected by Mr. Miketta, one of Mr. Rosenberg's correspondents. Wing 70½; tail 47; bill 12 mm.

I examined more than 20 specimens from the following localities, all in N.W. Ecuador: Cachabi, 500 ft.; Ventana; Lita, 3000 ft.; Paramba, 3500 ft.

* *Cat. Birds Brit. Mus.* xiv. p. 447.

† *Pasto* is not in Ecuador, as quoted in the *Cat. Birds*, but in Colombia.

There is no difference in colour between the sexes, the females being only a little smaller: ♂♂, wing 70—72; tail 47—49 mm.; ♀♀, wing 65—67; tail 42—44 mm. From *C. uniformis* it differs chiefly in its much smaller size and in having the axillaries greenish grey instead of yellowish white.

The various forms of *Chloropipo* can be distinguished by the following key :—

A. Plumage glossy black, axillaries and a large tuft of silky feathers on the sides of the breast snow-white *C. unicolor* ♂.

B. No black whatever in the plumage.

a^1. Top of the head bright yellow, breast and abdomen paler yellow . . . . . *C. flavicapilla* ♂♀.

a^2. Head green like the back.

b^1. Axillaries and a large tuft of silky feathers on the sides of the breast pure white . . *C. unicolor* ♀.

b^2. No white tuft on the sides of the breast; axillaries not white.

c^1. Larger (wing 78—80; tail 55—58 mm.); axillaries pale yellowish, greyish in the middle . . . . . *C. uniformis* ♂ ♀.

c^2. Smaller (wing 65—72; tail 42—49 mm.); axillaries greyish green . . .

d^1. Upper surface bright grass-green . *C. h. holochlora* ♂♀.

d^2. Upper surface pale olivaceous green *C. h. litae* ♂♀.

25. **Muscicapa luteocephala** Less. should be **Heterocercus luteocephalus** (Less.).

Muscicapa luteocephala Lesson, *Traité d'Orn.* (1831), p. 392 [no locality]; Pucheran, *Arch. Mus. Paris*, vii. (1855), p. 374 [crit.—"l'Amérique méridionale"].

Mus. Paris.—etiq.: "Moucherolle, Amérique méridionale." On the bottom of the stand I find the following notes in Pucheran's handwriting: "*Muscicapa luteocephala* Lesson (type) de l'Amérique méridionale." Wing 70; tail (moulting) 44; bill $11\frac{1}{2}$; graduation of tail 25 mm.

This is a very distinct species of *Heterocercus*, agreeing in the form of the bill and in the peculiar shape of the tail with the other species, from which, however, it is easily recognisable by its widely different coloration. That of the under-parts reminds one of *Scotothorus chrysocephalus* (Pelz.) [= *igniceps* Scl.]

Upper surface pale olive-green; top of the head and nape ashy grey, middle of the crown bright lemon-yellow; lores whitish, cheeks and ear-coverts pale olive greenish. Throat and chest dirty whitish, the latter with a slight brownish hue; rest of under-surface very pale sulphur yellowish. Upper wing-coverts, quills and tail-feathers dark brown, exteriorly edged with olive-greenish. Bill pale brownish, lower mandible almost whitish.

As will be seen from the above description, it differs from the other known species in having the forehead and sides of the crown ashy grey, and the posterior parts of the lower surface pale sulphur yellow. In structure it agrees perfectly with *H. flavivertex* Pelz. The tarsi are short and slender, the bill of exactly the same form, and the tail, although not full-grown, shows the characteristic reduction of the outer rectrices, the outermost pair being short, attenuated, and entirely hidden by the under tail-coverts. The middle pair has not yet reached its full length, hence the tail appears shorter than in the allied species.

It is only fair to state that M. Oustalet had already recognised the true position of this remarkable bird, as I learn from a MS. note of his on the bottom of the stand.

The type specimen has no locality, but M. Oustalet suggested that it might have come from the interior of Cayenne, which is almost entirely unknown.

The following key to the species of *Heterocercus* may be acceptable to ornithologists :

A. With a brightly coloured crest (♂ ♂).
- *a.* Forehead and sides of the crown very different from the olive-green colour of the back.
  - a^1. Crown-patch fiery red, forehead and sides of crown black ; breast chestnut . . *H. linteatus* (Strickl.)
  - a^2. Crown-patch lemon-yellow, forehead and sides of crown ashy grey ; breast and abdomen pale sulphur yellow . . *H. luteocephalus* (Less.)
- *b.* Forehead and sides of the crown olive-green like the back.
  - a^3. Crown-patch golden yellow ; breast chestnut-brown, decidedly darker in colour than the abdomen . . . *H. flavivertex* Pelz.
  - a^4. Crown-patch orange, breast and abdomen of a uniform pale ochreous reddish . *H. aurantiivertex* Scl. & Salv.

B. No bright crest (♀ ♀).
- *c.* Throat white with a slight isabelline tinge ; upper parts dull brownish olive-green . . *H. linteatus* (Strickl.)
- *d.* Throat pale grey ; upper parts pure olive-green . . . . . *H. flavivertex* Pelz.

26. **Muscicapa luteocephala** Lafr. = **Neopelma aurifrons** (Wied).

Muscicapa aurifrons Wied, *Beitr. Naturg. Brazil*, 3. ii. (1831), p. 829 [" *Camamú* and *Bahia*"].
Muscicapa luteocephala (nec Lesson 1831 !) Lafresnaye, *Mag. Zool.* 1833. cl. ii. tab. 13.

Mus. Paris, etiq. : "*Pipromorpha luteocephala*, Brésil, capt. des Mines,* M.S. Hilaire, août 1822. *Muscicapa luteocephala* Lafresnaye." Wing 68½ ; tail 62 ; bill 10 mm. Not different from specimens from S. Paulo.

As pointed out by Pucheran, the "*Muscicapa luteocephala*" of Lafresnaye is very different from Lesson's species. Lafresnaye's name has been quite correctly given as a synonym of *M. aurifrons* in the *Cat. Birds*, xiv. p. 323.

27. **Psaris erythrogenys** Selby should be **Tityra inquisitor erythrogenys** (Selby).

Psaris erythrogenys Selby, *Zool. Journ.* ii. no. viii. (January—April 1826) p. 483 [Pernambuco.—Mus. Paris].
Tityra erythrogenys Berlepsch & Hartert, *Nor. Zool.* ix. (1902) p. 55 [Orinoco ; crit.].

Mus. Paris. Spec. typ. (♀) ad. labelled : "*Tityra inquisitrix* (Licht.) ; ♀. J. Verreaux, Brésil," and on the bottom of the stand I find the note: "de Pernambuco, Échange à M. Verreaux, 1823. Brésil, no. 3593." Wing 94 ; tail 62 ; bill 20 mm.

This is undoubtedly the type of *Psaris erythrogenys*. Selby says expressly that he described an example from Pernambuco in the Paris Museum, and

* Minas Geraës.

the above specimen agrees in every respect with his account. Berlepsch and Hartert have already recognised the distinctness of this form, and its characters are fully discussed *l.c.* The type in the Paris Museum is perfectly identical with a female from Rio Catañapa, Orinoco (Tring Museum). The back is of a clear pale grey (without the brownish suffusion always to be seen in females of *T. i. inquisitor*), and wings and tail are quite as short. The males of the two forms differ only in size, those of the southern race being invariably larger. The two subspecies have to stand as follows:

a. Tityra inquisitor inquisitor (Licht.).

Lanius inquisitor (v. Olfers MS.) Lichtenstein, *Verz. Dubl.* 1823. p. 50 (San Paulo).

Hab. *S.E. Brazil:* S. Paulo, Minas, and Bahia.

MEASUREMENTS.

♂ ad. Alambary, S. Paulo. Wing 114; tail 71½ mm.
♂ ad. Victoria, S. Paulo. Wing 112; tail 68 mm.
2 ♂♂ ad. Rio Jordão, Minas Geraës. Wing 115, 112; tail 68 mm.
♂ ad. S. Francisco, Minas Geraës. Wing 111; tail 73 mm.
♀. Ypanema, S. Paulo. Wing 106 mm.
♀. Victoria, S. Paulo. Wing 106; tail 68 mm.
2 ♀♀. Bahia. Wing 103, 104; tail 68 mm.

b. Tityra inquisitor erythrogenys (Selby).

Hab. *N.E. Brazil:* Pernambuco (type); *Surinam:* Paramaribo (Mus. Tring); *Venezuela:* Maipures, Perico, and Rio Catañapa on the Orinoco River, Suapure on the Caura River, Lagunillas near Mérida; *Colombia:* Bogotá coll.; *East Ecuador:* Archidona (Goodfellow coll.—Tring Museum).

MEASUREMENTS.

♂ ad. Maipures, Orinoco. Wing 100; tail 63 mm.
♂ ad. Suapure, Caura. Wing 102; tail 65 mm.
♂ ad. Paramaribo, Surinam. Wing 98; tail 61½ mm.
♂ ad. Bogotá coll. Wing 105½; tail 64 mm.
2 ♀♀. Orinoco River. Wing 99, 100; tail 61, 65 mm.
♀. Suapure, Caura. Wing 99; tail 64 mm.
♀. Lagunillas, Venezuela. Wing 99 mm.
2 ♀♀. Bogotá coll. Wing 99, 100; tail 60½, 65 mm.
2 ♀♀. Paramaribo, Surinam. Wing 97, 99; tail 63 mm.
♀. Archidona, E. Ecuador. Wing 96; tail 61½ mm.

28. Attila brasiliensis Less.

Attila brasiliensis Lesson, *Traité d'Orn.* (1831) p. 360 ["Du Brésil"]; Pucheran, *Arch. Mus. Paris* vii. (1855) p. 366. [Typical locality stated to be Cayenne, and not Brazil.]

Mus. Paris. Spec. typ., mounted, labelled as follows: "*Attila brasiliensis* (Less.). Type. Cayenne," on the bottom of the stand: "No. 3847. *Attila brasiliensis* Less., type."—Wing 85½; tail (missing); bill 21½ mm.

I am not able to say whether Lesson's bird is really the same as *A. uropygialis* (Cab.),* having not yet examined the type of the latter; but it is undoubtedly identical with the specimens obtained by the late H. Whitely in British Guiana, and referred to by Mr. Sclater as *A. uropygialis*.†

* *Dasycephala uropygialis* Cabanis: in Schomburgk, *Reise Brit. Guiana* iii. (1848) p. 686.

† Sclater, *Cat. Birds* xiv. p. 360.

On comparing a series of seven specimens from Camacusa and the River Carimang, we notice considerable variation in the colour of the back, which, as far as I can see, does not in any way depend on sex, as supposed by Mr. Sclater. In two specimens (marked "♂" and "♀" by the collector) head and back are uniform pale olive-green, only that portion of the lower back adjoining the sulphur-yellow rump, being faintly washed with pale rufescent. The same coloration of the upper parts is shown by the type of Lesson's *A. brasiliensis*. Another male from the River Carimang has the entire middle portion of the back rather more distinctly suffused with rufescent-brown, while in a female from Camacusa the whole mantle is almost uniform dark rufescent-brown. The other extreme is represented by a female from Camacusa, which has the back of a uniform dull greyish green without the slightest trace of the brownish admixture. Exactly the same variation is shown in a series from the Caura River, Venezuela. Two specimens (both marked "♂" by the collector) have not only the back, but also the head (including cheeks and ear-coverts), strongly suffused with russet. Some peculiarities in coloration—viz. the broader and more rufous apical margins on the wing-coverts, the rusty suffusion on the sides of the body, rump and forehead, etc.—clearly indicate their immaturity; and I have, therefore, little doubt that the russet-backed specimens are the young, the green-backed ones the adult birds.

As to Lesson's type, there may be further stated that it agrees in coloration of the under-parts with a female from River Carimang. Throat and foreneck are dull grey with narrow whitish longitudinal streaks, the middle of belly white, sides and crissum pale yellowish. In other specimens, throat and chest are decidedly olive-green, streaked with pale yellow; but there is every possible intergradation between these two extremes in the series before me.

In South-east Brazil occurs a closely allied form which presents the same variation regarding the colour of the back, and differs from its northern representative only by its considerably larger size. It ought to be called *Attila brasiliensis uropygiata* (Wied). One of the specimens in the British Museum ("Rio"-make) ex coll. Sclater is marked as having been compared with the type of *A. brasiliensis* in the Paris Museum. As a matter of fact, however, the latter belongs to the smaller race found in Guiana, and the locality "Brésil," assigned to it by Lesson, had already been corrected by Pucheran, a statement that seems to have escaped the notice of Mr. Sclater. It is very unfortunate that a bird which does not occur in Brazil should be called "*brasiliensis*," but there is no way to avoid this regrettable change of nomenclature.

These two forms have, consequently, to stand as follows:

1. *Attila brasiliensis brasiliensis* Less.*

Attila brasiliensis Lesson, *Traité d'Orn.* 1831. p. 360 ["Brésil"—errore! The type came from Cayenne]; Salvin, *Ibis*, 1885. p. 30.
A. uropygialis Sclater, *Cat. Birds* xiv. p. 360 (Brit. Guiana).

MEASUREMENTS.

3 ♂♂. Brit. Guiana. Wing 85—87; tail 65—67½ mm.
3 ♀♀. Brit. Guiana. Wing 80—81; tail 60—62 mm.
2 ♂♂ (with green back). Caura River, Venezuela. Wing 84, 87; tail 67 mm.

* *A. virideseens* Ridgway, *P. U. S. Mus.* x. 1887 (1888) p. 522 [type ex Santarem] belongs, most probably, also to *A. b. brasiliensis*; I have not been able, however, to examine a specimen from the typical locality.

1 ♀ (back green). Caura River. Wing 85 ; tail 66 mm.

2 ♂♂ (back russet). Caura River. Wing 85, 86 ; tail 67 mm.

1 ♂. Salto Girao, River Madeira, Natterer coll. (back russet). Wing 85 ; tail 70 mm.

Hab. *Cayenne ; British Guiana ; Venezuela* : Caura River ; *W. Brazil :* Salto do Girao, Rio Madeira (Natterer coll.).

Obs. *Dasycephala uropygialis* Cab. may perhaps be the same as *Attila spadicea* (Gm.) [type ex Cayenne in Mus. Vindob. ex Mus. Leveriano].

2. *Attila brasiliensis uropygiata* (Wied).

Muscicapa uropygiata Wied, *Beitr. Naturg. Brasil.* 3. ii. (1831) p. 868 [Rio Doce, Espiritu Santo S.E. Brazil].

Attila brasiliensis (nec Lesson !) Sclater, *Cat. Birds* xiv. p. 359 [S.E. Brazil].

MEASUREMENTS.

Three Bahia skins. Wing 90, 92, 97 ; tail 68, 71½, 76 mm.

One adult, "Rio"-make. Wing 95 ; tail 74½ mm.

Hab. *S.E. Brazil :* Rio Doce, Espiritu Santo (Wied coll.) ; Bahia. In the British Museum is a skin of the well-known "Rio"-make.

29. **Attila bolivianus** Lafr.

In a paper published in the *Verhandlungen der k. k. zool. botan. Gesellschaft* of Vienna, 1902. p. 97, I pointed out that *A. validus* Pelz. was obviously synonymous with *A. bolivianus* Lafr. Last year I had an opportunity of inspecting, in the Paris Museum, some of Lafresnaye's original examples, and found my surmise to be quite correct. There are three skins of D'Orbigny's in the French National collection, labelled as "D. 367. Guarayos, D'Orbigny 1834. *Tyrannus rufescens* nob." They agree in every respect with an adult male, collected by Natterer in Central Brazil (typical *A. validus*), their identity being thus established beyond doubt. The synonymy is given in my paper *l. c.*, and need not be repeated here. D'Orbigny's specimens measure as follows :

No. 1. Wing 95 ; tail 83 ; bill 22⅓ mm.
No. 2. Wing 98 ; tail 83 ; bill 24 mm.
No. 3. Wing 94½ ; tail 80 ; bill 23 mm.

The original specimens of *A. validus* in the Vienna Museum, 7 ♂♂ : Wing 94—100 ; tail 83—89 ; bill 22—25 mm.

30. **Lanius unirufus** Pnch. = **Attila thamnophiloides** (Spix).

Muscicapa thamnophiloides Spix, *Av. Bras.* ii. (1825) p. 19. tab. xxvi. fig. 2 ["in locis sylvaticis fl. Amazonum"].

Lanius unirufus (Cuvier MS.) Pucheran, *Arch. Mus. Paris* vii. (1855) p. 332 [Cayenne].

1. Mus. Paris. Spec. typ., labelled as follows : "*Attila thamnophiloides, Lanius unirufus* (Cuv.) Type. Cayenne, 3849." Wing 88 ; tail 82 ; bill 21 mm.

2. Mus. Monac., av. jr. "Amazonas. Spix coll." Type of *M. thamnophiloides* Spix. Wing 90 ; tail 89 ; bill 23 mm.

Pucheran's type differs from No. 2 in its shorter tail and narrower, shorter bill. A series from Borba, however, varies in the length of the tail from 80 to 87, and in that of the bill from 20 to 22½ mm. Both types are somewhat faded, and look, therefore, paler than fresh skins. In No. 1 the whole lower surface is pale ochraceous ; in No. 2 only the breast and abdomen are of this colour, while the

throat is decidedly darker, more ferruginous. It may be added that a good series of skins from Surinam, lately received in the Tring Museum, is in no way distinguishable from Amazonian specimens.

31. **Upucerthia bridgesi** Sel. = **U. andaecola** Lafr. & Orb.

Upucerthia andaecola Lafresnaye & D'Orbigny, *Syn. Av.* ii. in *Mag. Zool.* cl. ii. (1838) p. 21 ["La Paz, Sicasica, rep. Boliviana"].
Upucerthia andecola D'Orbigny, *Voyage, etc., Oiseaux*, p. 371. tab. 56. fig. 2.
Upucerthia bridgesi Sclater *P. Z. S.* 1889. p. 32 [Bolivia (Bridges)].

a. Mus. Paris. Types of *U. andaecola* Lafr. & D'Orb., three specimens with D'Orbigny's original labels, which read as follows:—

	Wing.	Tail.	Bill.
No. 1 (mounted). "La Paz. D. 196. D'Orbigny, 1834.—378".	85	79½	16 mm.
No. 2 (skin). "378. D'Orbigny, 1834. D. 196. La Paz"	79	72	26 mm.
No. 3 (skin). "D. 196. Sicaca* 378. D'Orbigny, 1834"	77	76	25½ mm.

b. Mus. Brit. Types of *U. bridgesi* Sel.

No. 1. adult, ex Mus. T. C. Eyton. Int. Bolivia, Bridges	80	72	25 mm.
No. 2. av. juv. Bolivia—Bridges	77	75	20½ mm.

U. bridgesi is merely *U. andaecola* redescribed. By neglecting the typical locality, Dr. Sclater considered the Peruvian *U. serrana* the same as *U. andaecola*, while some Bolivian skins (typical *andaecola*) were referred to a new species!

Through the kindness of Mons. Oustalet, I was enabled to compare two of D'Orbigny's types (Nos. 2 and 3) with the original specimens of *U. bridgesi*. As was to be expected from the localities, they are absolutely identical.

U. serrana Taez., however, is a very distinct species, easily known from *U. andaecola* by its dark earthy-brown head and mantle, without any rufous tinge, buffy-white stripes on the forehead, and by the pale striations on the foreneck and breast.

The synonymy of the two species is the following:

1. *Upucerthia andaecola* Lafr. & Orb.

For original references see above.—*U. andecola* Scl. & Salv. *P. Z. S.* 1879. p. 644 (ex d'Orbigny).
Upucerthia bridgesi Sclater, *Cat. Birds* xv. p. 19.

Hab. *Andes of Bolivia:* La Paz, Sicasica (D'Orbigny); interior of Bolivia (Bridges).

I have seen many specimens in Count Berlepsch's collection.

2. *Upucerthia serrana* Taez.

U. serrana Taczanowski, *P. Z. S.* 1874. p. 525 [C. Peru]; idem, *P. Z. S.* 1880. p. 20 [Cutervo, North Peru]; idem, *Orn. Pérou* ii. (1884) p. 107 [Peru]; Salvin, *Nov. Zool.* ii. (1895) p. 13 [North Peru: Cajamarca, Huamachuco, Cajabamba]; Berlepsch & Stolzmann, *P. Z. S.* 1896. p. 371 [Central Peru: Palcamayo, Queta].
Upucerthia andicola (nec D'Orbigny & Lafresnaye), Sclater, *Cat. Birds* xv. p. 19 (Cutervo, Marañioc: Peru].

Hab. *Central Peru:* Junin, Acancocha, Monterico (Jelski coll.); Palcamayo, Queta (J. Kalinowski coll.). *North Peru:* Cutervo, 9000 ft. (Stolzmann coll.);

* Apparently pen-slip for *Sicasica*.

Cajamarca, 11,000 ft.; Huamachuco, 10,400 ft.; Cajabamba, 9000 ft. (O. T. Baron coll.).

In the Tring Museum there is a good series of this species from North and Central Peru (Baron and Kalinowski coll.).

32. **Synallaxis setaria** Temm. = **Leptasthenura setaria** (Temm.) sp. opt.!

Synallaxis setaria Temminck, *Pl. col.* livr. 52. tab. 311 fig. 2 [November 1824—"au Brésil dans la capitainerie de Saint Paul.—Musée de Paris"]. Cf. Ménégaux et Hellmayr, *Mém. Soc. hist. nat. Autun* xix. (1906) p. 68 (crit.).

1. Mus. Paris (mounted). Adult, labelled as follows: "Mr. St. Hilaire, Brésil, près *Casto*, capt. de Saint Paul. Type de l'espèce, *Pl. col.* 311. fig. 2. Synallaxe à filets." Wing 56½; tail 105; grad. of tail 70; bill 12½ mm.

2. Adult, labelled: "Mr. St. Hilaire, Mines, capt. de Saint Paul, 1822. Type de l'espèce." Wing 56; tail 118; grad. of tail 90; bill 12½ mm.

This is a very distinct species of *Leptasthenura*, and, as far as I know, the two specimens are the only ones in existence; at least, I never met with any other example. Temminck's plate gives a fairly good idea of the bird; but the tail, although well described in the letterpress, is not correctly coloured.

Whole top of the head blackish, each feather with a sharply defined whitish shaft-streak; back uniform bright rufous-brown, rump a little paler. Upper wing-coverts and remiges blackish brown, exteriorly broadly edged with the colour of the back. **Bend of the wing, axillaries,** and **under wing-coverts pure white.** Tail-feathers brighter than the upper parts, more ferruginous, the three median pairs with a blackish brown margin along the inner web. Lores and distinct eyebrow white; ear-coverts white with dark brown shaft-lines; sides of the neck greyish with indistinct whitish streaks; throat and jugulum white, slightly freckled with greyish; middle of breast and abdomen dirty whitish, sides of body pale buffy brownish. Inner webs of the remiges edged with fawn-colour. Bill blackish, basal half of lower mandible yellowish white.

The feathers of the head are somewhat elongated, so as to form a sort of loose crest. Tail much graduated, the central pair of rectrices strongly emarginated on the inner web, distinctly rounded at the tip, not pointed as in the other species of *Leptasthenura*, and about 28 mm. longer than the next.

Middle tail-feather of *L. setaria*.

L. setaria stands quite by itself, and needs comparison only with *L. fuliginiceps*, which also has the tail rufous. It differs, however, from the latter in having the head blackish striped with white (instead of uniform pale brownish rufous), the back bright rufous (not pale earthy brownish), a very distinct white eyebrow and quite differently coloured under-parts. The bill is also much longer and the basal half of the under mandible yellowish white (in *L. fuliginiceps* the whole lower jaw being dark horn-colour).

The locality "*Casto*" is evidently meant for *Castro*, in the state of Paraná, a province which formed part of the State *S. Paulo* at the time Aug. St. Hilaire travelled in South Brazil.

It is strange that this bird has never been met with since its discovery; but still more remarkable is it that Natterer obtained in the state *Paraná* another very distinct species, the type of which has also remained unique hitherto. This is

33. Leptasthenura striolata (Pelz.).

Synallaxis striolata (Natterer MS.) Pelzeln, *Sitzungsber. Akad. Wien* xx. (1856) p. 159 [Curytiba, Paraná]; idem, *Zur Ornith. Brasil.* i. (1867) p. 38.

1. Mus. Vindob., No. 20,010. ♂ ad. Curytiba, Paraná, October 8, 1820. Natterer coll. Type of *Synallaxis striolata* Pelz. Wing 54; tail 90; bill 10 mm.

Top of the head rufous brown, each feather distinctly margined with blackish; whole back paler and duller rufescent, densely covered with blackish brown longitudinal stripes, only the rump and upper tail-coverts being uniform. Upper wing-coverts dusky, the lesser and the median series with indistinct rufescent edges, the greater ones more distinctly margined with brownish white. Remiges dusky, margined exteriorly with pale rufescent. Middle pair of tail-feathers entirely dark brown, the others dark brown with pale rufous tips; two outer pairs almost entirely rufous, only the basal half of the inner web being brown. Above the eye a narrow buffy superciliary streak. Cheeks and ear-coverts dark brown; sides of the neck pale sandy brownish with slight dusky mottlings. Lower surface pale buff, throat faintly dotted with pale brown; sides of the body washed with light brownish. Axillaries, under wing-coverts, and a distinct margin to the inner web of the remiges fawn-colour. Bill horn-brown, base of the lower mandible yellowish white.

This species is perhaps nearest to *L. andicola*; but that bird has a striped under-surface, the back dark sepia-brown striped with white, a much broader white eyebrow, and no rufous on the tail. *L. pileata* has also white stripes on the back, greyish white tips to the outer tail-feathers, and differently coloured lower parts; it agrees, however, with *L. striolata* in the yellowish basal half of the lower mandible (which is wholly dusky in *L. andicola*) and in having only a narrow superciliary stripe.

According to my views, the genus *Leptasthenura* consists of the following species:

1. *L. aegithaloides* (Kittl.), Chili; N.W. Argentina: Tucuman; S.W. Peru: Islay.

2. *L. platensis* Reichb.* Central and South Argentina: Cordova, Paraná, Buenos Aires.

3. *L. andicola andicola* Scl. Andes of Ecuador and Sierra Nevada de Sta Marta, Colombia.

4. *L. andicola certhia* † (Mad.) Andes of Mérida, Veneznela.

5. *L. pileata* Scl. Andes of Lima, W. Peru.

6. *L. striolata* (Pelz.) Curytiba, Paraná, South Brazil.

7. *L. setaria* (Temm.). Castro, Paraná, S. Brazil.

8. *L. fuliginiceps fuliginiceps* (Lafr. & D'Orb.) [type ex Sicasica, Bolivia] (= *boliviana* Allen—type ex Bolivia!). Andes of Bolivia.

9. *L. fuliginiceps paranensis* Scl. Argentina: Paraná, Cordova, Tucuman, etc.

I hope to discuss the various species of this genus on another occasion.

* This species is quite distinct from *L. aegithaloides*. I have seen a large series.

† *Siptornis certhia* Madarász, *Ann. Mus. Hung.* i. (1903) p. 463 [San Antonio, Merida]; *Leptasthenura montivagans* Riley, *Proc. Biol. Soc. Wash.* xviii. (1905) (p. 219) [San Antonio, Merida].

34. Notes on **Synallaxis elegans** Less. and allies.

Synallaxis elegans Lesson, *Supplem. Oeuvres Buffon* (ed. Levêque), *Descr. Mammif. et Ois.*, 1847, p. 289, descr. orig. ♂ ad. (Guayaquil).

S. paucalensis Taczanowski, *Ornith. Pérou* ii. 1884. p. 131, descr. orig. ♂ ad. (Paucal, N. Peru).

S. subspeciosa Salvadori & Festa, *Boll. Mus. Torino*. xv. no. 362 (1899) p. 21, descr. orig. ♂ juv. (Balzar, near Guayaquil).

Lesson's excellent description, which has been overlooked by all recent writers, refers without any doubt to the West-Ecuadorian representative of the group, comprising *S. speciosa*, *S. subspeciosa*, and *S. paucalensis* Tacz. Thus, *S. subspeciosa* becomes a synonym of *S. elegans*.

The bird described by Lesson was evidently a perfectly adult male: cf. "une calotte d'un noir mat et profond recouvre le dessus de la tête depuis le front jusqu'à la nuque," and "tout le devant du cou, depuis le menton jusqu'au thorax, est blanc lavé de roussâtre par places, ce qui forme un large plastron de cette couleur, arrêté dans le bas, en travers du cou, par un cordon noir, **bordé lui-même par une écharpe d'un roux-marron vif.** Le ventre, le bas-ventre et les flancs, sont d'un jaune-rouille très pâle et uniforme, le dos et le croupion d'un cendré clair;" while the type of *S. subspeciosa* was a young male: cfr. "pileo et cervice saturate brunneis, colore griseo dorsi quoque brunnescente," etc.

In the British Museum there is a specimen from Balzar (collected by Illingworth) which differs from both these descriptions by lacking the chestnut pectoral area, the whole under-parts below the black jugular band being uniform fulvous. This is no doubt the female of *S. elegans*, as in the closely allied form *S. e. speciosa* of Puna Island, and in a series of the so-called *S. paucalensis* of Northern Peru the females differ exactly in the same way from the males.

Judging from the material before me, there are two distinct forms to be recognised—one confined to Puna Island, the other inhabiting S.W. Ecuador and N.W. Peru.

Five adult males, from various places in N.W. Peru (Tembladera, Trujillo, Otusco, Platanar; coll. O. T. Baron), agree very well with the description of *S. paucalensis* Tacz.*, all having below the black jugular collar a chestnut band well defined against the fulvous colour of the abdomen.

This tallies as well with what Lesson says about the coloration of the under-parts (vide *supra*). Furthermore, two females from North Peru (Trujillo and Platanar) in the Tring Museum are certainly identical with a female from Balzar in the British Museum. Therefore I have no hesitation in uniting *S. paucalensis* and *S. elegans*.

The form from the Puna Island, described by Salvin as a *Formicivora* † (!!!), however, seems sufficiently distinct to be separated subspecifically. The male type (in London) and an adult male in Tring have the abdomen much darker, chestnut rufous, only a shade lighter than the chest. The females,‡ like those from Balzar and North Peru without any chestnut on the lower surface, differ from these by having the upper wing-coverts much paler, isabelle instead of cinnamon rufous. These two forms have accordingly to stand as:

* *Orn. Pérou* ii. 1884. p. 131 (type: ♂ ad. ex Paucal, N. Peru).

† *Formicivora speciosa* Salvin, *Ibis* 1876. p. 491 (Puna Island).

‡ The statement by Sclater (*Cat. Birds* xv. p. 251): "Female similar, but without the black gorget," is a mistake, it being present in the three females in the British Museum.

a. Synallaxis elegans elegans Less. *S.W. Ecuador:* Guayaquil, Balzar; *N.W. Peru:* Paucal, Trujillo, Tembladera, Otusco, etc.

1 ♀. Balzar. Wing 54; tail 55½; bill 15 mm.

5 ♂♂. North Peru. Wing 55—58; tail 58—65; bill 14—15 mm.

2 ♀♀. North Peru. Wing 56, 56½; tail 61, 64; bill 14, 15 mm.

b. Synallaxis elegans speciosa (Salv.), Puna Island, in the Bay of Guayaquil.

2 ♂♂. Wing 58, 60; tail 63; bill 14, 15 mm.

2 ♀♀. Wing 56, 57; tail 57, 59; bill 14, 15 mm.

35. **Philydor cervicalis** Scl. should be **Automolus infuscatus cervicalis** (Scl.).

[*Anabates infuscatus* Sclater, *Ann. Mag. Nat. Hist.* (2) xvii. (1856) p. 468 ("in Peruvia orientali").]

Philydor cervicalis Sclater, *P. Z. S.* 1889. p. 33 [British Guiana: Bartica Grove & Camacusa]; idem, *Cat. Birds* xv. p. 101 [Bartica Grove, Camacusa; Surinam].

Automolus sclateri Salvin, *Ibis* 1885. p. 420 [Bartica Grove, Camacusa]; Sclater, *Cat. Birds* xv. p. 95 [part.: spec. *j—m.* Camacusa, Bartica Grove]; Berlepsch & Hartert, *Nov. Zool.* ix. (1902) p. 61 [Nericagua: Orinoco; La Priciou, La Union, Nicare: Caura River, Venezuela].

	Wing.	Tail.	Bill.
1. Mus. Brit. ex coll. P. L. Sclater: ♂ jr. Bartica Grove, January 10, 1880 (specimen *a* of *Philydor cervicalis* Scl., *Cat. B.*)	82	71	19½ mm.
2. Mus. Brit. ex coll. P. L. Sclater: ♀ jr. Camacusa, May 29, 1882. H. Whitely coll. Type of *P. cervicalis* Scl.	80½	73	18 ,,
3. Mus. Tring. ♀ ad. Camacusa, May 27, 1882. H. Whitely coll.	88	72½	20 ,,
4. Mus. Tring. ♂ ad. Canuku Mount., December 11, 1889. H. Whitely coll.	88	76	19½ ,,
5. Mus. Tring. ♀ jr. River Carimang, June 15, 1885. H. Whitely coll.	85	76	19¾ ,,
6. Mus. Berlepsch. ♂ ad. Bartica Grove, January 21, 1880. H. Whitely coll.	90	74	20 ,,
7. Mus. Berlepsch. ♂ ad. Camacusa, July 11, 1882. H. Whitely coll.	86	74	20 ,,

The type of *P. cervicalis* as well as No. 1 (of the above list) are both immature. The "species" has nothing to do with *Philydor erythrocercus*, with which it has been compared in the original description; but is very closely allied to *Automolus infuscatus* (= *sclateri* auct.). Indeed, it is so near the latter that I only reluctantly allow it to stand as a different form. Specimens Nos. 3—7 are exactly like the typical examples. This series differs from typical Peruvian skins only in having the top of the head decidedly rufescent, in slight contrast with the olive-brown back. In the birds from N.E. Peru the head is olive-brown like the back, only the forehead being slightly tinged with rufescent. A good series from the Caura and Orinoco Rivers agrees in every respect with Guiana skins, and the specimens of *Automolus sclateri* from British Guiana in the British Museum are also absolutely identical with the type of *P. cervicalis!* Although the colour of the crown serves to distinguish **most** specimens of the two subspecies, I may remark that one male from British Guiana (No. 4) and two skins from the Caura are hardly different from Peruvian examples. Immature birds show slight greyish edges to the feathers of the foreneck, producing a mottled appearance.

36. **Dendrocolaptes atrirostris** Lafr. & D'Orb. should be **Dendrocincla atrirostris** (Lafr. & D'Orb.).

Dendrocolaptes atrirostris Lafresnaye & D'Orbigny, *Syn. Av.* ii. in *Mag. Zool.* 1838. cl. ii. p. 12 [Guarayos, rep. Boliviana] ; D'Orbigny, *Voyage, Ois.* p. 369, tab. 54, fig. 1 (fig. pessima !).
Dendrocincla atrirostris Ridgway, *P. U. S. Mus.* x. 1887. (1888), p. 490, 493 ; Ménégaux et Hellmayr, *Mém. Soc. hist. nat. Autun.* xix. (1906), p. 120 (crit.).
D. minor Pelzeln, *Zur Ornith. Brasil.* i. (1867), p. 60 [S. Vicente, Mattogrosso].
D. fumigata idem, *l. c.* p. 42 [part. ; specimen ex *S. Vicente*].

	Wing.	Tail.	Bill.	
1. Mus. Paris. Spec. typ. (mounted), labelled : "Guarayos, Bolivie, D'Orbigny. *Dendrocolaptes atrirostris*, nob. (type)"	95	90	26	mm.
* 2. Mus. Vindob. No. 15892. Type of *D. minor* Pelz. ♀ juv. "S. Vicente, December 1826." Natt. coll.	97	80	24	„
* 3. Mus. Vindob. No. 15899. ♀ ad. "S. Vicente, December 1826." Natterer coll. . . .	98	90	28	„
4. Mus. H. v. Berlepsch. No. 1257. G. Garlepp coll. ♂ juv. "S. Mateo, Bolivia, August 10, 1891" .	99	88	29	„
5. Mus. H. v. Berlepsch. No. 1113. G. Garlepp coll. ♀. "S. Mateo, Bolivia, July 20, 1891" . .	97	90	28	„

There can be no doubt that *Dendrocincla minor* of Pelzeln is identical with *D. atrirostris* (Lafr. & D'Orb.). Both species are based on immature specimens with the bill entirely blackish. In the adult, the upper mandible is dark brownish horn-colour, the lower one, except the gonydeal angle, yellowish white (No. 3 of the above list). No. 4 agrees with the types of *atrirostris* and *minor* in having the bill entirely blackish. In No. 5 only the upper mandible and the basal half of the lower jaw are blackish, the apical half of the latter being yellowish white ; thus the coloration of the bill is intermediate between that of No. 3 and that of Nos. 1 and 2.

The black-billed specimens (Nos. 1, 2, and 4) have a distinct ochreous patch or suffusion on the occiput, a sign of immaturity, also to be seen in young examples of *D. fuliginosa*, *phaeochroa*, and *olivacea*. In No. 4 it is barely indicated, and in No. 3 there is no trace of it.

In coloration, the skins from Mattogrosso are practically identical with the typical birds from Bolivia. The type of *D. minor* has a decidedly shorter tail than the others, but this is doubtless due to its being very young.

In all essential particulars the five skins before me are very uniform : forehead and crown finely striated with buffy ; from behind the eye along the upper margin of the ear-coverts a broad ochraceous-buff postocular streak ; throat rather paler than the rest of the under parts, and slightly mixed with greyish ; jugulum with hair-like, buffy shaft-lines ; exposed portion of the remiges clear cinnamon rufous without any olivaceous tinge, but rather paler than the tail.

D. atrirostris is evidently the western representative of *D. turdina*, with which it shares the pale striations on the crown ; it differs, however, by its broad ochraceous postocular stripe, and in having the outer webs of the quills and the tertials pure cinnamon-rufous (instead of olivaceous brown, scarcely different from the colour of

* It is interesting to observe that the collector of the specimens, Natterer, correctly recognised them as belonging to the same species, both being marked by him with number "765."

the back), and the throat finely undulated with greyish (instead of uniform bright buff). The wings, too, are considerably shorter.

The distribution of these two allied forms is as follows :

1. *Dendrocincla turdina* (Lcht.).

Dendrocolaptes turdinus Lichtenstein, *Abhandl. Akad. Berlin a. d. J.* 1818-19 (publ. 1820), p. 204, tab. ii. fig. 1 [*Bahia* : cfr. l. c. *a. d. J.* 1820-21 (publ. 1822), p. 264].

Eastern Brazil from Bahia to Santa Catharina.*

2. *Dendrocincla atrirostris* (Lafr. & D'Orb.).

Eastern Bolivia : Guarayos (D'Orbigny), San Mateo (G. Garlepp coll.)—*Central Brazil*, Western Mattogrosso : S. Vicente on the R. Guaporé (Natterer coll.).

I hope that the following key will help ornithologists to recognise the species allied to *D. turdina*.

A. Top of the head finely striated with buff.

a. Exposed portion of remiges olivaceous brown, hardly different in colour from the back. Throat bright buff. Scarcely any indication of a postocular streak. Wing about 104—114 mm. Hab. Eastern Brazil (Bahia to S. Catharina) . . . . *D. turdina* (Lcht.).†

b. Exposed portion of remiges bright cinnamon rufous, very different from the colour of the back. A broad ochraceous postocular streak. Throat finely undulated with greyish. Wing 95—99 mm. Hab. Eastern Bolivia and Mattogrosso . . . . *D. atrirostris* (Lafr. & Orb.).

B. Top of the head uniform.

c. Upper wing-coverts deep dark chestnut like the outer web of the remiges. Anterior portion of throat distinctly whitish. Hab. Cayenne, Surinam, Brit. Guiana ; Orinoco region ; Lower and Upper Amazonia . . *D. merula* (Lcht.).‡

d. Upper wing-coverts olive-brown, very different from the cinnamon or chestnut rufous colour of the remiges. No whitish patch on the throat.

a[1]. A broad ochraceous postocular streak from behind the eye to the posterior edge of the ear-coverts. Lower throat with narrow, but distinct, buffy shaft-lines or dots. Hab. Cayenne, Guiana, Lower Amazonia . . . . *D. fuliginosa* (Vieill.).§

* Specimen in Mus. Berlepsch (Hjarup-coll.).
† 17 specimens.
‡ 13 specimens.
§ 15 specimens.

a^2. No distinct pale postocular streak, no pale markings on the lower throat.

b^1. Exposed portion of the remiges distinctly washed with olivaceous brown. Upper mandible as well as rami and upper edge of lower jaw deep black. Hab. Costa Rica, Panama, West Colombia (Cauca Valley : also found in Bogotá-coll.), West Ecuador . . . . *D. olivacea* Lawr.*

b^2. Exposed portion of the remiges clear chestnut rufous. Upper mandible as well as rami and upper edge of lower jaw horn-brown.

c^1. Upper parts olive brown.* Throat buffy, distinctly paler than the breast. Hab. Orinoco region, East Ecuador, E. Colombia (found in Bogotá coll.), Upper Amazonia (N.E. Peru : Iquitos ; Rio Jurua) . *D. phaeochroa* Berl. & Hart.†

c^2. Upper parts light cinnamon brown. Throat ochraceous-brown like the breast. Hab. North coast of Venezuela (S. Esteban to Cumaná), Trinidad, Tobago . . . . *D. meruloides* (Lafr.) ‡

37. Thamnophilus tristis Scl. & Salv. = T. polionotus Pelz.

Thamnophilus polionotus Pelzeln, *Zur Ornith. Brasil.* ii. (1868), p. 147 [Marabitanas, Barcellos], descr. orig. ♂ ♀.

T. tristis Sclater & Salvin, *Nomencl. Av. Neotrop.* (1873), p. 160 [Oyapoc, Cayenne], descr. orig. ♂.

Thamnophilus sp. inc., Berlepsch & Hartert, *Nov. Zool.* ix. (1902), p. 69 [La Pricion and Nicare : Caura R., Venezuela].

	Wing.	Tail.	Bill.	
1. Mus. Vindob. No. 16609. ♂ ad. Marabitanas, Rio Negro, April 1831. Natterer coll.	75 [damaged]		20	mm.
2. Mus. Vindob. No. 16607. ♂ imm. Marabitanas, Rio Negro, April 6, 1831. Natterer coll. . . .	73½	61	20½	,,
3. Mus. Vindob. No. 16608. ♀ ad. Barcellos, Rio Negro, November 31, 1830. Natterer coll. . . [These examples are the types of *T. polionotus* Pelz.]	72	55	18	,,
4. Mus. Brit. (♂) ad. Oyapoc, Cayenne—ex Verdey, 1871.—Type of *T. tristis* Scl. & Salv. . . .	76	61	20	,,
5. Mus. Tring. (♂) ad. Nicare, Caura, Venez., Jan. 1, 1901.—E. André coll.	75	59	18½	,,
6. Mus. Tring. ♀ ad. La Pricion, Caura, Jan. 31, 1901	74	59	18½	,,
7. Mus. Tring. ♀ ad. La Pricion, Caura, Dec. 12, 1901	73	61	20	,,
8. Mus. Tring. ♀ ad. La Pricion, Caura, Jan. 19, 1901	75	64	20	,,

[Nos. 6—8 collected by Mr. E. André and referred to by Messrs. Berlepsch and Hartert as *Thamnophilus sp. inc.* (l. c.).]

* 26 specimens. † 21 specimens. ‡ 17 specimens.

The type of *T. tristis* agrees in every respect with the adult ♂ of Pelzeln's *T. polionotus*, except in having the lower parts a shade paler schistaceous. Both have the forehead and crown blackish, the bend of the wing white, and small but very distinct white apical spots on all the upper wing-coverts.

No. 5 differs in having the crown less mixed with blackish, and by its shorter bill.

No. 2, being slightly immature, has still the brownish quills of the juvenile plumage, and some of the apical spots on the greater wing-coverts are tinged with buffy, but otherwise it agrees with the adults.

The nearest ally of *T. polionotus* is undoubtedly *T. incertus* Pelz.* The male of this species differs, however, at a glance by lacking the black cap and the white apical spots on the median and greater wing-coverts, only the bend of the wing being freckled or edged with white. The general colour, too, is of a much paler slaty-grey. The female of *T. incertus* has the back distinctly paler rufous brown, and the ferruginous colour below is confined to the throat and chest, while the abdomen is of a much paler tint, varying from ochraceous to fulvous.

Another very near ally is *T. juruanus* Ihering.† This form has the black cap of *T. polionotus*, but the uniform black wing-coverts of *T. incertus*.

T. aethiops Scl. belongs also to this group. The male differs from those of the foregoing species in the deep black (instead of schistaceous grey) coloration. The wing-coverts are uniform black without white apical spots. The female is readily distinguishable by its blackish tail. Moreover, the general colour above and below is much darker, chestnut rufous.

The range of these four forms is as follows :

T. aethiops Scl. Eastern Ecuador.

T. juruanus Ihering. Rio Juruá, W. Brazil.

T. polionotus Pelz. North Brazil : Marabitanas and Barcellos on the Rio Negro ; E. Veneznela : Nicare and La Pricion, Caura R., a tributary of the Orinoco ; Cayenne : Oyapoc.

T. incertus Pelz. Vicinity of Pará.

38. **Thamnophilus punctuliger** Pelz.

T. punctuliger Pelzeln, *Zur Orn. Brasil.* ii. (1868), p. 146 [Borba : Rio Madeira].

Mus. Vindob. Type of species : ♂ ad. "Borba, December."—Natterer coll.—Wing 77 ; tail 60 ; bill 19½ mm.

This is a close ally of *T. polionotus*, having, like that species, the top of the head black, and small white apical spots on the upper wing-coverts. It differs, however, by the presence of a distinct white interscapular patch. The general colour of the plumage, too, is even paler and purer schistaceous than in *T. juruanus*. So far as I know, Pelzeln's type is the only specimen in existence. Most probably *T. polionotus*, *T. juruanus*, *T. punctuliger*, etc., are geographical representatives, and would perhaps, more properly, be designated by trinomials.

* In *Nov. Zool.* xii. (1905), p. 284, I placed this bird in the genus *Dysithamnus*, near *D. schistaceus*, but after a careful study of the whole group I came to the conclusion that there is only a superficial resemblance between the males of the two species, and that the real affinities of *T. incertus* lie with *T. polionotus*. This opinion is strengthened by the coloration of the females, which are almost identical.

† *Revista Mus. Paulist.* vi. (May 1905) p. 439 [Rio Jurua, W. Brazil] Types examined by me.

39. On **Myrmelastes exsul** (Scl.) and its allies.

Myrmeciza exsul Scl. was described from a specimen, collected in *Panama* by Delattre (*P. Z. S.* 1858. p. 540). Two years afterwards Mr. Sclater identified some examples from *Esmeraldas*, *Western Ecuador* (coll. Fraser), with this species (*P. Z. S.* 1860. p. 294), and since that time the bird found on the western slopes of the Ecuadorian Andes was commonly called *M. exsul*. In 1864 Messrs. Sclater and Salvin pointed out the differences existing between this species and a closely allied form contained in one of MacLeannan's collections from *Lion Hill Station*, *Panama*, and described the latter as new under the name of *M. immaculata*. Having always suspected that there must be some error as to the original locality of *M. exsul*, I asked Dr. Forbes for the loan of the typical specimen, which was obligingly sent to me. On examining it, I was really surprised to find that it **had nothing to do with M. exsul auct. of Western Ecuador, but belonged apparently to the species named M. immaculata by Sclater and Salvin!** In order to be quite sure of my identification, I compared Delattre's specimen with the two male types of *M. immaculata* in the British Museum, and found the three skins absolutely alike. They agree perfectly in the dimensions, and in coloration. **The upper wing-coverts are uniformly rufescent brown, only the lesser series being blackish with very small white apical dots.*** In *M. exsul* auct. (ex W. Ecuador) **all the upper wing-coverts are marked with sharply defined, rounded white apical spots,** and the tail is considerably shorter, as will be seen from the measurements given below.

There can be no longer any doubt that the locality of Delattre's specimen was quite correct, and that the name *M. exsul* has to be used for the Panama-form. The one from Western Ecuador being thus without a name, I propose to call it

Myrmelastes exsul maculifer nom. nov.†

It remains to say a few words about the proper application of the name *M. exsul*. Mr. G. K. Cherrie distinguished two forms, which he calls

a. M. immaculata Scl. & Salv., having the under wing-coverts white and the first primary edged with white. Hab.: from Panama to Talamanca, S.E. Costa Rica;

b. M. intermedia Cherrie, having the under wing-coverts dark grey and the first primary not edged with white. Hab.: from Panama along the Atlantic lowlands of Costa Rica to Nicaragua.

The type of *M. exsul* Scl. and the two male types of *M. immaculata* Scl. & Salv., however, belong to *M. intermedia* Cherrie, having no white edge to the first primary, and the under wing-coverts pale ashy grey, like the under-surface of the quills. It follows that these three names are strictly synonymous, while the form identified as *M. immaculata* by Mr. Cherrie would require to be renamed if really distinct. From what Mr. Cherrie says, it would seem that his two forms are found together over a considerable area. Two adult males from Cascajal, Panama, in the Tring Museum have the basal half of the first primary distinctly edged with white, while a third specimen from the same locality (No. 3 of the list given below) shows no trace of this margin; the under wing-coverts are ashy grey in all three skins.

* This has been well described in Sclater's original description: "*alarum tectricibus minoribus nigricantibus ad apicem albo punctatis.*"

† Type in Mus. Tring: No. 414 ♂ ad. Paramba, N.W. Ecuador, 3500 ft. Collected by R. Miketta.

A large series (17 specimens) from Costa Rica (Atlantic side) and Eastern Nicaragua (Chontales and La Libertad) agrees in every respect with the two first-named examples from Cascajal. The ♀♀ from the Panama railroad (McLeannan coll.: *M. immaculata* Scl. & Salv.) are also absolutely identical with others of the same sex from Costa Rica and Nicaragua. Therefore it seems to me impossible to recognise more than one form occurring on the Atlantic side of the mountains in Costa Rica and Panama.

According to my views, the following geographical forms of this group are distinguishable :

1. *Myrmelastes exsul exsul* (Scl.)

Myrmeciza exsul Sclater, *P. Z. S.* 1858. p. 540 (Panama, coll. by Delattre.—Type No. 4939 Mus. Liverpool).

Myrmeciza immaculata Sclater & Salvin, *P. Z. S.* 1864. p. 357 (Lion Hill Station, Panama).

Myrmeciza intermedia Cherrie, *Proc. U. S. Mus.* xiv. 1891 (1892) p. 345 (Talamanca, S.E. Costa Rica.)

Hab. Panama, Eastern Costa Rica to Nicaragua (Chontales, Escondido River).

♂ ad. Upper wing-coverts uniform rufescent brown, only the bend of the wing and the lesser wing-coverts with very small white apical dots.

♀ ad. Back and upper wing-coverts dark rufous brown, the latter without any light apical spots ; throat very dark slate-colour, rest of under-surface dark sepia brown, sometimes with a faint rufescent tinge.

	Wing.	Tail.	Bill.	
Mus. Liverpool, No. 4939, ♂ ad. Panama (Delattre coll.). Type of *M. exsul* Scl.	67	49	19	mm.
Mus. Brit., 2 ♂♂ ad. Panama (McLeannan coll.). Types of *M. immaculata* Scl. & Salv.	68, 69	48	20	„
Mus. Tring, 3 ♂♂ ad. Cascajal, Coclé, Panama (Hyde coll.)	65½, 69, 71	48, 50	19—20	„
Mus. Tring, 4 ♂♂ ad. Siguirres, E. Costa Rica (Cherrie coll.). Determined by Cherrie as *M. intermedia* Cherrie . .	68—73	47—53	20—21	„
Mus. Tring, 2 ♂♂ ad. Carrillo, E. Costa Rica (Underwood coll.) . . .	70, 73	50	19½, 21	„
Mus. Tring, 6 ♀♀ ad. Siguirres and Carrillo, East Costa Rica (Cherrie and Underwood coll.)	67—69	48—52	20—21	„
Mus. Brit., 3 ♀♀ ad. Panama (McLeannan coll.)	65½—66	46—48	20	„

2. *Myrmelastes exsul occidentalis* (Cherrie).

Myrmeciza immaculata occidentalis Cherrie, *Auk* viii. (1891), p. 191 (Pozo Azul, West Costa Rica).

Hab. Western Costa Rica (Pozo Azul, Buenos Aires, Lagarto, Boruca, etc.), and Chiriqui (Bogava).*

♂ scarcely different from that of the foregoing form, but the ♀ is at once

* Outram Bangs (*Auk* xviii. 1901. p. 367) records *M. intermedius* (both sexes) from Chiriqui, but the pair from Bogava in the Tring Museum as well as a female from Chiriqui in the British Museum belong to *M. e. occidentalis*.

recognisable by the coloration of the under parts, the foreneck being bright ferruginous red, the breast and abdomen light rufescent brown.

	Wing.	Tail.	Bill.	
16 ♂♂ ad. from West Costa Rica (for exact localities see above), coll. by Cherrie and Underwood	66—70	47—52	19—21	mm.
9 ♀♀ ad. from West Costa Rica . . .	65—68	46—50	20—21	,,
1 ♂ ad. Bogava, Chiriqui (Watson coll.) .	70	50	20	,,
1 ♀ ad. Bogava, Chiriqui (Watson coll.) .	68	48½	21	,,

3. *Myrmelastes exsul maculifer* Hellm.

Myrmeciza exsul (nec Sclater 1858) Sclater, *P. Z. S.* 1860, p. 291 (Esmeraldas); Sclater & Salvin, *P. Z. S.* 1879, p. 526 (Neche, Antioquia); Berlepsch & Taczanowski, *P. Z. S.*, 1883, p. 566 (Chimbo); Hartert, *Nov. Zool.* v. (1898) p. 493 (Chimbo, Paramba); Salvadori & Festa, *Boll. Mus. Torino* xiv. No. 362 (1899) p. 31 (Rio Peripa); Goodfellow, *Ibis* 1902, p. 65 (Santo Domingo and Guanacillo).

Hab. Western Ecuador (Esmeraldas, Chimbo, Rio Peripa, S. Domingo, Guanacillo, Paramba, Cachabi, Lita, S. Javier, etc.). W. Colombia: Rio Dagua (Rosenberg coll. in Mus. Tring), Neche in Antioquia (Salmon).

♂. At once distinguishable from the same sex of the two preceding forms by its decidedly shorter tail, and by having all the upper wing-coverts spotted with white at the tips.

♀. Under parts as in the ♀ of *M. exsul occidentalis*, but readily distinguishable by its shorter tail, and by the fulvous-white apical spots on all the upper wing-coverts.

	Wing.	Tail.	Bill.	
20 ♂♂ from Western Ecuador	63—68	40—44	19—20	mm.
2 ♂♂ ad. from the Rio Dagua, Colombia . .	66	42—43	19—19½	,,
12 ♀♀ from Western Ecuador	62—66	41—44	19—19½	,,
1 ♀ from the Rio Dagua	66	43	19	,,

N.B.—The specimens from Neche (Brit. Mus.) agree very well with those from W. Ecuador, except in being rather paler, more olive brown, less rufescent on the upper parts.

40. On **Myrmeciza laemosticta** Salv. and **M. stictoptera** Lawr.

The Tring Museum possesses eight specimens of a *Myrmeciza*, collected by Mr. C. F. Underwood, near Carrillo, Costa Rica. Three of them, as well as a specimen from the same locality in the British Museum, agree perfectly with the original description of *M. stictoptera* Lawr. All are marked ♂ by the collector. The five other skins at Tring, an example from Carrillo, and one from Santa Fé, Veragua (Arcé), in the British Museum, all marked ♀, differ in having the chin and throat spotted with white (instead of uniform blackish), the foreneck slate-grey like the abdomen (not blackish like the throat), the white on the bend of the wing much less extended, or even wanting, and the pileum strongly washed with olive brown. This series agrees in every respect with the unsexed type of *M. laemosticta* Salv. from Tucurriqui, in the British Museum. In all other characters, such as the pattern of the wing-coverts, the presence of a large white interscapular blotch, the length of wing and tail, the shape of the bill, etc., the two series agree perfectly with each other; and as some of the specimens with a spotted throat were

obtained on the same day as others with the throat uniform blackish, I think there can be no longer any doubt that they merely **represent the two sexes of one species.**

In Western Ecuador a very near ally takes the place of *M. laemosticta*; it has been named *M. nigricauda* by Salvin and Godman. Besides the unsexed type from Intac in the British Museum, I examined three sexed ♀♀ of this form which were collected by Mr. Rosenberg's correspondents at Paramba, Lita, and Rio Verde, in N.W. Ecuador. These four specimens agree in the markings of the throat with the *laemosticta*-plumage, but differ from the Costa Rica series in the following details. The white spots are confined to the chin and the anterior portion of the throat; the tail is blackish (not dark rufous brown), and the back rather duller rufescent brown. In dimensions they agree with *M. laemosticta*, the wing measuring 67—68, the tail 47—49, the bill 18—20 mm. We have thus two forms:

a. Myrmeciza laemosticta laemosticta Salv.

Myrmeciza laemosticta Salvin, *P. Z. S.* 1864. p. 582 descr. orig. ♀ (Tucurriqui, Costa Rica).
Myrmeciza stictoptera Lawrence, *Ann. N. York Lyc.* viii. (May 1865) p. 132 descr. ♂ (Angostura, Costa Rica).

Hab. *Costa Rica* (Tucurriqui, Carrillo) and *Veragua* (Santa Fé).
4 ♂♂: Wing 65—67; tail 45—48; bill 19 mm.
7 ♀♀: Wing 62—66; tail 46—48; bill 18—19 mm.

b. Myrmeciza laemosticta nigricauda Salv. & Godm.

Myrmeciza nigricauda Salvin and Godman, *Biolog. Centr. Americ.* ii. (1892) p. 230 (Intac).

Hab. *Western Ecuador*: Intac (Buckley); Paramba, Lita, Rio Verde (Miketta and Flemming coll.—Mus. v. Berlepsch, Monac. et Vindob.).

41. Cercomacra hypomelaena Scl. = C. serva (Scl.)

Pyriglena serva Sclater, *P. Z. S.* 1858. p. 66 [Rio Napo, East Ecuador]; Sclater, *Cat. Birds* xv. p. 271 [excl. description of female which is referable to *C. approximans* ♀, and excl. specimens g, i].
Cercomacra hypomelaena Sclater, *Cat. Birds Brit. Mus.* xv. (1890) p. 268 [Cosnipata, S.E. Peru].

	Wing.	Tail.	Bill.
1. Mus. Brit. (♂) ad. Rio Napo (ex Verreaux), coll. P. L. Sclater. Type of *Pyriglena serva* Scl. . . .	65	59	18 mm.
2. Mus. Brit. (♂) ad. Sarayacu, E. Ecuador (C. Buckley coll.) ex Mus. Salvin & Godman (*P. serva*, specimen *e*).	70	63½	18 „
3. Mus. Brit. (♂) ad. Sarayacu, E. Ecuador (C. Buckley coll.) ex Mus. Salvin & Godman (*P. serva*, spec. *f*) .	67	59	18 „
4. Mus. Brit. "♂" ad. Cosnipata, S.E. Peru, June 2, 1871.—H. Whitely coll.—Type of *C. hypomelaena* .	65	62	17¾ „

C. hypomelaena has been described by a curious oversight. Mr. Sclater placed it quite correctly in the genus *Cercomacra*, but having referred his *P. serva* to another genus, he omitted to compare it with the latter species. Otherwise, he certainly would have found that both are the same.

Comparing three adult ♂♂ of *Pyriglena serva* (including the type) with the typical specimen of *C. hypomelaena*, I fail to see any difference between them, except that the latter has the bill very slightly narrower. It is, however, matched in this respect by a female from the Rio Napo.

C. serra (Sel.), as the species ought to be called, is certainly not a *Pyriglena*, but finds its nearest allies in *Cercomacra approximans* and *C. nigrescens*, with which it exactly agrees in the shape of the bill and form of the tail. The species of *Pyriglena*, on the other hand, differ very markedly in the following particulars: the bill is decidedly narrower and more slender, also rather higher and not so flattened; the tail-feathers are much wider; the forehead and the lores are thickly covered with soft, erect feathers, while they are much less densely set and rather stiffer (more bristle-like) in *Cercomacra*.

The female of *C. serra* is also very similar to that of *C. approximans* and *C. nigrescens*, in having the whole lower surface and the sides of the head bright ferruginous; it differs, however, from both in the forehead being dark olive grey like the back (instead of ferruginous as in the allied species). The Tring Museum has lately received a male from Chuchurras, near Pozuzo, province Huánuco, Peru.

42. On **Dysithamnus subplumbeus, Hypocnemis schistacea, Heterocnemis leucostigma,** and **H. saturata.**

The careful examination of a large amount of material reveals the surprising fact that the above four "species," placed by the latest authority* in three different genera, are very closely allied and evidently but geographical representatives of the same type. They agree perfectly with each other in all structural characters and in style of coloration. The males differ only in the intensity of the colour of the lower parts and in the amount of the white spotting on the upper wing-coverts, while the females are hardly distinguishable. Altogether, they form a natural group, and are certainly congeneric with *Sclateria*† *argentata* (Des Murs); but whether these birds can be associated with *S. naevia*, the type of the genus *Sclateria*, is another question. Anyhow, they have nothing to do with *Dysithamnus* and *Hypocnemis*. The species of the former genus have a much stronger, more hooked bill, and a shorter tail; those of the latter are distinguished by a much broader and much more flattened bill, etc.

The four recognisable forms have to stand as follows:

1. *Sclateria schistacea schistacea* (Sel.).

Hypocnemis schistacea Sclater, *P. Z. S.* 1858. p. 252 ["Rio Javarri"], descr. orig. ♂; Sclater, *Cat. Birds* xv. p. 287; Berlepsch & Stolzmann, *P. Z. S.* 1896. p. 384 [La Merced, La Gloria, Borgoña: Central Peru].

	Wing.	Tail.	Bill.	
1. Mus. Brit., ♂ ad., Rio Javarri, ex Stevens. Coll. P. L. Sclater. Type of species	63	49	17½	mm.
2. Mus. Brit., ♂ ad., La Gloria, Chanchamayo, C. Peru, January 23, 1891. Kalinowski coll.	68	51	19	,,
3. Mus. Berlepsch, ♂ ad., Borgoña, Chanchamayo, C. Peru, May 19, 1891. Kalinowski coll.	68	54	20	,,
4. Mus. Tring, ♂ ad., Pozuzo, Huánuco, C. Peru, March 1904. W. Hoffmanns coll.	65½	50	17	,,
5. Mus. Berlepsch, ♀, Marcapata, Cuzco, S.E. Peru, October 10, 1899. O. Garlepp coll.	69	57	20	,,
6. Mus. Berlepsch, ♀, Marcapata, Cuzco, S.E. Peru, November 9, 1899. O. Garlepp coll. . . .	70	57	20	,,

* Sclater, *Cat. Birds* xv.

† *Sclateria* Oberholser, *Proc. Acad. Philad.* 1899. p. 209 [nom. emend. for *Heterocnemis* Sel. preoccupied].

♂ ad. (type of species). Above and beneath uniform dark bluish schistaceous. Wings and tail sooty blackish; upper wing-coverts with very small white apical dots; remiges and rectrices exteriorly slightly edged with schistaceous. Bill black.

The specimens from Chanchamayo have rather longer bills and the lower parts a shade darker; the ♂ from Pozuzo, however, is absolutely identical with the type. In all four males the under surface is uniform schistaceous and scarcely paler than the back. The bill is entirely black in Nos. 1—3; while No. 4 has the lower mandible a little paler, more brownish.

♀ ad. Exactly like that of *S. s. leucostigma* and *S. s. subplumbea*, and only differing in the less rufescent, more olive-brown tint of the upper parts and in the top of the head being of the same colour as the back (instead of dark schistaceous). Tail rather longer. Upper mandible blackish, lower jaw **horn-brown** (not whitish, as in the following subspecies).

Nos. 5 and 6 are certainly the females of the present form, although their tail is rather longer than that of the males (Nos. 1—4). I have examined a female of *S. s. subplumbea* with the tail quite as long.

2. *Sclateria schistacea subplumbea* (Scl. & Salv.).

Dysithamnus (!) *subplumbeus* Sclater & Salvin, *P. Z. S.* 1880. p. 158 [Sarayaçu & Zamora: East Ecuador; Iquitos: N.E. Peru].

Dysithamnus plumbeus (not Wied!) Sclater, *P. Z. S.* 1858. p. 457 [Zamora: East Ecuador].

D. subplumbeus Sclater, *Cat. Birds Brit. Mus.* xv. p. 226 [East Ecuador, N.E. Peru].

Heterocnemis leucostigma Sclater, *l. c.* p. 276 [part.: specimens 1—p, ex Bogotá coll., examined by me].

		Wing.	Tail.	Bill.	
1.	Mus. Brit., ♂ ad., Sarayaçu, East Ecuador (C. Buckley coll.). Type of *D. subplumbeus* Scl. & Salv. [spec. *c* of Sclater's list]	71	53	20	mm.
2.	Mus. Brit., ♂ ad., Iquitos, August 27, 1878 (Whitely coll.) [specimen *a* of *D. subplumbeus*] . . .	71	50½ (worn)	19	,,
3.	Mus. Brit., ♂ ad., Iquitos, October 10, 1878 (Whitely coll.) [specimen *b* of *D. subplumbeus*] . . .	72	54	20½	,,
4.	Mus. Brit., ♂ jr., Zamora, E. Ecuador, January 1858 (Fraser coll.) [specimen *e* of *D. subplumbeus*] .	69	54	20	,,
5.	Mus. Brit., ♂ juv., Sarayaçu, East Ecuador (C. Buckley coll.) [specimen *d* of *D. subplumbeus*] . . .	69	55	19½	,,
6.	Mus. Brit., ♂ ad., Bogotá coll. [specimen *m* of Sclater's list of *Heterocnemis leucostigma*] . .	—	50	19	,,
7.	Mus. Brit., ♂ ad., Villavicencio to Medina, Llanos of the R. Meta, Colombia, 800—1500 ft. (T. Wheeler coll.)	67	51	18⅘	,,
8.	Mus. Berlepsch, ♂ ad., Bogotá coll.	68	54	20	,,
9.	,, ,, ♂ ad., ,, ,, ...	67	52	19	,,
10.	,, ,, ♂ juv., ,, ,, ...	66	57	19	,,
11.	,, ,, ♀ ad., ,, ,, ...	67	51	20	,,
12.	,, ,, ♀ ad., ,, ,, ...	67	56	20½	,,

♂ ad. Differs from that of *S. s. schistacea* only in having the lower mandible whitish, and the general plumage, especially the under parts, decidedly lighter schistaceous grey.

There is absolutely no difference between the specimens from Ecuador and N.E. Peru and those from Bogotá, though the latter have been referred by Dr. Sclater to *H. leucostigma*. In two examples (Nos. 3 and 7 of the above list) the white apical spots on the upper wing-coverts are quite as large as in *S. s. leucostigma*, while in all the other males there are only very small dots, just as in *S. s. schistacea*.

Nos. 4, 5, and 10 are immature males, showing some remains of the juvenile plumage. The flanks and under tail-coverts are still rufous brown, and most of the quills rufescent brown (instead of black with slaty margins), etc.

♀ ad. Easily distinguished from that of *S. s. schistacea* in having the lower mandible whitish and the top of the head slate-grey, sharply defined against the rufous brown back; from that of the following subspecies by its slightly shorter beak and rather shorter tail.

3. *Sclateria schistacea leucostigma* (Pelz.).*

Percnostola leucostigma Pelzeln, *Zur Ornith. Brasil.* ii. (1868), pp. 86, 160 [Barra do Rio Negro, Marabitanas, Rio Vaupé, Cayenne].
Heterocnemis simplex Sclater, *P. Z. S.* 1868 (probably publ. in 1869), p. 573 [Maroni R., Surinam].

	Wing.	Tail.	Bill.
1. Mus. Vindob., No. 15438, ♂ ad., Barra do Rio Negro, October 5, 1830. Natterer coll. Type of *P. leucostigma* Pelz.	70	60	20½ mm.
2. Mus. Vindob., No. 15436, ♂ ad., same date and locality	70	62	20½ ,,
3. Mus. Vindob., No. 15511, ♂ ad., St. George, Oyapoc, Cayenne, March 13, 1869. C. Jelski coll.	69	60	20 ,,
4. Mus. Vindob., No. 15437, ♀ ad., Barra do Rio Negro, January 6, 1833. Natterer coll.	69	60	20½ ,,
5. Mus. Vindob., No. 15440, ♀ ad., Rio Vaupé, July 15, 1831. Natterer coll.	65	58	20½ ,,
6. Mus. Tring, ♂ ad., Iponsin, Cayenne, January 5, 1903. G. K. Cherrie coll.	68	60	20 ,,
7. Mus. Tring, ♂ jun., same locality, December 24, 1902.	67	60	20 ,,
8. ,, ,, ♀ ad., ,, ,, January 5, 1903	68	58	20 ,,
9. Mus. Berlepsch, ♂ ad., Bartica Grove, Brit. Guiana, September 27, 1880. H. Whitely coll.	68	62	22⅓ ,,
10. Mus. Berlepsch, ♀ ad., Bartica Grove, May 31, 1880	68½	60	21 ,,
11. Mus. Tring, ♀ ad., Merume Mount., July 26, 1881. [H. Whitely jun., coll.]	68	58½	21 ,,

Besides these specimens, I have examined the series in the British Museum, including the type of *H. simplex* from Surinam.

♂ ad. Agrees with *S. s. subplumbea* in having the lower mandible whitish, but differs in the much paler colour of the lower parts, which are light grey, passing into whitish on the chin and middle of the abdomen. The blackish upper wing-coverts have **always** large rounded white apical spots, like the two specimens of *S. s. subplumbea* mentioned above (Nos. 3 and 7 of the list of *S. s. subplumbea*),

* Pelzeln's name appears to have the priority. Part ii. of the *Ornith. Brasil.* is reviewed by Newton in the *January* number of the *Ibis*, while the last part of the *P. Z. S.*, containing Sclater's description, certainly did not appear before March or April 1869.

Among the eleven ♂♂ ad. of *S. s. leucostigma* compared by me, there is not a single specimen that has such small, dot-like markings on the wing-coverts as *S. s. schistacea*.

♀ ad. Top of the head dusky slate-colour or dark slate-grey, in strong contrast to the dark rufescent brown back. Upper wing-coverts a little darker brown than the latter, terminated by large, rounded tulvous spots; quills dusky, dull rufescent brown on the outer webs: tail dull blackish. Lores greyish; cheeks, malar region and ear-coverts slate-grey, rather lighter than the pileum. Whole lower surface deep ferruginous, nearly whitish on the chin; flanks washed with rufescent brown. Upper mandible blackish, lower one whitish.

The specimens from British Guiana, Cayenne and Surinam are practically identical with Pelzeln's types from Barra do Rio Negro. Hence, *H. simplex* becomes a synonym of *P. leucostigma*.

4. *Sclateria schistacea saturata* (Salv.).

Heterocnemis saturata Salvin, *Ibis*, 1885, p. 427 [Roraima, Brit. Guiana].

	Wing.	Tail.	Bill.
1. Mus. Brit., ♂ ad., Roraima, 3500 ft. January 22, 1884. H. Whitely coll. Type of *H. saturata* Salv. . .	66	59	20 mm.
2. Mus. Brit., ♀ ad., Roraima, 3500 ft., June 29, 1884 .	66	56	19½ „

♂ ad. Agrees with *S. s. schistacea* in the dark schistaceous colour above and below, and in having the bill entirely black, but differs in its rather deeper black wing-coverts with much larger white apical spots, which are quite as large as in *S. s. leucostigma*.

♀ ad. Not distinguishable from that of *S. s. leucostigma*; bill perhaps a little shorter.

The distribution of the four subspecies is as follows:

1. *Sclateria schistacea schistacea* (Scl.).

Central Peru: La Merced (2600 ft.), La Gloria (3200 ft.), Borgoña (2600 ft.) [Kalinowski coll.]; Pozuzo, prov. Huánuco (2400 ft.) [W. Hoffmanns coll.].—*S.E. Peru:* Cuzco, Marcapata (3000 ft.) [O. Garlepp coll.].

Thus, this bird is an inhabitant of high elevations, and I doubt the correctness of the original locality: "*Rio Javarri*."

2. *S. schistacea subplumbea* (Scl. & Salv.).

East Ecuador: Sarayaçu (Buckley coll.); Zamora (Fraser coll.).—*N.E. Peru:* Iquitos, on the Amazons (H. Whitely coll.).—*Colombia:* Llanos of the Rio Meta, between 800 and 1500 ft. (W. T. Wheeler coll.); *Bogotá* coll. (Mus. Berlepsch, Brit.).

3. *S. schistacea leucostigma* (Pelz.).

North Brazil: Barra do Rio Negro, Marabitanas, Rio Vaupé (Natterer coll.), —*Cayenne:* Iponsin (Cherrie coll.), St. George d'Oyapoc (Jelski coll.).—*Surinam:* Maroni River (Bartlett coll.).—*British Guiana:* Bartica Grove, Camacusa, Takutu River, Merumé Mountains (H. Whitely coll.).

4. *S. schistacea saturata* (Salv.).

British Guiana: Roraima Mountains (3500 ft.) [H. Whitely coll.].

43. { Terenura melanoleuca Pelz. / Myrmochanes hypoleucus Allen } = **Hypocnemis hemileuca** Scl. & Salv.

Hypocnemis hemileuca Sclater & Salvin, *P. Z. S.* 1866. p. 186. descr. orig. ♂ [Lower Ucayali].
Terenura melanoleuca Pelzeln, *Zur Orn. Brasil.* ii. (1868), p. 157. descr. orig. ♂ [Borba, Rio Madeira].
Myrmochanes hypoleucus Allen, *Bull. Amer. Mus.* ii. (1889), p. 95. descr. orig. ♂ [Reyes, N.E. Bolivia].

	Wing.	Tail.	Bill.
1. Mus. Brit. ♂ ad., Lower Ucayali, June 4, 1865. E. Bartlett coll. Type of species	54	37	17½ mm.
2. Mus. Vindob. ♂ ad., Borba, July 1829 . . .	55	37	18 mm.
3. „ „ ♂ ad., „ August 1829 . . .	55	—	19 mm.

Natterer coll. Types of *T. melanoleuca*, Pelz.

Thanks to the kindness of my friend Dr. von Lorenz, of Vienna, I was enabled to examine Pelzeln's specimens, and I found them absolutely identical with the type of *H. hemileuca* in the British Museum. Perhaps they have a slightly longer bill, but, as will be seen from the measurements given above, the difference is hardly apparent. Mr. Allen's careful description leaves also no doubt that his *Myrmochanes hypoleucus* is nothing else but the species in question.

It need not be added that this bird has nothing to do with *Terenura* or with *Pyriglena*, but it agrees structurally with some species of the genus *Hypocnemis*, except that the bill is rather flatter and rather more compressed towards the tip. However, *H. melanopogon* and *H. maculicauda* are intermediate in this respect, and therefore I do not venture to separate *H. hemileuca* generically from *Hypocnemis*.

In the *Cat. of Birds* xv. p. 291, Mr. Sclater gives the description of the ♀ of *H. hemileuca*, but there must be some mistake here, as neither Bartlett nor any other naturalist collected specimens of this sex.

The British Museum possesses only the single ♂ ad. upon which Sclater and Salvin based their original description.

The range of *H. hemileuca*, thus far known, is as follows :

E. Peru : Lower Ucayali (Bartlett); *N.E. Bolivia :* Reyes (Rusby); *N. Brazil :* Borba (Natterer).

44. **Hypocnemis stellata** Scl. & Salv. = **Dichrozona cincta** (Pelz.).

Cyphorhinus (*Microcerculus*) *cinctus* Pelzeln, *Zur Ornith. Brasil.* i. (1867), pp. 47, 65 [Borba : Rio Madeira ; S. Joaquim : Upper Rio Negro].
Hypocnemis stellata Sclater & Salvin, *P. Z. S.* 1880. p. 160 [Sarayaçu : East Ecuador].
Dichrozona zononota Ridgway, *Proc. U. S. Mus.* x. 1887 (1888), p. 524 [Santarem : Lower Amazons]. Cf. Hellmayr, *Journ. f. Ornith.* 1903. p. 536.

	Wing.	Tail.	Tarsus.	Bill.	
1. Mus. Vindob. 16350, ♂ ad., S. Joaquim, July 28, 1831. Natterer coll. Type of *C. cinctus* Pelz. .	61	25	20	19	mm.
2. Mus. Vindob. 16351, ♀ ad., Borba, January 4, 1830. Natterer coll. Cotype of *C. cinctus* Pelz.	58	24	20	18½	„
3. Mus. Brit. av. jr., Sarayaçu, E. Ecuador. C. Buckley coll. Type of *H. stellata* Scl. & Salv. . . .	62	27	—	19	„
4. Mus. Brit. av. juv., Sarayaçu, E. Ecuador. C. Buckley coll. Type of *H. stellata* Scl. & Salv. . . .	58	25	—	17	„

In the paper quoted above I pointed out the identity of *Dichrozona zononota* and *Cyphorhinus cinctus*. Through the kindness of Dr. von Lorenz, of Vienna, I

was enabled to compare the types of the latter species with those of *H. stellata* in the British Museum, and found them to be identical.

No. 1 is an adult male. The spots on the lesser and median upper wing-coverts, as also the cross-band on the uropygium, are pure white. The female (No. 2) has a slight creamy wash on the latter, and the apical spots on the wing-coverts are pale fulvous.

The typical specimens of *H. stellata* are both immature. No. 3, in more advanced plumage, agrees perfectly with Natterer's female. The only differences I can find consist of the very slightly darker upper surface and the more fulvous tinge of the rump-band, both being evidently signs of immaturity. No. 4 is a very young bird in fluffy plumage, with the markings everywhere less pronounced than in the adults, and with but few very small black spots on the foreneck.

Strange to say, neither in the original description of *H. stellata* nor in the *Cat. Birds* xv., is any mention made of the coloration of the tail.* All the specimens have the two outer tail-feathers and the two basal thirds of the outer web of the third pair pure white, as correctly described by Mr. Ridgway.

45. **Myrmotherula guayabambae** Sharpe = **M. atrogularis** Tacz. ♀ !

Myrmotherula atrogularis Taczanowski, *P. Z. S.* 1874. p. 137 [Amable Maria and Monterico, Central Peru.—Mus. Univ. Warsaw].

M. guayabambae Sharpe, *Bull. Brit. Orn. Cl.* xi. no. lxxiv. (1900), p. 2. descr. ♀ [Guayabamba, North Peru].

Specimen typ. in Mus. Brit. : ♀ ad., Guayabamba, 4000 ft., August 26, 1894. O. T. Baron coll. Wing 53, tail 39, bill 15⅓ mm.

This example agrees perfectly with a female of *M. atrogularis* from Huambo, N. Peru, in the British Museum. Wing 53, tail 37, bill 15 mm.

M. guayabambae has been described by mistake. Sharpe never referred to *M. atrogularis*, but compared his bird with *M. fulviventris*, to which it is not at all related. *M. fulviventris* belongs to quite another group, in which the sexes are nearly alike, differing only in the colour of the throat. The ♀ of *M. atrogularis* bears, it is true, a superficial resemblance to the ♂ of *M. fulviventris*, but differs at a glance in having the back dark olive grey (not brownish), the outer margins of the remiges olive grey (not rufescent), and the apical spots on the upper wing-coverts pure white (instead of fulvous).

46. **Picumnus macconnelli** Sharpe should be **P. cirratus macconnelli** Sharpe.

Picumnus macconnelli Sharpe, *Bull. B. O. C.* xii. (Oct. 1901), p. 4 [British Guiana].

Picumnus amazonicus Snethlage, *Orn. Monber.* xiv. (1906), p. 60 [District of Pará : Marajó, and Monte Alegre].

	Wing.	Tail.	Bill.
1. Brit. Mus. (♂) ad., British Guiana. McConnell coll. Type of *P. macconnelli* Sharpe	54	30	14 mm.
2. Mus. Tring, ♂ ad., Boavista, near Pará. Steere coll.	55½	32	13 „
3. „ „ ♀ ad., „ „ „ „ „	55	32	13 „

In the original description Dr. Sharpe compared the species with *P. steindachneri*,

* In No. 3 the outermost pair is wanting.

which belongs to quite a different group, **having the chest spotted with white!** while in *P. macconnelli* the whole lower surface from the chin to the under tail-coverts is closely barred with black and white, just as in *P. cirratus*. There are, however, several small differences which justify the separation of the northern birds as a subspecies. Compared with a series of 26 adult birds of true *P. c. cirratus* from Rio, Espiritu Santo and S. Paulo, the three specimens have a slightly larger and stronger bill, the back of a darker brown, and the black bars on the lower surface much broader and deeper black. The cheeks and ear-coverts, too, are darker, more blackish. The other distinctive characters pointed out by Miss Snethlage do not hold good, some of my specimens from S.E. Brazil having the bill entirely plumbeous, and the forehead quite as pale buffy whitish as the northern form.

The birds from Pará being practically identical with the type from British Guiana, *P. amazonicus* becomes a synonym of Sharpe's name, and the form has to stand as *P. cirratus macconnelli* Sharpe.

47. Ortalis squamata (Less.)

Ortalida squamata Lesson, *Dict. Sci. Nat.* lix. (1829) p. 195 ["Brésil"]; idem, *Traité d'Orn.* 1831. p. 481 ["du Brésil"]; Berlepsch & Ihering, *Zeitschr. ges. Orn.* ii. (1885), p. 179 [Rio grande do Sul].

1. *Mus. Paris*, spec. typ. labelled as follows: "*Ortalida squamata* (Less.) A. de S. Hilaire, Brésil." On the bottom of the stand: "No. 11942. Brésil, *Ste. Cathérine*. M. de St. Hilaire, 1822.—*Ortalida squamata* Less., type." Wing 209, tail 240, bill 25½ mm.

2. Mus. Tring, ad., Blumenau, Santa Catharina. Wing 180, tail 220, bill 25 mm.

3. Mus. Tring, ad., Taquara do Mundo Novo, Rio grande do Sul, July 16, 1883, H. v. Ihering coll. Wing 186, tail 217, bill 24 mm.

Lesson's type agrees perfectly with No. 2, differing only in its rather larger size. The determination of the species by Count Berlepsch and Mr. Ogilvie-Grant thus proves to be correct. As clearly pointed out by the former authority, the species is quite distinct from the Bahia form named *O. albiventris* in the *Cat. Birds* xxii. p. 508. In the latter bird the whole breast and abdomen are uniform pure white, while in *O. squamata* they are wood-brown with distinct greyish apical margins. The thighs, dirty white in *O. albiventris*, are dark brown, or rufescent brown, in the South Brazilian form. The top of the head is but a shade more rufescent olive brown than the back (instead of bright brownish chestnut as in *O. albiventris*), and there is scarcely any trace of the rufous buff forehead and superciliary stripe to be seen in the Bahia form. The feathers of the mantle have no pale margins, the feathered portion of the lower throat is uniform olive brown (not at all spotted with greyish white), and the foreneck decidedly darker, more blackish brown with definite greyish white margins (not dark grey with whitish tips as in the Bahia form). Altogether, *O. squamata* resembles much more *O. guttata* from the Upper Amazons, but still it is distinguishable by its unspotted olive brown lower throat and uniform rufescent brown upper part of the head (not blackish brown or dusky with greyish spots on forehead and superciliary region).

O. squamata is only known from Santa Catharina (whence I received a

specimen* directly from a collector in Blumenau) and Rio grande do Sul. No *Ortalis*-species has as yet been recorded from Paraná, S. Paulo, and Rio.

In Minas Geraës, Bahia, and Pernambuco, the white-bellied species (*O. albiventris* auct.) occurs.

The following species are discussed in this paper :—

Cyanocorax inexpectatus Elliot *Cyanocorax heckelii* Pelz.	= *Cyanocorax caeruleus* (Vieill.)	p. 305
Anthus lutescens Puch.		p. 307
Haplospiza uniformis Scl. & Salv.	= *Spodiornis uniformis* (Scl. & Salv.)	p. 308
Crithagra hilarii Bonap.	= *Sicalis a. arvensis* (Kittl.)	p. 309
Buarremon baeri Oust.	= *Compsospiza baeri* (Oust.)	p. 309
Tachyphonus chloricterus Vieill. *Orthogonys viridis* (Spix) et auct.	= *Orthogonys chloricterus* (Vieill.)	p. 310
Nemosia chrysopis Scl. & Salv.	= *Thlypopsis s. sordida* (Lafr. & D'Orb.)	p. 310
Arremon callistus Oberholser	= *Arremon p. polionotus* Bonap.	p. 311
Arremon devillii Des Murs	= *Arremon polionotus devillei* Des Murs	p. 312
Arremon wuchereri Scl. & Salv.	= *Arremon flavirostris* Sws.	p. 313
Saltator azarae D'Orb.	= *Saltator coerulescens azarae* D'Orb.	p. 314
Saltator albicollis Vieill.	= *Saltator guadeloupensis* Lafr.	p. 315
Polioptila lactea Sharpe	= sp. optima !	p. 316
Curruca olivacea Less.	= *Vireo chivi* (Vieill.)	p. 317
Dacnis salmoni Scl.	= *Nemosia salmoni* (Scl.)	p. 317
Knipolegus unicolor Kaup	= *Knipolegus cyanirostris* (Vieill.)	p. 317
Muscicapa cristata Less.	= *Knipolegus cyanirostris* (Vieill.)	p. 318
Museisaxicola striaticeps Lafr. & D'Orb. *Cnipolegus cinereus* Scl.	= *Knipolegus striaticeps* (Lafr. & D'Orb.)	p. 318
Hapalocercus hollandi Scl.	= *Hapalocercus s. sclateri* (Oust.)	p. 320
Hapalocercus striaticeps Salv.	= *Hapalocercus sclateri striaticeps* Salv.	p. 321
Leptopogon tristis Scl. & Salv. *Muscicapa angustirostris* Lafr. & D'Orb.	= *Phylloscartes centralis angustirostris* (Lafr. & D'Orb.)	p. 321
Leptopogon godmani Scl.	= *Poyonotriccus ophthalmicus* Tacz.	p. 222
Capsiempis caudata Salv. *Serpophaga orenocensis* Berl. & Hart.	= *Serpophaga caudata* (Salv.)	p. 323
Myiarchus tricolor Pelz. *Myiarchus gracilirostris* Pelz.	= *Myiarchus tuberculifer* (Lafr. & D'Orb.)	p. 323
Xenopipo subalaris Godm.	= *Chloropipo unicolor* Tacz.	p. 324
Chloropipo holochlora Scl.	= sp. optima !	p. 325
Muscicapa luteocephala Less.	= *Heterocercus luteocephalus* (Less.)	p. 326
Muscicapa luteocephala Lafr.	= *Neopelma aurifrons* (Wied)	p. 327
Psaris erythrogenys Selby	= *Tityra inquisitor erythrogenys* (Selby)	p. 327
Attila brasiliensis Less.	= *Attila brasiliensis brasiliensis* Less.	p. 328
Attila bolivianus Lafr.	= *Attila validus* Pelz.	p. 330
Lanius unirufus Puch.	= *Attila thamnophiloides* (Spix)	p. 330
Upucerthia bridgesi Scl.	= *Upucerthia andaecola* Lafr. & D'Orb.	p. 331
Synallaxis setaria Temm.	= *Leptasthenura setaria* (Temm.)	p. 322

* Actually in the Tring Museum.

NOTES ON A SECOND COLLECTION OF BIRDS FROM THE DISTRICT OF PARÁ, BRAZIL.

By C. E. HELLMAYR.

IN the last volume of the *Noritates Zoologicae* I published an account of a small collection of birds made by Mons. A. Robert at a place called Igarapé-Assú, east of the town of Pará. Soon afterwards, Mr. W. Hoffmanns, who had been collecting for some time in Peru, where he discovered the beautiful *Pipra exquisita* Hellm., came to Tring, and I suggested to him to continue the researches in the Pará district so successfully taken up by M. Robert.

Some time ago the Tring Museum received the first consignment from this able collector, comprising the results of two months' work. It consists of 420 specimens, representing 120 species, of which no less than 21 are new to the fauna of Pará. Besides four forms new to science, Mr. Hoffmanns was so fortunate as to get large series of the newly described *Conopophaga roberti* and *Hypocnemis vidua*, each of which was represented in Europe only by a single specimen; and he likewise succeeded in obtaining a good number of skins of two exceedingly rare Hummingbirds, viz. *Agyrtria nitidifrons* and *Lophornis gouldii*. Several species, only known from Upper Amazonia, were found in the district of Pará, as well as a few others supposed to be confined to the Guianas—f. i. *Icterotula recurvirostris*.

Mr. Hoffmanns being still at work on the Lower Amazons, I defer general remarks about the ornithology of Pará to a later occasion, and proceed to give the account of the various species contained in his collection.

All specimens were collected near Prata, Igarapé-Assú, at an elevation of 45 metres above the sea-level. The notes on the colour of the iris and soft parts, carefully indicated on the label of every specimen, are given with quotation marks.

We are under great obligations to Herr Hermann Schindler, director of the railway company, and to Herr Schrader, Imperial German Consul of Pará, for many acts of kindness and assistance given to Mr. Hoffmanns.

1. Turdus phaeopygus Cab.

Turdus phaeopygus Cabanis: in Schomburgk, *Reise Brit. Guiana* iii. (1848) p. 666 [Brit. Guiana]; Pelzeln, *Zur Orn. Brasil.* ii. (1868) p. 93 (Pará); Layard, *Ibis* 1873. p. 376 (Pará).

2 ♂♂ ad. and 2 ♀♀ ad.: 2, 28. xi., 2, 6. xii. 05. "Iris brown." Nos. 61, 218, 246, 282.

They agree perfectly in colour and size with specimens from British Guiana.

2. Turdus fumigatus Licht.

Turdus fumigatus Lichtenstein, *Verz. Dubl.* 1823. p. 38 ("Brasilien"); Sclater & Salvin, *P. Z. S.* 1867. p. 568 (Mexiana Island); Layard, *Ibis* 1873. p. 376 (Pará).

A single ♂ ad. from Prata, 3. xii. 05. No. 251. "Iris brown."

It differs from an adult ♂ from Pará, collected by Prof. Steere, in having a distinct white patch in the middle of the lower abdomen. Thereby it approaches *T. hauxwelli* of Upper Amazonia, but in other respects it is very dissimilar. The specimens obtained by Natterer on the upper branches of the Rio Madeira (near Engenho do Gama, S. Vicente, Rio Guaporé) are also typical *T. fumigatus*, showing not the slightest transition towards *T. hauxwelli*.

3. *Microcerculus marginatus marginatus (Scl.).

Hetero'nemis marginatus Sclater, *P. Z. S.* 1855, p. 145 [Bogotá coll.—type examined].
Heteronemis bicolor Des Murs : in Castelnau, *Voyage. Oiseaux* (1855) p. 51. [No locality ; the type (which I examined) came from the Peruvian Amazons.]

A single ♂ jr., 23. xi. 05. No. 185. "Iris brown."

This is the first record for Pará, extending the range of the species from the upper Rio Negro (Marabitanas), where Natterer collected four specimens, to the Lower Amazons. The skin from Pará agrees perfectly with a good series from Upper Amazonia and Bogotá collections.

The various plumages of this species were not well understood hitherto, and none of the authors who wrote upon the subject appears to have recognised that the birds with dusky margins to the feathers of the pileum, throat and chest are the young, and those without these edges the adults of one and the same species. This is clearly proved by the series before me, where every possible transition between the two extremes can be found.

In North-western Ecuador *M. m. marginatus* is represented by a closely allied form, to which Mr. Sharpe erroneously applied the name *M. bicolor*. I propose to call it

Microcerculus marginatus occidentalis n. subsp.

Similar to *M. m. marginatus*, but the upper parts darker and less rufescent; the sides of the body much darker, deep chocolate brown with scarcely any rufous tinge, and the whole abdomen crossed by broad blackish-brown subterminal bars. The bill, too, is slenderer, and somewhat longer.

Type in Tring Museum : ♂ ad., Lita, N.W. Ecuador, 3000 ft. elevation, Oct. 4, 1899. No. 210. Wing 60, tail 23, bill 17½ mm.

I examined more than twenty specimens of this form from various places in N.W. Ecuador : Lita, Cachyjacu (3200 ft.), Pambilar (60 ft.), and Cachavi (500 ft.). The skins in the British Museum, said to be from **Sarayaçu,** East Ecuador (Buckley), and described by Sharpe s.n. *M. bicolor*,† are perfectly identical with this series. I feel perfectly sure that they never came from East Ecuador, where only *M. m. marginatus* is found. Buckley was a very careless collector, and his specimens had no original labels, but were labelled afterwards by Gerrard, almost invariably "Sarayaçu." But as so many species which have only been found on the **western** slopes of the Andes by Stolzmann, Goodfellow, Festa, Fraser, etc., and by Mr. Rosenberg's correspondents, bear this locality ; and as we know that Buckley's men, Villagomez and Illingworth, collected in Western Ecuador, there can be no doubt that many of the specimens labelled "Sarayaçu" really came from **western** Ecuador.

Dr. Sharpe, when employing the name *M. bicolor* for this western form, was apparently misled by the superficial resemblance between his specimens from "Sarayaçu" and the type of *M. bicolor*, all being adult birds with plain white foreneck and chest. By a singular coincidence all the specimens of the eastern form ‡ before him were immature birds with dusky margins to the feathers of the foreneck and chest, and therefore he regarded the coloration of these parts as the principal difference between the two forms ; but, as I have pointed out above, this is only due to age, the adults of both forms having the throat and breast unbarred, plain white.

† *Cat. Birds Brit. Mus.* vi. p. 298.

‡ Three from Bogotá (including the type of *H. marginatus*), one from East Peru (ex Verreaux), two from Pebas, and one from Chamicuros, N.E. Peru.

The type of *M. bicolor* (from the Peruvian Amazons) agrees in every way with several adults from Bogotá. The upper parts and the flanks are of the same rufescent brown colour, and there are only a few blackish and whitish bars in the middle of the lower abdomen.

Thus we have two distinct forms, the range of which is as follows :—

(*a*) *M. marginatus marginatus* (Scl.). From Eastern Colombia (Bogotá coll.) south through Eastern Ecuador to N.E. Peru and Central Peru, and even to Northern Bolivia (Rusby coll.—Amer. Mus. New York) ; east through the Rio Negro region to Pará.

(*b*) *M. marginatus occidentalis* Hellm. Only known from N.W. Ecuador.

N.B.—*M. taeniatus* Salv. (type ex Balzar, W. Ecuador) belongs to a different section of the genus, having the entire under-surface banded with smoky grey, and is a very near ally of *M. squamulatus* Scl. & Salv.

4. Thryothorus genibarbis Sw.

Cf. *Nov. Zool.* xii. (1905) p. 271.

2 ♂♂, 1 ♀ ad., and 1 young ♀ from Prata : 9, 17. xi., 9. xii. 05. Nos. 92, 94, 149, 301. Iris marked as "brown" or as "red."

5. *Granatellus pelzelni paraensis Rothsch.

G. p. paraensis Rothschild, *Bull. Brit. Orn. Cl.* xvi. (April 1906) p. 81.

No. 141. ♂ ad., Prata, 17. xi. 05. "Iris brown, bill grey-blue, feet bluish black." Wing 52½, tail 50½, bill 10½ mm. Type of subspecies.

No. 132. ♀ ad., Prata, 15. xi. 05. "Iris brown, feet and bill grey-blue." Wing 54, tail 53, bill 11 mm.

The ♂ of this interesting new form differs from that of *G. p. pelzelni* by lacking the silky white stripe which separates the grey flanks from the rosy red middle of the belly, the whole sides of the abdomen being uniform dark grey. On the top of the head the black does not extend over the whole crown, as in the typical form, but is restricted to a well-defined frontal band and a narrow stripe above the eye, while the vertex is slaty blue like the back. There is only a small white spot at the posterior margin of the eye, whereas typical *G. p. pelzelni* shows a long, broad, white postocular stripe.

In other respects the Pará form does not differ. The sides of the head are deep black, the throat is white, bordered below by a number of small black spots, and the breast as well as the middle of the abdomen are beautifully rosy red.

The ♀ of *G. p. paraensis* has the sides of the breast strongly washed with grey, which is barely indicated in a good series of ♀♀ of the typical form.

It appears that *G. p. paraensis* has a very limited range, as the specimens collected by Mr. André on the Caura River, Venezuela, agree with the type of *G. p. pelzelni* which was obtained by Natterer on the Upper Rio Madeira.

6. Pachysylvia thoracica semicinerea (Scl. & Salv.)

[*Hylophilus thoracicus* Temminck, *Pl. col.*, livr. 29 (1822) pl. 173, fig. 1 ("Brésil"—coll. Natterer. We substitute *Rio* as typ. locality).]

Hylophilus semicinereus Sclater & Salvin, *P. Z. S.* 1867. p. 570. pl. xxx. fig. 2 (Pará) ; Layard, *Ibis* 1873. p. 377 (Pará).

Two adult ♂♂, 16, 17. xii. 05. Nos. 354, 367. "Iris white (No. 354), whitish yellow (No. 367)."

The real affinities of this rare form have never been recognised. Mr. Sclater, in his review of the genus,* included it in the section of *P. flavipes*. This, however, is not its proper place, and a thorough study of all members of the genus proved it to be a geographical race of *P. thoracica* (Temm.), most nearly allied to *P. t. griseiventris* (Berl. & Hart.).†

It agrees with them in the coloration of the under-surface of the wing and in having the forehead and vertex tinged with yellowish olive, the occiput and nape being pure cinereous. The abdomen is pale cinereous, as in *P. t. griseiventris*. The Pará form differs, however, from both by having the sides of the head and neck ashy grey instead of yellowish olive-green, and by the lack of the olive-yellow jugular band. Yet, in one of the two specimens (No. 367) there is a faint yellowish tinge to be seen across the chest, thus indicating the close relations to *P. thoracica*. Therefore I have not the slightest doubt that the three forms with olive-yellowish forehead and grey nape form a natural group, consequently they must be designated by trinomials.

As pointed out by Berlepsch and Hartert,† *P. pectoralis* (Scl.) is quite a **different species,** easily recognisable by having the whole top of the head (from the front to the nape) pure cinereous, the middle of the abdomen white, and by the yellow pectoral band being much brighter and extended over the whole chest. This is an exclusively Amazonian species, ranging from Mattogrosso to Cayenne, Surinam and British Guiana. In Tring there are more than twenty specimens from the three latter countries, which I am unable to distinguish from Sclater's type (ex Mattogrosso—Natterer).

In another paper I intend to discuss the distribution of *P. thoracica* and its allies.

7. Dacnis cayana cayana (Linn.)

Motacilla cayana Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 336 [Cayenne : ex Brisson].
Dacnis cayana Sclater & Salvin, *P. Z. S.* 1867. p. 570 (Pará) ; Layard, *Ibis* 1873. p. 378 (Pará)
D. cyanocephala Pelzeln, *Zur Orn. Brasil.* i. (1867) p. 25 (Pará).

♂ ♀ ad. from Prata, 9, 11, xii. 05. Nos. 277, 312. "Iris brownish red."

8. Cyanerpes cyanea (Linn.)

Cf. *Nov. Zool.* xii. (1905) p. 272.

A single ♂ ad. from Prata, 16. xii. 05. No. 358. "Iris brown." Bill 16 mm.

9. Coereba chloropyga (Cab.)

Cf. *Nov. Zool.* xii. (1905) p. 272.

1 ♂, 3 ♀♀ ad. from Prata, 7. xi., 7, 16, 27. xii. 05. Nos. 81, 286, 362, 419 "Iris dark brown."

10. Euphonia violacea lichtensteinii (Cab.)

[*Fringilla violacea* Linnaeus, *Syst. Nat.* x. p. 182 (1758.—no locality).]
Phonasca Lichtensteinii Cabanis, *Journ. f. Ornith.* 1860. p. 331 (Cayenne).
Euphonia Lichtensteinii Pelzeln, *Zur Orn. Brasil.* iii. (1869) p. 204 (Pará).

3 ♂♂ and 2 ♀♀ ad., 25. xi., 5, 9, 14, 19. xii. 05. Nos. 205, 272, 304, 339, 384. "Iris brown."

The wing measures 54—55, the tail 30—31 mm. Therefore the specimens

* *Ibis* 1881. p. 308. † *Nov. Zool.* ix. (1902) p. 12.

from Pará belong to the smaller northern form separated by Cabanis as *P. lichtensteinii*.

Birds from Bahia, S. Paulo and Paraguay are much larger, the wing measuring 59—64 mm.

11. Euphonia cayennensis (Gm.)

Tanagra cayennensis Gmelin, *Syst. Nat.* 1. ii. (1788) p. 894 [ex Brisson & Buffon: *Cayenne*].
Euphonia cayana (nec *Tanagra cayana* Linné!) Selater & Salvin, *P. Z. S.* 1867. p. 570 (Pará).
Euphona cayana Pelzeln, *Zur Ornith. Brasil.* iii. (1869) p. 204 (Pará).

2 ♂♂ ad. and 1 ♀ ad. from Prata, 27. x., 7. xii. 05. Nos. 24, 287, 289. "Iris brown."

Besides these specimens, we possess another ♂ ad. from Bemfica, collected by Professor Steere. They agree perfectly with a series from British Guiana.

There is a curious mistake in the nomenclature of this species. Selater (*Cat. Birds* xi. p. 81) quotes as the original description: "*Tanagra cayana* Linn., *S. N.* i. [ed. xii. 1766] p. 315," but this account refers to *Calospiza cayana* = *Calliste cayana* auct.!! The *Euphonia* is described on the next page (p. 316) under the same term, viz. *T. cayana* (ex Brisson: Cayenne). This second name, being preoccupied by that of page 315, must give way to *T. cayennensis* of Gmelin.

12. Calospiza albertinae (Pelz.)

Nov. Zool. xii. (1905) p. 273.

1 ♂ fere ad., 25. xi. 05. No. 204. "Iris brown." Wing 70; tail 48; bill 11½ mm.

This specimen is slightly younger than the one sent by Robert. The orange-rufous shoulder-spot is less extended, the blue of the rump and breast paler and still mixed with pale green, and the chestnut-rufous of the head duller.

Dr. Lorenz kindly sent me the type belonging to the Vienna Museum, and I find that the supposed differences in coloration do not exist, Natterer's specimen having the sides of the body and the throat green like those from Pará; but the latter have a decidedly larger bill. The type of *C. albertinae*, however, being immature, a series from the Rio Madeira is required to confirm the constancy of this slight difference or otherwise.

Dimensions of the type: ♂ imm., Salto do Girao, October 8, 1829. Wing 71; tail 48; bill 10½ mm.

13. Ramphocelus carbo carbo (Pall.)

Lanius Carbo Pallas in Vroeg, *Cat. rais. d'Oiseaux, Adumbrat.* p. 2 [1764.—Surinam].
Ramphocelus jacapa auct.
Cf. *Nov. Zool.* xii. (1905) p. 274.

A single ♂ ad., 17. xii. 05. "Iris brown." No. 370.

14. Tachyphonus surinamus insignis n. subsp.

T. surinamus (nec Linnaeus!) Selater & Salvin, *P. Z. S.* 1867. p. 571 (Pará); Pelzeln, *Zur Ornith. Brasil.* iii. (1869) p. 213 (part.: Borba, Pará); Hellmayr, *Nov. Zool.* xii. 1905. p. 275 (Pará).

♂ ad. and ♀ ad. from Prata, 28. xi., 9. xii. 05. Nos. 219, 305. "Iris brown."

Since I recorded Robert's specimens, the Tring Museum has received several ♂♂ ad. of true *T. s. surinamus* from Surinam which agree with a large number of

skins from British Guiana, Guanoco (Orinoco delta) and the Caura River in having, on the sides of the chest, a small white patch slightly washed with buffy towards the inner edge.

In three ♂♂ ad. from Pará this patch is much larger, deep ochreous yellow and mixed with ferruginous interiorly. Three ♂♂, collected by Natterer near Borba on the Rio Madeira, are perfectly alike. I propose, therefore, to separate these birds as a different form.

Type in Tring Museum: ♂ ad., Bemfica, Pará. Collected by Professor Steere. Wing 87; tail 76½; bill 18 mm.

Five ♂♂ ad. from Barra do Rio Negro (Manáos), collected by Natterer, however, represent typical *T. s. surinamus*, agreeing in all respects with specimens from Surinam, etc.

Two ♂♂ ad. from Marabitanas, and another from the Rio Içanna, Upper Rio Negro, are again different, and belong to *T. s. napensis*. I can find no differences between them and a series from the Rio Napo, N.E. Peru and Bogotá collections. This form differs from *T. s. surinamus* in the patch on the sides of the chest being much smaller and pure white like the axillaries, and in having the uropygium of a darker ochreous colour.

The range of these three forms is thus as follows:

a. T. s. surinamus (Linn.). Cayenne, Surinam, British Guiana, Orinoco delta (Guanoco; André coll.—Mus. Tring), westwards to the Caura River, E. Venezuela, southwards to Manáos on the northern bank of the Amazons (Natterer). [♂♂ ad. examined: 4 from Surinam; 6 British Guiana; 12 Caura River; 1 Orinoco delta; 5 Barra do Rio Negro.]

b. T. s. napensis Lawr. From Eastern Colombia (Bogotá coll.) south through Eastern Ecuador (Napo) to N.E. Peru, east to Marabitanas, etc., on the Upper Rio Negro. [♂♂ examined: 3 Rio Napo; 3 Upper Rio Negro; 1 Chyavetas, N.E. Peru; 6 Bogotá coll.]

c. T. s. insignis Hellm. Lower Amazons, from Pará westwards to Borba on the lower course of the R. Madeira. [♂♂ ad. examined: 3 Pará; 3 Borba.]

While the females of *T. s. surinamus* and *T. s. insignis* are not distinguishable, that of *T. s. napensis* can easily be recognised by the much deeper colour of the throat and breast, which are ochraceous buff (Ridgw. *Nomencl.* v. 7), instead of being cream-buff (v. 11).

I compared twenty females of the eastern forms with nine of *T. s. napensis* (3 Marabitanas; 4 Bogotá; 2 Chyavetas, N.E. Peru).

15. Arremon silens (Bodd.)

Cf. *Nov. Zool.* xii. 1905. p. 275.

4 ♂♂ ad. and 1 ♀ from Prata, 31. x., 3, 4, 10, 14, 31. xi. 105. Nos. 9, 48, 66, 74, 101. "Iris brown."

Like the specimen sent by M. Robert, the males have the black jugular band rather narrow, but one is hardly distinguishable in this respect from Guiana examples.

16. Saltator magnus (Gm.)

Nov. Zool. xii. (1905) p. 276.

2 ♂♂ ad., 7, 12. xii. 05. Nos. 288, 321. "Iris brown."

17. Pitylus grossus (Linn.)

Loxia grossa Linnaeus, *Syst. Nat.* xii. 1 (1766) p. 307 ["America": ex Brisson: we substitute *Cayenne* as typical locality].
Pitylus grossus Pelzeln, *Zur Ornith. Brasil.* iii. (1869) p. 220 (Pará).

♂ ad., 2 ♀♀ from Prata, 22 xi., 4, 8. xii. 05. Nos. 180, 264, 298. "Iris brown."

Not different from Guianan specimens.

18. Pitylus erythromelas (Gm.)

Cf. *Nov. Zool.* xii. (1905) p. 276.

2 ♂♂ ad. and 1 ♀, 30, 31. x., 15. xi. 05. Nos. 43, 49, 128. "Iris brown."

The male from 30. October is still in moult, while the other one has already assumed perfect plumage.

19. Pitylus canadensis canadensis (Linn.)

Cf. *Nov. Zool.* xii. (1905) p. 276.

2 ♂♂ ad. from Prata, 4, 18. xi. 05. Nos. 71, 151. "Iris brown."

20. Guiraca rothschildii Bartl.

Cf. *Nov. Zool.* xii. (1905) p. 277.

3 ♂♂ and 1 ♀ ad. from Prata, 28. x., 7, 16. xi., 1. xii. 05. Nos. 34, 88, 135, 240. "Iris brown."

These specimens agree perfectly with Bartlett's types, now in the Tring Museum.

21. Volatinia jacarina splendens (Vieill.)

Cf. *Nov. Zool.* xii. (1905) p. 278.

2 ♂♂ imm., 2 ♂♂ juv., 4, 6. xii. 05. Nos. 254, 257, 280, 281. "Iris dark brown."

22. Coryphospingus cucullatus (P. L. S. Müll.)

Cf. *Nov. Zool.* xii. (1905) p. 278.

1 ♂ ad. and 2 ♀♀, 16. xi. 05. Nos. 131, 133, 136. "Iris brown."

The ♂ ad. is, like those sent by Layard and Robert, much paler, more rosy red on the lower parts than examples from Paraguay and S. Brazil. Perhaps the Pará form could be separated, but a good series from Cayenne should be compared.

23. Cacicus cela (Linn.)

Parus Cela Linnaeus, *Syst. Nat.* x. (1758) p. 191 ["in Indiis"—errore! As typical locality accepted *Surinam*; cf. *Nov. Zool.* xiii. (1906) p. 20].
Cacicus persicus Sclater & Salvin, *P. Z. S.* 1867. p. 573 (Pará).
Cassicus persicus Layard, *Ibis* 1873. p. 381.

2 ♂♂ ad. from Prata, 10, 20. xi. 05. Nos. 161, 310. "Iris light blue."

Not different from Surinam and Guianan skins.

24. Cacicus haemorrhous haemorrhous (Linn.)

Cf. *Nov. Zool.* xii. (1905) p. 279.

3 ♂♂ ad., 1 ♀ imm., 7, 9, 13. xi., 21. xii. 05. Nos. 84, 97, 115, 398. "Iris light blue."

25. Cassidix oryzivora (Gm.)

Oriolus oryzivorus Gmelin, *Syst. Nat.* 1. i. (1788) p. 386 [ex Latham · Cayenne].
Cassidix oryzivora Sclater & Salvin, *P. Z. S.* 1867. p. 573 (Pará).
Cassidix ater Pelzeln, *Zur Ornith. Brasil.* iii. (1869) p. 201 (Pará).

A single ♀ ad., 25. xi. 05. No. 203. "Iris pale yellow."

26. *Colopteryx galeatus (Bodd.)

Motacilla galeata Boddaert, *Tabl. Pl. enl.* 1783. p. 24 [ex Daubenton, *Pl. enl.* 391 fig. 1. - Cayenne].
Colopteryx inornatus Ridgway, *P. U. S. Mus.* x. (1888) p. 519 descr. orig. ♀ [Santarem].

1 ♂ ad., and 2 young ♂♂: 4. xii., 9, 14. xi. 05. Nos. 93, 117, 260. "Iris white, or whitish yellow." In addition to these, we possess an adult ♂, collected by Professor Steere near Benfica, Pará.

The adult males differ in no way from a very large series of the same sex from Cayenne, Surinam, Orinoco, Caura, and British Guiana. The characters given by Ridgway as distinguishing his *C. inornatus* are simply those of the female. We have a good many sexed ♀♀ from the above localities, and all differ from the males in their shorter, less conspicuous crest, smaller size, and in having the throat less, sometimes not at all streaked with greyish. The back is not brighter green in the Pará specimens; on the contrary, some of our Cayenne skins are decidedly brighter than the latter. Natterer's specimen from Manáos (Barra do Rio Negro), which I examined, is also exactly similar to others from Cayenne.

	Wing.	Tail.
3 ♂♂ ad. from Pará	46, 46, 47	40½, 42, 42 mm.
2 ♂♂ juv. „ „	44½, 45	37, 38 „
10 ♂♂ ad. from Surinam, Cayenne, and British Guiana	46—48	40—44 „
6 ♀♀ and ♂♂ juv. from Surinam, Cayenne, and British Guiana	42—45	35—39 „

This species has not before been recorded from Pará.

27. Mionectes oleagineus oleagineus (Licht.)

Muscicapa oleaginea Liechtenstein, *Verz. Dubl.* p. 55 (1823.—Bahia).
Mionectes oleagineus Sclater & Salvin, *P. Z. S.* 1867. p. 577 (Pará); Layard, *Ibis* 1873. p. 382 (Pará).

2 ♂♂, 2 ♀♀: 10, 21, 23. xi., 14. xii. 05. Nos. 99, 171, 188, 345. "Iris brown."

These specimens agree with others from British Guiana and Bahia.

28. Ornithion pusillum pusillum (Cab. and Heine).

Myiopatis pusilla Cabanis & Heine, *Mus. Hein.* ii. (1859) p. 58 [Cartagena, N. Colombia].
Camptostoma flaviventre Sclater & Salvin, *P. Z. S.* 1867. p. 577 (Mexiana Isl.—specimen in Brit. Mus. examined).
Ornithion incanescens (nec Wied!) Layard, *Ibis* 1876. p. 382 (Nazaré, near Pará.—specimen in Brit. Mus. examined).

A single ♂ ad. from Prata, 17. xii. 05. No. 369. "Iris light brown."—Wing 51; tail 42; bill 10 mm.

This bird agrees with a series from Surinam, while Bogotá skins have the cap of a darker, more brownish tinge. Examples from the Orinoco valley and from the Caura River present a large amount of variation in the colour of the crown. In some of them it is quite as dark as in Bogotá skins, but others are scarcely distinguishable from those of Surinam and Pará.

If the latter represent *O. napaeum* Ridgw.,† I doubt the possibility of separating it from *O. p. pusillum*.

29. * Elainea gaimardii (D'Orb.)

Muscicapara Gaimardii D'Orbigny, *Voyage, Oiseaux* (publ. betw. 1838 and 1847) p. 326 [Yuracares, N.E. Bolivia.—Type examined].

1 ♂ ad. and 1 ♀ ad.: 2, 6. xii. 05. Nos. 243, 276. "Iris brown."

These specimens are not different from others from Brit. Guiana, the Orinoco valley, etc.

30. Myiozetetes cayanensis cayanensis (Linn.)

Cf. *Nov. Zool.* xii. (1905) p. 293.

A single ♀ ad., 18. xi. 05. No. 150. "Iris brown."

It agrees perfectly with a large series from Cayenne, Brit. Guiana, etc.

31. Craspedoprion olivaceus (Temm.)

Rhynchocyclus olivaceus Hellmayr, *Nov. Zool.* xii. (1905) p. 293.

One ♂ ad., 23. xi. 05. No. 186. "Iris brown."—Wing 76; tail 67; bill 15½ mm.

This specimen is fully as large as examples of true *C. olivaceus* from Bahia, and differs only in having the fulvous margins to the upper wing-coverts rather paler and narrower. This slight difference should be confirmed by a larger series before separating the Pará form.

32. Rhynchocyclus poliocephalus sclateri Hellm.

R. p. sclateri Hellmayr, *Verhandl. zool. botan. Gesellsch.* Wien 1903. p. 207 descr. orig. [Barra do Rio Negro].
R. sulphurescens (nec Spix!) Sclater & Salvin, *P. Z. S.* 1867. p. 578 (Pará).
R. megacephalus (nec Swainson!) Layard, *Ibis* 1873. p. 383 (Pará).

One ♂ ad. from Prata, 21. xi. 05. No. 172. "Iris yellowish white"—Wing 54; tail 44; bill 12 mm.

This example agrees perfectly with a large series from Brit. Guiana, Surinam and the Orinoco region. The chin and throat are always strongly suffused with whitish, and the belly is of a pale yellow, slightly underlaid with greyish on the chest.

† *Proc. U. S. Mus.* x. (1888) p. 520 (Santarem).

Two specimens of *R. p. poliocephalus* Taez. from Xeberos and the upper Ucayali are much brighter yellow underneath and the throat is not mixed with whitish. The differences in size mentioned by me *l. c.* do not appear to be constant.

I examined one of Wallace's specimens, previously determined as *R. sulphurescens* by Sclater and Salvin, and the ♂ ad. collected by Layard,† and found both to belong to *R. p. sclateri*.

33. * Myiobius barbatus barbatus (Gm.)

Muscicapa barbata Gmelin, *Syst. Nat.* 1. ii. (1788) p. 933 [ex Daubenton, *Pl. enl.* 830 fig. 1—Cayenne.]

One ♂ ad. (with lemon-yellow crown-patch) and four ♀♀ or young ♂♂: 9, 20. xi., 2, 3. xii. Nos. 96, 160, 245, 248, 249. "Iris brown."

The series agrees with specimens from British Guiana and the Caura River, Venez., except that the foreneck is slightly more suffused with ochreous. This colour, however, is much duller and paler than in *M. b. mastacalis* (Wied) from Bahia.

34. Myiobius erythrurus erythrurus Cab.

Myiobius erythrurus Cabanis, *Arch. Naturg.* 13. i. p. 249 pl. 5 fig. 1 [1847—"Guiana, Cayenne"]; Sclater & Salvin, *P. Z. S.* 1867. p. 578 (Capim River).

One ♂ in moult, 14. xi. 05. No. 122. "Iris brown."—Wing 51½; tail 40; bill 8 mm.

This bird evidently belongs to the typical form, and differs from a series of the Caura River only in having the back more fulvous brown, less mixed with olive greyish. Topotypical Guianan specimens are not available for comparison.

The distingnishing characters of the western form, *M. e. fulvigularis* Salv. & Godm., have been pointed out by Berlepsch & Hartert, *Nov. Zool.* ix. (1902) p. 50.

35. Empidonomus varius (Vieill.)

Cf. *Nov. Zool.* xii. (1905) p. 293.

A single ♀ ad.: 7. xi. 05. No. 82. "Iris brown."

36. Pipra rubrocapilla subsp.

3 ♂ ad. 2 ♂ juv. and 1 ♀ ad. from Prata: 24, 31. x., 12, 26, 29. xi., 12. xii. 05. Nos. 17, 46, 106, 216, 236, 323. Iris marked as "whitish" or "pale yellow."

The ♂♂ ad. sent by Mr. Hoffmanns, as well as two others collected by Prof. Steere near Pará, differ from a large series of true *P. r. rubrocapilla* (more than twenty specimens) by the much lighter, more orange-red colour of the forehead and crown, which, in the typical form, are of the same dark crimson-red as the occiput. The difference between the two forms is about the same as that existing between *P. m. mentalis* Scl. and *P. m. ignifera* Bangs.

In my paper on the genus *Pipra* ‡ I alluded to the pale forehead, in two specimens from Pará; having now received three more skins which exhibit the same peculiarity, I feel quite confident as to the constancy of this character.

This form will shortly be described by a fellow-student of ornithology.

† *Cat. Birds Brit. Mus.* xiv. p. 171: *R. poliocephalus*, specimen g. ‡ *Ibis* 1906. p. 13.

37. Pipra leucocilla leucocilla Linn.

Pipra leucocilla Linnaeus, *Mus. Ad. Frid.* ii. Prodr. p. 33 [1761.—No locality, we substitute *Surinam*]; Sclater & Salvin, *P. Z. S.* 1867. p. 580 (Pará); Layard, *Ibis* 1873. p. 384 (Pará).

3 ♂ ad., 2 ♂ juv., and 3 ♀ ad.: 13, 31. x., 1, 3, 7, 30. xi., 1, 3. xii. 05. Nos. 7, 45, 49, 62, 78, 237, 241, 250.

38. Pipra opalizans Pelz.

Cf. *Nov. Zool.* xii. (1905) p. 294.

A single ♀ from Prata, 27. x. 05. No. 23. "Iris white, feet grey, bill greyish white."—Wing 55; tail 29; bill 11 mm.

According to a letter, Mr. Hoffmanns observed also the male, but unfortunately he was not able to get it.

39. Chiroxiphia pareola pareola (Linn.)

Pipra Pareola Linnaeus, *Syst. Nat.* xii. 1. p. 339 [1766.—ex Brisson, Edwards and Maregrave: we accept *Cayenne* (ex Brisson) as the typical locality].
Chiroxiphia pareola Pelzeln, *Zur Orn. Bras.* ii. (1868) p. 129 (Pará); Layard, *Ibis* 1873. p. 384 (Pará); Sclater & Salvin *P. Z. S.* 1867. p. 580 (Pará).

9 ♂ ad., 3 ♂ juv., and 3 ♀♀ from Prata: 7, 8, 10, 13, 16, 20, 20, 30. xi: 6, 19, 20, 24. xii. Nos. 86, 89, 102, 113, 114, 140, 142, 153, 154, 175, 231, 283, 382, 388, 417. Iris marked as "brown" or "dark red."

The specimens agree perfectly with others from Cayenne and British Guiana.

As far as we know, there are three geographical races of *C. pareola* to be distinguished.

a. C. p. pareola (Linn.): Guianas, Lower Amazons and Eastern Brazil as far south as Espiritu Santo (Wied).

b. C. p. atlantica Dalm. Island of Tobago.

c. C. p. boliviana Allen. Eastern Bolivia.

40. Chiromachaeris manacus purus (Bangs).

Manacus manacus purus O. Bangs, *Proc. New Engl. Zool. Cl.* i. (1899) p. 36 (Santarem).
Chiromachaeris manacus (nec Linné) Sclater & Salvin, *P. Z. S.* 1867. p. 580 (Pará); Layard, *Ibis* 1873. p. 384 (Pará).

6 ♂ ad. and 5 ♀♀: 11, 21, 29.xi.; 3, 13, 18, 20, 23. xii. Nos. 118, 162, 229, 233, 234, 235, 253, 332, 368, 387, 415.—"Iris brown or dark brown."

In addition to these, we possess two males and a female, collected by Prof. Steere near Marca da Legua, and at Marguary, in the district of Pará.

The adult males fully bear out the characters indicated by Mr. Bangs. All have the under tail-coverts white, only the sides of the abdomen being pale grey: the black area on the back is restricted to a rather narrow transverse band.

Four ♂♂ ad. collected by Natterer near Borba (on the lower course of the Rio Madeira) belong also to this well-marked form.

41. Scotothorus amazonum wallacii (Scl. & Salv.)

[*Heteropelma amazonum* Sclater, *P. Z. S.* 1860. p. 466 (Chamicuros, East Peru).]
Heteropelma wallacii Sclater & Salvin, *P. Z. S.* 1867. p. 579 ("in vic. urbis Pará").

5 ♂♂ ad.: 28. x.; 12, 15, 29. xi. 1905. Nos. 35, 107, 124, 129, 227. "Iris brown." Wing 87, 91, 92, 92, 94; tail 67, 70, 70, 70½, 72; bill 15—16 mm.

These specimens are particularly interesting, as they come from the typical locality.

S. a. wallacei is a very slightly differentiated form, but may be distinguished from *S. a. amazonum* by its purer green back and by the duller, less rufescent outer webs of the quills. The crown is scarcely washed with rufous, and there is no rufous tinge on the throat. As a rule, breast and abdomen are of a paler, rather more greyish green colour than in *S. a. amazonum*, but some specimens are hardly different on this score.

A series from British Guiana (Camacusa, Bartica Grove, R. Carimang), and two adult specimens from the Caura River, Venez., agree with those from Pará in the colour of the head and wings, but the back is decidedly darker, more brownish green, almost as dark as in *S. a. amazonum* from Upper Amazonia, and the throat and foreneck are tinged with brownish. These birds are thus somewhat intermediate between *S. a. amazonum* and *S. a. wallacii*.

42. Tityra cayana (Linn.)

Cf. *Nov. Zool.* xii. (1905) p. 294.

3 ♂♂ ad. and 1 ♀ from Prata: 7, 12, 24. xi. 05. Nos. 108, 109, 200, 291. "Iris brown."

These skins are typical in every way, and agree exactly with others from Cayenne and Surinam. Cf. my remarks *l. c.*

43. Lathria cinerea (Vieill.)

Cf. *Nov. Zool.* xii. (1905) p. 295.

1 ♂ ad. and 1 immature ♀: 3. xi., 13. xii. 1905. Nos. 64, 330. "Iris brown."

44. Lipangus simplex (Licht.)

Cf. *l. c.* p. 295.

One pair from Prata: 28. x., 4. xi. 05. Nos. 38, 75. "Iris 'dark red' in the male, 'brown' in the female."

45. *Laniocera hypopyrra (Vieill.)

Ampelis hypopyrra Vieillot, *Nouv. Dict.* viii. (1817) p. 164 ("à la Guyane" se. Cayenne).

1 ♂ from Prata, 1. xi. 05. No. 52. "Iris brown."

This specimen has the bright patch on the sides of the chest sulphur-yellow, and no orange spots in the middle of the breast. It agrees with others from British Guiana and the Orinoco region.

The species is new to the fauna of Pará.

46. *Sclerurus rufigularis Pelz.

Sclerurus rufigularis Pelzeln, *Zur Ornith. Brasil.* ii. (1868) p. 161, descr. orig. (Borba and Marabitanas, Brazil sept.).

A single adult ♂ from Prata, 24. x. 05. No. 11. "Iris brown."

It agrees perfectly with Pelzeln's types: 1 ♀ ad. and 2 ♂♂ imm. Besides these I have examined an immature bird from the Takutu River, British Guiana, and a young ♀ from Iponsin, Rio Approuague, Cayenne (Cherrie coll.) in the Tring Museum; and the British Museum possesses five specimens, none of them

quite adult, obtained by H. Whitely, jr., in British Guiana at the following localities: Rio Carimang, R. Takutu, Ourumee and Bartica Grove. They had been referred by Dr. Sclater partly to *S. mexicanus*, partly to *S. caudacutus*.

After comparing these eleven skins with some thirty specimens of *S. mexicanus*, I have come to the conclusion that *S. rufigularis* is a perfectly distinct, though nearly allied, species. I at first thought it might be a geographical race of *S. mexicanus* ; but such cannot be the case, as true *S. mexicanus* also is found in some of the localities where *S. rufigularis* is met with. For instance, the British Museum has an adult ♂ from Ourumee, British Guiana, and a specimen from the Capim River (coll. Wallace) which I am unable to distinguish from several Central American skins. On the other hand, among the large number of skins from Mexico, Nicaragua, Costa Rica, etc., I never found any specimen approaching the form here called *S. rufigularis*.

All the eleven specimens differ from *S. mexicanus* in their much weaker and shorter bills and in having the throat of a decidedly brighter and clearer rufous. In *S. m. mexicanus* and *S. m. obscurior* Hart. the young birds have the bill quite as long and stout as the adults.

For the sake of comparison I append the measurements of the three forms :

29 *S. m. mexicanus* from Central America, bill 22—25½ mm.

5 *S. m. obscurior* from N.W. Ecuador, bill 22—24½ mm.

11 *S. rufigularis*, 17—19½ mm.

47. Synallaxis omissa Hart.

Synallaxis omissa Hartert, *Bull. Brit. Orn. Cl.* xi. (June 1901) p. 71 (Pará).
Synallaxis rutilans (nec Temm.) Sclater & Salvin, *P. Z. S.* 1867. p. 574 (Pará).

1 ♂ juv. from Prata, 14. xi. 1905. No. 121. "Iris brown." Wing 63 ; tail 68 ; bill 13½ mm.

This specimen is a young bird, as shown by the fluffy structure of the feathers on the rump, and differs from the type in having the head and mantle of a more brownish hue, the sides of the neck strongly, the chest and the sides of the body slightly washed with ferruginous, and the quills outwardly margined with the same colour. The blackish throat-patch is rather smaller, and the under wing-coverts are narrowly tipped with orange. The tail is uniformly dull blackish, as in the type specimen. The specimen collected by Wallace and recorded s. n. *S. rutilans* by Sclater & Salvin, is an immature bird of the present species.

S. omissa is peculiar to the district of Pará.

48. Automolus infuscatus paraensis Hart.

Cf. *Nov. Zool.* xii. (1905) p. 279.

1 ♀ ad. and 1 adult bird not sexed, from Prata, 23. x., 17. xi. 05. Nos. 2, 145. Iris marked as "greyish white" (No. 2) and "brown" (No. 145).

These examples fully confirm the differences stated in my former article.

49. Philydor erythrocercus (Pelz.)

Cf. *Nov. Zool.* xii. (1905) p. 280.

A single ♂ ad. from Prata, 28. x. 05. No. 37. "Iris brown."

50. Xenops genibarbis genibarbis Ill.

Xenops genibarbis Illiger, *Prodr. Syst. Mamm. et Av.* p. 213 (1811—Cametá); Layard, 1873. p. 385 (Pará).

A single ♂ ad. from Prata, 15. xi. 05. No. 127. "Iris brown."

51. Glyphorhynchus cuneatus cuneatus (Lcht.)

Cf. *Nov. Zool.* xii. (1905) p. 280.

3 ♂♂ and 2 ♀♀, 24, 26. x., 10, 16, 23. xi. 05. Nos. 1, 18, 105, 139, 190. "Iris brown."

52. Dendrornis eytoni (Scl.)

Cf. *l.c.* p. 283.

3 ♂♂ ad. from Prata, 10. xi., 5, 12. xii. 05. Nos. 103, 273, 325. "Iris brown."

The bill is entirely black. Wing 123, 123, 127; tail 106, 108, 112; bill 42—43 mm.

53. Dendrocolaptes certhia certhia (Bodd.)

Cf. *l.c.* p. 282.

A single ♂ ad. from Prata, 23. x. 05. No. 3. "Iris brown."

This specimen agrees with others from Cayenne, etc., and shows no approach to *D. c. ridgwayi* from Santarem.

54. Thamnophilus major semifasciatus (Cab.)

T. m. s. Hellmayr, *Nov. Zool.* xii. (1905) p. 283.

A single ♂ ad. from Prata, 21. xii. 05. No. 397. "Iris red."

55. Thamnophilus amazonicus Scl.

Thamnophilus amazonicus Sclater, *P. Z. S.* 1858. p. 214 (descr. ♂♀) pl. 139 (Upper Amazons); Sclater & Salvin, *P. Z. S.* 1867. p. 575 (Pará and Rio Capim); Layard, *Ibis* 1873. p. 386 (Pará).

Nine males, some of them not quite adult, 3, 4, 9, 16, 24, 25, 28. xi., 12, 13. xii. 1905. Nos. 65, 70, 98, 143, 194, 206, 221, 322, 333. "Iris brown."

1 ♀ ad., 7. xi. 05. No. 90. "Iris brown."

These specimens do not differ from Upper Amazonian skins.

Salvin and other authors called this bird *T. ruficollis* ex Spix. The females of *T. amazonicus* and *T. cinereiceps* Pelz., however, are quite identical in coloration, differing only in size, and as Spix collected also on the Rio Negro where the latter species is met with, his description and figure could refer with equal certainty to the female of *T. cinereiceps*. Unfortunately the type does not any longer exist in the Munich Museum, and I see no alternative but to drop the name *ruficollis* altogether in favour of those proposed by Sclater and Pelzeln, about the application of which there is not the slightest doubt.

56. Thamnophilus palliatus (Lcht.)

Lanius palliatus Lichtenstein, *Verz. Dubl.* 1823. p. 46 (Bahia).

A single ♀, 6. xi. 05. No. 77. "Iris whitish grey."

57. **Thamnophilus incertus** Pelz.

Thamnophilus incertus Pelzeln, *Zur Orn. Brasil.* ii. (1868) p. 149 (Pará).
Dysithamnus incertus Hellmayr, *Nov. Zool.* xii. (1905) p. 284 (crit.)

Four adult males, 7, 22, 25. xi., 9. xii. 05; and 1 ♀ ad., collected 14. xi. 05. Nos. 83, 120, 176, 207, 306. Iris marked as "brown," "reddish brown," "yellowish red," or "bright red."

These specimens are in every way identical with those sent by Mons. Robert from the same district. The males have the bend of the wing and the lesser upper wing-coverts freckled with white. The top of the head is always slate-grey like the back, and there is no trace of a white interscapular blotch. About the systematic position of this species cf. *supra*, p. 339.

58. **Dysithamnus mentalis mentalis** (Temm.)

Myothera mentalis Temminck, *Pl. col.* livr. 30. tab. 179. fig. 3 = ♂ ad. (1823—Brésil, sc. Curytiba, Paraná. Type in Vienna Museum examined).
Dysithamnus mentalis Goeldi, *Ibis* 1903. p. 499 (Capim River).

1 ♂ ad., 14. x. 05, and 1 ♀ ad. 24. xi. 05. Nos. 15, 197. "Iris brown."

They agree well with a good series of South Brazilian skins, except that in the male the yellow colour on the abdomen is less extended.

59. **Pygiptila stellaris** (Spix).

Thamnophilus stellaris Spix, *Av. Bras.* ii. (1825) p. 27. tab. xxxvi. fig. 2. descr. orig. ♂ (Pará).
Thamnophilus maculipennis Sclater, *Edinb. New Philos. Journ.* (new ser.) i. (1855) p. 247 ("Quixos in Cisandean Ecuador and Peruvian Amazons").
Thamnophilus stellaris and *Pygoptila maculipennis* Sclater, *Cat. Birds Brit. Mus.* xv. pp. 195, 217.

1 ♂ vix ad. and 1 ♀ ad., 24. xi., 21. xii. 05. Nos. 193, 399. "Iris greyish brown" (♂), "brown" (♀).

They agree in every respect with specimens from the Upper Amazons and the Orinoco district. The Tring Museum has lately received a pair from near Paramaribo, Surinam, which does not differ either.

There can be scarcely any doubt that *T. stellaris* is the oldest name for this species, although Spix's type does not any longer exist in the Munich Museum. The description and figure suit our bird very well, and the only reason for rejecting the name *stellaris* was apparently the locality, which had been considered erroneous, but which now proves to be quite correct.

I may mention that in the *Cat. of Birds* this species is described under two different names, as I have satisfied myself by examining the specimens in the British Museum. The two skins recorded under the head of *Thamnophilus stellaris* are absolutely indistinguishable from those named *Pygoptila maculipennis*. It need not be emphasised that they have nothing to do with *Thamnophilus tristis* Scl. & Salv., which belongs to quite a different genus.

60. **Thamnomanes caesius hoffmannsi** Hellm.

T. c. hoffmannsi Hellmayr, *Bull. B. O. C.* xvi. Febr. 1906. p. 53.
T. caesius (nec Temminck), Hellmayr, *Nov. Zool.* xii. (1905) p. 285 (Igarapé-Assú, Pará).

2 ♂♂ ad. from Prata: 15, 20. xi. 05. Nos. 148, 158. "Iris brown."

This interesting new form resembles *T. c. caesius* from Bahia in having **no** white interscapular blotch, but agrees with *T. c. glaucus* in the clear slate-grey

colour of the plumage. It differs from both by its **pure white** (not slaty greyish) under wing-coverts. The throat is variegated with white (this being sometimes slightly indicated in *T. c. glaucus*), the ear-coverts show fine whitish shaft-lines, and the edge of the wing is white, not slate grey as in *T. c. glaucus*.

The ♂ imm., sent by M. Robert, and recorded s. n. *T. caesius*, exhibits the same differences when compared with examples of *T. c. glaucus* in corresponding plumage.

The female of the Pará form is not distinguishable from the same sex of *T. c. caesius*.

The range of the three subspecies of *Thamnomanes* is as follows:

a. T. c. caesius (Temm.): Eastern Brazil: Bahia and Espiritu Santo (Wied), west to the Rio Madeira (Salto do Girao, Natterer coll.), and the Rio Juruá (Garbe coll.; spec. in Mus. Paulista examined).

b. T. c. hoffmannsi Hellm.: N.E. Brazil, vicinity of Pará.

c. T. c. glaucus Cab.: Cayenne, Brit. Guiana, Surinam, thence through the Orinoco region (Munduapo, Caura R.) to the Rio Negro (Marabitanas, Rio Içauna, Barcellos, Manáos), to Eastern Ecuador, E. Peru, and N.E. Bolivia (D'Orbigny coll.—spec. in Paris Museum examined). Occasionally also found in Bogotá collections.

61. *Myrmotherula surinamensis surinamensis (Gm.)

Sitta surinamensis Gmelin, *Syst. Nat.* 1. i. (1788) p. 442 (ex Latham: "Surinam Nuthatch," *Gen. Syn.* 1. ii. p. 654. tab. 28 (= ♀)—Surinam).

A single ♂ ad., collected at Prata, 16. xi. 05. No. 138. "Iris brown."—Wing 52; tail 25; bill 14 mm.

It agrees perfectly with four ♂♂ ad. from near Paramaribo (topotypical *M. surinamensis*). All have the lower mandible whitish, and the whole lower surface striped with black.

This is not only the first record of the species for Pará, but also for the Brazilian Avifauna.

62. Myrmotherula cinereiventris cinereiventris Scl. & Salv.

Cf. *Nov. Zool.* xii. (1905) p. 286.

1 ♂ ad., 1 ♂ juv., 1 ♀ from Prata, 26. x., 15, 17. xi. 05. Nos. 20, 126, 146. "Iris brown."

The female agrees in the coloration of the underparts with others from Cayenne, while the one sent by Robert is much darker underneath.

63. Myrmotherula axillaris axillaris (Vieill.)

Myrmothera axillaris Vieillot, *Nouv. Dict.* xii. (1817) p. 113 ("La Guyane," sc. Cayenne).
Thamnophilus melanogaster Spix, *Av. Bras.* ii. (1825) p. 31. pl. xliii. fig. 1. (= ♂) (Curupá, mouth of the Amazons.—Type in Munich Museum examined).

3 ♂♂: 14. x., 16. xi., 21. xii. 05. Nos. 10, 134, 401. Iris brown or black (No. 10).

1 ♀: 13. x. 05. No. 6. Iris brown.

These specimens are in no way different from a good series of topotypical Cayenne skins, having the sides of the belly snow-white. I examined the type of *T. melanogaster* Spix, preserved in the Munich Museum, and found it also to belong to typical *M. axillaris*. The form of Eastern Brazil (from Pernambuco to Rio),

hitherto called *M. melanogastra*, ought to bear the next available name, *M. luctuosa* Pelz., of which I have likewise seen the types, and its proper appellation is, therefore, *M. axillaris luctuosa* Pelz.

64. **Myrmotherula longipennis** Pelz.

Myrmotherula longipennis Pelzeln, *Zur Orn. Brasil.* ii. (1868) p. 153 (Marabitanas and Rio Negro).
M. brevicauda (nec Swainson !) Sclater & Salvin, *P. Z. S.* 1867. p. 576 (Capim River, the ♂ only).

2 ♂♂ ad., 30 x., 15. xi. 05. Nos. 40, 130. "Iris brown."—Wing 59½, 60; tail 33; bill 13½, 14½ mm.

These two skins have the middle of the breast and the cheeks decidedly paler grey than the rest of the plumage, and the ear-coverts show distinct silvery-white shaft-lines, which are entirely wanting in the types of the species and in one ♂ ad. from Snapure, Caura River.

I have examined the specimens recorded by Sclater & Salvin s. n. *M. brevicauda*. The ♂ belongs to *M. longipennis*, agreeing perfectly with Guianan examples in size and coloration except the lower surface, which is much clearer grey, almost as pale as in *M. berlepschi* Hellm.; but I feel sure the colour has been altered by some external influence.

The so-called ♀, however, belongs to *M. a. axillaris* (Vieill.).

65. **Myrmotherula hauxwelli hellmayri** Snethlage.

M. h. hellmayri Snethlage, *Orn. Monber.* xv. (1906) p. 9. descr. orig. ♂ (no locality given, the types came apparently from Pará).
Myrmotherula spec.; Hellmayr, *Nov. Zool.* xii. (1905) p. 285 (Pará).

3 ♂♂ and 3 ♀♀, collected 15, 24, 28. x., 1, 26. xi. 05. Nos. 14, 16, 33, 36, 50, 213. Iris marked as "brown" or "blackish brown."

These specimens differ from a good series of true *M. hauxwelli* by the complete absence of the white interscapular patch; besides this, the females have the upper parts of a warmer olive-brown. The male has been fully described by Miss Snethlage.

M. hauxwelli does not belong to the section of *M. axillaris*, where it has been placed by Mr. Sclater (*Cat. Birds* xv. p. 237), but it is a very near ally of *M. guttata* (Vieill.). In fact, both species agree perfectly in the markings of the wing-coverts, tertials, upper tail-coverts, and rectrices, and in the shortness of the tail. The only difference between the males consists of the colour of the abdomen, which is ferruginous red in *M. guttata*, and slate grey like the breast in *M. hauxwelli*. The females differ only by the colour of the throat and breast. These are pale buffy brownish in *M. guttata*, while in *M. hauxwelli* the whole undersurface from the chin to the crissum is bright ferruginous.

66. **Formicivora grisea** (Bodd.)

Turdus grieseus (sic) Boddaert, *Tabl. Pl. enl.* 1783. p. 39 (ex "Le Grisin de Cayenne," Daubenton, *Pl. enl.* 643. fig. 1 = ♂.—*Cayenne*).
Formicivora grisea Sclater & Salvin, *P. Z. S.* 1867. p. 576 (Rio Tocantins); Pelzeln, *Zur Ornith. Brasil.* ii. (1868) p. 73 (Pará); Layard, *Ibis* 1873. p. 387 (Pará).

3 ♂♂ and 2 ♀♀ ad.: 4, 8, 21, 23. xi., 20. xii. 05. Nos. 69, 80, 170, 182, 386. "Iris brown."

This series agrees well with specimens from British Guiana and Bahia, the females being bright ochraceous underneath except the whitish throat.

67. Cercomacra sclateri Hellm.

Cercomacra sclateri Hellmayr, *Nov. Zool.* xii. (1905) p. 288 (type ex Chyavetas, Peru).

A single ♂ ad. from Prata, 14. xi. 05. No. 119. "Iris brown."

This specimen agrees in all essential characters with the type from Eastern Peru, but is much paler grey both above and below. The examples collected by Natterer on the Rio Madeira show the same pale coloration, and seem to indicate that the Brazilian birds represent a different form. A good series of **fresh** skins from Peru, however, should be compared before attempting any separation.

68. Cercomacra tyrannina (Scl.)

Cf. *Nov. Zool.* xii. (1905) p. 286.

7 ♂♂ ad. and imm., 5 ♀♀ from Prata: 14. x., 3, 7, 8, 10, 14, 24, 28. xi., 2, 15. xii., 05. Nos. 12, 13, 67, 79, 85, 100, 116, 196, 220, 242, 346, 347. "Iris brown or greyish brown" (No. 196).

69. Pyriglena leuconota leuconota (Spix).

Cf. *Nov. Zool.* xii. (1905) p. 290.

5 ♂♂ ad., 1 ♀ ad., and 2 ♀♀ juv.: 27. x., 2. xi., 9. xii. Nos. 26, 28, 29, 31, 53, 54, 59, 303. Iris marked as "red."

The females present all the characters described by me *l. c.*

70. Hypocnemis poecilinota vidua Hellm.

Hypocnemis vidua Hellmayr, *Nov. Zool.* xii. (1905) p. 290, descr. orig. ♀ (Igarapé-Assú); Snethlage, *Orn. Monber.* xiv. (1906) p. 29 (descr. ♂).

4 ♂♂ ad.: 28, 30. x., 2, 27. xi. .
5 ♀♀ ad. and jr.: 27, 27, 30. x., 16, 25. xi.
1 ♂ juv.: 29. xi. 05 . . . . .

Nos. 27, 30, 32, 39, 43, 60, 144, 157, 208, 215. "Iris brown."

When describing this interesting addition to the fauna of Pará, I had only a single female before me. Miss Snethlage has since published a note pointing out that the male closely resembled that of *H. poecilinota*. This is quite an unexpected discovery, as the type showed no trace of the black and fulvous markings on the back and wings so conspicuous in the female of *H. poecilinota*.

Mr. Hoffmanns has now sent a good series of both sexes, which enables me to speak more confidently about the characters of *H. vidua*.

As stated by Miss Snethlage, the males resemble in general coloration those of *H. poecilinota poecilinota* and *H. p. lepidonota*, having the back, the upper wing-coverts, and inner secondaries marked with black and white cross-bars, but differ at a glance by their **whitish throat**, which is in decided contrast with the cinereous colour of the remaining underparts, while in the two allied forms the throat is quite as dark grey as the belly. The markings of the tail are the same; each rectrix with a white apical margin and a roundish white spot on the inner web, the outermost pair with a longitudinal white spot also about the middle of the outer web. Sometimes there are two white spots on the inner web of the two or three outer tail-feathers, but the same variation is to be observed in specimens of the allied forms.

The females agree perfectly with the typical example; some of them have a

little more white at the base of the dorsal feathers, but always much less than in *H. p. griseiventris*, of which, thanks to the kindness of my friend Dr. von Lorenz, two of the types are now before me. In addition to the characters indicated in the diagnosis of *H. vidua*, I find that the edge of the wing is cinereous (not pale ferruginous as in *H. griseiventris*), the chin whitish like the throat (not ferruginous), and the upper surface of a much less reddish tint.

Considering the apparent close relation between the females of *H. griseiventris* and *H. vidua*, I at once suspected that the male of the former was most probably of a similar style of coloration to those of *H. poecilinota* and allies, and might have been mistaken by Pelzeln for the male of *H. p. lepidonota*, of which Natterer collected a fine series at Marabitanas on the upper Rio Negro. Dr. Lorenz having kindly sent me the whole series, I found among the skins an adult male collected near Borba, where Natterer also obtained two of the type specimens of *Pithys griseiventris*. **This skin is marked by Natterer himself as the male of the latter**—a statement which seems to have entirely escaped the notice of Pelzeln—and, as it agrees with them in all structural details, **there can be no doubt that it represents the hitherto unknown male sex of** *P. griseiventris* **!**

On comparing it with a large series of *H. p. poecilinota* and *H. p. lepidonota*, the general resemblance is very close indeed, but the Borba bird differs from either in having the **upper tail-coverts pale grey, with only a narrow black subterminal bar just behind the white tip,** while they are deep black tipped with white in its allies. The base of the three median pairs of rectrices is distinctly washed with cinereous (in *H. p. poecilinota*, *H. p. lepidonota*, and *H. p. vidua* they are deep black), and the throat is decidedly paler grey than the breast, but not whitish as in *H. p. vidua*.

We have thus four geographical races of one type : the males **not** or **very slightly** different, but the females with striking differences in coloration. The most interesting fact, however, is that in two of these forms—*H. p. poecilinota* and *H. p. lepidonota*—the females have attained the ornamental characters of the male plumage, while in the two others—*H. p. vidua* and *H. p. griseiventris*—they are still devoid of these, thus apparently representing a more primitive state of development.

In the following lines I give the characters and the range of the four forms :—

a. Hypocnemis poecilinota poecilinota Cab.

Hypocnemis poecilinota Cabanis, *Arch. f. Naturg.* 13. i. (1847) p. 212. tab. 4. fig. 2 (♂) [British Guiana].

Hab. *British Guiana :* Bartica Grove, Camacusa, Merume Mts., Roraima, Rio Atapurow. *Surinam :* Maroni River. *Cayenne :* Rio Approuague (Cherrie coll., Mus. Tring). *Venezuela :* Mundnapo and Nericagua on the Orinoco R.; Caura R. : Nicare, La Pricion, La Union, Snapure.

♂. Throat quite as dark grey as the rest of the underparts ; upper tail-coverts black with white tips.

Wing 65—71 ; tail 40—45 ; bill 17—18 mm.

♀. Forehead and sides of head, including chin, bright clear ferruginous, passing into rufescent brown on the pileum ; back olivaceous brown, and like the upper wing-coverts and inner secondaries with broad black subterminal and fulvous apical cross-bands ; upper tail-coverts olive brown with fulvous tips. Edge of the wing pale ferruginous. Tail-feathers black, with a white apical margin and a creamy

white spot about the middle of the inner web, the outermost pair with a similar, but more lengthened spot on the outer web. Undersurface clear cinereous.

Wing 64—67 ; tail 39—45 ; bill 16½—17½ mm.

b. Hypocnemis poecilinota lepidonota Scl. & Salv.

Hypocnemis lepidonota Sclater & Salvin, *P. Z. S.* 1880. p. 160 [Sarayaçu, E. Ecuador].
H. poecilonota (not of Cabanis) Pelzeln, *Zur Orn. Bras.* ii. (1868), p. 88 (part. : Marabitanas and Rio Vaupé).

Hab. *East Ecuador :* Sarayaçu, Santiago, Rio Napo ; *East Colombia :* Bogotá coll. ; *N.W. Brazil :* Marabitanas and Rio Vaupé, Upper R. Negro. *Peru :* Iquitos, Chamicuros, Huambo, Yurimaguas, Guayabamba, Loreto ; Monterico and La Merced, Chanchamayo ; Poznzo, Huánuco (Hoffmanns coll.—Mus. Tring).

♂. Not to be distinguished from that of the preceding form.

Specimens from Colombia, E. Ecuador and Peru : Wing 67—70 ; tail 42—47 ; bill 16—17 mm.

Specimens from Marabitanas : Wing 69—71 ; tail 49—52 ; bill 18 mm.

♀. Whole lower surface, like forehead and sides of the head, bright ferruginous; rest of upper parts warm rufescent brown ; back, upper wing-coverts and secondaries marked as in the preceding form, but the apical margins white instead of fulvous. Upper tail-coverts rufescent brown at the base, separated by a broad black subterminal band from the white tips. Tail as in *H. p. poecilinota*, but the cross-band pure white.

Wing 65—69 ; tail 45—49 ; bill 16—18 mm.

c. Hypocnemis poecilinota griseiventris (Pelz.)

Pithys griseiventris Pelzeln, *Zur Orn. Brasil.* ii. (1868) p. 167, descr. orig. ♀ [Villa Maria and Engenho do Gama, Mattogrosso ; Borba, R. Madeira].
Hypocnemis poecilonota (nec Cabanis) Pelzeln, *l. c.* p. 88 (part. : Borba).

Hab. *West Brazil :* Borba on the Rio Madeira, Villa Maria and Engenho do Gama on the R. Guaporé, Mattogrosso.

♂ ad. (Mus. Vindob. No. 15514, Borba, January 1830, Natterer coll.). Differs from *a* and *b* in having the upper tail-coverts cinereous, this colour being separated from the white tips by a sharply defined black subterminal bar. The middle tail-feathers are washed with grey at the base, and the throat is decidedly paler grey than the belly.

Wing 69; tail 46 ; bill 16½ mm.

♀. Forehead, sides of the head and a small chin-spot pale ferruginous ; rest of pileum, back, wings, and upper tail-coverts uniform warm rufescent brown without any cross-bars ; a distinct white interscapular patch ; tail-feathers rufescent olive-brown with a black subterminal band and a white apical margin, but with no other white markings. Edge of the wing pale ferruginous. Throat whitish, rest of undersurface pale grey, flanks washed with rufescent brown.

Wing 67—70 ; tail 45—49; bill 16—18 mm.

d. Hypocnemis poecilinota vidua Hellm.

Hypocnemis vidua Hellmayr, *Nov. Zool.* xii. (1905) p. 290 descr. orig. ♀ (Pará).

Hab. *N.E. Brazil*, vicinity of Pará : Igarapé-Assú (Robert), Prata (Hoffmanns).

♂. Like *H. p. poecilinota* and *H. p. lepidonota*, with the upper tail-coverts

black tipped with white, but at once known by having the throat whitish in marked contrast to the schistaceous-grey belly.

Wing 65—66; tail 40—42; bill 16—17 mm.

♀. Like *H. p. griseiventris* without spots on inner web of tail-feathers and without any markings on back, upper tail-coverts and wings, but the upper parts are less rufescent, more olive-brown, the edge of the wing and the sides of the head pale grey (not ferruginous), the chin whitish like the throat and the forehead olive-brown like the pileum. Moreover, the flanks are washed with olive-brownish, and the axillaries pale grey (not brownish).

Wing 62½—65; tail 39—41; bill 15—17 mm.

71. **Formicarius ruficeps** (Spix).

Formicarius ruficeps amazonicus Hellmayr, *Nov. Zool.* xii. (1905) p. 292.

1 ♀ ad. from Prata, Pará, November 16, 1905. No. 137. "Iris brown."

It has the top of the head much paler rufous than the ♂ sent by Robert, and agrees perfectly with specimens of true *F. ruficeps* of Eastern Brazil, so that I can no longer distingnish my *F. r. amazonicus*. The throat is black as in the male, only narrow shaft-lines being white, which, however, are not visible unless the feathers are raised.

72. **Conopophaga roberti** Hellm.

Nov. Zool. xii. (1902) p. 292 (Igarapé Assú, Pará); Snethlage, *Orn. Monber.* xiv. (1906) p. 9 descr. ♀.

9 ♂♂: 26, 31. x.; 2, 13, 15, 21. xi.; 2. xii. 05. Nos. 19, 47, 55, 56, 57, 111, 125, 189, 247. "Iris brown, greyish brown or reddish brown."

5 ♀♀: 13. x.; 9, 13, 20. xi.; 11. xii. 05. Nos. 5, 91,-110, 156, 318. "Iris brown."

The adult males agree exactly with the type. The young males, with the tail-feathers slightly pointed, show more or less distinct rufescent apical margins to the greater wing-coverts, secondaries and rectrices.

The female has been described by Miss Snethlage. It differs from the male in the following details. Forehead and pileum are of a dull russet brown, lores and superciliary region pale cinereous (not black), the white postocular stripe is rather narrower and bordered below by a fine blackish line. Cheeks, malar region and foreneck pale cinereous, throat white, ear-coverts rufescent brown; flanks more distinctly washed with brownish than in the male.

In all other respects the sexes are alike.

♂♂: Wing 69—72; tail 35—38; bill 15—16 mm.

♀♀: Wing 65—69; tail 32—36; bill 15 mm.

The female of *C. melanogastra* Ménétr. differs from that of *C. roberti* by its much larger size, much stronger and entirely black bill (in *C. roberti* the lower mandible being always whitish), deep chestnut upper-parts, dull blackish instead of rufescent brown ear-coverts, and by the presence of a broad, light grey superciliary stripe.

73. **Corythopis torquata anthoides** (Puch.)

Cf. *Nov. Zool.* xii. (1902) p. 293.

A single ♂ ad., 14. xi. 05. No. 123. "Iris brown."

It agrees perfectly with the one sent by Robert.

74. * Threnetes cervinicauda Gould.

Threnetes cervinicauda Gould, *P. Z. S.* 1854. p. 109 ("Quijos, in Ecuador").

1 ♀ fere ad. 30. x. 05. No. 42. "Iris black."—Wing 57; tail 31; bill 30 mm.

This is a highly interesting addition to the fauna of Pará, being not only the first record of the species for Brazil, but extending its range from Eastern Peru and Ecuador to the Lower Amazons.

In the Paris Museum there is a specimen, collected near Pará by M. Baraequin in 1859, which I found to differ slightly from typical *T. cervinicauda*; but the female now sent by M. Hoffmanns does not exhibit these differences, being in every detail exactly similar to a good series from Eastern Ecuador and Bogotá collections. It is strange to find *T. cervinicauda* at Pará, where I should rather have expected *T. leucurus* of Cayenne and Surinam.

75. Glaucis hirsuta (Gm.)

Trochilus hirsutus Gmelin, *Syst Nat.* 1. i. p. 490 (1788.—ex Brisson: ex Maregrave.—"Brasilia."—We accept *Bahia* as typical locality).
Glaucis lanceolata Gould, *Monogr. Trochil.* i. (1861) pl. 8 (Pará) descr. orig.
Glaucis hirsuta Layard, *Ibis* 1873. p. 388 (Pará).

1 adult, not sexed; 1 ♂ juv.: 14. xii. 05. Nos. 335, 340. "Iris black."—Wing 62, 63; tail 38, 42; bill 30, 31 mm.

Not different from a series of Bahia skins. The characters upon which Gould founded his *G. lanceolata*, viz. the pointed tail-feathers and the buffy edges to the quills and upper wing-coverts, are those of the young birds. One of Mr. Hoffmanns' specimens (No. 335) agrees with Gould's plate and description, while the other one is exactly similar to adults from various localities.

76. * Phoethornis affinis† moorei Lawr.

[*Phaetornis affinis* Pelzeln, *Sitzungsber. Akad. Wien* xx. (1856) p. 157 (Marabitanas, Barra do Rio Negro).]
Phaethornis moorei Lawrence, *Ann. New York Lyc.* vi. (1858) p. 258 ("Ecuador").

1 ♂ jr. and 1 ♀ ad., 28. xii., 23. x. 05. Nos. 371, 4. "Iris black, feet grey, bill black, lower mandible red." Wing 60, 58; tail 68, 64; bill 38, 37 mm.

These specimens nearly agree with a series of Bogotá skins and others from the Peruvian Amazons. The underparts are dirty greyish, only the middle of the lower belly being faintly tinged with buffy.

In true *P. a. affinis* the whole lower surface is bright buff, slightly underlaid with greyish on the sides of the throat. Pelzeln's types from Marabitanas and Barra do Rio Negro which lie before me are practically identical with a very large series (some thirty specimens) from Cayenne, British Guiana and the Orinoco River. *P. guianensis* Bonc. is, therefore, a pure synonym of *P. affinis*.

In the Gould collection, British Museum, there are several examples of *P. a. affinis* said to be from Pará, but these are skins of the unmistakable **Cayenne make**, and certainly never came from Pará!

It is interesting that the Upper Amazonian form occurs near Pará. We should rather have expected to meet with *P. a. affinis* of Cayenne here.

† This is the proper specific name, I believe, for the small species with **white** under tail-coverts, called *P. superciliosus* by Berlepsch & Hartert. *Trochilus superciliosus* Linnaeus appears to be referable to *P. malaris* Nordm., since Brisson, upon whose description Linné's account is exclusively based, states that the under tail-coverts like the rest of the lower parts are "d'un blanc roussâtre." The description of the four lateral tail-feathers also applies much better to *P. malaris*.

77. Phoethornis ruber ruber (Linn.)

Trochilus ruber Linnaeus, *Syst. Nat.* x. p. 121 (1758.—ex Edwards, *Ornith.* i. p. 32, pl. 32, fig. sup. —Surinam).
Phaëthornis rufigaster and *P. pygmaeus* auct.
Pygmornis pygmaeus Layard, *Ibis* 1873. p. 388 (Pará).

Six specimens, three marked as ♂, two as ♀, and one not sexed, 2, 6, 8, 9, 22, 28. xi. 05. Nos. 58, 77, 87, 95, 174, 224. "Iris black."

These specimens are all immature, with the tail-feathers tipped or margined with cinnamon-rufous, only one showing the purple-black cross-band on the breast characteristic of the adult plumage. In most of them the rectrices are uniformly bronzy brown, as in specimens from Rio and Bahia; but two examples (Nos. 58 and 174) have a slight purplish tinge just behind the rufescent tips, thereby approaching *P. ruber episcopus* Gould of British Guiana and the Orinoco district. The latter form is very closely allied, and single specimens are not always distinguishable.

Berlepsch and Hartert (*Nov. Zool.* ix. (1902) p. 82) replaced the name of *P. episcopus* by that of *ruber* Linn., which is strictly referable to the bird of Surinam. Four specimens from near Paramaribo, however, agree with the Brazilian form (= *pygmaeus* Spix), as do also skins from Cayenne, of which I examined a good series in the Museums of Tring, London and Paris. It is, therefore, evident that the *P. pygmaeus* auct. ought to be called *P. r. ruber*, while the form of British Guiana has to stand as *P. r. episcopus* Gould.

78. Campylopterus obscurus obscurus Gould.

Campylopterus obscurus Gould, *P. Z. S.* 1848. p. 13 ("River Amazon"); Sclater & Salvin, *P. Z. S.* 1867. p. 584 (Pará); Layard, *Ibis* 1873. p. 388 (Pará).

2 ♂♂ jr. and 5 ♀♀: 4, 15, 21, 22, 24. xi. 05. Nos. 166, 168, 178, 181, 199, 262, 351. "Iris black."

This series agrees with the type of *C. obscurus* (Brit. Mus.) and with the specimens collected near Pará by Wallace and Layard. The British Museum possesses also an adult ♂ (with the shafts of the outer primaries much dilated) obtained by Natterer, which, although having no locality on the label, doubtless came from Pará, as it formed part of Natterer's last consignment. Altogether, I examined **eighteen** skins of this form, which is characterised by having the two outermost tail-feathers on each side tipped with **smoky-grey**.

In a large series from the Upper Amazons,* including the type of *C. aequatorialis* Gould (ex Quito), these patches are pure white or scarcely shaded with greyish. The difference, though slight, being evidently constant, two distinct races ought to be recognised:

a. C. obscurus obscurus Gould, from *Pará*.

b. C. obscurus aequatorialis Gould, ranging from *Eastern Ecuador* through *Eastern Peru* to *N.E. Bolivia*.

79. Florisuga mellivora (Linn.)

Trochilus mellivorus Linnaeus, *Syst. Nat.* x. (1758) p. 121 [ex Edwards, *Ornith.* i. pl. 35, fig. sup.— Surinam].
Florisuga mellivora Sclater & Salvin *P. Z. S.* 1867, p. 584 (Pará); Layard, *Ibis* 1873. p. 388 (Pará).

A large series of both sexes and young birds, obtained in October, November and December.

* 4 ♂♂ ad., 2 ♀♀ Pebas; 2 ♂♂ ad. East Ecuador; 1 ♀ or ♂ jr. from Sarayaçu, E. Ecuador; 4 skins from N.E. Peru (Bartlett coll.); 1 ♂ ad., 1 ♀ Mapiri, N.E. Bolivia (Buckley); 1 ♀ ♀ or ♂♂ jr. from S. Augustin and Guanay, N.E. Bolivia (M. Stuart coll.—Mus. Tring).

80. Agyrtria nitidifrons (Gould).

Thaumatias nitidifrons Gould, *P. Z. S.* 1860, p. 308 (loc. ign.).
Agyrtria nitidifrons Berlepsch & Leverkühn, *Ornis* vi. (1890) p. 28 (Pará).

13 ♂♂ ad. and imm., and 3 ♀♀: 26, 27, 28. xi., 2, 3, 4, 5, 8, 11, 14, 15, 18, 22. xii. Nos. 209, 212, 222, 223, 244, 256, 263, 270, 274, 297, 313, 338, 353, 380, 407, 410. "Iris black, bill black, lower mandible at basal half red or yellow."

Of this species only two specimens were known to exist: Gould's type in the British Museum (from unknown origin), and a specimen in the Kiel Museum said to be from Pará, a locality which proves to be quite correct. Mr. Hoffmanns is to be congratulated upon having secured a good series of this rare bird.

As pointed out by Berlepsch and Leverkühn, *A. nitidifrons* is a near ally of *A. affinis* (Gould), agreeing with it in the greyish green tail, in the coloration of the under tail-coverts, and in the throat being spotted in the same manner. The adult males differ, however, at a glance in having the forehead and anterior part of the crown of a beautiful glittering bluish green instead of dull bronze green; the glittering rounded spots on the throat and sides of the head have also a decided bluish hue, while they are pure golden green in *A. affinis*. Another striking difference consists of the markings of the tail, the four outer pairs of rectrices showing a broad, well-defined steel-black subterminal band on both webs; in *A. affinis* this is but slightly indicated on the inner web of the two outermost tail-feathers.

The females of *A. nitidifrons* lack the glittering patch on the head, the forehead and crown being shining metallic green like the back, and the spots on the throat are less bright and almost devoid of the bluish tinge. They are, however, easily distinguishable from *A. affinis* by the markings of the tail.

♂♂. Wing 47—50½; tail 28—31; bill 15—16½ mm.

♀♀. Wing 45—48; tail 25—27; bill 15—16 mm.

The type differs from our series only by the white ground colour of the throat being almost entirely hidden by the glittering bluish green apical portion of the feathers, and in the strong golden bronze suffusion on the rump and upper tail-coverts.

81. *Hylocharis cyanus viridiventris Berl.

[*Trochilus cyanus* Vieillot, *Nouv. Dict.* xxiii. (1818) p. 426 ("Brésil," coll. Delalande—sc. Rio).]
Hylocharis cyanea, subsp. *viridiventris* Berlepsch, *Ibis* 1880. p. 113 ["Venezuela (Merida), Trinidad, and the Orinoco district"].

3 ♂♂ ad., 24, 25, 27. xi. 05. Nos. 195, 202, 216. "Iris black."

They agree perfectly with specimens from Cumaná and British Guiana, being much darker green both above and below than typical *H. c. cyanus* of S.E. Brazil.

New to the fauna of Pará.

82. Hylocharis sapphirina (Gm.)

Trochilus sapphirinus Gmelin, *Syst. Nat.* 1. i. (1788) p. 496 (ex Buffon: Hab. ign.).
Hylocharis sapphirina Sclater & Salvin, *P. Z. S.* 1867. p. 584 (Pará).

2 ♂♂ ad., 1 ♂ juv., 1 ♀: 5, 7, 8, 20. xii. 05. Nos. 267, 284, 292, 390. "Iris black."

These specimens agree exactly with a series from Surinam and Brit. Guiana (*H. guianensis* Bonc.). If two geographical races of this species are recognised, the name *sapphirina* must be retained for the northern form, Buffon's description being most probably based upon Cayenne examples.

83. **Chlorestes caeruleus** (Vieill.)

Trochilus caeruleus Vieillot, *Nouv. Dict.* vii. (1817), p. 361 (type ex Cayenne).
Eucephala caerulea Sclater & Salvin, *P. Z. S.* 1867. p. 584 (Pará); Layard, *Ibis* 1873. p. 388 (Pará).

5 ♂♂ ad., 3 ♀♀: 18, 21, 22, 23, 26. xii. 05. Nos. 376, 396, 402, 408, 409, 413, 414, 418. "Iris black."

They do not differ in any way from Cayenne specimens.

84. **Thalurania furcata furcatoides** Gould.

Cf. *Nov. Zool.* xii. (1905) p. 297.

14 ♂♂ ad. and juv., 13 ♀♀: 14, 26, 30. x.; 19—22, 25, 28, 29. xi.; 3, 5, 10, 11, 12, 14, 16, 18, 20, 21. xii. 05. "Iris black."

The characters of this form are extremely variable, and I am a little doubtful whether it can be maintained as distinct. As a rule, the tail is less deeply forked than in *T. f. furcata* of Cayenne, the green of the throat less extended, and the blue band across the upper back slightly interrupted in the middle.

85. ***Avocettula recurvirostris** (Sw.)

Trochilus recurvirostris Swainson, *Zoolog. Illustr.* ii. (1821-2), pl. 105, descr. orig. ♂ ad. ("Peru."—errore!)

A single ♂ imm. 22. xii. 05. "Iris black." No. 404. Wing 55; tail 26½; bill 17 mm.

The three outermost tail-feathers are fiery coppery red on the under-surface, as in the ♂ ad., but widely tipped with white. On each side of the breast there is a tuft of silky snow-white feathers, apparently a peculiarity of the adult male, but never mentioned before as far as I know.

This is the first record for Brazil, the species having been only known to occur in Cayenne and British Guiana.

86. **Anthracothorax nigricollis** (Vieill.)

Trochilus nigricollis Vieillot, *Nouv. Dict.* vii. (1817) p. 349 ("Brésil").
Lampornis mango (nec Linnaeus!), Sclater & Salvin, *P. Z. S.* 1867. p. 584 (Mexiana).
L. violicauda (nec Beddaert) Layard, *Ibis* 1873. p. 388 (Pará).

2 ♂♂ ad., 1 ♂ jr. and 3 ♀♀: 7, 14, 15, 17, 21. xii. 05. "Iris black." Nos. 285, 334, 349, 350, 366, 400.

87. **Anthracothorax gramineus** (Gm.)

Trochilus gramineus Gmelin, *Syst. Nat.* 1. i. (1788) p. 488 [based on the "Haussecol vert" of Buffon.—As typical locality accepted *Cayenne*; cf. *Nov. Zool.* xiii. p. 35].
Lampornis gramineus Sclater & Salvin, *P. Z. S.* 1867. p. 584 (Mexiana).

A single ♀ juv. collected near Prata, 20. xii. 05. No. 389. "Iris black." Wing 72½; tail 39½; bill 30 mm.

It agrees well with specimens from Cayenne and Surinam. I examined also the adult ♂ obtained by Wallace, and found it to be identical with our series.

88. **Chrysolampis mosquitus** (Linn.)

Trochilus mosquitus Linnaeus, *Syst. Nat.* x. (1758) p. 120 [ex "Indiis."—errore! We substitute *Surinam* as typical locality].

1 ♂ in moult, 21. xii. 1905. No. 392.

89. Psilomycter theresiae theresiae (Da Silva).

Trochilus theresiae Da Silva, *Mai. Min. Bras.* 1843. p. 2.†
Polytmus Theresiae Cabanis & Heine, *Mus. Hein.* iii. (1860) p 5 (Pará).

1 ♂ jr.: 18. xii. 05. No. 377. "Iris black."

This specimen agrees perfectly with a good series from Surinam and British Guiana, having the under tail-coverts spotted with shining green.

4 ♂♂ collected by Natterer at Manáos belong also to this form, while those obtained by him near Marabitanas on the Upper Rio Negro (3 ♂♂, 2 ♀♀) represent *P. t. leucorrhous* Scl. & Salv., which differs only in having the under tail-coverts pure white.

90. *Topaza pella (Linn.)

Trochilus Pella Linnaeus, *Syst. Nat.* x. (1758) p. 119 (ex Edwards, *Ornith.* i. pl. 32 fig. inf.-*Surinam*).

A single ♀ moulting: 16. xii. 05. No. 359. "Iris black."

Though collected by Natterer near Manáos, this species has not yet been recorded from Pará.

91. Heliothrix auriculatus phaïnolaema Gould.

Cf. Hellmayr, *Nov. Zool.* xii. (1905) p. 297 (Igarapé-Assú).

1 ♂ ad., 2. xi.; 1 ♀ ad., 20. xi.; 3 ♂♂ juv., 4, 13, 14. xi. 05. Nos. 72, 122, 155, 152, 337. "Iris black."

The ♂ ad. agrees perfectly with the one sent by Robert, having the whole throat glittering golden-green without any trace of the white median stripe, characteristic of typical *H. a. auriculatus* of S.E. Brazil.

The ♀ ad. and the young males have the underparts pure white, not spotted, while in the corresponding plumages of the typical form there are always distinct bronze-brownish spots on the foreneck and chest. In the nearly allied *H. auritus* (Gm.) there occur occasionally females with pure white underparts, though, as a rule, they are spotted like those of *H. auriculatus auriculatus*.

Besides the colour of the throat in the males, there is a marked difference in size between *H. a. auriculatus* and *H. a. phaïnolaema*, the latter having decidedly shorter wings.

H. a. auriculatus: 14 ♂♂ ad., wing 68—71.—10 ♀♀, wing 67—70 mm.

H. a. phaïnolaema: 3 ♂♂ ad., wing 61, 63, 65.—4 ♀♀ and ♂♂ juv., wing 62—65 mm.

It may be added that I have examined the type of *H. aequatorialis* Boucard,‡ said to have been collected by Buckley in Ecuador, and found it **to be a skin of the well-known Rio-make,** differing in no way from typical *H. a. auriculatus*. The differences alluded to by Boucard are merely individual. In Natterer's series there are from the same localities specimens with the chin and sides of the head pure glittering green and others which show there a more golden hue (Ypanema, Goiaz, etc.)

† I have not been able to verify this quotation.
‡ *Gen. Humming Birds* p. 314 (1895.—Type now in Paris Museum).

92. * Calliphlox amethystina (Gm.)

Trochilus amethystinus Gmelin, *Syst. Nat.* 1, i. p. 496 [1788.—ex Daubenton, *Pl. enl.* 672 fig. 1 and Buffon.—Cayenne].

Three young ♂♂ and 4 ♀♀ : 16, 21, 22, 23. xii. 05. Nos. 356, 393, 394, 403, 406, 411, 412. "Iris black."

New to the fauna of Pará, but very widely distributed in South and East Brazil.

93. Lophornis gouldii (Less.)

Ornismya gouldii Lesson *Hist. nat. Trochilid.* 1832. p. 103 pl. 36 descr. orig. ♂ ad. (hab. ign.)
Trochilus reginae Schreibers, *Isis* 1833. p. 534 descr. orig. ♂ ad. ("in provincia Mattogrosso").

4 ♂♂ ad. and one young ♂ : 16, 19, 22, 23. xii. 05. Nos. 328, 360, 361, 379, 405.—"Iris black, bill red, tip blackish."

The exact range of this lovely species has been very imperfectly known till now. The specimens in the British Museum and in the Boucard Collections (now in the Paris Museum) **were said** to be from the Lower Amazons, but as an adult male had been collected by Natterer far in the interior of Mattogrosso, the correctness of this indication appeared to me always very doubtful, and I was really pleased to find a series in Mr. Hoffmanns' collection.

It seems, therefore, that *L. gouldii* has a more extensive range than hitherto supposed. Thanks to the kindness of Dr. Lorenz, the type of *T. reginae* Schreib. (ex Mattogrosso) is now before me, and it proves to be absolutely identical with the Pará specimens. The discrepancies noted by Pelzeln † are certainly only due to inaccuracies of the figure in Lesson's work, the elongated feathers on the sides of the head being evidently much exaggerated and the coloration of the outer tail-feathers obviously wrong. Lesson never saw the bird himself, but based his description upon a coloured drawing from a stuffed specimen in the Loddiges collection, forwarded to him by Mr. Stokes.

The specimens before me present the following measurements :

4 ♂♂ ad. from Pará : Wing 39—40 ; tail 23—23½ ; bill 10½—11½ mm.

♂ ad. from Mattogrosso (type of *T. reginae* Schreib.) : Wing 40 ; tail 24 ; bill 11 mm.

94. * Discosura longicauda (Gm.)

Trochilus longicaudus Gmelin, *Syst. Nat.* 1. i. (1788) p. 498 [ex Buffon : "du cabinet de Mons. Mauduit," no locality. We substitute *Cayenne*].

A single ♀ not quite adult ; 18. xii. 05. No. 375. "Iris black."

New to the fauna of Pará, but found in Cayenne and in Bahia collections.

95. Chloronerpes flavigula (Bodd.)

Cf. *Nov. Zool.* xii. (1905) p. 301.

A single ♂ imm. from Prata : 3. xi. 05. No. 68. "Iris brown."

96. Trogon melanurus Sw.

Trogon melanurus Swainson, *Anim. in Menag.* p. 329 (1838.—Demerara) ; Sclater & Salvin, *P. Z. S.* 1867. p. 583 (Pará) ; Pelzeln, *Zur Ornith. Brasil.* i. (1867) p. 19 (Pará).

1 ♂ ad., Prata : 14. xii. No. 342. "Iris pale brown, bill yellow."

Not different from Demerara specimens.

† *Zur Ornith. Brasil.* i. (1867) p. 32.

97. *Trogon atricollis atricollis Vieill.

Trogon atricollis Vieillot, *Nouv. Dict.* viii. (1817) p. 318 (ex Levaillaut, Couroucous pl. 8.— "Guyane, Surinam et à la Trinité").

A single ♀ from Prata, 4. xi. 05. No. 73. "Iris brown."

The South Brazilian form, *T. a. chrysochlorus* Pelz., differs only by its larger size and less golden upperparts.

98. Neomorphus geoffroyi (Temm.)

Cf. *Nov. Zool.* xii. (1905) p. 298.

A single adult from Prata: 30. x. 05. No. 44. "Iris yellow, feet grey-blue, bill greyish blue, base of upper mandible black." Wing 160; tail 273; bill 42½ mm.

Not different in any way from the ♀ ad. sent by Mons. Robert.

99. Ramphastos ariel Vig.

Cf. *l. c.* p. 300.

A single ♂ ad. from Prata: 13. xii. 05. No. 329. "Iris greyish white, bill black, basal band yellowish green."

100. Pteroglossus aracari aracari (Linn.)

Cf. *l. c.* p. 300.

1 ♂ ad.: 8. xii. 05. No. 300. "Iris brown."

As shown (*l. c.*), *P. aracari* of Linné refers to the Brazilian form, commonly called *P. wiedii*.

101. Pteroglossus bitorquatus Vig.

Pteroglossus bitorquatus Vigors, *Zool. Journ.* ii. (1826) p. 481 (loc. igu.); Sclater & Salvin, *P. Z. S.* 1867. p. 586 (Pará); Pelzeln, *Zur Ornith. Brasil.* iii. (1869) p. 237 (Pará).

1 ♂ ad. from Prata: 15. xii. 05. No. 352. "Iris reddish yellow; upper mandible greenish yellow, lower one white at basal half, black at apical half."

Agrees well with an adult ♂ from Camolins, near Pará, collected by Prof. Steere.

102. Galbula cyanicollis Cass.

Cf. *Nov. Zool.* xii. (1905) p. 296.

4 ♂♂ ad., 2 ♀♀ from Prata: 1. xi., 1, 11, 18. xii. 05. Nos. 51, 238, 239, 315, 316, 373. "Iris brown, bill yellow, tip of upper mandible black."

The Tring Museum possesses now a fine series of this rare species, which is only known to occur on the Lower Amazon and its southern affluents, the Rio Madeira and Rio Jurná.

There is considerable variation in the colour of the upper mandible to be observed. In one male it is entirely yellow, while all the other specimens have the apical half more or less blackish.

103. Bucco tectus (Bodd.)

Cf. *l. c.* p. 296.

1 ♂, 1 ♀ ad. from Prata: 5. xii. 05. Nos. 265, 266. "Iris dark brown."

104. *Bucco striolatus Pelz.

Bucco striolatus Pelzeln, *Sitzungsber. Akad. Wien* (Math. Physik. Cl.) xx. (1856) p. 500 (Engenho do Gama & No Dourado, Mattogrosso).

1 ♂ ad., 2 ♀♀ ad. from Prata: 23. xi. 16, 18. xii. 05. Nos. 187, 363, 374. "Iris pale yellow, feet and bill blue-grey."—Wing 86—88; tail 76—83; bill 32—33 mm.

These specimens have the sides of the head, the foreneck and the band across the nape pale buff while the same parts are deep ochraceous in a female from No Donrado (typical *B. striolatus*). Very likely the Pará birds are separable as a geographical form, bnt I would like to see more specimens of the typical race, since of two examples from Sarayaçu, East Ecuador, one is quite as brightly colonred as Natterer's ♀ from Mattogrosso, while the other is almost as pale as those from Pará.

Anyhow, *B. striolatus* is a very interesting addition to the fauna of the district, extending the range of the species from Mattogrosso and Eastern Ecuador to the Lower Amazons.

105. **Malacoptila rufa** (Spix).

Bucco rufus Spix, *Av. Bras.* i. (1824) p. 52, pl. xl. fig. 1. ("in sylvis fl. *Amazonum*").
Monasa rufa Pelzeln, *Zur Ornith. Brasil.* i. (1867) p. 23 (Pará).
Malacoptila rufa Sclater & Salvin, *P. Z. S.* 1867. p. 583 (Pará).

1 ♀ in moult, 5. xii. 05. No. 76. "Iris brown, bill greyish black."

Differs from Upper Amazonian examples only in having the frontal band of a paler ferrnginous, and the back more olive-brown (not so rufescent). The white shaft-lines on the head, too, are somewhat broader.

106. **Monasa morphoeus morphoeus** (Hahn.)

Cf. *Nov. Zool.* xii. (1905) p. 297.

1 ♀ ad. from Prata, 28. xi. 05. No. 217. "Iris brown, bill red."

This bird is intermediate between *M. m. morphoeus* and *M. m. peruana* Scl., having the narrow white frontal band of the latter, but the large chin-spot of the former. Other specimens from Pará, however, are entirely typical of *M. m. morphoeus*.

107. **Chelidoptera tenebrosa tenebrosa** (Pall.)

Cuculus tenebrosus Pallas, *Neue Nord. Beytr.* iii. (1782) p. 2 (Suriuam).
Chelidoptera tenebrosa Sclater & Salvin, *P. Z. S.* 1867. p. 583 (Pará); Layard, *Ibis* 1873. p. 392 (Pará).

A single ♂ ad. from Prata, 30. xi. 05. No. 232. "Iris brown, bill black." Wing 108; tail 53; bill 19 mm.

This specimen agrees with a series from Surinam as regards size and coloration. Skins from S.E. Brazil (*C. t. brasiliensis* Scl.) average rather larger, and have the abdomen much lighter, more ochraccons.

108. **Pyrrhura perlata** (Spix).

Cf. *Nov. Zool.* xii. (1905) p. 301.

2 ♂♂, 1 ♀, and one adult without indication of the sex: 7, 9, 13. xii. 05. Nos. 290, 302, 307, 331. "Iris brown."

One of these specimens has a few brownish red feathers on the frontal edge,

and the anterior part of the bluish cheeks slightly mixed with yellowish green. In the three others the cheeks, as well as a distinct, though narrow band across the forehead, are dull greenish blue.

This species is peculiar to the district of Pará.

109. **Pionites leucogaster** (Kuhl).

Cf. *Nov. Zool.* xii. (1905) p. 302.

A single adult, sex not stated, from Prata, 10. xii. 05. No. 309. "Iris golden yellow."

In every way similar to the examples sent by Robert.

This species is also confined to the district of Pará.

110. * **Accipiter bicolor bicolor** (Vieill.)

Sparvius bicolor Vieillot, *Nouv. Dict.* x. (1817) p. 325, descr. orig. juv. (Cayenne).

A single immature ♀ from Pará, 24. xi. 05. No. 201. "Iris light yellow."

In addition to it, the Tring Museum possesses an adult ♂, collected by Prof. Steere at Bemfica, near Pará, July 25. The iris is marked as "dark yellow."

It agrees in the whiteness of the underparts with a series from British Guiana, Bogotá coll., and Caicara, Orinoco River.

Specimens from Panama, Chiriqui, and Western Ecuador are much darker underneath, and have been described by me as *Accipiter bicolor schistochlamys*.†

This is the first record of the species for the district of Pará, though it was collected near Santarem ‡ by Riker. The ♀ ad. obtained by Natterer near Barra do Rio Negro, and determined by von Pelzeln as *A. pileatus*, § belongs likewise to this species, as I have satisfied myself by examining the specimen.

111. **Asturina nitida** (Lath.)

Falco nitidus Latham, *Ind. Ornith.* i. (1790) p. 41 (Cayana).
Asturina nitida Pelzeln, *Zur Ornith. Brasil.* i. (1867) p. 3 (Pará).

A single ♀ changing from the young into the adult plumage, 29. xi. 05. No. 230. "Iris brown."

112. * **Leucopternis albicollis** (Lath.)

Falco albicollis Latham, *Ind. Orn.* i. (1790) p. 36 (Cayana).

1 ♀ ad. from Prata, 18. xii. 05. No. 378. "Iris brown."

Differs from all other specimens before me by having **no** black spots on the mantle and interscapular region.

113. **Leucopternis kuhli** Bonap.

Leucopternis Kuhli, Bonaparte, *Consp. Av.* (1849) p. 19 (no locality).
L. kaupi Bonaparte, *Rev. Mag. Zool.* 1850 (Sept.) p. 481.
L. superciliaris Sclater & Salvin, *P. Z. S.* 1867. p. 589 (Pará); Pelzeln, *Zur Ornith. Brasil.* i. (1867) p. 3 (Borba, Pará).

1 ♂ ad. from Prata, 8. xii. 05. No. 299. "Iris yellowish red."

† *Bull. B.O.C.* xvi. (1906) p. 82. ‡ *Auk*, 1891. p. 161. § *Orn. Brasil.* i. (1867) p. 8.

1 ♂ ad. and 1 ♀ ad. from Igarapé-Assú, 21. i., 5. iii. 04. Nos. 1925, 2015. Iris: ♂, "rouge foncé"; ♀, "brun rouge." Collected by Mons. A. Robert.

This well-marked species is still very rare in collections, and hitherto only known from Pará and Borba, Rio Madeira. It differs from *L. melanops* in having the top of the head and the mantle slaty black, only the bases of the feathers being white, and in having no visible white spots on the lower back and upper wing-coverts. The well-defined white superciliary stripe is another point of distinction.

The juvenile plumage of this species seems to be unknown.

Its proper name is the one used above, *L. kahli* having undoubted priority over *L. kaupi*. Bonaparte's diagnosis, though very bad, cannot be referred to any other species.

Wing 205, 210, 210; tail 130, 138, 138 mm.

114. Columba speciosa Gm.

Columba speciosa Gmelin, *Syst. Nat.* 1. ii. (1788) p. 783 (ex Buffon, et D'Aubenton, *Pl. enl.* 213—Cayenne); Sclater & Salvin, *P. Z. S.* 1867, p. 590 (Pará).
Lepidoenas speciosa Pelzeln, *Zur Orn. Brasil.* iii. (1869) p. 274 (Pará).

1 ♂ ad. in beautiful plumage, 23. xi. 05. No. 183. Iris "brownish red"; bill "cardinal red."

Identical with specimens from British Guiana.

115. Columba plumbea bogotensis Berl. & Leverk. (an subsp. dist.?)

Chloroenas plumbea Vieill., subsp. nov. *bogotensis* Berlepsch and Leverkuhn, *Ornis* vi. (1890), p. 32 (Bogotá coll.)
Columba vinacea (nec Temminck!) Sclater & Salvin, *P. Z. S.* 1867, p. 580 (Capim River).
C. plumbea (nec Vieillot!) Goeldi, *Ibis* 1903, p. 499 (Rio Capim).

1 ♂ ad. from Prata, 11. xii. 05. No. 317. "Iris white." Wing 175; tail 135; bill 16½ mm.

It differs from an adult bird from Pina, Northern Peru, which we may consider to represent *C. p. bogotensis*, by having the throat almost of the same lilac tint as the foreneck, while in the Peruvian skin there is a distinct vinaceous buff throat-patch. This is also very well pronounced in a good series from Merida and N.W. Ecuador; they differ, however, a little in coloration from the Peruvian and Pará examples.

While it is quite possible that the birds from northern South America may be divisible into several geographical races, there can be not the slightest doubt that they are altogether different from *C. p. plumbea* Vieill., which is confined in its range to Eastern Brazil, from Bahia to Rio Grande do Sul. I have now examined 26 specimens of the typical, and about a dozen of the northern form, and found them always easily separable. In *C. p. bogotensis* the head and nape, as well as the underparts, are always strongly washed with vinaceous or lilac, while in *C. p. plumbea* they are pure light grey, with an almost imperceptible lilac hue.

Berlepsch and Hartert* have already shown that *C. purpurcotincta* Ridgw., erroneously united with *C. plumbea* by Salvadori, had nothing to do with this species, but belonged to the group of *C. nigrirostris*, which is characterised by its short, thickish bill, rufescent brown (not greyish) under wing-coverts, etc., etc.

* *Nov. Zool.* ix. (1902) p. 117.

P.S.—Since the above was written, I examined the series in the British Museum. The adult bird collected by Wallace on the Capim River agrees perfectly with our ♂ from Pará. A topotypical skin of *C. p. bogotensis* (from Bogotá) differs from both in its cinereous occiput, only the forehead, sinciput and nape being vinaceous. A larger series is required to confirm the constancy of this character or otherwise.

116. *Geotrygon violacea violacea (Knip & Temm.)

Columba violacea, Knip & Temminck, *Pigeons*, Fam. *Columbes* (1808-11) p. 67, pl. 29 (loc. ign.—Mus. Paris).

1 ♀ fere ad. from Prata, Pará, 23. xi. 05. No. 184. "Iris light brown, bill greyish red." Wing 145; tail 86 (moulting); bill 15 mm.

It agrees with several adults from Victoria, S. Paulo, but has the foreneck rather more greyish. All Brazilian specimens examined by me have the vertex pure light grey, shading into whitish on the forehead and the cheeks; the malar region and ear-coverts are very pale greyish.

Pará is a very interesting locality, and extends the range of the species far to the north. I have examined specimens from Rio de Janeiro (Mus. H. v. Berlepsch), Victoria (Tring) and Ypanema, S. Paulo (Natterer; Vienna Mus.), Rio Jordão, province Araguay, Minas Geraës (Robert; Mus. Tring), and Bahia (Wucherer; Mus. Brit.).

Schlegel† records a specimen from Surinam, which, however, cannot be Temminck's type (*vide supra*).

Young birds have the forehead dull whitish, the vertex and occiput dull bronzy green, the back bronze-brown, with only slight purple reflections on the mantle, the foreneck and chest dirty brown, and the quills with distinct cinnamon apical margins.

The Central American form, *G. v. albiventer*,‡ though closely allied, can easily be distinguished by having the forehead (as far as the anterior edge of the eye), cheeks, malar region, and ear-coverts clear buff-pink (Ridgw., *Nomencl.* iv. 20), there being no trace of the bluish grey colour on the crown. Of this form I have compared a good series from Miravelles, Costa Rica (Underwood coll.).

117. Columbigallina passerina griseola (Spix).

[*Columba passerina* Linnaeus, *Syst. Nat.* x. (1758) p. 165 [part.; as typical locality accepted: *Jamaica* (ex Sloane—first quotation.)]

Columbina griseola Spix, *Av. Bras.* ii. (1825) p. 58, pl. lxxv., fig. 2 ("in sylvis fl. *Amazonum*").

Chamaepelia passerina (nec Linné) Sclater & Salvin, *P. Z. S.* 1867. p. 591 (Pará); Layard, *Ibis* 1873. p. 395 (Pará).

1 ♂ fere ad. from Prata, 17. xi. 05. No. 147. "Iris rosy red."

Besides this, we received an adult ♂ from Prof. Steere, collected near Bemfica, Pará, August 30. Both specimens have the bill entirely blackish.

As I have shown in my paper on Spix's types, *C. griseola* was based upon a female of the present species. Consequently this name must be accepted for the continental form of *C. passerina*.

† *Mus. Pays-Bas* iv. *Columbae*, p. 165.

‡ *Geotrygon albiventer* Lawrence, *Proc. Acad. Philad.* 1865. p. 108 (Lion Hill, Panama).

118. Creciscus viridis viridis (P. L. S. Müll.)

Cf. *Nov. Zool.* xii. (1905) p. 304.

A single ♀ ad. from Prata, 3. xii. 05. "Iris brown, feet light red." No. 252.

119. * Crypturus cinereus (Gm.)

Tetrao cinereus Gmelin, *Syst. Nat.* 1. ii. (1788) p. 768 [ex Buffon: Cayenne].

A single ♀ imm. from Prata, 15. xii. 05. No. 348. "Iris brown."

Besides, we received an adult ♂ from Prof. Steere, collected on the island of Marajo, which differs only in having the top of the head more washed with rufous.

The specimens from Pará agree perfectly with a series from British Guiana, and cannot, consequently, belong to the pale "variety" mentioned by Schlegel and von Pelzeln.

New to the list of Pará birds.

120. Crypturus soui (Herm.) subsp.

Tinamus soui Hermann, *Tabl. Aff. Anim.* 1783. pp. 164, 235 [ex Daubenton, *Pl. enl.* 829—Cayenne.
Crypturus pileatus Layard, *Ibis* 1873. p. 396 (Nazaré, Pará).

1 ♂ imm. from Prata, 21. xi. 05. No. 163. "Iris greyish brown."

We have also one ♂ ad. from Igarapé-Assú, 16. ii. 04, collected by Mons. A. Robert, and inadvertently omitted from the report on his collection. Both specimens are much paler above and below than a series from British Guiana and Trinidad, agreeing best with others from Pernambuco. Most probably they belong to a different form, but whether the birds from N.E. Brazil or those found in Guiana represent the typical *C. soui*, can only be decided by a good series of Cayenne skins.

MISCELLANEA ORNITHOLOGICA.

CRITICAL, NOMENCLATORIAL, AND OTHER NOTES, MOSTLY ON PALAEARCTIC BIRDS AND THEIR ALLIES.

By ERNST HARTERT, Ph.D.

PART III.*

The genus ANTHOSCOPUS.

I CANNOT do otherwise than unite the Europeau "Penduline Tits" with the African ones in one genus. The latter have a much longer first primary, but in *A. macronyx* it is also longer than in the various allies of *A. pendulinus*, and from the great variability in the length of the first primary in many other groups I must decidedly refuse to separate the African Penduline Tits generically from the Palaearctic ones. Therefore the name *Anthoscopus* Cab. 1851 (type *A. capensis*) must be used instead of *Remiza* Stejn. 1886 (type *A. pendulinus*). On the other hand, the American species (*Auriparus flavifrons*) deserves to be separated generically. Its tail is longer, its bill more curved, its first primary long (as in the African forms), and it lays blue eggs with coppery-brown spots, while the Palaearctic and African species lay white, unspotted eggs. Also the Himalayan "*Aegithalus flammiceps*" has no place in the genus *Anthoscopus*, and must be called *Cephalopyrus flammiceps*. The more open nostrils, stiff, narrow feathers of the forehead, comparatively longer wings and longer tail, and very tiny first primary, justify its generic separation. Moreover, it does not build a purse-shaped or globular hanging nest, but breeds in holes of trees, and lays not white, but blue eggs. Mr. Dresser (*Manual Pal. B.* p. 183) still uses the name *Aegithalus* Boie 1822, although it is well known that this name was already given by Hermann to the Long-tailed Tits in 1804. As Mr. Dresser generally accepts those names which have priority, there seems to be no reason for a deviation from his usual custom in this case. Mr. Dresser's treatment of the various forms of Penduline Tits in the manual is also not very convincing. Why *macronyx* has been treated as a subspecies of *pendulinus* is not clear, as it occurs together with forms of *pendulinus*, and is more distinct than many species acknowledged by Mr. Dresser; and why the perfectly distinct forms *stoliczkae* and *consobrinus* have been placed as synonyms under *pendulinus* is not explained. The only possibility seems to me to be that the author did not compare them with *pendulinus*, or very superficially.

The Asiatic Penduline Tits are not easy to unravel. In the Far East, on the Yang-tse-Kiang, the great ornithologist Swinhoe discovered a new form, which he named *A. consobrinus*. This is a very rare bird in collections, but a number of specimens were obtained by Mr. Ringer near Nagasaki, on Kiu-shiu Island, Japan. It is a very distinct form, easily distinguished by the grey crown and black line through the eyes, instead of extended black auricular region. Why several authors have doubted its distinctness is an enigma. The most astonishing remark is that of Seebohm, who (*B. Japanese Emp.* p. 182) says that he has seen two males and two females, and "that it is, however, very probable that it may eventually be proved to

* For Part I. see *Nov. Zool.* 1901. pp. 156-60; for Part II. *Nov. Zool.* 1905. pp. 497-503.

be the female of the western species, or be degraded to subspecific rank." How a male can be proved to be the female of another species is not known to me, and why could not Seebohm compare the well-known females of "the western species," by which he means the European *pendulinus?*

The Central Asiatic *Anthoscopi* were first separated by Sewertzow and Hume. Sewertzow established two forms, *coronatus* and *macronyx*, but unfortunately complicated matters by creating other names as well, *atricapillus* for the former, *cucullatus* and *pectoralis*, like a "Brehm redivivus," and with the same want of clear discrimination which was Brehm's weakness. Sewertzow also made a "nomen nudum" *jaxartica*, which was revived and established by diagnosis by Dr. Suschkin in 1904, under the name of "*Remiza pendulina jaxartensis*" (*Bull. B.O.C.* xiv. p. 45). Hume described the East-Turkestan bird as *stoliczkae* (*Stray Feath.* ii. p. 521, 1874). With this form were united the West Turkestan birds (Syr Darja), until Suschkin separated them clearly as *jaxartensis* (t.c.). Unfortunately, at the same time the last-named author described two more Penduline Tits! One he named *centralasiae*, which is the same as *stoliczkae*, and the other *yenisseinsis*. It is possible that the birds from the Upper Yenissei, between Tannu-ola and the Sayan mountains, may ultimately be found to belong to a separate form, but the name *yenisseinsis* is merely based on young specimens, which are hardly separable from the corresponding plumage of *Anthoscopus pendulinus jaxartensis*—only our *jaxartensis* have a narrow chestnut line behind the white forehead, while this is not seen in the types of *yenisseinsis*, which were kindly sent for my inspection by Dr. Suschkin. However, one *jaxartensis* from Iskander Kul in the Petersburg Museum* has no trace of this chestnut line. Therefore it is very doubtful what *yenisseinsis* really is, until we know the adult birds. Dr. Suschkin's diagnosis is of very little use, because he compares his new form with the European *pendulinus*.

At present I recognise the following forms:

A. pendulinus pendulinus: South Europe.

A. pendulinus caspius: Caspian basin to Orenburg.

A. pendulinus stoliczkae: E. Turkestan to Dsungaria (figured and enumerated by Dr. Sharpe in *Sec. Yarkand Mission* under the wrong name *coronatus*).

A. pendulinus jaxartensis: W. Turkestan (Syr Darja).

A. pendulinus consobrinus: Valley of the Yang-tse-kiang and Kiu-shiu, Japan.

(*A. yenisseinsis*, Upper Yenissei, doubtful.)

A. coronatus: Transcaspia, West Turkestan to Persian Baluchistan.

A. macronyx: West Turkestan to East Persia (Seistan).

The genus PANURUS.

The position of the Bearded Titmouse has often been questioned, and several ornithologists have denied its close affinity with the Tits. The nostrils are not covered with narrow bristly feathers, which are directed forwards, but covered with a thin operculum; the oesophagus is widened in its second third; the nest differs from that of the *Parinae*. These peculiarities, and the striking resemblance in colour with the Chinese *Paradoxornis heudei*, prove that the correct position of *Panurus* is among the *Paradoxornithinae*, which agree with the *Paridae* in so many points that they are best placed as a subfamily in the family *Paridae*.

* Dr. Bianchi most kindly sent this and many other specimens for comparison, and Dr. Suschkin lent me his *yenisseinsis*.

The genus COLOEUS Kaup.

By many authors united with *Corvus*. The following characters, however, may be sufficient excuse for its separation. Bill somewhat short, high, hardly as long as the head, upper mandible rather straight. Feathers on crown and neck decomposed. Tail straight, tips of rectrices not rounded, but square. Nests in holes, eggs lighter, with fewer and larger spots than in *Corvus*. Smell peculiar, musky, different from that of the true *Corvi*.

Only *Coloeus monedula*, with its subspecies *C. m. dauuricus*, and *C. neglectus*—the latter probably not a species, but a dark aberration—belong to this genus. The American *Corvus ossifragus* has none of the characteristics of *Coloeus*. Also the eggs of *C. ossifragus* differ in no way from the type of the genus *Corvus*, and might be taken for small rooks' eggs. They do not at all resemble jackdaws' eggs.

The genera of PALAEARCTIC MUSCICAPIDAE.

Nowhere, perhaps, do we find more unnecessary genera than among the *Muscicapidae*. If it would only be understood that zoologists have invented the so-called genera in order that we may find our way through the vast multitude of species, and that we may, by this eminently practical method, group together the most closely allied forms, thus expressing their affinities* in the names by which we know them, and that in nature only species and subspecies have evolved, but no such things as genera!

The generally adopted genera of *Muscicapidae* are alleged to be based on certain "structural" differences—*i.e.* length of vibrissae at gape, width and length of bill; but if we examine these supposed characters we find it impossible to follow the customary arrangement, and we shall soon perceive that really the genera were separated by colour and an unlucky attempt made afterwards to find structural differences. Thus I cannot separate the genera *Muscicapa*, *Hemichelidon*, *Ficedula* (or rather *Hedymela*), *Siphia*, *Zanthopygia* (generally altered into *Xanthopygia*, but originally deliberately spelt *Zanthopygia*), *Arizelomyia*, and others. On the other hand, I should have separated "*Hemichelidon*," on account of its short first primary, if it was not for the fact that *sibirica* has as short a first primary as *griseisticta*, while the southern representative of *sibirica*, i.e. *Muscicapa sibirica fuliginosa*, has a longer first primary, this being as long as, or sometimes even a little longer than, the primary coverts.

On TCHITREA PRINCEPS ILLEX.

Mr. Outram Bangs (*Bull. Mus. Comp. Zool.*, Harvard Coll. xxxvi. 8, p. 264), described as a "new species" a "*Terpsiphone illex*." He had only two specimens, a male and a female, both from Ishigaki. He declares that they have a different wing-

* One of the objections made to modern scientific trinomial nomenclature is, that its adherents strive to express affinities in their names, and that this is against our principles of nomenclature, which should only serve practical purposes, and should not be based on researches of affinities and development. I do not know who first invented the dogma that names should not express affinities, but it seems to me to be only the personal idea of some of our ornithological friends, and by no means a generally adopted view, though repeated parrot-like by some writers. Moreover, it is an erroneous and objectionable view, because, first of all, our old universally adopted nomenclature already expresses most emphatically the affinities of species. Everybody will admit that in a genus—unless it is a wrongly constructed one—the nearest allies are comprised, in opposition to other groups which are more distantly related. Not only is there no reason why we should not express affinities in trinomials in a similar way as we do in binomial names, but the more we do so the more valuable will our nomenclature be.

formula, differently shaped rectrices, narrower crest-feathers, and smaller size. I have examined six adult males and as many females from Ishigaki, and nearly twenty more specimens from other islands in the Loo-Choo group, *i.e.* from Amami, Okinawa, Iriomote, and Iheya, and I find no difference between them and a series of skins from Hondo, *i.e.* "typical" *princeps*. The different wing-formula does not exist. Mr. Bangs' statement must have been based on a moulting or abnormal specimen. Nor are the rectrices differently shaped. It is true that the wing of Loo-Choo specimens is generally about 2—5 mm. shorter, and therefore *Tchitrea princeps illex*, as this form must be called, may be regarded as a slightly differentiated subspecies. Single specimens, however, cannot always be distinguished. As a rule, Hondo males have the wing about 89—93 mm., while males from the Loo-Choo Islands have wings of 84—89 mm. A male shot on Okinawa, however, on April 24th, has the wing 91 mm., and some from Southern China have wings of 88 and 89, so that one can hardly say to which race they belong.

It is difficult to believe that birds with such enormous soft-feathered tails as *Tchitrea* can be migrants, and yet we find *Tchitrea incei* to wander to the Malayan peninsula, and the same is the case with *T. princeps princeps*: at least specimens with long wings (93 and even 94 mm.!) occur there, but apparently only in winter. We must, therefore, assume that they are migrants. It is difficult to understand why Mr. Outram Bangs named such closely allied forms as *Tchitrea princeps illex* with two names, as he often employs trinomials. Such inconsistency is most disturbing to students. Or does he still adhere to the exploded theory that one must see "intergradation" to employ trinomials? Let him read Mr. Hart Merriam's lucid article, who remarked most truly, that it depends on our material alone whether we see intergradation or not. Therefore our scientific language cannot be based on such accidental circumstances; in fact, we must use trinomials in all cases where allied forms, which agree in their essential characters, replace each other geographically. It is true that more knowledge is required for using trinomials correctly than for merely separating so-called species binomially, but it is desirable that closer studies be made than hitherto, and if a mistake is made it will be corrected, as has been done before.

On the African forms of the genus PYCNONOTUS.

As in so many other genera, ornithologists have hitherto for the most part confined themselves to distinguishing as many different forms as possible as so-called species—or occasionally to "lumping" them again—but few attempts have been made towards an understanding of their actual affinities in connection with their distribution. Trying to study all these forms with the help of their distribution—as far as we know it at present—I come to the following conclusions:

1. Undoubtedly all the *Pycnonoti* with white or whitish under tail-coverts are geographical representatives of one species. This has already been recognised by Oscar Neumann. Thus *barbatus*, *inornatus*, *gabonensis*, *arsinoe*, *somaliensis*, and *schoanus* are undoubtedly forms of one species.

2. These forms are connected with yellow-vented forms through *gabonensis*, which has the under tail-coverts white, edged, and sometimes all over tinged with yellow. *P. b. gabonensis* is so much like young *tricolor* that even Professor Reichenow mistook the latter for *gabonensis*. He states that *gabonensis* extends to the Congo, on the strength of a bird collected at Manyanga by Bohndorff; but the specimens collected by Bohndorff at Manyanga are now before me, and they are

tricolor, but by no means *gabonensis*, though a young specimen has the under tail-coverts very pale sulphur-yellow. Thus *tricolor*, *layardi*, *micrus*, *spurius*, and *minor* become also subspecies of the *barbatus* group.

3. Together with the forms of the *barbatus* group, however, we find others, which have almost the same plumage, but differ in having a protruding, wattle-like, mostly orange or yellowish eyelid. These forms, therefore, though disguised in a similar plumage, are specifically different. These "wattled" forms are *capensis*, *nigricans*, *reichenowi* and *xanthopygos*.

4. Another form, *Pycnonotus dodsoni* Sharpe, appears to stand by itself. There is evidently no wattled naked ring round the eye, though the eyelid is scantily feathered. *P. dodsoni* does not, therefore, belong to the *capensis* group, and I do not think that it can be placed as a subspecies of the *barbatus* group because it appears to inhabit countries in which forms of the *barbatus* group partly occur, and it has also marked differences, so that there is no reason why it should not be looked upon as a third specialised species. The size is very small, the rectrices have a wide, sharply defined white tip, the feathers of the back and throat have whitish edges, so that these parts have a scaly appearance.

Thus we arrive at the following table:

I. Pycnonotus barbatus: eyelid feathered.

1*a*. *P. barbatus barbatus:* Morocco, Algiers, Tunis. Crown brown. Under tail-coverts white. (28 specimens examined.)

1*b*. *P. barbatus inornatus:* Senegambia to the Niger. Like *P. b. barbatus*, but smaller. (35 specimens examined.)

1*c*. *P. barbatus gabonensis:* Kamerun to Gabun. Like *P. b. inornatus*, but under tail-coverts white, edged or sometimes tinged with yellow. (6 specimens examined, including the type.)

As I said before, this form does not extend to the Congo, so far as we know at present, where *P. b. gabonensis* is replaced by *P. b. tricolor*.

1*d*. *P. barbatus arsinoe:* N.E. Africa (Egypt to Kordofan).* Under tail-coverts white, crown black. (10 specimens examined.) Wing about 87—95 mm., *i.e.* males about 91—95, females less.

1*e*. *P. barbatus schoanus:* Mountains of Abyssinia and Northern Galla-land. Very similar to *arsinoe*, but much darker above. This is easily seen in fresh specimens, but not in worn plumage. (51 examined, among them the type.)

1*f*. *P. barbatus somaliensis:* Zeila and Somadu. Smaller than *arsinoe*, but of about the same pale coloration. (8 examined, among them the type.)

This form is indeed very closely allied to *P. b. arsinoe*, in fact so closely that even Prof. Reichenow called it *P. arsinoe somaliensis*. It differs only by its smaller size, the wings measuring in the ♂ 87—91, in the ♀ about 77 to 84 mm. It is thus evident that this form is not easily recognisable, and I should doubt its distinctness if it were not for the slender bills which it exhibits when compared with *P. b. arsinoe*. Reichenow's statement that it is paler brown on the upper surface is not correct, as far as one can make out from the 8 rather worn specimens collected by Baron von Erlanger. On the contrary, judging from a few fresh growing

* Mr. Grant (*Nov. Zool.* 1900, p. 257) says that he procured specimens near Aden; and Yerbury stated that this species nests there. I have not been able to find an Arabian specimen in the British Museum, but I should say that Arabian specimens cannot be the true *arsinoe*.

feathers, I am inclined to think that *somaliensis* is rather darker than *arsinoe*, not paler. Probably Reichenow's material of *arsinoe* is very poor. The measurements have not been given by Reichenow, and no type has been marked. I fix as the type specimen No. 5, ♂ (sexed), Dadab 23 January 1900, this being in the best condition.

1*g*. *P. barbatus tricolor:* S.W. Africa, north to Congo. Under tail-coverts yellow, crown brown. Axillaries whitish. (26 examined.)

1*h*. *P. barbatus layardi:* Eastern Cape Colony northwards, probably to Mozambique and Lake Nyassa. Under tail-coverts yellow, crown black. (20 examined.)

1*i*. *P. barbatus micrus:* British East Africa and Kilimanjaro. Exact limits not yet known. Like *layardi*, but upperside darker, size smaller. (5 examined.)

1*j*. *P. barbatus minor:* Upper White Nile to Victoria Nyanza. Like *tricolor*, but axillaries greyish brown, and slightly smaller. (9 specimens examined.)

1*k*. *P. barbatus spurius* Rchw. (*Vögel Afr.* iii. p. 841): Ennia, Gallaland.

Very similar to *micrus*, but ear-coverts quite black, not brown, with only the upper portion black. Apparently more whitish underneath, than *micrus*. Not the whole throat, but only the upper part of the throat is black, as in *micrus*. There is no close similarity to *dodsoni* at all, which is described below. Of the three specimens one is marked as "♀," the other two as "♂." The ♀ from Arbadule and the one from Oda Muda have the wings 87 and 88 mm. long, the ♂ from Arbadule 93 mm. I fix the last as the type, and think the other two must be both females. (3 specimens examined, including the type.)

II. **Pycnonotus capensis:** eyelids protruding, wattle-like.

2*a*. *P. capensis capensis:* Southern parts of Cape Colony. Eyelid mostly whitish, underside brownish, paler in the middle of the abdomen. (10 examined.)

2*b*. *P. capensis nigricans:* Central parts of Cape Colony north to the Transvaal in the east, to Benguella in the west.

Under-surface, except the throat and jugulum, whitish, crown black. Eyelid as a rule bright reddish or "chrome orange." This can easily be seen in well-prepared skins, and the bright colour is clearly described on each label on the specimens collected in Benguella by Dr. Ansorge. In two specimens, both marked ♀, one from Katenge, 14. vii. 1904, the other from Huxe, 2. vii. 1904, the eyelid is—though bare and protruding—blackish, and Dr. Ansorge described it as greenish black in one, dark green in the other, while in other females it is bright orange as in males. (21 skins examined.)

2*c*. *P. capensis reichenowi:* South Arabia. Upper surface more greyish, eyelid brownish. (15 examined)

2*d*. *P. capensis xanthopygos:* Palestine to the Sinai-peninsula. Like *reichenowi*, but larger, bill stronger, upper surface not so greyish, black on throat less abruptly separated. (7 examined.)

III. **Pycnonotus dodsoni:** eyelid not protruding and wattle-like.

3*a*. *Pycnonotus dodsoni:* Middle and Southern Somaliland to Witu and Makindos River (tributary of the Athi River) in British East Africa.

Differs at a glance from all its allies by the broader whitish tips to the

rectrices, very short wings and somewhat scaly appearance of chest and back. Under tail-coverts bright yellow. Wing: ♂ about 82—87·5, but seldom above 84, ♀ about 74 to 79 mm. (45 specimens measured.) Young specimens have the under tail-coverts paler, lemon yellow, and the tips to the rectrices brownish.

With this species and the others hitherto known to occur in Somaliland, our knowledge of the *Pycnonoti* of Somaliland and the neighbouring countries is, however, not yet finished. We have a specimen shot by Dr. Donaldson Smith on June 16th, 1895, on the western shore of Lake Stephanie. It is an immature bird, sex not determined. It is as small as *P. dodsoni*, the wing only measuring 78 mm. It is, however, not *dodsoni*, as the under tail-coverts are white, and the back has no scaly appearance. I have little doubt that this is a new form, but the single specimen before me is young and in moult, moreover its sex is unknown; therefore I shall not create a new name for this bird.

Prof. Reichenow mentions a male from Ginir as an evident hybrid between *P. arsinoe schoanus* and *P. dodsoni*. This bird is an adult male, and Prof. Reichenow's surmise is very likely correct.

Notes on the Palaearctic forms of the genus LANIUS.

It has long been known that the genus *Lanius* is not an easy one for those who study its forms, and that the Grey Shrikes especially are one of the most difficult groups in ornithology, though several works have been written about them. One of these, the eighth volume of the *Catalogue of Birds*, however, is far from satisfactory, partly because its author was not an experienced systematist when he wrote it, partly because the material at his disposal was far from being sufficient for such a task. The other most noteworthy attempt to classify the Palaearctic Shrikes, that by Professor Modest Bogdanow, is written in Russian, and therefore unfortunately a sealed book to the ornithologists of Western Europe; moreover, the material in Russian collections is only rich in specimens from the Russian possessions and Central Asia, and the work, which is entitled *Sorokoputni Russköi* (*i.e.* Russian Shrikes), professes only to discuss the Shrikes of the Russian Fauna; nor is it up to date, as it appeared 25 years ago, in 1881. It was therefore hailed with delight by Mr. Rothschild, when an experienced systematical writer, Mr. Ogilvie-Grant, resolved to write a new review of the genus *Lanius*, and the editors of *Novitates Zoologicae* accepted his article for Volume IX. of the Tring Journal, where it appeared in December 1902.

Mr. Grant (p. 449) invited criticism, hoping "that in this way any mistakes in the present paper may be corrected before the work appears in the new edition of the eighth volume of the *Catalogue of Birds*."

Unfortunately there is ample occasion for criticism; but it is not so much a number of mistakes that must be corrected—no work being without mistakes—as the entire plan and scope of Mr. Grant's article which is at fault. The work is not what we should expect in the twentieth century, but it is written with the perceptions of bygone ornithological ages. The author takes the bull by the horns, and selects a striking character or two, by which he endeavours to distinguish what he calls species, without regard to their distribution. Thus "*L. dealbatus*," according to Grant, occurs from Algiers to Turkestan; "*L. pallidirostris*" from Morocco to Mesopotamia and India; while "*L. excubitor*" and "*L. major*" on the one, "*L. homeyeri*" and "*L. leucopterus*" on the other hand, occupy about the

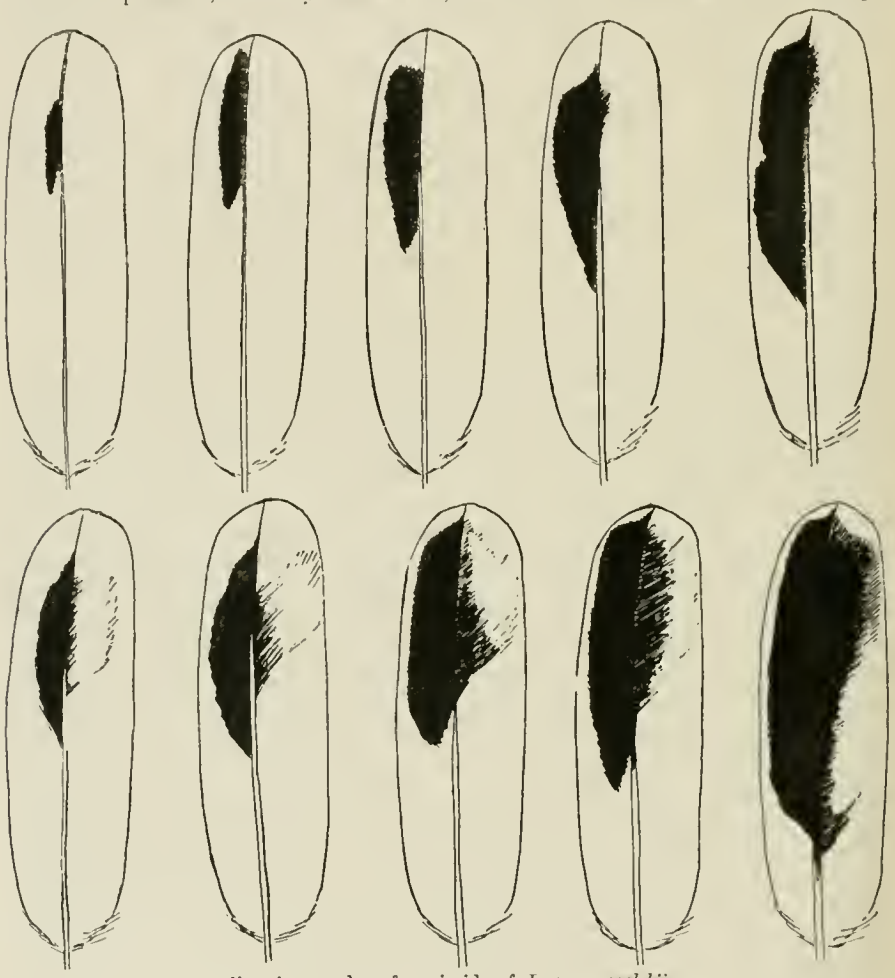
same ranges. Hybrids occur between *L. leucopterus* and *L. sphenocercus*, "many intermediate forms" are found between *L. excubitor* and *major*, between *L. dealbatus* and *assimilis*, between *L. assimilis* and *pallidirostris*, between *L. elegans* and *dealbatus*, between *L. elegans* and *assimilis*, between *L. dealbatus* and *pallidirostris*, between *L. assimilis* and *lahtora*, between *L. algeriensis* and *assimilis*, *algeriensis* and *pallidirostris*. This is certainly not very reassuring for students who are desirous of naming a Grey Shrike, and in a case like this the question so often put by laymen: "Why do you distinguish between such and such forms?" is certainly more than justified.

But the reason why we do not approve of Mr. Grant's method, is that it is an artificial one. A hundred and fifty years ago, in Linnaeus' time, was the era of artificial systems. It was then useful, and a great step forwards. When Linnaeus classified the plants by their sexual organs, creating families and orders on account of the numbers of stamina and pistils, it was admired and praised; but we have gone past that time—we classify plants by the summary of their characters, and we have to arrange the animals by their actual affinities, and not by one or two artificially selected peculiarities. What was admired a hundred and fifty years ago is not naturally looked upon with favour in our days, since we have considerably advanced in method—and especially within the last twenty-five years.

If the general appearance, and not only the markings of the wings and tails, had been studied, such conclusions as Mr. Grant's could hardly have been arrived at. Unless we consider about one-third of the specimens as hybrids, *Lanius excubitor* and *L. major*, both inhabiting Northern Europe and Siberia to the Amur, cannot be regarded as two different species. Mr. Grant says that *L. excubitor* and *L. major* are alike, except that *L. major* has only one speculum, *i.e.* the bases of primaries only are white, while *L. excubitor* has also the basal half of the six outer secondaries white on both webs, and that the white terminal portion of the outer rectrices is wider. Unfortunately both these characters are most variable, and especially that of the greater extent of white in the tail is perfectly useless; and between the specimens with only one speculum and those with two we find all sorts of intermediates. Moreover, both varieties inhabit the same area, and both have been found in one nest! It is thus perfectly clear that only one form of Grey Shrike inhabits Northern Europe, this being *L. excubitor* L.

A very closely allied form inhabits Northern Asia, but it has never two specula, the base of the primaries only being white; the under surface, which gets uniform white in adult European birds, is always barred, the rump and upper tail-coverts are more whitish, and the young are dark greyish brown. The name *L. major* Pallas 1827 is not available for this form, as there is already a *Lanius major* Gmelin 1788, which is a synonym of *L. excubitor*, a fact which has been overlooked by many authors. The next oldest name for the Siberian Grey Shrike is *L. mollis* Eversm. 1853. Russian authors have persistently adhered to the idea that these dark brown Shrikes were adult ones, and Mr. Dresser has endorsed their opinion. Mr. Grant admitted that the so-called *L. mollis* were "unquestionably immature birds," and described the type of *L. seebohmi* as the adult male; but nevertheless he placed his *L. mollis* far away from *L. excubitor* and *L. borealis*, which are its nearest allies, placing such entirely different types as the Red-headed Shrikes and a number of others between these closely allied subspecies. To this we must object, as even the adherents of the old binomial nomenclatorial system, as a rule, try to arrange their species so that the more or less allied forms stand near each other—though of course the trinomial

system makes the relations of forms infinitely clearer. It must not be left unmentioned that Taczanowski correctly described the various plumages of the North Siberian Grey Shrike, fully recognising that the brown birds were the young of the grey ones. It is strange that Russian authors and Mr. Dresser have not grasped the fact that their *L. mollis* is the young of a Grey Shrike. Not only do they bear all the peculiarities of juvenile birds, such as the closely barred under-surface and pale bill, but they are variable, and moreover the North American large



Fourth secondary from inside of *L. e. przewalskii*.

Grey Shrike, *L. borealis* Vieill., has the same brown young, some being almost indistinguishable from the brownest *mollis*! It is possible that this fact was unknown to the Russian ornithologists who wrote about *L. mollis*, and who were probably little acquainted with North American birds; but Mr. Dresser could have known it as well as any one else. In fact, the North American Great Grey Shrike is so much like the North Siberian one that it cannot easily be distinguished. Single specimens are sometimes indistinguishable, but the upper surface seems to be clearer grey, and the rump is more tinged with grey in adult birds; moreover, the

wing appears to be generally shorter. Measurements are given in my book. It is strange that Dresser, who—except in one or two groups to which he took a fancy, such as *Cinclus*—does not, as a rule, separate very closely allied forms, nevertheless recognised as different "*L. funereus*," which is nothing but "*mollis*."

Under these circumstances I recognise, instead of Mr. Grant's No. 1, *L. borealis* (N. America); No. 2, *L. major* (N. Europe and N. Asia); No. 3, *L. excubitor* (N. Europe and N. Asia); and No. 33, *L. mollis* (N. Asia)—the following subspecies:

Lanius excubitor excubitor, N. Europe,
Lanius excubitor mollis, N. Asia,
Lanius excubitor borealis, N. America.

thus simplifying matters very considerably.

I differ equally from Mr. Grant in the case of his *L. homeyeri* and *L. leucopterus*. Instead of taking into consideration the distribution and studying the variation within a given area, he sticks to an artificial and partly erroneous diagnosis —based on the lesser or greater extent of the white on the secondaries—and thus makes these two geographical races occupy the same range. The accompanying figures will show the variation of the white on the secondaries in the bird named by Mr. Grant *leucopterus*, a name which is a "nomen nudum," and must therefore, of course, give way to *przewalskii* Bogd., 1881. The supposed British specimen of *L. homeyeri* in the British Museum has no exact locality and no history! It would be better if specimens which have no better history than "England, out of Mr. Fred. Bond's collection"—without locality, date, or name of collector—were not considered in a scientific work.

I must equally disagree with Mr. Grant's treatment of the North African Grey Shrikes and their allies in Western Asia, where he allows to occur together, in the same countries (*i.e.* N.W. Africa) *L. hemileucurus*, *L. elegans*, *L. dealbatus* and *L. pallidirostris*, and in "South-West Asia and North-East Africa" both *L. assimilis* and *L. pallidirostris*. The inevitable result is, that "intermediate forms" between the various "species" are frequent. The fact is, that the characters by which Mr. Grant distinguished his species are very variable (see accompanying figures), but that, nevertheless, there is a certain limit of variation and certain general colorations are observed which serve well enough to separate the various forms and to cover even more or less aberrant specimens; these forms, however, are not species distributed anywhere at random, but geographical forms (so-called subspecies) of Grey Shrikes, and their areas are different during the breeding season, although occasionally (as in Central Tunis) individuals may overstep their boundaries and specimens may occur which are not easy to determine, or which may actually be intermediate, though they are naturally very rare.

In the charming book of Mr. Whitaker on the Birds of Tunis the N.E. African Shrikes have already been discussed with perfect correctness.

The following details must be understood:

Lanius hemileucurus (Mr. Grant's species 8) is a synonym of *L. elegans*, being based on an individual with more white in the tail. When Dr. Gadow kept *L. hemileucurus* separate, in 1883, he could not be blamed, but nowadays sufficient series have been collected to show that every intermediate occurs between the specimens with more and less white in the tail, and that these are clearly individual aberrations.

Lanius elegans (Grant's sp. 9) is the correct name of the pale Grey Shrike of Southern Tunis and South Algeria, though originally described erroneously as coming from "the Fur Countries" in Canada. The distribution given by

Mr. Grant (*i.e.* South Algeria and S. Tunis) is perfectly correct, and the recent explorations of Tripoli have shown that it extends eastwards to Barka.

Mr. Grant's No. 10, which he calls "*Lanius dealbatus*," is a dreadful mixture. The name *L. dealbatus* was given by Defilippi to a specimen from the White Nile,

Third tail-feather of *L. c. elegans*.

collected by Brun Rollet (cf. *Rev. & Mag. Zool.* 1853. p. 289). The description as well as the critical notes by Salvadori and Finsch, in connection with the locality, leave no doubt that the name *dealbatus* refers to the small white-rumped species, which extends from Nubia to the White Nile. Moreover I have carefully compared the type in the Turin Museum. Mr. Grant quotes as the original locality "Tripoli,"

evidently because Defilippi adds to his diagnosis the remark "jam extabat a Tripoli," which, however, means "it was already there from Tripolis," and not that the type came from Tripolis! This specimen from Tripoli, which Defilippi thought to be the same as his *dealbatus*, is still in the Turin Museum, where I have examined it also. It is a specimen of *L. elegans*, and Defilippi was wrong in uniting it with his *dealbatus*. It is, of course, very important to know that the type of *dealbatus* came from the White Nile, and not from Tripoli, as in Tripoli *elegans* is found, and on the White Nile not.

The name *Lanius leucopygos* Hemprich & Ehrenberg 1828 has been rejected, as it has been said to be a "nomen nudum." This, however, is not correct, for, if one takes the trouble to read the foregoing sheet, one will see that a perfectly recognisable description is given on fol. *d*, though the new name of the bird described on fol. *d* is only given on fol. *e* and fol. *dd*. It is true that the authors had the silly idea that their bird was a hybrid between *L. excubitor* and *minor*, but as they gave a binomial name to it, and diagnosed it, we must accept it. But even if *L. leucopygos* had been a "nomen nudum" the name *dealbatus* could not have been accepted, because the name *L. pullens* (afterwards altered to *pallens*) of Cassin had more than a year's priority. Last, not least, *L. grimmi* Bogdanow, a name referring to a Transcaspian and Turkestan form, does not refer to the young of *leucopygos*, but to *pallidirostris*, *leucopygos* being only known from Nubia to the Blue and White Nile.

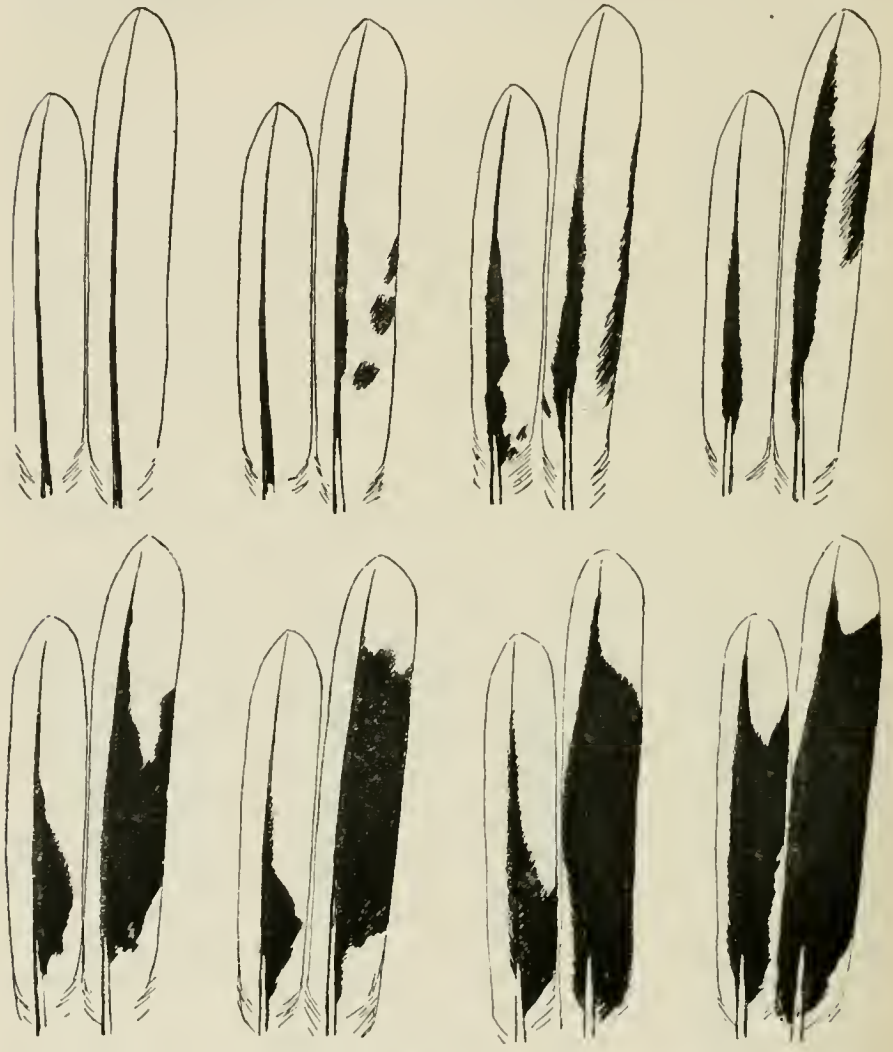
The next species in Mr. Grant's list is No. 11, *L. assimilis* Brehm. How it came that this bird was kept as a separate species is not easy to understand, still less that it was granted such an area as from Turkestan, India and "Pamir" to N.E. Africa. *L. assimilis* is merely a synonym of *L. pallidirostris*.

A still wider distribution is attributed to species 12, *L. pallidirostris*, which is said to range from Morocco to India. This is, however, quite erroneous, and Mr. Grant's *pallidirostris* is again a mixture. Among the synonyms appears correctly *L. pallidus* Antinori, 1864, but its locality is quoted as "Kadaref, ? Blue Nile," while Kadaref is a village on the Blue Nile. *L. fallax* appears wrongly under *L. pallidirostris*, and so do *dodsoni* and *buryi*. About *L. algeriensis dodsoni* Whitaker (*Ibis* 1898, p. 599), from Central and Southern Morocco, Mr. Grant had evidently made up his mind that it must be made a synonym of something, as according to his idea, the types were all intermediate between *L. algeriensis*, *assimilis* and *pallidirostris* (p. 460). The fact is, that *dodsoni* is a pale form of *algeriensis*, between the latter and *elegans*. It has been discussed in Mr. Whitaker's book on Tunisia, and in my forthcoming treatise of the Shrikes in *Vögel d. pal. Fauna*. Mr. Grant was also convinced that my *L. algeriensis koenigi* from the Canary Islands was of no good whatever, and so he placed it as a synonym under his *L. algeriensis*. We could not blame him much for that, for my *koenigi*—though certainly not **quite** the same—is very much like *algeriensis*; but on p. 459 he states that *dodsoni* "are indistinguishable from the palest forms from the Canary Islands." Now if *dodsoni* and the Canarian Shrikes are "indistinguishable," then *dodsoni* should not appear as a synonym of "*pallidirostris*" (p. 459, No. 12), while *koenigi* is placed under *algeriensis* (p. 462, No. 16), far away.

L. fallax, looked upon as the same as "*pallidirostris*," is a very distinct form, with more or less grey on the breast and flanks, but unfortunately its oldest name is *aucheri*! The unfortunate decision to classify the Grey Shrikes only by the markings of the tail and wings, disregarding more or less all other characters,

led Mr. Grant to state that *L. aucheri* Bp. 1853 was based on birds "intermediate between *L. dealbatus* and *L. pallidirostris*."

I have examined the cotype of *L. aucheri* in the British Museum, and Mr. Hellmayr has confronted the two typical examples in the Paris Museum with skins from the Tring Museum. There is no doubt whatever that *L. aucheri* is the bird



Two outer rectrices of *L. c. aucheri*.

afterwards so well described and figured by Dr. Finsch under the name of *L. fallax*. The following is a description of the typical examples of *L. aucheri* in Paris.

1. Adult bird, mounted; on label: "*L. aucheri* Bp. Type, M. Aucher-Eloy. Perse 1840. No. 10003." Bill entirely black. Narrow, sharply defined black frontal line, rest of upper surface uniform ash-grey (scapulars incomplete!) Upper wing-coverts black, only the least wing-coverts grey. Only one large white alar "speculum," reaching from the second to the tenth primary and extending over both

webs, about 40 mm. wide, thus occupying the basal half of the feathers. Secondaries with wide white edges to the inner webs, and with white tips about 7 mm. wide, of equal width, across both webs. Inner secondaries entirely black to the base, with white tips of about 1 to 1·5 mm. Lores and usual lanine black markings on sides of head pure black. Under-surface white, sides of breast tinged with grey. Two outer rectrices white with black shafts. Third rectrix black with outer web and tip of inner web white for 21 mm., the black running up along the shaft, in a narrow line, nearly to the tip. Fourth rectrix black, with tip white for about 10 mm. Fifth rectrix black, with tip about 2—3 mm. white, sixth entirely black. Axillaries and under wing-coverts white, only the under primary coverts greyish. Wing about 114, tail 117, outer pair 28 mm. shorter, bill 17 mm.

2. Adult bird, mounted; on label: "*L. aucheri* (Bp.) Type. M. Aucher-Eloy, Perse. 10018 D." Like No. 1, upper surface equally grey, rump as grey as back. Narrow black frontal line only 1·5 mm. wide. Size smaller, bill larger. Wing 105, tail 110, gradation 33, bill 17·5 mm. Scapulars complete, therefore with a distinct white line. Tail differently marked: Outer pair with white outer web, inner web black at base, tip white for 40 mm. Second pair similar, but tip only white for 34 mm. Third pair, outer web white at tip, towards base only with white outer edge, inner web black, tip white for about 19 mm. Fourth pair black, tip white for 10 mm., fifth with narrow white tip as in No. 1, sixth entirely black. For further description, differences between *pallidirostris* and *aucheri*, and the somewhat puzzling distribution, I must refer to my forthcoming book, Part IV.

In 1905 Mr. Grant independently discovered that two different grey Shrikes were found in South Arabia. He named the dark form *Lanius arabicus* (*Bull. B. O. C.* xv. p. 78, May 1905). Unfortunately, however, this same dark form was already described as *Lanius buryi* by Lorenz and Hellmayr (*J. f. O.* 1901. p. 238). The mistake which Mr. Grant made in renaming *L. buryi*—a name which he had placed as a synonym under his *L. pallidirostris* (p. 459)—was entirely due to his unhappy method of separating his species principally by the markings of the tail and wings. How variable these are is shown by the accompanying figures. If the general appearance—in this case the dark colour of the upper and under surface—combined with the distribution is taken into consideration, *buryi* (= *arabicus*) is easily distinguished. We know two grey Shrikes to be common in S. Arabia: *L. exc. aucheri* (= *fallax*) and *L. exc. buryi*. Probably the latter is the breeding race, replacing the commoner migratory *aucheri* as a resident. Under this assumption I decided to regard *buryi* also as a subspecies of *excubitor*.

For my reasons for keeping separate from the *excubitor* group the long-tailed *sphenocercus* and *giganteus* I must refer to my book, Part IV.

Under *Lanius ludovicianus* Mr. Grant unites not less than six forms distinguished by American authors (cf. Ridgway, *B. North and Middle Amer.* iii. pp. 235-52). I have not had the opportunity of studying very good series of *all* of these forms, but from what I have seen I am convinced that it is impossible to unite them all, and I do not quite see why they should be united by Mr. Grant, when he separates so many North African and European forms. It seems to me that *mearnsi* and *anthonyi* are the same, but that the other four forms are fairly well separable from *ludovicianus*. All these forms are considerably smaller than *L. excubitor borealis*, which lives farther to the north than any of them, but otherwise they do not differ in any essential characters. I am therefore of the opinion that they should all be treated as subspecies of *L. excubitor*.

Of *L. meridionalis*, which I call *L. excubitor meridionalis*, Mr. Grant gives as the "habitat": "South of France, Spain and Portugal," and he adds: "Records of this species occurring in Italy, Sicily, and Sardinia, etc., are apparently erroneous, though it has undoubtedly been obtained in Corfu and the Ionian Islands." Unfortunately what Mr. Grant says about the occurrence outside of the regular breeding-range (*i.e.*, as correctly stated, "South of France, Spain and Portugal") is not right; in fact, almost the opposite is true. *L. e. meridionalis* extends along the Mediterranean coast at least as far as Nice, and has occurred, though irregularly and more or less accidentally, in Liguria, Toscana, Umbria, and even as far as Rome, specimens being preserved in Italian museums. On the other hand, the occurrence on the Ionian Islands is erroneous (cf. Reiser, *Fauna Balcanica*, iii. p. 569), and there is no reason to believe that Lord Lilford's statement of its occurrence on Corfu is correct, since he evidently only "observed" it, no specimen from Corfu being preserved in his or any other collection. In Sardinia a young *L. minor* has been mistaken for *meridionalis*. The same might have happened elsewhere. Nordmann's statement of its occurrence in S. Russia is sure to be erroneous; Kolombatovics' note of its presence near Spalato in Dalmatia is not verified; Gätke records it from Heligoland, but no specimen of *meridionalis* exists in his collection: therefore it is probably erroneous, or, let us say, not verified, like several others of Gätke's records. Under *Lanius nubicus* Mr. Grant says, "North-East Africa and South-Western Asia, ranging west to Senegal." This is a most incautious statement, as the only reason for it appears to be one skin in the British Museum which is labelled "Sénégal." This skin, however, was purchased from the "Maison Verreaux" in Paris, which is notorious for its inaccuracy regarding localities, as I have repeatedly had occasion to prove. Altogether the practice of stating the range of a bird from single occurrences is a very crude one, because we want to know where a species breeds and where it migrates. So in the case of *L. nubicus*, which breeds in Asia Minor and Palestine to S.W. Persia, but appears to be only a winter visitor in N.E. Africa, and never occurs in Senegambia or on the Senegal. It would also have been interesting to state that *L. nubicus* used to breed, until 1864 at least, near Athens (cf. Reiser, *Ornis Balcanica*, iii. p. 260).

Mr. Grant's No. 21 is called *Lanius pomeranus*. The earliest name is *L. senator* L. 1758; but Mr. Grant, belonging to the small band of British ornithologists who do not follow the international code of nomenclature, and adhere to the "Stricklandian Code," does not adopt names prior to 1766, and therefore refused it. It has likewise been refused by Dr. Schiebel, in his interesting treatise "Die Phylogenese der Lanius-Arten" in *Journ. f. Orn.* 1906. p. 190. Dr. Schiebel based his opinion on the consideration that Linnaeus' diagnosis was not clear. Every ornithologist, however, who has any experience in interpreting Linnaean names must know that we must judge Linnaean names by the source he took them from. Now, as it is perfectly clear that Linnaeus did not know the bird, but merely took his attempt at a diagnosis from Albin, whom he faithfully quoted, or made it up from Albin's figure, we must look to Albin for a solution, if we are uncertain; and Albin, though his figure is bad, undoubtedly figures the Red-headed Shrike. Albin does not give a locality for his bird, merely stating that he had it out of the collection of Sir Thomas Lowther,* but adds that Willoughby had described a specimen from the Rhine. It is evidently merely a slip that Linnaeus said "In

* It is a thousand pities that this rich collection has not been preserved—at least I never heard of it. It contained many of the birds figured by Albin, among them the *Comatibis eremita* from Switzerland.

Indiis," but, unfortunately, such careless statements occur several times in his *Systema Naturae*. Dr. Schiebel has evidently no experience in interpreting old names, and can hardly have consulted Albin's figure, or he would have understood that Linnaeus had no idea of describing a bird he knew, merely adding a reference to Albin (" mit einem bloss angehängten Hinweis auf Albin "). Also the ventilation of his personal views about Brisson's names, which Dr. Schiebel treats us with (p. 192), had better remained unprinted. Nor can I agree, that the next available name is none other than *pomeranus* of 1786, because there are one or two before that date: *Lanius ruficeps* Pallas, *Vroeg's Cat. Verzam. Vogelen dieren, Adumbratiuncula*, p. 1, 1764, and *L. auriculatus* P. L. S. Müller, *Natursystem*, Suppl. p. 71 (1776). I am glad that we are not forced to adopt this latter name, as its diagnosis is not clear, and the author mixed up with the Red-headed Shrike the common Red-backed Shrike. On the other hand, he based his *auriculatus* primarily on Daubenton's " Pie grièche rousse," the male of which was figured on that gentleman's Pl. 9. In mixing up with it *L. collurio* he partly followed Daubenton himself, who figured a female of *L. collurio* as that of the Red-headed Shrike. Therefore there was some excuse for adopting the name *auriculatus*, as Dresser and Gadow have done, and in no case can *L. auriculatus* be quoted as a doubtful synonym of *minor*, as has been done by Grant (p. 470).

Mr. Grant's quotation of Daubenton's plates is not correct. He quotes: " Piegrièche Rousse de France Buff., *Pl. Enl.* i. p. 239, Pl. LIII., No. 9, Fig. 2," and similarly in the footnote. I do not know what Pl. LIII. No. 9 means at all, as it is Pl. 9, Fig. 2, but not Pl. 53; moreover it is impossible to quote "*Pl. Enl.* p. 239," as the *Pl. Enl.* are plates without text by Daubenton and not by Buffon, who, however, together with Montbeillard, wrote the great *Hist. Nat. des Ois.*, to which Daubenton's plates, as far as they represented birds, were added as an atlas, though they originally appeared quite independently.

I am glad to be able to agree with Mr. Grant regarding the question of the races of *L. senator*, of which there are three. Mr. Grant justly unites the Shrike inhabiting N.W. Africa with the European form. I have been one of the offenders who separated a paler North African race, and who, worst of all, adopted once upon a time (*Senckenb. Cat.* p. 90) for it the name *rutilans*, which is based on Daubenton's Pl. 477, Fig. 2. Koenig insisted, in various articles, that the North African form had a paler head and back, and was a good species. Erlanger declared that Koenig was wrong, and that the head, in fresh plumage, was at least as bright as in Europe, but that the under-surface was more strongly washed with rusty-buff. Kleinschmidt (in litt.) believes that the lighter back which is seen in some specimens is peculiar to North-West African specimens, while Hilgert (in litt.) doubts if the head in European examples gets so bright as in some African birds. I have examined over a hundred specimens from various parts of Europe and North Africa, and I must now agree with Grant, Whitaker, and most of the older authors, that we cannot separate the form from North-West Africa from that of Southern and Central Europe. Two other subspecies, however, are fairly well distinguishable: *i.e. Lanius senator niloticus*, with wide white base to the central rectrices as well as to the rest; and *Lanius senator badius*, without white speculum, *i.e.* white base to the outer primaries. The latter inhabits Corsica and Sardinia, and migrates to West Africa; the former breeds from southern Persia to Palestine, and seems to winter in North-East Africa, where it has not yet been found breeding with any certainty.

Mr. Grant calls *Lanius senator niloticus* binomially *Lanius rufus*. This,

however, cannot be done. Gmelin's *Lanius rufus* is based on Brisson's "Pie-Griesche rousse," which is the European Red-headed Shrike. The tail is described by Brisson as half white, and this is the reason why Mr. Grant used his name for *niloticus*. But it is quite evident that Brisson described and only knew the European bird, and he must have overlooked the fact that the base of the central pair of rectrices was black, while the rest really are about half white. Nor is the country where *niloticus* lives indicated by Brisson and Linnaeus, and the name *rufus* is thus strictly synonymous of *senator*, *ruficeps*, *auriculatus*, *pomeranus*, and *rutilus*.

Lanius cognatus Brehm, *Vogelfang*, p. 84 (1855), is a further synonym of *L. senator*, and not of *collurio*, as stated by Grant, and, probably following Grant, also in Reichenow's great work on the Birds of Africa.

The name *L. spinitorquus* Bechstein, a synonym of *collurio*, dates from 1791, and not from 1805, as generally quoted, being already published in the first edition of the *Naturgesch. Deutschl.* ii. p. 392.

A very puzzling group are the Asiatic Brown-tailed Shrikes. I mean "*Lanius isabellinus*, *phoenicuroides*, *cristatus*, *superciliosus*" and their allies. Mr. Grant separated about as many forms as I consider separable, and I even must unite his numbers 37 and 38 (pp. 472-3); but it appears to me strange that Mr. Grant did not grasp the affinity of his numbers 37 and 38 with the *cristatus-phoenicuroides-isabellinus* group, as the latter are so closely allied to *phoenicuroides*. Mr. Grant calls his number 38 "*Lanius elaeagni*," but this must have been an oversight, as the name *bogdanowi* is nine years older, and must therefore be used. Mr. Grant remarks, on p. 474, "I am doubtful if this bird is really a species distinct from *L. raddei*, or merely a stage of plumage." After a careful study of the entire material in the St. Petersburg Museum, of the types of *L. bogdanowi*, *L. raddei*, *L. dichrourus*, *L. infuscatus*, "*L. phoenicuroides pseudocollurio*," of authenticated specimens of *L. elaeagni*, and some examples kindly lent by Dr. Suschkin, I cannot see any possibility for keeping these separate, thus agreeing with Mr. Grant, and even going a step further. There is no doubt that this group of Shrikes is a difficult one, and this fact should be a reason for being careful and hesitating before naming supposed new forms belonging to it; instead of this, however, our Russian colleagues treat us with new names whenever one or more individuals differ from the usual types. Dr. Suschkin, in an article in the *Bull. B. O. Club* xvi. pp. 58-61, endeavoured to enlighten us about these Shrikes. As we poor ones in the west of Europe cannot see these birds alive, and Dr. Suschkin collected many specimens, his article should be of great service to us; but unfortunately it only adds to our embarrassment. According to Dr. Suschkin, *L. raddei*, *infuscatus*, *pseudocollurio*, and *elaeagni* are "subspecies" of *phoenicuroides*, while *bogdanowi* (said to be the same as *varius*) is a "variety" ("personal variation" in the text) of *L. ph. phoenicuroides*, and, to add to the number of names, a new aberration is described as *analogus*. Worst of all, the distribution is not explained in Suschkin's article; but it is evident from the original descriptions, and most kindly confirmed by Dr. Suschkin in litt., that his idea of subspecies is not the same as ours. Advanced ornithologists have now agreed to use trinomials for geographical representatives. Dr. Suschkin employs them partly for forms which breed in the same area. Ornithologists have hitherto not named aberrations, because we could very well do without them, the cases in which species or subspecies occurred in numerous well-marked colour-variations not being very numerous, and there being no necessity

for loading our lists with names for the latter. We thought hitherto that we could dispense with names for such colour-aberrations, though Naumann and others used to call albinoes and other variations by Latin names; but their names were not actual names to be considered in nomenclature, because every species in a genus had a "*varietas pallida, lutea, alba, variegata*," etc. What is now Suschkin's *analogus*? What is the difference between Suschkin's "personal variation" and his "aberration"? Surely we shall be happier without names for aberrations—as looked upon by entomologists—while I fail to understand what a "variety" is, if the author has besides the latter "subspecies" and "aberrations"! I can only recognise geographical and non-geographical variations. The former we call by trinomials, the latter we do not recognise in nomenclature, and I sincerely hope that we shall be spared names for them. In cases where well-marked groups of varieties were known, as in many owls, some goatsuckers, a few petrels, *Demiegretta sacra*, and others, it has become customary to talk of these colour-varieties as "phases." I think another expression would be more suitable, as a phase, as a rule, is the term for a changing stage of a thing, while we know that these colorations are not stages that change gradually, but that some individuals appear in one, others in the other colour throughout life. The term "phases" should be retained for age-variations, so that we may talk of the brown and the white "phase" of the Gannet, the former being the juvenile, the latter the adult stage; or of the white and the brown "phase" of the Snow Grouse, the former being the winter, the latter the summer garment.

To return to *Lanius bogdanowi*: it is a very variable form. The types of *raddei* and *dichrourus* are much the same, but a worn so-called *pseudocollurio* shows the transition to the *bogdanowi*-, *elaeagni*-, *infuscatus*-type, moreover *raddei* and *dichrourus* do **not** come from the same country. I fail to see how Suschkin came to the dictum that *raddei*, *infuscatus*, *pseudocollurio* and *elaeagni* are "subspecies," while *bogdanowi* was only a "variety" or "personal aberration." The distribution does not seem to lead to such a view! Moreover, I fail to see that *Otomela varia* Sarudny is a synonym of *bogdanowi*, as Suschkin says. It is, judging from specimens named "*varia*" by Sarudny, and from the description, a synonym of *phoenicuroides*. The remarks by its author are truly humorous, for he says (according to the translation in *Orn. Monatsber.* 1897. p. 183) that this bird looks like a hybrid between *romanowi* and *karelini*, except that the tail is differently marked; that one might consider it as a species, which accidentally straggled to the locality where it was shot and there paired with a female of *romanowi*! And, if it should be new, the author proposes to call this energetic bird *Otomela varia*. A pity it was shot, and we do not have the hybrids between *varia* and *romanowi*!

The list of what I consider synonyms of *phoenicuroides* is appalling: *montana*, *canescens*, *ruficeps*, *caniceps*, *romanowi*, *karelini*, *varia*. I am glad to agree with Mr. Grant in my view about these, and to be able to state that Dr. Walter Rothschild has taken great interest in these Shrikes, and that we have together fought many a battle about them, and at last agreed perfectly about all of them. For the rest I must refer my readers to Part IV. of my "Vögel d. pal. Fauna."

In Mr. Grant's distribution of *bogdanowi* there appears to be a slip; Astrabad being a town **in** North Persia, he should not have said to Astrabad **and** North Persia. In the description of *L. phoenicuroides* it is said that the female is similar to the male, but this is not quite correct. The distribution is given very roughly, no distinction being made (as in the case of *isabellinus*, *tigrinus* and several others) between the breeding range and winter quarters.

Under *L. isabellinus* Mr. Grant has several synonyms which are referable to *phoenicuroides*, and the description of the female is not correct. In the description of *L. darwini* (a doubtful species, founded on a single skin), the measure of the tarsus should be 0·95, not 1·95 in.

In the distribution of *L. bentet* (p. 478) the "Moluccas" are included; but *L. bentet* has never been found on any island of the Moluccas.

Under *L. schach* hybrids between *L. schach* and *L. fuscatus* are quoted, following Mr. Rickett's suggestion; but this is not correct, the birds in question being young *L. fuscatus*.

Under *L. vittatus* Mr. Grant describes birds in the "first plumage" and "still younger ones." This looks funny, but I think I understand it, and this leads me to the remark that in most books the young birds are not clearly described. In most cases the passerine birds have a plumage in which they leave the nest, and from this they moult into a plumage which is generally described as the first plumage. It is not always easy, and sometimes impossible, to distinguish between these two plumages, our knowledge often being incomplete; but we should try to describe both these plumages, and distinguish between them, as the nest-plumage and the juvenile plumage.

A very interesting article on the genus *Lanius* appeared recently in the *Journal für Ornithologie*. It is a study of the "Phylognese der Lanius-Arten," by Dr. Guido Schiebel. It is most readable, and contains many interesting facts. The conclusions arrived at are sound and sensible, though they are, of course, not all undoubted facts, but speculations, based only on the developments of the coloration and markings. The article is that of an advanced systematic worker. Trinomial nomenclature is used throughout. In a few cases the author endeavoured to bring forward his ideas about the propriety of old names, but in this he failed altogether. If the year 1758 is taken as the commencement of our nomenclature—and this is fortunately done by Dr. Schiebel—the name *Lanius senator* must be used for the Red-backed Shrike, as I have explained above. The judgment of ancient names requires practice, and Dr. Schiebel would have done well if he had consulted an older, more experienced ornithologist. Of some forms the author had no material, and thus some errors were unavoidable, but they are few and far between. Very instructive plates by the author himself accompany the text: birds arrayed side by side in series, in the shape of skins. This excellent method, first employed by Kleinschmidt, is most commendable: room is spared, as more forms can be figured on one plate, the imaginary surroundings of the birds do not distract attention and eyes, and the more or less arbitrary and often erroneous positions of birds never seen by the artist are avoided.

I am sorry to say that the name *Lanius caudatus*, given by Cabanis to an East African Shrike in 1869, is preoccupied by *Lanius caudatus* Brehm, 1855 (*Vogelfang*, p. 84), a silly synonym of *Lanius nubicus*. It is therefore necessary to rename the bird known as *L. caudatus*, and I propose to call it

Lanius cabanisi nom. nov.,

in memory of the veteran ornithologist Jean Cabanis, who died some months ago at the age of almost 90 years.

My notes on the Shrikes have become longer than I intended, and a great portion of them consists of criticism and corrections of Mr. Grant's article. My brother ornithologists, and first of all Mr. Grant himself, will understand the spirit in

which they have been written. They contain, to use Mr. Grant's words, the criticism of another ornithologist, "who may have paid special attention to these birds." But, as I have said before, it is not so much the number of errors in quotations, geographical statements, etc., as the scope of the "Review of the species of the genus *Lanius*" which I oppose. We all make mistakes, but we do not all adhere to the system of systematic study which was reigning in former ornithological times. Our mistakes must be corrected, for the truth for which we work must come out by mutual efforts; and it is important that we take a wider view and study birds in the light of their geographical distribution as far as possible, and that we no longer rely on single characters, but thoroughly study the birds in all their parts, in order to understand their actual affinities. This is less easy than the old system, and especially geographical distribution is sometimes difficult to fully understand, when we do not know the country, its aspect, geological and climatic conditions, and where maps are scarce and bad; but we must try to do our best, and leave it to the future to correct our errors. And other difficulties, too, stand in our way. Valuable works are published in Russian, a language not understood, as far as I know, by any Western ornithologist; new names are sometimes hidden in the text, not showing in headings; descriptions are often too short and insufficient, and sometimes taken from single individuals. Our friends should be more careful in creating new names; they should, if forms are closely allied, not describe "new species" from single examples, and they should boldly show what they do, and not hide their deeds inconspicuously in the letterpress. All these troubles I have felt much during the work on the last parts of my book on the Palaearctic Birds, but nevertheless it has been pleasant and fascinating to me, and I look forward with much pleasure to more such work and to more criticism!

My work has been aided by the kind help of many friends and authorities of museums. Without this it would have been impossible to come to the conclusions at which I arrived. Many an hour has been spent in the bird room at the British Museum, where I discussed two or three questions with Mr. Grant; and I have been able to compare types and series in Paris, Turin, and Florence, in all of which places I have been received with the greatest kindness—by the late Dr. Oustalet and Mons. Ménégaux, by Count Salvadori and Professor Giglioli. My warmest thanks are due to Dr. Bianchi, who generously sent me nearly all the Shrikes in the St. Petersburg Museum. I am much indebted to Dr. Suschkin for the loan of some of his types, to Professors Reichenow and Brauer in Berlin, Dr. Forbes in Liverpool, Dr. Hoyle in Manchester, Mr. Joseph Whitaker in Palermo, the late Baron Carlo and his mother, Baroness von Erlanger, in Nieder-Ingelheim, Dr. Julius von Madarász in Budapest, Dr. von Lorenz in Vienna, Pfarrer Kleinschmidt in Volkmaritz, Professor Lampert in Stuttgart, Professor Dr. Schauinsland in Bremen, Count Berlepsch of Berlepsch Castle, Professor Dr. Wilhelm Blasius in Braunschweig, Herrn N. Sarudny in Pskov, for kindly lending specimens in their possession or under their care; to Dr. Louis Bureau, Herrn N. Zarudny, Herrn Dr. Hartlaub in Helgoland, Herrn Sergius Buturlin, Dr. Bianchi, Dr. Suschkin, Herrn von Tschusi, Herrn Hilgert, Baron Loudon, and others for kind information, translations, descriptions; and last but not least to Herrn Hellmayr for making comparisons for me in the Paris Museum.

SOME NEW SPHINGIDAE IN THE BRITISH MUSEUM.

By the HON. WALTER ROTHSCHILD and KARL JORDAN.

1. Polyptychus poliades spec. nov.

♂. In size and pattern nearest to *P. orthographus* R. & J. (1903). Pinkish grey. A brown mesial stripe on head and anterior portion of thorax. Joint of palpus open, second segment rounded off. Tibial spurs somewhat shorter than in *P. orthographus*.

Wings, *upperside*: forewing with brown lines: a short thin subbasal line, a more prominent line at basal fourth, curving costad, an antemedian double line, feeble, biflexuose, curved basad anteriorly and posteriorly and in middle; interspace between this double line and the preceding one brownish; a small stigma with pale centre; an almost straight discal line, a little more proximal at costal margin than the corresponding line of *P. orthographus*, followed by a faint crenate line and a submarginal line, the latter being straight from costal margin to R^3, and faint and flexuose farther back; hinder angle less produced than in *P. orthographus*, no distinct black-brown spot near this angle.——Hindwing pinkish drab, deeper in tint than forewing, grey at anal angle; a trace of a brown median line and of an interrupted subanal bar; fringe dotted with brown.

Underside more clayish grey than upper, both wings with a curved discal line and a row of submarginal dots, the dots of hindwing being replaced near anal angle by a line.

Genitalia: tenth tergite broad, narrowed beyond middle, then widening again a little, with an antemedian tubercle at the lateral edge, apex sinuate, the lobes broad, obtuse, somewhat slanting downwards; tenth sternite divided into two obtuse lobes. Clasper sole-shaped, with large patch of small friction-scales, the eighth tergite bearing laterally on inner surface a band of large friction-scales. Harpe nearly as broad proximally as the valve, and two-thirds the length of the same, sinuate at apex, the two lobes short and obtuse, the upper a little longer than the lower, both denticulate; dorsal edge of harpe produced at base into a long thin process which projects anad. Penis-sheath thin, bearing at apex a long pointed process which lies close on the sheath, being directed proximad.

Length of forewing: 33 mm.

Hab. Obuassi, Ashanti (G. E. Bergmann).

One ♂.

Typhosia gen. nov.

♂. Palpus closely appressed to the head, second segment much longer than the first; joint not open. Antenna less deeply grooved than in *Lycosphinx* R. & J. (1903); end-segment somewhat shorter, without long bristles, the scales of upperside projecting beyond apex. Posteriorly below eye a tuft of hair-scales, projecting forward, covering half the eye. Abdominal tergites with dispersed flat spines all over, besides the numerous spines at the edges. Tibiae spinose, spurs as short as in *Lycosphinx*, one pair to hindtibia, midtibia as long as midtarsus, hindtibia somewhat shorter than tarsus, but more than half as long again as first tarsal segment.

Neuration as in *Lycosphinx*, but S^2 and R^1 of hindwing on a shorter stalk, D^2 shorter, M^2 less proximal. Distal margin of forewing deeply emarginate between

the pointed apex and M^1, sinuate behind M^1, angulate at this vein, hinder margin deeply emarginate proximally of angle, the latter therefore produced backwards.

Type : *T. illustris* spec. nov.

Nearest to *Lycosphinx* R. & J. (1903), from which it differs especially in the eyes being covered by a brush of hair-scales as in *Rhodoprasina* and *Phylloxiphia* R. & J. (1903).

2. **Typhosia illustris** spec. nov.

♂. Body creamy buff, washed with olive anteriorly.

Wings, *upperside* : forewing creamy buff, somewhat shaded with clay, marked with olivaceous brown lines ; a double line crossing cell at base of M^2, two parallel lines on disc, dentate on M^1 and M^2, the second crossing subcostals just distally of fork ; a bar R^3—M^1 nearly halfway to distal margin as remnant of a third line, which is faintly indicated at costal margin, an evenly curved line from tip of wing to R^2 and continued from here straight across lower angle of cell to costal margin, which it reaches not far from base.——Hindwing rufous-red, costal margin cream-colour as far as covered by forewing, abdominal margin creamy buff, this border widened forward distally and here irrorated with some brown scales ; fringe brown.

Underside buff, irrorated with brown scales.——Forewing rufous red from base to disc, a somewhat S-shaped line from subcostal fork to hinder margin, crossing R^3 about 3 mm. from cell, brown in front, reddish behind ; a second line abont 3 mm. from the first, parallel with it, but dentate, brown, a sharply marked but thin brown line from apex to R^3 joining here the second line.——Hindwing slightly washed with red posteriorly at base, two parallel lines on disc, the first heavier than the second, almost touching lower angle of cell, ending at costal edge in a brown spot.

Genitalia : Tenth tergite almost completely divided into two processes which stand separate proximally but are converging, each process with almost parallel sides and ending suddenly in a very short brown point. Clasper without friction-scales, long, pointed, nearly symmetrical ; harpe very short, basal, consisting of a small curved piece of brown chitin. Penis-sheath without armature.

Hab. Obuassi, Ashanti (G. E. Bergmann).

Two ♂♂.

3. **Macroglossum hirundo samoanum** subspec. nov.

♂. Smaller than *M. h. vitiense* and *h. hirundo* ; straight black-brown median band of forewing distinct, but the grey band absent ; yellow band of hindwing as broad as in *h. hirundo* ; yellow side-spots of abdomen also as in the Tahiti form.

Hab. Samoa.

One ♂.

Connects *vitiense* with *hirundo*.

4. **Macroglossum hirundo confluens** subspec. nov.

♀. Close to *M. h. lifuense* Rothsch. (1894), from Lifu. Black-brown antemedian band of forewing broader, almost completely merged together with the median band ; yellow band of hindwing broader than black-brown basal area. A small yellow side-spot on third abdominal segment and a few yellow scales on the fourth segment.

Hab. New Hebrides.

One ♀.

SOME NEW ANTHRIBIDAE FROM THE COLLECTION OF H. E. ANDREWES.

By KARL JORDAN.

1. **Mecocerus allectus elegans** subspec. nov.

♂ ♀. Similar in pattern to *M. allectus maculatus* Jord. (1894) from Tenasserim, Burma, and Assam. The elytra much longer in proportion and more regularly tessellated; the mesial vitta of the head broader, and that of the pronotum strongly constricted before middle, the triangular apical portion of the vitta being separated from or just touching a round spot which stands on each side of the disc before the middle.

Hab. South India: Anamalai and Nilgiri Hills.

"Flying among felled trees and on living trunks, at 3500 to 4000 ft., in May. Very wary. In the Ouchterloney Valley in the Nilgiri Hills during November and December at 3500 ft., on recently felled *Ficus* and other trees" (H. Leslie Andrewes).

2. **Physopterus analis** spec. nov.

♂ ♀. Black, the tibiae rufescent; pubescence grey beneath, more olive above, being obviously grey in middle of pronotum, at the base and apex of the elytra, the grey apical area of the latter occupying about one-third, being rather sharply limited in front and rounded; third elytral interspace with some black pustules, one of which, situated just in front of the grey apical area, is more prominent; the other alternate interspaces also with small black spots; a brown-black spot upon suture at apex; tibiae ringed with brown at base, in middle, and at apex.

In structure similar to *P. tuberculatus* Jord. (1894) from Ceylon. Elytra much more convex, and the postmedian pustule much less elevate. Hindfemur of ♂ with an acute tooth on the underside beyond middle.

Hab. South India: Anamalai Hills.

"In May, at 3900 to 4000 ft." (H. Leslie Andrewes).

3. **Sintor andrewesi** spec. nov.

♂ ♀. Brown-black. Rostrum with parallel sides, very feebly dilated at apex, mesially carinate, somewhat impressed along the carina, at base mesially grooved, like the head uniformly covered with a greyish clay pubescence. Eye small. Antenna rufescent, club black. Prothorax uneven above, depressed, subtuberculate in centre, and somewhat elevate also laterally of depression; carina interrupted in middle, evenly flexed forward at sides. Elytra flattened at suture, especially before apex, basal callosity tuberculiform, black in front, a large tubercle before apex between the third and eighth stripes, third stripe ending in a small tubercle, sutural and alternate interspaces tessellated and pustulated with black; a median pustule in fifth interspace, and a submedian one in third interspace larger than the others and bordering a greyish area occupying the sutural depression. Legs rufescent, tibiae and tarsi annulated with brown; midtibia with apical mucro (♂).

Length, 4½ to 5½ mm.

Hab. Nilgiri Hills.

"At 6000 feet, by beating" (H. Leslie Andrewes).

A few specimens.

The tubercles of the elytra and the small eyes separate this species from all the other forms of *Sintor*.

4. **Habrissus sellifer** spec nov.

♂ ♀. Similar to *H. indicus* Jord. (1903), but head and rostrum with sharply marked grey mesial vitta; end-segment of antenna black-brown like the other segments of the club, not luteous; disc of pronotum distinctly bi-impressed, the grey markings ill-defined; the grey transverse postmedian band of elytra further back; mesosternal process more rounded; metasternum of ♂ with velvety black spot on each side, without combs.

Hab. Nilgiri Hills (H. Leslie Andrewes).

Several specimens.

Phloeomimus gen. nov.

♂ ♀. Head similar to that of *Phloeobius* Sch., but neither carinate nor sulcate. Antenna not reaching beyond base of prothorax, segments 2 and 3 thinner than the others, 5 slightly thicker than 4 and 6, especially in ♂, 8 as long as broad, club hardly longer than segments 6, 7 and 8 together. Eye as in *Phloeobius*, coarsely granulated, deeply sinuate. Antennal groove not covered, transverse. Prothoracic carina basal, laterally extending to middle. First tarsal segment short, claw-segment of foretarsus a little shorter than segments 1, 2 and 3 together.

Distinguished from *Phloeobius* especially by the antenna. We are acquainted with only one species, which resembles *Basitropis* in shape.

5. **Phloeomimus griseus** spec. nov.

♂ ♀. Subcylindrical; brown-black, somewhat rufescent; densely covered with a clayish grey pubescence, the upperside being indistinctly marked with brown. Rostrum slightly impressed in middle. Eye about four times as long transversely as broad in centre. Prothorax broader than long, truncate, widest a little behind middle, being rounded at sides; puncturation very dense; angle of carina a little over 90°, but not rounded. Elytra cylindrical, practically truncate at base, basal callosity just vestigial; regularly punctate-striate, bearing dispersed indistinct brown dots. Pygidium twice as broad as long, rounded. Prosternum depressed in front, very short. Mesosternal process vertical, curved backwards at apex.

Length, 5½ to 7½ mm.; breadth, 2 to 2½ mm.

Hab. Tharrawaddy, Burma.

Several specimens.

TWO NEW *XENOCERUS* (*ANTHRIBIDAE*) IN THE COLLECTION OF R. VON BENNIGSEN.

By KARL JORDAN.

1. **Xenocerus bennigseni** spec. nov.

♀. Black; pubescence creamy white. Antennae reaching beyond middle of elytrum, peculiar in structure; segment 7, base of 8 and apex of 6 grey, 1 to 6 clothed with brushes of brown hairs; segments 1 and 3 short, 2 almost thrice as long as 1, equalling 4, this a little shorter than 5 = 6. Prothorax broadly and deeply impressed longitudinally in middle, the impression occupying nearly one-third the width of the pronotum, narrowing apically, filled in with creamy-white pubescence; a slightly darker vitta on the side, partly obliterated. Elytra broadly impressed at the suture, the impression rather sharply limited laterally; apical declivity irregular, each elytrum being elevate in middle at the beginning of the declivity and impressed laterally of this elevation; base also more strongly impressed at shoulder than usually; pubescence creamy white; a large lateral area brown, reaching from basal fourth to apical declivity, irregular, extending upwards in middle to the elevate third interspace, and posteriorly produced into a narrow, irregular, transverse band which runs over the subapical elevation and is dilated forward upon suture; two large round dots on elevate third interspace (but extending to second and fourth interspaces) black, one subbasal, the other antemedian, joined to the fuscous lateral area; humeral and apical areas somewhat marmorated with fuscous.

Pygidium creamy white. Underside the same laterally, less densely pubescent in middle; abdomen with a row of small black lateral spots. Process of mesosternum sub-bituberculate. Femora and tibiae rufescent.

Length: 17 mm.

Hab. Sattelberg, Huon Gulf, German New Guinea (R. v. Bennigsen).

One ♂.

The remarkable structure of the antennae and the broad impression of the pronotum and elytra distinguish this species from all the others which are known.

2. **Xenocerus lacrymans herbertus** subspec. nov.

♂♀. Differs from *X. l. lacrymans* in the pattern of the elytrum: the basal sutural stripe is thinner, the rounded cordiform sutural spot is replaced by an anguliform spot, the anterior lateral spot is transverse, irregular, the postmedian lateral spot is more transverse than in *l. lacrymans*, being often continuous with the sutural anguliform spot, and the apical spot is smaller.

Hab. Herbertshöhe and Baining Mts., Gazelle Peninsula, Neupommern (R. v. Bennigsen).

Two pairs.

This form is interesting inasmuch as it forms a transition from the pattern of *X. lacrymans lacrymans* to the ordinary *Xenocerus* pattern.

NOVITATES ZOOLOGICAE.

Vol. XIII. AUGUST, 1906. No. 3.

A REVISION OF THE AMERICAN PAPILIOS.

By the HON. WALTER ROTHSCHILD, Ph.D., and KARL JORDAN, Ph.D.

AFTER the publication, in 1895, of the *Revision of the Papilios of the Eastern Hemisphere, exclusive of Africa*, we intended to continue the work by revising also the Papilios of the Aethiopian Region and of America. However, we soon found that the material at our disposal from these regions was not extensive enough, and therefore postponed the researches. We knew our task to be specially difficult with some groups of American Papilios, which are either so variable individually or present such slight external specific differences that, in the absence of breeding from the egg, a comparison of long series of specimens appeared to us necessary to render the conclusions reliable. Since 1895 the collection of Lepidoptera in the Tring Museum has been steadily increased, so that, after the issue of the *Revision of the Sphingidae* in April 1903, we considered the material large enough to base upon it a *Revision of the American Papilios*. We undertook the work the more readily, as we were assured of the kind assistance of several friends who were willing to place the material in their collections at our disposal for the purpose of this Revision. Many of the deficiencies in our collection have thus been made good, and the number of specimens compared has been rendered considerable in the case of most species. We take this opportunity of tendering our very best thanks to all who have so kindly assisted us.

The collection of the British Museum, containing the types of the numerous names given to Papilios by Doubleday, Gray, Hewitson, and others, and the collection of Mr. F. Ducane Godman, comprising not only a large Central American material, but also many South American forms which are rare in collections, have been of the greatest help to us. We have also examined the specimens in the large collections of Messrs. H. Grose-Smith, H. Druce, and H. J. Adams, as well as the Hopeian collection at Oxford, all of which contain material which it was very important for us to see. Of Continental collections we have visited those of Monsieur Paul Dognin, the Paris Museum, and Monsieur Charles Oberthür; and Dr. Rebel has been kind enough to send us some of the types of Kollar and Felder contained in the Hofmuseum at Vienna. The most valuable assistance has been rendered to us by Monsieur Charles Oberthür, whose magnificent collection comprises, in addition to the numerous specimens described by Boisduval, and others described by Lucas, a very large recent material, among which there are a number of forms which we have not seen in other collections, several being undescribed.

We have further been assisted in our task of clearing up the synonymy by photographs of some Godartian types preserved in the Royal Scottish Museum at Edinburgh, and of some Hopfferian specimens in the Berlin Museum, and we

are also indebted to Herr G. Weymer for a sketch of *P. orthosilaus*. We have not had an opportunity of visiting for the purpose of this Revision the fine collection of the late Dr. O. Staudinger. However, we do not think that we have made a mistake in regard to any of the forms of *Papilio* of which the name-type is contained therein, nearly all the forms described by Dr. Staudinger being now also in other collections.

The series of Papilios sent for inspection by Prof. Dr. Goeldi, the founder of the well-known Goeldi Museum at Pará, has been very serviceable. We were the more pleased to have these specimens for examination, as our own material from the Lower Amazons is very limited.

With the exception of the North American forms, the literature on the American Papilios is generally not very extensive. There are comparatively few local lists of South and Central American Lepidoptera, collectors of neotropical butterflies apparently not being given to publishing lists of captures, as is so frequently done with African Lepidoptera. We are not over-sorry that this is so; for we have found some of the lists more a source of trouble than a help, on account of the species being partly enumerated under obviously wrong names.* In the case of some difficult species, such as *P. protesilaus* and *P. iphidamas*, we have been obliged to discard a number of references, as we could not possibly ascertain which of the numerous allied forms is concealed under the name quoted in the list. Otherwise we have endeavoured to make the bibliography fairly complete. Most of the works referred to are in the Tring Museum, and those which are wanting have been consulted at the British Museum, very few books being quoted in this Revision which we have not seen ourselves. We hope, therefore, that we have not missed any observation of importance bearing on our subject, or names proposed for American Papilios.

However, although there is little written about the greater percentage of American Swallowtails, the literature presents nevertheless a great deal of nomenclatorial intricacy, which it was one of the objects of this Revision to unravel. Owing to a great looseness in the descriptions published by some of the old authors, and an equally great arbitrariness in the application of names, the nomenclatorial puzzles are numerous and partly difficult to solve. This laborious research in mere nomenclatorial matters might easily have been avoided for the greater part, if a little more preciseness had been exercised on the part of the authors of names. We can only regret the unnecessary burden unconsciously put on the revisers by former authors; but we express the hope that it will serve our contemporaries, as it has served us, as a warning not to be equally loose in matters nomenclatorial and vague in the introduction of new names. A name too many does not much matter, if one knows to what it is meant to apply; but a name which one does not know where to place correctly is a great nuisance.

It is now close on a century and a half since the publication of Linné's *Systema Naturae* (1758), the starting-point in nomenclature. The knowledge of American Papilios was extremely meagre at that time, only seven different species (*glaucus*, *philenor*, *thoas*, *aeneas*, *anchises*, and *protesilaus*) being distinguished by a

* An erroneous name for a species is distinguished by us in the synonymy from the preoccupied name by putting err. det. (*error determinationis*) after the author who misapplied the name. For instance, *Papilio asterioides* Staudinger (non Reakirt, 1863, err. det.) means that Staudinger called an insect *asterioides* Reakirt which was not Reakirt's insect; while *Papilio mentor* Boisduval (non Dalman, 1823) means that Boisduval gave, in 1836, to a new species the name *mentor* which had already been employed in 1823 for another insect.

name in that fundamental work, an eighth name (*antilochus*) being proposed for an exaggerated and partly fictitious figure of the male of *P. glaucus*. Small as this number is, it presented a good deal of contentious matter for subsequent authors to write about. Linné laboured under the great disadvantage that, as a reformer of the methods in Natural History, he had to base his work not on actual specimens alone, but had also to include the recorded forms of animals which he did not know authentically.

Since the pre-Linnean descriptions and figures are for the greater part very poor productions, Linné was frequently misled to quote these figures and descriptions in a wrong place. Some of his erroneous quotations, however, are doubtless due to mere oversight or absentmindedness—as, for instance, the citation of *Edw. av.* 34* under *Papilio ajax* in 1758, under *P. protesilaus* in 1764, and again under *P. ajax* in 1767, Edwards's figure not agreeing in the least with the other quotation given in 1758 and 1767, or with Linné's own description. The citations under *P. protesilaus* comprise several *Nymphalidae* and *Papilionidae*, the references under *P. anchises* being also wild. Now, in dealing with such names, it is obvious that the description given by Linné must be the primary guide in the application of the name; at least, so it appears to us. The three Linnean names are good illustrations of the different results one arrives at. In the case of *P. anchises* the description and the reference to the Museum Ludovicae Ulricae (M. L. U.) leave no doubt that the insect figured by Clerck in 1764 is the true *P. anchises*, though post-Linnean authors have often erred in the application of the name. No such positive result can possibly be arrived at in the case of *P. protesilaus*. From the descriptions given by Linné in 1758, 1764, and 1767, we can only conclude that *P. protesilaus* was one of the numerous white neotropical species distantly related to *P. podalirius*. Among the figures referred to by Linné in 1758 there is only one which does not contradict Linné's description. This figure of Merian is unfortunately very incorrect. In 1764 Linné gave a better description, which, taken in conjunction with Clerck's figure referred to by Linné, applies best to that species to which we have restricted the name in this Revision. Since neither the figure nor the description is exact enough for absolutely certain identification, it is obvious that Linné's specimen, if he had one, may very well have belonged to one of the other white Papilios. However, it would only be possible to disprove the correctness of our application of the name *protesilaus*, if the authentic specimen from which the description was presumably taken were preserved, and in a sufficiently good state of preservation to exhibit those delicate differences by which the various species allied to *P. protesilaus* are distinguishable. Perhaps one might agree in this case with Mr. G. H. Verrall † that it is fortunate there is no such Linnean specimen, since it is really very indifferent which species bears the name *protesilaus*, as long as there is no possibility of our application of the name being justly reversed.‡ Nevertheless, this case renders

* Edw. av. p. 36. t. 226 is quoted by Linné in 1767 on p. 756 under his *Papilio Eques Heliconius thallo*, and again p. 807 under *Sphinx pectinicornis*.

† Presidential Address, in *Proc. Ent. Soc. Lond.* for 1900. p. 47.

‡ There are two specimens of this group of species in Linné's collection preserved at the Linnean Society in London. One specimen is similar to Clerck's figure, while the other is *P. telesilaus*. Unfortunately a former librarian, under whose care (?) the collection was, thought fit to supplement the collection by adding fresh specimens!! It is therefore hardly possible to say if these two Papilios, or one of them, were originally in the Linnean collection. The one which agrees fairly well with Clerck's figure has no abdomen.

it quite clear that, as the distinguishing characters of the various species in question have never been recognised, absolute certainty as to the application of the name *protesilaus* might only be arrived at by ourselves examining the original specimen on which the description was based, or the "name-type," as such a specimen may conveniently be called. In all instances where new distinguishing characters are discovered between forms which were formerly considered the same, it is nearly always indispensable for a conscientious reviser to examine the name-type of each form. As long as the baptizers of new forms are not omniscient, and hence are liable to publish descriptions and figures which future discoveries may render insufficient, a great deal of instability in nomenclature and of haggling about names, and therefore of waste of time, would be avoided, if every name introduced were made monotypical, and the name-specimen carefully preserved. Many systematists are fortunately in the habit of doing this, thus saving future classifiers much unnecessary labour. The habit of designating as type every specimen of the series the describer had originally before him is not to the point, since there is no guarantee that all these specimens are the same. The history of American Papilios offers many examples of composite species, and not only among those described in the eighteenth century, as will be seen in the body of this Revision. If Linné had been quite precise in the application of his names, fixing each name to one particular specimen or a previously published figure or description, we should not now be in such a peculiar predicament with regard to his *Papilio ajax* as we are placed in. As said above, the description of this *P. ajax* and the two references given beneath it contradict one another, each applying, without the slightest doubt, to a different insect. The description fits the *Papilio* described later as *polyxenes* by Fabricius and as *asterius* by Cramer, and does not agree with the species which is generally known as *P. ajax*. If we had here to do with some little-known insects, we should hardly hesitate to apply the name *ajax* L. to the insect figured as such by Clerck—namely, *polyxenes* Fabr.

However, there is an enormous literature on both these insects, and the replacement of the names *polyxenes* or *asterius* by *ajax* would lead to endless confusion. The whole mischief is occasioned by Linné's reference under *P. ajax* to Edwards's figure. Now, this reference Linné himself removed to *P. protesilaus* in 1764. Under this same name *protesilaus* we find in 1758, 1764, and 1767 a reference to a figure in Catesby which represents the same insect as Edwards's. And in 1767 Linné described *Papilio xuthus* as being similar to *P. ajax*, which would have been quite ludicrous if Linné's *ajax* had been the insect now so called. There is a remote possibility that Linné described *ajax* from a small male of *P. glaucus*. For this reason we have thought it advisable to overcome the difficulty by rejecting the name *ajax* altogether on the ground of its being of doubtful application.

The name *ajax* does not appear in Linné's *Museum Ludovicae Ulricae*; this is unfortunate, since the descriptions given in that work are far superior to those of the *Systema Naturae* of 1758 and 1767.

The most famous and, at that time, the most important post-Linnean works on Entomology were those of Linné's disciple Fabricius. The *Systema Entomologiae* of 1775, the *Species Insectorum* of 1781, etc., were conceived on the same lines as Linné's *Systema Naturae*. They gave a short, concise classification of all the insects known to the author either from specimens or previous publications. No

entomologist has ever exercised so much influence on the works of others, and for such a long time, as Fabricius. Nowadays the Fabrician works are rather a source of trouble. The descriptions are no better than in the *Systema Naturae*, and the frequent changing of names indulged in is most confusing. The nomenclatorial errors of Fabricius have, unfortunately, been perpetuated by subsequent authors, many of whom, as late as the middle of the last century, followed Fabricius blindly, giving his names preference to older ones, and accepting his identifications even if known to be erroneous.

The habit of supplanting the name of a species by a new one is bad only in so far as it swells the synonymy unnecessarily ; but very pernicious it is to transfer arbitrarily a name from one species to another. This is occasionally done even nowadays, though not in so flagrant a way as by Fabricius. Some authors appear to be of the opinion expressed by Boisduval in 1836—that a name which has become a synonym on account of another name having priority, may be used again in the same genus for another species which has no name. Boisduval named a Brazilian species *P. mentor* according to this principle, though the name had already been employed for a closely allied species but become a synonym, stating : "Dalman a donné le nom de *mentor* à un autre *Papilio* qui est le suivant, et qu'Hübner avait fait connaître avant lui sous le nom de *lycophron* ; nous avons cru pouvoir prendre sans inconvénient le nom de Dalman pour l'appliquer à celui-ci qui est nouveau."* As this principle leads unavoidably to confusion, we are strenuously opposed to it. We go even further, and maintain that a name should not recur within the same genus even as a name for varieties.

A good many of the Fabrician descriptions were taken from specimens which he had seen in England during his several visits to this island, and from the unpublished drawings of Mr. Jones, of Chelsea. These drawings are now in the possession of Dr. Drewitt, a descendant of Jones. Dr. Drewitt has kindly allowed us to examine the drawings and to take photographs of some of the figures. The two volumes are in the best state of preservation, while Jones's collection of insects had much suffered before it came into Dr. Drewitt's hands. The execution of the drawings is admirable. There are ten names for American Papilios characterised by Fabricius from Jones's drawings, respectively from specimens which had served as originals for these drawings (*pelaus*, *acamas*, *dardanus*, *tros*, *zacynthus*, *dimas*, *idaeus*, *ilus*, *iphidamas*, and *homerus*). The specimens were in Drury's collection, with the exception of *homerus*, which was contained in the collection of Latham. Since the Fabrician descriptions are mostly rather meagre, and as most of his types have disappeared, the preservation of Jones's drawings is a very fortunate circumstance.

The butterflies described by Fabricius were revised in 1869 by Butler ; but this revision was not so thorough as the subject required. With the help of Jones's drawings we have been able to identify all the Fabrician Papilios about which there was some doubt.

In 1779 appeared the third volume of Goeze's *Entomologische Beyträge*, which is a kind of catalogue enumerating all the Lepidoptera known at that time. A few critical remarks are offered by the author, often beside the mark ; and some new names are introduced for some of Seba's more or less bad figures, which might with advantage have been left unnamed.

The short descriptions of Linné and Fabricius being generally insufficient for

* *Spec. Gén. Lép.* i. p. 352 (1836).

precise identification, it was soon recognised that good illustrations were a necessity. The first iconographer producing figures which can be called good was Rösel. The productions of the earlier authors (Petiver, Moffat, Merian, etc.) ,as well as of some later ones, are much inferior to the plates in the *Insekten-Belustigungen*. There are only a few figures of Exotic Insects in Rösel. The first iconography of great importance for the nomenclature of Lepidoptera, however, were the *Icones Insectorum* of Clerck (1764), the figures of which were for the greater part taken from specimens in the museum of the Queen Ludovica Ulrica, and hence may be considered typical.

Shortly after the appearance of the twelfth edition of the *Systema Naturae*, the last edited by Linné himself (1767), Drury published his *Illustrations of Natural History*, which is usually quoted for the sake of convenience under its subtitle as *Illustrations of Exotic Insects*. The three volumes contain only insects. The plates are nearly all very good for that time. In using the work one should bear in mind that in some cases the localities are erroneous, some North American insects being stated to have been received from Jamaica, and the reverse. However, in respect to localities the work was a great improvement on former authors.

If we find the localities given in the works of the earlier writers often deplorably vague and frequently erroneous, we must remember that the majority of the specimens were collected by people who did not take an actual interest in Natural History, but brought the specimens home as curiosities from foreign countries. Our forefathers in systematics had not the good opportunities we have nowadays of obtaining correctly localised material. They had to be content with what they got. The wrongly localised specimens misled them often to attribute a much wider distribution to many tropical species than they actually have, it being stated of many species that they occur in all tropical countries. The knowledge of the great importance of exact localisation has come very slowly ; but we may now fairly say that every serious student of some branch of systematics is aware that specimens without exact locality are of little value to the scientist.

Being acquainted with many large collections of Lepidoptera, we note that the progress made during the last ten years in labelling insects is very marked. While the labels, if there were any, were formerly usually hand-written, bearing mostly only such general localities as Brazil, Venezuela, West Africa, etc., we find the labels of recent additions mostly printed, giving often, besides the exact locality, the date or season of capture, altitude, name of collector, and even some biological fact. No doubt we are on the right track, and there is hope that also the general collecting public, which depends to a large extent on dealers for additions to the collection, will soon follow, rejecting with disgust the specimens offered with such vague localisation as East Africa, Australia, or Amazons. On critically examining the geographical distribution of the American Papilios, we have come across many errors. Localities mentioned in the literature on these insects which are flagrantly wrong have been put by us between inverted commas (“ ”) in the bibliography quoted in this Revision, and have further been designated as *false* or *loci error*. In a few cases, however, where there is a possibility of the insect being found in the district, we have referred to the record from that locality as being doubtful or as requiring confirmation.

How erroneous localities get into collections and hence into literature is shown by the following instructive instance, where we can trace the error to its source. Streeker figured erroneously as *Papilio asterioides* Reak. a specimen of *Papilio*

polyxenes americus Koll., giving Costa Rica as locality. An itinerant German dealer, Heyne, sold as *P. asterioides* specimens he had received from Messrs. Standinger and Bang-Haas without locality labels. Heyne, following a custom of collectors and dealers, ticketed his specimens Costa Rica, the locality whence *asterioides* had been recorded by Strecker (such specimens with a label in Heyne's handwriting are in the Tring Museum). Eimer described and figured as *P. asterioides* similar specimens, giving as locality Mexico, these specimens having been received either from Heyne or direct from Standinger and Bang-Haas. Now, all these individuals are neither the *asterioides* of Reakirt nor of Strecker, but are unmistakably Cuban specimens of *P. polyxenes*. The locality Costa Rica and Mexico for them is "manufactured." We add that the error was not made by Messrs. Standinger and Bang-Haas; however, that firm is much to blame in selling their specimens without locality labels on the pins.

Fabrication of localities is even nowadays going on. We mention the following instance as a warning to other lepidopterists. Two specimens of what was said to be *Papilio oregonia* were offered to us by an American dealer, who had received them from a correspondent who apparently loves the dollar more than his honour. On receipt of the specimens we found them to be Old World *P. machaon*, one being a Sikkim individual, the other a British specimen! The specimens are labelled "Plumas Co., California, May '03." We are keeping them as a memento, an additional label giving the necessary explanation.

With the publication of Cramer's *Papillons Exotiques* the number of known forms of exotic Lepidoptera increased enormously.* Though the descriptions are useless and the figures not always good, very few of the numerous new Papilios are not sufficiently well represented for identification. Only one of Cramer's American Papilios has remained doubtful to us. This is *P. euristeus*, the figure of which does not agree with any specimen which we have seen. The figure is coarse, and may be erroneous, but it is also possible that the insect has not been rediscovered. Some of Cramer's American Papilios are very rare in collections, his specimens being mostly from Surinam, whence no extensive collections of butterflies have been sent in recent years. Collecting in the French and Dutch Guianas is difficult, we hear, owing to the extensive forests without roads and the impenetrable swamps, the only means of exploring the interior being by means of canoes. Moreover, the butterflies, some species excepted, do not appear in such great numbers of individuals as elsewhere, having to be searched for.

Jablonsky's *Natursystem aller Insekten*, continued by Herbst, introduces in the volumes devoted to Lepidoptera some original matter and many copies from Cramer, and contains also several artefacts. The figure which Esper named later *P. pelcides*, and usually considered fictitious, may have been taken from an actual specimen; but nothing of the kind exists now in collections.

Far more critical than any of his predecessors and contemporaries was Esper, in whose work *Die Ausländischen Schmetterlinge* (1784—1801) all the species of *Papilio* which he considered distinct are depicted. The dates of issue of the work are given by Aurivillius in 1882.† The lengthy text accompanying the plates is difficult to understand for a non-German, being full of provincialisms and now antiquated words, the meaning of which the foreigner does not find

* The copy in the Tring Museum contains the original covers bearing the years of issue. We obtained this valuable copy from the library of the late J. H. Leech.

†_*Recensio Critica*, in *K. Sv. Vet. Ak. Handl.* xix. 5. p. 182 (1882).

in ordinary dictionaries. There are many remarks which have quite a modern flavour.

The name *aeneides* on Esper's Plate 15 raises a point in nomenclature which we think it is necessary to discuss here, since our decision with regard to this name is opposed to that arrived at by most other authors. Esper described under the name of *P. aeneas* Linné two males of two different species, believing these males to be ♂ and ♀ of *aeneas*. These two specimens are figured on Plate 15. Though the figures are referred to as *aeneas* everywhere in the text, they stand as *aenides* on the plate, a name which is nowhere mentioned in the text. The name is doubtless due to a mistake on the part of the engraver, Bock. However that may be, is the name *aeneides* to be employed for the one of the two species called *aeneas* in the text which had no name at that time? The facts put in a formula are these:

P. aeneas Esper ♂ ♀ text = *P aeneides* in tab. = { *P.* species indenominata ♂. / *P aeneas* Linné ♂.

In our opinion a new name proposed for a composite species sinks as a synonym if a component part of this composite species had already a valid name. In this instance, be the name *aeneides* a mere lapsus of the engraver of the plate, or a name intentionally given by Esper himself, there was no justification whatever for a new name, since the supposed female of what Esper considered to be a species had the valid name *aeneas*. Similarly Swainson renamed Linné's *Papilio protesilaus*, calling it *Protesilaus leilus*. The description and figure given by Swainson are, however, those of the Brazilian insect, not the Surinam form of Linné's species. Therefore what Swainson considered to be one species *leilus* consists of two forms, of which one had already the valid name *protesilaus*, *leilus* sinking consequently as a synonym of the latter. In general terms, if an author wishes to deal with A and B (individuals, varieties, species, genera, families) under one name, a new name is valid only if neither A nor B has already a valid name.*

Two of Esper's Papilios have been said to be antedated by names given in Martyn, *Psyche*. We agree now with Mr. Sherborn † that *Psyche* should be treated as non-published. There is one copy and portions of two others in the Tring Museum, some plates being numbered and others not. The plates have the appearance of being nothing but printer's proofs. However that may be, in the case of the two American Papilios (*aristodemus* and *hectorides*) Martyn has no priority over Esper, the latter having published a description and figure three years previous to Martyn in the *Magazin der Neuesten Ausländischen Insecten* (1794), a rare work which has been overlooked by recent authors. Esper himself quotes the *Magazin*, and it has also been mentioned by Donovan in *Naturalist's Repository*, *Ent.* ii., text for plate 177 (1827). It has not been consulted by Sherborn.

In 1797 there appeared what is perhaps the best lepidopterological work of the eighteenth century. *The Natural History of the Rarer Lepidopterous Insects of Georgia*, by Abbot & Smith, deviates entirely from the other iconographies above referred to in illustrating the life history of the insects observed. Apart from the pictures in Merian's *Insecta Surinamensia*, often fanciful and grossly incorrect, and Seba's worthless drawings of caterpillars and pupae in the *Thesaurus*, Stoll's Supplement to Cramer, *Papillons Exotiques*, was practically the only work

* See also *Nov. Zool.* ix. *Suppl.* p. xxiv. (1903).

† *Index Animalium* (1902).

containing illustrations of the early stages of exotic Lepidoptera. The *Natural History of Georgia* meant an enormous advance in this direction.

The series of lepidopterological works of the nineteenth century, as far as they concern us here, opened with Hübner's *Sammlung Exotischer Schmettlinge*, appearing from 1806 onwards. As a collection of fine illustrations the *Sammlung* was a great success, while as a scientific work it was an entire failure. With the exception of the separate volume, entitled *Zuträge*, there is hardly any text accompanying the plates. Sherborn* says that he does not recognise as valid the names appearing on plates without text. We wonder if he will be bold enough to reject the majority of the new names of the *Sammlung*. The plates not being numbered, and no date of publication† being given, the work is a great trouble in compiling the bibliography of the insects figured. As every little contribution towards fixing the years of publication of the plates is of some value, we draw attention to the fact that Hübner figures on Plates 114 and 115 of the second volume the identical insects which Godart described in 1819 as ♀ and doubtful ♂ of his *Papilio protodamas*, which name Hübner employed for the male. This can hardly be a coincidence. Hübner doubtless knew of Godart's publication when he engraved the two plates—*i.e.* the plates appeared after 1819.

Hübner's *Verzeichniss bekannter Schmettlinge* was published from 1816 to 1827 or 1828, the Papilios appearing about 1818. A few new names are proposed for American Papilios in this much-abused work, which represents the first attempt at classification of all the known Lepidoptera.

If Hübner erred much on the side of descriptions, Godart's treatment of the Butterflies in the *Encyclopédie Méthodique* ix. (1819) suffered from the entire lack of figures. The work is purely descriptive, but the descriptions are admirable for that time. It is a most careful piece of work. There are naturally a number of mistakes, especially in the mating of the sexes of dimorphic species, which is excusable, since hardly any reliable observations on di- or polymorphism among exotic Lepidoptera were known. Godart's species were mostly described from specimens contained in the Paris Museum. Very few authentic specimens are preserved; the majority appear to have become destroyed already during the first half of the last century. A few of the specimens are in the Royal Scottish Museum (*P. serville*, *triopas*, *imerius*). While previous authors, with some exceptions, employed generally the Linnean formula of nomenclature for Butterflies, interposing between the generic title *Papilio* and the specific name either the sectional name *Eques* or the subsectional name *Trojanus* (or *Troes*), respectively *Achivus*, or both these names (*Eques Trojanus* and *Eques Achivus*), Godart adhered to a pure binominal system of nomenclature. In the Supplement to his work, issued in 1824, several Papilios appear with modern personal names standing in the nominative form: *Papilio serville*, *P. devilliers*, etc. This kind of name for species had become the fashion in France. We do not consider it advisable to alter such names into *servillei*, *devilliersi*, etc., as has been done by most subsequent authors, *servillei* being no more Latin than is *serville*.

The custom of naming species after persons, which is nowadays almost a mania, hails from Linné himself, who named insects *Schäfferi*, *Bergmanniana*, *Listerella*, etc.

* *Index Animalium* p. vii (1902).

† The new edition of the *Sammlung* which is now being issued by P. Wytsman is accompanied by a text written by W. F. Kirby. Here, again, no date of publication of this text is given!!

Many of the entomological works of Godart's period have a French nomenclature, which cannot be considered valid. Rogers's names for Papilios published in 1826 cannot stand, the names given being *Papillon bias*, *Papillon pirithous*, etc.

A few of the specimens described by Godart were subsequently figured by Lucas in his *Lépidoptères Exotiques* (1835), which appeared shortly before Boisduval's *Species Général des Lépidoptères* i. (1836). This *Species Général* is a fundamental work for the study of Papilios. Many errors are cleared up, and also new ones are made. The original specimens from which the new species were described are nearly all in the collection of Monsienr Charles Oberthür. A few appear to have been replaced by Boisduval by specimens which do not agree with the descriptions. Such a result of the habit of removing from the collection the original specimens in favour of better-preserved individuals is very instructive, confirming our contention (see p. 414) that the type-specimen of a new name should be marked as such, and be carefully preserved. Barring accidents, the revision of the nomenclature of a family is made comparatively easy by that means, and, what is more important, the results are more reliable, and hence the nomenclature rendered more stable than if a reviser has only the descriptions and figures to go by. The nomenclatorial type, or "name-type" for short, is of no other importance. That should be clearly understood. Nomenclature is an extraneous matter. It is not the natural history, but only a convenient method of recording some of the results of descriptive science. The natural history types of one and the same species or form are manifold. One may call an individual a type, if it represents the average. Since the same individual is not the average in all characters, a species or form has many average-types, one individual being a morphological type in one detail of structure or pattern, other individuals in other details. There are, further, two kinds of phylogenetic types. Specimens which are the most generalised in a certain character may be called ancestral types in respect to this character, others being ancestral types in other organs. Some individuals are more advanced in certain characters than other specimens, and therefore represent a more advanced type, other individuals being more advanced in other details. Since the variation of the various organs is to a large extent independent—*i.e.* since retrogressive or progressive development does not take place in the same degree in the various organs—an individual may be an average type in one organ, an advanced or an ancestral type in another, and not typical in a third organ. To these morpho- and phylotypes may be added bionomical types, habits being also variable within a species; and so on. It is obvious that all these types have nothing to do with the name-type.

Besides Drury's *Illustrations of Exotic Insects* (1770-82) very little of importance on American Papilios was published in England during the eighteenth century and the first four decades of the nineteenth. The *Zoological Illustrations* by Swainson and Donovan's *Naturalist's Repository* * were the only works which contain more than an occasional reference to exotic Papilios. This became entirely altered in the forties. With Doubleday's *List of the Specimens of Lepidopterous Insects in the Collection of the British Museum* (1845) commenced a series of catalogues which, though in the first instance meant to be a list of the contents of the British Museum collection, became synonymic catalogues of all the species and varieties described. Doubleday's List of 1845–48 was followed by his *Genera of Diurnal Lepidoptera* (1846-52), by Gray's *Catalogue*

* Each plate of the *Repository* bears the date of publication.

of Lepidopterous Insects (1852), and Gray's *List of Lepidopterous Insects* (1856), both works of Gray dealing only with the *Papilionidae*.

The *Catalogue* of Gray is for our subject the most important of these publications, since it contains descriptions and figures of numerous new "species." The work is faulty in many respects. The figures are in some instances misleading on account of errors in coloration, the sexes are often wrongly mated, and the localities are not always reliable.

In these English catalogues we find for the first time *nomina nuda* of American Papilios, names without any attempt at description, the author of such names considering it apparently sufficient publicity if the name was in a museum behind the specimen. This bad example has fortunately not been followed in the case of American Papilios by later authors, excepting certain Continental dealer-authors, who did it for the sake of earning an additional shilling, the purchasers of specimens paying more for a supply of named specimens than for unnamed ones. Such an abuse of nomenclature cannot be too strongly condemned.

During the fifth and sixth decades quite a number of new American Papilios were described by Kollar, Lucas, Ménétriés and others. Among the Lepidoptera recorded from Cuba by Lucas, in *Sagra, Historia Fisica* vii. (1857), there are several that do not occur on the island. The species published by Lucas in the *Révue de Zoologie* for 1852 were mostly based on specimens lent to him by Boisduval, and are now contained in the Oberthür collection.

Kollar's species were collected by Prince Sulkowsky. In dealing with the list of captures published in 1850 one must bear in mind that Sulkowsky travelled up the Magdalena River, and crossing the Cordillera of Bogota went down the Rio Meta and Orinoco. The localities of the specimens have not in every case been carefully kept, some specimens said to be found near Angostura (Ciudad Bolivar, on the Orinoco) being doubtless of Colombian origin.

So far very little was known of the habits of the butterflies of tropical America. The study of exotic insects was almost purely museological. The more valuable were the essays on the Amazonian fauna published by Wallace and Bates. The essay on the Papilios of the Amazons by Bates (in *Trans. Ent. Soc. Lond.* 1861) is a classical work. It is full of notes on habits, distributions, and on geographical and individual variation which were quite new at that time. Nothing equalling this essay has since appeared on tropical American butterflies. However, in his references to non-Amazonian forms Bates was very often at fault, nor have all his conclusions as to variability and distribution in the Amazon valley been borne out by recent explorations and researches. It is a great pity that the material collected by Bates has been scattered over many collections. Variation cannot be studied without comparison of long series of specimens. The problems of the distribution of the various geographical varieties in the Amazonian fauna touched upon by Bates will remain open till adequate material (properly labelled) is available. Everybody has Amazonian Papilios, but nobody has long series from a sufficiently large number of localities. The large collections made by Dr. Hahnel—the best collector of butterflies who ever visited South America—are also scattered.

Shortly after Bates's essay there appeared a work of quite a different character, but of no less importance. The *Species Lepidopterorum huiusque descriptae vel iconibus expressae*, by C. & R. Felder, contains, like Gray's *Catalogue* and *List*, only Papilionidae. It is the first classification and revision of the entire family which might be called thorough. The species are mostly grouped correctly, with

the exception of some mimetic forms, which are classified with their models. In characterising the groups of species the Felders laid great stress upon small differences of neuration, in which they were wrong. The series of specimens compared by the authors was generally small, and therefore many small differences appeared to them to be constant, while they are in fact individually variable. The same applies to differences in size, wing-shape, and pattern, which served the Felders as specific distinctions. The numerous "species" of *Papilio* described by them in the essay mentioned, in the *Reise der Fregatte Novara*, and elsewhere, are mostly varietal forms, often mere individuals deviating in some character from the average. In many cases the authors were well aware that the new "species" of *Papilio* was a geographical form; in fact, they make sometimes a statement to that effect. However, they treated nomenclatorially all such forms as species. This curious phenomenon is by no means uncommon among systematists of our day. To consider all geographical representative forms as distinct species, and treat them as such nomenclatorially, is quite consistent. To regard all individual, seasonal and geographical varieties of a species as not necessary to be distinguished by special names and hence deal with all of them under the one specific name, is again methodical. But to call a form a local race, naming it *Papilio pandion*, and to employ the same formula *Papilio anchisiades* for the species, is certainly ill-considered. The formula expressing a conception should show which special conception is meant, whether a family, a subfamily, a genus, a species, a geographical form or another kind of variety. It will doubtless take a long time before all systematists have learned to employ a nomenclature which is consistent with their own ideas. The more is it necessary to bring the matter again and again before their mind.

The Felderian types are mostly in the Tring Museum, some being in the Hofmuseum at Vienna.

In the second half of the last century the number of works and treatises dealing with American Lepidoptera increased very rapidly. In North America especially entomologists became very active in the sixties, and have ever remained so, being now in some branches well in advance of European systematists. We mention here only those authors whose work is of special importance for our Revision.

The species of *Papilio* described by Hopffer in 1866 have partly been overlooked subsequently. We hope that we shall be found to have identified them correctly. Kirby's *Catalogue of Diurnal Lepidoptera* (1871; Supplement, 1877) is too well known to require more than passing mention. The nomenclature of varieties needs purifying. The formula "*Papilio eurimedes* Cram. var. a. *P. agathocles* Koll." for a variety is very cumbersome. The work has been most useful to us, in spite of the errors in synonymy, which are hardly avoidable in a compilation of this kind. A second edition of the catalogue is a great desideratum.

The Lepidoptera of the Argentine Republic are dealt with by Burmeister in his *Description Physique de la République Argentine*, vol. v. (1878) and *Atlas* (1879). The figures of the early stages, though some are not correctly identified, are very useful.

Another faunistic work of the same time is Gundlach's *Contribucion á la Entomologia Cubana* (1881). It is a descriptive catalogue in which former work on Cuban Lepidoptera by Poey, Lucas, Herrich-Schäffer and others is revised, notes on the life-history of many species being added. Since Gundlach had resided so

long on Cuba, nobody was better fitted to write on the subject. One of the prettiest American Papilios bears his name (*P. gundlachianus*). Unfortunately we are bound to employ for it the older name *columbus*, given to it previously by Gundlach *in litt.* and published by Herrich-Schäffer. The insect was renamed *gundlachianus* by Felder, because the name *columbus* had already been employed for another species in the genus *Papilio*. Our reasons for retaining nevertheless the name *columbus* for the Cuban species are of a general nature.

We distinguish between the name of a form (species or variety) and the nomenclatorial formula in which this name appears. *Papilio marcellus* f. *telamonides* is the formula for the summer variety of the North American species *Papilio marcellus*, the name of this variety being *telamonides*. Some authors consider it permissible, or even advisable, to replace the name by a new one, if the supposed variety turns out to be a distinct species. Among prominent Lepidopterists this view was held by Nicéville. If the principle were correct, one ought consequently to replace a name by another also in the case of supposed species being proved to be varieties, or a supposed geographical form to be seasonal, etc. We regard this opinion as utterly opposed to stability in nomenclature. The first name given to a form, if not *preoccupied*, is the name of this form, whatever position the name takes in the nomenclatorial formula according to the individual opinion of an author. Now, systematists differ as to when a name is preoccupied. Leaving aside the view that a name is preoccupied by another which has the same root or the same meaning (*fluviatilis*, *fluviorum* ; *alboniger*, *leucomelas*), there are two opposite opinions with regard to this question. Most systematists adhere to the rule that a name is preoccupied if at the time of its publication there was already a name identical in spelling in the genus where the new form was placed by the author. This rule would be excellent, and we should adhere to it, if there were not serious drawbacks. Opinion as to the extent of each genus is not at all unanimous, and never will be. According to one author a certain genus contains many species ; according to another writer only one or a few belong to it. Hence it is often impossible to decide, if at the time of publication of a new form the name was or was not contained in the respective genus as conceived by the author of the new form. For instance, if somebody published to-day a new Swallow-tail, calling it *Papilio ulysses*, who will decide if this name is preoccupied, since some authors restrict the generic title to *machaon* and allies, others to *priamus* and allies, others again to some Nymphalids, while the majority of Lepidopterists comprise in *Papilio* many hundreds of differently organised *Papilionidae*? To follow the above rule consistently is the more difficult in the case of Lepidoptera, as the genera were formerly so very extensive that the species belonging at one time to a single genus are now often distributed over several families. There is, moreover, the great difficulty in Lepidoptera that one would have to decide whether *Papilio Eques Trojanus dardanus* Fabr. (1793) is preoccupied by *Papilio Eques Achivus dardanus* Brown (1775) or by *Papilio Danaus Festivus dardanus* Cram. (1775); and whether *Papilio Eques Achivus orestes* Fabr. (1793) is superseded by *Papilio* (*orestes*) Meerb. (1775). The above rule further compels us to ask, if *Papilio harmodius* Doubl. (1845) which is a swallow-tail, is preoccupied by *Papilio Nymphalis Festivus harmodius* Cram. (1779), which is a moth, or the name of the swallow-tail *Papilio hesperus* Westw. (1843) by *Papilio Festivus hesperus* Fabr. (1793), which is a Nymphalid ?

Now, there is no difficulty about these questions, and there can be no difference of opinion, if one accepts our principle of dealing with such names. We consider

a name preoccupied only if there is an identical older name in the genus to which the species or variety *now* belongs, it being quite irrelevant whether the name was or was not preoccupied in the genus where the author originally placed the form. *Papilio brutus* Fabr. (1793), which is a swallow-tail, does not sink as a synonym on account of *Papilio brutus* Cram. (1775), which is a Nymphalid. As in the case of the Revision of the Papilios of the Eastern Hemisphere (1895), we revert also in the present Revision to the first name of each form, though this name may recur in this so-called genus *Papilio*. In our proposed generic revision of the *Papilionidae* the forms which appear homonymous in the present work will come under different generic titles. The number of such names is very small, and it is certainly advisable to bring already here the names of the forms in accord with the names they will bear in the generic revision of the family.

The list of Papilios in his collection published by Charles Oberthür in 1880 contains many useful hints, besides a number of fine figures, and descriptions of new forms. The collection was very small at that time as compared with what it contains now.

Aurivillius, in 1882, gave a revision of the Lepidoptera described by Linné in *Museum Ludovicae Ulricae* (1764). Though there are some points which the author could not satisfactorily decide for want of adequate material, the essay is an example of very painstaking work, nothing being taken for granted and every question carefully investigated. It is a *Revisio Critica* in the true sense.

The only popular work on exotic Butterflies which it is necessary to mention here is Standinger's *Exotische Tagfalter*. The book, which was destined for the great mass of "collectors" of butterflies, was not meant to be a critical entomological work. But, in spite of numerous errors in identification, it was also from a scientific point of view a welcome contribution towards the knowledge of tropical butterflies. Here, and in some other places, notably in the *Iris*, Staudinger described quite a number of new species and varieties of American Papilios, among which *hahneli*, *quadratus*, *tasso* and *garleppi* are the most noteworthy. We need not dwell here on Staudinger's enormous influence on Palaearctic Lepidopterology, which was his chief interest; but it is only fair to mention that no other entomologist has had so great an influence on the exploration of the South American butterfly fauna as Dr. Standinger. A great many collectors and residents were encouraged and subsidised by him, among whom Dr. Hahnel and the Garlepps were the most successful. A large proportion of the American Papilios which one sees in collections are Staudingerian specimens. In systematics Staudinger was guided more by the general appearance of the species, or by intuition, if we may say so, than by hard facts of morphology, and therefore was often led astray. However, he was far too keen an observer not to recognise some general truths in respect to relationship. He was the first to see that there is a difference between geographical and non-geographical varieties, and he endeavoured to distinguish even nomenclatorially between these two grades of varieties, calling the geographical variety *varietas* (*var.*) and the non-geographical variety *aberratio* (*ab.*) The distinction remained, however, more or less theoretical, Lepidopterists employing *var.* and *ab.* just as indiscriminately as before. This is one of the reasons why we reject *var.* altogether as a *special* nomenclatorial term. In another matter we have followed Staudinger now for some years. In the Revision of the Papilios of the Eastern Hemisphere we altered, following precedent, all the adjective names of species and varieties into the masculine gender, *Papilio* being masculine. We

have since come to accept Standinger's view that every name should be treated as a noun, and therefore its gender be independent of that of the generic name. For us *Papilio oregonia* is as correct as *P. opalinus*.

Standinger was an ardent adherent of the habit of writing all names of Lepidoptera with a capital. One of his arguments for the correctness of this purely lepidopterological custom—in no other branch of Zoology have *all* the names ever been written with capital initials—was that Linné had employed capitals for all names of butterflies. In this Standinger was wrong, Linné having written with a small initial the few adjective names bestowed on butterflies (*dissimilis*, *assimilis*). We consider the writing of all specific and varietal names with small initials, and of generic names with capitals, as by far the most convenient method, generic and non-generic titles being at once recognisable as such. In contradistinction to the habit of capitalising all names (*Papilio Priamus*), there was early in the nineteenth century the method in vogue, especially among French authors, of writing both the generic and specific names with small initials—*papilio priamus* Such matters are purely conventional. One ought to select that method which is the least confusing.

Among the literature on Nearctic Lepidoptera no works are so prominent as the *Butterflies of North America*, by W. H. Edwards (1868-97), and Scudder's *Butterflies of the Eastern United States and Canada* (1889). The plates issued by Edwards are nearly all of a quality hardly ever reached on this side of the Atlantic, nor have we any work in which the life history of the butterflies is so well illustrated. His greatest discovery among Papilios was the demonstration by breeding of the polymorphism of *Papilio bairdi* and of the seasonal variation of *P. mancellus*. Though in other places Edwards rather ridicules the idea of frequent occurrence of hybrids in nature, he explains nevertheless this polymorphism of *P. bairdi* by assuming that the insect is a product of hybridisation.

Scudder's *Butterflies* is the most intrinsic work written on Diurnals. No other work on Butterflies can be compared with it. The mass of morphological detail which was new is enormous, and, what is more, the facts were well digested, and not merely compiled and put together anyhow. But it was perhaps just this abundance of small characters which obscured the great distinctions in *Papilio* so much that Scudder did not clearly perceive the three main divisions of this so-called genus. It was left to Erich Haase to rediscover the three natural sections into which the Papilios of all regions are separated.

In his *Untersuchungen über Mimicry* (1893) Haase gives a classification of the Papilios which is in the main quite correct, starting from the three main divisions which Horsfield had defined in 1857. Many obscure points in relationship which had defied every other author were successfully solved. He was the first and has remained the only author who saw the close connection that exists between *Papilio ariarathes*, *harmodius*, *eurycon*, etc., on the one hand, and *Papilio protesilaus* and allies on the other. Those mimetic Papilios are placed everywhere in books and collections with *P. anchisiades*, or even *P. aeneas*, instead of with *P. protesilaus*, *marcellus*, etc. As a student of Mimicry Haase was aware that models and mimics are usually not nearly related, and this general knowledge may have guided him in the right direction.

The morphological distinctions advanced by Haase for the three main divisions of *Papilio* are only slight, and do not apply to all the species. We have endeavoured to give the classification a better morphological basis. The only serious mistake which Haase made in respect to American Papilios was the position he assigned to

Papilio hellanichus, placing this insect with *P. machaon*, as all other authors * had done, instead of close to *P. scamander*.

In Scudder's work, mentioned above, the genitalia of both sexes have to a certain extent been taken into consideration in distinguishing the species. Messrs. Godman and Salvin followed that line of research, at least with the ♂ genitalia, details of which are figured of nearly all the Central American Papilios in their famous work, the *Biologia Centrali-Americana*. The female genitalia were only referred to cursorily in a few instances, inclusive of the bursa copulatrix, which was often found to be different in different species. It was the first faunistic work on tropical insects in which such researches were carried out. These researches have greatly advanced our comprehension of the true taxonomical value of these organs. The authors found the genitalia to be excellent guides, in many instances the sole trustworthy guides ; but they recognised also that there are groups in which the genitalia do not present any tangible differences between the species, while in other instances the organs were observed to be variable. We commenced to work at this problem when the Revision of the Papilios of the Eastern Hemisphere was in preparation (1894). The main results, which we have since repeatedly verified in many groups of Lepidoptera, were published in 1896.† They may be epitomised as follows :

(1) The majority of species are different in the genitalia of both sexes, a small percentage only showing no distinctions in these organs. Among American Papilios *P. ariarathes* and allies cannot be separated by these organs with certainty, and *P. bairdi* and *polyxenes* appear to be identical in the genitalia.

(2) About half the number of geographical forms are more or less distinctly different in the genitalia, at least in the males, the differences being often found to be entirely bridged over by intergradations.

(3) There is always a certain amount of individual variability in the genitalia. Specimens abnormal in these organs also occur. It requires, therefore, often a series of dissections to arrive at a correct estimate of the distinctive characters presented by the genitalia. There is no individual dimorphism in these organs connected with the dimorphism in pattern or colour. The only **seasonal** dimorphism we have come across, though a great number of seasonally dimorphic species have been examined, is found in *P. xuthus*, the spring specimens (from hibernated pupae) differing slightly and not quite constantly in the harpe from the summer specimens. No such difference obtains in the seasonally dimorphic *P. marcellus*.

It will be observed that the differences in the genitalia, though generally less variable than those of colour and pattern, and often much more striking than wing-differences, require in each case the same careful investigation as colour and pattern, before their true taxonomic value can be pronounced upon. A difference in the genitalia may be specific or varietal, just like wing-differences.‡

A number of American Papilios have been dealt with by Eimer in his treatises on *Artbildung* und *Verwandtschaft bei Schmetterlingen* (1889 and 1895). These essays are of a philosophical nature. As contributions towards *Papilio*-systematics they are a failure, the researches not having been intrinsic enough to

* Burmeister, in 1878, placed *hellanichus* near *scamander*. It appears that he assigned the right position to it only because he identified it erroneously with *eleotas* Gray (1832), which was known to be a near relative of *scamander*.

† "Mechanical Selection," in *Nov. Zool.* iii. pp. 426—525 (1896).

‡ P. Born has arrived at similar results from a study of the forceps of *Carabus* (see *Insekten-Börse* xvii. (1900) and ff.).

warrant the majority of the conclusions. The essays suffer also greatly from verbosity. Nevertheless we may say (with some poet) that mistakes are often more instructive than facts. The name *mediocauda* introduced by Eimer for a specimen of *P. polyxenes* without locality has been overlooked by subsequent authors, not being mentioned in the catalogues of Nearctic Lepidoptera. The specimen without home might better have been left also without a name.

It has been the object of the present Revision to correct to the best of our ability the mistakes contained in the literature on the American Papilios, and to broaden the morphological basis of the systematics of these insects. We have widened the scope of research as far as the material permitted, and therefore we have arrived in many cases at a clearer insight into the relationship of the Papilios with one another than if we had followed the customary methods of investigation. We hope to be pardoned for not having solved every knotty point.

The most interesting general result of our researches is perhaps the demonstration of geographical variability in secondary sexual characters apart from the genitalia. The occurrence of such variability is of great bearing on systematics, since many authors consider secondary sexual differences to be of generic value. The remarkable difference obtaining in the scent-scales of some species which are otherwise very similar (see *P. protesilaus* and allies) is also noteworthy. Since we shall have to discuss the general questions as to distribution, relationship and evolution of the *Papilionidae* in our proposed essay on the classification of the family, we abstain here from entering on such problems. For the same reason we have restricted the illustrations of details of structure as far as it was possible without serious injury to the lucidity of the descriptions. We have further abstained from describing in detail the various known species and varieties, but have given at least some principal feature of each form in order to enable the reader who is not in possession of the literature quoted to determine his specimens from this Revision. The keys to the groups and species will, we venture to hope, also be found useful. The groups of species have been defined only from the American species which they contain. These groups are not all of generic value. We hope nobody will find it necessary to propose generic names for them. The extent of some of the groups may be considerably altered in our proposed generic revision by the inclusion of Old-World forms. Besides, Hübner and Moore have already supplied a great number of generic names for Papilios, the diagnoses given with the names being of the most superficial kind, and those of Moore, moreover, often very faulty. It is common knowledge that the delimitation of genera in cosmopolitan families cannot well be based on the limited number of species occurring in a single faunistic district. Classification has always suffered from the habit of systematists of studying the systematics of a district rather than concentrating their labours on certain families, taking into account all the species of the globe.

The treatment of the matter embodied in this Revision requires a few more remarks. We are in favour of simplification of nomenclature. Every simplification which is consistent with the object of nomenclature should be welcome to the systematists, whose labour suffers from unnecessary nomenclatorial complications. One such simplification is to write in the text, headings, and in the synonymy all specific and varietal names with small initials, and the names of higher classificatory categories (subgenus, genus, subfamily, etc.) with capitals, no matter whether they were thus written or not by the authors quoted. We consider it utterly indifferent,

whether Lucas wrote *Papilio orbignyanus* or *papilio orbignyanus* or *Papilio Orbignyanus*. Such outside matter does not in the least affect the natural history of the insect thus designated. *Papilio orbignyanus* is the most convenient form of spelling, and is therefore here adopted in every case. We have also simplified, as in former essays, the spelling of dedication-names standing in the genitive form ending in i. The authors of such names are very inconsistent in the spelling of the names. We find *birchallii* and *dunali*, *blumei* and *latreillii*, *wallacei* and *wallacii*, *bairdii* and *brucii*, *lorquini* and *lorquinii*, *kirbii* and *kirbyi*, etc. One cannot possibly remember what in each case the original spelling of such a name was. If one has to write the name, one has to look up the original description. But is it really necessary to stick to this inconsistency and this burdensome variety in spelling? We think not, since uniformity can be arrived at without the slightest difficulty. However, what is an unnecessary burden in nomenclature should certainly be dropped. We write these dedication-names with one i added to the name of the person, *wallacii*, *Wallacii*, *wallacei* and *Wallacei* being all reduced to one form, *wallacei*. That such a simplifying principle is really opportune is best shown by the fact that, in consequence of the general arbitrariness in spelling the ending of dedication-names, the name of a new form spelt *drucei* will invariably be written by some later author *drucii*; or if the name was written originally *drucii*, the spelling *drucei* will surely also crop up. As we treat names like *androgeos* and *androgeus*, *polydamas* and *polidamas* as being different, *brucei* and *brucii*, or *westwoodi* and *westwoodii*, or *kirbii* and *kirbyi* would be rather embarrassing without the foregoing principle of simplification which renders such names uniform. For similar reasons the German *ä*, *ö*, and *ü* (which were originally *ae* = ä, *oe*, *ue*,) have been changed into *ae*, *oe*, and *ue* in all names.

About the naming of forms below species there are many different opinions. All agree that what an author considers to be a "species" should bear a name. But one may very well ask, is it necessary to give names also to the various categories of varieties? The answer depends on what is the object of naming. Linné invented his binominal formula for the species with the purpose of reducing chaos to order. However, if we agree that for the sake of lucidity in studying the species of each genus it is necessary to have a special name for each species contained therein, it follows that in researches on the varieties which compose each species names are likewise required for these varieties. Now, is the study of these varieties essential enough for systematics to warrant the introduction of names for the enormous host of varieties? With many authors systematics have been and are essentially a description of the differences of "species." The knowledge of these differences is certainly in each case essential; one cannot do without it. But it is not the final aim of systematics as part of the science of life. A collector learns to know the various "species" by handling them, just as a child learns to know a language by practice. When once a candidate who spoke and wrote French and English fluently, having resided in these countries for a number of years, presented himself for examination *pro facultate docendi* at a German University, the professor of modern languages gave him the advice to become foreign correspondent in a mercantile house, since he had no philological knowledge at all. And similarly a professor of zoology once said to a candidate for the degree of Ph.D. who could and did boast of knowing by heart practically all the vertebrates and a large proportion of the invertebrates of Central Europe: "That is very good; if you now study Zoology for a couple of years I shall be pleased to accept you as a candidate."

Both professors were perhaps a little sarcastic. Nevertheless there is a good deal of truth in what they said. The describing and cataloguing of "species" are certainly the basis of systematics, but also the lowest degree in this science. After that comes classification, or in other words, research in relationship. To have a sound basis in this research one has to start from the individuals which are blood-related, and work upwards to the species. The individuals composing a species have each some peculiarity. This individual variability, however, is not everywhere indiscriminate. The individuals are in many instances found to fall into different groups characterised by some corporeal distinction. These are the varieties of which a species is composed. If the species are the product of evolution, the commencement of the splitting up of one species into more must be found among the varieties. The study of the varieties is, therefore, a study of the origin of species, or the relationship of species with one another; from which follows that the classification of species according to their relationship depends on the study of varieties. However, if the study of varieties is essential for the classifier, varieties have as much a claim to a precise nomenclature as the species. If we speak, for instance, of *Papilio thoas* from Cuba, *P. thoas* from the Guianas, *P. thoas* from Brazil, etc., all we gather is that *Papilio thoas* occurs in these different districts. On the other hand, if we write of *Papilio thoas oviedo* from Cuba, *P. thoas thoas* from the Guianas, *P. thoas thoantiades* from Argentina, etc., we perceive at once that the species *P. thoas* has developed into a number of different varieties, and we are able to discuss these varieties and their bearing on the general questions of evolution without having constantly to repeat the localities where each variety occurs, *P. thoas cinyras* being a decidedly more convenient term than "the variety of *P. thoas* from the Upper Amazons, Peru, and Bolivia."

The varieties fall into three categories: the geographical, the seasonal, and the individual variety; the last two being the lower grade variety, and the first the higher grade variety. This distinction between a lower and a higher grade of varieties has been habitual with most entomologists for over a century. It was Esper who first made the distinction. He dealt with variability in a far more philosophic spirit than any contemporary systematist. In his essay *De varietatibus* (1781) he says, p. 18:

"In pluribus generibus species iterum subdividi jubet copia et proxima earum affinitas. Essentiales quibusdam insunt characteres, diversitatem in ipsa specie constituentes, quos in aliis pro accidentibus habere debes. Illas *subspecies*, has meras *varietates* appellandas censeo, de quibus nunc uberius quid constet est dicendum.

§ XIV.

"*Subspecies* (Untergattungen, Raçes *) quae vulgo annumerantur varietatibus, plane ab his sunt separandae. Originem ex speciebus duxisse, perfectissima in iis declarat partium essentialium similitudo. . . ."

We have accepted Esper's term *subspecies* for the essential variety—namely, that kind of variety which is an incipient species. For an incipient species no better term could have been coined than *subspecies*. According to our researches the incipient species is represented by the geographical race. As no other variety forms the basis of the development of a species into several species, the term subspecies is employed by us for nothing else but the geographical variety. Since

* Esper's "Gattung" means, of course, what is now called a species, "was sich gattet."

the contrast existing between the geographical variety (= subspecies) and the non-geographical variety (= individual and seasonal forms) has been demonstrated recently in Lepidoptera in another place,* we mention here merely that the combination of characters in a subspecies is essentially the same as in a species, the difference being one of degree more than of kind. An overlapping of characters often takes place in subspecies, showing that these races have not attained to that kind of complete separation which exists between sympatric species.†

In dealing nomenclatorially with the varieties it appears to us highly advisable to emphasize also in the nomenclatorial formula the contrast which exists between the essential variety, or the subspecies, and the lower-grade varieties. This, we think, is best attained by the formula first employed for the geographical race by another lepidopterist, Drury, in 1773, and adopted during the last twenty years by a great many systematists. In this formula the name of the subspecies follows directly after the name of the species, just as this comes immediately after the name of the genus, no explanatory term, subsp. (= subspecies), or var. geogr. (= varietas geographica), or anything of that kind being put in between the specific and subspecific names: *Papilio polyxenes americus* meaning *Papilio polyxenes* subsp. (= var. geogr.) *americus*. Entomologists appear to be rather reluctant to adopt this simple Druryan formula.

However, we repeat that the main point is not the nomenclatorial formula by which species and varieties are recorded, but the recognition of the existence in nature of species contrasting with a higher grade of variety (subspecies = geographical race), and this contrasting with a lower grade of variety (seasonal and individual forms). Linné rendered chaos into order; let it be the duty of the modern systematist to follow him by bringing order into the chaos of varieties.

A geographically variable species consists of at least two subspecies. For instance, the Colombian specimens of *Papilio bachus*, which species occurs from Colombia to Bolivia, are different from the more southern individuals. We have therefore a northern and a southern subspecies. The opinion still held by many collectors and describers that the Colombian form is the "species" (the "Stammart" of German describers), because Felder gave a name to it some forty years ago, while the more southern form is the "variety of it," on account of its name being of a later date, should be abandoned as utterly unscientific. All the subspecies, inclusive of the first described one, are co-ordinate; the entire series of (two or more) subspecies is the species.‡

As regards the nomenclature of subspecies we have first to repeat that, if the stability of names is one of the principal aims of nomenclatorial rules, the first name given to any member of a species must be adopted as the name of the entire species. For instance, though Linné described the black female of a Nearctic Swallowtail as a

* "Der Gegensatz zwischen geographischer und nichtgeographischer Variation," in *Zeitschr. Wiss. Zool.* lxxxiii. pp. 151—210 (1905).

† The principal criterion of the conception "species" is that species can exist together without fusing, no other barrier keeping them apart than their own organisation.

‡ Lorenz, in 1892, called the series of subspecies constituting a species the *Formenkreis* of thi species. A *Formenkreis* is therefore the same as our species. The term *Formenkreis* is very convenient. Unfortunately it has later been employed by Herr Kleinschmidt in a slightly widened sense, closely allied species being sometimes included in the *Formenkreis*. In this sense the *Formenkreis* is a kind of half-caste between species and subgenus, and the Linnean binominal specific formula being employed for it by Kleinschmidt obscures the distinction between species and non-species. The older definition of the term by Lorenz was precise, correct, and has priority; there is therefore no reason for modifying the meaning of the term.

species different from the male, the name *glaucus*, given to that kind of female only, is the name of the entire species. Similarly, though only the male of an Amboina *Papilio* was named *priamus* by Linné, the female being described by him as a different species, the name of the species is *priamus*. In neither case is a *new* name necessary or permissible. In a great many instances different individuals (sexes or otherwise) have been described as separate species. The first name given to any specimen is the name for all, however restricted the original application of the name may have been. It appears to us further self-evident that the philosophic conception which an author may have of "species" or "variety" cannot be permitted to affect the name of the forms, which are realities in nature. Whether we believe that *Papilio machaon* is the product of a special act of creation or the product of evolution; whether we believe that the various varieties from the Old and New World constituting the species *machaon* are evolved from an ancestral homomorphic created species, or that each variety has been created as such; whether we believe that the species is the product of evolution by slow degrees, or *per saltum*, by Natural Selection, or by the direct influence of external conditions, etc., etc.; all such differences of opinion cannot be allowed to overthrow the name *machaon* for this species of Swallowtail, unless one wishes nomenclature to become chaotic. In the same way, the subspecies (= geographical race) takes that name which is the first given to a member of this subspecies, whatever conception the author of the name may have had of the individuals so named. Since *glaucus* was the first name for a specimen of a Nearctic Swallowtail, it is the name for the southern subspecies to which that specimen belonged, as well as the name for the entire species. The formula for this subspecies is therefore *Papilio glaucus glaucus*.* This formula is precise, showing at one and the same time that the species is geographically variable, and that the particular subspecies thus designated was the first one of that species of which a specimen, or specimens, received a name.

The number of systematists who object to having special names for subspecies appears to be very small as compared with those who deal with subspecies, at least

* In the Revision of the Papilios of the Eastern Hemisphere, the first described subspecies was termed *forma typica*, as it was nomenclatorially the typical form, giving the name to the species. At the end of the Introduction to that essay I stated that it is wrong to call the first-named form the "species" and the later-named forms subspecies of it, but that one ought to treat the first-described form as a subspecies like the others, "so that one could speak of *P. eurypylus* L., meaning the entire species with all its subspecies, and of *P. eurypylus eurypylus* L., *P. eurypylus lycaon* Feld., *P. eurypylus pamphylus* Feld, *P. eurypylus mikado* Leech, etc., meaning the local races." The proposal did not meet at that time with the approval of the co-editors of *Nov. Zool.* Subsequently, when I worked out the idea, I found that Dr. Lorenz had already given expression to the same view some years previously (1892) in very lucid language. In 1895 I had no knowledge that I had been anticipated by Lorenz; but it has since dawned upon me that I have nevertheless little claim of having invented the formula *P. eurypylus eurypylus* independently of former authors. One is apt to forget where one's ideas originally came from. In the *Catalogus Coleopterorum* by Stein and Weise, which was one of my treasures when a schoolboy, I found a sample of nomenclature which was at first very puzzling to me. Under the species *Carabus scheidleri* (of course written with a capital *S* in the *Catalogus*) there was a whole string of varieties, one of which was named var. *scheidleri*. When I came to understand the meaning of this formula *Carabus scheidleri* var. *scheidleri* I was much impressed with the wisdom of thus designating the first-described variety in contrast to the whole species to which it lends the name. This impression, I think, expressed itself in 1895 in the formula *P. eurypylus eurypylus*.

We have some hope that entomologists will sooner or later all follow the *Catalogus* of Stein and Weise, not only in this particular instance, but carry out consistently the nomenclature exemplified by *Carabus scheidleri* var. *scheidleri*, at the same time dropping the misleading and unnecessary "var." in the case of subspecies (= geographical races), calling the English *Carabus arvensis* by the concise formula *Carabus arvensis anglicus*.—K. J.

nomenclatorially, as if they had the rank of species. Nor can the former view be justified. There would be much more justification in rejecting names for the lower grade varieties. However, entomologists on the whole appear to be inclined to multiply names for individuals characterised by some striking peculiarity. Now, it seems to us obvious that it is impossible to provide consistently a name for every peculiarity and combination of special characters observed in the specimens, since every individual differs to some extent from every other, and as, further, an individual may agree with a second in some peculiarity and with a third in some other character, and would have to receive two names. The number of individuals is endless. The number of names cannot possibly be allowed to be so. Therefore, restriction in naming individuals is absolutely necessary. We believe the most sensible way of dealing with the range of individual variability, apart from marked dimorphism, is that of employing, instead of *names*, descriptive morphological terms which would cover the corresponding individual varieties of all the nearly and distantly related species. One might have, for instance, one term for all individuals of *Papilio* which have yellow spots instead of the normally red ones, and another term for the aberrant individuals which have these spots white. This method has been advocated by various authors, and we think will ultimately be adopted. For a study of variation this method is certainly better adapted than that of giving an unlimited number of names to individuals. For a specimen can bear only one **name**, though the individual may have many peculiarities in pattern, colour, and structure; while by the other method it would be possible to refer to each peculiarity by a special morphological term if necessary. For instance, one and the same specimen may be diminutive, tailless, diffuse in markings, xanthochromatic, heterographic right and left, etc.; these peculiarities could not all find expression in a **name** given to the specimen. However, the method requires careful working out before it can be successfully applied in all groups.

We have considered it sufficient in this Revision to have special names for seasonal forms, and for the forms of conspicuously di- or trimorphic species respectively subspecies, also in the case of this di- or trimorphism obtaining in one sex only.

Bearing these explanations in mind, the reader will not find any difficulty in understanding the system of nomenclature employed.

A fairly large number of subspecies and a few species are here described for the first time, and we feel sure that there are a good many new ones yet undiscovered in those parts of South and Central America and the West Indies which are not exhaustively explored. The species and subspecies which are represented in collections by uniques or by very few specimens is suspiciously large, always a sign of the incompleteness of our knowledge of the fauna of the respective districts. The interior of Brazil, especially the province of Goyaz, is still a good field for a collector. The districts north of the mouth of the Amazons are also practically untouched by entomological collectors, not to speak of the mountains at the boundary of the Guianas. West and North Peru, the north coast of Colombia, the Atlantic side of the Volcano de Chiriqui, the mountains of Costa Rica, West Mexico, and especially the island of Haiti (and S. Domingo) will doubtless yield interesting results to a competent explorer; and the swamps of the Amazonian region may still harbour some unknown species allied to *Papilio triopas*, *aeneas* or *certumnus*.

The Papilios, inclusive of the so-called genus *Troides* (= *Ornithoptera*), fall into three natural groups, which are sharply separated in the larval, pupal and imaginal stages. This classification was given by Horsfield in 1857 for the Indo-Malayan Papilios (in Horsf. & Moore, *Cat. Lep. Ins. Mus. E. I. Comp.*), being based almost exclusively on larval characters. Haase, in 1893, recognising the soundness of the classification, applied it to all Papilios, separating them correctly into the three Horsfieldian groups. Investigation in the classification of the Papilios must start from these primary divisions, as we have repeatedly insisted upon. The recent attempts by Moore * and Kirby † to divide up the mass of Papilios into small genera have proved to be more or less abortive, the three large natural sections not having been recognised by these authors. We find consequently united in one genus models and mimics which belong to different main groups, in Kirby's genus *Ithobalus* all three main groups being represented.‡

A detailed description of these primary Sections will be given in our proposed generic revision of the *Papilionidae*. The following short synopsis, we think, will suffice for the present:

I. *Aristolochia*-Swallowtails; p. 435.——The larvae feed on *Aristolochia*, occasionally on allied plants. They are densely covered with minute hairs, which give them a velvety appearance, the head, prothoracic plate and the thoracic legs remaining glossy; each segment bears a belt of tubercles, which vary in length according to species, but are always fleshy, being covered with fine hairs like the body, never with heavy spines, one of the tubercles standing beneath the stigma and another above the legs.——The proximal abdominal segments of the pupa are depressed dorsally, and, like the wing-cases, dilated laterally, the pupa being much more broadened in the centre than in the other two Sections of *Papilio*; on each side of the abdomen there is dorsally a row of tubercles or flaps, sometimes forming a nearly continuous crest.——The antennae of the imago is not scaled, and appears to the naked eye less distinctly segmented than in the other Sections of *Papilio*, on account of the segments not being much compressed or constricted at the base; each segment bears a sensory groove ventrally at each side, the grooves being in most species of this Section deep and ovate (reminding one of the Nymphalid antennae); the sensory pores on the dorsal side of the segments are rather large. The arrangement of the spines on the tarsi is also characteristic for this Section; the outer ventral row of spines (there are normally four ventral rows in Lepidoptera) is not separated by a sharply defined, spineless, impressed space from the spines of the dorsal surface, as is the case in the other two Sections.

The American species are distinguished from the Old-World forms by the sinus of the fifth tarsal segment in which the claws are inserted being much less extended. This Section is not represented on the African Continent, only one species occurring on Madagascar, while the species are numerous in the Oriental Region and in America.

II. Flnted Swallowtails; p. 537.——The larvae are without tubercles, or the tubercles are hard and bear spines (for instance, in the Oriental species *aegeus*, *anactus* and *clytia*); the third thoracical segment is enlarged, the larva therefore

* *Lepidoptera Indica* v. (1901-3).

† Hübner, *Samml. Exot. Schmett.* ed. ii. (190—; year?).

‡ *Ithobalus* as conceived by Hübner in 1818 (?) contains only species which are really closely allied with one another. The exponents of Mimicry will doubtless be glad to see that mimics have managed to deceive such old hands at Lepidoptera as Kirby and Moore.

tapering in front and also becoming almost gradually thinner backwards.——The chrysalis is more or less strongly rugate, often resembling a piece of wood ; the head and thorax are usually curved upwards as in the preceding section, but not so strongly, being almost straight in certain species (for instance, *clytia*).——The antennal segments are more or less narrowed at the bases and somewhat compressed; the fine sensory hairs are either ventrally concentrated in a patch on each side, there being no distinct grooves as in the preceding Section, or the hairs cover nearly the whole ventral surface. There is no scaling on the antenna, except at the extreme base. The tibiae are never incrassate in the ♂, as they often are in the Aristolochia-Swallowtails ; the ventral spines of the tarsi are separated from the dorsal spines by a regular, somewhat impressed, spineless interspace. The abdominal margin of the hindwing is always curved downwards, having the appearance of being fluted beneath, the two sexes resembling each other in this respect, while in the males of the two other Sections the abdominal margin is usually modified, bearing nearly always a distinct scent-organ.

This Section comprises the majority of the Papilios. It is less homoeomorphic than the preceding Section. Many species are mimetic.

III. Kite-Swallowtails ; p. 654.——The most characteristic forms of this Section somewhat resemble a paper kite (for instance, *dorcus*, *antheus*, *protesilaus*). ——The third thoracic segment of the larva is enlarged, as in the preceding section; the thoracic segments and the anal one bear often spinelike tubercles, the anal spines standing close together : in other forms the tubercles are absent or vestigial, traces of tubercles being usually found on all segments. There are no eye-spots or oblique bands, the pattern consisting of small dots, or several transverse lines (belts) on each segment, or more or less irregular longitudinal bands.——The chrysalis is more smooth than in the other Sections ; its head and thorax are hardly at all curved upwards. The mesonotum bears a pyramidal projection which is carinate in front and behind and at the sides. The lateral carina is continuous with the carinate edge of the sheath of the hindwing. The abdomen bears dorsally two carinae which converge in front and behind, the anal segment being longer than broad and almost regularly pyramid-shaped.——The antenna of the imago has a more distinct club than in the previous Sections (which is noticeable already in the chrysalis). The upperside of the antenna and the tibiae and tarsi are scaled, but the scales fall off easily in most species. The arrangement of the tarsal spines is as in the previous Section. The tibiae are never incrassate in the males. The abdominal margin of the hindwing is widened in the males and bears usually a distinct scent-organ. The scaling of the wing is often less dense than in the previous Section, the wings becoming transparent distally. In a large proportion of the species the first, or the first and second subcostal veins of the forewing are anastomosed with the costa, which does not occur in the other Sections, and the cell of the hindwing is narrow in most cases, the cross-vein D^1 (in the third cellule) being more or less strongly incurved.*

The Section is cosmopolitan, like the preceding, but goes less far north and south, being essentially tropical. The mimetic American species are all characterised by red spots situated at the base of the wings on the underside, either on both wings or on the hindwing only.

* For explanation of neuration see diagram after Species No. 169.

SECTION I.—ARISTOLOCHIA-SWALLOWTAILS.

The following generic or subgeneric names have American species as types :

Parides Hübner (1818 ?) ; type *echelus*.

Ithobalus Hübner (1818 ?) ; type *polydamas*.

Endopogon Lacordaire (1833) ; type *sesostris*.

Blakea Grote (1875) ; type *columbus* (= *gundlachianus*).

Lacordaire (*Ann. Soc. Ent. France* ii. p. 384) gives Eschscholtz as author of the name *Endopogon*. We do not know when and where Eschscholtz proposed the name.

The American Aristolochia-Swallowtails fall into two very distinct subsections.

Subsection A.*

Antenna long ; club slender ; sensory grooves more or less large, sharply defined ; end segment conical, almost as long as it is broad. Claws asymmetrical. Markings of body red. Hindwing usually with red band or row of red spots on disc, these markings seldom white or yellowish white. Forewing of ♀ bearing often white or yellowish white patches on disc and in cell, being sometimes all black. Subbasal cellule long, widening distally ; PC curved near its base. Cross-veins of forewing oblique ; upper angle of cell obtuse. Cell of hindwing more or less acuminate, D^3 more or less leaning basad anteriorly, the cell-angle D^3—D^4 being smaller than the angle D^2—D^3, or vein D^3 reduced to a point, rarely transverse, never leaning distad.

♂. Scent-organ woolly or densely scaled, no naked streak at its discal side. Tenth abdominal sternite not reaching to the apex of the long and slender tergite. Tibiae often incrassate and hairy.

♀. Anal segment with numerous hairs and bristles which are mostly tapering to a fine point, others ending abruptly, being somewhat thicker at the tip than at the base ; in many species there are some bristles which are distinctly club-shaped.

The American species which come here can be conveniently placed into three groups.

Key to the groups :

Fringe-spots white. Hindwing with submarginal spots and usually also discal spots or dots, or a discal band ; mostly with tail	*Ascanius Group.*
Fringe-spots white. Palpus black or red. Hindwing with discal band or row of spots, but without submarginal spots	*Aeneas Group.*
Fringe-spots red. Palpus always black. Hindwing marked as before	*Lysander Group.*

I. Ascanius Group.

In the preservation of a row of submarginal spots on the hindwing this group is more ancestral than the other American Aristolochia-Swallowtails. The forewing of some species, especially *columbus*, shows also ancestral characters in pattern. The tail of the hindwing is a third generalised peculiarity, which is more strongly and more generally developed in this group than in the other two groups of red-spotted species.

Key to the species :

a.	Forewing with green-blue band on forewing . . .	Species No. 1.
	Forewing with white band on forewing . . .	*b*.

* Subsection B. follows after Species No. 45.

Forewing without band (or only a trace of it) . . .	*f.*
b. Band of hindwing partly red	Species No. 2.
Band of hindwing entirely white	*c.*
c. Band of forewing angulate at lower angle of cell, red anal spot of hindwing very large	Species No. 3.
Band of forewing practically straight	*d.*
d. Palpus red	*e.*
Palpus black	Species No. 7.
e. Submarginal spots of hindwing sandglass-shaped . .	Species No. 5.
Submarginal spots of hindwing transverse, oblong or luniform	Species No. 4.
f. One row of spots on hindwing	*g.*
Two rows of spots on hindwing	*h.*
g. Fringe of forewing completely white or very slightly interrupted at the veins	Species No. 6.
Fringe of forewing uneven, spotted with white . . .	Species No. 11.
h. Forewing with a white dot on disc ; central submarginal spots of hindwing slightly curved	Species No. 10.
Forewing without white discal dot ; central submarginal spots of hindwing strongly arched ; discal spots red .	Species No. 8.
As before, but discal spots of hindwing small, more or less white	Species No. 9.

1. Papilio columbus H.-Sch. (1862).

Papilio columbus Herrich-Sch., *Correspbl. Zool. Min. Ver. Regensb.* xvi. p. 141 (1862) (Cuba) ; id., *l.c.* xviii. p. 173 (1864).

Papilio gundlachianus Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 75 (1864) (nom. nov. loco "columbus H.-S.") ; id., *Reise Novara, Lep.* p. 137. n. 101. t. 27. fig. 1. 2 ♂ (1865) ; Herr.-Sch., *Prodr. Syst. Lep.* ii. p. 20 (separ.) (1867) ; Kirby, *Cat. Diurn. Lep.* p. 536. n. 120 (1871) ; Gundl., *Papilio* i. p. 113 (1881) (Cuba) ; id., *Contr. Ent. Cubana* p. 124 (1881) (Eastern Cuba) ; Honr., *Sitzber. Berl. Ent. Zeit.* xxx. p. 4 (1886) ; id., *Berl. Ent. Zeit.* xxx. p. 131. t. 5. fig. 5. ♀ (1886) ; Bonzon, *Trans. Amer. Ent. Soc.* xv. p. 293 (1888) (larva); Haase, *Untersuch. Mimicry* p. 77 (1893).

Papilio grotei Blake, *Proc. Ent. Soc. Philad.* iv. p. 313 (1865) (Cuba).

Blakea gundlachianus Grote, *Trans. Amer. Ent. Soc.* v. p. 118 (1875).

As this *P. columbus* of Herrich-Schaeffer belongs to quite a different division of the subfamily *Papilioninae* than *P. columbus* of Kollar and *P. columbus* of Hewitson, we employ that name for the present species, instead of the later name *gundlachianus*, according to our rules of nomenclature.*

The species comes close to the Brazilian *P. ascanius* and *agavus*. The tibiae of the male are hardly at all incrassate, bearing bristles and numerous small hairs. The blue scales of the wings are entire, while the scales in the costal area on the upperside of the hindwing and in the posterior area on the underside of the forewing are dentate as in the allied species. The anal submarginal spot M^2—SM^2 of the hindwing is absent from the upperside, being small and short on the underside. As a remnant of a discal band there are on the underside of the hindwing three or four white bars proximally of the red spots. The distal edge of the forewing is dotted with white, as in the *Aeneas* Group.

Scent-organ as in *P. agavus* and allies.

Genitalia in general structure as in *P. agavus* and allies, but characteristically modified.——♂. Clasper short, rounded ventrally, the inner surface deeply concave,

* See p. 423.

the hairy ventral margin very broad distally, being at the apical third nearly half the width of the entire clasper; this hairy convex area gradually widening apicad; dorsal margin of clasper emarginate, the apex acuminate, slightly pointing upwards. Harpe elongate, narrowest in middle, lying flat on the clasper, being curved upwards distally; ventral edge denticulate proximally; this proximal portion dilated into a rounded or acuminate lobe, which is directed obliquely basad and ventrad; apical lobe rounded off, denticulate. Tenth tergite very slender, slightly incurved in middle. Penis-sheath acuminate, a disc-like piece of chitin projecting ventrally from the orifice as in *P. agavus*.——♀. In non-virgin specimens the vaginal area covered with a hardened substance, which is whitish and has a spongy appearance; this coital substance has no such definite shape as in *P. proneus*, but it is always constricted in the middle and there are also several holes or grooves, which are more or less in the same place in different specimens. In virgin individuals a broad central process is visible without dissection; this process stands behind the vaginal orifice, being somewhat curved, subacuminate, convex on proximal side, hollowed out on hinder side. In front of the vaginal orifice there is a heart-shaped lobe covered with minute hairs.

Larva described by Bonzon, *l.c.*

Hab. Eastern districts of Cuba, especially plentiful in the hills near Santiago de Cuba.

In the Tring Museum 14 ♂♂, 9 ♀♀, from: Sardinero, Santiago, January 1904 (Wirt Robinson); Gibara (Tollin).

2. **Papilio ascanius** Cram. (1775).

Papilio Eques Trojanus ascanius Cramer, *Pap. Exot.* i. p. 20. t. 14. fig. A (1775) (Rio de Janeiro); Goeze, *Ent. Beytr.* iii. 1. p. 42. n. 14 (1779); Fabr., *Spec. Ins.* ii. p. 2. n. 6 (1781) (Brazil); Drury, *Illustr. Exot. Ins.* iii. p. 11. t. 9. fig. 1 & Index (1782) (Rio de Janeiro); Jabl. & Herbst, *Naturs. Schmett.* ii. p. 148. n. 36. t. 13. fig. 3 (1784); Fabr., *Mant. Ins.* ii. p. 2. n. 7 (1787); Gmelin, *Syst. Nat.* i. 5. p. 2226. n. 274 (1790); Jung, *Alphab. Verz. Schmett.* p. 57 (1791); Fabr., *Ent. Syst.* iii. 1. p. 3. n. 8 (1793).

Menelaides ascanius, Hübner, *Verz. bek. Schmett.* p. 85. n. 871 (1818?); id., Samml., *Exot. Schmett.* ii. t. 105 (1822?).

Papilio ascanius, Godart, *Enc. Méth.* ix. p. 73. n. 138 (1819) (Brazil); Lucas, *Lép. Exot.* p. 31. t. 16. fig. 1 (1835) (Brazil); Boisd., *Spec. Gén. Lép.* i. p. 306. n. 141 (1836) (Rio de Janeiro; North Brazil); Drury, ed. Westw., *Illustr. Exot. Ins.* iii. p. 11. t. 9. fig. 1 (1837) (Rio de Janeiro); Dunc., in Jard., *Nat. Libr.* xxxvi. p. 101. t. 3. fig. 1 (1843); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil); Lucas, *Lép. Exot.* ed. ii. p. 31. t. 16. fig. 1 (1845); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 190 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 42. n. 217 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 230 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 73 (1857) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 73 (1864) (S. Brazil); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 236. n. 9 (1869) (Brazil); Kirby, *Cat. Diurn. Lep.* p. 536. n. 117 (1871); Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 5 (1874) (Icaraby, Aug.; Botafogo, Nov.); Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 8. n. 20 (1879) (descr. of egg, larva and pupa; Rio de Janeiro); Oberth., *Et. d'Ent.* iv. p. 77. n. 249 (1880) (Brazil); Staud., *Exot. Tagf.* p. 14 (1884) (Brazil); Haase, *Untersuch. Mimicry* i. p. 77 (1893); Bönningh., *Verh. Ver. Nat. Unterh.* ix. p. 27 (1896) (Rio de Janeiro).

Hectorides ascanius, Hübner, *Samml. Exot. Schmett.* ii. t. 105. ♀ (1822?); Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 270. t. 65. fig. 1 (1896); id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 89. t. 318. fig. 3, 4 (1905?*).

♂♀. Median band very broad on both wings, wider in female than in male, washed with red on hindwing, traversing apex of cell on forewing, but usually not

* The new edition of Hübner is being issued in parts, no year of publication being given, even with the new text written by Kirby.

reaching quite across cell. The band of the forewing nearly the same in position as the blue-green band of the Cuban *P. columbus* (= *gundlachianus*); some males have obscure white spots distally of apex of cell, while in some females these spots, as well as a triangular streak situated before cell, are quite distinct; in one of our females the band extends basad to point of origin of M^2, being very broad also on hindwing. The anal submarginal spot is completely merged together with the anal spot of the discal band in most specimens, but in some individuals there is a separate submarginal anal bar distally of the last patch of the band.

Genitalia scarcely different from those of *P. chamissonia* and *perrhebus*; harpe proximally a little wider.

Early stages described by Burmeister, *l.c.*

Hab. Rio de Janeiro.

In the Tring Museum 13 ♂♂, 4 ♀♀.

3. Papilio agavus Drury (1782).

Papilio Eques Trojanus lysander Fabricius (*non* Cramer, 1775, err. det.), *Gen. Ins.* p. 251. n. 23-4 (1776) ("India," Dr. Fothergill.—Mutilated specimen of this species ?); Goeze, *Ent. Beytr.* iii. 1. p. 45. n. 29 (1779); Fabr., *Spec. Ins.* ii. 9. n. 33 (1781); id., *Mant. Ins.* ii. p. 3. n. 20 (1787); Gmelin, *Syst. Nat.* i. 5. p. 2229. n. 285 (1790); Jung, *Alphab. Verz. Schmett.* p. 338 (1791); Fabr., *Ent. Syst.* iii. 1. p. 9. n. 25 (1793).

Papilio Eques Achivus agavus Drury, *Illustr. Exot. Ins.* iii. p. 11. t. 9. fig. 4 & Index (1782) (Rio de Janeiro); Stoll, in Cram., *Pap. Exot., Suppl.* p. 144. t. 32. fig. 1 (1790) (Rio de Janeiro).

Princeps heroicus agavus, Hübner, *Samml. Exot. Schmett.* i. t. 113. fig. 1. 2. ♂ (1806—).

Menelaides agavus, id., *Verz. bek. Schmett.* p. 85. n. 872 (1818 ?) (= *lysander* Fabr.).

Papilio agavus, Godart, *Enc. Méth.* ix. p. 73. n. 137 (1819) (Brazil); Boisd., *Spec. Gén. Lép.* i. p. 306. n. 142 (1836) (Brazil); Drury, ed. Westw., *Illustr. Exot. Ins.* iii. p. 12. t. 9. fig. 4 (1837) (Brazil); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 189 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 42. n. 216 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 229 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 72 (1857) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 68 (1864) (Brazil); Prillw., *Stett. Ent. Zeit.* xxvi. p. 130 (1865) (Corcovado); Kirby, *Cat. Diurn. Lep.* p. 536. n. 112 (1871); Burm., *Descr. Rép. Argent.* v. *Lép.* p. 66. n. 8 (1878) (Rio de Janeiro; Paraguay; Corrientes); id., *l.c., Atlas* p. 9. n. 21 (1879) (Rio de Janeiro); Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 6 (1874) (Botafogo, Aug.; Rio, Oct.; Copa Cabana, Oct.; common); Obertb., *Et. d'Ent.* iv. p. 77. n. 247 (1880) (Brazil); Stand., *Exot. Tagf.* p. 14, t. 9. ♀ (1884) (Rio de Janeiro; Sao Paulo); Haase, *Untersuch. Mimicry* i. p. 77 (1893); Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 8. (1895) (Rio Grande do Sul); Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 48 (1896); Bönningh., *Verh. Ver. Nat. Unterh.* ix. p. 28 (1896) (Rio de Janeiro); Eimer, *Orthogen.* p. 137. fig. 61 (1897); Peters, *Illustr. Zeitschr. Ent.* ii. p. 52 (1897) (Nova Friburgo, common; *partim*).

Papilio lysander, Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 238. n. 17 (1869) (Fabr.'s "*lysander* is evidently *harrisianus*," false).

Hectorides agavus, Kirby, in Hübner, *Samml. Exot. Schmett.* ed. ii. p. 89. t. 113. fig. 1. 2 (1905 ?)

♂♀. Anal submarginal spot large on upperside, in male completely merged together with the preceding spot, the edge of the wing at anal angle being very narrowly black; in female the two spots connected, the anal spot being produced distad along M^2, the two spots forming a Z-shaped mark, which is well separated from the anal sinus. There is often a minute dot in cell of forewing in male. The white band of the hindwing is usually composed of three spots, which vary in size, the second spot being sometimes missing, while in other individuals there are one, two or three small additional spots, situated one in front of and two behind the apex of the cell. Vein M^2 of hindwing has a more distal position than in the allied species.

Genitalia: ♂. Tenth tergite slenderer than in *P. proneus*. Harpe long, knife-like, the distal half denticulate ventrally; apex rounded dorsally, being ventrally acuminate and somewhat twisted. Penis-sheath acuminate; a flat, rounded disc of chitin projecting ventrally from the orifice of the sheath, the disc being continuous with the membranaceous ventral portion of the sheath.——♀. In front and at the sides of the vaginal orifice an irregular ridge, much folded, being semi-membranous, forming a ring which is open distally in the middle; within this ring and just behind the vaginal orifice a short process, curved anad, being convex ventrally, hollowed out on hinder (or upper) side; the membrane connecting the ridge with the seventh sternite densely folded, there being a more strongly chitinised, smooth, rounded lobe laterally where this membrane joins the seventh sternal sclerite; in a non-virgin female the central process is enveloped by a hardened substance blocking up the vaginal orifice. Anal segment with numerous short stout bristles.

Early stages described by Burmeister, *l.c.*

Hab. Brazil: Minas Geraës to Rio Grande do Sul; Paraguay; Argentina: Corrientes.

In the Tring Museum 34 ♂♂, 16 ♀♀, from: Minas Geraës, March and April (A. Kennedy); Tijuca and Petropolis, March; Castro, Parana, March and October (E. D. Jones); Sapucay, Paraguay, January, August, October, December (W. Foster); Yhu, Paragnay, September to December (Andeer).

4. **Papilio proneus** Hübn. (1825).

Hectorides proneus Hübner, *Samml. Exot. Schmett., Zuträge* p. 25. n. 249. fig. 497-8 (1825) (Brazil).

Papilio proneus, Boisduval, *Spec. Gén. Lép.* i. p. 307. n. 143 (1836) (Brazil); Doubl., Westw. and Hew., *Gen. Diurn. Lep.* i. p. 17. n. 188 (1846); Doubl., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 3. (1848) (Rio de Janeiro); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 42. n. 214 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 226 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. *Suppl.* p. 68. n. 1125 (1857) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 70 (1864) (S. Brazil); Kirby, *Cat. Diurn. Lep.* p. 536. n. 114 (1871); Burm., *Descr. Rép. Argent.* v. *Lép. Atlas* p. 9. n. 22 (1879) (Petropolis; Nova Friburgo); Oberth., *Et. d'Ent.* iv. p. 77. n. 246 (1880) (Brazil); Staud., *Exot. Tagf.* p. 14 (1884) (Rio de Janeiro; Sao Paulo); Bönningb., *Verh. Ver. Nat. Unterh.* Hamburg ix. p. 28 (1896) (Organ Mts.).

Papilio phryneus Lucas, *Rev. Zool.* (2) iv. p. 136 (1852) ("Cayenne" loci error); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 42. n. 215 (1852) (Brazil; "Cayenne"); Kirby, *Cat. Diurn. Lep.* p. 536. n. 113 (1871) ("Cayenne" loci error).

♂♀. Red submarginal spots of hindwing transverse, oblong or lnniform, not sandglass-shaped as in *P. chamissonia*; anal spot not V-shaped, there being no discal spot proximally of the anal submarginal one. Width of central band and the number of spots composing it on hindwing variable. Foretibia and first foretarsal segment more finely hairy, less spinose, than in *P. agavus*.

Genitalia different from those of the allied species, the female bearing after copulation a kind of pouch, externally visible and homologous to the pouch of *Euryades*, *Parnassius*, and *Acraea*.——♂. Tenth segment as in the allied species, the tergite being very long and slender. No separate harpe on clasper, the harpe being represented by a polished central space which extends from base to middle, being rounded distally; this space depressed, a triangular distal portion of it being slightly elevate; ventral edge of clasper with a short stout conical tooth. Penis-sheath strongly chitinised at apex, ending in a sharp point.——♀. In a virgin specimen there is at each side of the vagina a large flap, rounded, asymmetrical, bearing distally several carinae, the two flaps inclining towards each other; from

the slit between them, which widens distally, there projects a curved process pointing anad; these organs are distinct without dissection, projecting free, not being covered by the scaling. On dissection the central process is found to be situated immediately behind the vaginal orifice, being convex ventrally, and channelled on the posterior or dorsal side; the apex of this process is slightly incrassate, giving the process a feebly ladle-shaped outline in lateral aspect. The lateral flaps are continuous proximally of the vaginal orifice, being the lateral portions of a ridge which is almost entirely separated into two halves by a deep mesial sinus. In a female which has copulated the central process is enveloped by a hardened substance which forms a large irregular cone effectually blocking up the vaginal orifice, the lateral flaps remaining free, at least distally, the hardened substance covering the flaps only proximally.

Early stages not known.

Hab. Brazil: Minas Geraës to Parana, perhaps farther south.

In the Tring Museum 42 ♂♂, 14 ♀♀, from: Minas Geraës, April (A. Kennedy); Petropolis, October—Februnary (A. Foetterle); Bahuru, Sao Paulo (Dr. Hempel); Castro, Parana, November (E. D. Jones).

5. Papilio chamissonia Eschsch. (1821).

Papilio chamissonia Eschscholtz, in Kotzebue, *Reise* iii. p. 203. n. 3. t. 2. fig. 3. ♂ (1821) (Brazil).
Menelaides hunichus Hübner, *Samml. Exot. Schmett.* ii. t. 103 (1822 ?)
Papilio ascalus Godart, *Enc. Méth.* ix. *Suppl.* p. 812. n. 137-8 (1824) (Brazil).

♂♀. Upperside of wings with a slight metallic green tint; white spot in cell of hindwing not extending farther basad than point of origin of M^2, white spot M^1—M^2 reaching at least as far distad as spot R^3—M^1; red submarginal spots constricted, sandglass-shaped; a red (discal) bar proximally of anal bar, connected with the latter to form a V-shaped spot; harpe of ♂ a little narrower, and central process of ♀ a little longer.

Genitalia as in *P. perrhebus*.

For early stages described by E. D. Jones, see below.

Hab. Brazil.

Two subspecies.

a. P. chamissonia diodorus Hopff. (1866).

Papilio diodorus Hopffer, *Stett. Ent. Zeit.* xxvii. p. 23. n. 2 (1866) (Brazil); Kirby, *Cat. Diurn. Lep.* p. 567. n. 333 (1871).
Papilio echedorus, Oberthür (*non* Boisduval, 1836, err. det.), *Et d'Ent.* iv. p. 77 n. 244 (1880).
Papilio campeiro Foetterle, *Rev. Mus. Paulista* v. p. 622. t. 15. fig. 2. ♀ (1902) (Minas Geraës).

♂♀. Fringe of both wings entirely white. Band variable in width, straight on hindwing, *diodorus* being based on narrow-banded individuals, and *campeiro* on narrow- and broad-banded ones, the difference not being geographical.

There are two Boisduvalian specimens in coll. Oberthür which belong to this form. In 1880 Oberthür considered them to be typical specimens of *echedorus*. However, according to the description and the locality—Sta. Catharina—Boisduval's *echedorus* is the next form. Probably Boisduval replaced his original specimens later by some better preserved ones which happened to belong to another geographical race.

Hab. Minas Geraës, interior of Sao Paulo; Goyaz; San Antonio de Barra, Bahia.

In the Tring Museum 4 ♂♂ from Minas Geraës, Februnary (A. Kennedy).

b. P. chamissonia chamissonia Eschsch. (1821).

Papilio chamissonia Eschscholtz, *l.c.*; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 212 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 224 (1856) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 72 (1864) (= *echedorus* = *curydorus*); Kirby, *Cat. Diurn. Lep.* p. 536. n. 115 (1871); Obertb., *Et. d'Ent.* iv. p. 77. n. 243 (1880) (Brazil); Staud., *Exot. Tagf.* p. 14 (1884) (S. Catharina).

Menelaides bunichus Hübner, *l.c.*

Papilio ascalus Godart, *l.c.*

Papilio echedorus Boisduval, *Spec. Gén. Lép.* i. p. 308. n. 144 (1836) (S. Catharina); Doubl., Westw. and Hew., *Gen. Diurn. Lep.* i. p. 17. n. 187 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 42. n. 213 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 225 (1856) (Brazil?); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 71 (1857) (haec subsp. ?).

Papilio bunichus, Boisduval, *l.c.* n. 145 (1836) (Brazil); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil); id., Westw. and Hew., *Gen. Diurn. Lep.* i. p. 17. n. 186 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 211 (1852) (Brazil); id. *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 223 (1856) (= *ascalus*; Brazil); Ménétr., *l.c.* n. 70 (1857); Felder, *l.c.* n. 71 (1864) (Brazil); Kirby, *l.c.* n. 116 (1871); Burm., *Descr. Rép. Argent.* v. *Atlas* p. 9. sub n. 21 (1879) (S. Catharina; Pt. Alegre; "not at Rio de Janeiro"); Oberth., *l.c.* n. 245 (1880) (Brazil); Jones, *Proc. Lit. Philos. Soc. Liverpool* p. 15 (1883) (metamorphosis); Staud., *Exot. Tagf.* p. 14 (1884) (Rio de Janeiro; Sao Paulo); Haase, *Untersuch. Mimicry* i. p. 77. t. 10. fig. 69. ♀ (1893); Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 48 (1896).

Papilio eurydorus Lucas, *Rev. Zool.* (2). iv. p. 135 (1852) (S. Catharina); Doubl., Westw. and Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 42. n. 216 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 228 (1856) (Brazil); Lucas, in Casteln., *Voy. Amér. Sud* iii. *Lép.* p. 198. t. 2. fig. 1. ♂ (1857).

Hectorides bunichus, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 89. t. 316. fig. 3. 4 (190— ?).

♂ ♀. Fringe of forewing less extended white than in the preceding form, sometimes all black; fringe of hindwing black at the apex of the teeth. White band variable in width, on forewing often very thin and anteriorly obsolete; on hindwing on the whole narrower and posteriorly less widened in specimens from Santa Catharina (*chamissonia* = *echedorus* = *curydorus*) than in the individuals from Sao Paulo and Rio de Janeiro (*bunichus*); however, the difference does not hold good.

Hab. Petropolis; Sao Paulo; Parana; Santa Catharina.

In the Tring Museum 24 ♂♂, 18 ♀♀, from: Petropolis (Foetterle); Sao Paulo, August to January (E. D. Jones); Jundiahy; Theresopolis, S. Catharina (J. Michaelis); Castro, Parana, October and November (E. D. Jones).

6. **Papilio perrhebus** Boisd. (1836).

Papilio perrhebus Boisduval, *Spec. Gén. Lép.* i. p. 305. n. 140 (1836) (Paraguay; Rio Grande).

Papilio perrhaebus (!), Burmeister, *Descr. Rép. Argent.* v. *Lép.* p. 65. n. 7 (1878); id., *l.c. Atlas* p. 8 t. 2. fig. 8, t. 3. fig. 10 (1889) (larva; ♂).

♂ ♀. No discal band on wings. Submarginal spots of hindwing transverse, constricted or interrupted in middle; a spot proximally of anal one representing the discal row, this spot distinct only below, often joined to the anal submarginal bar, the two spots forming a kind of V; some specimens have a small white discal spot M^1—M^2. Cell of hindwing broader distally than in the allied species, and the subbasal cellule longer.

Genitalia: ♂. Tenth tergite slender, tapering, much longer than the sternite. Harpe reaching close to apex of clasper, sublinear, slightly tapering at apex, rounded at base ventrally, dorsally subangulate a short distance from apex, the whole ventral edge and the dorsal edge from apex to the before-mentioned angle denticulate.——♀. Behind vaginal orifice a curved, ladle-shaped process, convex

ventrally, excavate on upper or distal side ; curved anad ; proximally of orifice a low folded ridge extending on each side beyond the central process, forming a ring which opens behind ; this ridge widest behind ; at each side of the ridge the membrane densely plicate and further laterad again raised into a smooth, somewhat rounded ridge.

Early stages described by Burmeister, *l.c.*

Hab. Sao Paulo to Buenos Aires and northwards to Paraguay.

Two subspecies.

a. P. perrhebus perrhebus Boisd. (1836).

Papilio perrhebus Boisduval, *l.c.* ; Doubl., Westw. and Hew., *Gen. Diurn. Lep.* i. p. 19. n. 226 (1846) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 206 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 217 (1856) (Paraguay) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 74 (1864) (Paraguay ; Rio Grande) ; Kirby, *Cat. Diurn. Lep.* p. 536. n. 119 (1871) (Paraguay) ; Oberth., *Et. d'Ent.* iv. p. 97. n. 248 (1880) (Paraguay) ; Gosse, *Entom.* xiii. p. 194 (1880) (Assuncion, not scarce, Nov. Dec.) ; Staud., *Exot. Tagf.* p. 15 (1884) (Paraguay ; Rio Grande do Sul teste Boisd.) ; Haase, *Untersuch. Mimicry* i. p. 77 (1893) ; Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 7 (1895) (Rio Grande do Sul).

Papilio perrhaebus var., Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 48 (1896).

♂ ♀. Frons and palpus red. Submarginal spots of hindwing bright red on both sides. Fringe of hindwing black at the ends of the veins.

Hab. Brazil : Sao Paulo to Rio Grande do Sul ; Paraguay and neighbouring districts of Argentina.

In the Tring Museum 12 ♂♂, 6 ♀♀, from : Sao Paulo ; Rio Grande do Sul ; Sapucay, Paraguay, August to October (W. Foster).

b. P. perrhebus damocrates Guen. (1872).

Papilio damocrates Guenée, *Mém. Soc. Phys. Hist. Nat. Genève* xxii. p. 371. n. 4. fig. 2. ♂ (1872) (Buenos Aires) ; Staud., *Exot. Tagf.* p. 15 (1884) (Argentina).

Papilio perrhebus, Guenée, *Pet. Nouv. Ent.* p. 201 (1872) (= *damocrates*) ; Kirby, *ibid.* p. 239 (1872) (= *damocrates*) ; Guen., *l.c.* p. 244 (1872) ; Kirby, *Cat. Diurn. Lep.* p. 810. n. 119 (1877) (*partim* ; *damocrates* = *perrhebus*) ; Staud., *l.c.* t. 9. ♂ (1884) (the figure too black).

Papilio perrhaebus, Burmeister, *ll.cc.* (Buenos Aires ; l. on *Aristolochia ciliata*).

Papilio perrhebus var. *damocrates*, Obertbür, *Et. d'Ent.* iv. p. 77 and 115. sub n. 248 (1880) (Buenos Aires).

♂ ♀. Paler than the preceding, especially the female ; red colour on body more restricted, palpus and frons usually quite black. White border of forewing wider and that of hindwing not interrupted ; submarginal spots less distinct, paler on both sides.

Hab. Buenos Aires and Entre Rios, probably also in Uruguay.

In the Tring Museum 31 ♂♂, 24 ♀♀, and a series of larvae and pupae, from : Buenos Aires, December to February (Ruscheweyh) ; Paysandu ; La Soledad, Entre Rios, end of November to January (Chas. Britton and Miss E. A. Britton).

7. Papilio phalaecus Hew. (1861).

Papilio phalaecus Hewitson, *Trans. Ent. Soc. Lond.* p. 32 (1869) (Ecuador) ; id., *Exot. Butt.* iv. t. 11. fig. 37 (1869) ; Kirby, *Cat. Diurn. Lep.* p. 536. n. 118 (1871) ; Staud., *Exot. Tagf.* p. 14 (1884) ; Dognin, *Faune Lép. Loja* i. p. 11 (1887) ; Maass. & Weym., in Stubel, *Reisen S. Amer., Lep.* p. 64. n. 87 (1890) (Huamboya) ; Dognin, *l.c.* ii. p. 37 (1891) ; Haase, *Untersuch. Mimicry* p. 77 (1893).

Papilio phalaechus (!), Hewitson, *Exot. Butt.* iv. *Index* (1872).

♂ ♀. Body woolly ; head, prothorax and palpus black, a few red scales behind eye. Mid- and hindtibiae minutely hairy, and armed with dispersed spines, as in

P. agarus. A white band from costal margin of forewing to anal angle of hindwing, parallel to distal margin of forewing, shaded with black scaling on forewing and distally on hindwing, interrupted by the black veins ; the band close to cell on both wings, wider in ♀ than in ♂ ; ♀ with white spot in cell of forewing ; a row of red submarginal spots on hindwing, densely shaded with black on upperside, especially in ♂.

Scent-organ : fold rather narrower than in the allied species.

Genitalia : ♂. Clasper rounded at apex or slightly emarginate ; harpe longitudinal, much shorter than the clasper, the apici-ventral marginal area of the latter being broad, apex of harpe feebly acuminate, a little curved upwards, ventral and apical edges dentate, at base of harpe two heavy conical teeth, both vertical on the plane of the harpe, one standing at the ventral edge, the other farther dorsad.——♀ not dissected.

Early stages not known.

Hab. Eastern Ecuador.

This is the only American species of *Aristolochia*-feeders bearing a spatulate tail which occurs in a central district of the Neotropic region, all the other tailed *Aristolochia*-Swallowtails being found either in Brazil and the Rio La Plata (R. Paragnay and R. Parana) districts, or in Central America from Costa Rica northwards, and the West Indian Islands Cuba and Haiti.

In the Tring Museum, 2 ♂♂ from : Loja, July 1886 ; Zamora (O. T. Baron).

8. **Papilio photinus** (Doubl.) (1844).

Papilio photinus Doubleday, *Ann. Mag. N. H.* xiv. p. 415 (1844) (W. Mexico ?) ; id., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (W. Mexico ?) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 229 (1847) (Mexico) : Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n 287. t. 11. fig. 2. ♀ (1852) (West coast of America) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 75. n. 304 (1856) (West coast of Am. ; Mexico) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (Mexico) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 77 (1864) (Mexico) ; Kirby, *Cat. Diurn. Lep.* p. 536. n. 122 (1871) (Mexico) ; Guen., *Mém. Soc. Phys. Hist. Nat. Genève* p. 379 (1872) (Mexico, ♂ ♀) ; Kirby, *Pet. Nouv. Ent.* p. 239 (1872) ; Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 364 (1874) (Costa Rica) ; Oberth., *Et. d'Ent.* iv. p. 80. n. 262 (1880) (Mexico) ; Staud., *Exot. Tagf.* p. 15 (1884) (Mexico) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 196. n. 9. t. 65. fig. 7, 7A, fold, genit. (1890) (Mexico to Costa Rica) ; Haase, *Untersuch. Mimicry* p. 77. t. 9. fig. 62. ♀ (1893) ; Godm. & Salv., *l.c.* p. 728 (1901) (Guadalajara).

♂ ♀. Upperside metallic, especially the hindwing, which has a strong blue gloss in male, being less strongly glossy in female : scales of upperside feebly dentate, the upper scales partly entire in male, the same being the case in the posterior area of the underside of the forewing ; no markings on forewing, except the distinct white fringe-spots ; but one of our females has a row of indistinct pinkish grey patches about 5 mm. distant from distal margin, the row curving costad in front, the first spot standing behind R^1 and the last before SM^2, this last spot being present in several other specimens ; this row of patches corresponds to the blue band of *P. columbus* (= *gundlachianus*) ; posterior fringe-spots sometimes pink.——Hindwing : two parallel rows of red spots, submarginal spots strongly arched except upper two or three and anal one ; the latter distinct on upperside only in female.

Genitalia : ♂. Tenth tergite only a little longer than the sternite ; clasper somewhat variable in outline, short, broad, obliquely emarginate-truncate, both angles strongly rounded, dorsal edge somewhat incurved ; harpe much shorter than the clasper, divided into two lobes, both rounded at apex, one apical, the other basal and ventral, the latter smaller than the former, which is somewhat

curved ventrad ; penis-sheath pointed, but the apex a little twisted and curved over the orifice, less strongly chitinised than in *P. montezuma*, *agavus*, etc.—— ♀. Antevaginal ridge small, low ; postvaginal process short, broad, continued laterad as a low carina ; anal segment with short stout blunt bristles ventrally.

Early stages not known.

Hab. East and West Mexico, southwards to Costa Rica.

In the Tring Museum, 54 ♂♂, 16 ♀♀, from : Jalapa and Espinal, Vera Cruz (W. Schaus) ; Patzcuaro, Michoacan ; Cuernavaca, July, 4000 ft. (A. Hall) ; Cuantla, Morelos, June, 3800 ft. (A. Hall) ; Colima ; Guerrero (O. T. Baron) ; Amatitlan, W. Guatemala, August, 4000 ft. (A. Hall) ; La Antigua, W. Guatemala, August, 5200 ft. (A. Hall) ; Pozo Azul, June, and Volcan de Miravalles, Costa Rica, (Underwood).

9. **Papilio alopius** Godm. & Salv. (1890).

Papilio alopius Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 231 (1856) (Mexico ; *nom. nud.*) ; Godm. and Salv., *Biol. Centr. Amer., Rhop.* ii. p. 197. n. 12. t. 65. fig. 10. 11. ♀ (1890) (Chihuahua and Durango, Mexico ; ♀ ♀ only) ; Haase, *Untersuch. Mimicry* p. 78 (1893) ; Godm. and Salv., *l.c.* p. 728 (1901) (Nicaragua).

♂ ♀. Larger than *P. photinus*, less glossy ; spots of hindwing much smaller, partly white, those of proximal row very small, white or pinkish white, the upper ones obliterated, sometimes the whole row missing, tail spatulate.

Genitalia : ♂. Clasper rounded at apex ; ventral lobe of harpe narrow, pointed.—— ♀ not dissected.

Hab. West Mexico ; Nicaragua.

In the Tring Museum, 10 ♂♂, 2 ♀♀, from : Guadalajara, August and October (W. Schaus) ; Guerrero (O. T. Baron).

10. **Papilio dares** Hew. (1867).

Papilio dares Hewitson, *Trans. Ent. Soc. Lond.* (3). v. p. 561. n. 2 (1867) (♀, Nicaragua) ; id., *Exot. Butt.* iv. *Pap.* t. 11. fig. 34. ♀ (1869) : Kirby, *Cat. Diurn. Lep.* p. 536. n. 123 (1871) (Nicaragua) ; Haase, *Untersuch. Mimicry* p. 77 (1893) ; Godm. and Salv., *Biol. Centr. Amer., Rhop.* ii. p. 196. n. 10 (1890) (Nicaragua).

♀. Only one specimen known. Resembling *photinus* ; forewing with a white dot R^1—R^3 ; upper two submarginal spots of hindwing not curved, the following three very slightly luniform, anal spot large. Femora scaled.

Hab. Nicaragua.

11. **Papilio montezuma** Westw. (1842).

Papilio montezuma Westwood, *Arc. Ent.* i. p. 67. t. 18. fig. 3. ♂ (1842) (Mexico) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (W. Mexico) ; id., Westw. and Hew., *Gen. Diurn. Lep.* i. p. 19. n. 227 (1847) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 286 (1852) (West Coast of America) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 75. n. 303 (1856) (Yucatan ; Nicaragua ; West Coast of Amer.) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147. (1863) (Mexico ; Centr. Amer.) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 76 (1864) (Mexico ; Chiapas ; = *tulana*) ; Kirby, *Cat. Diurn. Lep.* p. 536. n. 121 (1871) (Mexico) ; Oberth., *Et. d'Ent.* iv. p. 77. n. 250 (1880) (Mexico ; Yucatan) ; Godm. and Salv., *Biol. Centr. Amer., Rhop.* ii. p. 197. n. 11. t. 65. fig. 8. 8A. fold, genit. (1890) (Mexico to Nicaragua) ; Haase, *Untersuch. Mimicry* p. 78 (1893) ; Hoag, *Ent. News* xiv. p. 320 (1903) (Altamira, Mex.).

Papilio perrhebus, Ménétries (*non* Boisduval, 1836, err. det.), *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 89 (1857) (Nicaragua).

Papilio tulana Reakirt, *Proc. Ent. Soc. Philad.* ii. p. 140. n. 12 (1863) (Chiapas) ; Strecker, *Lep. Rhop. Het., Suppl.* iii. p. 17 (1900) (♂, type ; = *montezuma*).

♂ ♀. No markings on forewing, except the white fringe-spots, which are often indistinct. On hindwing a row of red submarginal spots, which are larger

in the female than in the male ; on upperside the first three spots often absent or vestigial; the spots larger in southern specimens than in most individuals from the more northern districts of the range, the tail being somewhat reduced in the former. Legs characteristic. Femora naked, rough with dispersed conspicuous granules, mostly bearing a bristle or thin hair. The bristles of the tibiae and tarsi also situated on granules, which are smaller than on the femora. Spur of foretibia proximally of middle.

Genitalia : ♂. Clasper rounded at apex ; harpe gradually tapering, ending in a sharp point, almost reaching apical edge of clasper, the free apical half longitudinally impressed. Penis-sheath essentially as in *agavus*, *columbus*, etc. Tenth tergite about one-third longer than the lobes of the sternites, slender, pointed, basally subcarinate above.——♀. Behind the vaginal orifice a short, broad process about half as long again as it is broad in middle, slightly sinuate at apex, convex on proximal, concave on distal side ; a large lobe proximally of orifice, emarginate in middle, rounded, finely hairy, its distal surface concave ; in non-virgin females these organs concealed under a hardened coital substance.

Early stages not known.

Hab. Mexico to Nicaragua.

In the Tring Museum, 100 ♂♂, 48 ♀♀, from : Colima ; Guadalajara, October (W. Schaus) ; Patzcuaro ; Cuernavaca, end of August, September (Dr. Gadow); Guerrero (O. T. Baron) ; S. José, Guatemala, September (A. Hall) ; S. Pedro Sula, Honduras.

II. Aeneas Group.

Marginal spots of hindwing white (in *klagesi* vestigial). Palpus black or red. Tibiae of ♂ incrassate and hairy, or non-incrassate and spinose as in ♀. Scent-organ woolly, or the scales at least elongate, the wool being white, brown-black or tawny.

This is the largest group of Aristolochia-Swallowtails. Though some of the species differ much from one another, the group does not appear to fall into sharply defined divisions. We have not seen *P. hahneli*, but the figures published by Standinger show it to be a near relative of *P. triopas*, which itself is very close to *chabrias*. The great gap between *hahneli* and *aeneas* is overbridged by a series of more or less close allies : *triopas*, *chabrias*, *quadratus*, *pizarro*, *coelus*, and *steinbachi*.

The species of this group are partly very difficult to distinguish, there being often very little in the outward appearance by which one can differentiate them. However, if some attention is paid to the structure of the tibiae of the males, the colour of the palpi of both sexes, the extent of red at the apex of the abdomen of the females, and the shape of the apex of the cell of the hindwing, the reader will generally be able to identify the species and mate the sexes correctly.

Key to the species :—

A. Palpus black (in *drucei* sometimes red).

a. Hindwing with yellowish white area which occupies at least half the cell . . . . . *b*.

Hindwing with yellowish white area which stands outside the cell or occupies only the apex of the same; no white patch on forewing . . . . . *c*.

Hindwing with red patch or band on upperside, or with white patch in cell of forewing . . . . . *d.*

b. Forewing with large basal patch of the same colour as the median and subapical bands . . . . . Species No. 12.

Forewing without basal patch . . . . . Species No. 13.

c. Hindwing below with red anal spot . . . . . Species No. 16.

No red anal spot on underside of hindwing; forewing with a row of postdiscal spots, sometimes absent in ♀, yellowish patch of hindwing entering cell . . . Species No. 14.

No red anal spot on hindwing; forewing without postdiscal spots; cell of hindwing entirely black, or only a minute creamy spot at apex . . . . . Species No. 17.

d. Hindwing below with a red anal spot which is much more distal than the discal spot which stands in front of it . *e.*

Last spot of underside of hindwing on a level (or nearly) with the next spot, or forewing with green patch. . *f.*

e. Forewing with diffuse white patch at apex of cell . . Species No. 15.

Forewing with sharply defined white patch posteriorly on disc . . . . . Species No. 18.

f. Tooth R^3 of hindwing prolonged to a tail . . . . Species No. 21.

Tooth R^3 of hindwing not or very little more prominent than the other teeth . . . . . *g.*

g. Fringe-spots of hindwing absent or vestigial; abdomen without red spots (♀; ♂ not known) . . . . Species No. 19.

Fringe-spots of hindwing distinct . . . . . *h.*

h. Males . . . . . *i.*

Females . . . . . *m.*

i. Red area of upperside of hindwing large, occupying at least the apical fourth of the cell; no green patch on forewing Species No. 22.

The red area occupying more than half the cell; a green patch on forewing . . . . . Species No. 20.

A row of rounded or ovate spots on hindwing; forewing without green patch . . . . . Species No. 26.

Cell of hindwing black, a green patch on forewing . . *j.*

j. Abdominal fold black at base; green patch of forewing very large, glossy; hindwing black above, with or without a red spot near anal angle . . . . *k.*

Abdominal fold not black at base; hindwing with a band of red patches; red spots of hindwing strongly opalescent . . . . . *l.*

k. Green area of forewing entering cell . . . . . Species No. 24.

Green area of forewing not entering cell . . . . Species No. 23.

l. Green patch of forewing reaching forward to R^3, or narrow, being at least twice as long as broad; longest red spot of hindwing three or four times as long as broad, usually a red streak behind M^2 . . . . Species No. 27.

Green patch more or less triangular, about as broad posteriorly as long, often broader; longest red spot of hindwing about twice as long as broad . . . Species No. 25.

m. Forewing without white patch, or the edges of the patch washed out and the fringe-spots of the forewing indistinct or absent . . . . . *n.*

Forewing with sharply defined patches and distinct fringe-spots . . . . . *q.*

n. Hindwing with a row of widely separated ovate spots which stand nearer the margin than cell . . . Species No. 26.

Red spots of hindwing merged together, or at least some separated only by the black veins . . . . *o.*

o. Apex of cell of hindwing acute, vein D^3 being oblique and longer than D^4 . . . . . Species No. 22.

Apex of cell of hindwing truncate, vein D^3 being transverse and shorter than D^1 . . . . . *p.*

p. Fringe-spots of forewing distinct, no white on disc and in cell . . . . . Species No. 27.

Fringe-spots absent, indistinct, or distinct but small, in the last case always a white patch in middle of wing . Species No. 20.

q. White spot M^1—M^2 of forewing smaller than spot R^3—M^1, often absent; cell-spot large . . . . . Species No. 25.

White spot M^1—M^2 of forewing larger than spot R^3—M^1, the latter often absent; cell-spot small or absent, usually a spot behind M^2 . . . . . *r.*

r. A row of small white spots outside apex of cell . . . Species No. 24.

No such spots . . . . . Species No. 23.

B. Palpus red (often black in *P. druceï*).

a. Males . . . . . *b.*

Females (*the key should be consulted in connection with the descriptions*) . . . . . *i.*

b. Forewing without any trace of a green patch; hindwing with more than three red spots on upperside . . Species No. 33.

Forewing with green patch, or trace of it, rarely absent; in the latter case there is always a white dot on forewing *c.*

c. Tibiae and first tarsal segment somewhat incrassate, hairy . *d.*

Tibiae and first tarsal segment not incrassate, spinose as in ♀ . . . . . *e.*

d. Tooth R^3 of hindwing much more prominent than the others; forewing with large white patch; hindwing with three rather small red spots, there being often a minute fourth spot standing near the apical angle . Species No. 37.

Tooth R^3 of hindwing not or only a little more prominent than the other teeth; the red spot behind M^2 on upperside of hindwing large, the red band triangular, consisting of three spots which stand close together; no white spots on forewing, or only a minute one; green patch not extending forward beyond M^1 . . . Species No. 30.

Tooth R^3 of hindwing not or slightly more prominent than the others; green patch of forewing narrow, or reaching forward beyond M^1, or forewing with a large white spot M^1—M^2 or several spots, or red patch of hindwing small,

consisting of three spots and occasionally a small fourth one which stands behind M^2 . . . . Species Nos. 34 and 35.

e. Red patch on upperside of hindwing small, elliptical, consisting of two contiguous spots ; spots on underside of hindwing glaucous cream-colour . . . . . Species No. 28.
Hindwing with at least three red spots on upperside . . *f.*
f. Patch of hindwing triangular, spot M^2—(SM^1) large . . Species No. 33.
Spot M^2—(SM^1) of hindwing absent or small . . . *g.*
g. Hindwing with a red spot behind M^2 . . . . . Species No. 31.
Hindwing without a red spot behind M^2, or this spot minute . . . . . *h.*
h. Spots on underside of hindwing almost uniformly red in colour . . . . . Species No. 29.
Spots on underside of hindwing partly pale pink ; forewing often with prominent white spot before M^1 or before R^3, sometimes without green patch . . . . Species No. 32.
i. Forewing without white patch . . . . . *j.*
Forewing with white patch . . . . . *l.*
Forewing with broad white band ; underside of hindwing for the greater part white and pink . . . . Species No. 36.
j. Band of hindwing creamy white . . . . . Species No. 28.
Band of hindwing red . . . . . *k.*
k. Hindwing with a band of six red spots which stand nearer the distal margin than the cell ; apex of forewing very little paler than base . . . . . Species No. 33.
Forewing semi-transparent in apical half; hindwing feebly dentate . . . . . Species No. 27.
Forewing semi-transparent in apical half; hindwing strongly dentate . . . . . Species No. 35.
l. Forewing with greyish green patch before hindmargin . Species No. 29.
Forewing without greyish green patch . . . . *m.*
m. White spot R^2—R^3 of forewing larger than patch R^3—M^1. Species No. 32 and 34.
White spot R^2—R^3 smaller than R^3—M^1, often absent . *n.*
n. Hindwing with tooth R^3 prominent, red spot C—SC^2 usually present, while spot SC^2—R^1 is absent . . Species No. 37.
Tooth R^3 of hindwing not much more prominent than the other teeth ; if spot C—SC^2 is present, spot SC^2—R^1 is also marked . . . . . *o.*
o. Spot M^1—M^2 of forewing present, usually large . . . *p.*
Spot M^1—M^2 of forewing absent . . . . . *r.*
p. Cell-patch of forewing very large, occupying at least one-third of the cell . . . . . Subspec. No. 30*b*.
Cell-patch smaller . . . . . *q.*
q. Red band of hindwing narrow and short, not extending forward beyond R^2, consisting of four or five spots only which are more or less completely merged together . Subspec. No. 31*c*.
Red band of hindwing consisting of at least six spots . Species No. 35

r.	Cell-spot of forewing absent or small	Species No. 30.
	Cell-spot of forewing large, extending across the cell (or nearly)	*s*.
s.	Cell-spot of forewing transverse, narrow, about twice as long as broad	Subspec. No. 34*a*.
	Cell-spot of forewing broad, nearly square, sometimes triangular	*t*.
t.	Forewing semi-transparent in apical half	Species Nos. 32 and 35.
	Forewing not semi-transparent in apical half . . .	Species No. 31.

12. **Papilio hahneli** Staud. (1882).

♂ ♀. *Papilio hahneli* Staudinger, *Proc. Zool. Soc. Lond.* p. 396. t. 24. fig. 1. ♂ (1882) (Massauary) ; id., *Exot. Tagf.* p. 19. t. 13. ♀ (1884) ; Hahnel, *Iris* iii. p. 257 (1890) (Massauary, below Manés) ; Haase, *Untersuch. Mimicry* i. p. 79 (1893).

♂ ♀. Sexes similar ; three broad bands of yellowish grey patches on forewing, one subbasal, the second central, and the third subapical. Hindwing tailed ; yellowish area occupying the greater part of the wing ; anal angle strongly produced in male.

Hab. Manés, Amazons.

In coll. Staudinger.

13. **Papilio triopas** Godt. (1819).

Papilio triopas Godart, *Enc. Méth.* ix. p. 33. n. 23 (1819) (♀, hab. ?) ; Grimsh., *Trans. Roy. Soc. Edinb.* xxxix. 1. No. 1. p. 7 (1897) (type in Mus. Edinburgh).

♂ ♀. Palpus black. End-segment of antenna hardly as long as broad. Forewing elongate, lower angle of cell very obtuse. Hindwing reduced in size, tooth R^3 prominent, cell acuminate, veins R^2 and R^3 standing close together, D^3 being very short. Pattern similar in the sexes, but the yellowish markings larger in female than in male ; the subapical and central patches of the forewing reminding one of the spots of *Papilio childrenae* and the blue band of *P. columbus*. Tibiae of mid- and hindlegs of male somewhat incrassate, hairy, and anal angle of hindwing strongly produced. Abdomen of female with a red spot in front of vaginal cavity and another behind it.

Scent-organ : fold large ; a line of broad buff scales on SM^2, at the abdominal side of which there is a broad clayish streak consisting of very small scales. These scales very densely packed together, erect, elongate-triangular, widest at apex, which is somewhat rounded, being centrally produced into a thin thread ; the base of each scale also threadlike. This scent-organ, as regards the shape of the scales, represents doubtless a less advanced type than the woolly scent-organ of other species.

Genitalia : ♂. Ninth tergite bearing at each side of base of tenth a conical, spinelike tooth. Harpe narrow, curved, distally dilated, the apical portion triangular, short, ventral edge denticulate.——♀. Anal segment ventrally with numerous thin gradually tapering bristles ; edge of vaginal aperture raised, the proximal wall of this short funnel tawny, smooth ; behind the aperture and covering the vaginal cavity a rounded plate which is concave on its distal surface ; the edge of this plate dilated to a short rounded process which curves distad.

Early stages not known.

Hab. The Guianas and Lower Amazons.

Two subspecies.

a. P. triopas triopas Godt. (1819).

Papilio triopas Godart, *l.c.*; Boisd., *Spec. Gén. Lép.* i. p. 313. n. 151 (1836) (Cayenne); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 48 (1838); Doubl., Westw. and Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 314 (1852) (*partim*; Amazons); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Para, and all over the Amazons); Lucas, in Chenu, *Enc. Hist. Nat., Pap.* i. p. 38. t. 4. fig. 1. ♂ (1851-53) (Cayenne); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 80. n. 331 (1856) (*partim*; Para; Amazons); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 343, 358 (1861) (Guiana; Lower Amazons); id., *Journ. Entom.* i. p. 226. n. 16 (1862) (Lower Amazons and Pará, forest); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 36 (1864); Kirby, *Cat. Diurn. Lep.* p. 528. n. 66 (1871) (Guiana; Lower Amazons); Mösehl., *Verh. Zool. Bot. Ges. Wien* xxvii. p. 295 (1876) (Surinam); Oberth., *Et. d'Ent.* iv. p. 97. n. 295 (1880) (Guyane; Pará); Staud., *Exot. Tagf.* p. 14. t. 9. ♂ (1884) (Guiana; Lower Amazons); Haase, *Untersuch. Mimicry* i. p. 79 (1893).

Ascanides triopas, Hübner, *Samml. Exot. Schmett., Zuträge* v. p. 32. n. 465. fig. 929. 930. ♀ (1837); Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 269 (1896) (Guiana; Lower Amazons).

Papilio triopus (!), Ménétries, *Enum. Corp. Anim. Mus. Petrop., Lép.* ii. p. 69. n. 1134 (1857) (Cayenne).

♂♀. The markings of fore- and hindwing variable in size and number. Forewing of male usually with one large and two small subapical spots, the small ones being often vestigial on upperside, the one in subcostal fork more often quite obliterated; male mostly without cell-spot, while all the females have an elongate cell-spot.

Hab. French and Dutch Guiana; Amazons, from Pará to Obidos.

In the Tring Museum 10 ♂♂, 9 ♀♀, from: Cayenne; Igarapé, Pará (W. Hoffmanns); Obidos, October and November 1904 (M. de Mathan).

In coll. Oberthür a small series from Maroni, Guiana, and Pará.

b. P. triopas mithras Grose-Smith (1902).

Papilio triopas, Gray, *ll.cc.* (Demerara).

Papilio mithras Grose-Smith, *Rhop. Exot.* iii. *Pap.* t. 23. fig. 1. ♂ (1902) (British Guiana).

♂♀. Spots paler and smaller than in the preceding, the last spot of the hindwing, above, especially smaller.——The differences may not be constant. We have seen only a few specimens.

Hab. British Guiana.

In the Tring Museum 1 ♀ from Bartica, British Guiana, 22. v. 1904 (R. Haensch).

14. Papilio chabrias Hew. (1852).

Papilio chabrias Hewitson, *Trans. Ent. Soc. Lond.* (2). ii. p. 23. t. 6. fig. 1. ♀ (1852) (Amazons); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 247 (1847) (Cayenne; N. Brazil); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 315 (1852) (Ega); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Upper Amazons; forest); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 80. n. 332 (1856) (Ega); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 343. 358 (1861) (Upper Amazons, ♂♀; subspecies of *triopas*); id., *Journ. Entom.* i. p. 226. n. 17 (1862) (Upper Amazons; "local modification" of *triopas*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 37 (1864); Oberth., *Et. d'Ent.* iv. p. 96. n. 294 (1880) (Teffé; "Para" false); Kirby, *Cat. Diurn. Lep.* p. 528. n. 66A (1871) (Upper Amazons); Hopff., *Stett. Ent. Zeit.* xl. p. 51. n. 10 (1879) (Amazons, Peru); Staud., *Exot. Tagf.* p. 14 (1884) (Upper Amazons); Hahnel, *Iris* iii. p. 307 (1890) (Jurimáguas); Haase, *Untersuch. Mimicry* i. p 79 (1893); Michael, *Iris* vii. p. 214 (1894) (Sao Paulo de Olivença).

Papilio nymphas Grose-Smith, *Rhop. Exot.* iii. *Pap.* t. 23. fig. 2. ♀ (1902) (Ecuador; "Para" false).

♂♀. In structure like *triopas*. Forewing of both sexes with a submarginal row of spots, which are often missing in female independently of locality. Patch of hindwing more distal than in *triopas*, therefore the spots around apex of cell larger, while the cell-spot is smaller.

Hab. Upper Amazons, from Ega to the eastern slopes of Ecuador and Peru.

In the Tring Museum 5 ♂♂, 6 ♀♀, from: R. Chuchuras, affluent of R. Palcazu, Huánuco, Peru, 320 m. (W. Hoffmanns); R. Cachyaco, affluent of R. Huallaga, Peru (Maxwell Stuart); Iquitos; S. Paulo de Olivença.

In coll. Oberthür a series from Moyobamba; S. Paulo de Olivença; Tocantins; Teffé.

15. **Papilio coelus** Boisd. (1836). (Pl. IV. fig. 2).

♀. *Papilio coelus* Boisduval, *Spec. Gén. Lép.* i. p. 289. n. 117 (1836) (Cayenne); Doubl., Westw. and Hew., *Gen. Diurn. Lep.* i. p. 18. n. 209 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 53 n. 253 (1852); id, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 268 (1856).

♀. *Papilio vertumnus* var., Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 340, 355 (1861).

♀. *Papilio vertumnus*, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 42 (1864) (*partim*).

♀. *Papilio vertumnus* var. d. *P. coelus*, Kirby, *Cat. Diurn. Lep.* p. 525. sub n. 61 (1871).

♂. *Papilio vercingetorix* Oberthür, *Et. d'Ent.* xii. p. 5. n. 10. t. 7. fig. 51 (1888) (French Guiana).

♂ ♀. Palpus black. Abdomen in male with a tiny red dot before claspers, in female with a red spot around vaginal cavity, no red scales dorsally at apex of eighth tergite. Sexes similar in pattern; forewing with a white patch in apex of cell extending on to disc, larger in female than in male, washed out at the edges.——A red patch or band on hindwing close to cell, consisting in male of four spots, in female of six, in this sex the band being continued to abdominal edge; tooth R^3 prominent, almost pointed, the following two teeth also somewhat pointed.

On *underside* the white patch of forewing a little larger than above.——Red band of hindwing paler red than above and the spots in female smaller, in male two additional spots between M^2 and anal angle.

Scent-organ white.

Hab. French Guiana.

Only two specimens known, the type (♀) of *coelus* being in Mus. Paris, and the type (♂) of *vercingetorix* in coll. Charles Oberthür.

16. **Papilio quadratus** Staud. (1890).

Papilio quadratus Staudinger, *Iris* iii. p. 337. t. 3. fig. 1. ♂ (1890) (Manicoré); id., *l.c.* iv. p. 61 (1891).

♂ ♀. Sexes similar. Palpus black. Mid- and hindtibiae of male slightly dilated, hairy, but also bearing many bristles. Abdomen beneath with minute red spot before claspers in male, and with large spot around vaginal cavity in female, no red scales dorsally at apical edge of eighth segment. Forewing very long, costal and distal margins almost parallel in male. Hindwing with a creamy patch consisting of five discal spots and (in ♂) a small cell-spot; tooth R^3 somewhat projecting in female, while the wing is strongly rounded at apex, being produced anally.

On *underside*, the hindwing bears a red spot close to anal angle.

Scent-organ with a very broad stripe of white wool; this stripe not quite extending to base, where there is a brush of white spreading hairs.

Genitalia: ♂. Ninth tergite with a conical spinelike process at each side of base of tenth tergite. Harpe half the length of the clasper, bearing four teeth, all projecting ventrad and curved inward, the apical one very long, the next two shorter, the most proximal one being minute.

Early stages not known.

Hab. Upper Amazons.

Two subspecies.

a. P. quadratus quadratus Stand. (1891).

♂. *Papilio quadratus* Staudinger, *ll.cc.*

Forewing with yellow quadrate spot M^1—M^2 in male. The female not known. This may be only an aberrant individual.

Hab. Manicoré, Rio Madeira.

b. P. quadratus spoliatus Stand. (1898).

♂ ♀. *Papilio quadratus* var. *spoliatus* id., *l.c.* xi. p. 138 (1898) (Sao Paulo de Olivença; Pebas; Iquitos); Grose-Smith, *Rhop. Exot.* iii. *Pap.* t. 17. fig. 1 ♂, 2. ♀ (1899); Staud., *l.c.* xi. p. 376 (1899).

♂ ♀. Forewing without markings, or the spot M^1—M^2 vestigial above and distinct though small below.

Hab. Upper Amazons.

In the Tring Museum 2 ♂♂, 1 ♀, from: R. Jurna; S. Paulo de Olivença.

In coll. H. J. Adams 6 ♂♂, 4 ♀♀, from the Upper Amazons.

17. **Papilio pizarro** Stand. (1884).

♂ ♀. *Papilio pizarro* Staudinger, *Exot. Tagf.* p. 18. t. 13. ♂ (1884) (Sao Paulo de Olivença, Pebas, Jurimáguas; ♀ *partim*); Hahnel, *Iris* iii. p. 286 (1890) (Pebas); id., *l.c.* p. 307 (1890) (Jurimáguas); Haase, *Untersuch. Mimicry* i. p. 79 (1893); Staud., *Iris* xi. p. 141 (1898).

♂ ♀. Palpus black. Abdomen of male without red scales before claspers, of female with red spot behind vaginal cavity and at apex of seventh sternite, but no (or very few) red scales dorsally and laterally at apex of eighth segment, in the female of *P. cutorina* this segment being edged with red.——Forewing without white fringe-spots, no markings on disc.——Hindwing with creamy patch consisting of three or four spots in male, of three to six in female; D^3 short, transverse, much shorter than D^4.

Mid- and hindtibiae of male slightly incrassate, hairy; foretibia thinner, spinose, with comparatively few short hairs.

Scent-organ grey, with a streak of small erect scales as in *P. chabrias* and *steinbachi*.

Hab. Upper Amazons.

In coll. Oberthür from: Chambiriyacu; Tarapoto; Pebas.

In coll. H. Grose-Smith from Yurimáguas; and in coll. H. J. Adams from the Upper Amazons.

As Dr. Staudinger, *Iris* xi. p. 141 (1898), when comparing the females of *P. pizarro*, *bolivar*, and *cutorina* with one another, did not find any constant character, except size, by which to separate *bolivar* and *cutorina*, and mentions as a distinguishing character between *cutorina* and *pizarro*, besides the greater expanse of *cutorina*, only a creamy spot situated in *cutorina* on the underside of the hindwing at the abdominal margin, which character is not constant, we append here a short exposition of those external characters by which the females of the three insects can be recognised. In the Godman collection there is a female received from Staudinger as *pizarro*, being labelled "original." This female is *bolivar*.

1. Palpus black; a red spot behind vaginal cavity and in front of it, no red scales at apex of eighth segment dorsally and laterally; fringe of forewing quite black or with a white scale here and there, not bearing distinct spots; cell of hindwing narrow, vein D^3 transverse, much shorter than D^4; spot M^2—(SM^1) absent or small :——Female of *pizarro*.

2. Palpus and apex ofabdomen as before, or the latter more extended red; fringe of forewing with more or less distinct white spots; lower angle of cell of hindwing acute, D^3 oblique, as long as D^4, being usually longer, rarely shorter; spot M^2—(SM^1) about half the size of spot M^1—M^2 :——Female of *bolivar*.

3. Palpus red; apex of eighth abdominal segment red all round, the red scaling forming a ring around the anal segment; fringe of forewing with sharply marked white spots; D^3 of hindwing shorter than D^4 :——Female of *cutorina*.

18. **Papilio steinbachi** Rothsch. (1905). (Plate IV. fig. 5. ♂, 6. ♀).

♂ ♀. *Papilio steinbachi* Rothschild, *Entom.* p. 125 (1905).

♂ ♀. Palpus black. Abdomen of male without red scaling before claspers; of female with red scaling around vaginal cavity, but not dorsally at apex of eighth segment. Tibiae of male somewhat dilated and hairy.——Forewing in male with white or buffish double spot M^1—(SM^1); in female with a larger white patch consisting of a minute cell-streak, a very large spot M^1—M^2, a triangular spot before M^1 and a streak behind M^2.——Hindwing with red patch in both sexes, the last spots being more or less white in male, this colour only indicated in female.

On *underside* both sexes with a red spot close to anal angle, separated from the discal spots.

Scent-organ: fold grey inside; a broad stripe of small scales as in *P. triopas*, the scales of the same type as in that species, but larger.

Genitalia: ♂. Ninth tergite with conical lateral process as in the allied species. Harpe about two-thirds the length of the clasper, curved, narrow, with short but strong teeth from base to apex.

Early stages not known.

Hab. Eastern Bolivia.

In the Tring Museum 5 ♂♂, 1 ♀ from: Sara, S. Cruz de la Sierra, end of February to June 1904 (J. Steinbach); Mapiri.

19. **Papilio klagesi** Ehrm. (1904). (Pl. V. fig. 20).

♀. *Papilio klagesi* Ehrman, *Ent. News* xv. p. 215 (1904) (Suapure, Venezuela).

The male is not known.

♀. Palpus and apex of abdomen black, no red spot behind or in front of vaginal cavity.——Fringe of forewing quite black, lower angle of cell completely rounded off; a white band from M^1 to SM^2.——Hindwing: fringe-spots white, vestigial or entirely absent, this being the only case in the present group of *Aristolochia*-Papilios of the fringe of the hindwing not being distinctly spotted; tooth R^3 slightly prominent, while the others are very obtuse and short; band of discal spots somewhat pinkish, upper two spots small, more distal than the last four, which are contiguous; M^2 originating almost on a level with R^1, D^3 shorter than D^4, transverse, D^4 nearly as long as upper partition of M.

Anal segment ventrally with very numerous short stiff yellowish bristles. In front of vaginal cavity a low ridge continued distad on each side of the cavity; the proximal portion of this ridge densely clothed with very short stiff hairs; behind the vaginal aperture a long smooth process, convex on proximal side, excavate on distal side, rounded at apex.

Hab. Caura River, Orinoco.

In the Tring Museum 3 ♀♀ from Suapure, Caura R., February and March 1899 (S. M. Klages).

20. Papilio aeneas L. (1758).

♂. *Papilio Eques Trojanus aeneas* Linné, *Syst. Nat.* ed. x. p. 461. n. 15 (1758) ("Asia").
♀. *Princeps dominans marcius* Hübner, *Samml. Exot. Schmett.* i. t. 122 (1806—?).
♂ ♀. *Papilio aeneas*, Erichson, in Schomb., *F. F. Brit. Guiana* p. 593 (1848) (♀ = *marcius*).

♂ ♀. Palpus black; posterior abdominal segments of male without red markings, there being in the female a restricted red spot situated behind vaginal cavity, neither the seventh nor eighth segment as a rule bearing any red scales at the edge. Fringe of forewing black, showing rarely vestiges of white spots in female. Mid- and hindtibiae of male densely hairy, except base, incrassate, especially the hindtibia, foretibia and tarsi simply spinose. Scales of red patch of hindwing of male above entire; in female the scales also rounded at apex, but seldom entire, bearing from three to five teeth, very few scales being only bidentate; on the underside the white scales covering the red ones nearly all sharply tridentate in female, only a few having two teeth, while in male the majority is bidentate. No opalescent gloss on upper side of hindwing. White patch on forewing of female washed out at edges.

Neuration: D^3 of hindwing about as long as D^4, often considerably longer, however in one of our males much shorter.

Scent-organ: wool blackish hair-brown.

Genitalia: ♂. Tenth tergite a very little longer than the sternite; apical edge of ninth tergite somewhat dilated near the tenth tergite and denticulate. Harpe reaching close to apex of clasper, bearing at the apex from two to six heavy teeth, and at the ventral edge beyond the middle one more tooth, the distal portion of the ventral edge being sometimes minutely denticulate.——♀. No strongly elevate ridge in front of the vaginal cavity; posterior edge of cavity rounded, slightly incrassate, partly covering the cavity, rest of postvaginal area membranous, transversely wrinkled.

Early stages not known.

Hab. The Guianas; Amazons from Pará upwards; eastern slopes of Andes of Peru and Bolivia; Upper Orinoco.

a. P. aeneas aeneas L. (1758).

Roesel, *Ins.-Belust.* iv. B. p. 24. t. 2. fig. 2. ♂ (1755).

♂. *Papilio Eques Trojanus aeneas* Linné, *l.c.* ("Asia"; citat. *partim*); Kleem., in Roesel, *l.c.* (ed. ii., 1761) (Surinam); Linné, *Mus. Lud. Ulr.* p. 197. n. 16 (1764); Houtt., *Naturl. Hist.* i. 11. p. 198. n. 15 (1767); id., *Syst. Nat.* ed. xii. p. 747. n. 16 (1767); Fabr., *Syst. Ent.* p. 448. n. 23 (1775) ("India"); Goeze, *Ent. Beytr.* iii. 1. p. 36. n. 16 (1779) (cit. Sebae excl.); Cramer, *Pap. Exot.* iii. p. 156. t. 279. fig. C. D (1780) (Surinam); Fabr., *Spec. Ins.* ii. p. 8. n. 32 (1781) (citat. Cram. excl.); Jabl. and Herbst, *Naturs. Schmett.* ii. p. 53. n. 19. t. 9. fig. 5, 6 (1784) (*partim*); Fabr., *Mant. Ins.* ii. p. 5. n. 35 (1787); Esper, *Ausl. Schmett.* p. 40. n. 15, p. 60 (1788) (*partim*, ♀); Gmelin, *Syst. Nat.* i. 5. p. 2233 n. 16 (1790) (*partim*); Jung, *Alphab. Verz.* p. 11 (1791) (synon. *partim*); Fabr., *Ent. Syst.* iii. 1. p. 17. n. 50 (1793) (citat. *partim*).

Papilio Eques aeneas Linné, *Syst. Nat.* ed. Lange p. 461. n. 15 (1760).

Papilio (Tros) aeneus, Müller, *Naturs.* v. 1. p. 570. n. 16 (1774).

Papilio (aeneas), Meerburgh, *Afb. Zeldz. Gew.* t. 19. ♂ (1775).

Papilio Eques Trojanus aeneides Esper, *Ausl. Schmett.* t. 15. fig. 4 (1788).

Parides gargasus Hübner, *Verz. bek. Schmett.* p. 87. n. 909 (1818?) (*partim*; *nom. novum loc.* "aeneas Cram. 279. A—D").

Papilio aeneas, Godart, *Enc. Méth.* ix. p. 33. n. 24 (1819) (*partim*; "♀" only); Boisd., *Spec. Gén. Lép.* i. p. 286. n. 112 (1836) (*partim*; "♀" only); Constable, *Miscell. Butt.* p. 140. t. 13. ♂ (1832) ("Cochin China"); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (Demerara; syn. *partim*); id., Westw. and Hew., *Gen. Diurn. Lep.* i. p. 18. n. 202 (1846) (Guiana; cit. Cram. *partim*); Erichs, in Schomb., *F. F. Brit. Guiana* p. 593 (1848); Gray, *List Lep. Ins. Brit.*

Mus. i. *Pap.* p. 65. n. 264 (1856) (*partim*; Demerara); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 342, 357 (1861) (*partim*; Guiana); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 80 (1864) (*partim*; Surinam; Guiana); Guenée, *Ann. Soc. Ent. France* p. 305 (1867) (synonymy); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 236. n. 11 (1869) (Demerara; synon. *partim*); Kirby, *Cat. Diurn. Lep.* p. 528. n. 63 (1871) (*partim*; Guiana); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvii. p. 295 (1876) (Surinam); Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 21. n. 16 (1882) (*Recensio critica*); Möschl., *l.c.* xxxii. p. 303 (1883) (Surinam); Haase, *Untersuch. Mimicry* i. p. 79 (1893).

Papilio marcius, Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (Demerara).

♂. *Papilio bochus* Lucas, *Rev. Zool.* (2). iv. p. 191 (1852) (Cayenne).

♂. Green spot distant from cell, usually shortest in basi-distal direction, mostly shorter behind SM^2 than before this vein. Spots on underside of hindwing red, separate, spot M^2—(SM^1) usually the largest.

♀. Dichromatic, the forewing being sometimes without the usual white patch. Red band of hindwing distant from cell, the two spots M^2–SM^2 confluent, or at least standing close together.

a'. ♀-f. *specularis* nov.——Forewing: A large white spot R^3—M^1, a smaller one in cell, and usually a small spot before R^1 and another behind M^1.——The ordinary female.

b'. ♀-f. *dido* nov.——Forewing: No white patch. A rare form.

Hab. of *P. aeneas aeneas:* The Guianas.

In the Tring Museum 16 ♂♂, 15 ♀♀ from: Cayenne; Surinam; Rio Demerara, Essequibo R., and Camaria (January 1904, R. Haensch), Brit. Guiana.

b. P. aeneas marcius Hübn. (1806— ?).

♀. *Princeps dominans marcius* Hübner, *Samml. Exot. Schmett.* i. t. 122 (1806—?).

♀. *Priamides marcius* id., *Verz. bek. Schmett.* p. 87. n. 900 (1818 ?) (syn. excl.).

♀. *Papilio marcius*, Boisduval, *Spec. Gén. Lép.* i. p. 288. n. 115 (1836); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. n. 259 (1856) (Pará); Wallace, *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons; forest); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 274 (1856) (Pará).

♀. *Papilio echelus*, Doubleday, Westw. & Hew. (*non* Hübner, 1806—?, err. det.), *Gen. Diurn. Lep.* i. p. 18. n. 210 (1846) (*partim*).

♀. *Papilio parsodes* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 256. t. 8. fig. 4. ♀ (1852) (*partim*, ♀ only; Pará).

♂. *Papilio aeneas*, id., *l.c.* p. 52. n. 249 (1852) (syn. excl.; Pará); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Pará; forest); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 264 (1856) (*partim*; Pará); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 342, 357 (1861) (*partim*; Pará); id., *Journ. Entom.* i. p. 226. n. 14 (1862) (*partim*; Pará); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 80 (1864) (*partim*; Pará); Bates, *Natural. Riv. Amaz.* p. 26 (1864) (Pará, ♂ in swampy shades, ♀ in more open places); Guen., *Ann. Soc. Ent. France* p. 307 (1867); Kirby, *Cat. Diurn. Lep.* p. 528. n. 63 (1871) (*partim*; Pará); Oberth., *Et. d'Ent.* iv. p. 95. n. 291 (1880) (♂ = *bochus*, ♀ = *marcius* = *parsodes*; Pará; Amazons, *partim*); Hahnel, *Iris* iii. p. 212 (1899) (Pará).

Papilio lysander local var. *parsodes*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 344 (1861) (♀ sub synon.).

Parides aeneas, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 90. t. 122. fig. 3, 4 (190—?).

♂. As in *P. a. aeneas*, last but one spot on underside of hindwing rather smaller.

♀. White patch of forewing usually reaching backwards to M^2, the posterior spot being larger than in the preceding. The central spots of band of hindwing larger and closer together, spot C—SC^2 present.

Hab. Lower Amazons: Pará district, probably found farther south on the Tocantins.

In the Tring Museum 5 ♂♂, 3 ♀♀, from: Pará (Stuart); Igarapé (W. Hoffmanns).

c. P. aeneas linus subsp. nov. (Pl. V. fig. 28).

♂. Similar to the preceding; spots R^2—M^2 of underside of hindwing paler, close together, nearer to cell, spot R^3—M^1 longer than the distance of this spot from cell.

♀. White patch of forewing as in *P. a. aeneas*, consisting of a large spot R^3—M^1, a smaller cell-spot, a minute spot R^2—R^3, and a small streak behind M^1.——Red band of hindwing broad, extending from R^1 to abdominal margin, touching cell or nearly, spot R^3—M^1 the longest, about four times as long as broad, the spots close together above, the last one standing a little separate; on underside the first spot minute, separate, the last small, also separate, the four others nearly as large as above.

Hab. Middle Amazons: Santarem; Obidos (*type*); Massauary.

Bates did not meet with *aeneas* on the Middle Amazons.

In the Tring Museum 1 ♂, 1 ♀ from Obidos and Santarem.

In coll. Oberthür from Massauary.

d. P. aeneas damis subsp. nov.

Papilio aeneas, Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 4 (1876) (Ucayali).

♂. Green patch of forewing larger than in the three preceding forms, touching cell in most specimens, extending basad to SM^3 or even beyond. Spots R^2—M^2 of underside of hindwing pinkish white, nearer the cell than in *P. a. aeneas* and *marcius* and closer together, spot M^1—M^2 sometimes obsolescent.

♀. Dichromatic.

a'. ♀-f. *pyromelas* nov. (Pl. VI. fig. 37).—This is the usual form. Forewing without white patch, deeper black than in the other subspecies, with vestiges of white fringe-spots.——Hindwing: red band broad, much broader than the black distal area, the spots close together, the central ones touching cell as in female of *linus*, or the band 3 or 4 mm. distant from cell, in this case its inner edge being concave; no spot before R^1; spot at abdominal margin (the sixth) separate, distinct or vestigial or absent; scales of red band either mostly entire or finely denticulate; the band narrower on underside, sixth (last) spot small or absent.——This female differs from that of *P. drucei* especially in cross-vein D^3 of hindwing being at least as long as D^4, and in the apex of the abdomen bearing a red spot only behind vaginal cavity, there being no red scales at the edges of segments 7 and 8; the forewing is also more opaque.

b'. ♀-f. *eucharia* nov. (Pl. VI. fig. 35).——Apparently a very rare form, which we thought first to represent a distinct species. Besides the specimen figured (from the Perené River) we have seen only one other, which is in the collection of Mr. H. J. Adams, being also found in the Perené valley (5000 ft., May—June 1902, W. Watkins).——Forewing with large white patch. Eighth abdominal segment more extended red than in other females of *P. aeneas*.

Hab. of *P. a. damis*: East Peru.

In the Tring Museum: 5 ♂♂, 9 ♀♀, from: Pozuzu, Huánuco, 800—1000 m. (W. Hoffmanns); R. Chuchuras, Huánuco, 320 m. (W. Hoffmanns); R. Perené, March 1900 (Simons); La Merced, Chanchamayo, May and June 1903, 2500 ft. (Watkins & Tomlinson); La Union, R. Huacamayo, Carabaya, 2000 ft., November 1904 to January 1905 (G. Ockenden); Pachitea.

e. P. aeneas locris subsp. nov. (Pl. VI. fig. 26).

♂. Like *damis*, red area of hindwing rather larger, and spot M^1—M^2 of underside of hindwing mostly obliterated.

♀. Similar to the Guiana ♀-f. *specularis*.——Forewing deeper black, the apical area being less transparent; cell-patch larger, extending from M^1 to lower angle, reaching nearly across cell, the spots rather more sharply defined and spot R^3—M^1 longer; fringe with or without minute white spots.——A row of six spots on hindwing, standing nearer cell than outer margin, but being quite remote from cell, all separate, spot R^3—M^1 the largest; fifth spot smaller than first, and the sixth vestigial, both small on underside and separate.

Hab. Bolivia.

In the Tring Museum: 3 ♂♂, 2 ♀♀, from: Mapiri; Province Sara, S. Cruz de la Sierra, April—June 1904 (J. Steinbach).

f. P. aeneas bolivar Hew. (1850).

Papilio bolivar Hewitson, *Trans. Ent. Soc. Lond.* (2). i. p. 97. t. 10. fig. 2. ♂ (1850) (Amazons); Doubl., Westw. and Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 265. t. 10. fig. 7. ♀ (1852) (Ega); Wall., *Trans. Ent. Soc. Lond.* (2). p. 256. (1854) (Upper Amazons; forest); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 280 (1856) (Ega); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 342, 357 (1861) (Upper Amazons); id., *Journ. Entom.* I. p. 226. n. 15 (1862) (Upper Amazons, abundant, "local modification" of *aeneas*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 81 (1864) (Ega); Kirby, *Cat. Diurn. Lep.* p. 528. n. 63A (1871) (Upper Amazons); Hopff., *Stett. Ent. Zeit.* xl. p. 50. n. 7 (1879) ("Brazil"); Oberth., *Et. d'Ent.* iv. p. 96, 117. n. 293 (1880) (Teffé; Sao Paulo de Olivença; Pebas; Iquitos); Stand., *Exot. Tagf.* p. 19 (1884); Hahnel, *Iris* iii. p. 275 (1890) (S. Paulo de Olivença); id., *l.c.* p. 307 (1889) (Jurimáguas); Haase, *Untersuch. Mimicry* i. p. 79 (1893); Michael, *Iris* vii. p. 214 (1894) (Sao Paulo de Olivença).

Bates, *l.c.*, considered this to be the Upper Amazonian form of *P. aeneas*, in which he was doubtless right. The differences, though conspicuous enough, are not very trenchant.

♂. Green patch of forewing as in the Peruvian subspecies, spot M^2—SM^2 proximally rather more reduced than in most Peruvian and Bolivian males. Red area of hindwing deeper red and smaller, the spots around the cell being reduced; these spots without bright red tips, or only spot R^3—M^1 with small red dot at apex; fringe with small white spots.——On underside all the spots of hindwing cream-colour, one or the other with a few red scales at the edge, spot M^2—SM^2 much the largest.

♀. Forewing without white patch; fringe with white spots.——Hindwing with the band cream-colour instead of red, last spot separate, often absent; width of band variable.

Hab. Upper Amazons; Orinoco.

In the Tring Museum: 8 ♂♂, 5 ♀♀, from: Maipures, Orinoco, December 1898 (Cherrie): R. Cachyaco, affluent of R. Huallaga (Stuart); S. Paulo de Olivença; Teffé, January 1904 (M. de Mathan).

The female resembles that sex of the Peruvian subspecies except in the colour of the band. One of our males of the Bolivian subspecies has all the spots of the underside of the hindwing cream-colour and on the upperside only the two middle spots tipped with bright red.

21. Papilio dardanus Fabr. (1793).

♂. *Papilio Eques Trojanus dardanus* Fabricius, *Ent. Syst.* iii. 1. p. 10. n. 29 (1793) (Brazil).

♀. *Papilio Eques Trojanus tros* id., *l.c.* n. 30 (1793) (Brazil).

♂. *Papilio opleus* Godart, *Enc. Méth.* ix. p. 33. n. 22 (1819) (Brazil ;—mutilated specimen).

♂. *Papilio dardanus*, id., *l.c.* p. 73. n. 134 (1819) (Brazil) ; Lucas, *Lép. Exot.* p. 26. t. 13. fig. 2 (1835) ; Boisd., *Spec. Gén. Lép.* i. p. 304. n. 139 (1836) (Brazil) ; Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 47 (1838) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil).

♀. *Papilio tros*, Godart, *l.c.* n. 135 (1819) (Brazil) ; Donov., *Nat. Repos.* ii. t. 29 (1823) (Brazil) ; Boisd., *l.c.* p. 304. n. 139 (1836) ; Doubl., *l.c.* p. 13 (1844) ; Prillw., *Stett. Ent. Zeit.* xxvi. p. 129 (1865) (Corcovado).

♂ ♀. *Papilio dardanus*, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 194 (1846) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 44. n. 224 (1852) ; id., *List Lep. Ins. Brit Mus.* i. *Pap.* p. 60. n. 237 (1856) (Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 75 (1857) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 78 (1864) (S. Brazil); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 236. n. 10 (1869) ; Kirby, *Cat. Diurn. Lep.* p. 531. n. 77 (1871) (Brazil) ; Burm., *Descr. Rép. Argent.* v. *Lép.*, Atlas p. 8. n. 18 (1879) (Corcovado) ; Oberth., *Et. d'Ent.* iv. p. 91. n. 283 (1880) (Brazil) ; Haase, *Untersuch. Mimicry* i. p. 79 (1893).

♂ ♀. Palpus black ; posterior abdominal segment not spotted red in male, there being in female a spot only behind vaginal cavity ; vein R^1 of hindwing more distal than M^2 ; tail long, spatulate, tooth M^1 also somewhat prolonged. Red spots of hindwing not opalescent. Scales behind SM^2 of underside of forewing elongate, entire in both sexes ; scales of buffish-green patch of forewing and most scales of the red patch on upperside of hindwing of male also entire. Mid- and hindtibiae of male incrassate, densely covered with minute hairs, the spines being small and almost restricted to the underside ; foretibia spinose. Fore- and midtarsi in male about half as long again as tibiae ; not quite so long in female. In male sometimes a greyish band on underside of forewing across apex of cell, corresponding to the band of female.

Scent-organ : fold large, containing a very narrow stripe of long grey wool.

Genitalia : ♂. Tenth tergite a little longer than the sternite, bearing proximally on each side some irregular prominent teeth. Harpe very broad, rounded and strongly dentate at apex, one large conical tooth ventrally in middle. Penis-sheath acuminate, the tip a little curved over the orifice.——♀. Some distance proximally of vaginal orifice on both sides a large, triangular, somewhat rounded lobe, convex on outer side ; postvaginal area transversely wrinkled, mesially impressed ; proximal edge of this impression somewhat raised, especially mesially. Bristles of anal segment gradually tapering to a fine point.

Early stages not known.

Hab. Brazil : Province of Rio de Janeiro.

In the Tring Museum : 21 ♂♂ and 16 ♀♀.

22. Papilio orellana Hew. (1852).

Papilio orellana Hewitson, *Trans. Ent. Soc. Lond.* (2). ii. p. 23. t. 5. fig. 2. ♂ (1852) (Amazon); Doubl., Westw. and Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 51. n. 246 (1852) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Upper Amazons ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 261 (1856) (Ega) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 343, 358 (1861) (♂, Ega) ; id., *Journ. Entom.* i. p. 226 n. 18 (1862) (Ega) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 79 (1864) (Ega) ; Kirby, *Cat. Diurn. Lep.* p. 528. n. 64 (1871) (Ega) ; Oberth., *Et. d'Ent.* iv. p. 116. n. 270bis (1880) (Iquitos) ; Staud., *Exot. Tagf.* p. 19. t. 13. ♀ (1881) (Iquitos) ; Hahnel, *Iris* iii. p. 275 (1890) (Sao Paulo de Olivença).

Palpus black ; M^2 of hindwing more distal than R^1 ; tooth R^3 prominent.

♂. Forewing without markings, except the white fringe-dots, which are

sometimes vestigial ; blue-black, scales feebly dentate, those of upper layer narrow in apical area ; a large purplish red discal area on hindwing, entering cell, extending from SC^2 beyond M^2, non-opalescent, the red spots of the underside shining through ; scales of this patch entire. On *underside* scales behind SM^2 of forewing and some before SM^2 elongate, entire. Tibiae simple, spinose. Abdomen with red spot only at base.

♀. Forewing similar to that of male, less blue, scales dentate. A red band on hindwing consisting of six spots, first and second smallest and usually isolated, third, fourth and fifth much longer than broad, scales dentate ; the spots smaller below, paler, and all separated.

Scent-organ : white wool from base to apex of fold, the wool short, even, as if shorn. In one of our specimens there is a large cinnamon streak on fold (SM^1).

Genitalia : ♂. Tenth tergite with small tubercle on each side dorsally at base, the lateral edge being somewhat dilated proximally of the tubercle. Clasper rounded ; harpe of a similar type as in *P. lysander* and allies, long, reaching close to apex of clasper, rounded-truncate, with about six large apical teeth, no tooth at ventral margin proximally of middle. Penis-sheath acuminate.

Hab. Upper Amazons.

In the Tring Museum : 3 ♂♂, 2 ♀♀, from : S. Paulo de Olivença ; Iquitos (Stuart).

In coll. Oberthür from : Iquitos, November ; Cavallo Cocho, May—July.

In coll. H. J. Adams a series of 4 ♂♂, 5 ♀♀, from the Upper Amazons.

23. Papilio sesostris Cram. (1779).

♂. *Papilio Eques Trojanus sesostris* Cramer, *Pap. Exot.* iii. p. 34. t. 211. fig. F. G (1779) (Surinam).
♀. *Papilio Eques Trojanus tullus*, id., *l.c.* iii. p. 153. t. 277. fig. C. D (1780) (Surinam).

Palpus black in both sexes, M^2 of hindwing on a level with R^1 or more distal.

♂. Forewing : a large green patch from M^1 to hinder margin, contiguous with cell, consisting of three partitions, the first and second or all three acuminate distally, the scales composing the patch broad, rounded ; rarely a streak of dispersed green scales in cell ; rest of wing velvety black, upper scales narrower, lanceolate, nearly all entire ; under scales dentate, broad.——Hindwing with or without red spot behind M^2, the spot not being opalescent.

On *underside* the upper scales in posterior area of forewing entire and lanceolate, being bidentate on rest of wing ; occasionally small creamy patches posteriorly on disc.——Hindwing always with three large red contiguous spots R^3—(SM^1), more or less shaded with white, and a small spot on abdominal fold, there being usually also a red dot R^1—R^2 near margin and often a small spot R^2—R^3 in front of the patch of three ; a submarginal dot SC^2—R^1 does not seem to be ever present. Tibiae not incrassate, spinose.

♀. Forewing opaque, being very little paler distally than basally ; there are always at least two creamy or buffish-white patches on forewing ; upper scales of forewing partly lanceolate, acuminate.——Hindwing : red band broad and continuous either from R^2 or R^3 to abdominal margin, rarely represented by only two isolated spots ; spots SC^2—R^2 usually present, isolated, small as compared with the posterior spots ; red upper scales nearly all entire, except near abdominal margin.——Scales on *underside* dentate, a very few in the white patch of the forewing being acuminate.

Scent-organ : white wool not extending to base, the basal third of the fold

being covered with long, half-erect, rounded-truncate or feebly sinuate, purplish black scales, there being also a brush of long hairs; the greyish white scales at the discal side of the patch of wool nearly all entire.

Genitalia: ♂. Tenth tergite a little longer than the long acuminate lobes of the sternite; edge of ninth tergite minutely serrate. Harpe long, gradually narrowed distally, longitudinally impressed; apex rounded, either entire or denticulate, the most ventral tooth being usually somewhat enlarged; ventral edge with a solitary small conical tooth proximally; a compressed, tuberculiform ridge on clasper close to apex of harpe. Penis-sheath obliquely truncate, the proximal (or ventral) edge produced into an abrupt short-pointed lobe.——♀. Vaginal orifice surrounded by a ridge which is widened behind into a broad lobe; this lobe rounded, concave on distal side, somewhat like an oyster-shell in outline, bent forward, lying over the vaginal orifice; the edge of this lobe a little incrassate centrally; proximally of the vaginal ridge there is on each side a large, irregularly triangular lobe which is finely hairy.

Early stages not known.

Hab. Mexico to Bolivia and Goyaz.

a. P. sesostris zestos Gray (1852).

Papilio sesostris, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 213 (1847) (*partim*); Reak., *Proc. Ent. Soc. Philad.* ii. p. 139. n. 9 (1863) (synon. *partim*; Honduras); Weidem., *ibid.* p. 148 (1863) (Central America; *partim*); Dist., *Proc. Ent. Soc. Lond.* p. xiv. (1876) (Costa Rica); Hopff., *Stett. Ent. Zeit.* xl. p. 50. n. 9 (1879) (*partim*; Honduras).

Papilio zestos Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 235. t. x*. fig. 5. ♀ (1852) (Honduras); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 62. n. 248 (1856) (Honduras); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 340 (1861) (Honduras); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 39 (1864) (Mexico; Honduras); Staud., *Exot. Tagf.* p. 13 (1884) (*partim*; Central America); Godm. & Salv., *Biol. Centr. Amer.*, *Rhop.* ii. 190. n. 1 (1890) (Guatemala; Brit. Honduras; Nicaragua; Honduras).

Papilio sesostris, local var. *zestos*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 355 (1861) (*partim*; Honduras).

Papilio sesostris var. a. *P. zestos*, Kirby, *Cat. Diurn. Lep.* p. 525. sub n. 60 (1871) (Honduras).

♂. Hindwing always with red spot on upperside; on underside the band of spots R^3—(SM^1) almost at right angles to the veins, the last of these three spots elliptical, not being produced distad, spot on abdominal fold rather large.

♀. Patch R^3—M^1 of forewing contiguous with cell, a small spot in cell. Band of hindwing bright red on upperside, not shaded with buff; on underside spots R^2—M^2 well separate from cell.

Hab. South Mexico to Costa Rica.

In the Tring Museum 5 ♂♂, 4 ♀♀, from: Coatzalcualcos, S. Mexico, July 1904 (A. Hall); Volcan de Miravalles, Costa Rica (Underwood); Juan Vinas, 2500 ft., and Carillo, 3000 ft., Costa Rica, October 1904 (A. Hall).

b. P. sesostris tarquinius Boisd. (1836).

Papilio tarquinius Boisduval, *Spec. Gén. Lép.* i. p. 296. n. 127 (1836) (♀, Colombia); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 234 (1852) (Colombia); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 62. n. 247 (1856) (Colombia); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 358 (1861); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 40 (1864) (Bogota); Oberth., *Et. d'Ent.* iv. p. 88. n. 280 (1880) (Colombia; Panama; *partim*, ♂ excepted); Godm. & Salv., *Biol. Centr. Amer.*, *Rhop.* ii. p. 191. n. 2 (1890) (Panama; Bugaba, Chiriqui, Lion Hill).

Papilio sesostris local var. *zestos*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 355 (1861) (*partim*; N. Granada).

Papilio sesostris var. b. *P. tarquinius*, Kirby, *Cat. Diurn. Lep.* p. 525. sub n. 60 (1871) (N. Granada).

Papilio sesostris, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 38 (1864) (*partim* ; N. Granada ; Ecuador) ; Hopffer, *Stett. Ent. Zeit.* xl. p. 50. n. 9 (1879) (*partim* ; N. Granada) ; Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 230 (1880) (Sta. Marta) ; Hahnel, *Iris* iii. p. 147 (1890) (San Estéban) ; id., *l.c.* p. 194 (1890) (Mérida) ; id., *l.c.* p. 203 (1890) (Valera) ; Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 154 (1903) (Archidona, 640 m.).

Papilio sesostris var. ♂ *zestos*, Oberthür, *Et. d'Ent.* iv. p. 90, sub n. 281 (1880) (*partim* ; N. Granada).

Papilio zestos, Staudinger, *Exot. Tagf.* p. 13 (1884) (*partim* ; Colombia).

♂. Most specimens with red spot on upperside of hindwing ; band R^3—(SM^1) on underside more oblique than in the preceding, the posterior one of these three spots being more distal and the anterior a little more proximal than the central one ; spot on abdominal fold often small or absent.

♀. Patch M^1—M^2 of forewing on the whole longer than in the preceding ; band of hindwing a little nearer the cell, more oblique, the distal marginal area therefore wider, which is especially noticeable on underside.

Hab. Panama ; Colombia ; Ecuador ; North Venezuela.

In the Tring Museum 30 ♂♂, 15 ♀♀, from : Boquete, Chiriqui, 3500 ft. (Watson) ; Brava I., Sevilla I., and Parida I., January 1902 (J. A. Batty) ; Colon, Rio Dagua, West Coast of Colombia (Rosenberg) ; Onaca, Sta. Marta, 2200 ft., September—October 1901 (Chas. Engelke) ; Cananche, Cundinamarca, July 1903 (Mathan) ; Villavicencio to R. Ocoor, Colombia, January 1897 (Dr. Bürger) ; Cachabi, West Ecuador, November 1896 and January 1897 (Rosenberg) ; Cachabi to Paramba, February 1897 (Rosenberg).

c. P. sesostris sesostris Cram. (1779).

Seba, *Thesaur.* iv. p. 32. t. 26. fig. 19. 20. ♂ (1764).

♂. *Papilio Eques Trojanus sesostris* Cramer, *l.c.* (Surinam) ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 70. n. 21. t. 10. fig. 1. ♂ (1784) ; Esper, *Ausl. Schmett.* p. 51. o. 20. t. 12. fig. 2 (1788).

♀. *Papilio Eques Trojanus tullus* Cramer, *l.c.* (Surinam) ; Esper, *Ausl. Schmett.* p. 52. n. 21. t. 12. fig. 3 (1788) (artefact ; forewing of *tullus* Cram. and hindwing of *lysander* Cram.).

Papilio Eques Trojanus aeneus ϵ, *Papilio sesostris*, Gmelin, *Syst. Nat.* i. 5. p. 2233. sub n. 16 (1790).

Priamides tullus, Hübner, *Verz. bek. Schmett.* p. 87. n. 901 (1818 ?)

Parides sesostris (!), id., *l.c.* n. 912 (1818 ?).

Papilio tullus, Godart, *Enc. Méth.* ix. p. 37. n. 37 (1819) (Guyane) ; Boisd, *Spec. Gén. Lép.* i. p. 295. n. 126 (1836) (Cayenne ; Surinam) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (Brazil) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 201 (1846) (*partim*) ; Hewits., *Trans. Ent. Soc. Lond.* (2). i. p. 97 (1851) (♀ of *sesostris*) ; Doubl., Westw. & Hew., *l.c.* ii. p. 529 (1852) (♀ of *sesostris*).

Papilio sesostris, Godart, *l.c.* ix. p. 38. n. 40 (1819) (Guyane) ; Lucas, *Lép. Exot.* p. 28. t. 14. fig. 1. ♂ (1835) (Guyane) ; Boisd., *Spec. Gén. Lép.* i. p. 299. n. 131 (1836) (Surinam ; Cayenne) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil) ; Erichs., in Schomb., *F. F. Brit. Guiana* p. 593 (1848) (♀ = *tullus* Cram.) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 213 (1847) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 267 (1852) (*partim* ; Brazil) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 282 (1856) (*partim*) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 84 (1857) (Brazil) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 339, 355 (1861) (Pará to Tabatinga) ; id., *Journ. Entom.* I. p. 225. n. 11 (1862) (throughout the Amazons, in the forest) ; Felder, *Verh. Zool. Bot Ges. Wien* xiv. p. 292. n. 38. (1864) (*partim* ; Surinam ; Cayenne ; Guiana ; Amazonia) ; Bates, *Natural. Riv. Amaz.* p. 25. (1864) (Pará, ♂ in swampy shades, ♀ in more open places) ; Kirby, *Cat. Diurn. Lep.* p. 525. n. 60 (1871) ; Druce, *Proc. Zool. Soc. Lond.* p. 244. n. 1 (1876) (Peru) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvii. p. 295 (1876) (Surinam) ; Hopff., *Stett. Ent. Zeit.* xl. p. 50. n. 9 (1879) (*partim* ; Surinam ; Peru ; Brazil) ; Oberth., *Et. d'Ent.* iv. p. 90. n. 281 (1880) (Guyane ; Pará ; Amazons) ; Staud., *Exot. Tagf.* p. 13. t. 8. ♂ ♀ (1884) (Amazons) ; Sharpe, *Proc. Zool. Soc. Lond.* p. 555. n. 2 (1890) (Prov. of Goyaz) ; Hahnel, *Iris* iii. p. 240 (1890) (Villabella, Amaz.) ; id., *l.c.* p. 253 (1890) (Manés) ; Haase,

Untersuch. Mimicry i. p. 79 (1893) ; Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença) ; Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

Princeps dominans sesostris, Hübner, *Samml. Exot. Schmett.* i. t. 128. ♂. (1806— *!*) (hab.? ; "♀" false).

Papilio catora Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 266. t. 5. fig. 2. ♀ (1852) (*partim* ; *non* ♂).

Papilio lycomes id., *l.c.* p. 52. n. 251 (1852) (nom. nov. pro Esper. t. 12. fig. 3 ;—artefact) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 266 (1856).

Papilio sesostris var. ♂ *zestos*, Oberthür, *Et. d'Ent.* iv. p. 90. sub n. 281 (1880) (*partim* ; Amazons).

Endopogon sesostris, Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 270 (1896) ; id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 88. t. 128. fig. 3, 4. (190—?).

♂. Usually no red spot on upperside of hindwing; spots of underside rather more distal than in the previous, in Bolivian specimens sometimes minute.

♀. Two patches M^1—SM^2 on forewing, remote from cell.——One of our two females from East Bolivia (Santa Cruz de la Sierra) has only two small spots on upperside of hindwing, bearing on underside an additional dot R^1—R^2; the spots of upper- and underside of hindwing are pink in both specimens.

Hab. Orinoco ; the Guianas ; Pará to Peru ; Bolivia ; Goyaz.

In the Tring Museum 76 ♂♂, 20 ♀♀, from : Snapure, Caura R., Orinoco, Oct. 1902 (S. M. Klages) ; British Guiana ; Surinam ; Santarem ; Obidos ; R. Jurua, June 1897 (Dr. Bach) ; Iquitos (Stuart) ; R. Ucayali and R. Cachyaco (Stuart) ; R. Mixiollo, Loreto (Baer) ; Pozuzo, Huánuco (Hoffmanns) ; Chanchamayo (Schunke) ; R. Chuchuras, Huánuco (Hoffmanns) ; La Union, Carabaya, 2000 ft., Nov. 1904 (Ockenden) ; Salinas, Bolivia, July 1895, and Reyes, August 1895 (Stuart) ; Mapiri ; Province Sara, S. Cruz de la Sierra (Steinbach).

24. **Papilio childrenae** Gray (1832).

♂. *Papilio childrenae* Gray, in Griff., *Anim. Kingd.* xv. p. 673. t. 38. fig. 1 (1832) ("Brazil," error loci).

♀. *Papilio childrenae*, Felder, *Wien. Ent. Mon.* v. p. 73. n. 6 (1861) (Bogota).

♂♀. Close to *P. sesostris*.——In male, green area of forewing much larger, entering cell, occupying from one-third to two-thirds of the cell, one or more white spots beyond apex of cell, either on both sides, or only below, or the spots absent; red spot of hindwing always present, oblique, contiguous with cell, expanded at cell from before M^1 to M^2, the red scaling before M^1 being restricted to the very base of the cellule. On *underside* of hindwing there is a row of spots from SC^2 to anal angle, but the upper spots, which are small, are always shaded with black, being in most specimens absent; spot R^3—M^2 larger than the others, spot M^1—M^2 often the only one preserved, besides a more or less linear spot M^2—SM^2, which is often interrupted.——In female, two buffish white patches M^1—SM^2 on forewing, separate from cell, the first sometimes minute, the second always large, often a minute spot behind SM^2 and another before M^1; several spots beyond apex of cell, but no spot in cell; hindwing resembling that of *P. sesostris*.

Scent-organ as in *P. sesostris*.

Genitalia as in *P. sesostris*; harpe more curved, dentition at apex a little more ventral, the solitary ventral tooth larger.

Early stages not known.

Hab. Guatemala to Ecuador.

Two subspecies.

a. P. childrenae childrenae Gray (1832).

Papilio childrenae Gray, *l.c.* (1832) ; Staud., *Exot. Tagf.* p. 13 (1884) (Central America) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 192. n. 3. t. 65. fig. 1. ♂, 2. ♀, 3. genit. (1890) (Guatemala ; Nicaragua ; Costa Rica ; Panama) ; Haase, *Untersuch. Mimicry* i. p. 79 (1893).

Papilio sesostris var., Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. sub n. 267 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 70. sub n. 282 (1852) (Brazil).

♂. Forewing always with a rather large white spot, which is usually preceded by a smaller one.

♀. Band of hindwing on the whole brighter red than in *P. ch. childrenae*.

Hab. Panama to Guatemala.

In the Tring Museum 74 ♂♂, 8 ♀♀, from : Carillo, Costa Rica, June—July 1903 (Underwood) ; Carillo, 3000 ft., Oct. 1904 (A. Hall) ; Chiriqui ; Colon.

b. P. childrenae oedippus Lucas (1857).

♂. *Papilio oedippus* (!) Lucas, in Castelu., *Voy. Amer. Sud, Ent.* p. 197 (1857) ("Inter. of Brazil"); Staud., *Exot. Tagf.* p. 13 (1884) (Colombia) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 192. sub n. 3 (1890) ; Skinn., *Ent. News* xv. t. 1. fig. 3. ♂ (1904).

Papilio oedypus (!) Lucas, *l.c. Lép.* t. 2. fig. 4. ♂ (1857).

Papilio sesostris, local var. *childrenae*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 355 (1861) (New Granada).

Papilio childrenae, Felder, *Wien. Ent. Mon.* v. p. 73. n. 6 (1861) ; id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 41 (1864) (Bogota ; R. Napo ; Interior of Brazil) ; id., *Reise Novara, Lep.* p. 21. n. 11 (1865) (Bogota) ; Kirby, *Cat. Diurn. Lep.* p. 525. n. 60a (1871) (N. Granada ; Ecuador) ; Oberth., *Et. d'Ent.* iv. p. 90. n. 282 (1880) (N. Granada).

Papilio oedipus, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. sub n. 41 (1864).

♂. No white spot on upperside of forewing, or (rarely) only one small dot. Underside of hindwing mostly without red spots SC^2—R^2.

♀. Band of hindwing pale, somewhat buffish proximally on upperside.

Hab. Colombia and Ecuador.

An Ecuador specimen (♂) in coll. Hewitson (British Museum) has a small red spot on upperside of hindwing and two small spots R^3—M^2 on underside ; the green scaling in cell of forewing is much reduced in extent.

In the Tring Museum 40 ♂♂, 7 ♀♀, from : Rio Dagua, W. Colombia (Rosenberg) ; "Bogota."

25. **Papilio erlaces** Gray (1852).

♂. *Papilio erlaces* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 49. n. 240. t. 8. fig. 9. ♂ (1852) (♂ only ♀ another species ; Bolivia).

♀. *Papilio cyphotes* id., *l.c.* p. 49. n. 241 (1852) ("S. America, coll. Hewitson").

Palpus always black in both sexes. Fringe of both wings dotted with white.

♂. Tibiae spinose, not incrassate, resembling those of female. Eighth abdominal segment edged with red ventrally in front of clasper. Forewing : a large olivaceous green patch from inner margin forward, sometimes entering cell, the scales composing it elongate, tongue-shaped ; a creamy white spot M^1—M^2, usually large, very often preceded by a smaller spot R^3—M^1, occasionally followed by a small dot standing behind M^2, these spots wanting in nearly all Ecuadorian specimens and in a small proportion of the individuals from Peru and Bolivia.—— Hindwing : three red spots R^2—M^1, about half-way between cell and distal margin, strongly opalescent, the first spot sometimes minute, occasionally absent, rarely a fourth dot R^1—R^2 marked ; on underside the spots much paler, in the northern forms more or less creamy, the row being usually prolonged forward by one or two spots, there being also two spots present on the abdominal fold.

♀. Ventral edge of seventh abdominal segment and apex of eighth red.—— Forewing with large white patch, consisting of two or three discal spots and a large cell-spot, there being often some small dots distally of apex of cell.—— Hindwing : a band of red spots, distant from cell, rarely touching cell at R^3.

Neuration : cell of hindwing acuminate, D^3 being transverse and shorter than D^4, usually much shorter.

Scent-organ with white wool.

Genitalia : ♂. Tenth tergite about one-third longer than the sternite, lateral edge at base sharp, somewhat projecting, irregularly sinuous, minutely denticulate like the edge of the ninth tergite. Harpe of almost even width from base to apex, somewhat curved dorsad, its dorsal edge being concave, apex rounded dorsally ; a large tooth at ventral margin in or beyond middle ; from this tooth to apex a number of smaller conical teeth.——♀. In front of vaginal orifice a long lobe, of nearly even width, feebly sinuate at apex ; on each side but more proximally another lobe, rounded at apex, the internal edges of these lateral lobes extending on to the proximal surface of the median lobe ; behind the vaginal orifice a large rounded lobe covering the vaginal cavity. Anal segment with numerous short, stout, club-shaped or pointed bristles.

Early stages not known.

Hab. Ecuador to North Argentina.

No representative known from the Amazons, Brazil, the Guianas, Venezuela, and Colombia.

a. P. erlaces lacydes Hew. (1869).

♂. *Papilio lacydes* Hewitson, *Equat. Lep.* i. p. 1. n. 1. (1869) (Ecuador) ; Kirby, *Cat. Diurn. Lep.* p. 527. n. 62c (1871) ; Maas. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 64. n. 89 (1890) (Huamboya).

♀. *Papilio erithalian* ♀ ab. ? *equestris* Oberthür, *Et. d'Ent.* iv. p. 88. sub n. 276. t. 5. fig. 2 (1880) ("Quito").

♂. *Papilio erithalion* var. *lacydes* Oberthür, *l.c.* p. 116. n. 276 (1880) (Ecuador).

♂ ♀. *Papilio lacydes*, Kirby, *Trans. Ent. Soc. Lond.* p. 351 (1881) (descr. of ♂ ; Sarayaçu ; Chiquinda); Grose-Smith & Kirby, *Rhop. Exot.* ii. p. 39. n. 26. *Pap.* t. 16. fig. 1, 2. ♂ (1897) (Sta. Ines ; Sarayaçu ; Chiquinda).

Papilio erithalion var. *equestris*, Maassen & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 64. sub n. 88 (1890) (Huamboya).

♂. Forewing rarely with a white spot. Spots of hindwing below small, creamy white, partly pinkish.

♀. Forewing : white cell-patch large, reaching across cell, there being always a triangular streak in front of cell, most specimens with some small spots distally of apex of cell, the cross-veins alone being black ; white spot R^2—R^3 large, often larger than spot R^3—M^1, which is mostly much reduced posteriorly, extending to M^1 only distally ; no spot behind M^1.——Band of hindwing white.

Hab. Eastern Ecuador.

In the Tring Museum, 55 ♂♂, 26 ♀♀, from : Loja ; Zamora, 3000—4000 ft. (O. T. Baron) ; Santa Inez (R. Haensch).

In coll. Oberthür a series from : Ambato ; Sarayaçu ; Baños to Canelos.

b. P. erlaces xanthias subsp. nov. (Pl. V. fig. 24).

♂. *Papilio erlaces*, Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 3 (1876) (Pozuzo).

♂. Not constantly different from : the following ; forewing nearly always with one or two white spots, there being sometimes a minute third spot behind M^2.

Spots on underside of hindwing either cream-colour as in *lacydes*, or red as in *erlaces*, or intermediate.

♀. Forewing: two white spots R^2—M^1, the second much the largest, its posterior proximal corner cut off; cell-spot more or less triangular, just reaching across cell, rarely a small streak in front of cell.——Hindwing: band yellowish cream-colour, broader than in *lacydes*, spot C—SC^2 small or absent.

Hab. North-East Peru, southward to Huánuco. Type of name: ♀ from Pozuzo.

In the Tring Museum, 21 ♂♂, 5 ♀♀, from: Pozuzo, 800—1000 m. (W. Hoffmanns); Cushi, 1820 m. (W. Hoffmanns).

In coll. Oberthür a series of males from Chachapoyas and Moyobamba.

c. P. erlaces erlaces Gray (1852).

♂. *Papilio erlaces* Gray, *l.c.* (1852) (Bolivia); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 253 (1856) (*partim*); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 341, 356. n. 8 (1861) (Bolivia; Eastern Peru); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 46 (1864) (Bolivia; Peru); Kirby, *Cat. Diurn. Lep.* p. 528. n. 62g (1871) (Bolivia); Hopff., *Stett. Ent. Zeit.* xl. p. 49. n. 5 (1879) (= *luctuosa*; Bolivia; Chanchamayo; descr. of ♀); Weeks, *Illustr. Diurn. Lep.* p. 28 (1905) (Bolivia: Cochabamba).

♀. *Papilio hierocles*, Bates, *l.c.* p. 341 (1861) (*partim*).

♀. *Papilio cyphotes* Gray, *l.c.* p. 49. n. 241 (1852) ("S. America"); Kirby, *l.c.* p. 527. n. 60 d (1871) (*partim*).

♂. *Papilio luctuosa* Butler, *Cist. Ent.* i. p. 12 (1869) (Peru); Kirby, *Cat. Diurn. Lep.* p. 527. n. 62 b (1871).

♂. White spots of forewing very variable in size, rarely absent. On underside of hindwing from five to seven red spots, the central ones the largest and more or less extended pinkish white.

♀. Forewing: most specimens with three white spots behind cell, there being a streak behind M^1 in addition to spots R^2—M^1; spot R^2—R^3 sometimes minute; cell-spot very variable, in most individuals triangular, not reaching across cell, in some specimens as large as in *lacydes*, there being in this case a prominent streak in front of cell; some individuals with minute spot before R^2.——Hindwing: band red, on the whole paler and spots R^2—M^2 longer in the specimens from East Central Peru than in those from South-East Peru and Bolivia; the band consisting usually of seven spots, the last of which are more or less merged together, the upper two being occasionally absent.

Hab. Peru to North Argentina, from the Rio Perené (Chanchamayo) southward to Tucuman.

One of the Chanchamayo females which we have seen has the band of the hindwing orange-red (coll. Charles Oberthür), being a transition to *xanthias*.

In the Tring Museum, 70 ♂♂, 23 ♀♀, from: Chanchamayo (W. Hoffmanns); R. Toro, Chanchamayo, August—September 1901 (Simons); R. Perené, March 1900 (Simons); R. Slucuri, S.E. Peru, June 1901 (Simons); various places in Carabaya, S.E. Peru, apparently all through the year (G. Ockenden); Vilcanota, Cuzco, 3000 m. (Garlepp; from Staud. & Bang-Haas, altitude correct ? ?); Cajon, Cuzco (Garlepp); Huancabamba, N.E. of Cerro de Pasco (Boettger); R. Cachyaco, affluent of R. Huallaga (Stuart); Marcapata; Mapiri; Yungas de la Paz; R. Burmejo to R. Pilcomayo, Bolivia, December 1903, and Province Sara, S. Cruz de la Sierra (J. Steinbach); R. Grande, Province Cordillera, December 1903 (J. Steinbach); Tucuman (G. A. Baer).

26. Papilio burchellanus Westw. (1872). (Pl. IV. fig. 1).

♀. *Papilio burchellanus* Westwood, *Trans. Ent. Soc. Lond.* p. 101. t. 3. fig. 5 (1872) (Tenente, Farinhapodre, Brazil) ; Kirby, *Cat. Diurn. Lep.* p. 812. n. 351 (1877).
♂. *Papilio socama* Schaus, *Proc. U.S. Nat. Mus.* xxiv. p. 424 (1902) ("Bolivia").

♂♀. Palpus black. Mid- and hindtibiae of male slightly incrassate and hairy, foretibia spinose. Forewing without markings, except the more or less distinct white fringe-spots.——Hindwing with a row of widely separate rounded spots nearer margin than cell, almost parallel to margin, the spots rather smaller and paler beneath.

Scent-organ : a streak of buffish white wool in fold, the streak narrower than in *P. vertumnus*.

Genitalia : ♂. Harpe long, straight, reaching to apical margin of clasper, and bearing at the apex about half a dozen teeth ; no tooth in middle of ventral margin.

Hab. Interior of Brazil. The occurrence in Bolivia requires confirmation ; Mr. Schaus did not receive the specimen described by him direct from Bolivia, but from a correspondent who has been a resident of Rio de Janeiro. The species is very interesting, being an exact counterpart of *P. panthonus numa*, which also occurs in Brazil.

In coll. Charles Oberthür one male from Goyaz.

27. Papilio drucei Butl. (1874).

♀. *Papilio cutora*, Bates (*non* Gray, 1852, err. det.), *Trans. Ent. Soc. Lond.* (2). v. p. 341, 355 (1861) (♀ only ; Ega).
♂. *Papilio drucei* Butler, *Trans. Ent. Soc. Lond.* p. 434. t. 6. fig. 2. ♂ (1874) (Ecuador) ; Kirby, *Cat. Diurn. Lep.* p. 812. n. 357 (1877) ; Oberth., *Et. d'Ent.* iv. p. 116. n. 276bis (1880) (Pebas. ♀ = *opalinus*) ; Kirby, *Trans. Ent. Soc. Lond.* p. 353 (1881) (Canelos, ♂) ; Michael, *Iris* vii. p. 214 (1894) (Sao Paulo de Olivença).
♀. *Papilio opalinus* Butler, *Trans. Ent. Soc. Lond.* p. 145. n. 225. t. 3. fig. 5 (1877) (Rio Purus).

♂. Palpus black, rarely red. Eighth abdominal segment edged with red beneath. Tibiae and first tarsal segment hairy above, very slightly incrassate. Forewing : a sage-green patch from inner margin to M^1 or R^3, separated from cell, often reduced to a narrow band ; fringe dotted with white ; sometimes two small creamy white spots M^1—(SM^1), on underside occasionally four spots.—— Hindwing : three opalescent red spots R^2—M^2 close to cell, often preceded by a dot or streak R^1—R^2 and followed by a narrow streak M^2—(SM^1).

♀. Palpus black or red. Apex of eighth abdominal segment and of seventh sternite red. Forewing without white patch ; fringe dotted with white. Band of hindwing red, sometimes rather strongly opalescent, the red scales being in this case nearly all entire, while the red non-opalescent scales are obtusely bidentate ; the number of spots varying from five to seven, their size being also variable, the band not touching cell, but standing sometimes close to it ; last two spots usually merged together.

Neuration, scent-organ and genitalia essentially as in *P. lacydes* ; in female the postvaginal plate more triangular, the incrassate edge being mesially dilated into a rather prominent tubercle which is a little curved backwards.

Early stages not known.

Hab. Ecuador to Bolivia, Upper Amazons.

In the Tring Museum 12 ♂♂, 15 ♀♀, from : Archidona (R. Haensch) ; Coca, Upper Rio Napo, May—July 1899 (W. Goodfellow) ; Zamora (O. T. Baron) ; Juhuty, Amazons, April 1905 (Mathan) ; R. Jurua ; Iquitos ; R. Cachyaco, affluent

of R. Huallaga (Stuart); Pozuzo, Huánuco (W. Hoffmanns); R. Chuchuras (W. Hoffmanns); Pachitea; Cuzco; Mapiri, Bolivia.

In coll. Oberthür a series of both sexes from: Tarapoto; Cavallo Cocho; Sarayaçu; Pebas.

28. **Papilio cutorina** Staud. (1898).

♂. *Papilio vertumnus* local var. *cutora*, Bates (*non* Gray, 1852, err. det.), *Trans. Ent. Soc. Lond.* (2). v. p. 341, 355 (1861) (*partim*; ♂ only).

♂. *Papilio cutora*, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 43 (1864) (*partim*); Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 2 (1876) (Ucayali and Huallaga); Kirby, *Trans. Ent. Soc.* p. 353 (1881) (Ecuador, common!—this insect??); Hahnel, *Iris* iii. p. 275 (1890) (Sao Paulo de Olivença); Michael, *Iris* vii. p. 214 (1894) (Sao Paulo de Olivença).

Papilio vertumnus var. g. *P. cutora*, Kirby, *Cat. Diurn. Lep.* p. 525. sub n. 61 (1871) (Upper Amazons).

♂ ♀. *Papilio cutorina* Staudinger, *Iris* xi. p. 139 (1898) (Sao Paulo de Olivença; Pebas; Iquitos); id., *l.c.* p. 376 (1899) (*mazeppa* is ♀ of *cutorina*); Grose-Smith, *Rhop. Exot.* iii. p. 51. n. 37. *Pap.* t. 22. fig. 1. 2. ♂ (1902).

♀. *Papilio mazeppa* Grose-Smith, *l.c.* p. 42. n. 29. *Pap.* t. 17. fig. 3 (1899) (Iquitos).

Palpus red. Fringe of forewing spotted. Cell of hindwing narrow at apex, D^3 being transverse and short.

♂. Tibiae spinose, not incrassate. Eighth abdominal segment edged with red ventrally. Glaucous green patch of forewing from inner margin to M^2 or a little beyond, proportionally longer than in *P. vertumnus* in basi-distal direction. Only two red spots on upperside of hindwing situated between M^1 and (SM^1). Spots on underside of hindwing cream-colour, somewhat glaucous buff at edges, resembling the spots of *P. aeneas bolivar*.

♀. Forewing without white patches. Hindwing with creamy band consisting usually of five contiguous spots.

Nenration, scent-organ and genitalia essentially as in *P. vertumnus*.

Early stages not known.

Hab. Upper Amazons, East Peru, and East Ecuador.

In the Tring Museum: 3 ♂♂, 3 ♀♀, from: Coca, R. Napo, Ecuador (R. Haensch); Rio Chuchuras, Hnánuco (W. Hoffmanns); R. Cachyaco, affluent of R. Huallaga (Stuart); Sao Paulo de Olivença; Itaituba; Pebas.

In coll. Oberthür: 2 ♂♂, 7 ♀♀ from Iquitos and Sao Paulo de Olivença.

29. **Papilio phosphorus** Bates (1861) (Pl. IV. fig. 9. 10. 11).

♂. *Papilio phosphorus* Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 342 note (1866) (R. Demerara).

♀. *Papilio gratianus* Hewitson, *Exot. Butt.* ii. *Pap.* t. 5. fig. 13 (1861) (New Granada; "♂" false).

Having received a female agreeing almost in every detail with Hewitson's type (which is a female with a male abdomen stuck on), we have no longer any doubt that *phosphorus* and *gratianus* are the sexes of the same species.

♂. Tibiae spinose, not incrassate. Palpus red. *Upperside:* forewing semi-transparent in apical area; a glaucous or buffish green patch from hinder margin forward to M^1 or beyond; one or two white spots behind M^2, often a third before M^2, minute or large, usually elongate, often absent.——Hindwing rather strongly dentate; a row of three, four, or five spots, gradually decreasing in size from M^2 forward, the last two more or less contiguous, the others separate, distance of spot R^3—M^1 from cell at least equal to half the length of the spot.

Underside: forewing always (?) with at least one minute white dash behind or before M^2, usually with two spots, often three, two of which stand between M^2 and

SM^2.——Hindwing with six or seven spots, the row in middle about halfway between cell and distal margin, spot behind M^2 beyond middle of this vein.

♀. This is the only instance in which the female bears on the forewing a patch somewhat similar to that of the male.——*Upperside:* forewing with slaty grey patch from inner margin to M^2 or beyond, the patch narrower than in male, consisting of buffish white, narrow, entire scales lying on black ones; three or four white spots within the patch, two standing between M^2 and SM^2.——Hindwing: a pale red band from abdominal margin forward, gradually decreasing in width from M^2, curved, situated about halfway between cell and distal margin, the posterior spots contiguous, the anterior ones separate.

Underside: white spots of forewing as above, but no slaty scaling.——Hindwing: band narrower than above, the spots all or nearly all separate.

Genitalia: ♂. Harpe shorter than in the allied forms, the apical half more acuminate-triangular, ventral tooth large.

Hab. British Guiana; Colombia; Eastern Peru; Lower Amazons.

May be expected to occur also on the Middle and Upper Amazons.

a. P. phosphorus phosphorus Bates (1861) (Pl. IV. fig. 9. ♂. type, 10. ♀).

♂. *Papilio phosphorus* Bates, *l.c.* (Rio Demerara); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 47 (1864); Kirby, *Cat. Diurn. Lep.* p. 528. n. 62e (1871).

♂. *Upperside:* forewing, a patch from inner margin to M^1, being in that direction much longer than it is broad, distant from cell, with two or three minute white linear spots, or one, or no spot.——Hindwing with an evenly curved row of four or five spots.

Underside: on forewing at least one minute white spot.

♀. *Upperside:* forewing with a row of four white spots; spot M^1—M^2 much larger than in Hewitson's figure.——Band of hindwing consisting of six spots, the first minute, the last four much smaller than in Hewitson's specimen.

Hab. British Guiana; Lower Amazons.

In the Tring Museum: 6 ♂♂, 1 ♀, from: British Guiana (R. Haensch); British Guiana; Igarapé, Pará (W. Hoffmanns).

b. P. phosphorus gratianus Hew. (1861) (Pl. IV. fig. 11).

♀. *Papilio gratianus* Hewitson, *l.c.* (New Granada); Felder, *l.c.* p. 295. n. 82 (1864); Kirby, *l.c.* p. 528. n. 65 (1871).

♂. *Upperside:* forewing, green patch much broader than in the preceding, touching cell or nearly; with or without white spots.——Hindwing: three red spots R^2—M^2 and sometimes a minute dot R^1—R^2, the row less curved than in the previous subspecies, the last spot not reaching further proximad than the last but one.

Underside: at least one white dot on forewing.——On hindwing five or six red spots, the spots R^3—M^2 smaller than in *P. ph. phosphorus*.

♀. Forewing with two white spots; last three spots of hindwing very large.

Hab. Colombia (♀); Peru (♂♂).

We have not seen Peruvian females, nor Colombian males, and therefore do not know if there are two races in these countries or one.

In the Tring Museum 3 ♂♂ from Pachitea and Hillapani, Peru (received from Messrs. Staudinger and Bang-Haas).

In coll. Oberthür from Tarapoto, Peru.

30. **Papilio vertumnus** Cram. (1779).

♂. *Papilio Eques Trojanus vertumnus* Cramer, *Pap. Exot.* iii. p. 32. t. 211. fig. A. B (1779) (Surinam ; fig. C = *P. anchises* ♂).

♀. *Papilio cixius* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 48. n. 237. t. 8. fig. 6 (1852) (Ega).

As the tibiae are in a number of species of the present group simply spinose and non-incrassate, resembling the tibiae of the females, while in other species the tibiae are incrassate and densely hairy, bearing only a limited number of spines, it is of great interest to observe that in *P. vertumnus* this specific difference breaks down.

Though the tibiae of *vertumnus* are never much incrassate, they are densely hairy in one geographical form, and almost normally spinose in the other forms.

♂. Palpus red, eighth abdominal sternite edged with red. Forewing with large glaucous green patch from inner margin forward beyond M^2, sometimes extending a little across M^1, the streak at inner margin sometimes reduced, seldom absent, the patch variable in width, touching cell at least at base of M^2, rarely so much reduced as to be 1 or 2 mm. distant from cell.——Red patch of hindwing close to cell, triangular, consisting of three or four spots, the last (rarely the last but one) being the longest, this last spot standing behind M^2; the spots small on underside, spot R^3—M^1 being placed about midway between cell and distal margin.

♀. Palpus and apex of eighth abdominal segment and of seventh sternite red. Forewing with white or creamy patch. Red band of hindwing broad, consisting of five to six spots, there being rarely a small seventh spot in front of R^1, the last four spots more or less completely merged together, the scaling on veins M^1 and M^2 being red, at least proximally, within the red band ; the band paler beneath, the veins traversing it black, the last two spots alone confluent, rarely separated like the other spots.

Neuration : D^3 of hindwing transverse, short, being shorter than D^4.

Scent-organ : fold with broad streak of white wool ; scales at discal side of wool grey, elongate, entire.

Genitalia : ♂. Tenth tergite one-fourth longer than the sternite, its lateral edge dilated basally into a small ridge. Harpe as in *P. lacydes*, apex a little more regularly rounded.——♀. As in *P. erlaces*, but antevaginal lateral ridge membranaceous, wrinkled, not raised to a distant lobe ; edge of postvaginal plate tuberculiform in middle.

Early stages not known.

Hab. Eastern slopes of the Andes from Colombia to Bolivia, extending eastwards to Pará and the Guianas ; not yet found in Venezuela.

a. P. vertumnus yuracares subsp. nov.

♂. Green patch of forewing touching cell between M^1 and M^2, its proximal edge between M^2 and inner margin slightly oblique, somewhat concave, the patch narrower in basi-distal direction than across veins ; a white spot M^1—M^2, rounded, in one specimen reaching from M^1 to M^2, a minute dot behind it in two of our three individuals ; these white spots repeated on undersurface.——Hindwing with four red spots, the upper two separate, the second rounded off proximally and distally ; five small pale red spots on underside.

♀ not known.

Hab. Eastern Bolivia.

In the Tring Museum 3 ♂♂, from: Encorado, January 1904, and Province Sara, S. Cruz de la Sierra, March—April 1904 (J. Steinbach); Mapiri.

b. P. vertumnus autumnus Stand. (1898) (Pl. IV. fig. 3).

♂. *Papilio vertumnus* Cr. var. *autumnus* Standinger, *Iris* xi. p. 142 (1898) (Chanchamayo).

♂. Green patch of forewing larger than in the preceding, usually touching cell also behind M^2, often extended along cell as far as halfway between M^2 and base; most specimens with one or two white elongate spots.——Hindwing: red patch consisting of three spots, large, the third spot reaching close to base of M^2, sometimes extending a short distance along cell; four small red spots on underside, sometimes a minute fifth before R^3, spot M^1—M^2 often obsolete.

♀. Very different from the well-known females from the Amazons and Guiana. Forewing: patch cream-colour, very large, consisting of four spots; a very large cell-spot, occupying about half the cell, proximally edged with glaucous buff, a small spot before R^3, a large spot R^3—M^1, truncate, and another large spot M^1—M^2, as long as the one before it, but not so broad, not quite extended to M^2.——Hindwing: red band broad, consisting of six spots, one specimen bearing a minute seventh spot before R^1; on underside some of the spots shaded with black proximally.

Hab. Central East Peru: Chanchamayo district, probably also farther south.

In the Tring Museum: 26 ♂♂, 4 ♀♀, from: Chanchamayo (W. Hoffmanns; Schunke); R. Toro, August—September 1901, and R. Peréné, March 1900 (Simons).

c. P. vertumnus bogotanus Feld. (1864).

♂. *Papilio vertumnus* var. *bogotanus* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. sub n. 42 (1864) (Bogota); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 31. n. 127 (1890) (Colombia).

♂. Connecting the preceding subspecies with the following. Green patch of forewing contiguous with cell between M^1 and M^2; no white spot.——Red patch of hindwing large, consisting sometimes of four spots; the spots small on underside as in the preceding form.

Hab. Rio Palcazu and Pachitea in Peru, northward to Bogota, eastern slopes of the Andes.

In the Tring Museum 9 ♂♂ from: Poznzo, Huánuco, and Rio Chuchuras, affluent of R. Palcazu (W. Hoffmanns); R. Mixiollo, Loreto (Baer); Pachitea; Rio Cachyaco, affluent of R. Huallaga (Stuart); Archidona (R. Haensch); Bogota.

d. P. vertumnus diecros Gray (1852).

♀. *Papilio diecros* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 48. n. 236. t. 11. fig. 4 (1852) (Pará); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 249 (1856) (Pará); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Pará; forest).

♀. *Papilio cicius* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 48. n. 237. t. 8. fig. 6 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 250 (1856) (Ega; vars. from R. Tapajos and Villa Nova); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Upper Amazons; forest).

♂. *Papilio vertumnus*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 266 (1852); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Pará; forest); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 281 (1856) (*partim*; Pará); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 78 (1857) ("Brazil").

♂. *Papilio vertumnus* var. c. *Papilio cubora* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. sub n. 266. t. 10*. fig. 6. ♂ (1852) (♂ only; ♀ alia spec.); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. sub n. 281 (1856) (Ega; Villa Nova; "Brazil"); Bates, *Trans. Ent. Soc. Lond.* (2). v.

p. 340, 355 (1861) (syn. *partim*) ; id., *Journ. Entom.* i. p. 225. n. 12 (1862) (*partim*) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 42 (1864) (*partim* ; Amazons) ; Bates, *Natural. Riv. Amaz.* p. 26 (1864) (Pará, ♂ in swampy shades, ♀ in more open places) ; Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 235. n. 6 (1869) (Pará) ; Oberth., *Et. d'Ent.* iv. p. 83. n. 274 (1880) (Pará ; Obydos) ; Staud., *Exot. Tagf.* p. 13 (1881) (*partim* ; Amazons) ; Hahnel, *Iris* iii. p. 212 (1890) (Pará) ; id., *l.c.* p. 240 (1890) (Villa Bella, Amaz.) ; Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença).

Papilio vertumnus var., Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. sub n. 266 (1852) (Pará) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. sub n. 281 (1856) (Pará).

Papilio cutora, Wallace, *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons ; forest) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 43 (1864) (*partim*).

♂. Green patch touching cell between M^1 and M^2, often a little separated from cell, in many specimens not reaching M^1 ; white spots transverse, oblique, usually absent.——Red patch of hindwing smaller than in the preceding forms, especially the last spot ; spots of underside usually larger than in the previous forms.

♀. Forewing with chalky-white patch, consisting of two, three or four spots, most specimens having a small spot in cell, a large spot R^3—M^1, a small one before R^3 and a streak behind M^1. A specimen from S. Paulo de Olivença, in coll. Oberthür, has only a small double spot, divided by vein M^1, extending forward and backward only to the middle of the cellules. Gray figures as *cixius* a female with a single, square spot R^3—M^1. The only specimen which we have seen of this form, besides the type, came from Surinam. Gray's specimen was said to be from Ega. It was bought from Stevens, the locality being perhaps erroneous.

Hab. Amazons : from Para to Iquitos.

In the Tring Museum 14 ♂♂, 16 ♀♀, from : Sao Paulo de Olivença ; Juhuty, April 1905, and Obidos, October—November 1904 (Mathan) ; Itaituba ; Manicoré.

e. P. vertumnus vertumnus Cram. (1779).

Papilio Eques Trojanus vertumnus Cramer, *l.c.* ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 61. n. 20. t. 11. fig. B (1784) ; Esper, *Ausl. Schmett.* p 58. n. 25. t. 15. fig. 1 (1788) ; Fabr., *Ent. Syst.* iii. 1. p. 16. n. 49 (1793) (Surinam).

Papilio Eques Romanus vertumnus, Jablonsky & Herbst, *Naturs. Schmett.* ii. p. 64 (1784).

Papilio Eques Trojanus aeneas, Fabricius, *Spec. Ins.* ii. p. 8. n. 32 (1781) (*partim*) ; Gmelin, *Syst. Nat.* i. 5. p. 2233. n. 16 (1790) (*partim*).

Parides vertumnus, Hübner, *Verz. bek. Schmett.* p. 87. n. 911 (1818 ?).

Papilio vertumnus, Godart, *Enc. Méth.* ix. p. 37. n. 38 (1819) (*partim*) ; Boisd., *Spec. Gén. Lép.* i. p. 298. n. 129 (1836) (Cayenne ; Surinam) ; Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 47 (1838) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 200 (1846) (Guiana) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 292. n. 42 (1864) (*partim* ; Surinam ; Cayenne) ; Kirby, *Cat. Diurn. Lep.* p. 525. n. 61 (1871) (*partim*) ; Staud., *Exot. Tagf.* p. 13 (1884) (*partim* ; Surinam) ; Haase, *Untersuch. Mimicry* i. p. 79 (1893).

Papilio vertumnus var., Gray, *Cat. Lep. Ins. Brit. Mus* i. *Pap.* p. 57. sub n. 266 (1852) (Surinam) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. sub n. 281 (1856) (Surinam).

Papilio vertumnus var. *diecros*, Möschler, *Verh. Zool. Bot. Ges. Wien* xxxii. p. 303 (1883) (Surinam).

♂. As in the Amazonian form, but the mid- and hindtibiae short-hairy ; this character not quite constant.

♀. Forewing with the white patch as in the Amazonian form, or the patch reduced to a single spot R^3—M^1, which is sometimes vestigial only.

Hab. The Guianas.

In the Tring Museum 6 ♂♂, 4 ♀♀, from : Camaria, British Guiana, January 1904 (R. Haensch) ; Essequibo R. ; Surinam.

A series of both sexes in coll. Oberthür from Maroni, French Guiana.

31. **Papilio lycimenes** Boisd. (1870) (Pl. VI. fig. 31. 33. 34).

♂. *Papilio lycimenes* Boisduval, *Consid. Lép. Guatemala* p. 7 (1870) (Costa Rica ; synon. excl.).

A near relative of *P. vertumnus*. The ranges of the two species overlap in Colombia. The forewing is shorter and proportionately broader, the green patch of the forewing and the red patch of the hindwing of the male are differently shaped, and the red spots of the underside of the hindwing, instead of being small, as in the Colombian form of *vertumnus*, are large, having also a different position. In the female the wings are less deep black than in *vertumnus*, opaque, the spots of the forewing are yellowish white, the cell-spot is transverse, reaching across the cell, and the band of the hindwing is much paler both above and below. There is hardly anything in structure by which *P. lycimenes* could be distinguished from all forms of *P. vertumnus*.

Besides a subspecies of *P. lycimenes* there are in Colombia three more Papilios with almost the same pattern. They occur in the same localities, and are apparently quite distinct from one another, being independent forms—*i.e.* true species. Leaving *P. vertumnus* apart, this insect being easily recognised, there are four species generally mixed up in collections. At first sight one is inclined to take these insects for mere individual varieties of one species, the species resembling each other so much, and each species being in itself so variable, that only by a careful study of long series of specimens are we now enabled to draw the lines of separation. If one has once understood that there are four species in Colombia occurring apparently everywhere together in suitable places (perhaps with the exception of *P. anchises scrapis*, which has not been found in West Colombia), and if one has moreover grasped the distinctions between the species in Colombia, it will be comparatively easy to separate into species also the material from Central America, where the same problem obtains. Therefore we confine our remarks in this place to the Colombian forms of the four insects in question. Three of these insects are common in "Bogota" collections.

The males of the Colombian subspecies of these species are separable by comparing the size of the red patch or band of the hindwing and the structure of the tibiae.

a. Tibiae simply spinose as in female.

a'. Red patch of hindwing large, there being always a streak behind M^2 . . . . A subspecies of *P. lycimenes*.

b'. Hindwing with three small spots, no streak behind M^2, or only a minute dot . . . A subspecies of *P. erithalion*.

b. Tibiae and first tarsal segments dilated, densely hairy.

c'. Hindwing below with a band of six or seven spots, the band close to apex of cell . . Two subspecies of *P. anchises*.

d'. Hindwing usually with four or five spots on underside, spot M^2 (SM^1) much nearer to the distal margin than to the cell . . . A subspecies of *P. iphidamas*.

The females are best distinguished by the different relative size of the spots of the forewing and the colour or width of the band of the hindwing.

c. Spot R^3—M^1 smaller than the spot in front of it ; cell-patch large . . . . . A subspecies of *P. erithalion*.

d. Spot R^3—M^1 larger than the spot in front of it.

e'. Forewing semitransparent distally; cell-spot large; band of hindwing entering cell, pinkish cream proximally . . *P. anchises serapis* and a subsp. of *P. iphidamas*

f'. Forewing opaque, cell-spot large; band of hindwing less pale proximally . . . . A subspecies of *P. lycimenes.*

g'. Forewing opaque, cell-spot narrower; band of hindwing broad, entering cell, beneath more rosy, and black distal marginal area wider than in the other females . . . . . *P. anchises alyattes.*

For some other distinctions see the note under the respective heading of each species. The geographical variability of the various species is not the same.

Scent-organ and genitalia of *P. lycimenes* essentially as in *P. vertumnus.*

Early stages not known.

Hab. Guatemala to Ecuador.

a. P. lycimenes lycimenes Boisd. (1836).*

♂. *Papilio lycimenes* Boisduval, *l.c.* (Costa Rica).

♂♀. *Papilio iphidamas*, Godman & Salvin (*non* Fabricius, 1793, err. det.), *Biol. Centr. Amer., Rhop.* ii. p. 192. n. 4. t. 65. fig. 5, 5a. ♂-fold, genit. (1890) (*partim*).

♂. *Papilio alyattes*, iid. (*non* Felder, 1861, err. det.), *l.c.* p. 194. n. 5 (1890) (Panama).

♂. *Upperside.*—Forewing: olive-green patch limited behind by SM^2, always reaching this vein, often a small streak behind this vein, many specimens with green scaling in cell; a creamy spot R^3—M^1 present in almost every specimen, being absent only in a few of the individuals from the southern limit of the range (Chiriqui); a second creamy spot occasionally behind M^1, and often also a creamy spot in cell.——Hindwing: a band of four, five or six spots, narrowing costad, the last spot standing behind M^2, narrower than the last but one, but nearly as long.

Underside.—Forewing: white spots as above, many specimens with a dot in cell and some ill-defined creamy scaling in front of cell.——Hindwing with a band of five to seven spots, the upper two small, sometimes vestigial, the first occasionally absent.

♀. Forewing: creamy white spot R^3—M^1 much larger than spot R^2—R^3.——Hindwing: band broad, uniformly red or proximally a very little paler than distally, its proximal edge slightly convex or straight in most specimens.

Hab. Guatemala to Panama; islands off the west coast of Panama.

Occurs together with *P. iphidamas*, which it resembles. The male differs from *iphidamas* in the green patch of the forewing reaching down to SM^2 or beyond, in the spot behind M^2 of the hindwing being much larger, and in the tibiae being spinose. The female is distinguishable from the female of *iphidamas* by the second discal spot of forewing being larger than the first and by the band of the hindwing being less evenly curved.

In the Tring Museum: 42 ♂♂, 22 ♀♀, from: Polochic Valley, Guatemala (Salvin); San José, Costa Rica, 4000 ft., September 1904 (A. Hall); Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall); Juan Vinas, Costa Rica, 2500 ft., October 1904 (A. Hall); Carillo, June—July 1903 (Underwood); Carthago and Careblanco

* In the bibliography of this and the allied forms we have quoted only such references as are accompanied by a description or figure, and a few others which we could verify by the examination of the specimens referred to.

de Sarapiqui, Costa Rica (Underwood); Volcan de Miravalles, Costa Rica (Underwood); Cebaco I., Brava I., and Sevilla I., January 1902 (I. H. Batty); Bogava, Chiriqui, 800 ft. (Watson); Colon.

b. P. lycimenes erythrus subsp. nov. (Pl. VI. fig. 33, 34).

♀. *Papilio zeuxis*, Gray (*non* Lucas, 1852, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 231. t. 9. fig. 7 (1852) (♂ alia species).

♀. *Papilio erythalion* (!), Wood (*non* Boisduval, 1836, err. det.), *Ins. Abroad* p. 552. fig. 302 (1883) (Bogota;—this species?)

This common Bogota insect has always been confounded with the Colombian forms of *P. iphidamas* and *P. anchises*. The main differences from these insects have been mentioned above (p. 472).

♂. *Upperside.*—Forewing: olive-green patch mostly broader than in the preceding form, and always reaching close to inner margin, but never entering cell; a small white spot present in some specimens, standing behind M^1, there being occasionally also a tiny dot in front of M^1, this latter spot more often marked on the underside.——Hindwing: four spots, contiguous, the first more or less rounded.

Underside: five, rarely six, spots on hindwing, paler than in the preceding; spot R^2—R^3 farther away from cell.

♀. *Upperside.*—Forewing: discal spot R^3—M^1 much larger than spot R^2—R^3, and also larger than in the previous subspecies.——Hindwing: band paler red than in Central American females, touching cell or entering it; spot SC^2—R^1 small or absent.

Underside: white upper scales of band of hindwing in most specimens tridentate.

Hab. Colombia: Magdalena and Canca valleys; Sta. Marta; Northern Venezuela.

Type: ♂ from Cundinamarca.

Most Venezuelan specimens have two white spots on forewing, separated by vein M^1.

In one of our males, probably from Bogota, the patch on the upperside of the hindwing is orange.

In the Tring Museum 90 ♂♂, 8 ♀♀, from: Pereira, Cauca valley; Muzo, December 1896; Purnio, Magdalena valley, October—November 1896 (Dr. Bürger); Cananche, Cundinamarca, July 1903 (Mathan); Pacho; Tachira and Mérida, Venezuela (Briceño).

c. P. lycimenes paralius subsp. nov. (Pl. VI. fig. 31).

A very distinct, small form.

♂. *Upperside.*—Forewing: green patch as in *erythrus*; a round creamy spot M^1—M^2.——Hindwing: red patch smaller than in the preceding, consisting of four spots; first spot minute, sometimes absent.

Underside: white spot of forewing large, touching both M^1 and M^2; four red spots on hindwing, first sometimes absent; no spot on abdominal fold.

♀. *Upperside:* forewing less opaque than in the previous forms; spots purer white; cell-spot reduced, triangular, being the smallest of the three spots present, rarely reaching halfway across cell; no spot between R^2 and R^3; spot R^3—M^1 triangular, being obliquely truncate distally, separated from the cell-spot by the

black vein ; spot M^1—M^2 the largest, either oblong or proximally narrowed, being reduced behind.——Hindwing : band rather more rosy than in *erythrus*, much narrower than the brown-black distal area, not entering cell, almost straight, extending from abdominal edge to R^2 or a little beyond.

Underside : white patches sometimes larger than above, and band of hindwing paler, usually consisting of four spots R^2—(SM^1), the abdominal spot (SM^1)—SM^2 being rarely present ; some specimens with a minute dot before R^2.

Hab. West Ecuador : Guayaquil ; Chimbo ; La Chima.

In the Tring Museum 11 ♂♂, 5 ♀♀, from : Chimbo, 1000 ft., August 1897 (Rosenberg); Naranjas, Guayaquil (O. T. Baron).

32. **Papilio erithalion** Boisd. (1836).

♀. *Papilio erithalion* Boisduval, *Spec. Gén. Lép.* i. p. 295. n. 125 (1836) (Colombia ; "Jamaica" false).

♂. *Papilio pyrocles* Doubleday, *Ann. Mag. N. H.* xiv. p. 416 (1884) (Colombia).

♂. Tibiae spinose. No distinct red streak behind M^2 of hindwing, usually no red scales whatever behind this vein.

♀. Spot R^3—M^1 of forewing smaller than spot R^2—R^3, often minute or absent, or larger, but then band of hindwing wider than in the respective form of *lycimenes* and proximally paler ; fringe-spots generally large.

Genitalia : ♂. Harpe less dentate than in *P. lycimenes*, more curved.

Early stages not known.

Hab. Costa Rica to Colombia and Northern Venezuela.

a. P. erithalion zeuxis Lucas (1852).

♂. *Papilio rhameses* Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 147 (1845) (Venezuela ; *nomen nudum* ; haec species ?).

♂. *Papilio rhesus* Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 353. sub n. 7 (1850) (Klug in litt. ; indescr. ; haec species ?).

♂. *Papilio zeuxis* Lucas, *Rev. Zool.* (2). iv. p. 190 (1852) (Venezuela ;—coll. Oberthür) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 231. t. 9. fig. 6. (1852) (♂ only, ♀ alia species) ; Lucas, in Casteln., *Voy. Amér. Sud, Ent.* p. 198, *Lép.* t. 2. fig. 3 (1857) (upper white dot exaggerated).

♀. *Papilio erithalion*, Gray (*non* Boisduval, 1836, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 46 n. 230. t. 10*. fig. 4 (1852) (Venezuela ; ♂ alia species).

♂. *Papilio rhamases* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 58 (1864) (type : Gray, *l.c.* t. 9. fig. 6 ; no description).

♂. *Papilio rhesus* Felder, *l.c.* (sub synon.).

♂. *Papilio abilius* Felder, *l.c.* (sub synon.).

♂. *Papilio rhamses* (!), Boisduval, *Consid. Lép. Guatem.* p. 7 (1870).

♂. *Upperside.*—Forewing : green patch strongly narrowing discally, rarely extending forward a little beyond M^1 ; a rather large rounded creamy white spot M^1—M^2, often followed by a second spot and not rarely preceded by a third, the white spots being seldom missing.——Hindwing : three, seldom two, small red spots, sometimes a vestige of a fourth spot behind M^2.

Underside : forewing always with two or three white spots, one of them usually grey or vestigial.——Hindwing usually with five spots, the central discal ones often touching cell ; the spot on abdominal fold sometimes absent, a few specimens bearing a sixth spot before R^2.

♀. We are not sure that the female figured by Gray really belongs to this species. We have several specimens agreeing fairly well with the figure. The second discal spot of the forewing larger than the first, as is the case also in

the female of *P. lycimenes erythrus*; the band of the hindwing entering cell, being proximally much paler than distally.

Hab. Northern Venezuela, and Colombia east of the Cordillera of Bogota.

In the Tring Museum 23 ♂♂, 5 ♀♀, from: Cuca, Valencia, Caracas, Puerto Cabello, Mérida, and Cumana, in Venezuela; Peperital to Buenavista, Eastern Colombia, January 1897, 400—1300 m., dry (Dr. Bürger).

b. P. erithalion erithalion Boisd. (1836).

♀. *Papilio erithalion* Boisduval, *l.c.*; Felder, *Reise Novara, Lep.* p. 25. n. 15. t. 6. fig. d (1865).
♂. *Papilio pyrochles* Doubleday, *Ann. Mag. N. H.* xiv. p. 416 (1846) (Colombia); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 229. t. 9. fig. 2 (1852) (*partim*; ♂ only).
♂. *Papilio phaenon* Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 353. n. 7. t. 42. fig. 5. 6 (1850) (Cundinamarca).
♀. *Papilio alyattes* Felder, *Wien. Ent. Mon.* v. p. 73. n. 7 (1861) (♀ only).

♂. *Upperside.*—Forewing: olive-green patch extending from inner margin to M^1, seldom beyond, very often reduced and ill-defined; white spot rarely present, standing between R^1 and M^1 (not M^1—M^2 as in the Veneznela form), usually narrow, obliqne, and separate from the green patch.——Hindwing: three red spots R^2—M^2, occasionally a vestige of a spot behind M^2, sometimes a dot SC^2—R^1, rarely another dot R^1—R^2, and still more rarely a sixth dot before SC^2 (a specimen in the Vienna Museum).

Underside: Forewing often with a greenish grey spot R^3—M^1 in specimens which have no white dot on npperside, preceded sometimes by a second dot; the spot R^3—M^1 white in specimens with white dot on upperside; sometimes a cloud of whitish scales in front of cell, rarely condensed to a white elongate-triangular spot.——Hindwing usually with five spots, which are on the whole farther away from cell than in the previous subspecies, often seven spots, very rarely eight.

♀. *Upperside.*—Forewing: spot R^3—M^1 smaller than R^2—R^3, many specimens with small spots distally of apex of cell; cell-spot large, close to cross-veins.——Band of hindwing very variable, spot R^3—M^1 longer than its distance from distal edge of wing.

Hab. Colombia: Magdalena valley; Cordillera of Bogota.

In the Tring Museum: 90 ♂♂, 40 ♀♀, from: Valdivia, Jnly 1897 (Pratt); La Palma, August, Guadalite, September, Cananche, July and August, Pizarra, August 1903, Cundinamarca (Mathan); Muzo, Jannary 1898 and December 1896; Purnio, October—November 1896 (Dr. Bürger); La Vega, east of Bogota, 1900 m., Jannary 1897, dry (Dr. Bürger); Pacho; Villavicencio.

c. P. erithalion cauca Oberth. (1880).

♂ ♀. *Papilio erithalion cauca* Oberthür, *Et. d'Ent.* iv. p. 84. sub n. 276 (1880) (Cauca).
♂ ♀. *Papilio cauca*, Staudinger, *Exot. Tagf.* p. 13. t. 9. ♂ (1884) (Cauca).

While in *P. lycimenes* and *P. iphidamas* the males from the Canca valley have the green patch of the forewing as large as it is in the specimens from the Magdalena valley, the Cauca males of *P. erithalion* have the green patch absent or vestigial. This fact proves conclusively that *P. erithalion* is specifically distinct from the other two insects.

♂. *Upperside.*—Forewing: green patch absent or vestigial; no white spot.——Hindwing with three spots, mostly separated from one another, rarely preceded by one or two minute dots.

Underside.—Forewing not seldom with glaucous grey spot R^3—M^1 and an

elongate-triangular spot before cell.——Hindwing usually with five spots, sometimes with six or seven, distant from cell.

♀. *Upperside.*—Forewing : cell-spot close to cross-veins, an elongate-triangular spot in front of cell and several small ones on distal side of cross-veins ; discal spots R^2—R^3 larger than spot R^3—M^1, the latter rarely touching M^1.——Hindwing: band narrow, evenly curved, situated about halfway between cell and distal margin.

Underside like upper, band of hindwing paler.

Hab. Colombia : Cauca valley.

In the Tring Museum 30 ♂♂, 10 ♀♀, mostly from Pereira.

In coll. Oberthür a long series of both sexes from Manzales and Pereira.

d. P. erithalion sadyattes Druce (1874).

♂. *Papilio sadyattes* Druce, *Ent. Mo. Mag.* xi. p. 36 (1874) (Costa Rica); Kirby, *Cat. Diurn. Lep.* p. 814. n. 389 (1877) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 195. n. 7. t. 65. fig. 4 (1890) (Costa Rica) ; iid., *l.c.* p. 728 (1901) (Costa Rica).
Papilio iphidamas, iid., *l.c.* p. 192. n. 4 (1890) (*partim*).

♂. *Upperside.*—Forewing: olive-green patch very variable, either large, extending from inner margin to R^3, or reduced in length and width, or altogether absent, our series showing all intergradations between the extremes ; black specimens being known from Costa Rica and Chiriqui, in which localities occur also specimens with large olive-green patch ; all individuals with at least one small creamy spot, most specimens with a large spot, the spot standing either before or behind R^3, there being often a spot at both sides of the vein ; sometimes an olive-green streak in cell, but no creamy spot.——Hindwing : three spots, often preceded by one or two dots, there being occasionally also a minute dot behind M^2.

Underside.—Forewing : always one or two white or buffish white spots on disc, and the majority of specimens with a sharply defined elongate-triangular spot in front of cell.

♀. *Upperside.*—Forewing : spot R^3—M^1 minute or absent ; in our only Costa Rica specimen which we place here, spot R^2—R^3 small, oblique, a very little larger than in the figure of ♂ in *Biol. Centr. Amer., l.c.*, the cell-spot of this specimen also reduced, narrower, transverse, not reaching across cell, no other spots.——Hindwing : in the Costa Rica specimen the band evenly curved, separate from cell, half as wide again as black distal border ; in the specimens from the more southern localities the band entering cell, twice as broad as the distal marginal border, almost uniformly orange-red.

Hab. Islands off West Coast of Panama; Chiriqui ; Costa Rica.

The males with large olive-green patch on forewing are distinguished from *P. lycimenes lycimenes* by the absence of a red streak behind M^2 on the upperside of the hindwing.

In the type of *sadyattes* the white dot on the upperside of the forewing stands behind R^3.

The males without olive-green patch and the above-mentioned female with reduced spots on forewing lead over to the next species, which has in both sexes an entirely black forewing, very few specimens bearing a creamy white dot R^2—R^3.

In the Tring Museum 23 ♂♂, 4 ♀♀, from : Brava and Sebaco Is., January 1902 (J. H. Batty) ; Boquete, Chiriqui, 2500 ft. (Watson) ; Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall) ; Limon, Costa Rica, October 1904 (A. Hall).

33. Papilio polyzelus Feld. (1865).

♂. *Papilio anchises*, Doubleday (*non* Linné, 1758, err. det.), *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (*partim* ; Honduras).

? *Papilio alector* Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 341, 357 (1861) (*nom. nud.* ; haec spec. ?).

♂ ♀. *Papilio polyzelus* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 54 (1864) (*nom. nud.* ; Mexico ; Honduras) ; id., *Reise Novara, Lep.* p. 24. n. 14. t. 6. fig. a. ♂ (1865) (Mexico).

The differences between this insect and black specimens of *P. erithalion* are very slight. A more exhaustive exploration of Nicaragna and Honduras may possibly furnish material of specimens completely connecting *P. e. sadyattes* with *P. polyzelus*.

The differential characters of the two subspecies of *P. polyzelus* are highly interesting. We have mentioned under *P. vertumnus* that one of the subspecies of that species has the tibiae of the male hairy, while they are simply spinose in the other subspecies. In *P. polyzelus* we meet with the same phenomenon. The males from Western Mexico have hairy and somewhat incrassate tibiae, while those from Eastern and South Mexico, Guatemala and Honduras have spiny tibiae, both forms differing also somewhat in pattern. In a classification which is based strictly on the quantity of difference, the forms of *P. vertumnus* and *P. polyzelus* with hairy male tibiae would have to be treated as specifically distinct from the forms with spinose male tibiae. But in a system based on true relationship (as far as we are able to make out relationship from the morphological and biological characters known) all the circumstances have to be taken into account. As the spiny-legged *P. lycimenes* and *P. erithalion* are very closely related to hairy-legged *P. iphidamas*, it is quite natnral that the difference which is constant and specific in these insects should appear in other species as a difference between geographical forms, the development of a species into geographical forms being the first step towards the splitting up of one species into more species which can exist side by side, no longer being separated geographically, as are the geographical forms.

♂ ♀. Sexes similar, female a little paler than male ; forewing rarely with white dot R^2—R^3 (some Honduras males), on underside occasionally grey scaling in front of cell. Hindwing with red band from SC^2 to abdominal margin, standing much nearer distal margin than in the allied species.

Early stages not known.

Hab. Mexico to Honduras.

Two subspecies.

a. P. polyzelus polyzelus Feld. (1865).

♂. *Papilio anchises*, Doubleday (*non* Linné, 1758, err. det.), *l.c.* (1845) (*partim* ; Honduras) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19 n. 224 (1847) (*partim*) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 283 (1852) (syn. excl. ; Honduras) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 74. n. 299 (1856) (syn. excl. ; Honduras) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863).

(?) *Papilio alector* Bates, *l.c.*

♂ ♀. *Papilio polyzelus* Felder, *ll.cc.* ; Kirby, *Cat. Diurn. Lep.* p. 527. n. 61g. (1871) (Mexico) ; Oberth., *Et. d'Ent.* iv. p. 82. n. 270 (1880) (Mexico) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 195. n. 8. t. 65. fig. 6. genit. (1890) (*partim*).

Papilio candezei Borre (Belval ined.), *C. R. Soc. Ent. Belg.* xxviii. p. 126 (1884) (= *polyzelus*).

♂ ♀. Tibiae of male spinose, non-incrassate.

Genitalia : ♂. Harpe acuminate, no teeth between ventral conical tooth and apex.

Hab. Eastern Mexico, southwards to Honduras.

In the Tring Museum 44 ♂♂, 16 ♀♀, from: S. Pedro Sula, Honduras; Escuintla, W. Guatemala, 1100 ft., August 1904 (A. Hall); Mazatenanga, W. Guatemala, 1000 ft., September 1904 (A. Hall); Saba, Vera Paz, Guatemala (Champion); "Mexico"; Coatzalcoalcos, July 1904 (A. Hall); Orizaba.

b. P. polyzelus trichopus subsp. nov.

♂♀. *Papilio polyzelus*, Godm & Salv., *l.c.* (West Mexico).

♂♀. Tibiae and first tarsal segments hairy and somewhat incrassate. Spots of hindwing on the whole larger and nearer to the margin than in the preceding, the band being in one of the females only 2½ mm. distant from cell, in male usually a small spot behind M^2. The posterior marginal spots of fore- and hindwing often edged with red.

Genitalia: ♂. Harpe distally broader than in the preceding, denticulate.

Hab. West Mexico: Guerrero; Michoacan; Jalisco.

In the Tring Museum 64 ♂♂, 25 ♀♀, from: Guerrero, type (O. T. Baron); Patzcuaro, Michoacan; S. Sebastian (Dr. Buller).

34. **Papilio iphidamas** Fabr. (1793). (Pl. IV. fig. 7.)

♀. *Papilio Eques Trojanus iphidamas* Fabricius, *Ent. Syst.* iii. 1. p. 17. n. 52 (1793) (type: Jones's drawing).

♂. Tibiae and first tarsal segments somewhat incrassate and densely hairy.

♀. Forewing: spot R^2—R^3 larger than R^3—M^1 (Central American form), or smaller (South American forms). For differences between the Colombian females of this species and the females of the allied insects see p. 472.

Genitalia: ♂. Harpe more curved than in *P. lycimenes* and *erithalion*, besides the large ventral tooth with several small teeth, which are variable in size and number.

Hab. Mexico to Ecuador and North Venezuela.

The drawing of Jones, upon which the name *iphidamas* is based, represents in our opinion a Central American female of the present species. The band of the hindwing is too uniformly red for a South American female of this or any allied species. The *P. idaeus* of Fabricius, likewise described from Jones's drawing, is also a Central American form.

As only *P. iphidamas* is known to extend into Mexico as far north as Vera Cruz, there can hardly be any doubt that the Central American males are mated correctly with the females described below. It is interesting to observe that the proportional size of the two discal spots R^2—M^1 of the forewing (♀) is reversed in the forms from Colombia and Ecuador, as is the case also in several other Papilios.

a. P. iphidamas iphidamas Fabr. (1793).

♀. *Papilio Eques Trojanus iphidamas* Fabricius, *l.c.* (no locality given).

♀. *Papilio iphidamas*, Godart, *Enc. Méth.* ix. p. 37. n. 34 (1819) (copied from Fabricius); Boisd., *Spec. Gén. Lép.* i. p. 292. n. 121 (1836) (copied from Fabricius); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 220 (1847) ("S. America" false); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 44. n. 225. t. 8. fig. 1. ♂, 2. ♀ (1852) (Honduras.; Mexico); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 60. n. 238 (1856) (Mexico; Honduras); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 341, 357 (1861) (Mexico; Honduras); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 117 (1863) (= *arcas*, false); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 53 (1864) (Mexico; Nicaragua; Honduras; *partim?*); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 236. n. 8 (1869) ("Bogota specimen agreeing with Jones's figure," false); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 192. n. 4. (1890) (*partim*).

♂. *Papilio arcas*, Doubleday (*non* Cramer, 1782, err. det.), *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) ("S. America" false).

♀. *Papilio panares* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 226. t. 10. fig. 4 (1852) (Mexico); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 60. n. 239 (1856); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 341, 357 (1861) (*partim*; ♂ alia spec.); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863); Felder, *l.c.* p. 294. n. 67 (1864).

Papilio serapis, Ménétries (*non* Boisduval, 1836, err. det.), *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 76 (1857) (syn excl.; haec spec. ?).

♂ ♀. *Papilio echelus*, Reakirt (*non* Hübner, 1806—, err. det.), *Proc. Ent. Soc. Philad.* ii. p. 138. n. 7 (1863) (Nicaragua; syn. excl.; haec spec. ?).

♂. *Papilio achelous* Hopffer, *Stett. Ent. Zeit.* xxvii. p. 22 (1866) (Central America).

♀. *Papilio vertumnus* var. b. *P. iphidamas*, Kirby, *Cat. Diurn. Lep.* p. 526. sub n. 61 (1871) ("New Granada" false).

♂. *Papilio asclepius*, id., *l.c.* p. 537. n. 126 (1871) (*partim*; *achelous* Hopff. sub syn.).

♂. *Papilio incandescens* Butler, *Trans. Ent. Soc. Lond.* p. 433. t. 6. fig. 1 (1874) ("Para" false; this subsp. according to type in coll. Godman).

♂ ♀. *Papilio lycimenes*, id. & Druce (*non* Boisduval, 1870, err. det.), *Proc. Zool. Soc. Lond.* p. 363. n. 362 (1874) (Costa Rica).

♂ ♀. *Papilio alyattes*, Staudinger (*non* Felder, 1861, err. det.), *Exot. Tagf.* p. 13. t. 8. ♂ ♀ (1884) (this locality? this species?).

♂. *Upperside.*—Forewing: apex not semitransparent; green patch usually much reduced, seldom extending to hindmargin, being on the whole longer in the southern than in the northern specimens; always one or two creamy white spots, often a white spot in cell.——Hindwing: band gradually widening behind, extending usually from SC^2 to M^2, with a narrow streak behind M^2, the first spot often small, rarely absent.

Underside.—Forewing always with white creamy spot R^3—M^1, mostly also with spot R^2—R^3 and a cell-spot, the latter often reaching across cell.——Band of hindwing from SC^2 to anal angle, widest between R^2 and M^2.

♀. *Upperside.*—Forewing: cell-spot close to cross-veins, square or oblong; a triangular streak in front of cell; discal spot R^3—M^1 smaller than R^2—R^3, often absent, rarely larger, but in this case gradually tapering proximally, its oblique hinder edge being continuous (or almost) with the proximal edge of the cell-spot: usually one or more dots at distal side of cross-veins.——Hindwing: band nearly uniformly red, variable in width, but always nearly evenly curved.

Hab. Southern Mexico to Panama.

Some of the southern individuals leading over to the next form.

In the Tring Museum 73 ♂♂, 30 ♀♀, from: Coatzacoalcos, Mexico, at sea level, July 1904 (A. Hall); Escuintla and Mazatenanga, W. Guatemala, 1100 and 1000 ft., August and September 1904 (A. Hall); S. Pedro Sula, Honduras; Nicaragua; Juan Vinas, 2500 ft., August, Carillo, 3000 ft., October 1904, Costa Rica (A. Hall); Juan Vinas, Escazu, Limon, San José, and Tarbaca, Costa Rica (Underwood); Bogava, 800 ft., and Boquete, 3500 ft., Chiriqui (Watson); Brava, Cebaco, and Sevilla Is., January 1902 (J. H. Batty).

b. P. iphidamas phalias subsp. nov.

♂. *Upperside.*—Forewing: olivaceous green patch from hinder margin to M^1 or beyond, widest behind, the streak along hinder margin being rarely somewhat reduced in length and width; no green scaling in cell; no white spot, except in a very small percentage of specimens, the spot standing usually behind M^1.——Hindwing: three red spots, separate from cell, often a minute streak or dot behind M^2, rarely a dot in front of R^2, sometimes only two spots present.

Underside.—Forewing often with a greyish white spot across M^1 or in front of M^2. ——Hindwing with three spots R^2—M^1, a smaller one behind M^1 and usually a minute dot on abdominal fold.

♀. *Upperside.*—Forewing : apical area slightly transparent, being visibly less opaque than in the Colombian subspecies of *P. lycimenes* and *P. erithalion* ; cell-spot very large, longer than broad, often somewhat reduced in width costally, in this case not quite reaching across cell ; subcostal streak often absent, discal spot R^3—M^1 much larger than spot R^2—R^3.——Hindwing : band very broad, entering cell, very pale proximally, spot SC^1—R^1 small or absent in most specimens.

Underside : spots of forewing purer white, and band of hindwing distally brighter red than above.

Hab. Colombia : Magdalena valley, and Cordillera of Bogota.

In the Tring Museum 30 ♂♂, 13 ♀♀, from : Cananche and La Palma, Cundinamarca, July, August and September 1903 (Mathan); Muzo, December 1896 ; Pacho ; Peperital to Buenavista, 400—1300 m., January 1897, dry season (Dr. Bürger); Villavicencio to Monte Redondo, March—April 1897, beginning of wet season (Bürger).

e. P. iphidamas elatos subsp. nov.

♂. Like the preceding ; green patch of forewing more olive, duller in tint, posteriorly reduced, the streak behind SM^2 small, the patch being rhombiform, with the upper proximal and posterior distal angles strongly rounded.——Three small spots on hindwing.

On *underside* five spots R^2—SM^1 on hindwing, all well separated from one another, spot R^3—M^1 the largest, being about half as long again as broad.

Hab. Cauca valley.

In the Tring Museum 1 ♂ from Popayan.

d. P. iphidamas ealogyna subsp. nov. (Pl. IV. fig. 7).

♂. *Upperside :* forewing a little less opaque in apical area than in *phalias* ; olive-green spot about the same in size, on the whole somewhat smaller, duller green ; many specimens with a white spot M^1—M^2, which is often large, touching both veins, being sometimes preceded by a small dot.——Hindwing : three small red spots, contiguous, often a minute dot behind M^2.

Underside : forewing with white or greenish buff, distinct or vestigial, spot M^1—M^2, or R^3—M^1, or a double-spot across M^1, or the spot larger, extending from M^2 forward to R^2.——Hindwing : five spots from R^2 to anal angle, last one often absent, the spots on the whole less pale and smaller than in *P. i. phalias*, the upper three close together.

♀. *Upperside :* forewing : apical area slightly transparent ; cell-spot large, but often reduced costally, in this case not reaching across cell ; subcostal streak present or absent ; two discal spots R^2—M^1, the second the largest.——Hindwing : band from R^2 to near abdominal edge, often a detached dot before R^1, the band bright red, usually almost white proximally, the two colours contrasting strongly, inner edge of band almost straight, but more or less curved distad before abdominal margin, sometimes also incurved at apex of cell, in many specimens band entering apex of cell; width of band variable, but not exceeding (or very little) the width of the distal marginal area.

Underside: spots of forewing a little larger than above, cell-spot reaching across cell in all specimens, subcostal streak present.——Hindwing: band paler than above, narrower posteriorly, spot SC^2—R^1 nearly always indicated.

Hab. West Ecuador and West Colombia.

The West Colombian males have rarely a white spot on the forewing, being hardly distinguishable from *phalias*, while the females agree well with Ecuadorian ones.

In the Tring Museum 20 ♂♂, 16 ♀♀, from: Paramba, 3500 ft., February, March and April 1897, dry (Rosenberg); Chimbo, 1000 ft., August 1897 (Rosenberg); Cachabi, low country, January 1894 (Rosenberg); Zaruma, June 1899, 1000 m., wet (Simons).——13 ♂♂ from Rio Dagna, W. Colombia (Rosenberg).

e. P. iphidamas teneates subsp. nov.

♂. *Papilio osyris*, Godman & Salv. (*non* Felder, 1861, err. det.), *Trans. Ent. Soc. Lond.* p. 126. n. 231 (1880) (Sta. Marta).

♂. *Upperside*, forewing: apical area usually rather more transparent than in *P. i. phalias*; green patch narrow, separate from cell; most specimens with one or two white spots.——Hindwing with three red spots, separate from cell, often a small spot behind M^2, sometimes an additional dot behind R^1.

Underside: forewing with one, two or three white spots.——Hindwing with four to seven spots in an almost straight row, somewhat resembling the band of *alyattes*.

♀ not known.

Hab. North Venezuela, and Santa Marta, Colombia; name-type from Cucuta, Venezuela.

Resembling *alyattes* in being rather more glossy blue on the hindwing than in *P. i. phalias*, in the green patch of the forewing being reduced in width, the streak along inner margin being often obsolescent (*type*), and in the forewing bearing often rather large white spots. The hindwing, however, is not so glossy as in *alyattes*, the spots of the underside are less close to cell, and the spot behind M^2 of hindwing is smaller. The harpe is also somewhat different, being narrower and more curved, agreeing with that of *P. i. phalias*.

In the Tring Museum 9 ♂♂ from: Cucuta and Porto Cabello, Venezuela; Onaca, Santa Marta, 2200 ft. (Chas. Engelke); R. Hacho, Santa Marta, March 1898 (Wilmot Brown).

35. **Papilio anchises** L. (1758) (Pl. IV. fig. 8. 12.; VII. fig. 44—47).

♀. *Papilio Eques Trojanus anchises* Linné, *Syst. Nat.* ed. x. p. 460. n. 10 (1758) (cit. exceptis); Clerck, *Icon. Ins.* ii. t. 29. fig. 1 (1764).

♂♀. *Papilio anchises*, Boisduval, *Spec. Gén. Lép.* i. p. 291. n. 119 (1836).

♂. Tibiae and first tarsal segments somewhat incrassate and densely hairy. Apical area of forewing semitransparent. Hindwing strongly glossy blue on disc; red spots rather closer to cell than in *P. i. phalias*, variable in number and in size, often forming a continuous band, many specimens bearing a small spot behind M^2.——Spot M^2—(SM^1) of *underside* of hindwing rather larger and more proximal than in *P. iphidamas*, the band of spots extending usually forward to SC^2.

♀. Apex of forewing somewhat transparent; discal spot R^2—R^3 smaller than spot R^3—M^1.

Early stages only known of *P. a. orbignyanus*.

Hab. South America, from Colombia to Pará, Sao Paulo, Bolivia, and Paraguay. Not known from Peru.

We are not sure that the forms here united under *P. anchises* are specifically distinct from those treated as subspecies of *P. iphidamas*. It is very well possible that all these forms of which the males have hairy tibiae are only geographical varieties of one single species. Our knowledge of the distribution of these *Papilios* in Colombia is very imperfect, and the material examined too scanty for the purpose of deciding the question.

a. P. anchises alyattes Feld. (1861).

♂ ♀. *Papilio alyattes* Felder, *Wien. Ent. Mon.* v. p. 73. n. 7 (1861) (*partim*, ♂ only ; Bogota) ; id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 57 (1864) ; id., *Reise Novara, Lep.* p. 26. n. 16. t. 6. fig. e. ♂, f. ♀ (1865).

Papilio vertumnus var. k. *P. alyattes*, Kirby, *Cat. Diurn. Lep.* p. 526 sub n. 61 (1871) (New Granada).

♂. *Upperside :* forewing distally somewhat transparent, but less than in the following forms ; green patch reduced, not touching cell, streak behind SM^2 often vestigial ; always at least one white spot, situated between M^1 and M^2, often a second spot before M^1, some specimens having also a dot behind M^2.——Hindwing much more strongly glossy blue than in all the allies, the scales on the disc being entire ; three red spots, the last usually the largest, often a minute spot behind M^2 and another before R^2.

Underside : red band of hindwing extending forward to SC^2, spot M^2—(SM^1) large as compared with the respective spot in *P. iphidamus phalias.*

♀. *Upperside :* forewing less opaque distally than in *P. iphidamas* ; cell-spot transversely longer than broad, narrower than in *P. i. phalias* ; two discal spots, the second larger than the first, separated from cell or touching it behind R^3.——Hindwing : band crossing apex of cell, almost gradually widened behind, reaching forward to SC^2, its distal edge farther away from margin of wing than in *P. iphidamas.*

Genitalia : ♂. Harpe decidedly broader and less curved than in *P. iphidamas*, the ventral median tooth smaller, being sometimes not larger than the other teeth.

Hab. Colombia : Magdalena valley, probably on both sides of the Cordillera of Bogota.

In the Tring Museum : 13 ♂♂, 5 ♀ ♀, from "Bogota."

b. P. anchises serapis Boisd. (1836).

♂. *Papilio serapis* Boisduval, *Spec. Gén. Lép.* i. p. 298. n. 130 (1836) (Colombia) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 196 (1846) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 227 (1852) (*partim* ; ♂ only ; ♀ alia species) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 61. n. 240 (1856) (*partim*) ; Feld , *Verh. Zool. Bot. Ges. Wien* xiv. p. 249. n. 65 (1864) (*partim*) ; Kirby, *Cat. Diurn. Lep.* p. 526. n. 61 d (1871) (*partim*) ; Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 232 (1880) (Sta. Marta) ; Prinz. Theresa, *Berl. Ent. Zeitschr.* xlvi. p. 241. n. 4 (1901) (La Popa, Cartagena, August, 2 ♂ ♂ ;—we have seen one of them).

♂. *Upperside :* forewing rather more transparent distally than in *alyattes* ; green band very narrow, usually extending forward to R^3, a little wider behind than in front.——Hindwing : band consisting of five spots, there being usually a sixth minute spot or narrow streak behind M^2.

Underside : the band of the hindwing as in *alyattes.*

♀. *Upperside :* forewing more transparent distally than in *alyattes* ; spots more yellow, as are also the fringe-spots on both wings ; cell-spot subtriangular, not reaching across cell, no spot in front of cell ; discal spot R^3—M^1 very much larger than spot R^2—R^3, but much smaller than the cell-spot.——Hindwing : band

very broad, buff or yellow proximally, strongly palmate, its inner edge crossing cell proximally of base of M^2, spot SC^2—R^1 larger than in *alyattes*; one of our two specimens with a dot before SC^2.

Underside similar to upper, band of hindwing paler red.

The two specimens here described have the appearance of being killed too soon after emergence, which may account for the yellowish colour of the markings.

Hab. Northern Colombia: Santa Marta; Cartagena.

In the Tring Museum 2 ♂♂, 2 ♀♀, from "Bogota."

c. P. anchises osyris Feld. (1861).

♀. *Papilio erithalion*, Kollar (*non* Boisduval, 1836, err. det.), *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 353. n. 6 (1850) (Angostura).

Papilio proteus, Hewitson (*non* Boisduval, 1836, err. det.), *Trans. Ent. Soc. Lond.* (2). i. p. 97 (1851) (♂ of *arcas*, Venezuela!).

♂. *Papilio erithalion*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 239. t. 10*. fig. 3. ♂ (1852) (Venezuela; synon. excl.); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 61. n. 243 (1856) (*partim*).

♂ ♀. *Papilio osyris* Felder, *Wien. Ent. Mon.* v. p. 74. n. 8 (1861) (Caracas); id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 66 (1864); id., *Reise Novara, Lep.* p. 30. t. 9. fig. b. ♂, c. d. ♀ (1865).

♀. *Papilio xenares* id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 59 (1864) (Orinoco; nom. nov. loc. "*erithalion* Koll.") ; id., *Reise Novara, Lep.* p. 28. n. 17. t. 8. fig. a (1865) (Angostura).

♂. *Papilio toxaris* id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 61 (1864) (nom. nov. loco *erithalion* Gray, *l.c.* t. 10*. fig. 3;—"f. 4" laps. cal.).

♂ ♀. *Papilio severus* id, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. sub n. 66 (1864) ("Moritz in litt."; = *osyris*).

Papilio arcas var. a. *P. xenares*, Kirby, *Cat. Diurn. Lep.* p. 526. sub n. 61a (1871).

Papilio toxaris, id., *l.c.* n. 61b (1871).

Papilio serapis var. a. *P. osyris*, id., *l.c.* sub n. 61d (1871).

Papilio arcas, Hahnel (*non* Stoll, 1782, err. det.), *Iris* iii. p. 138 (1889) (San Estéban, in forest).

♂. Similar to *serapis*, bands of forewing and hindwing broader; white spots of forewing usually large, sometimes absent, occasionally a white spot in cell.

♀. Cell-spot of forewing reaching usually across cell, many specimens with a subcostal streak, two discal spots, R^2—M^1, the second much the larger.——Band of hindwing only very little paler proximally than distally, usually entering apex of cell, variable in width, spot SC^2—R^1 rarely small.

Hab. Venezuela.

One single female from Ciudad Bolivar has the spots of the forewing pure white, while in the type of *xenares* from the same place they are only a little less buffish than in the more northern individuals. It is possible that these two specimens represent another subspecies; however, more material is wanted to decide the point. The specimens from Caicara and the Caura River belong to the next form.

In the Tring Museum 6 ♂♂, 6 ♀♀, from: Cucuta; Mérida; Puerto Cabello; Ciudad Bolivar.

In coll. Oberthür 6 ♂♂, 4 ♀♀, from San Estéban.

d. P. anchises cymochles Doubl. (1844).

♂. *Papilio cymochles* Doubleday, *Ann. Mag. N. H.* xiv. p. 416 (1844) (Trinidad); id., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 205 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 50. n. 245. t. 10. fig. 8 (1852) (Trinidad); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 260 (1856) (Trinidad?); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 341, 357 (1861) (Trinidad?); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 63 (1864) (Trinidad?); Kirby, *Cat. Diurn. Lep.* p. 526. n. 61c (1871) (Trinidad).

♂. *Papilio anacharsis* Felder, *l.c.* n. 62 (1864) (hab.?; *nom. nud.*); id., *Reise Novara, Lep.* p. 29. n. 18. t. 7. fig. d. (1865) (hab.?).

♂. *Papilio toxaris* var. a. *P. anacharsis*, Kirby, *l.c.*

Papilio xeuxis (!), Kaye, *Proc. Ent. Soc. Lond.* p. 19 (1901) (= *alyattes*, both bred from one ♀; error of identification).

Papilio zeuxis, id., *Trans. Ent. Soc. Lond.* p. 206. n. 194 (1904) (Trinidad; "larvae on orange!!" false.—These larvae belonged probably to *P. anchisiades*).

Papilio cymocles (!), id., *l.c.* n. 195 (1904) (Trinidad).

♂. Similar to *osyris*; band of forewing on the whole rather narrower, at least in many specimens, with one, two or three white spots; hindwing usually with three red spots, often preceded by a small spot and followed by a minute streak.

On *underside* most specimens with four spots on hindwing, often preceded by a small fifth, but one of our specimens with seven spots.

♀. Spots of forewing purer white than in the previous forms, the discal ones differently placed; cell-spot small, triangular, not reaching halfway across the cell, often a mere streak; two discal spots R^3—M^2, the second extending farther distad than the first, occasionally a minute dot before R^3.——Hindwing: band almost evenly red, widest in middle, no spot before R^1.

On *underside* the last spot of the band of the hindwing much reduced, sometimes minute, usually isolated.

Hab. Trinidad; Peninsula of Paria; Orinoco.

In the Tring Museum 24 ♂♂, 17 ♀♀, from: Caicara, Orinoco, March 1897, May and July 1898 (Cherrie); Suapure, February 1899, La Vuelta, May 1904, Corosito, June 1904, Caura R. (S. M. Klages); Patao, Guiria, August 1891; various places on Trinidad, December, January and February.

e. P. anchises anchises L. (1758) (Pl. IV. fig. 8. 12).

♀. *Papilio Eques Trojanus anchises* Linné, *Syst. Nat.* ed. x. p. 460. n. 10 (1858) (cit. excl.); Clerck, *Icon. Ins.* ii. t. 29. fig. 1 (1764); Linné, *Mus. Lud. Ulr.* p. 191. n. 10 (1764); id., *Syst. Nat.* ed. xii. p. 746. n. 11 (1767); Fabr., *Spec. Ins.* ii. p. 7. n. 26 (1775) (cit. excl.); Goeze, *Ent. Beytr.* iii. 1. p. 34. n. 11 (1779) (cit. excl.); Fabr., *Spec. Ins.* ii. p. 7. n. 26 (1781) (cit. excl.); Gmelin, *Syst. Nat.* i. 5. p 2230. n. 11 (1790) (cit. excl.); Fabr., *Ent. Syst.* iii. 1. p. 13. n. 40 (1793) (cit. excl.).

Papilio Eques anchises Linné, *Syst. Nat.* ed. Lange, p. 460. n. 10 (1760).

Papilio (Troes) anchises, Müller, *Naturs.* v. 1. p. 569. n. 11 (1764) (larva exclusa).

♂. *Papilio Eques Trojanus vertumnus* Cramer, *Pap. Exot.* iii. p. 32. t. 211. fig. C (1779) (Surinam; *non* fig. A. B.).

Priamides vertumnus, Hübner, *Verz. bek. Schmett.* p. 87. n. 911 (1818?) (*partim*).

Papilio vertumnus, Godart, *Enc. Meth.* ix. p. 37. n. 38 (1819) (*partim*); Boisd., *Spec. Gén. Lép.* i. p. 298. n. 129 (1836) (*partim*).

♂ ♀. *Papilio anchises*, Boisduval, *l.c.* p. 291. n. 119 (1836) (Surinam); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 44 (1864) (Surinam); Guen., *Ann. Soc. Ent. France* p. 309 (1867) (descr. of ♀); Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 15. n. 10 (1882) (recensio critica; descr. of ♀; probably type specimen).

Papilio vertumnus var. a., Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. sub n. 266 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. sub n. 281 (1856).

♂. *Papilio telmosis* Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 340, 356 (1861) (Surinam; type: Cramer's fig. C, *l.c.*; "extends into Columbia" false); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 45 (1864) (Surinam); Kirby, *Cat. Diurn. Lep.* p. 528. n. 62 f (1871); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvii. p. 295 (1876) (Surinam); Oberth., *Et. d'Ent.* iv. p. 82. n. 273 (1880) (Guyane; variability; = *eteocles*).

♂. *Papilio eteocles* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 49 (1864) (hab.?; *nom. nud.*); id., *Reise Novara, Lep.* p. 22. n. 12. t. 7. fig. c. ♂ (1865) (hab.?).

Papilio cyphotes var. a. *P. eteocles* Kirby, *l.c.* p. 527. sub n. 62 d (1871).

♂. *Upperside.*—Forewing: band very variable, extending from M^1 to inner margin, often being reduced to a narrow streak, not rarely altogether absent, all

intergradations occurring ; it varies also in colour, being sometimes bluish, sometimes greenish ; a white spot M^1—M^2 in some specimens.——Hindwing strongly dentate, mostly with three spots, which are usually well separated from one another and from cell, there being often a streak behind M^2 and occasionally a dot before R^2 ; the spots sometimes yellowish.

On *underside* of hindwing, a row of five to seven spots, usually placed rather nearer the distal margin than the cell.

♀. *Upperside.*—Forewing : no spot in cell or only a small streak, two spots R^3—M^2 on disc, the upper touching cell, or only one spot R^3—M^1, touching cell or separate from it, or this spot vestigial, or the wing without any spots, except the fringe-dots.——Hindwing with a row of six or seven evenly red spots, all separate from each other and from cell, last two usually merged together.

Hab. Dutch and French Guiana.

In the Tring Museum 3 ♂♂, 2 ♀♀, from Surinam.

In coll. Oberthür a long series of both sexes from Maroni and Cayenne.

f. P. anchises thelios Gray (1852).

♀. *Papilio thelios* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 250. t. 10*. fig. 7 (1852) (Pará); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854)(Pará ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 265 (1856).

♂ ♀. *Papilio hierocles* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. n. 258. t. 10. fig. 2. ♂, t. 9. fig. 9. ♀ (1852) (Pará) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 273 (1856) (Pará) ; Bates, *Trans. Ent. Soc Lond.* (2). v. p. 341, 356 (1861) (synonymy ; " cyphotes " excl. ; Pará) ; id., *Journ. Entom.* I. p. 225. n. 13. (1862) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 48 (1864) (Pará) ; Oberth., *Et. d'Ent.* iv. p. 88. n. 277 (1880) (Pará) ; Wood, *Ins. Abroad* p. 551. fig. 301 (1883).

♀. *Papilio aglaope* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 260. t. 10. fig. 6 (1852) (♀ only, ♂ alia spec. ; Pará); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 275 (1856) (♀ ; Pará).

Papilio cyphotes, Kirby (*non* Gray, 1852, err. det.), *Cat. Diurn. Lep.* p. 527. n. 62 a (1871) (*partim*) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 89. n. 42 (1890) (Baião, Lower Amazons).

♂. *Upperside.*—Forewing with triangular green patch and one or two white spots, seldom a minute third spot being present.——Hindwing nearly as strongly dentate as in *P. a. anchises*, with three or four separate red spots and often a narrow line behind M^2, spot M^1—M^2 the longest.

On *underside* of hindwing a row of six separate pale red spots, of which the central ones stand nearer the cell than outer margin.

♀. *Upperside.*—Forewing with or without white cell-streak ; two larger distal spots R^3—M^2, often preceded by a small spot, spot M^1—M^2 the largest, oblong.——Hindwing : a row of seven or eight separate red spots, the last two merged together.

On *underside* the spots of the hindwing somewhat paler than above.

Hab. Lower Amazons: Pará to Santarem.

In the Tring Museum 2 ♂♂, 3 ♀♀, from Pará.

g. P. anchises etias subsp. nov. (Pl. VII. fig. 46. 47).

♂. Like *P. a. orbignyanus*, but spot SC^2—R^1 of hindwing absent, being rarely represented by a minute dot, the others on the whole somewhat shorter and narrower. Palpus sometimes almost entirely black.

♀. Spots of forewing pure white ; cell-spot minute ; a small spot before R^3 and

two large spots R^3—M^2, not touching M^2.——Spots of hindwing smaller, being shorter and narrower, than in *orbignyanus*; spot SC^2—R^1 sometimes missing.

Hab. Eastern Bolivia.

In the Tring Museum 11 ♂♂, 2 ♀♀, from : Santa Cruz de la Sierra, January, April—May 1904 (J. Steinbach) ; R. Grande, Province Cordillera, December 1903 (J. Steinbach).

In coll. Godman from Rio San Mateo.

h. P. anchises orbignyanus Lucas (1852).

♂. *Papilio orbignyanus* Lucas, *Rev. Zool.* (2). iv. p. 192. t. 10. fig. 3 (1852) (Corrientes) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 530 (1852) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 256 (1856) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 341, 357 (1861) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 294. n. 64 (1864).

Papilio cymochles var. a. *P. orbignyanus*, Kirby. *Cat. Diurn. Lep.* p. 526. sub n. 61 c. (1871) (Corrientes).

♂. *Papilio serapis*, Burmeister (*non* Boisd., 1836, err. det.), *Descr. Rép. Argent.* v. *Lép.* p. 64. n. 6 (1878) (*partim*).

♂. Green patch of forewing rarely much widening posteriorly, its proximal and distal edges being parallel in most individuals ; always a buffish white spot M^1—M^2, often very large, usually also a second spot before M^1 and often a third behind M^2.——Hindwing with an evenly curved band which gradually widens posteriorly, consisting of five spots and a line behind M^2, the spots close together, but separate, the veins being black, rarely a dot in cell (type-specimen).

On *underside* of hindwing a row of seven spots, the last two being usually merged together.

♀. Forewing : a spot of variable size in cell, rarely absent, reaching sometimes halfway across cell ; three spots R^2—M^2 on disc, the first minute, often absent, the second the largest, the third mostly rounded off behind and then not touching vein M^2. ——Hindwing : band from SC^2 to abdominal edge, separate from cell.

Larva reddish-brown ; a spot at sides of the thoracic segments and of the last two abdominal rings, a dorsal spot on each side of mesial line on second and tenth rings, and an oblique, sometimes maculer, side-band on sixth and seventh ; tubercles of prothorax not longer than those on the following segments. Dorsal tubercle of thorax of pupa small, divided ; abdomen with two pyramid-shaped dorsal tubercles and a smaller one in front of them.

Hab. Paraguay ; adjacent district of Argentina ; Matto Grosso ; Province Goyaz in Brazil.

In the Tring Museum 16 ♂♂, 8 ♀♀, 6 larvae, 1 pupa, from : Formosa, Argentina ; Patino cué, Paraguay, February 1894 (Montforts) ; Villa Maria to Diamantino, January 1897 (Andeer).

i. P. anchises foetterlei subsp. nov. (Pl. VII. fig. 44. ♂, 45. ♀).

♂. *Upperside.*—Forewing : two very large white patches R^3—M^2, often followed by a smaller spot and usually accompanied by a minute streak in cell ; bluish grey scaling between the white patches and inner margin, partly edging the patches, especially on distal side.——Hindwing : red band rather paler than in *orbignyanus*, broader, entering cell (always ?), streak behind M^2 very distinct, inner edge of band almost straight from SC^2 to base of M^2.

Underside paler than upper ; white spots of forewing somewhat larger,

especially the cell-spot.——Band of hindwing almost elongate-rhombiform, extending from SC^2 to near anal angle ; a dot in cell.

♀. *Upperside :* spots of forewing white, cell-spot large, but not reaching across cell ; two large patches R^3—M^2, a minute dot before R^3 and sometimes a small streak behind M^2.——Hindwing : red band almost as in male, anteriorly wider than in that sex, crossing apex of cell, the veins only partly black, the central ones almost entirely red within band ; a small spot before SC^2 present or absent.

Underside : band paler than above, the veins for the greater part black.

Hab. Brazil: Sao Paulo.

We have much pleasure in naming this form after Herr J. Foetterle, from whom we have received some useful material of *Papilio.*

In the Tring Museum 3 ♂♂, 3 ♀♀ from Sao Paulo (received from Messrs. Staudinger & Bang-Haas).

36. **Papilio hedae** Foett. (1902).

♀. *Papilio hedae* Foetterle, *Rev. Mus. Paulista* v. p. 620. t. 15. fig. 1 (1902) (S. Paulo).

The figure gives one the impression of the unique specimen being an abnormal individual of *P. anchises foetterlei.* However, it is impossible to be certain on this point without comparing the specimen with a series of females of *foetterlei.* If it is, as we suppose, an aberration, the individual will doubtless remain unique for a long time.

The forewing is buffish white from inner margin forward to near R^2, the inner edge of this broad band entering cell just proximally of M^2, a large semicircular cell-spot forming part of the band ; on the *underside* the band wider and reaching close to costal margin, its distal edge irregular. A pale red band on hindwing gradually shading off into grey, the grey scaling nearly extending to base on *underside.*

Hab. Interior of Sao Paulo.

37. **Papilio nephalion** Godt. (1819).

♀. *Papilio nephalion* Godart, *Enc. Méth.* ix. p. 37. n. 36 (1819) (Brazil) ; Lucas, *Lép. Exot.* p. 29. t. 14. fig. 3 (1835) (Brazil) ; Boisd., *Spec. Gén. Lép.* i. p. 294. n. 124 (1836) (Brazil) ; Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 47 (1838) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 199 (1846) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *App.* p. 147 (1848) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 77 (1857) (Brazil).

♂. *Papilio vertumnus*, Godart (*non* Cramer, 1782, err. det.), *l.c.* p. 37. n. 38 (1819) (*partim* ; Brazil) ; Lucas, *Lép. Exot.* p. 13. t. 7. fig. 2 (1835) (Brazil) ; Ménétr., *l.c.* n. 78 (1857) (Brazil).

♂. *Priamides osymanduas* Hübner, *Samml. Exot. Schmett.* iii. t. 27. (1834 ?) (Brazil).

♂. *Papilio proteus* Boisduval, *Spec. Gén. Lép.* i. p. 297. n. 128 (1836) (Brazil) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (Brazil).

♀. *Papilio tullus*, Doubleday (*non* Cramer, 1780, err. det.), *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (Brazil) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 201 (1846) (*partim* ; Brazil ; ♂ = *proteus*).

♂. *Papilio stilbon* Kollar, *Ann. Wien. Museum* ii. p. 215. t. 12. fig. 1 (1839) (Brazil) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 357 (1861).

♂♀. *Papilio proteus*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 233 (1852) (Brazil ; *stilbon* is var.) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 62. n. 246 (1856) (Brazil ; Rio Grande do Sul) ; Bates, *l.c.* p. 341, 356 (1861) (Rio) ; Prillw., *Stett. Ent. Zeit.* xxvi. p. 130 (1865) (Corcovado) ; Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 8. n. 4 (1874) (Gavia, August).

♀. *Papilio proteus* var. b. *Papilio nephalion*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. sub n. 233. t. 10*. fig. 8 (1852) (Brazil).

♂ ♀. *Papilio nephalion*, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. n. 51 (1864) (Southern Brazil); Kirby, *Cat. Diurn. Lep.* p. 527. n. 62 (1871) (Brazil); Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 9 (1895) (Rio Grande do Sul); Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 44 (1896); Bönningh., *Verh. Ver. Nat. Unterh.* ix. p. 27 (1896) (Rio de Janeiro; rather common).

♂. *Papilio nephalion* ab. ? ♂ *P. haemon* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 293. sub n. 51. p. 336 (1864) (Mus. Vienna).

♂ ♀. *Papilio vertumnus*, Burmeister, *Descr. Rép. Argent.* v. *Lép., Atlas* p. 7. n. 16 (1879) (larva, pupa; Rio de Janeiro to Santa Catharina; synon. *partim*); Seitz, *Stett. Ent. Zeit.* liv. p. 18 (1893) (Santos).

♂. *Papilio osmandryas* (*!*), Burmeister, *l.c.* (1879) (sub syn.).

♀. *Papilio nephaleon* (*!*), Bönninghausen, *l.c.*

Endopogon nephalion, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 88. t. 465. fig. 3. 4 (190—?).

In structure practically the same as *P. anchises*, but very different in colour from the Brazilian form of that insect.

♂. The creamy patch of the forewing large, consisting of two or three spots, spot M^1—M^2 being the largest, the patch extending occasionally to near SM^2, sometimes only spot M^1—M^2 distinct; some specimens with a minute dot in cell. ——Hindwing usually with three spots R^2—M^2, rarely with two only, often an additional spot SC^2—R^1 marked, but apparently never a spot R^1—R^2; tooth R^3 prominent.

On *underside* the three spots R^2—M^2 of hindwing pinkish white, their distal portions remaining red; two red spots between M^2 and anal angle, usually confluent, and a spot SC^2—R^1, the latter often vestigial.

♀. Forewing with or without cell-spot; a patch of two or three discal spots, spot M^1—M^2 the largest.——Hindwing: red band from R^2 to abdominal margin, consisting of five spots, the last two being usually confluent; most specimens with an additional spot SC^2—R^1, while in some others there is also a dot R^1—R^2; rarely spot R^1—R^2 present and SC^2—R^1 absent.

On *underside* there is apparently always a cell-spot on forewing.——The hindwing bears always a spot SC^2—R^1, while spot R^1—R^2 is rarely marked; spots R^2—M^2 are rather large, sometimes spot R^3—M^1 touching cell, but there is never a dot in cell; colour of these spots as in ♂.

Early stages described by Burmeister, *l.c.*

Hab. Brazil; Matto Grosso; Paraguay and adjacent districts of Argentina.

In the Tring Museum 40 ♂♂, 32 ♀♀, from: Minas Geraës (A. Kennedy); Rio de Janeiro; Organ Mts., Sarapuhy, and Corcovado; Sao Paulo; Castro, Parana (E. D. Jones); Hajahy, S. Catharina, February 1897; Yhu, Paraguay, September —December 1896 (Andeer); Sapucay, Paraguay, October, December, and January (W. Foster).

III. Lysander Group.

Marginal spots of hindwing red. Palpus always black. Hindtibia of male incrassate, hairy, foretibia not enlarged, spinose as in female. Harpe long, reaching close to apex of clasper, truncate, with two to five apical spinelike teeth, ventral edge non-dentate or minutely denticulate, never with a prominent conical tooth as in most species of the *Aeneas* Group. Anal segment of female without the short stout spinelike bristles of the *Belus* Group; in the vaginal cavity, on the proximal side, two broadly triangular lobes close together, these lobes pointing proximad when the walls of the cavity are pushed outside.

Key to the species:—

A. Vein M^2 of hindwing branching off from cell far beyond SC^2, the cell being asymmetrical.

a. Forewing without markings in both sexes, except the red or pinkish white marginal dots; an evenly curved row of red spots on hindwing about halfway between cell and distal margin . . . . . Species No. 38.

Forewing with blue or bluish green band in male; in female with or without white patches, no distinct fringe-spots, or the fringe not indented between the veins; red band of hindwing not regularly arched, the spots closer together and less regularly ovate than in Species No. 38 . . . . . *b*.

b. ♂ without white wool in fold of hindwing; ♀, distal margin of forewing straight, last two spots on hindwing on a level with one another, usually confluent . . Species No. 41.

♂ with white wool in fold of hindwing; ♀, distal margin of forewing rounded, last two spots of hindwing not on a level . . . . . *c*.

c. ♂, band of forewing oblique, strongly tapering, patch M^2—SM^2 obliquely truncate proximally; ♀, apical half of forewing semi-transparent, distal margin feebly rounded, tooth R^3 of hindwing usually prominent. . Species No. 40.

♂, band of forewing more straight, patch M^2—SM^2 square, one or two white spots on disc; ♀, apex of forewing more opaque than in No. 40; distal margin more convex, hindwing more rounded . . . . Species No. 39.

B. Veins SC^2 and M^2 of hindwing almost at the same distance from base, the cell being nearly symmetrical.

d. ♂, midtibia densely covered with small hairs; ♀, forewing with broad white subapical cell-patch, or with two rounded spots on disc, in the latter case the red band of hindwing always entering cell . . . *e*

♂, midtibia spinose like foretibia, cell of hindwing red on upperside (base excepted), or the forewing with large white patches; ♀, no spot in cell, or only a small one, band of hindwing outside cell . . . *f*.

e. ♂, forewing with two white spots on disc; ♀, forewing with a small or no spot . . . . . Species No. 45.

♂, forewing with one or no white spot on disc; ♀, forewing with large cell-patch . . . . . Species No. 44.

f. ♂, forewing with large white spots on disc, band blue, cell of hindwing black; ♀, forewing opaque, or a straight row of three white spots on disc, the upper one being more or less obscure, but no spot in cell . . . Species No. 43.

♂, band of forewing green, cell of hindwing red on upperside; ♀, apical half of forewing semitransparent, no spots on disc, or small ones, or the spots are large, usually also a streak in cell. . . . . Species No. 42.

38. **Papilio panthonus** Cram. (1780).

Papilio Eques Trojanus panthonus Cramer, *l.c.* iii. p. 154. t. 278. fig. C. D. ♂ (1780) (Surinam); Esper, *Ausl. Schmett.* p. 67. n. 30. t. 16. fig. 4 (1789).

Papilio Eques Trojanus pompeius Fabricius, *Spec. Ins.* ii. *Append.* p. 502 (1781) (nom. nov. loco *panthonus*).

♂ ♀. Sexes similar, but the female paler than the male; fringe of forewing spotted with pale red; hindwing with regularly curved row of red spots situated about halfway between cell and distal margin.

Scent-organ: fold with white wool as in *P. lysander*.

Genitalia: ♂, harpe truncate at apical edge, with about six teeth of nearly equal size.

Early stages not known.

Hab. The Guianas and Brazil.

Two subspecies.

a. P. panthonus numa Boisd. (1876).

♀. *Papilio numa* Boisduval, *Spec. Gén. Lép.* i. p. 289. n. 116 (1836) (♀; hab.?); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 208 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 285 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 74. n. 301 (1856) (*partim*); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 361 (1861); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 85 (1864) (Surinam; Demerara); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 237. sub n. 11 (1869) (= *panthonus*?); Kirby, *Cat. Diurn. Lep.* p. 529. n. 70 (1871); Oberth., *Et. d'Ent.* iv. p. 82. n. 271 (1880) (differences from *panthonus*).

♂. *Papilio jaguarae* Foetterle, *Rev. Mus. Paulista* v. p. 619. t. 15. fig. 3 (1902) (Minas Geraës; Sao Paulo).

♂ ♀. Differs from the Guiana form in the forewing being rather paler and in the red spots of the hindwing being smaller, and therefore farther apart.

Hab. Interior of Sao Paulo and Minas Geraës, Brazil.

Type (♀) of *numa* in coll. Oberthür.

b. P. panthonus panthonus Cram. (1780).

Papilio Eques Trojanus panthonus Cramer, *l.c.* (Surinam); Esper, *l.c.*

Papilio Eques Trojanus pompeius Fabricius, *l.c.*; id., *Mant. Ins.* ii. p. 5. n. 37 (1787).

Papilio Eques Trojanus pompejus, Jablonsky & Herbst, *Naturs. Schmett.* ii. p. 48. n. 19 (1784) (♂); Gmelin, *Syst. Na* i. 5. p. 2233 n. 295 (1790); Fabr., *Ent. Syst.* iii. 1. p. 18. n. 54 (1793).

Priamides pompejus, Hübner, *Verz. bek. Schmett.* p. 87. n. 904 (1818?).

Papilio pompeius, Godart, *Enc. Méth.* ix. p. 36. n. 32 (1819) (*partim*)

Papilio arbates, Boisduval (*non* Cramer, 1782, err. det.), *Spec. Gén. Lép.* i. p. 290. n. 118 (1836) (*partim*).

Papilio panthonus Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 284 (1852) (synon. *partim*); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 74. n. 302 (1856): Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 358 (1861); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 295 n. 87 (1864); Kirby, *Cat. Diurn. Lep.* p. 528. n. 69 (1871) (Guiana; synon. *partim*); Oberth., *Et. d'Ent.* iv. p. 82. n. 272 (1880) (Guyane).

Papilio aeneas, Butler (*non* Linné, 1758, err. det.), *Cat. Diurn. Lep. descr. Fabric.* p. 236. n. 11 (1869) (*partim*; ♀).

Papilio santhonus (!), Möschler, *Verh. Zool. Bot. Ges. Wien* xxvii. p. 295 (1876) (Surinam).

Papilio phylarchus Hopffer, *Stett. Ent. Zeit.* xxvii. p. 24. n. 3 (1866) (Cayenne).

♂ ♀. The red spots of the hindwing variable in size, but apparently never so small as in the Brazilian form. The fringe-spots of the forewing are sometimes nearly pure white; in other specimens they are represented only by a very few rosy scales.

Hab. The Guianas.

In the Tring Museum 7 ♂♂, 5 ♀♀, from: Bartica, British Guiana, Febrnary 1904; Paramaribo, Febrnary 1892 (Ellacombe); New Amsterdam.

39. Papilio aglaope Gray (1852).

(?) *Papilio Eques Trojanus euristeus* Cramer, *Pap. Exot.* i. p. 47. t. 29. fig. F (1775) (Surinam; this species?).

(?) *Papilio euristeus*, Boisduval, *Spec. Gén. Lép.* i. p. 282. n. 107 (1836); Kirby, *Cat. Diurn. Lep.* p. 528. n. 68 (1871).

♂. *Papilio aglaope* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. n. 260. t. 10. fig. 5. ♂ (1852) (Pará; *partim*, ♀ *alia species*); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons, forest); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* 67. n. 275 (1856) (*partim*); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 343, 358 (1861) (Pará; only two ♂♂ known); id., *Journ. Entom.* i. p. 226. n. 19 (1862) (Pará, rare); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 83 (1864) (Pará); Kirby, *Cat. Diurn. Lep.* p. 528. n. 67 (1871).

♀. *Papilio erlaces* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 49. n. 240. t. 8. fig. 10 (1852) (Bolivia; ♂ *alia species*); id., *s Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 253 (1856) (*partim*).

♀. *Papilio callicles* Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 361 (1861) (nom. nov. pro *erlaces* ♀); Feld., *l.c.* p. 295. n. 86 (1864); Kirby, *l.c.* p. 529. n. 70 (1871); Hopff., *Stett. Ent. Zeit.* xl. p. 50. n. 6 (1879) (Bolivia).

♂♀. *Papilio lysimachus* Honrath, *Berl. Ent. Zeitschr.* xxxii. p. 251. t. 5. fig. 5. ♂, fig. 6. ♀ (1888) (Southern Peru).

We believe Cramer's figure of *euristeus* to represent a specimen of this species. But as the figure is very rough, and as, further, the species is not known from Surinam, we are not certain that our identification is correct. For this reason we treat the name *euristeus* as of doubtful application, and accept Gray's name *aglaope* for the present insect.

♂. Forewing shorter, its distal margin more convex than in *P. lysander*; bluish green band more straight, patch M^2—SM^2 square; a large white spot M^1—M^2 in band, generally a second spot R^3—M^1; fringe usually with small red spots.——Hindwing: a row of four red spots, which are much shorter than in *P. lysander*, being separate from cell; sometimes a minute fifth spot before R^1.

♀. Resembling closely the white-spotted female of *lysander*. Apical area of forewing less transparent, apex broader, distal margin more convex; hindwing more evenly rounded.

There are two forms, one which resembles the male in the position of the spots of the forewing, and the other resembling *P. lysander* ♀-f. *parsodes*.

*a*¹. ♀-f. *lysimachus* Honr., *l.c.*—Forewing with three spots in a straight row, spot M^2—SM^2 greenish, small, spot M^1—M^2 white, rounded, a little longer than broad, spot R^3—M^1 white, shaded with brown, narrow, situated along M^1.

*b*¹. ♀-f. *callicles* Bates, *l.c.*—Forewing with large white patch M^1—M^2, a smaller patch R^2—M^1 and a streak in cell.

Scent-organ as in *P. lysander*.

Hab. of *P. aglaope*: Lower Amazons; Southern Peru; East Bolivia.

In the Tring Museum 3 ♂♂, 2 ♀♀, from: Igarapé (W. Hoffmanns); Pará (Stuart); Province Sara, Santa Cruz de la Sierra, Bolivia, February—April 1904 (J. Steinbach).

40. Papilio lysander Cram. (1775).

Seba, *Thesaur.* iv. p. 12. t. 7. fig. 27. 28. ♀ (1764).

♂. *Papilio Eques Troes lysander* Cramer, *Pap. Exot.* i. p. 46. t. 29. fig. C. D. (1775) (Surinam); Goeze, *Ent. Beytr.* iii. 1. p. 36. note (1779) (var. of *aeneas*); Esper, *Ausl. Schmett.* p. 62. n. 27. t. 16. fig. 1 (1788) (fringe-spots of hindwing white in figure!).

♀. *Papilio Eques Trojanus anchises*, Fabricius (*non* Linné, 1758, err. det.), *Syst. Ent.* p. 446. n. 19 (1775) (*partim*); Sulzer, *Gesch. Schmett.* i. p. 141. ii. p. 24. n. 4. t. 12. fig. 4 (1776) (forewing with white patches) ; Goeze, *l.c.* p. 34. n. 11 (1779) (*partim*) ; Fabr., *Spec. Ins.* ii. p. 7. n. 26 (1781) (*partim*) ; Gronov., *Zoophylac.* p. 188. n. 727 (1781) (*partim*) ; Esper, *l.c.* p. 13. n. 11. t. 6. fig. 1 (1785) ; Fabr., *Mant. Ins.* ii. p. 4 n. 28 (1787) (*partim*) ; Roem., *Gen. Ins.* p. 68. t. 12. fig. 4 (1789) ; Gmelin, *Syst. Nat.* i. 5. p. 2230. n. 11 (1790) (*partim*) ; Fabr., *Ent. Syst.* iii. 1. p. 13. n. 40 (1793) (*partim*).

♀. *Papilio Eques Trojanus arbates* Stoll, in Cram., *Pap. Exot.* iv. p. 198. t. 386. fig. C. D (1782) (Surinam) ; Jabl. & Herbst., *Naturs. Schmett.* ii. p. 41. n. 17. t. 9. fig. 4 (1784) ; Esper, *Ausl. Schmett.* p. 55. n. 23. t. 14. fig. 1 (1788).

♂. *Papilio Eques Trojanus meleander* Jablousky & Herbst, *Naturs. Schmett* ii. p. 75. n. 23. t. 10. fig. 2 (1784) (nom. nov. loco *lysander* Cram.).

♂. *Papilio Eques Trojanus aeneas*, Esper (*non* Linné, 1758, err. det.), *l.c.* p. 40. n. 15. t. 9. fig. 1 (1786) (syn. excl.) ; Gmelin, *Syst. Nat.* i. 5. p. 2233. n. 16 (1790) (*partim*).

P. anbates (!), *Goett. Gelehrte Anz.* 40. Stück p. 400 (1790).

♀. *Princeps dominans arbates*, Hübner, *Samml. Exot. Schmett.* i. t. 123. fig. 3. 4 (1806—).

♀. *Princeps dominans pompejus*, id. (*non* Fabricius, 1776, err. det.), *l.c.* i. t. 124. fig. 3. 4 (1806—) (fringe-spots of hindwing white in fig. 4, error in colouring).

♂. *Princeps dominans lysander*, id., *l.c.* t. 127. fig. 1. 2 (1806—).

♀. *Priamides anchises*, id. (*non* Linné, 1758, err. det.), *Verz. bek. Schmett.* p. 87. n. 902 (1818 ?) (*partim*).

♀. *Priamides brissonius* id., *l.c.* p. 87. n. 903 (1818 ?) (nom. nov. loco *pompejus* Hübn.).

♂. *Parides lysander*, id., *l.c.* p. 87. 910 (1818 ?).

♂. *Papilio eurymas* Godart, *Enc. Méth.* ix. p. 34. n. 27 (1819) (nom. nov. loco *lysander* Cram. ; Guyane) ; Boisd., *Spec. Gén. Lép.* i. p. 284. n. 110 (1836) (" var." discoloured specim. ; Cayenne ; Surinam) ; Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 352. n. 3 (1850) (Las Palmas, Nova Granada).

Papilio anchises, Godart, *Enc. Méth.* ix. p. 36. n. 31 (1819) (*partim*) ; Guen., *Ann. Soc. Ent. France* p. 309 (1867) (Sulzer's fig. of *anchises* represents *dimas* = ♀ of *zacynthus*, error) ; id., *l.c.* p. 309 (1867) (Esper's fig. of *anchises* represents *arbates*, = ? *panthonus*) ; Butl., *Cat. Diurn. Lep. descr. Fabr.* p. 235. n. 7 (1869) (*partim*) ; Kirby, *Cat. Diurn. Lep.* p. 529. n. 74 (1871) (*partim*) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvii. p. 295. (1876) (*partim* ; Surinam ; = *lysander* = *arbates* = *eurymas*) ; Staud., *Exot. Tagf.* i. p. 14. t. 9. ♂ ♀ (1884) ; Hahnel, *Iris* iii. p. 275 (1890) (Sao Paulo de Olivença).

Papilio lycander (!), Swainson, *Zool. Illustr.* iii. text of t. 92 (1823).

♀. *Papilio arbates*, Boisduval, *Spec. Gén. Lép.* i. p. 290. n. 118 (1836) (*partim* ; his ♂ is ♀) ; Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 353. n. 5 (1850) (Venezuela).

Papilio panthonus, Doubleday (*non* Cramer, 1780, err. det.), *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (*partim*) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 225 (1846) (*partim*).

♂ ♀. *Papilio lysander*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 53. n. 254 (1852) (Demerara) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 269 (1856) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 79. 83 (1857) (" Brazil ") ; Bates, *Trans. Ent. Soc. Lond.* (2.). v. p. 343 (1861) (variability) ; id., *Journ. Entom.* i. p. 226. n. 20 (1862) (typ. form in Guiana and Upper Amazons as far down as Villa Nova ; local form *parsodes* at Pará) ; id., *Natural. Riv. Amaz.* p. 26 (1864) (Pará, ♂ in swampy shades, ♀ in more open places) ; id., *l.c.* p. 156 (1864) (*lysander* replaces *parsodes* on the Upper Amazons) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 295 n. 93 (1864) (Surinam ; Guiana ; Cayenne ; Amazonia inf. ; " Brasilia ? ") ; Oberth., *Et. d'Ent.* iv. p. 91. n. 285 (1880) (Guyane).

♂ ♀. *Papilio brissonius*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 53. n. 255. t. 8. fig. 7. ♂ (1852) (Ega) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Upper Amazons ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 270 (1856) (Ega ; Villa Nova) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 92 (1864) (Ega ; Orinoco).

♂ ♀. *Papilio parsodes* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 256. t. 8. fig. 3. ♂ (1852) (Pará ; *partim* ; ♀ *alia spec.*) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Pará ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 271 (1856) (Pará ; Villa Nova) ; Bates, *Natural. Riv. Amaz.* p. 156 (1864) (replaces *lysander* in the Delta region) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 91 (1864) (Pará ; Tocantins ; " Mexico ? ") ; Oberth., *Et. d'Ent.* iv. p. 92. n. 286 (1880) (Pará ; geogr. form of *lysander*) ; Sharpe, *Proc. Zool. Soc. Lond.* p. 555. n. 3 (1890) (Prov. Goyaz).

♀. *Papilio sonoria* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 263 (1852) (nom. nov. loc. "*anchises* Sulz." ; Pará) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Pará ; forest) ; Gray, *List*

Lep. Ins. Brit. Mus. i. *Pap.* p. 68. n. 278 (1856) (Pará); Butl., *Trans. Ent. Soc. Lond.* p. 145. n. 224 (1877) (♂, R. Tapajos, March).

♀. *Papilio sonoria* var. a., Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. sub n. 263 (1852) (Pará).

♀. *Papilio anaximander* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 89 (1864) (*nom. nud.*, hab. ?); id., *Reise Novara, Lep.* p. 32. n. 21. t. 18. fig. b (1865) (hab. ?—Mus. Tring); Kirby, *Cat. Diurn. Lep.* p. 529. n. 73 (1871).

♂. *Papilio phrynichus* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 90 (1864) (*nom. nud.*; Nova Granada); id., *Reise Novara, Lep.* p. 33. n. 22. t. 8. fig. e (1865) (Las Palmas, N. Granada;—Mus. Vienna).

♂. *Papilio lysander* var. *bari* Oberthür, *Et. d'Ent.* iv. p. 91. sub n. 285 (1880) (patch of hindwing orange).

Papilio anchises var. *parsodes*, Möschler, *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304. (1883) (Surinam).

♀. *Parides arbates*, Kirby, in Hubn., *Samml. Exot. Schmett.* ed. ii. p. 90. t. 123. fig. 3. 4 (190—?).

♂ ♀. *Parides brissonius*, id., *l.c.* p. 90. t. 124. fig. 3. 4, t. 127. fig. 1. 2 (190—?).

The considerable series of specimens we have compared appears to prove that the species is not split up into well-defined geographical races, in spite of the large area it occupies. The males at least do not show any reliable differences in the various districts. However, there is something geographical in the variability of the other sex, in one place the one female form being prevalent or occurring alone, while in another district another form is more commonly met with. According to the females the area inhabited by *P. lysander* can be divided into three districts:

(*a*) Eastern portions of Colombia, Ecuador and Peru, and the Upper and Middle Amazons. In this district the females have no white spots on the forewing or only traces of them.

(*b*) The Lower Amazons, south side of the river. Here the females have always a large white patch consisting of several spots.

(*c*) The Guianas (and probably the north side of the Lower Amazons). The females agree either with (*a*) or with (*b*), or are intermediate. In Surinam the larger proportion of the females are without white patch or have only a round spot M^1—M^2, while in British Guiana the majority of females have as large a white patch as the Pará specimens.

Gray, *l.c.*, and also Bates, *l.c.*, said that the Pará males have a larger green band on the forewing than those from other places. This distinction does not hold good.

♂ ♀. Intermediate between *P. echemon* and *aglaope*, the main differences being stated under these species. Linné's *Papilio anchises* is quite a different insect. The earlier writers treated all the males of the species of this group marked green and red as being specifically the same.

P. lysander is the first name given to the present species. Gray correctly assigned the name of *lysander* to Guiana specimens of this insect. But Kirby in his *Catalogue* enumerated the species again as *anchises* L. In a ♂ in coll. Oberthür the patch of the hindwing is orange instead of red (ab. *bari*).

In order to facilitate reference the females may be grouped in three individual forms:

a'. ♀-f. *parsodes* Gray, *l.c.*; *sonoria* id., *l.c.*—Forewing with large white patch consisting of several spots; besides a large spot M^1—M^2 there being a spot R^3—R^1, another behind M^2, and often a small spot in cell.

b'. ♀-f. *arbates* Stoll, *l.c.*; *anaximenes* Feld., *l.c.*—Forewing with a single, more or less rounded, spot M^1—M^2. In type of *anaximenes* the red spots of the hindwing are faded, except the upper two.

c'. ♀-f. *brissonius* Hübner, *l.c.*; *pompejus* id., *l.c.* (*non* Fabricius, 1787, err. det.).—Forewing without distinct white spot.

Early stages not known.

Hab. of *P. lysander*: The Guianas; Amazons from Pará to Peru and Ecuador; "Bogota."

In the Tring Museum 38 ♂♂, 45 ♀♀, from: Bartica, Brit. Guiana, Febrnary 1902; Rio Demerara; Fort Akayma; New Amsterdam; Upper Real Berbice R.; Berg-en-Daal, May 1892 (Ellacombe); Surinam; Teffé, January 1905 (Mathan); Juhuty, April 1905 (Mathan); Manés; Itaituba; Iquitos (Stuart); R. Juruá; Igarapé (W. Hoffmanns); Pará (Stuart); Archidona, E. Ecuador (R. Haensch).

41. **Papilio echemon** Hübn. (1806—).

Princeps dominans echemon Hübner, *Samml. Exot. Schmett.* i. t. 121. fig. 3. 4. ♀ (1806—).
Princeps (!) *dominans echelus* id., *l.c.* t. 126. fig. 1. 2. ♂ (1806—).

The male of this species is easily distinguished from that of *P. lysander*. The females of the two insects come often very near one another, but can be separated by the differences hereafter mentioned.

♂. Apex of eighth abdominal segment less extended red than in *P. lysander*. Forewing narrower, apex more acute, distal margin concave, the blue-green spot situated behind SM^2 small, not produced basad into a point; underside with cyaneous gloss posteriorly; scales of upper layer in apical area of upperside bidentate, those of under layer tridentate, the teeth being short; on underside the upper scales bi-, the under scales tridentate in apical half of wing, the teeth, though long, being shorter than in *P. lysander*.——Hindwing with cyaneous gloss above, especially along abdominal fold; scales of upperside in distal area nearly all denticulate, the larger portion of the red patch included; tooth R^3 longer than in *P. lysander*.

♀. Apex of seventh and eighth abdominal segments less extended red than in *P. lysander* female, the red scaling usually restricted to a postvaginal spot. Forewing narrower than in *P. lysander* ♀, distal margin less convex, being straight from SC^5 to SM^2.——Hindwing: tooth R^3 prominent, anal angle produced, last two red spots M^2—SM^2 on a level with one another, usually not separate, forming a transverse bar either above or below or on both sides, while in *P. lysander* the two spots are separate, the posterior one being more distal than spot M^2—(SM^1), the oblique position towards each other being especially obvious on underside.

Neuration: Apex of cell of forewing narrower than in *P. lysander*, cross-veins D^1 and D^2 less oblique; D^3 of hindwing usually much shorter than D^4.

Scent-organ: edge of fold with a fringe of long hairs; no wool in the fold, the surface of the fold being occupied by densely packed, lanceolate scales, which have a cyaneous gloss.

Genitalia: ♂. Harpe as in *P. lysander* with several teeth at apex, the tooth situated at the ventral angle being the longest.

Early stages not known.

Hab. The Guianas and Lower and Middle Amazons.

Two subspecies:

a. P. echemon echemon Hübn. (1806—).

♀. *Princeps dominans echemon* Hübner, *l.c.*

♂. *Princeps dominans echelus* id., *l.c.*

♀. *Priamides echemon* id., *Verz. bek. Schmett.* p. 87. n. 898 (1818?).

♂. *Parides echelus* id., *l.c.* n. 907 (1818?).

♂. *Papilio echelus*, Boisduval, *Spec. Gén. Lép.* i. p. 287. n. 113 (1836) ("Amer. mér.", descr. from Hübner's fig.).

♀. *Papilio polymetus*, id. (*non* Godart, 1819, err. det.), *l.c.* p. 283. sub n. 108 (1836) (*partim* ; = *echemon* Hübn.).

♀. *Papilio spartacus* Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 206 (1846) (*nom. nud.* ; Brazil ; "cit. Doubl." erroneous).

♀. *Papilio echelus* var. a. *Papilio spartacus* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. sub n. 257. t. x*. fig. 1 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. sub n. 272 (1856); Kirby, *Cat. Diurn. Lep.* p. 530. sub n. 75 (1871) (Brazil).

♂ ♀. *Papilio echelus* Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 120 (1846) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 257 (1852) (syn. *partim* ; Pará) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons ; forest) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 272 (1856) (syn. *partim* ; Pará ; Saotarem ; Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. *Suppl.* p. 68. n. 1130 (1857) (Pará) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 344 (1861) (Lower Amazons) ; id., *Journ. Ent.* i. p. 227. n. 21 (1862) (Pará and south shore of Amazon as far as Santarem, nowbere else) ; Reak., *Proc. Ent. Soc. Philad.* ii. p. 138. n. 7 (1863) ("Nicaragua" false) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 94 (1864) (Pará ; "Nicaragua" error) ; Bates, *Natural. Riv. Amaz.* p. 160 (1864) (only on south side of Amazon).

♂ ♀. *Papilio echelus* Kirby, *Cat. Diurn. Lep.* p. 530. n. 75 (1871) ("var. c." excl.) ; Oberth., *Et. d'Ent.* iv. p. 93. n. 287 (1880) (Pará) ; Staud., *Exot. Tagf.* i. p. 14 (1884) (Lower Amazons) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 89. n. 43 (1890) (Baião, Lower Amazons) ; Haase, *Untersuch. Mimicry* i. p. 79 (1893).

Papilio anchises ♀ var. *parsodes*, id., *l.c.* ii. p. 60. t. 10 fig. 72. ♀ (1893).

♂ ♀. *Parides echemon*, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 91. t. 121. fig. 3. 4, t. 126 fig. 1. 2 (190—?).

♂. Bluish green band of forewing narrow, tapering, extending from hindmargin to R^3, separated from cell.

♀. Forewing with band of white patches, separated from cell, tapering in front, reaching from SM^2 forward to R^3, sometimes being vestigial as far as R^2 or even beyond ; patch M^2—SM^2 as a rule square or almost, larger than patch M^1—M^2; often a bluish grey streak behind SM^2. Posterior red (double) patch of hindwing, above, large.

Hab. Lower Amazons, southern side as far upwards as Santarem.

In the Tring Museum 16 ♂♂, 5 ♀♀, from : Igarapé (W. Hoffmanns) ; Santarem.

b. P. echemon ergeteles Gray (1852).

♂ ♀. *Papilio ergeteles* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 252. t. 8. fig. 5. ♂ (1852) (♂ ♀ ; Amazons) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 267 (1856) (Amazons, ♂) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Upper Amazons ; forest) ; Bates, *l.c.* v. p. 344, 359 (1861) (descr. of ♀, north shore of Amazon, westward apparently not beyond R. Negro) ; id., *Journ. Entom.* i. p. 227. n. 22 (1862) (north side of Amazon from Obydos to Rio Negro) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 99 (1864) (Amazons) ; Bates, *Natural. Riv. Amaz.* p. 160 (1864) (only on north side of Amazon from Obydos to Rio Negro) ; Oberth., *Et. d'Ent.* iv. p. 91. n. 284 (1880) (Guyane) ; Wood, *Ins. Abroad* p. 550. fig. 300 (1883).

♂. *Papilio echephron* Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 345 note (1861) (French Guiana); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 98 (1864) (Cayenne).

♂. *Papilio echion* id., *l.c.* xiv. p. 296. n. 95 (1864) (*nom. nud.* ; hab.?). ; id., *Reise Novara, Lep.* p. 33. n. 23. t. 8. fig. d (1865) (hab.?—Mus. Vienna).

♂. *Papilio polyphron* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 96 (1864) (*nom. nud.* ; Surinam); id., *Reise Novara, Lep.* p. 33. n. 24. t. 8. fig. e (1865) (Surinam).

♀. *Papilio pisander* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 88 (1864) (*nom. nud.*; hab. ?); id., *Reise Novara, Lep.* p. 31. n. 20. t. 8. fig. f (1865) (hab. ?—Mus. Tring); Kirby, *Cat. Diurn. Lep.* p. 529. n. 72 (1871); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304 (1883) (Surinam).
Papilio echelus var. a. *P. echion*, Kirby, *Cat. Diurn. Lep.* p. 530, sub n. 75 (1871).
Papilio echelus var. b. *P. polyphron*, id., *l.c.*
Papilio echelus var. e. *P. echephron*, id., *l.c.*
Papilio echelus var. f. *ergeteles*, id., *l.c.*
Papilio echelus, Möschler, *l.c.* xxxii. p. 304 (1883) (Surinam).

♂. Band of forewing wider than in the preceding, usually extending to cell at M^2, its inner edge being elbowed at this vein, spot R^3—M^1 mostly absent; white dots absent from underside in most specimens, being occasionally present in specimens from the Amazons.——Hindwing: red spots larger than in *echemon*, contiguous, the two middle ones touching cell or nearly, sometimes all four reaching cell, the latter bearing in one such individual (from Anteirim, north shore of Lower Amazon) a red dot at apex. Some Amazonian specimens intermediate between the present subspecies and the preceding one.

♀. Dichromatic, the white patches disappearing sometimes.

a'. ♀-f. *ergeteles* Gray, *l.c.*; Bates, *l.c.*——Forewing: a large white patch M^1—M^2, longer than broad, touching cell, preceded by a smaller patch R^3—M^1, which is usually reduced to a streak or a shadowy spot standing before M^1, sometimes barely vestigial, a third white spot behind M^2, narrowed behind, rarely extended to M^2, having usually the same shape as in Gray's figure 1 on Pl. X* (*spartacus*, see above under subspec. *echemon*).——This is the ordinary form of the female, commonly met with.

b'. ♀-f. *pisander* Feld., *l.c.*——Forewing: white patches represented by a few white scales.——There are two females of this form in coll. Felder, no locality being given; we have not seen it in other collections.

Hab. Lower and Middle Amazons, north shore; the Guianas.

The type of *echion*, a male without locality, takes a somewhat intermediate position between typical *echemon* and typical *ergeteles*; the band of the forewing is narrower than in the latter, the red spots of the hindwing, above, are rather shorter, and there are vestiges of white spots on the underside of the forewing.

In the Tring Museum 8 ♂♂, 7 ♀♀, from: Camaria, British Guiana, January 1904 (R. Haensch); Cayenne; Surinam; Onoribo, March 1893 (Ellacombe).

42. **Papilio neophilus** Hübn. (1837).

Seba, *Thesaur.* iv. p. 38. t. 30. fig. 25. 26. ♂ (1864) (marginal spots descr. as being white !).
♂. *Papilio Eques Trojanus aeneas*, Cramer (*non* Linné, 1758, err. det.), *Pap. Exot.* iii. p. 155. t. 279. fig. A. B (1780) (Surinam); Esper, *Ausl. Schmett.* p. 40. n. 15. p. 60 (1788).
♂. *Papilio Eques Trojanus aeneides* Esper, *l.c.* t. 15. fig. 3. ♂ (1788) (*non* text, *non* fig. 4).
♂. *Parides gargasus* Hübner, *Verz. bek. Schmett.* p. 87. n. 909 (1818?) (*partim*).
♀. *Priamides neophilus* id., *Samml. Exot. Schmett., Zuträge* p. 46. n. 499. fig. 997. 998 (1837) (Surinam).
Papilio aeneides, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 51. n. 247. t. 9. fig. 8. ♀ (1852); Guenée, *Ann. Soc. Ent. Fr.* p. 307 (1867); Oberth., *Et. d'Ent.* iv. p. 94. n. 290 (1880) (Trinidad; Guyane; Pará); Staud., *Exot. Tagf.* p. 14 (1884) (Trinidad; Guiana; Amazons).

The early authors considered the male of the present species and the male of *P. aeneas* to be the sexes of one species. Esper is quite emphatic on this point. Like Cramer, he describes this composite species as *aeneas* L. On the

plate, however, the name *aeneides* appears instead. No mention of this new name being made anywhere in the text, we think Esper was not responsible for it, but the engraver of the plate, *aeneides* being perhaps a misspelling of *aeneas*. Anyhow, as the name *aeneides* was proposed for a supposed species of which the "female" had already a name (*aeneas* L.), *aeneides* is a synonym of this older name *aeneas*.*

Hübner introduced for the same two insects the name of *gargasus*. This name, covering exactly the same species as *aeneides*, is a pure synonym of the latter.

The first name given to a specimen of the present species alone is *neophilus*. We employ it accordingly for the entire species. We add that the name *aeneides* on Esper's plate was entirely overlooked or perhaps suppressed by the older authors. Gray introduced it again, erroneously referring it to the Pará form of the present insect.

♂. Cell of hindwing red, except extreme base. The cell-patch and more or less also the bases of the spots around the cell have a purplish appearance, owing to the presence of black scales among the red ones. On the underside, the red area is reduced to a row of spots standing distally of the cell; these spots are pale, the upper scales being white, transparent.

♀. Resembles that sex of *P. lysander* and *aglaope*, but is easily distinguished by the different position of M^2 of the hindwing, this vein originating from cell as much proximally (or nearly as much) as vein SC^2, the cell therefore being almost symmetrical in *P. neophilus*. From *P. eurimedes*, which has practically the same neuration as *neophilus*, the latter is distinguished by the forewing bearing two or three white patches on disc and a streak in cell, or being devoid of white patches, or being intermediate between these extremes; there is never a patch across the cell, as in *arcas*.

Genitalia: ♂. Harpe truncate or obliquely rounded, usually with three long apical teeth, sometimes with four, many specimens bearing one or two small additional teeth; sometimes, especially often in Peruvian specimens, there is a row of minute teeth at the ventral edge.

Early stages not known.

Hab. Colombia to Bolivia and Paraguay, the range extending eastwards to Southern Brazil, the Lower Amazons, Trinidad, and to the Guianas; not found in the western districts of Ecuador and Colombia; also not occurring in Brazil from Rio de Janeiro to Pernambuco, being here replaced by *P. zacynthus*.

The subspecies are not very sharply defined in characters. Unlike *P. lysander*, the males from the various faunistic districts are fairly well separated, while the females of some of the geographical races come very close to each other, occasionally overlapping in characters. In the Guianas the female has usually small or no white patches, rarely fairly large ones. On the Upper Amazons and on the eastern slopes of the Andes from Peru to Colombia, the forewing never bears distinctly marked spots, while in Venezuela and Trinidad, on the Lower Amazons, and in Bolivia, Paraguay, Matto Grosso, and Southern Brazil, the white spots are always large. Bates did not meet with the species at the Middle Amazons, but it is hardly likely that it is entirely absent from that district. We have it from the Rio Juruá and Manáos (received from dealers), and Felder described a specimen from the Rio Negro.

* See p. 418.

a. P. neophilus eurybates Gray (1852).

♀. *Papilio dimas*, Doubleday (*non* Fabricius, 1793, err. det.), *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (*partim*).

♂ *Papilio eurybates* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 51. n. 248. t. 9. fig. 1 (1852) ("Bolivia" laps. cal.; Brazil on label of type); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 263 (1856); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 101 (1864) ("Bolivia" error loci).

♀. *Papilio eupales* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 262. t. x*. fig. 2 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 277 (1856) (Brazil).

♀. *Papilio neophilus*, Gray (*non* Hübner, 1837, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 262 (1852) (sub synon.).

♂. *Papilio aenetdes* local var. *eurybates*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 360 (1861) ("Bolivia").

♀. *Papilio zacynthus* var. ♀, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 360. (1861).

♀. *Papilio zacynthus* ab., Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. sub n. 105 (1864).

♂. *Papilio aeneides* var. e. *P. eurybates*, Kirby, *Cat. Diurn. Lep.* p. 531. sub n. 76 a (1871) ("Bolivia," error loci).

♀. *Papilio zacynthus* var. b. *P. eupales*, id., *l.c.* p. 531. sub n. 76 B. (1871).

♂. Forewing rather narrower than in the other subspecies, white spots large. ——Hindwing: red spots around apex of cell not shaded with black proximally, except the first and last; at least the two middle ones touching cell on underside, the spots being less reduced than in the other forms. The type of *eurybates* agrees with Brazilian specimens, and bears the locality label Brazil, not Bolivia, as said by Gray.

♀. Forewing slightly narrower than in the other races, usually with two large patches R^3—M^2 and a cell-streak, but the patches occasionally vestigial.—— Hindwing: red band usually wider than in the other forms, touching cell, there being sometimes a minute spot in cell; the spots of underside paler and usually longer than in the other subspecies.

Hab. Sao Paulo; Matto Grosso.

One single specimen (a female) from Sapucay, Paraguay, 60 miles east of Assuncion, has the narrow forewing of this form, but agrees in the red band of the hindwing with the next.

In the Tring Museum 7 ♂♂, 12 ♀♀, from: Baluru, Sao Paulo (Dr. Hempel); R. Bitalha, Sao Paulo; Araras, Matto Grosso; Cuyaba (Andeer); Sapucay, Paraguay (W. Foster).

b. P. neophilus consus subsp. nov.

Papilio eurybates, Hopffer (*non* Gray, 1852, err. det.), *Stett. Ent. Zeit.* xl. p. 50. n. 8 (1879) (Bolivia).

Larger on an average than the preceding.

♂. Forewing: green patch M^2—SM^2 longer than broad, often bearing a white dot in the upper distal corner; white spot M^1—M^2 smaller than in *eurybates*, but always very distinct, rounded, spot R^3—M^1 usually larger than spot M^1—M^2, but shaded with black; most specimens with a vestige of a spot R^2—R^3.——Hindwing: bases of red discal spots shaded with black like cell-patch, spot R^3—M^1 often excepted—in one of our numerous specimens hardly any black scales in the red markings, the cell-patch being nearly as pure red as the discal spots; the spots on underside much shorter than in the preceding, standing separate from cell.

♀. Forewing: a large white patch M^1—M^2, preceded by another large patch, which is usually somewhat shaded with brown distally; a more or less distinct cell-streak, which is in one of our Mapiri specimens enlarged to a triangular patch which nearly reaches across the cell; most specimens with a small dot behind M^2, there being also often a small spot marked before R^3.——Hindwing: band usually

narrower than in the preceding, mostly not touching cell, the spots often well separated from one another.

Hab. Bolivia : Santa Cruz de la Sierra northward to the Beni River.

The individuals from Reyes approach a little the next form.

In the Tring Museum : 27 ♂♂, 20 ♀♀, from : Santa Cruz de la Sierra, January to April 1904 (J. Steinbach) ; Rio Grande, December 1903 (J. Steinbach) ; Mapiri ; Salinas, Beni R., July 1893 (Stuart) ; Reyes, Beni R., August 1903 (Stuart).

c. P. neophilus olivencius Bates (1861).

♂ ♀. *Papilio olivencius* Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 345 (1861) (S. Paulo de Olivença ; Bogota) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 102 (1864) (Upp. Amazons ; Bogota); Hahnel, *Iris* iii. p. 275 (1890) (Sao Paulo de Olivença).

Papilio aeneides local var. *olivencius* Bates, *l.c.* p. 360 (1861) ; id., *Journ. Entom.* i. p. 227. sub n. 23 (1862) (S. Paulo de Olivença).

♀. *Papilio anaximenes* Felder, *Wien. Ent. Mon.* vi. p. 65. n. 1 (1862) (Upper R. Negro) ; id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 100 (1864) ; id., *Reise Novara, Lep.* p. 36. n. 25. t. 7. fig. b. (1865) (Upper R. Negro).

Papilio aeneides var. b. *P. olivencius*, Kirby, *Cat. Diurn. Lep.* p. 531. sub n. 76 a. (1871) (Upp. Amazons).

Papilio aeneides var. d. *P. anaximenes*, id., *l.c.* p. 531. sub n. 76 a (1871) (R. Negro).

Papilio aeneides, Obertbür, *Et. d'Ent.* iv. p. 116. n. 290 (1880) (Sao Paulo de Olivença, November) ; Michael, *Iris* vii. p. 214 (1894) (Sao Paulo de Olivença).

Papilio aeneides var. *eurybates*, Maassen & Weym. (*non* Gray, 1852, err. det.), in Stübel, *Reisen S. Amer., Lep.* p. 24. n. 105 (1890) (West side of Cordillera of Bogota) ; iid., *l.c.* p. 79. n. 29 (1890) (N. Peru) ; Haase, *Untersuch. Mimicry* ii. p. 60. t. 9. fig. 65. ♂ (1893).

♂. Forewing : spot M^1—M^2 not distinctly white, being much shaded with green and brown ; spot R^3—M^1 absent or just vestigial.—Hindwing : red discal spots long, shaded with black proximally, small on underside, being separated from cell.

♀. Forewing with vestigial white spot M^1—M^2 or without trace of such a spot. In the specimen described as *anaximenes* the red spots of the hindwing exceptionally long.

Hab. Upper Amazons, from Sao Paulo de Olivença and Upper R. Negro westwards ; eastern slopes of the Andes of Peru and Ecuador, as far north as the Cordillera of Bogota.

In the Tring Museum 40 ♂♂, 32 ♀♀, from : "Bogota" ; Villavicencio to Rio Ocoor, January 1897, 350—400 m., dry season (Dr. Bürger) ; Chanchamayo (W. Hoffmanns ; Schunke) ; La Union, R. Huacamayo, Carabaya, 2000 ft., December 1904, dry season (G. Ockenden) ; Perené, March 1900 (Simons) ; Rio Toro, La Merced, August—September 1901 (Simons) ; Cumbare ; Huallaga ; R. Cachyaco, R. Huallaga (Stuart) ; R. Juruá ; Manáos ; R. Negro.

d. P. neophilus ecbolius subsp. nov.

Papilio aeneides, Gray (*non* Esper, 1788, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 51. n. 247. t. 9. fig. 8. ♀ (1852) (Para ; syn. excl.) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Pará ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 262 (1856) (*partim* ; Pará ; Villa Nova) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 345, 360 (1861) (*partim* ; Pará to Obydos) ; id., *Journ. Entom.* i. p. 227. n. 23 (1862) (Lower Amazons, Tocantins, Guiana) ; Kirby, *Cat. Diurn. Lep.* p. 530. n. 76 a (1871) (*partim* ; Lower Amazons) ; Hahnel, *Iris* iii. p. 240 (1890) (Villabella, Amaz.).

Papilio gargasus, Wallace (*non* Hübner, 1818 ?, err. det.), *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons ; forest) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 103 (1864) (*partim* ; Pará ; Lower Amazons) ; Butler, *Trans. Ent. Soc. Lond.* p. 145. n. 223 (1877) (Rio Tapajos, March).

♂. Forewing: green patch M^2—SM^2 about as long as broad, rather shorter than in the previous forms; white spot M^1—M^2 very distinct, oblong or elliptical, transverse, spot R^3—M^1 also distinct, transverse, spot R^2—R^3 vestigial.——Hindwing: red discal spots shorter than in the preceding forms, the two middle ones usually not shaded with black proximally, small on underside, and spot M^1—M^2 mostly closer to cell than in the other forms.

♀. Forewing: white patch M^1—M^2 large, touching cell behind base of M^1, spot R^3—M^1 more or less shaded with brown, projecting as much distad as spot M^1—M^2 (a line touching both spots would be parallel to distal margin of wing), a small streak in cell, often vestigial, a dot behind M^2 (never absent?), and often a patch before R^3, its distal edge being in a line with the edges of the two patches R^3—M^2; the arrangements of the distal spots reminding one of *P. echemon echemon* ♀, *P. zacynthus polymetus* ♀, and of the ♂ of *P. aglaope*.——Hindwing: red band much narrower than the black distal area between R^2 and M^2, the middle spots touching cell, on underside at least spot R^3—M^1 close to cell.

Hab. Lower Amazons, from the Tocantins to Obidos.

In the Tring Museum 5 ♂♂, 7 ♀♀, from: Igarapé (W. Hoffmanns); Santarem; Obidos, October—November 1904 (M. de Mathan); Juhuty, April 1905 (Mathan).

c. P. neophilus neophilus Hübn. (1837).

♂. *Papilio Eques Trojanus aeneas*, Cramer (*non* Linné, 1758, err. det.), *l.c.* (*partim*; Surinam); Esper, *l.c.* (*partim*).

♂. *Papilio Eques Trojanus aeneides* Esper, *l.c.* (*partim*).

♂. *Priamides gargasus* Hübner, *l.c.* (*partim*).

♀. *Parides neophilus* id., *Samml. Exot. Schmett., Zuträge* fig. 997. 998 (1837).

♂. *Papilio aeneas*, Godart, *Enc. Méth.* ix. p. 33. n. 24 (1819) (*partim*, ♂; Guyane); Lucas, *Lép. Exot.* p. 27. t. 13. fig. 3. ♂ (1835) (Guyane); Boisd., *Spec. Gén. Lép.* i. p. 286. n. 113 (1836) (*partim*, ♂; Surinam; Cayenne); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (*partim*); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 202 (1846) (*partim*).

♀. *Papilio neophilus*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 49. n. 239 (1852) ("♂"!, Surinam)

♂. *Papilio aeneides*, id., *l.c.* p. 51. n. 247 (1852) (descr. and fig. excl.).

♂♀. *Papilio aencides*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 345, 360 (1861) (*partim*; Guiana); Kirby, *Cat. Diurn. Lep.* p. 530. n. 76 A (1871) (*partim*; Guiana); Staud., *Exot. Tagf.* t. 9. ♂♀ (1884).

Papilio gargasus, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 103 (1864) (*partim*; Surinam; Guiana).

Papilio aeneides var. a. *Priam. neophilus*, Kirby, *l.c.* p. 531. sub n. 76 A (1871).

Papilio euristeus?, Möschler, *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304 (1883) (Paramaribo, ♀♀).

Papilio eurimedes var. *eurybates*, Möschler (*non* Gray, 1852, err. det.), *l.c.*

Parides aeneas, Kirby (*non* Linné, 1758, err. det.), in Allen's *Nat. Libr., Lep. Butt.* ii. p. 271. t. 66. fig. 2. ♂ (1896).

♂. Similar to *echolius*, green patch wider; white spots not quite so distinct; red spots of underside of hindwing rather smaller, spot M^1—M^2 farther away from cell.

♀. Forewing: white spots absent, or vestigial, most specimens having two small round spots R^3—M^2, rarely both patches large (occasionally in British Guiana).——Hindwing: band often distant from cell, third spot the longest; black distal area of upperside wider than in *olivencius*.

Hab. The Guianas.

In the Tring Museum 19 ♂♂, 10 ♀♀, from: Cayenne; Surinam; Bartica, Brit. Guiana, March—April 1901.

f. P. neophilus parianus subsp. nov.

Papilio aeneides, Oberthür (*non* Esper, 1788, err. det.), *Et. d'Ent.* iv. p. 94. n. 290 (1880) (*partim* ; Trinidad) ; Staud., *Exot. Tagf.* p. 14 (1884) (*partim* ; Trinidad).

(?) *Papilio gargasus*, Kaye (*non* Hübner, 1818 ?, err. det.), *Trans. Ent. Soc. Lond.* p. 206. n. 196 (1904) (Trinidad ;—this insect ?).

♂. Forewing : green patch M^2—SM^2 longer than broad ; white spot M^1—M^2 large, spot R^3—M^1 usually larger than M^1—M^2, a more or less distinct spot R^2—R^3 ; green streak at inner margin broad.——Hindwing : red patch less palmate than in the Bolivian form, spot R^3—M^1 rarely purple at base, the spots paler beneath than in *consus*, R^3—M^1 close to cell.

♀. Forewing : a large patch M^1—M^2, a somewhat smaller one R^3—M^1, often a spot R^2—R^3 and a dot behind M^2, cell-streak distinct in most specimens.—— Hindwing : band more S-shaped than in the other forms, narrow middle spots close to cell above and below, paler beneath than in the Bolivian subspecies, with which this subspecies agrees best.

Hab. Trinidad ; Venezuela : Cumana and Orinoco.

In the Tring Museum 55 ♂♂, 50 ♀♀, from : Caparo valley, Trinidad, December 1896 and January and February 1897 (Dr. P. Rendall) ; Maraval, Trinidad, July 1891 ; Campo Alegre, Cumana, 1500 ft., April 1899 (André) ; Patao, Guiria, August 1891 ; Maipures, Orinoco, December 1898 (Cherrie) ; Snapure, Caura R., February and March 1899, October 1900 (S. M. Klages) ; La Vuelta, May 1904, and Corosito, June 1904, Caura R. (S. M. Klages).

43. **Papilio zacynthus** Fabr. (1793).

♂. *Papilio Eques Trojanus zacynthus* Fabricius, *Ent. Syst.* iii. 1. p. 15. n. 46 (1793) (Brazil).

♀. *Papilio Eques Trojanus dimas* id., *l.c.* p. 16. n. 47 (1793) (Brazil ; cit. Cram. exceptis).

♂♀. *Papilio zacynthus*, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 211 (1846) (*dimas* ♀ of *zacynthus*) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 105 (1864) (Brazil ; ♂ = *polymetus* ; ♀ aberr. = *eupales*, error !) ; Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 7. n. 17 (1879) (Rio ; larva mentioned) ; Staud., *Exot. Tagf.* i. p. 14 (1884) (Bahia ; Rio de Janeiro).

♂. Forewing with greenish blue patch and at least two white spots. Red band of hindwing separate from cell or contiguous with it, no red spot in cell or only a minute one. Midtibia spinose as in *P. neophilus*.

♀. Very close to certain females of *P. neophilus* ; either the white spots of forewing more or less rounded and no spot in cell, or spot M^1—M^2 oblong, large, and a sharply defined spot in cell ; band of underside of hindwing paler pink than in *neophilus*, there being hardly any black scales in the band.

Scent-organ and genitalia as in *P. neophilus*.

Early stages mentioned by Burmeister, *l.c.*

Hab. Brazil, from Rio de Janeiro to Pernambuco.

In the district where *zacynthus* occurs *P. neophilus* is not found. The two insects are so closely related that it is quite possible there exists an intermediate form, perhaps in Goyaz, where the Brazilian and Amazonian faunae meet. Of the two subspecies of *P. zacynthus* the more northern one agrees better with *P. neophilus* than the southern one.

a. P. zacynthus polymetus Godt. (1819).

Papilio polymetus Godart, *Enc. Méth.* ix. p. 35. n. 28 (1819) (♂, Brazil ; "Peru," error) ; Swains., *Zool. Illustr.* iii. t. 92. ♂♀ (1823) (Bahia ; var. excl.) ; Lucas, *Lép. Exot.* p. 10. t. 6. fig. 1 (1835) (fig. mala ? haec subsp. ?) ; Boisd., *l.c.* p. 283. n. 108 (1836) (*partim*) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 212 (1846) (cit. Hübn. excl.) ; Oberth., *Et. d'Ent.* iv. p. 93. n. 288 (1880) (Brazil).

Papilio dimas, Godart, *l.c.* p. 36. n. 33 (1819) (*partim*).
Papilio zacynthus var. a. *Papilio polymetus*, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. sub n. 261 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. sub n. 276 (1856) (Brazil ; "Pará" error loci) ; Kirby, *Cat. Diurn. Lep.* p. 531. sub n. 76 B (1871).
Papilio orsilius Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 264 (1852) (Pernambuco) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 279 (1856) (Pernambuco; Tapajos) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 346, 360 (1861) ; id., *Journ. Entom.* i. p. 227. n. 24 (1862) (Pernambuco ; Tapajos, not in the Amazonian plains) ; Feld., *l.c.* n. 104 (1864) (Babia ; Pernambuco ; R. Tapajos).
Papilio zacynthus Fabr. var. *polymetus*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 346, 360 (1861) ; id., *Journ. Entom.* i. p. 227. n. 24 (1862) ("Pará," locality doubtful !).
Papilio polymatus (!), Guenée, *Ann. Soc. Ent. France* p. 308. note (1867) (= *zacynthus* ; ♀ *dimas*).
Papilio zacynthus var. c. *P. orsillus*, Kirby, *l.c.*
Papilio zacynthus, Grimshaw, *Trans. Roy. Soc. Edinb.* xxxix. i. No. 1. p. 7 (1897) (in Edinburgh Museum, one of Godart's types).

♂ ♀. Apex of forewing semitransparent; in male spot M^1—M^2 a little smaller, but purer white, than spot R^3—M^1, separate from cell, rarely a white dot behind M^2; in female spot M^1—M^2 a little larger, or at least broader, than spot R^3—M^1, usually a spot R^2—R^3, but not cell-spot.

Hab. Pernambuco ; Bahia ; R. Tapajos.

In the Tring Museum 7 ♂♂ and 3 ♀♀ from Pernambuco and Bahia.

b. P. zacynthus zacynthus Fabr. (1793).

♂. *Papilio Eques Trojanus zacynthus* Fabricius, *l.c.* (Brazil).
♀. *Papilio Eques Trojanus dimas* id., *l.c.* (Brazil).
♀. *Priamides hippasan*, Hübner, *Verz. bek. Schmett.* p. 87. n. 906 (1818?) (*partim*).
♂. *Papilio zacynthus*, Godart, *Enc. Méth.* ix. p. 34. n. 25 (1819) ; Donov., *Nat. Repos., Ent.* ii. t. 26, 27. fig. 1 (1823) (Brazil) ; Boisd., *Spec. Gén. Lép.* i. p. 284. n. 109 (1836) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 11 (1845) (cit. Hübn. excl. ; Brazil).
♀. *Papilio dimas*, Godart, *l.c.* p. 36. n. 33 (1819) (Brazil, *partim*) ; Donov., *l.c.* fig. 2 (1823) (Brazil); Lucas, *Lép. Exot.* p. 30. t. 14. fig. 2 (1835) ; Boisd., *l.c.* p. 292. n. 120 (1836) (Rio de Janeiro ; "♀ var. in coll. Roger," probably ♀ *neophilus*) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 12 (1845) (Brazil).
Papilio polymetus, Swainson, *l.c.* (1823) (var., Rio de Janeiro).
♂ ♀. *Papilio zacynthus*, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 211 (1846) (*dimas* ♀ of *zacynthus*); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 261 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 276 (1856) (Brazil) ; Butl., *Cat. Diurn. Lep. descr. Fabric.* p. 237. n. 12 (1869) (Brazil) ; Kirby, *Cat. Diurn. Lep.* p. 531. n. 76 b (1871) (Brazilia) ; Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 8. n. 3 (1874) (Jacarepagua, August) ; Haase, *Untersuch. Mimicry* i. p. 79 (1893).
Papilio demas (!), Doubleday, Westw. & Hew., *l.c.* ii. p. 529 (1852).
♂ ♀. *Papilio dimas*, Oberthür, *Et. d'Ent.* iv. p. 93. n. 289 (1880) (Brazil; difference from *polymetus*)
Papilio zacinthus (!), id., *l.c.* iv. p. 93. sub n. 289 (1880) (err. cal.).

♂ ♀. Apex of forewing much more opaque than in *polymetus*, the wing altogether deeper black, the spots purer white, spot M^1—M^2 much larger than in *polymetus*, longer than broad, spot R^3—M^1 smaller, in both sexes a white spot behind M^2, in female a spot in cell, small but sharply defined. Band of hindwing narrower than in *polymetus*.

Hab. Province of Rio de Janeiro.

In the Tring Museum : 3 ♂♂ and 3 ♀♀ from Rio de Janeiro (E. May).

44. Papilio arcas Cram. (1781).

(?) *Papilio Eques Trojanus viridimaculatus* Goeze, *Ent. Beytr.* iii. 1. p. 44. n. 24 (1779) (this species? or *P. aeneas* ?—Type : Seba, *Thes.* t. 30. fig. 25. 26. ♂).
♀. *Papilio Eques Trojanus arcas* Cramer, *Pap. Exot.* iv. p. 174. t. 378. fig. C (1781) ("Brazil").

♂. *Papilio Eques Trojanus eurimedes* id., *l.c.* iv. p. 199. t. 386. fig. E. F (1782) (Berbices).
♂ ♀. *Papilio eurymedes* (!), Erichson, in Schomb., *F. F. Brit. Guiana* p. 593 (1848) (♀ = *arriphus*).
♂ ♀. *Papilio eurimedes*, Kirby, *Cat. Diurn. Lep.* p. 530. n. 76 (1871) ("var. b. *P. timias*" excl.); Oberth., *Et. d'Ent.* iv. p 95. n. 292 (1880) (synon. *partim*).

♂ ♀. Antenna deeper black than in *P. neophilus*, the sensory grooves, though sharply defined, not so distinct, being black like the rest of the antenna. Mid-tibia much more densely hairy than in *P. neophilus*. Apical half of forewing opaque in both sexes. In male the cell of hindwing red from centre to apex on upperside, the cell-patch being, however, often reduced, sometimes absent, occasionally occupying about three-fifths of cell. In female forewing with a broad white (slightly yellow) patch across cell, a large patch R^3—M^1 on disc, a smaller one R^2—R^3, and sometimes a small spot behind M^1. Abdominal fold as in *P. neophilus*.

Genitalia: ♂. Harpe truncate, with two long spinelike teeth at apex, sometimes accompanied by one or two small ones.

Early stages not known.

Hab. Mexico to Colombia, Veneznela and the Guianas.

Seba's figures, on which the name *viridimaculatus* was based by Goeze, are rough. The underside (fig. 26) does not agree with any *Papilio* known. The marginal spots are described as being white. The figure may have been meant for *P. aeneas*, *arcas*, or even *neophilus*.

a. P. arcas mylotes Bates (1861).

♂ ♀. *Papilio mylotes* Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 258 (1856) (*nom. nud.*; Mexico; Nicaragua); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 346. note (1861) (Nicaragua; descr. of ♂ ♀); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (Mexico; Central America); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 109 (1864) (Nicaragua; Mexico?; *docimus* ♀ of *mylotes*); Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 364. n. 365 (1874) (Costa Rica); Strecker, *Butt. Moths N. Amer.* p. 68. n. 4 (1878) ("S. California" false; Mexico, Nicaragua, Panama); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 198. n. 13. t. 65. fig. 9. 9A. genit. (1890) (Mexico to Costa Rica).

Papilio docimus Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 259 (1856) (*nom. nud.*; Nicaragua); Weidem., *l.c.* p. 147 (1863) (Mexico).

♂. *Papilio caleli* Reakirt, *Proc. Ent. Soc. Philad.* ii. p. 138. n. 8 (1863) (Guatemela); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 107 (1864) (Guatemala; *tonila* ♀ of *caleli*?); Strecker, *Lep. Rhop. Het.* p. 15. (1873) ("= *polymetus* Godt.") ; id., *l.c. Suppl.* iii. p. 17 (1900) (type in coll. Strecker).

♀. *Papilio tonila* Reakirt, *l.c.* p. 140. n. 10 (1863) (Guatemala); Streck., *l.c.* iii. p. 17 (1900) (type in coll. Strecker).

♂. *Papilio alcamedes* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 286. n. 106 (1864) (*nom. nud.*; Nova Granada?); id., *Reise Novara, Lep.* p. 36. n. 26. t. 7. fig. e (1865).

♀. *Papilio aristomenes* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 108 (1864) (*nom. nud.*; Mexico); id., *Reise Novara, Lep.* p. 38. n. 27. t. 7. fig. a (1865).

Papilio eurimedes, Boisduval, *Consid. Lép. Guatem.* p. 6 (1870) (Honduras; Nicaragua; Costa Rica; "Venezuela" alia subspec.; *alcamedes* = *eurimedes*).

Papilio eurimedes var. e. *P. mylotes*, Kirby, *Cat. Diurn. Lep.* p. 530. sub n. 76 (1871) (Nicaragua).

Papilio eurimedes var. d. *P. tonila*, id., *l.c.* (Mexico).

Papilio eurimedes var. e. *P. caleli*, id., *l.c.*

Papilio zacynthus var. *P. polymetus*, id. (*non* Godart, 1819, err. det.), *l.c.* p. 809. n. 76b (1877) (*caleli* = *polymetus*, error).

♂. Forewing: green patch R^3—M^1 long, rarely without white spot; cell usually with green and white spot; no streak at inner margin, patches M^1—SM^2 large.——Hindwing: red spots large, all separate from cell on underside.

♀. Band of hindwing separate from cell above and below, bright red, no spot SC^2—R^1.

In coll. Charles Oberthür there is a curious aberration of the male, from San Pedro Sula, Honduras. The specimen has a large pale pink patch on the underside of the forewing, the band on the underside of the hindwing being also pale pink.

Hab. Mexico to Costa Rica.

In the Tring Museum: 57 ♂♂, 52 ♀♀, from: Motzorongo, Mexico; Mazatenanga and Retalhuleu, W. Guatemala, 1000 ft., September 1904 (A. Hall); Escuintla, W. Guatemala, 1100 ft., August 1904 (A. Hall); San Pedro Sula, Honduras; Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall); Carillo, June—July 1903 (Underwood); Carthago, Costa Rica (Underwood); San José, Costa Rica, September 1904 (A. Hall); Pozo Azul, Costa Rica, June 1902 (Underwood); Guatil Pirris, Costa Rica, January 1902 (Underwood).

b. P. arcas mycale Godm. & Salv. (1890).

Papilio mycale Godman & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 199. n. 14. t. 65. fig. 12. ♂, 13. ♀ (1890) (Panama: Chiriqui, Bugaba, Lion Hill, Veraguas).

♂. Forewing: green spot R^3—M^1 always present, often with white dot; patch M^1—M^2 large, usually extended close to cell, filling in base of cellule M^1—M^2; patch M^1—SM^2 sometimes reduced posteriorly; streak at inner margin present or absent; occasionally a white dot in cell on underside.——Hindwing: cell-spot and bases of discal spots more or less shaded with brown.

♀. Hindwing with or without a small cell-spot, the band deeper red above and below than in the Colombian forms, sometimes separate from cell on underside.

Hab. Northern Panama and the islands off the south coast.

Completely connecting *P. a. mylotes* with *P. a. arriphus*.

In the Tring Museum: 24 ♂♂, 11 ♀♀, from: Chiriqui; Bogava, 800 ft., and Boquete, 3500 ft. (Watson); Brava I., January 1902, and Cebaco I., February 1902 (J. H. Batty); Colon.

c. P. arcas arriphus Boisd. (1836).

♀. *Papilio arriphus* Boisduval, *Spec. Gén. Lép.* i. p. 393. n. 123 (1836) (Colombia).

♀. *Papilio serapis*, Doubleday (*non* Boisduval, 1836, err. det.), in Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 196 (1846) (*partim*; Colombia); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (*arriphus* ♀ of *serapis*, false).

♂. *Papilio agathokles* Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 352. n. 4 (1850) ("R. Orinoko"); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852).

Papilio eurimedes, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 50. n. 244 (1852) (*partim*; *arriphus* ♀ of *eurimedes*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 111 (1864) (*partim*); Kirby, *Cat. Diurn. Lep.* p. 530. n. 76 (1871) (*partim*; N. Granada).

Papilio arrhipus (!), Weidemeyer, *l.c.*

Papilio arripus (!), id., *l.c.*

Papilio eurimedes var. a. *P. agathocles* (!), Kirby, *Cat. Diurn. Lep.* p. 530. sub n. 76 (1871).

Papilio eurimedes var. *mylotes*, Staudinger (*non* Bates, 1861, err. det.), *Exot. Tagf.* p. 14. t. 9. ♂ ♀ (1884).

♂. Forewing: spot R^3—M^1 nearly always distinct, usually isolated, often centred with white.——Hindwing with cell-spot on upperside, not on underside.

♀. Band of hindwing entering cell, pale, its inner edge crossing cell in most specimens just distally of point of origin of M^2.

Hab. Colombia: Magdalena valley, and R. Meta, east side of Cordillera of Bogota.

The locality given by Kollar for his *agathokles* is doubtless erroneous. The specimen agrees with certain individuals from Colombia in which the patch of the hindwing is very pale. We are the more convinced that *agathokles* came from Colombia, as Kollar records also *Papilio americus* from the Orinoco, where it is hardly likely to occur, being in Colombia and Venezuela a species of high altitudes. Prince Sulkowsky, who brought these specimens home, went up the Rio Magdalena in Colombia, crossed the Cordillera of Bogota and came down the Rio Meta and Orinoco, which accounts for errors in localisation.

In the Tring Museum 40 ♂♂, 30 ♀♀, from: Valdivia, July 1897 (Pratt); Pacho, November 1898; Muzo, November 1896; Purnio, October—November 1896 (Dr. Bürger); Villavicencio.

Very common in "Bogota" collections.

d. P. arcas antheas subsp. nov.

Papilio agathokles, Maassen & Weym. (*non* Kollar, 1850, err. det.), in Stübel, *Reisen in S. Amer., Lep.* p. 36. n. 37 (1890) (La Plata, Cauca).

♂. Forewing: green band more or less reduced, no spot before M^1 either above or below.——Hindwing: no spot in cell or only a minute one, the band pale in most individuals and very narrow: first spot of underside, R^1—R^2, much smaller than the last.

♀. Forewing: patch R^2—R^3 on the whole larger than in *arriphus*, sometimes nearly as long as patch R^3—M^1; most specimens with a white streak in front of apex of cell; cell-patch often completely filling in apex of cell.——Hindwing: band very pale, narrow, standing outside cell or just entering apex; spot SC^2—R^1 (the first of the Bogota form) absent from most specimens.

Hab. Cauca valley.

This is one more instance of the reduction of the markings observed among the Cauca Papilios. As in the case of *P. erithalion cauca* and *P. eurycon pithonius*, we find also here all intergradations between the Cauca and Magdalena or "Bogota" forms. It appears to us that intergradations are especially often observed in the lower as well as the upper districts of the Cauca valley, while the typical Cauca forms come from the middle portion of the valley.

In the Tring Museum 40 ♂♂ and 34 ♀♀ from Pereira and Popayan.

e. P. arcas arcas Cram. (1781).

(?) Seba, *Thesaur.* iv. p. 38. t. 30. fig. 25. 26 (1764) (fig. malae).

(?). ♂. *Papilio Eques Trojanus viridimaculatus* Goeze, *Ent. Beytr.* iii. 1. p. 44. n. 24 (1779) (this species?).

♀. *Papilio Eques Trojanus arcas* Cramer, *l.c.* iv. p. 174. t. 378. fig. C. (1781) ("Brazil"); Jabl. & Herbst, *Naturs. Schmett.* ii. p. 83. n. 24. t. 10. fig. 3 (1785); Jung, *Alphab. Verz. Schmett.* p. 46 (1791); Esper, *l.c.* p. 146. n. 68. t. 38. fig. 2 (1793).

♀. *Papilio Eques Trojanus curimedes* Stoll, *l.c.*; Esper, *Ausl. Schmett.* p. 60. n. 26. t. 15. fig. 2 (1788).

Parides aeneas, Hübner (*non* Linné, 1758, err. det.), *Verz. bek. Schmett.* p. 87. n. 908 (1818?).

Papilio curimedes, Godart, *Enc. Méth.* ix. p. 31. n. 26 (1819) (♂, Guyane); Boisd., *Spec. Gén. Lép.* i. p. 285. n. 111 (1836); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 204 (1846) (Guiana; Venezuela); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 50. n. 244 (1852) (Venezuela; synon. *partim*); id., *List Lep. Ins. Brit. Mus.* i. *Pap* p. 64. n. 257 (1856) (*partim*; Venezuela); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 111 (1864) (*partim*); Hahnel, *Iris* iii. p. 138 (1890) (San Estéban, in forest); Poujade, *Bull. Soc. Ent. France* p. 140. n. 1 (1895) (Venezuela).

♀. *Papilio arcas*, Godart, *l.c.* p. 37. n. 35 (1819) ("Brazil"); Boisd., *l.c.* p. 293. n. 122 (1836) ("Brazil"); Doubl., Westw. & Hew., *l.c.* i. p. 18. n. 195 (1846) ("Brazil"); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 228 (1852) ("Brazil"); id., *List Lep. Ins. Brit. Mus.* i. *Pap* p. 61. n. 241 (1856); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 295. n. 60 (1864) (Brazil?); Kirby, *Cat. Diurn. Lep.* p. 527. n. 61a (1871) (Brazil?).

Papilio curymedes (!), Erichson, in Schomb., *F. F. Brit. Guiana* p. 593 (1848).

♂. Forewing with white spot R^3—M^1 above and below, seldom vestigial.——Hindwing: red patch large, entering cell on underside as well as upper, but the cell-spot usually much shaded with black on underside.

♀. Red band of hindwing large, brighter red than in the Colombian forms.

Hab. The Guianas; Venezuela.

The insect figured by Cramer as *arcas* is without doubt the female of the present subspecies. The fringe-spots of the hindwing are white in the figure; but that is surely a mere error in coloration, since similar mistakes occur in other figures—for instance, in fig. F of Pl. 386, which represents the male of *arcas* (= *eurimedes*).

In the Tring Museum 16 ♂♂, 14 ♀♀, from: Cayenne; San Esteban, October, 1896 (Dr. Bürger); Mérida and Tachira (Briceño); Valencia.

45. Papilio timias Gray (1852).

♂. *Papilio timias* Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 203 (1846) (*nom. nud.*; Guayaquil); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 50. n. 242. t. 9. fig. 3 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 255 (1856); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 296. n. 110 (1864).

♀. *Papilio bimaculatus* Hewitson, *Exot. Butt.* v. *Pap.* t. 14. fig. 47 (1875) (Ecuador).

♂♀. *Papilio curimedes* var. b. *P. timias*, Kirby, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 530. sub n. 76 (1871); id., *l.c.* p. 809. n. 76 (1877) (*bimaculatus* ♀ of *timias*).

This insect takes a similar position towards *P. arcas* as does *P. zacynthus* towards *P. neophilus* (= *aeneides* auct.); but, while in *zacynthus* it is the male which differs more essentially from *P. neophilus*, it is the female of *timias* which differs conspicuously from *P. arcas*.

There is apparently no structural difference between *timias* and *arcas*. Male with a large green patch on forewing from inner margin beyond R^3 and two conspicuous white spots R^2—M^1; apical half or third of cell of hindwing red. In female the forewing bears two rounded spots, R^2—M^1, white, more or less shaded with brown, the upper one being the larger; red band of hindwing across apex of cell, its proximal edge nearly straight. Cell of forewing with or without small subapical spot, never with broad patch as in ♀ *P. arcas*.

Hab. West Ecuador.

Two subspecies.

a. P. timias timias Doubl. (1846).

♂. *Papilio timias* Gray, *l.c.* (Guayaquil).

♀. *Papilio bimaculatus* Hewitson, *l.c.* (Ecuador).

Papilio curimedes var. *timias*, Maas. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 66. n. 23 (1890) (Guayaquil).

♂♀. *Papilio bimaculatus*, Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 150 (1903) (Palmar, W. Ecuador, July).

♂. Forewing: no green spot in cell, or only a few green scales; green patch M^2—SM^2 usually not extended to base of M^2.——Hindwing: red spot R^1—R^2 of underside (first spot) longer than, or at least as long as, the last spot.

♀. Forewing: no spot in cell or only a vestige; white discal spots more or less washed with brown, often small.——Hindwing: cell-spot usually shaded with brown proximally, spot R^1—R^2 at least as long as spot M^1—M^2, the band somewhat narrowing behind and deeply incised distally at the veins; on underside the band more strongly narrowing than above, spot R^1—R^2 being much longer than spot M^2—SM^2; no spot at abdominal edge or only a vestige of a spot.

Hab. Guayaquil and neighbouring districts at a low elevation: Chimbo, La Chima, Los Rios, Bahahoyo, Arenillas, Palmar, etc.

In the Tring Museum 22 ♂♂, 13 ♀♀, from: Cachabi, January 1897 and Chimbo, 1000 ft., August 1897 (Rosenberg); Palmar (R. Haensch); Naranjas, Guayaquil (O. T. Baron); Quevedo (v. Buchwald).

b. P. timias potone subsp. nov.

♂. Forewing: a more or less distinct cell-spot; green patch wider than in *P. t. timias*, white spots generally larger.——Hindwing: spot R^1—R^2 not longer than M^1—M^2, streak M^2—(SM^1) usually long; on underside spot R^1—R^2 smaller than spot M^2—SM^2.

♀. Forewing: mostly with conspicuous cell-spot, patch R^3—M^1 usually larger than in *P. t. timias*.——Hindwing: band widening behind; on underside spot R^1—R^2 shorter than M^2—SM^2; a distinct spot at abdominal edge, the cell-spot and the middle ones larger than in the preceding, the veins separating them less extended black.

Hab. West Ecuador: Paramba; also Ambato. At higher elevations than the preceding subspecies.

In the Tring Museum 6 ♂♂, 10 ♀♀, from: Paramba, 3500 ft., February and March 1897 (Rosenberg); Paramba (Flemming & Miketta).

Subsection B.

Antenna without distinct grooves; end-segment very short, more or less completely fused with the preceding segment. Claws more or less symmetrical, at least of hindleg. Markings of body not bright red, being white or yellow, rarely rufous, in this case the hindwing with a red dot at base; dots on abdominal sternites (if present) always white; no red spots or band in centre of hindwing; submarginal spots always present, often also admarginal ones. Subbasal cell of hindwing not widening apicad; cell rounded at apex, cross-vein D^3 leaning distad anteriorly, the cell-angle D^3—D^4 being larger than the cell-angle D^2—D^3, or at least as large.

♂. Scent-organ never woolly, consisting of a stripe of short scales, there being a naked streak along the fold on the discal side. Tenth abdominal tergite shorter than the sternite. Clasper short; harpe very short, not reaching to centre of clasper, usually ending in two teeth, of which one is lost or modified in many forms, there being often some small additional teeth. Tibiae not incrassate, similar in the sexes.

♀. Vaginal cavity large, covered on hinder side by a smooth convex sclerite, which bears distally a small groove of which the proximal edge is raised, somewhat resembling the lip of a jug. Proximally within this cavity two large membranaceous hairy flaps, which are either separated or are almost merged together. Ana

segment proximally with some short stout spinelike bristles. The lateral tubercle of the prothorax of the larva is much prolonged.

The species are much less numerous than in Subsection A. Though some of the species are more nearly related with one another than with the other members of the Subsection, the differences in structure are very slight. It appears to us, therefore, advisable to keep all the species united in one group, by which means the close relationship between them will be best emphasised. In the key the species are grouped according to relationship.

IV. Polydamas Group.

Key to the species :—

a. Tailed ; tail sometimes absent, such specimens recognisable as belonging here by the strong blue-green gloss in the distal half of the underside of the hindwing ; white discal spots on underside of hindwing, besides the submarginal row of orange or red spots . . . *b*.

No tail ; spots of body rufous red, or underside of hindwing with white central band . . . . . *c*.

No tail; spots of body yellow . . . . . *d*.

No tail ; breast and sides and undersurface of abdomen greenish yellow, long-hairy . . . . . *e*.

b. Hindwing below strongly glossy bluish green in outer half. Species No. 46.

Hindwing below not glossy green, distally with several small white spots in middle of wing behind cell and in apex of same . . . . . Species No. 47.

Hindwing below not glossy green distally, with a band of large white patches in middle . . . . . Species No. 48.

c. Forewing without band of spots on upperside . . . Species No. 49.

Forewing with band of spots on upperside ; hindwing below for the greater part creamy buff . . . Species No. 50.

Forewing with band of spots on upperside ; hindwing below brown . . . . . Species No. 51.

d. Hindwing below with red spots . . . . . Species No. 52.

Hindwing below without red spots . . . . . Species No. 53.

e. Hindwing above with a regularly curved discal row of seven greenish white spots parallel to distal margin, separate from cell, the last spot, which is double, being at least as large as the second ; submarginal spots also marked; forewing with a row of spots . . *f*.

Discal band of hindwing absent, or touching cell, or entering it, or the spots decreasing in size, the last ones being minute, while the first is very large . . . *g*.

Hindwing above with white streak along abdominal fold . Species No. 58.

f. Red submarginal spots on underside of hindwing transverse, contiguous with creamy white spots . . . . Species No. 54.

Red submarginal spots of hindwing arched ; no white admarginal spots. . . . . Species No. 55.

g.	White costal patch on upperside of hindwing of male very large, extending to base; forewing with white streak in cell and some large patches on disc (females and most males)	Species No. 59.
	White costal patch of hindwing not reaching base, creamy white; no streak in cell of forewing and no large patches on disc close to cell; or there is a large patch in apex of cell	*h*.
h.	Hindwing below with small white admarginal dots . .	Species No. 56.
	Hindwing below without white admarginal dots; red submarginal spots thin	Species No. 57.

46. **Papilio philenor** L. (1771).

Papilio Eques Trojanus philenor Linné, *Mant. Plant.* p. 535 (1771) (America).
Papilio Eques Trojanus astinous Drury, *Illustr. Exot. Ins.* i. p. 21. t. 11. fig. 1. 4. ♂ and Index (1773) (New York; Maryland; Virginia).
Laertias philenor, Hübner, *Verz. bek. Schmett.* p. 84. n. 858 (1818?); Scudd., *Butt. E. U.S. & Canada* ii. p. 1241 (1889).

♂ ♀. A close ally of *P. polydamas*, being more generalised than that species in the preservation of a tail (in most specimens), and of dots on the abdominal sternites, and more specialised in the development of metallic colours and in the reduction of the markings of the upperside.

The presence of white discal dots on the underside of the hindwing is also a generalised character, which is still more in evidence in *P. devilliers* and *zetes*. Comparing the forewings of *polydamas* and *philenor* a close agreement in the phyletic development of the spots will be observed. In both species the spots in the apical region are the first to disappear, being longer preserved on the upper than on the underside, the apical area of the underside assuming a faded tint. The posterior spots of the upperside, however, which in *polydamas* are always present, while they are often absent like the anterior ones in *philenor*, are always smaller than the respective spots of the underside, the latter spots being preserved when those of the upperside have disappeared.

The development in the markings of the hindwing is opposite in the two species. In *polydamas* the band of spots of the upperside remains comparatively broad, in connection with the development of the spots of the forewing, the spots being rarely reduced to narrow lunules. The corresponding spots of the underside have been shifted towards the distal margin, and are reduced to more or less narrow bars. In *philenor*, on the contrary, the spots of the upperside are much reduced, being sometimes absent, those of the underside being much larger.

The preservation of a tail in *P. philenor* and the West Indian *zetes* (Haiti) and *devilliers* (Cuba), and the occasional absence of the tail from Mexican specimens of *philenor*, are significant facts worthy of special mention. If the tail is a useful appendage developed to give protection to the individual, the projecting tail being taken hold of by an insect-feeder and breaking off, affording the insect a chance of escape, as is the opinion of adherents of this variety of Natural Selection, we must naturally conclude that in countries where there is a greater number of tailed species the persecution of the insects must be more vigorous than in districts which are inhabited by comparatively few tailed species.

Now, with the exception of two species (*hahneli* from the Amazons, and *phalaecus* from Ecuador) all the tailed species of the vast group of American Aristolochia-Swallowtails occur in the countries from Costa Rica northwards, and in the Brazilian faunistic subregion (inclusive of Paragnay and Argentina). Is it at all likely that in the Andesian and Amazonian provinces, from Bolivia to Costa Rica and eastwards to the Guianas and Pará, the tail is an unnecessary appendage in these insects and has therefore been dropped, while it is a useful passive means of defence in the other districts? Considering further that these Aristolochia-feeders are supposed to be practically immune, their nasty smell protecting them from insect-feeders (perhaps not against inexperienced young individuals), it appears to us certain that the presence of a tail in nearly all the Aristolochia-Papilios occurring from Nicaragua northwards, as well as in almost every species found in the Brazilian province, has nothing to do with a supposed usefulness of the tail as a passive means of protection, and that accordingly the occasional absence of the tail from Mexican specimens of *philenor* is due to a physiological change of the species in the southern districts of its range. *P. philenor* was originally doubtless an inhabitant of the Atlantic district of the Nearctic Region; the close morphological connection between the Continental *philenor*, the Cuban *devilliers* and the Haitian *zetes* pointing decidedly in this direction. From this original home the species spread southward and westward into Mexico, and at the Pacific coast again northward as far as Northern California, Californian, Arizonan and Mexican specimens differing on the whole slightly from eastern ones.

The scales of the upperside of the forewing are denticulate in *P. philenor*, except towards the hinder angle; on the hindwing, on the contrary, the scales are entire, except in the region of the tail and anal angle. On the underside the scales are dentate on both wings, the inner area of the forewing excepted. The white spots attached to the orange spots of the hindwing are homologous to the white spots of *P. polydamas*, which stand in the same connection with the red spots in this species. The basal dot of the hindwing of *P. philenor*, on the underside, is found in all the near allies of *P. polydamas*, the corresponding dot of the forewing being also present in *P. polydamas*. The scent-organ of the male and the genitalia of both sexes are essentially as in *P. polydamas*, being only slightly different.

The spring specimens of *P. philenor* appear to be on the whole smaller than the later individuals, and bear always a row of spots on the upperside of the forewing, this row being often absent from the males of the summer brood (or broods). The hairiness of the body varies considerably, early Californian specimens having quite a shaggy appearance.

Scent-organ: the scales are smaller than in *P. polydamas*, those of the streak of small scales situated along the naked streak being moreover less triangular.

Genitalia: ♂. The lateral edges of the tenth tergite are elevate in proximal half, the distal half of the process appearing depressed in a lateral view. Harpe with two processes as in *P. polydamas*, both short, pointed, the ventral one compressed and broader than the dorsal process.——♀. Hairy flaps in front of cavity large, connected with one another at base, acuminate, each bearing on the distal side a carina which extends on to the membranous proximal wall of the cavity.

For early stages, see literature under *P. ph. philenor*.

Hab. United States, except the central district from Colorado northwards; Mexico.

a. P. philenor philenor L. (1771).

Papilio Eques Trojanus philenor Linné, *Mant. Plant.* p. 535 (1771) (America) ; Fabr., *Syst. Ent.* p. 445. n. 12 (1775) (America ; = *astenous*) ; Goeze, *Ent. Beytr.* iii. 1. p. 39. n. 2 (1779) ; Fabr., *Spec. Ins.* ii. p. 4. n. 15 (1781) ; id., *Mant. Ins.* ii. p. 2. n. 15 (1787) ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 271. n. 52. t. 19. fig. 2. 3 (1784) ; Esper, *Ausl. Schmett.* p. 49. n. 19. t. 11. fig. 3 (1785) ; Panz., *Drury's Abbild.* p. 54. t. 11. fig. 1. 4 (1785) ; Gmelin, *Syst. Nat.* i. 5. p. 2228. n. 282 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 6. n. 18 (1793).

Papilio Eques Trojanus astinous Drury, *Illustr. Exot. Ins.* i. p. 21. t. 11. fig. 1. 4. ♂ (1773) (New York ; Maryland ; Virginia) ; Cram., *Pap. Exot.* iii. p. 26. t. 208. fig. A. B. ♂ (1779) (New York) ; Jung, *Alphab. Verz. Schmett.* i. p. 59 (1791) (= *philenor*).

Papilio Eques Achivus astionous (!), Stoll, in Cram., *Pap. Exot.* iv., *Ordre Syst.* p. 3. note 2 (1782) (= *philenor*).

Princeps dominans philenor, Hübner, *Samml. Exot. Schmett.* i. t. 128 (1806— ?).

Laërtias philenor, id., *Verz. bek. Schmett.* p. 84. n. 858 (1818 ?) ; Scudd., *Syst. Rev. Amer. Butt.* p. 43 (1872) ; id., *Geol. New Hampsh.* i. p. 359. t. A. fig. 15. 17 (1874) ; id., *Butt. E. U.S. & Canada* ii. p. 1241. t. 16. fig. 3, t. 26. fig. 6, t. 35. fig. 24. 25, t. 40. fig. 8, t. 43. fig. 19, t. 45. fig. 4. 5, t. 46 fig. 42, t. 56. fig. 8, t. 66. fig. 4. 8, t. 72. fig. 7, t. 76. fig. 13. 20. 21, t. 80. fig. 1—5, t. 85, fig. 14 (1889) ; id., *Psyche* viii. p. 207. t. 5. fig. 1 c. larva juv. (1898) ; Dyar, *Bull. U.S. Nat. Mus.* lii. p. 4. n. 23 (1902).

Papilio philenor, Jung, *Alphab. Verz. Schmett.* ii. p. 102 (1792) (India !) ; Abbot & Smith, *Lep. Ins. Georgia* i. p. 5. t. 3 (1797) (l., p., ♂, ♀) ; Say, *Amer. Entom.* No. 1. plate (1817) ; Godt., *Enc. Méth.* ix. p. 40. n. 47 (1819) ; Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 29. t. 11 (1833) (l., p., ♂) ; Lucas, *Lép. Exot.* p. 15. t. 8. fig. 2 (1835) ; Boisd., *Spec. Gén. Lép.* i. p. 324. n. 167 (1836) ; Lucas, *Vade-mecum* p. 50 (1838) ; id., in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 48 (1838) ; Drury, ed. Westw., *Illustr. Exot. Ins.* i. p. 20. t. 11. fig. 1. 4 (1837) ; Harris, *Entom.* i. p. 60 (1841) (Massachusetts, l. on *Aristolochia sipho*., August) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 15 (1845) ; id., in Westw., *Arc. Ent.* i. p. 68 (1845) (habits) ; Lucas, *Lép. Exot.* p. 15. t. 8. fig. 2 (1845) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 230 (1846) (U.S.A. ; Mexico) ; Kirtl., *Proc. Ent. Soc. Lond.* (2). i. p. 101 (1851) (l. on *Aristolochia*) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 291 (1852) (California) ; Boisd., *Ann. Soc. Ent. France* p. 282. n. 4 (1852) (California) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 75. n. 308 (1856) (Ohio ; Florida ; California ; " Nicaragua ") ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 6. n. 90 (1857) (Mexico) ; Urban, *Can. Nat. Geol.* iii. p. 400. fig. a. b. (1858) ; Gosse, *Letters from Alabama* pp. 77, 148, 272 (1859) ; Newm., *Proc. Ent. Soc. Philad.* 26 (1861) (N. Jersey ; on *Serpentaria*) ; Morris, *Syn. Lep. N. Amer.* p. 6. n. 8 (1862) ; Reak., *Proc. Ent. Soc. Philad.* ii. p. 141. n. 13 (1863) (" Chiapas," error loci) ; Weidem., *ibid.* p. 147 (1863) (" Mexico, West Indies, Cent. America ") ; Kirkp., *ibid.* iii. p. 328 (1864) (Cleveland, Ohio, common) ; Jaeger, *Life N. Amer. Ins.* p. 209 (1864) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 113 (1864) (U.S.A., Calif., Mexico) ; Behr, *Stett. Ent. Zeit.* xxvii. p. 216 (1866) (Calif.) ; Pack., *Guide Study Ins.* p. 248. fig. 181 (1868) ; Butl., *Cat. Diurn. Lep. descr. Fabric.* p. 237. n. 13 (1869) (Ohio) ; Harris, ed Flint, *Ent. Corresp.* p. 147, 273. fig. 37. 38 (1869) ; Beth., *Canad. Nat.* iii. p. 320 (1871) (habits) ; Riley, *2nd Missouri Rept.* p. 116. fig. 84. 85. 86 (1870) (life history) ; Kirby, *Cat. Diurn. Lep.* p. 521. n. 20 (1871) ; Scudd., *Canad. Ent.* iv. p. 74. (1872) (Abbot's MS. in Brit. Mus.) ; Edw. *Proc. Cal. Ac. Sc.* v. p. 162 (1873) (larva, pupa ; occurrence in Calif.) ; Butl. & Druce, *Proc Zool. Soc. Lond.* p. 364. n. 367 (1874) (" Costa Rica," error) ; Edw., *Proc. Calif. Ac. N. Sc.* v p. 162 (1875) (pupa) ; Ison, *Rept. Ent. Soc. Ontario* p. 15 (1876) (rare, Cleveland) ; H. W. Edw., *Trans. Amer. Ent. Soc.* vi. p. 9. n. 3 (1877) (Atlantic to Pacific, Canada to Gulf of Mexico) ; H. Edw., *Proc. Cal. Ac. Sc.* v. vii. p. 19 (1877) (pupa) ; French, *Trans. Dept. Agric. Illin.* xv. p. 136 (1877) (larva) ; Aaron, *Canad. Ent.* ix. p. 200 (1877) ; Grote, *l.c.* p. 220 (1877) (pollen on eye) ; White, *l.c.* x. p. 20 (1878) (pollen on eye) ; Streck., *Cat. Butt. Moths N. Amer.* p. 67. n. 1 (1878) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 436 (1878) ; Dury, *Cincinnati Soc. Nat Hist.* i. p. 12 (1878) (Cinc., common) ; Beth., *Canad. Ent.* xi. p. 203 (1879) (Hamilton, Ont. ; one year in abundance) ; Oberth., *Et. d'Ent.* iv. p. 98. n. 304 (1880) (Mexico ; Texas ; Florida) ; Saund., *Rept. Ent. Soc. Ontario* p. 37. fig. 16. 17. 18 (1880) ; Moffat, *ibid.* p. 10 (1881) (Long Point and Ridgeway) ; Saund., *ibid.* p. 39. fig. 16. 17. 18 (1881) (i., l., p.) ; Edw., *Canad. Ent.* xiii. p. 9. (1881) (life history) ; Hagen, *ibid.* p. 37 (1881) (l. on *A. sipho*) ; Middl., *Trans. Dept. Agric. Illin.* xviii. *Append.* p. 73. fig. 6 (1881) ; Coquill., *ibid.* xviii. *Append.* p. 164 (1881) (larva) ; Riley, *Amer. Natural.* p. 327. fig. 1. 2. 3 (1881) (life hist.) ; Edw., *Canad. Ent.* xiv. p. 21 (1882) (oviposition) ; Butl., *Journ. Linn. Soc. Lond.* xvi. p. 472. n. 58 (1883) (Mendocino

and Lake Co., June) ; Behr, *Bull. Cal. Ac. Sc.* i. p. 64 (1884) (Calif., common, l. on *Aristolochia*) ; Edw., *Canad. Ent.* xvi. p. 109, 112 (1884) (egg, larva) ; Gruber, *Jenaische Zeitschr. Naturw.* xvii. p. 474. t. 7. fig. 20—24 (1884); id., *Papilio* iv. p. 88. t. 2. f. 20—24 (1884) (transf.); Lintn., *ibid.* iv. p. 136. n. 1 (1884) (Rio Grande) ; Aaron, *ibid.* iv. p. 172 (1884) (S. Texas) ; Mayn., *Butt. N. Engl.* p. 49. n. 67. t. 5. fig. 67. 67a. ♂ (1886) ; French, *Butt. E. U. States* p. 88 (1886) ; Mayn., *Butt. New Engl.* p. 49. t. 5. fig. 67. 67a (1886) ; Royst. & Pigott, *Journ. Quek. Club* (2). iii. p. 205 (1888) (scaling) ; Edw., *Syn. N. Amer. Butt.*, in *Butt. N. Amer.* i. p. 1. n. 1 (1888) ; id., *Bull. U.S. Nat. Mus.* xxxv. p. 9 (1889) (liter. on metamorph.) ; Skinn. & Aaron, *Canad. Ent.* xxi. p. 126 (1889) (larva on *Ipomoea* !) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 204. n. 21. t. 65. fig. 18. 18a. fold and genit. (1890) (North Amer. ; Mexico) ; Mayn., *Man. N. Amer. Butt.* p. 4. n. 2 (1891) ; Staley, *Canad. Ent.* xxiv. p. 204 (1892) (Marshall, Missouri, common, iv.—x.) ; Kunze, *ibid.* xxv. p. 17 (1893) (Long I., l. eating l. for want of food) ; Haase, *Untersuch. Mimicry* i. p. 74 (1893) ; Davis, *Journ. N. York Ent. Soc.* I. p. 47 (1893) (Staten I., N.Y., May to Sept.) ; Skinn., *Ent. News* iv. p. 82 (1893) (N. Carolina) ; Jones, *ibid.* iv. p. 190 (1893) (Richmond Co., N.C.) ; Holl., *Canad. Ent.* xxv. p. 311 (1893) (Florida) ; Beutenm., *Bull. Amer. Mus. N. H.* v. p. 242 (1893) (N. York ; descr. of l., p., i.) ; Cockerell, *Trans. Amer. Ent. Soc.* xx. p. 353. n. 648 (1893) (Rosita, Colorado) ; Denton, *Ent. News* v. p. 41 (1894) (Cambridge, Mass.) ; Moore, *ibid.* p. 77 (1894) (Bridgeport, Conn., larvae on *Aristol. serpentaria*) ; White, *ibid.* v. p. 175 (1894) (Brooklyn) ; Soule, *Psyche* vii. p. 155 (1894) Nonquitt, Mass., August) ; Weed, *ibid.* vii. p. 130. n. 39 (1894) (N.E. Miss.) ; Beth., *Rept. Ent. Soc. Ontario* xxiv. p. 6 (1894) (Toronto & Hamilton) ; Holl., *ibid.* p. 53. fig. 27 (1894) ; Osburn, *Ent. News* vi. p. 282. n. 48 (1895) (Tennessee, abundant, iv. to x., probably three broods) ; Longl., *ibid.* vi. p. 314 (1895) (Chicago) ; Blatchl., *Canad. Ent.* xxviii. p. 266 (1896) (Indiana ; l. on *Asarum* !) ; Truman, *Ent. News* viii. p. 29 (1897) (Volga, S. Dakota, travel-worn) ; Bubna, *ibid.* viii. p. 98 (1897) (Cleveland, Ohio ; plentiful on May 2nd and 3rd, a few in July) ; Britton, *ibid.* ix. p. 173 (1898) (Newhaven, Ct., common) ; Duzee, *Bull. Buffalo Soc. N.Sc.* v. p. 107. n. 2. (1897) (Buffalo, very scarce) ; Christ, *Mitt. Schweiz. Ent. Ges.* ix. p 273 (1897) ; Moffat, *Rept. Ent. Soc. Ontario* xxvii. p. 79 (1897) (London, Ontario) ; Gibson, *ibid.* p. 106. fig. ♂ (1897) (Toronto, said to be seen !) ; Moffat, *l.c.* p. 109. n. 85. (1897) (Pt. Hope, August) ; Dent., *Moths Butt. U.S.* p. 354. t. 19 (1898—1900) ; id., *Ent. News* xi. p. 580 (1900) (Wellesley) ; id., *l.c.* p. 643 (1900) (ex. with five red submarg. spots on hindwing) ; Beutenm., *Butt. N. York City* p. 8. n. 6. fig. (1902) ; Wasman, *Ent. News* xiii. p. 28 (1902) (aberr., corresp. to *calverleyi*) ; Comst., *ibid.* xiii. p. 76 (1902) (L. Josephine, Fla.) ; Foster, *ibid.* xiii. p. 326 (1902) (Claremont, N.H.); Hoag, *ibid.* xiv. p. 321 (1903) (S. Louis Potosi, Mex.) ; Baker, *Proc. U.S. Nat. Mus.* xxix. p. 128 (1905).

Papilio astenous (!), Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 15 (1845) (sub synon.).

Puchliopta (?) *philenor*, Reakirt, *Proc. Ent. Soc. Philad.* iii. p. 504 (1865).

Papilio philenor var. *acauda* Oberthür, *Et. d'Ent.* iv. p. 98. sub n. 304 (1880) (hab ?).

Papilio philinor (!), Edwards, *List Diurn. Lep.*, in *Butt. N. Amer.* ii. No. 2 (1881).

Papilio nezahualcoyotl Strecker, *Proc. Ac. Nat. Sci. Philad.* xxxvii. p. 174 (1885) (Mexico) ; id., *Lep. Rhop. Het., Suppl.* iii. p. 17 (1900) (= *acauda* = *corbis* = *orsua*).

Papilio corbis Godman & Salv., *Ann. Mag. N. H.* (6). iii. p. 357. n. 16 (1889) ; iid., *Biol. Centr. Amer., Rhop.* ii. p. 205. n. 22. t. 66. fig. 7. 8. ♂ (1890) (Valladolid, Yucatan).

Papilio philenor, Linn., var. *obsoleta*, ♂, Ehrman, *Canad. Ent.* xxxii. p. 348 (1900) (S.W. Penn.).

Papilio philenor Linn., aberr, *wasmuthi* Weeks, *Journ. N. York Ent. Soc.* ix. p. 82. t. 6 (1901) (Brooklyn).

Ithobalus acauda, Dyar, *Bull. U.S. Nat. Mus.* lii. p. 4. n. 24 (1902) (New Mexico ; Mexico : *philenor* standing in another genus !).

Pterurus (!) *philenor*, Kirby, in Hübner, *Samml. Exot. Schmett.* ed. ii. p. 100. t. 129. fig. 1. 2 (190—?).

Papilio philenor var. *wasmuthi*, Franck, *Ent. News* xv. p. 47 (1904) (Flatbush).

Papilio philenor wasmuthi, Skinner, *ibid.*, *Index* p. 6 (1904).

Papilio (*Laertias*) *philenor*, Floersheim, *Ent. Rec.* xviii. p. 104 (1906) (protective taste of pupa).

♂ ♀. The individuals from the Atlantic States have generally a more elongate hindwing than the majority of the southern and western specimens ; the marginal spots of both wings are often smaller, the spots on the upperside of the forewing are more often absent or vestigial in the males, and the distal margin of this wing is rather more concave ; the metallic distal area of the underside of the hindwing is less often green, and the body is rarely so shaggy as in some western specimens.

However, these distinctions are by no means reliable, the species being apparently in a process of separating in an Atlantic and in a southern and Pacific form.

Two kinds of striking aberrations from the ordinary type are known :

a'. ab. *wasmuthi* Weeks, *l.c.*——♀. Marginal spots of both wings very much enlarged, forming large patches ; on the underside of the hindwing these patches are merged together with the orange spots into a complete band, the veins remaining very thinly black. One specimen in the Tring Museum.

b'. ab. mex. *acauda* Oberth., *l.c.* ; *P. nezahualcoyotl* Strecker, *l.c.* ; *P. corbis* Godm. & Salv., *l.c.*——♂. Tail of hindwing reduced to a tooth ; the metallic distal area of the underside of the hindwing reduced in width (always ?), its inner edge (and the white discal dots) being far separate from cell. This form is known only from Mexico (Yucatan ; Guadalajara).

Hab. of *P. ph. philenor* : Atlantic States and Southern Canada, but in the latter country and New England only a straggler, appearing sometimes to breed where *Aristolochia sipho* is found (as a cultivated plant) ; its range being originally less extended on account of the true food-plant (*A. serpentaria*) not occurring in N. England and Canada ; Mexico, from Vera Cruz to the Pacific Coast ; Colorado ; Arizona ; California.

In the Tring Museum some larvae and pupae, and 195 ♂♂, 95 ♀♀, from : Brooklyn ; Raleigh, N. Carolina (Brimley) ; Nelson Co., W. Virginia (Wirt Robinson) ; Sanford, Florida ; Makanda and Evanston, Illinois (Snyder) ; Nashville, Tennessee (W. Osburn) ; Jefferson Co., Kentucky (Troxler) ; Monterey and San Luis Potosi, Mexico ; Jalapa, Vera Cruz, February 1894 (W. Schaus) ; Iguala, Guerrero, 2500 ft., June 1904 (A. Hall) ; Guadalajara, July and October 1896 (W. Schaus) ; Verde R. and Nogales, Arizona (Oslar) ; Huachuca Mts. and Phoenix, Arizona (Dr. Kunze) ; Benson, Arizona (O. T. Baron) ; Clarion I., December 1900 (Beck) ; San Luis Obispo, California ; McCloud R., Schasta, and Siskiyou Co., California (O. T. Baron) ; Butte Co., California, April 1898 (Mrs. Austin).

b. P. philenor orsua.

Papilio orsua Godman & Salv., *Ann. Mag. N. H.* (6). iii. p. 358. n. 17 (1889) ; iid., *Biol. Centr. Amer., Rhop.* ii. p. 205. n. 23. t. 66. fig. 9. 10. ♂ (1890) (Tres Marias Is.).

♂♀. A small form, with short rounded hindwing bearing a tooth instead of a tail. Upperside of hindwing more strongly glossy than in *P. ph. philenor*, especially in female. Glossy area of underside of hindwing touching cell, the apex of which is also somewhat metallic.

Hab. Tres Marias Islands.

47. Papilio devilliers Godt. (1824).

Papillon devilliers Godart, *Mém. Soc. Linn. Paris* ii. *Lép.* t. 1. fig. 3. 4, ♂ (1822) (Cuba).

Papilio devilliers id., *Enc. Méth.* ix. *Suppl.* p. 810. n. 47-8 (1824) (Cuba) ; Poey, *Mem. R. Soc. Econ. Habana* p. 235 (1846).

Papilio villiersi (!), Boisduval & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 36. t. 14 (1833) (Florida; Cuba) ; Boisd., *Spec. Gén. Lép.* i. p. 325. n. 168 (1836) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 231 (1846) (Cuba ; Florida) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 292 (1852) ("N. America") ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 76. n. 309 (1856) ("N. America") ; Lucas, in Sagra, *Hist. Fis. Cuba* vii. p. 207 (1857) ; Morris, *Syn. Lep. N. Amer.* p. 12. n. 17 (1862) ("Southern States") ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (U. St. ? ; West Indies) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 112 (1864) (Cuba ; Florida) ; Edw., *Trans. Amer. Ent. Soc.* vi. p. 9. n. 4 (1877) (Florida ; Cuba) ; Oberth., *Et. d'Ent.* iv. p. 98. n. 305

(1880) (Cuba) ; Gundl., *Papilio* i. p. 113 (1881) (Cuba) ; Edw., *Syn. N. Amer. Butt.*, in *Butt. N. Amer.* i. p. 1. n. 2 (1888) (Florida ; Cuba) ; Haase, *Untersuch. Mimicry* i. p. 75 (1893) (Cuba ; Florida).

Papilio devilliersi, Herrich-Sch., *Corr.-Bl. Zool. Min. Ver. Regensb.* p. 173. n. 7 (1864) (Cuba ; not common) ; Kirby, *Cat. Diurn. Lep.* p. 520. n. 19 (1871) ; Streck., *Cat. Butt. Moths N. Amer.* p. 67. n. 2 (1878) (? Florida ; Cuba) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 435 (1878) (Florida) ; Gundl., *Contr. Ent. Cubana* p. 123 (1881) (Cuba ; Florida).

♂ ♀. Sexes similar. More specialised in pattern than in *P. zetes*, which comes in some respects near the ancestral form of *P. polydamas*, as do *P. archidamas* and *P. streckerianus*. On the forewing there are some discal dots preserved, situated beyond the apex of the cell, either on both sides (♀) or at least on the underside (♂), the spots being larger on the underside than on the upper. The pattern of the underside of the hindwing is not unlike that of *P. polydamas* ; the basal dot and costal streak of *P. polydamas* are in *devilliers* represented by a heavy basi-costal streak ; behind C there is in most specimens a vestige of a creamy subbasal spot and a silvery antemedian spot, which are homologous to the two creamy spots C—SC² found in some subspecies of *P. polydamas* ; sometimes there is a complete row of silvery dots on the disc, but most specimens have only three or two or one silvery spots behind the cell and usually one in the apex of the cell, these spots being found again in *P. philenor*.

Scent-organ as in *P. philenor*.

Genitalia : ♂. Harpe triangular, produced apically into a single process, which bears some conical teeth.——♀. Hairy flaps narrowed proximally as well as apically, being ovate-lanceolate, separate at base, each bearing a ridge on hinderside as in *P. philenor*.

Early stages not described.

Hab. Cuba.

In the Tring Museum 9 ♂♂ and 9 ♀♀ from Holquin and Gibara (Tollin).

48. **Papilio zetes** Westw. (1847).

Papilio zetes Westwood, *Trans. Ent. Soc. Lond.* v. p. 36. t. 3. fig. 1. 1*. ♀ (1847) (Haiti) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. *Append.* p. 529 (1852) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 293 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 76. n. 310 (1856) (Haiti) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (West Indies) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 283 (1864) ; Kirby, *Cat. Diurn. Lep.* p. 543. n. 165 (1871) ; Haase, *Untersuch. Mimicry* i. p. 77 (1893) (near *philenor*).

♂ ♀. Sexes similar. In shape resembling *P. devilliers*. A yellowish band across upperside of both wings, somewhat as in *P. polydamas* ; some dots in and beyond apex of cell of forewing, yellowish above, larger and paler on underside.—— Hindwing with a broad band of white patches on underside proximally of black discal band, these patches being all contiguous with cell except the last ones ; the white spots attached to the red ones large, the pattern of hindwing reminding one of that of *P. streckerianus*.

Hab. Haiti.

In coll. F. D. Godman and also in that of H. J. Adams.

The three following species of this group are very closely allied, the near phyletic connection between *P. polydamas*, *P. archidamas*, and *P. streckerianus* being evident in every detail of pattern and structure. In fact, there would be some reason for considering all three as geographical forms of one species.

♂ ♀. Abdomen greenish black above in both sexes; sternites not dotted. Forewing below with a reddish or greenish yellow dot at base proximally of

praecostal spur; SC^2 originating from cell more proximally than in *P. belus* and *P. madyes*.

Scent-organ: a streak of minute triangular scales along the naked streak; these scales not very close together, smaller than the scales situated along abdominal edge; striation of scales heavy.

Genitalia: ♂. Harpe short, sinuate at apex, each angle produced into a curved horn-like process, the upper process being absent from some forms of *P. polydamas*.——♀. The two membranous lobes situated in front of the vaginal cavity standing close together, forming one large lobe which is deeply cleft mesially.

49. Papilio streckerianus Honr. (1884).

Papilio streckerianus Honrath, *Berl. Ent. Zeitschr.* xxviii. p. 395. t. 8. fig. 1. 1A. ♂ (1884) (Guahangos, Peru).

Papilio mathani Oberthür, *Et. d'Ent.* xiv. p. 1. t. 2. fig. 8.♂, 12.♀ (1891) (Chachapoyas).

♂. A close relative of *P. archidamas*. Markings of body pale greenish yellow, not orange or reddish. Forewing without discal band above and below, but there are in nearly every specimen vestiges of greenish streaks in the basal third of the upperside, the streak along inner margin reaching sometimes as far as the greenish spot situated in many specimens at distal fourth; the greenish yellow scaling is more extended on underside, covering here usually the greater half of the cell, often extending anteriorly beyond the apex of the cell; in many specimens there are some greenish yellow spots posteriorly on disc.——The discal band of the hindwing, on upperside, is variable in width; it usually crosses the apex of the cell, but in some specimens the cell-spot is just vestigial; the marginal spots are always large, being in some specimens twice as large as in others. The black discal band of the underside is always broad; the silvery white submarginal spots SC^2—M^1 are sharply defined; there is sometimes a vestige of a red spot at the proximal side of each white spot; the red anal bar is always present, while the red subcostal bar is often replaced by white.

♀. Much paler than the male, the discal band of the upperside of the hindwing strongly opalescent, this opalescent gloss being vestigial also in the female of *P. archidamas*.

Genitalia as in *P. archidamas*.

Early stages not known.

Hab. Northern Peru, in the dry districts of the Marañon.

It is quite possible that in a more southern district of West Peru a form exists which connects *P. streckerianus* with *P. archidamas*.

In the Tring Museum 39 ♂♂ from: Upper Marañon, east of Huamachuco, North Peru, dry country (O. T. Baron).

50. Papilio archidamas Boisd. (1836).

(?) *Papilio psittacus* Molina, *Sagg. Stor. Nat. Chili* p. 211, 347 (1781).

Papillon bias Roger, *Bull. Soc. Linn. Bordeaux* i. p. 159 (1826) (Chili).

Papilio archidamas Boisduval, *Spec. Gén. Lép.* i. p. 321. n. 163. (1836) (Chili); Feisth., *Mag. Zool.* (2). i. *Ins. Lép.* p. 1 (1839) (Chili); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Chili); id., Westw. & Hew., *Gén. Diurn. Lep.* i. p. 20. n. 242 (1846) (Chili); Blanch., in Gay, *Hist. Fis. Chile, Zool.* vii. p. 8. *Atlas* t. 1. fig. 1a. b. (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 295 (1852) (Chili); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 76. n. 312 (1856) (Chili); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 116 (1864) (Chili); Kirby, *Cat. Diurn. Lep.* p. 521. n. 25c (1871); Mathew, *Ent. Mo. Mag.* xiv. p. 152 (1877) (Valparaiso, Oct. to Jan.; habits, descr. of larval stages); Oberth., *Et. d'Ent.* iv. p. 98. n. 302 (1880) (Chili); Walk., *Ent. Mo.*

Mag. xviii. p. 83 (1881) (Coquimbo, larva on *Aristolochia* ; "common during our stay from Jan. 21st to March 12th") ; id., *l.c.* xx. p. 223 (1884) (Coquimbo, July and August, common, fresh ; succession of broods all the year) ; id., *l.c.* xxi. p. 118 (1884) (Coquimbo, common, March) ; Staud., *Exot. Tagf.* i. p. 12 (1884) (Chili) ; Haase, *Untersuch. Mimicry* i. p. 76 (1893).

Papilio bias, Kirby, *Cat. Diurn. Lep.* p. 521. n. 25b (1871); id., *Trans. Roy. Soc. Dublin* (2). ii. p. 324 (1880) (*archidamas* = *bias*) ; Butl. & Edm., *Trans. Ent. Soc. Lond.* p. 474. t. 21. fig. 1 (1881) (larva) ; Elwes, *ibid.* p. 293. n. 53 (1903) (Santiago, "seen").

Papilio archemas (!), Mathew, *Entomol.* vii. p. 62. n. 92 (1874) (Valparaiso, Nov., common, fast flight).

Molina's description appears to apply to a certain extent to this species.

The French name "Papillon bias" of Roger is nomenclatorially not valid.

♂♀. The species varies a good deal in the amount of brown in the marginal area of the forewing and on the disc of the hindwing, on the underside. The yellowish marginal spots of the fore- and hindwing are sometimes enlarged.

Genitalia : ♂. Harpe with two processes, the upper one smaller than the lower one.

Early stages described by Mathew and again by Walker, ll.cc.

Hab. Chili.

In the Tring Museum 14 ♂♂, 6 ♀♀.

51. Papilio polydamas L. (1758).

Papilio Eques Trojanus polydamas Linné, *Syst. Nat.* ed. x. p. 460. n. 11 (1758) (citat. Meriauae excepta ; America).

One of the most interesting features of this species is the peculiar distribution of its geographical varieties. While the American continents, from Buenos Aires to the southern Atlantic states of the United States, are inhabited by one single subspecies, the West Indian islands appear to have each a special subspecies. On the continents and the Greater Antilles the species is very common in open ground, while it is decidedly rare on the Lesser Antilles, having perhaps become rare in consequence of extensive cultivation of the soil. There are quite a number of islands from which the species has not been recorded, though it doubtless exists there, probably in special forms, for instance on Barbuda, Grenada, St. Christopher, etc. In the position of the band of the hindwing the subspecies from Martinique is the most different from the ordinary continental form ; the Sta. Lucia subspecies is characterised by an exceptionally broad band on both wings ; the Guadeloupe form is extreme in the reduction of the number of spots on the forewing, the Haiti and Jamaica forms deviate from all the others in the absence of the upper process of the harpe.

In all the subspecies the band of the upperside of fore- and hindwing is on the whole rather wider in the female than in the male.

For literature on the early stages see *P. polyd. polydamas.*

Hab. Southern Atlantic states southward to Buenos Aires ; West Indies.

a. P. polydamas vincentius subsp. nov. (Pl. VII. fig. 36).

♂. Halfway between *P. polyd. lucianus* and *P. polyd. polydamas.*—*Upperside.*—Forewing : a band of spots as in *P. polyd. polydamas*, spots SC^5—R^2 a little farther away from margin.——Hindwing : band curved, about five mm. from cell, not essentially different from that of *polyd. polydamas* ; creamy white marginal spots distinctly enlarged, resembling those of *P. archidamas* ; marginal teeth broader than in *polyd. polydamas.*

Underside.—Forewing : apical area paler than basi-discal area, but not so pale brown as in *P. polyd. polydamas* ; spots SC^4—R^1 small, while spots R^2—SM^2 are much larger than above.——Hindwing almost uniformly brownish black, a grey costal streak as in *lucianus*, *xenodamas*, etc., and also a vestige of grey spot proximally of the brick-red spot C—SC^2 ; submarginal spots as large as in *xenodamas*, paler red, nearly as close to margin as in *P. polyd. polydamas* ; marginal spots larger than in the other subspecies ; a thin grey bar M^2—SM^2 proximally of red anal spot, preceded before M^2 by a thin oblique grey bar.

Genitalia as in *polyd. polydamas* ; the carina which runs from the tip of the upper hook of the harpe proximad is oblique.

Hab. St. Vincent, March 1897 (Dr. Percy Rendall).

One ♂ in the Tring Museum.

b. P. polydamas lucianus subsp. nov. (Pl. VII. fig. 37).

Papilio xenodamas, Sharpe (*non* Hübner, 1822 ?, err. det.), *Proc. Zool. Soc. Lond.* p. 223 (1901) (Sta. Lucia) ; Butl., *ibid.* p. 713 (1901) (Sta. Lucia).

♂ ♀. *Upperside.*—Forewing : a complete band of large spots from SC^4 to inner margin, spot SC^5—R^1 being the smallest, a streak in front of SC^4, somewhat shadowy but always distinct, some yellowish scaling between $SC^{4,5}$ and R^1 close to cell ; the band much nearer the margin than in *neodamas* and *xenodamas*.—— Hindwing : a distinct spot behind C ; band curved, about two mm. distant from cell, patches SC^2—M^2 about equal in size, or the second patch a little longer than the others.

Underside.—Forewing : spots SC^4—R^1 much smaller and the others rather larger than above, no streak before SC^4 or only a vestige of it.——Hindwing : a more or less distinct grey costal streak at base outside praecostal spur, and usually a distinct grey spot behind C a little beyond middle ; brick-red submarginal spots as in *xenodamas*, but much nearer the margin ; a distinct grey bar proximally of red anal spot, the bar usually extended to M^1 ; creamy white marginal spots rather larger than in *xenodamas*.

Genitalia as in *P. polyd. polydamas*.

Hab. Santa Lucia.

In the Tring Museum 6 ♂♂.

In the British Museum several pairs.

c. P. polydamas xenodamas Hübn. (1822 ?) (Pl. VII. fig. 38).

Ithobalus xenodamas Hübner, *Samml. Exot. Schmett.* ii. t. 113. fig. 1. 2. ♂ (1822 ?).

Papillon eurydamas, Roger, *Bull. Soc. Linn. Bordeaux* i. p. 158 (1826) (Martinique).

Papilio xenodamas, Boisduval, *Spec. Gén. Lép.* i. p. 320. n. 161 (1836) ("Brazil") ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 240 (1846) ("Brazil"); Doubl., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 3 (1848) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 301 (1852) ("Brazil") ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 77. n. 318 (1856) ("Brazil") ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 117 (1864) ("Bras. austr."); Kirby, *Cat. Diurn. Lep.* p. 521. n. 23 (1871) ("Brazil") ; Oberth., *Et. d'Ent.* iv. p. 97. n. 300 (1880) ("Brazil") ; Staud., *Exot. Tagf.* i. p. 12 (1884) ("Brazil").

Papilio cebriones Dalman, *Anal. Entom.* p. 38. n. 3 (1823) (hab. ?).

Papilio eurydamas, Kirby, *l.c.* p. 521. n. 25 a (1871) (Martinico).

Ithobalus xenodamas, id., in Hübn, *Samml. Exot. Schmett.* ed. ii. p. 91. t. 326. fig. 3. 4 (190—?) ("Brazil," false).

There are apparently only old specimens in collections. The insect inhabits Martinique, not Brazil, Hübner's *xenodamas* being the same as Roger's "Papillon eurydamas." It is hardly possible to decide with certainty if *xenodamas* was

published after or before *cebriones*. We accept the view of all previous authors, giving *xenodamas* priority.

♂ ♀. *Upperside*.—Forewing : band broad, upper three spots elongate, the third the smallest, sometimes an additional spot before subcostal fork.——Hindwing : band broad, bluish, close to cell, spot M^2—SM^2 large.

Underside uniformly black, forewing brownish, band creamy white, broader than above, except upper three spots.——Hindwing deeper brown than forewing, a subbasal costal streak and a large subbasal patch before cell bluish grey, recalling the pale underside of *P. streckerianus* ; red submarginal spots twice as large and twice as far away from margin as in average specimens of *P. polyd. polydamas*.

Genitalia : ♂. Harpe with two processes as in *P. polyd. polydamas*, both slender and acutely pointed, the lower one bearing proximally a regular row of teeth.

Hab. Martinique.

In the Tring Museum 1 ♂.

Two pairs in coll. Charles Oberthür.

d. P. polydamas dominicus subsp. nov. (Pl. VII. fig. 41).

Papilio neodamas, Godman & Salvin (*non* Lucas, 1852, err. det.), *Proc. Zool. Soc. Lond.* p. 318. n. 17 (1884) (Dominica).

♂ ♀. Intermediate between *P. polyd. neodamas* and *P. polyd. xenodamas*.

Upperside.—Forewing : spots situated as in *xenodamas*, standing nearer the margin than in *neodamas*, the six spots from R^2 to hinder margin smaller than in *xenodamas*, but rather larger than in *neodamas*, especially the uppermost one ; three small dots SC^4—R^2 and a vestige of dot SC^3—SC^4.——Hindwing : band distinctly curved, standing two or three mm. from cell, very slightly narrowing backwards ; a vestigial spot C—SC^2 in male, a distinct spot in female.

Underside.—Forewing : creamy white spots intermediate in size between those of *xenodamas* and *neodamas*, spot R^2—R^3 arrowhead-shaped like the others, spots between costal margin and R^2 absent or vestigial.——Hindwing slightly paler brown from base to disc than in *xenodamas* ; a vestige of a grey subbasal streak, no grey subbasal patch C—SC^2 ; red submarginal spot a little smaller than in *xenodamas* and a little nearer the margin ; no grey bar proximally of red anal spot, or only a vestige of it.

Genitalia not markedly different from those of *P. polyd. polydamas*, but the carina which runs from the upper hook proximad is parallel with the carina of the lower hook, the two carinae being proximally connected with one another by a transverse ridge which stands at right angles to them.

Hab. Dominica.

In the Tring Museum 2 ♂♂, 3 ♀♀ (E. A. Agar, and Elliott).

In the British Museum 2 ♂♂, 1 ♀.

e. P. polydamas neodamas Lucas (1852) (Pl. VII. fig. 42).

Papilio polydamas, Boisduval & Lec., *Hist. Gén. Lép. Amér. Sept.* t. 15. fig. 1. 2. ♂ (1833).

Papilio neodamas Lucas, *Rev. Zool.* (2). iv. p. 193. t. 10. fig. 5. ♂ (1852) ("Antilles"); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 300 (1852) ("Antilles") ; Lucas, in Sagra, *Hist. Fis. Cuba* vii. p. 208. t. 14. fig. 3. 4. I. & p. (1857) (Guadeloupe ; "Yucatan" error loci) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 77. n. 317 (1856) ("Antilles") ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 118 (1864) (Guadeloupe ; "Cuba, Yucatan" error loci) ; Obertb., *Et. d'Ent.* iv. p. 97. n. 301 (1880) (Guadeloupe).

Papilio xenodamas var., Gueuée, *Mém. Soc. Phys. Hist. Nat. Genève* xxii. p. 370. n. 2 (1872) (hab. ?).

♂ ♀. Similar to *P. polyd. xenodamas*, but the upper three spots of the forewing

absent (♂) or vestigial (♀), the remaining spots farther away from margin.—— Hindwing : discal band of *upperside* almost straight, no spot behind C, middle patches smaller than anterior ones and usnally also smaller than posterior ones, the band therefore appearing narrowed in centre.——On *underside* no grey subbasal patch in front of cell.

Genitalia : ♂. Harpe as in *xenodamas* ; the carinae extending from the tip of each process proximad almost parallel.

Hab. Guadeloupe.

In the Tring Museum 1 ♂, 2 ♀♀.

In coll. Charles Oberthür 3 ♂♂, 1 ♀.

f. P. polydamas polydamas Linné (1758).

Seba, *Thesaur.* iv. p. 53. t. 44. fig. 14. 15 (1765).

Papilio Eques Trojanus polydamas Linné, *Syst. Nat.* ed. x. p. 460. n. 11 (1758) (citat. Merianae excepta) ; id., *Mus. Lud. Ulr.* p. 192. n. 11 (1764) (in India occidentali) ; Houtt., *Naturl. Hist.* i. 11. p. 195. n. 11 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 747. n. 12 (1767) ; Fabr., *Syst. Ent.* p. 447. n. 22 (1775) ; Cram., *Pap. Exot.* iii. p. 33. t. 211. fig. D. E (1779) (Surinam) ; Goeze, *Ent. Beytr.* iii. 1. p. 34. n. 12 (1779) (cit. Sebae et Druryi excepta) ; Fabr., *Spec. Ins.* ii. p. 8. n. 29 (1781) ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 91. n. 26. t. 10. fig. 6. 7 (1784) ; Esper, *Ausl. Schmett.* p. 33. n. 12. t. 7. fig. 1. 2 (1785) (an fig. 1. ad hanc subsp. pertin. ?) ; Fabr., *Mant. Ins.* ii. p. 4. n. 31 (1787) ; Gmel., *Syst. Nat.* i. 5. p. 2231. n. 12 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 14. n. 42 (1793).

Papilio Eques polydamas, Linné, ed. Lange, *Syst. Nat.* p. 460. n. 11 (1760).

Papilio (Troes) polydamas, Müller, *Naturs.* v. 1. p. 569. n. 12 (1774).

Papilio (polydamas), Meerburgh, *Afb. Zeldz. Gew.* t. 2. 3. (1775).

Princeps dominans polydamas, Hübner, *Samml. Exot. Schmett.* i. t. 130. fig. 1. 2 (1806—).

Ithobalus polydamas, Hübner, *Verz. bek. Schmett.* p. 88. n. 913 (1818 ?) ; Scudd., *Proc. Amer. Ac. Arts & Sci.* x. p. 198 (1875) ; Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 272 (1896) ; Dyar, *Bull. U.S. Nat. Mus.* lii. p. 4. n. 25 (1902) (Florida ; "Antilles") ; Kirby, in Hübner, *Samml. Exot. Schmett.* ed. ii. p. 91. t. 130. fig. 1. 2 (190—?).

Papilio polydamas, Godart, *Enc. Méth.* ix. p. 39. n. 44 (1819) (citat. Druryi et Sebae excepta) ; Lacord., *Ann. Soc. Ent. Fr.* ii. p. 384 (1833) (Guyane) ; Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 37 (1833) (synon. *partim* ; t. 15. fig. 1. 2 ad subspeciem insulae Guadeloupe pertinet) ; Lucas, *Lép. Exot.* p. 33. t. 17. fig. 2 (1835) ; Boisd., *Spec. Gén. Lép.* i. p. 321. n. 162 (1836) (citat. " Boisd. & Leconte " falsa) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 241 (1846) (*partim*) ; Poey, *Mem. R. Soc. Ec. Habana* p. 236 (1846) ; Erichs., in Schomb., *F. F. Brit. Guiana* p. 593 (1848) ; Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Naturw. Cl.* i. p. 354. n. 9 (1850) (Venezuela) ; Lucas, in Chenu, *Enc. Hist. Nat., Pap.* i. p. 38. t. 20. f. 2 (1851-53) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 299 (1852) (" var., Jamaica " alia subsp.) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons ; everywhere, common) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 77. n. 316 (1856) (" var." excepta) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 6. n. 95 (1857) ; Lucas, in Sagra, *Hist. Cuba* p. 486 (1857) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 228 (1861) (open ground) ; id., *Journ. Entom.* i. p. 224. n. 6 (1862) (throughout the Amazons, in cultivated places) ; Morris, *Synops. Lep. N. Amer.* i. p. 12. n. 18 (1862) (Georgia) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (*partim* ; U.S.A., Centr. Amer.) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 119 (1864) (" var." aliae subsp.) ; Herr.-Sch., *Corr. Bl. Regensb.* p. 174. n. 14 (1864) (Cuba, common) ; Jaeger, *Life N. Am. Ins.* p. 210 (1864) ; Kirby, *Cat. Diurn. Lep.* p. 521. n. 25 (1871) ; Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 364. n. 367 (1874) (Costa Rica) ; Caproun., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 11 (1874) (Petropolis, Nov., common) ; Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 6 (1876) (Upper Ucayali) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 295 (1876) (Surinam) ; Edw., *Trans. Amer. Ent. Soc.* vi. p. 11. n. 22 (1877) (Florida ; Cuba) ; Butl., *Trans. Ent. Soc. Lond.* p. 145. n. 226 (1877) (Obydos, January ; R. Tapajos, March) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 437 (1878) ; Streck., *Butt. & Moths N. Am.* p. 67. n. 3 (1878) ; Dewitz, *Arch. Naturg.* xliv. 1. p. 2. t. 1. fig. 1 (1878) (larva) ; Hopff., *Stett. Ent. Zeit.* xl. p. 51. n. 12 (1879) (Brazil, Surinam, Venezuela, N. Granada, Peru, Honduras, Mexico, Cuba) ; Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 6. n. 13. t. 2. fig. 7. 7A

(1879) (larva, pupa ; Buenos Aires) ; Oberth., *Et. d'Ent.* iv. p. 98. n. 303 (1880) (Mexico ; Guyane ; Pará) ; Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 244 (1880) (Sta. Marta) ; Gosse, *Entom.* xiii. p. 193 (1880) (Assuncion, Dec. to March, not uncommon) ; Gundl., *Papilio* i. p. 113 (1881) (Cuba) ; id., *Ent. Cubana* p. 121 (1881) (*partim* ; Cuba, larva, pupa) ; Edw., *Papilio* ii. p. 122 (1882) (Florida) ; id., *Canad. Ent.* xiv. p. 120 (1882) (Florida) ; Walk., *Ent. Mo. Mag.* xix. p. 26 (1882) (Panama, not rare) ; Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 16. n. 11 (1882) (recensio eritica) ; Müller, *Kosmos* xii. p. 448 (1883) (metam. ; pupa brown or green, no intergradations) ; Meldola, *Proc. Ent. Soc. Lond.* p. 23 (1883) (colour of pupae and larvae) ; Jones, *Proc. Lit. Philos. Soc. Liverp.* p. 16. n. 77 (1883) (metamorph.) ; Heezko, *Proc. Ent. Soc. Lond.* p. 24 (1884) (drinking) ; Staud., *Exot. Tagf.* i. p. 12. t. 8. ♂ (1884) ; Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 13 (1889) (liter. of transf. ; *partim*) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 200. n. 15. t. 65. fig. 14. genit. (1890) (Mexico to Panama ; "S. Domingo, Jamaica, St. Thomas" aliae subsp.) ; Sharpe, *Proc. Zool. Soc. Lond.* p. 555. n. 1 (1890) (Prov. of Goyaz) ; Hahnel, *Iris* iii. p. 203 (1890) (Valera) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 11. n. 37 (1890) (Colombia) ; iid., *l.c.* p. 34. n. 29 (1890) (Pitol, Colombia) ; Seitz, *Stett. Ent. Zeit.* li. p. 98 (1890) (Coreovado) ; Mayn., *Mon. N. Amer. Butt.* p. 15. n. 22. fig. 9A (1891) (Cuba ; Mexico ; occasionally Florida) ; Haase, *Untersuch. Mimicry* p. 75 (1893) ; Michael, *Iris* vii. p. 214 (1894) (Sao Paulo de Olivença) ; Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 28 (1895) (Rio de Janeiro, very common) ; Weym., *Stett. Ent. Zeit.* lv. p. 312. n. 1 (1895) (Rio Grande do Sul) ; Mabilde, *Guia pract. Borbolet. Rio Grande do Sul* p. 43. t. 1. fig. 2A. B. C (1896) (larva, pupa, imago) ; Peters, *Illustr. Zeitschr. Ent.* ii. p. 52 (1897) (Nova Friburgo, larva, pupa) ; Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 273 (1897) (Florida) ; Holland, *Butt. Book* p. 316. n. 21. t. 41. fig. 4 (1899) ; Denton, *Moths Butt. U.S.* p. 355. fig. (1898–1900) ; Prinz. Therese, *Berl. Ent. Zeitschr.* xxxv. p. 240. n. 1 (1901) (Palmer, W. Ecuador, 100 m., Aug. 19 ; R. Negro, Juli) ; Kaye, *Trans. Ent. Soc. Lond.* p. 206. n. 193 (1904) (Trinidad) ; Weeks, *Illustr. Diurn. Lep.* p. 20 & 28 (1905) (Bolivia).

♂♀. There is considerable individual variation in the size of the spots composing the band of the upperside of fore- and hindwing. The range of this subspecies is enormous ; in fact, *P. polyd. polydamas* is the most widely distributed American *Papilio*. The insect reminds one in this respect of the African *P. demodocus demodocus*, which occurs as such all over the African continent south of the Sahara. Both species, which belong to widely different groups of *Papilio*, have further in common that their distribution depends apparently to a great extent on the ground being cleared of forest for cultivation, both species being essentially inhabitants of open country.

The only approach to a division of this subspecies into two geographical races which we can find is the frequent reduction of the red submarginal spots on the underside of the hindwing in Cuban specimens, these spots being partly shaded over with black.

Genitalia : Harpe bifurcate, the two processes of about the same size and shape, pointed, curved, horn-shaped, the ventral one bearing usually some minute teeth proximally.

Hab. Cuba ; Georgia southward to Buenos Aires.

In the Tring Museum several larvae and pupae, and 230 odd specimens from : Cuba ; many places in Central and South America ; from East and West Mexico southwards to Argentina.

In a crippled female from Barbados in the British Museum the red submarginal spots on the underside of the hindwing are rather larger than they are in average specimens of *P. polyd. polydamas*. There may be a special form on Barbados ; but more and better specimens are required for comparison with *P. polyd. polydamas*.

g. P. polydamas lucayus subsp. nov.

♂♀. Band of *upperside* broad.——*Underside* of hindwing paler than in *P. polyd. polydamas*, yellowish white anal bar larger, usually extending forward

to M^1, reaching at least beyond M^2; red submarginal spots of the same irregular shape as in the continental form, but larger.

Hab. Bahamas: Nassau and New Providence.

In the British Museum (name-type) and in coll. F. D. Godman.

h. P. polydamas polycrates Hopff. (1866).

Papilio Eques Trojanus polydamas var., Esper, *Ausl. Schmett.* p. 33. n. 12. t. 7. fig. 1 (1784).

Papilio polydamas, Ménétriés, *Bull. Moscou* ii. p. 293. n. 1 (1832) (Haiti; common); Dewitz, *Stett. Ent. Zeit.* xxxviii. p. 234. n. 3 (1877) (Porto Rico, common); Hahnel, *Iris* iii. p. 134 (1890) (Porto Rico); Möschl., *Abh. Senkenb. Nat. Ges.* xvi. p. 91. n. 3 (1891) (Porto Rico, common); Gundl., *An. Hist. Nat. Madrid* xx. p. 114. n. 3 (1891) (Porto Rico; synon. *partim*).

Papilio polydamas var., Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 77. sub n. 316 (1856) (*partim*; S. Domingo); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 119 (1864) (*partim*; S. Domingo).

Papilio polycrates Hopffer, *Stett. Ent. Zeit.* xxvii. p. 24. n. 4 (1866) ("Pará" error loci).

Papilio polydamas var. *P. polycrates*, Kirby, *Cat. Diurn. Lep.* p. 521. sub n. 25 (1871) ("Antilles").

Papilio hypodamas Guenée, *Mém. Soc. Phys. Hist. Nat.* xxii. p. 371. n. 3 (1872) (Haïti); Kirby, *Pet. Nouv. Ent.* p. 239 (1872) (= *polycrates* Hopff.); id., *l.c.* p. 809. n. 25 (1877) (= *polycrates*).

♂ ♀. Upper- and underside of both wings deeper in tint than in *P. polyd. polydamas*. Band of forewing, upperside, a little more proximal, and that of hindwing less curved, than in *P. polyd. polydamas*, the spot M^1—M^2 of this band being more distad than in *polydamas*; the anal spot standing proximally of the anal marginal sinus is always small, often vestigial. Size of spots of both wings somewhat variable, the spots of hindwing being in some specimens only half as broad as in others. Red submarginal spots of hindwing below usually larger than in *P. polyd. polydamas*, the silvery white spots attached to spots SC^2—R^3 large; black discal area mostly touching cell at R^1, much deeper black than in *P. polyd. polydamas*; spots of forewing paler than in *P. polyd. polydamas*, creamy white.

Genitalia: Harpe with one curved process only, the upper process being absent; the process bears one or two teeth on the hinderside.

Hab. Haiti.——Porto Rico (this form?).

We have not seen specimens from Porto Rico.

In the Tring Museum 8 ♂♂, 1 ♀.

A series from Port au Prince in coll. Charles Oberthür.

i. P. polydamas jamaicensis subsp. nov. (Pl. VII. fig. 40).

Sloane, *Voy. Jamaica* ii. p. 216. t. 239. fig. 19. 20 (1725).

Papilio polydamas var., Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Jamaica); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 241 (1846) (*partim*; Jamaica); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. sub n. 299 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 77. sub n. 316 (1856); Butl., *Cat. Diurn. Lep. descr. Fabr.* p. 237. n. 14 (1869) (Jamaica); id., *Proc. Zool. Soc. Lond.* p. 481. n. 33 (1878) (Jamaica).

Papilio polydamas var. *polycrates*, Cockerell (*non* Hopffer, 1866, err. det.), *Jamaica Instit.* i. p. 27 (1891) (larva); Fox & Johns., *Ent. News* iv. p. 3 (1893) (Jamaica).

Papilio polycrates, Robinson, *ibid.* xiv. p. 18 (1903) (Jamaica).

♂ ♀. Close to *P. polyd. polycrates* from Haiti, differing in the rufous brick-red spots of the underside of the hindwing being larger and the white spots attached to them smaller, the fourth red spot being usually without a vestige of white at its hinder end, and the fifth and sixth spots mostly without any white scales at both ends.

Hab. Jamaica.

In the Tring Museum 4 larvae, 1 pupa, 10 ♂♂, 6 ♀♀.

j. P. polydamas thyamus subsp. nov.

Papilio Eques Trojanus polydamas, Esper, *Ausl. Schmett.* p. 33. n. 12. t. 6. fig. 2 (1784).
Papilio polydamas var., Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 77. sub n. 316 (1856) (*partim*; St. Thomas).

This form stands much nearer *P. polyd. polydamas* than do the subspecies from Haiti and Jamaica, though geographically *polyd. thyamus* is farther away from *polyd. polydamas*. Esper's figure, *l.c.*, agrees better with this subspecies than with any other we know.

♂ ♀. *Upperside* as in *polyd. polydamas*; distal margin of forewing a little more strongly scalloped, tooth R^3 of hindwing rather prominent.

Undersiae, hindwing: submarginal spots rufous brick-red, much paler and much larger than in *polyd. polydamas* and not quite so close to the margin, these spots even paler than in the Jamaica subspecies, and as irregular in shape as in *polyd. polydamas*; the white spots attached to second, third, and fourth spot not quite so large as in the Haiti subspecies; the black band situated at the proximal side of the red spots ill-defined, much narrower than in the Jamaica and Haiti forms, and much deeper black than in *polyd. polydamas*; a long yellowish white costal streak or (instead) dispersed yellowish white scales situated along costal margin from praecostal spur to three-fourths; a heavy creamy white bar proximally of red anal spot.

Genitalia as in *polyd. polydamas*; the two processes of the harpe short and stout.

Hab. St. Thomas.

In the Tring Museum 2 ♂♂ (E. Hartert). A pair in the British Museum; a male in coll. F. D. Godman.

k. Papilio polydamas antiquus subsp. nov.

Papilio Eques Trojanus polydamas, Drury, *Illustr. Exot. Ins.* i. p. 32. t. 17. fig. 1. 2 (1770) (Antigua).

Known to us only from Drury's figure, which comes near the form from St. Thomas, but does not agree with it.

♂. *Upperside*, forewing: a band of well separated spots from SC^4 to inner margin, the upper four spots small, the sixth, which is the largest, shorter than its distance from margin.——Hindwing: band narrower than in the St. Thomas form, the black marginal area being one-third broader; anal spot as large as in *thyamus*.

Underside, forewing: three small dots SC^4—R^2, the other spots larger than above.——Hindwing: submarginal spots rufous brick-red as in the St. Thomas form, large, the white silvery spots attached to the second to fourth spots smaller than in our St. Thomas specimens.

Hab. Antigua.

In the following two species the abdomen is yellowish white above in the male, the first segment and the claspers excepted, the scales being tongue-shaped, entire, while in the female the upperside is blackish green, the scales being dentate. The head, thorax, and underside of the abdomen are long-hairy, the sterna, coxae, and femora being greenish yellow like the sides of the abdomen. The abdominal sternites are dotted with white like the palpus, but these dots are often indistinct on account of the hairiness of the body. The cell of the hindwing is rather shorter

and more rounded than in *P. belus* and allies. The underside of the hindwing is greenish yellow from the base to the black discal band, the upper scales in this basi-discal area being greenish yellow and the underscales blackish brown. The claws of the hindtarsus are nearly symmetrical.

Scent-scales ochraceous yellow.

52. **Papilio philetas** Hew. (1869).

Papilio philetas Hewitson, *Trans. Ent. Soc. Lond.* p. 31 (1869) (Ecuador); id., *Exot. Butt.* iv. *Pap.* t. 11. fig. 35. 36. ♂ (1869); Kirby, *Cat. Diurn. Lep.* p. 522. n. 32 (1871) (Ecuador); Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 152 (1903) (Baños, R. Pastaza).

♂ ♀. Sexes similar, apart from abdomen. There is little variability in pattern; the spots in the costal region on the upperside of the forewing are sometimes minute. The species is easily recognised by the row of red spots on the disc of the hindwing below.

Scent-organ: Scales of densely scaled streak three or four times as long as broad, those situated between this streak and the abdominal edge being much less elongate.

Genitalia: ♂. Harpe broader than long, strongly but gradually narrowed apicad, apex bifid, each angle being produced into a long curved hornlike tooth, dorsal edge of harpe with some small teeth proximally.—— ♀ not dissected.

Early stages not known.

Hab. Eastern Ecuador; North Peru.

In the Tring Museum 22 ♂♂, 1 ♀, from: Loja; Zamora (O. T. Baron); Baños (R. Haensch).

In coll. Charles Oberthür a series from Ambato, Ecuador, and from Chachapoyas, Peru.

In coll. Paul Dognin both sexes from Loja. In the British Museum from Nanta, Loreto, Peru.

53. **Papilio madyes** Doubl. (1846).

Papilio madyes Doubleday, *Ann. Mag. N. H.* xviii. p. 375 (1846) (♀, Bolivia); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 296. t. 6. fig. 4. ♀ (1852) (fig. of type).

♂ ♀. Sexes similar, apart from abdomen; female a little less metallic than male. The red spots on the underside of the hindwing of *P. philetas* are in *P. madyes* replaced by greenish yellow ones, which are more or less completely merged together with the submarginal greenish yellow patches. The scales of the forewing, above, are more heavily denticulate than in *P. philetas*. There is considerable geographical variation in this insect.

Scent-organ: Scales ovate, or broadly ovate, or asymmetrical, one side being reduced.

Genitalia: ♂. Harpe triangular, the apex produced into an acute, curved, hornlike tooth, a similar but much smaller tooth at the ventral proximal corner, occasionally accompanied by a minute tooth.—— ♀. Vaginal lobes longer than broad, separate, not carinate on hinderside; spines situated proximally on anal segment heavy.

Early stages not known.

Hab. Peru and Bolivia.

Five subspecies.

a. P. madyes plinius Weym. (1890).

Papilio plinius Weymer, in Stübel, *Reisen S. Amer., Lep.* p. 73. n. 14, p. 125. n. 42. t. 1. fig. 1. ♂ (1890) (North Peru, between Tambo Almirante and Pucatambo).

♂. Only one specimen known ; apparently somewhat discoloured. *Upperside* brighter green than in the other subspecies ; forewing with only four small white spots from R^2 to SM^2 ; spots of hindwing about the same size as in the next form, but more sharply defined (?, according to figure).

Underside, forewing: no indication of the distal spots SC^3—R^2.——Hindwing ochre-yellow ; submarginal spots small, curved, the second to fourth ∽-shaped.

Hab. North Peru : Chachapoyas-Moyobamba district.

b. P. madyes chlorodamas Guen. (1872) (Pl. VII., fig. 39).

Papilio chlorodamas Guenée, *Mém. Soc. Phys. Hist. Nat. Genève* xxii. p. 369. n. 1. fig. 1. ♂ (1872) (Peru ; "♀," errore).

Papilio madyas (!), Kirby, *Pet. Nouv. Ent.* p. 239 (1872) (*chlorodamas* = *madyas* (!), errore).

Papilio madyes, id., *Cat. Diurn. Lep.* p. 809. n. 22 (1877) ; Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 5 (1876) (Peru : Huiro, Santana) ; Hopff., *Stett. Ent. Zeit.* xl. p. 51. n. 11 (1879) (*partim* ; Chanchamayo ; "*chlorodamas* is ♂ of *madyes* ; Chanchamayo specimens smaller than Bolivian ones") ; Oberth., *Et. d'Ent.* iv. p. 97. n. 299 (1880) (Peru).

Papilio madyes var. *marsyas* Staudinger, *Iris* vii. p. 59 (1894) (Chanchamayo).

♂ ♀. Spots on upperside of fore- and hindwing large, those on forewing either yellowish (most ♂♂) or white (♂, ♀).

Scent-scales ovate.

Hab. Eastern Central Peru : Departments of Huánuco and Junin.

In the Tring Museum : 47 ♂♂, 2 ♀♀, from : Huancabamba, Cerro de Pasco (Böttger) ; Pozuzo, Cushi, and Chanchamayo (W. Hoffmanns) ; Rio Toro (Simons).

c. P. madyes crispus subsp. nov. (Pl. VII. fig. 43).

Papilio madyes, Staudinger (*non* Doubl., 1846, err. det.), *Exot. Tagf.* i. p. 12 (1884) (*partim* ; S. Peru).

♂. *Upperside*, forewing : spots much reduced, those at apex of cell vestigial ; of the small distal spots SC^3—R^2 only the one in subcostal fork distinct, spots R^2—SM^2 less than half the size of the spots of *chlorodamas*.——Hindwing : submarginal spots very small as compared with those of *chlorodamas*.

Underside : apical area of forewing densely powdered with yellowish scales, the yellow and the brown scales almost regularly alternating ; greenish yellow submarginal spots on the whole somewhat smaller than in *chlorodamas*.

Hab. South-East Peru : Cuzco.

Resembles on the upperside the following subspecies, the spots of the forewing, however, standing a little farther away from the margin.

In the Tring Museum : 3 ♂♂ from Callanga, 1500 m. (Garlepp).

In coll. F. Ducane Godman a male from Santa Ana, Cuzco (Whitely).

d. P. madyes madyes Doubl. (1846).

Papilio madyes Doubleday, *l c.* (1846) (Bolivia) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 243 (1846) ; Doubl., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 4 (1848) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 66. n. 296. t. 6. fig. 4. ♀ (1852) (Bolivia) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 76. n. 313 (1856) (Bolivia) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 115 (1864) (Bolivia) ; Kirby, *Cat. Diurn. Lep.* p. 521. n. 22 (1871) (Bolivia) ; Hopff., *Stett. Ent. Zeit.* xl. p. 51. n. 11 (1879) (*partim* ; Moxos in Bolivia) ; Staud., *Exot. Tagf.* i. p. 12 (1884) (*partim* ; Bolivia) ; Haase, *Untersuch. Mimicry* i. p. 76 (1893) ; Staud., *Iris* vii. p. 59 (1894) (Cocapata, Bolivia) ; Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani, Bolivia).

♂ ♀. Veins on *underside* of hindwing streaked with black.

Scent-organ: most of the scales asymmetrical, one side being reduced in width.

Hab. Bolivia.

In the Tring Museum 7 ♂♂ from: R. Undnawe, 2000 m., February 1901 (Simons); Chulumani, 2000 m., January 1901, wet season (Simons); Yungas de La Paz, 1000 m., November 1899 (Garlepp).

In coll. F. D. Godman from Coroico, Bolivia, 6500 ft. (Garlepp).

e. P. madyes tucumanus subsp. nov.

♂ ♀. *Upperside*, forewing: spots R^1—SM^2 on the whole a little larger and a little more sharply defined than in *P. m. madyes*.

Underside, forewing: the band of spots sharply defined, forked, the apical area not being suffused with pale primrose-yellow, the interspace between the proximal and distal costal bands and the distal margin of the wing being brown, the brown border anteriorly wider than the submarginal spots, gradually becoming narrower posteriorly.——Hindwing: basi-discal area smoky, appearing washed with fawn-colour; veins black as in *P. m. madyes*; black discal band wider than in the Bolivian subspecies; greenish yellow submarginal spots smaller.

Hab. Tucuman, Argentina.

In the Tring Museum 3 ♂♂, 1 ♀, from: Tucuman (J. Steinbach).

A ♂ in coll. F. D. Godman from Bueyes, Bolivia (Garlepp).

A ♀ from Tucuman (Kinkelin coll.) in coll. Charles Oberthür.

54. Papilio polystictus Butl. (1874).

Papilio protodamas (?) Godart, *Enc. Méth.* ix. p. 40. sub n. 46. ♂ (1819) ("pourrait bien être le mâle de *protodamas*"!; Brazil).

Ithobalus protodamas, Hübner (*non* Godart 1819, err. det.), *Samml. Exot. Schmett.* ii. t. 115. fig. 1. 2. ♂ (1822 ?).

Papilio polystictus Butler, *Trans. Ent. Soc. Lond.* p. 435 (1874).

Papilio protodamas, Burmeister *Descr. Rép. Argent.* v. *Lép., Atlas* p. 6. n. 12. t. 2. fig. 6. 6A (1879) (larva, pupa).

Godart described *P. protodamas* from a female, adding the description of a male *Papilio*, which, he says, might perhaps be the male of that female. As these two specimens belong to different species, there can be no doubt whatever that the name *protodamas* has to be applied to the species to which that female belongs. Following the lead of Hübner, who erroneously restricted the name *protodamas* to the male of Godart and renamed the other species *hyperion*, all authors have treated the present insect as being the true *protodamas* of Godart. The species is geographically variable in the size of the markings on the upperside of the wings. Butler, in 1874, separated the small-spotted form as a distinct species, calling it *polystictus*, from the large-spotted form, which he considered to be typical *protodamas*. Though Butler was wrong in creating a new "species," his name *polystictus* is nevertheless valid for the species, being the first name originally given to individuals of the present species only. The so-called *protodamas*, namely the large-spotted form, requires a new name, having remained without a valid name of its own.

♂ ♀. Forewing with three to seven grey-green submarginal spots on upperside, and occasionally a streak behind SM^2, spot M^2—SM^2 double, all more or less angle-shaped; the corresponding spots of the underside large, greyish white, apex

of cell and the disc beyond being suffused with greyish white ; scales of upperside entire, somewhat fan-shaped, being almost gradually widened, with the apex rounded as in *P. laodamas*, *belus*, etc.——Hindwing : scales of upperside nearly all entire, those in anal area being denticulate ; two rows of grey-green or greenish yellow spots ; the discal spots more or less ovate, often mere dots, sometimes vestigial, the middle ones usually of almost even size, the first, second and last being generally smaller than the others ; the submarginal spots angle-shaped, the upper ones being reduced to dots in many specimens ; red submarginal spots of underside resembling those of *P. laodamas* and *polydamas* ; no white dots distally of them.

Scent-organ : scales twice or 2½ times as long as broad, strongly striate, mostly somewhat asymmetrical.

Genitalia of the same type as in *P. belus*.

Early stages described and figured by Burmeister, *l.c.*

Hab. Brazil ; Paraguay ; and Argentina.

The report of an occurrence of this species near Buenos Aires (Burmeister) is confirmed by a female in coll. Charles Oberthür collected by Kinkelin at Zarate.

Two subspecies :

a. P. polystictus janira subsp. nov.

Papilio protodamas (?) Godart, *l.c.* ♂ (1819).

Ithobalus protodamas, Hübner (*non* Godart, 1819, err. det.), *l.c.* (1822 ?) ; Kirby, *ibid.* ed. ii. p. 91. t. 328. fig. 1. 2 (190—?).

Ithobatus (!) *protodamas*, Charpentier, in Esper, *Ausl. Schmett.* i. *Zusätze* p. 13 (1831).

Papilio protodamas, Boisduval, *Spec. Gen. Lép.* i. p. 322. n. 164 (1836) (Rio de Janeiro) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Brazil) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 244 (1846) (Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 302 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 78. n. 319 (1856) (Rio de Janeiro ; " var." excl.) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 6. n. 96 (1857) (Brazil) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 120 (1864) (Brazil ; " var." excl.) ; Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 10 (1874) (Gavia, Aug. ; Entre Rios, Sept. ; Botafogo, Nov.) ; Oberth., *Et. d'Ent.* iv. p. 98. n. 306 (1880) (Brazil) ; Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 28 (1895) (Petropolis, common).

♂ ♀. Submarginal spots of upper- and underside of forewing and discal ones of upperside of hindwing larger than in the following form.

In some individuals the discal spots of the hindwing are so large that the middle ones extend close to cell. Most males have seven distinct submarginal spots on the upperside of the forewing, while in the females the upper two or three spots are usually missing.

Hab. Province of Rio de Janeiro ; Minas Geraës.

In the Tring Museum 25 ♂♂, 10 ♀♀, from : Minas Geraës (R. Haensch) ; Nova Friburgo ; Petropolis, November 1897, January 1898 (Foetterle) ; Rio de Janeiro.

b. P. polystictus polystictus Butl. (1874).

Papilio protodamas var. b., Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 78. sub n. 319 (1856).

Papilio polystictus Butler, *Trans. Ent. Soc. Lond.* p. 435 (1874) (Rio Grande ; Espirito Santo) ; Kirby, *Cat. Diurn. Lep.* p. 814 (1877) ; Weym., *Stett. Ent. Zeit.* lv. p. 312. n. 2 (1895) (Rio Grande do Sul).

Papilio protodamas, Burmeister, *Descr. Rép. Argent.* v. *Lép., Atlas* p. 6. n. 12 (1879) (*partim* ; (Buenos Aires) ; Jones, *Proc. Lit. Philos. Soc. Liverp.* p. 17. n. 83 (1883) (larva, pupa ; forest) ; Haase, *Untersuch. Mimicry* i. p. 76 (1893) (South Brazil).

Papilio neodamas, Mabilde (*non* Lucas, 1852, err. det.), *Guia pract. Borbol. Rio Grande do Sul* p. 43 (1896).

♂♀. Spots on upperside of wings reduced in size, especially the discal series of hindwing; the upper two or three spots of the forewing vestigial or missing in most individuals. Specimens with exceptionally large spots scarcely distinguishable from *janira* specimens with exceptionally small markings.

Hab. Brazil: Sao Paulo southward to Rio Grande do Sul; Paraguay; Buenos Aires.

In the Tring Museum 1 pupa, 21 ♂♂, 11 ♀♀, from: Castro, Parana (E. D. Jones); S. Catharina; Rio Grande do Sul; Yhu, Paragnay, December 1896 (Andeer); Sapucay, Paragnay, October to February, June (W. Foster).

55. **Papilio eracon** Godm. & Salv. (1897).

Papilio eracon Godman & Salvin, *Trans. Ent. Soc. Lond.* p. 248 (1897) (Colima, Mexico); iid., *Biol. Centr. Amer., Rhop.* ii. p. 729. n. 18 (b). t. 111. fig. 11. 12. ♂ (1901) (Colima).

♂♀. Wings, *upperside*: forewing with a submarginal row of four to seven spots from hindmargin forward, the spots gradually decreasing in size.——Hindwing: an evenly curved row of spots placed (in centre) halfway between cell and distal margin, the upper two spots the smallest, the others of about equal size, the band broader in female than in male; a row of admarginal spots, being the remnants of transverse bars.

On *underside* a row of heavy transverse red bars on hindwing, the upper bars bearing at costal side a silvery spot, at the distal side of which there is a rather large creamy admarginal dot, in cellule R^3—M^1 two silvery dots and two creamy ones, in cellule M^1—M^2 the silvery and the creamy dot standing at posterior end of red bar—*i.e.* at vein M^2, not at M^1.

Scent-organ: a streak of dense erect scaling as in the allied species, the scales twice as long as broad or less, multistriate, nearly as broad at base as at apex.

Genitalia as in *P. belus*, tenth tergite a little slenderer.

Early stages not known.

Hab. West Mexico: Colima and Guerrero.

In the Tring Museum 2 ♂♂ from Guerrero (O. T. Baron).

In the British Museum a pair from "Mexico" (coll. Crowley).

In coll. Adams 3 ♂♂ without special locality.

56. **Papilio belus** Cram. (1777).

Papilio Eques Achivus belus Cramer, *Pap. Exot.* ii. p. 23. t. 112. fig. A. B. ♂ (1777) (Surinam).

Papilio Eques Achivus numitor id., *l.c.* p. 25. t. 113. fig. B (1777) (Surinam).

Papilio Eques Trojanus amulius Esper, *Ausl. Schmett.* p. 113. n. 48. t. 27. fig. 1. ♀ (1792); Martyn, *Psyche* t. 1. fig. 1. t. 2. fig. 1 (1797) (ined.).

Papilio varus Kollar, *Denkschr. K. Acad. Wiss. Wien, Math. Nat. Cl.* i. p. 354. n. 8. t. 42. fig. 5. 6. ♀ (1850) (Cundinamarca, Colombia).

We have not seen a specimen agreeing with Esper's or Martyn's figures of *amulius*, in which the submarginal spots on the underside of the hindwing are yellow instead of red. We believe this insect to be a xanthochromatic female of *belus*. Martyn's figure is better than that of Esper. The yellow spots on the upperside of the hindwing as shown in Martyn's figure are rather often found in females of *belus*, but are not so pure yellow.

♂. Scaling of body and wings practically as in *P. lycidas*. No white streak along abdominal fold of hindwing, red spots on underside farther away from margin than in *P. lycidas*, accompanied by white admarginal dots, which are

rarely vestigial ; the number of white discal patches on upperside variable from one to seven, the first always large, often occupying half the cellule C—SC², but never extending to base as in *P. crassus*, the others smaller and usually more greenish, very variable in size, the scales composing them lying on top of the metallic scales (as in *P. lycidas*), less acuminate than in *P. lycidas* ; SC² on the whole branching off from cell a little more proximally than in *P. lycidas*.

♀. Dichromatic; the ordinary form similar to the male except in the abdomen being metallic green above and the forewing bearing often some submarginal spots on upperside ; the rarer form bearing a large buffish yellow patch on forewing occupying apex of cell and the adjacent portions of the disc.

Scent-organ: scales geographically variable, very close together, erect, either about four times as long as broad, slightly curved, obtuse at apex and faintly or not at all denticulate, somewhat cucumber-shaped, but compressed, though not quite flat as ordinary scales ; or even shorter than in *P. lycidas* ; or of intermediate size.

Genitalia: ♂. Harpe small, short, triangular, with the apex strongly rounded ; ventral margin dilated into an acuminate lobe which stands vertically on the plane of the harpe ; this lobe curved basad, denticulate at distal edge.——♀. Hairy lobes of vaginal cavity larger than in *P. lycidas* and the postvaginal tubercle higher.

Early stages not known.

Hab. Mexico to Bolivia, eastwards to Pará ; not in Brazil proper, but may be expected to occur in the province of Goyaz.

Five subspecies.

If the figure of *P. numitor* Cram., *l.c.*, does not represent a specimen of *P. lycidas*, it represents a specimen of *P. belus belus* with spots on the disc of the hindwing. There is no white streak on the hindwing of the figure, as there is in *P. lycidas*, but the artist may have forgotten to put that streak in.

a. P. belus chalceus subspec. nov.

♂. Wings, *upperside*: hindwing deeper green at distal margin than on disc; within this marginal area a row of angle-shaped submarginal spots of the same green colour as the disc ; discal row of creamy white spots similar in position to that of the Bolivian form, *P. belus cochabamba*, the row being straight or only faintly curved from SC² to abdominal margin, spots from R¹ backwards small, spot R¹—R² farther away from cell than spot R²—R³.

Underside, forewing: white fringe-spots as distinct as above.——Hindwing: red submarginal bar C—SC² sharply marked (absent from the other forms or vestigial); white admarginal dots very distinct.

♀ not known.

Scent-organ : scales very short, being partly broader than long, cup-shaped, proximally strongly rounded, striation heavy, the apical edge appearing multidentate.

Hab. Guerrero, West Mexico (O. T. Baron).

Four ♂♂.

b. P. belus varus Koll. (1850).

Papilio varus Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 354. n 8. t. 42. fig. 3. 4. ♀ (1850) (Cundinamarca, Colombia) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 308 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 79. n. 325 (1856) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 124 (1864) (*partim* N. Granada).

Papilio numitor, Gray (*non* Cramer, 1777, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 305 (1852) (Venezuela) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 78. n. 322 (1856) (Venezuela) ; Bates

Ent. Mo. Mag. i. p. 2 (1864) (Guatemala); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 202. n. 17. t. 66. fig. 1. ♀, 2. 3. ♂ (1890) (Guatemala; Nicaragua; Costa Rica); iid., *l.c.* p. 728 (1901) (Honduras).

Papilio latinus Felder, *Wien. Ent. Mon.* v. p. 72. n. 2 (1861) (Mérida, ♀;—Mus. Tring); id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 126 (1864) (Venezuela; Bogotá); id., *Reise Novara, Lep.* p. 39. n. 28. t. 10. fig. b. ♂ (1865) (Bogota; Mérida); Kirby, *Cat. Diurn. Lep.* p. 522. n. 29 (1871) (Amer. Centr.; N. Granada); Oberth., *Et. d'Ent.* iv. p. 98. n. 308 (1880) (Panama; Colombia; San Estéban); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 243 (1880) (Sta. Marta); Habnel, *Iris* iii. p. 203 (1890) (Valera); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 11. n. 38, and p. 31. n. 124 (1890) (Colombia); Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 154 (1903) (Arcbidona, E. Ecuador, 640 m.).

♂. Hindwing, *upperside*: distal margin of the same colour as the disc, or, if darker, not bearing distinct paler green snbmarginal angle-shaped spots; an evenly curved row of discal spots, variable in size, but always gradually diminishing in size from spot SC^2—R^1 backwards, the nnmber being usnally four or five, seldom seven, rather often two, inclusive of the large costal patch. Six red snbmarginal spots on *underside*, there being no spot between C and SC^2 or only a vestige of it.

♀. Dimorphic.

a'. ♀-f. *latinus* Feld., *l.c.*——Forewing with three or four snbmarginal spots, enlarged on underside, where the upper ones are usually elongate arrowhead-shaped.——Hindwing: distal edge darker than disc, this border proximally crenate, limited by some creamy scales forming more or less distinct dots or curved bars; an evenly curved band of five or six spots, gradually diminishing in size, the first and second of about the same size, the last minute.

b'. ♀-f. *varus* Kollar, *l.c.*——Forewing with large yellowish patch occnpying apex of cell and adjacent portions of disc.

Scent-organ: scales elongate, gradually widened, the larger proportion of them about three or four times as long as broad, somewhat curved, not or very feebly denticulate, the scales from the distal part of the fold being especially long.

Hab. Guatemala southward to North-East Ecuador and North Venezuela.

In the Tring Museum 27 ♂♂, 5 ♀♀, from: San Pedro Sula, Honduras; Chiriqui; "Bogota"; Purnio, R. Magdalena, November 1896 (Dr. Bürger); Archidona (Goodfellow); Mérida and Tachira (Briceño); Mérida (type of *latinus*, ex coll. Felder).

A specimen of ♀-f. *varus* in Brit. Mus. from "Bogota" (Crowley bequest).

c. P. belus belus Cram. (1777).

Papilio Eques Achivus belus Cramer, *l.c.* (1777) (Surinam); Goeze, *Ent. Beytr.* iii. 1. p. 85. n. 57 (1779).

Papilio Eques Achivus numitor id., *l.c.* (1777) (Surinam); Goeze, *l.c.* p. 82. n. 45 (1777).

Papilio Eques Trojanus belus, Fabricius, *Spec. Ins.* ii. p. 9. n. 34 (1781) (*partim*); id., *Mant. Ins.* ii. p. 5. n. 36 (1787) (*partim*); Jabl. & Herbst, *Naturs. Schmett.* ii. p. 95. n. 27. t. 11. fig. 1. ♂ (1784) (*partim*); Gmelin, *Syst. Nat.* i. 5. p. 2233. n. 294 (1790) (*partim*); Fabr., *Ent. Syst.* iii. 1. p. 17. n. 53 (1793) (*partim*).

Papilio Eques Trojanus numitor Esper, *Ausl. Schmett.* p. 81. sub n. 35, p. 114. n. 49. t. 27. fig. 2 (1792).

Papilio Eques Trojanus amulius id., *l.c.* p. 113. n. 48. t. 27. fig. 1. ♀ (1792).

Ithobalus belus, Hübner, *Verz. bek. Schmett.* p. 88. n. 915 (1818?).

Ithobalus numitor, id., *l.c.* p. 88. n. 918 (1818?).

Papilio belus, Godart, *Enc. Méth.* ix. p. 38. n. 42 (1819) (*partim*); Lacord., *Ann. Soc. Ent. Fr.* ii. p. 384 (1833) (Godart's *belus* = *belus*, *crassus* and *crymanthus*); Boisd., *Spec. Gén. Lép.* i. p. 315. n. 154 (1836) (Surinam); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 233 (1846) (Surinam); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 303 (1852) (Ega; eit. Lucas

excl.); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* 78. n. 320 (1856) (Ega); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 6. n. 92 (1857) ("Brazil"); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 227 (1861); id., *Journ. Entom.* i. p. 223. n. 2 (1862) (Upp. Amazons; Guiana); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 128 (1864) (Surinam; Upp. Amazons); Butl., *Cat. Diurn. Lep. descr. Fabric.* p. 238. n. 15 (1869) (Peru); Kirby, *Cat. Diurn. Lep.* p. 522. n. 30 (1871) (Surinam; Upper Amazons); Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 8 (1876) (Peru); Butl., *Trans. Ent. Soc. Lond.* p. 145. n. 227 (1877) (R. Jutahi, Feb.); Hopff., *Stett. Ent. Zeit.* xl. p. 51. n. 13 (1879) (Brazil, Surinam, Peru); Oberth., *Et. d'Ent.* iv. p. 98. n. 309 (1880) (Guyane; Teffé); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 303 (1883) (hindwing with macular band, Surinam); Staud., *Exot. Tagf.* i. p. 12 (1884) (♀ dimorphic; Amazons); Haase, *Untersuch. Mimicry* i. p. 76 (1893) (♂ ♀); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença).

Papilio numitor, Boisduval, *Spec. Gén. Lép.* i. p. 317. n. 157 (1836); Bates, *Journ. Entom.* i. p. 223. n. 4 (1862) (*partim*; Guiana; "Venezuela" alia subsp.); Kirby, *Cat. Diurn. Lep.* p. 522. n. 31 (1871) (*partim*; "Guatemala" alia subsp.).

♀. *Papilio varus*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 228 (1861) (♀ of *belus*; Ega).

♀. *Papilio caburi* Kaye, *Entom.* xxxix. p. 51. t. 2. fig. 1 (1906) (Brit. Guiana).

♀. Hindwing, *upperside*.——There is usually only the costal patch present; many specimens have a small ill-defined patch behind the costal one, while very few specimens have a row of small spots across the disc (*numitor*).

♀. Dimorphic as in the preceding form.

a'. ♀-f. *belus* Cram., *l.c.*; *caburi* Kaye, *l.c.* (1906).—Similar to the male.—— Hindwing, *upperside*, with a costal patch as in male, but usually smaller, followed either by one single spot or by a row of spots extending straight across disc, the row being not or little curved, the middle spots standing close to cell and being the smallest of all; the spots more or less yellowish; distal marginal area more or less blackish green, with brighter green halfmoons; red submarginal spot C—SC^2 of underside present; in ab. *amulius* the submarginal spots of the underside of the hindwing yellow according to Esper and Martyn, *ll.cc.*

b'. ♀-f. *amazonis* nov.——Like *varus* ♀-f. *varus*; the yellow spots beyond apex of cell smaller; the costal patch of the hindwing larger, the dark green distal border less well defined and the blue-green angle-shaped markings within it larger.

Scent-organ: scales much shorter than in *P. belus varus*, but longer than in *chalceus* and *cochabamba*.

Hab. Guiana; Amazons; Peru.

In the Tring Museum 25 ♂♂, 5 ♀♀, from: Surinam; R. Negro; Iquitos, R. Ucayali, and R. Cachyaco (Stuart); R. Chuchuras and Chanchamayo (Hoffmanns); R. Pérené (Simons); type of ♀-f. *amazonis* from Iquitos.

In coll. Godman a ♂ from Chapada, Brazil (H. H. Smith).

In coll. Oberthür a ♀ of ♀-f. *amazonis* from Massauary; three specimens of ♀-*belus* from Cayenne, two of which have a complete band of spots across hindwing, a band of smaller spots being present in the third.

In coll. F. D. Godman two specimens of ♀-f. *amazonis* from Ega and Massauary.

d. P. belus belemus Bates (1864).

Papilio numitor, Bates (*non* Cramer, 1777, err. det.), *Trans. Ent. Soc. Lond.* (2). v. p. 228 (1861) (Pará); id., *Journ. Entom.* i. p. 223. n. 4 (1862) (*partim*; Pará; local form of *belus*).

♂. *Papilio belemus* id., *Ent. Mo. Mag.* i. p. 2. note (1864) (Pará;—coll. Godman); Kirby, *Cat. Diurn. Lep.* p. 522. n. 31a (1871); Hahnel, *Iris* iii. p. 212 (1890) (Pará).

♂ ♀. Hindwing with straight band of spots across disc close to cell, nearly as in *cochabamba*; green submarginal half-crescents distinct.

Hab. Pará district, apparently only on the south side of the Amazon.

e. P. belus cochabamba Weeks (1901).

♂. *Papilio cochabamba* Weeks, *Canad. Ent.* xxxiii. p. 265 (1901) (Bolivia, some 200 miles north of Cochabamba) ; id., *Ent. News* t. 5 (1902) ; id , *Illustr. Diurn. Lep.* p. 39. t. 7. ♂ (1905) (reprint of orig. descript. !).

♂. Hindwing on upperside with a row of greenish white patches straight across disc, the middle patches, if large, standing near cell, there being sometimes an additional spot in apex of cell ; the second to seventh spots usually of about equal size, occasionally spot 3 to 6 minute and 7 absent, or 2 to 6 large and 7 vestigial, or 2 and 4 to 6 large, 3 small and 7 absent ; size of spots very variable, sometimes minute, very rarely absent, except the upper two (a male in coll. Godman from S. Mateo, Bolivia).

♀ not known to us.

Scent-organ : scales as in *P. b. chalceus*, short, mostly as broad as long.

Hab. S.E. Peru ; Bolivia.

In the Tring Museum 18 ♂♂ from : La Union, R. Huacamayo, Carabaya, 2000 ft., December 1904, and La Pampa, R. Huacamayo, 2500 ft., November 1904, wet season (G Ockenden) ; Chirimayo, Carabaya, 1000 ft., July 1901, dry season (Ockenden) ; Montanas, R. Madre de Dios, September 1901 (Ockenden) ; Oroya, R. Inambari, 3500 ft., November 1901 (Ockenden) ; R. Shucuri, Carabaya, June 1901 (Ockenden) ; Salinas, R. Beni, Bolivia, July 1895 (Stuart) ; Province Sara, S. Cruz de la Sierra, March—April 1904 (J. Steinbach).

57. **Papilio laodamas** Feld. (1859).

Papilio laodamas Felder, *Wien. Ent. Mon.* iii. p. 393. n. 33. t. 8. fig. 1. ♂ (1859) (Bogota).

♂ ♀. Close to *P. belus varus* ; red submarginal spots on underside of hindwing much thinner and nearer the margin, transverse, angulate, spot C—SC^2 always present, being at least vestigial ; no white dots distally of these spots. The female resembling the male, but the band of the hindwing different, the first patch being much reduced, often to a mere dot, and patches R^2—M^1 being at least as long as the preceding patches, sometimes patch M^1—M^2 even longer than R^3—M^1 ; abdomen as in the allied species.

Scent-organ : scales about as long as in *P. belus belus*, being longer than in West Mexican *P. belus chalceus* and shorter than in *P. belus varus*, occurring from Guatemala to North Veneznela.

Genitalia : ♂ essentially the same as in *P. belus*.

Early stages not known.

Hab. Mexico to Colombia.

Four subspecies.

a. P. laodamas procas Godm. & Salv. (1890).

Papilio procas Godman & Salvin, *Biol. Centr. Amer., Rhop.* ii. p. 203. n. 19. t. 65. fig. 15. 16. ♂ (1890) (San Blas, Jalisco ; 1 ♂).

Papilio iopas iid., *Trans. Ent. Soc. Lond.* p. 248 (1897) (Colima) ; iid., *Biol. Centr. Amer., Rhop.* ii. p. 728. t. 111, fig. 9. 10. ♂ (1903) (Colima, 1 ♂).

♂. First patch of hindwing somewhat smaller than in the other three subspecies ; the band usually close to cell, there being an additional spot in the apex of the cell ; sometimes the band separate from cell (*iopas*) ; vestiges of white submarginal spots.——White spots on *underside* of forewing on the whole smaller than in

copanae, especially the upper ones, and the orange-red submarginal spots of the hindwing slightly larger.

♀. Greenish band of upperside of hindwing widest in centre, usually entering cell, the patches larger than in the following form, especially patches R^3—M^2.

Scent-organ : scales shorter than in the other subspecies.

Hab. West Mexico : Jaliseo, Guerrero, Michoacan.

In the Tring Museum 6 ♂♂, 5 ♀♀, from : Colima ; Guerrero (O. T. Baron) ; Patzcnaro, Michoacan.

In our two females from Patzcuaro the band of the hindwing does not enter the cell ; the spots of the forewing are smaller than in the next form.

b. P. laodamas copanae Reak. (1863).

Papilio copanae Reakirt, *Proc. Ent. Soc. Philad.* ii. p. 141. n. 16 (1863) (♀, Copán, Guatemala) ; Kirby, *Cat. Diurn. Lep.* p. 521. n. 21 (1871) ; Streck., *Lep. Rhop. Het.* p. 61. t. 8. fig. 1. ♀ (1874) (fig. of type) ; Kirby, *l.c.* p. 809. n. 21 (1877) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 202. n. 18. t. 66. fig. 4. ♀, 5. 6. ♂ (1890) (Yucatan; Brit. Honduras; Guatemala; Honduras); Strecker, *l.c., Suppl.* iii. p. 17 (1900) (type, ♀, in coll. Strecker).

Papilio chrysodamas Bates, *Ent. Mo. Mag.* i. p. 1. n. 2 (1864) (Guatemala) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 122 (1864) (cit. erroneous) ; Kirby, *l.c.* p. 522. n. 30c (1871) ; Oberth., *Et. d'Ent.* iv. p. 117. n. 307bis (1880) (Mexico).

♂. Band of hindwing always outside cell ; the first patch narrowed proximally, not touching the cell.——Forewing with a row of arrowhead-shaped submarginal spots, spot R^2—R^3 produced basad ; these spots much more distinct on *underside*, there being also a spot in cell near lower apical angle. Red submarginal spots of *underside* of hindwing thin ; there are often vestiges of white submarginal spots on *upperside*.

♀. Forewing as in male, spot R^2—R^3 occasionally vestigial.——Band of hindwing placed outside cell, there being no spot in cell or only a very few greenish white scales.

Scent-organ : scales about two or three times as long as broad.

Hab. East Mexico southward to Honduras. May be expected to occur in Nicaragua.

In the Tring Museum 5 ♂♂, 4 ♀♀, from : Songolica, Espinal, and Jalapa, Vera Cruz, April 1896 and June 1899 (W. Schaus) ; Coazualcos, Vera Cruz, July 1904 (A. Hall) ; San Pedro Sula, Honduras.

c. P. laodamas rhipidius subsp. nov. (Pl. IV. fig. 4).

♀. Forewing shorter and its distal edge less emarginate than in the two preceding subspecies ; vestiges of submarginal spots on *upperside* ; on *underside* four long creamy spots, the upper one reaching cell, and a spot in lower angle of cell.——Hindwing, *upperside :* a large central area of a greenish straw-colour, consisting of a patch which occupies about three-fourths of the cell, and six patches around cell, these patches acuminate distally, contiguous proximally, patch M^1—M^2 the longest, the tips of the patches almost equally distant from outer margin ; area between cell and abdominal edge washed with greenish straw-colour ; outside this area two minute dots R^2—M^1 of the same colour situated near the central area ; red submarginal spots of *underside* larger than in the next subspecies, the first spot distinct.

♂. A Costa Rica male in coll. H. Druce agrees with the above-described

female. The white area of the hindwing extends almost to the base in and before the cell; spots R^2—M^2 become gradually longer, the last being the longest. Spots on underside rather smaller than in female.

Hab. Costa Rica.

In the Tring Museum 1 ♀ from Carillo, June—July 1903 (Underwood).

d. P. laodamas laodamas Feld. (1869).

Papilio laodamas Felder, *l.c.* (1859) (Bogota); id., *l.c.* v. p. 72. n. 3 (1861); id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 121 (1864) (Bogota); Kirby, *Cat. Diurn. Lep.* p. 522. n. 30b. (1871); Oberth., *Et. d'Ent.* iv. p. 98. n. 307 (1880) (Toquiza, Llanos de San Martin, Colombia); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 31. n. 125 (1890) (Colombia).

♂. *Upperside:* forewing without submarginal spots.——Hindwing: a broad deep green distal border, at the edge of which there are sometimes some white dots; first patch of greenish white band large, touching cell, only a few mm. short of subbasal cellule, followed by four, seldom five, more spots, which gradually decrease in size, touching the cell, except the last one or two; usually a spot in cell, oblique, often produced to a streak situated in anterior part of cell along SC^2 and the cross-veins D^1 to D^4.

Underside much deeper brown-black than in the Mexican races.——Forewing: three grey submarginal spots R^3—SM^2 and some grey scales before R^3 and in lower angle of cell; these spots not prolonged.——Hindwing: red submarginal spots more regularly arched than in *procas* and *copanae*, deeper red, more heavily bordered with black, the upper ones often partly shaded over with black, the first being mostly vestigial.

Scent-organ: scales more triangular than in the preceding, being apically broader, differing much in outline from *P. belus varus* with which the present insect occurs together.

♀ not known to us.

Hab. Colombia.

In the Tring Museum 76 ♂♂ from: Cananche, Cundinamarca, July 1903 (Mathan); Muzo, September 1903 (Mathan), and December 1896; "Bogota"; R. Dagua (W. Rosenberg).

A common insect in Bogota collections.

58. Papilio lycidas Cram. (1777).

Papilio Eques Achivus lycidas Cramer, *Pap. Exot.* ii. p. 25. t. 113. fig. A. ♀ (1777) (Surinam); Goeze, *Ent. Beytr.* iii. 1. p. 81. n. 43 (1779).

Papilio Eques Achivus erymanthus id., *l.c.* p. 25. t. 113. fig. C. ♂ (1777) (Surinam); Goeze, *Ent. Beytr.* iii. 1. p. 79. n. 35 (1779).

Papilio Eques Trojanus belus, Fabricius (*non* Cramer, 1777, err. det.), *Spec. Ins.* ii. p. 9. n. 34 (1781) (*partim*); Jabl. & Herbst, *Naturs. Schmett.* ii. p. 95. n. 27 (1784) (*partim*); Fabr., *Mant. Ins.* ii. p. 5. n. 36 (1787) (*partim*); Gmel., *Syst. Nat.* i. 5. p. 2233. n. 294 (1790) (*partim*); Fabr., *Ent. Syst.* iii. 1. p. 17. n. 53 (1793) (*partim*).

Papilio erimanthus (!), Jabl. & Herbst, *Naturs. Schmett.* ii. p. 97 (1784).

Papilio lycidas, Esper, *Ausl. Schmett.* p. 80 (1792); Boisd., *Spec. Gén. Lép.* i. p. 317. n. 156 (1836) (Cayenne; Surinam); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 235 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 304 (1852) (Pará); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons; banks of rivers); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 78. n. 321 (1856) (Pará); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lép.* i. p. 6. n. 93 (1857) ("Brazil"); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 228 (1861) (Pará; Ega); id., *Journ. Entom.* i. p. 223. n. 5 (1862) (Upper Amazons & Pará; Guiana; habits); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 297. n. 123 (1864) (Surinam; Pará; Upp. Amazons; Bogota); Kirby, *Cat. Diurn. Lep.* p. 522. n. 27 (1871) (Guiana; Pará); Distant, *Proc. Ent. Soc. Lond.* p. xiv. (1876) (Costa

Rica); Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 7 (1876) (Huallaga; Ucayali); Oberth., *Et. d'Ent.* iv. p. 99. n. 310 (1880) (Teffé); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 242 (1880) (Sta. Marta); Staud., *Exot. Tagf.* i. p. 12. t. 8 ♂ (1884) (Amazons; Peru; Venezuela; Chiriqui); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 201. n. 16. t. 65. fig. 17. genit. (1890) (Guatemala; Nicaragua; Costa Rica; Panama); Hahnel, *Iris* iii. pp. 149, 203, 297 (1890) S. Estéban; Valera; Iquitos); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 31. n. 123 (1890) (Colombia); Haase, *Untersuch. Mimicry* i. p. 76 (1893); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença); Godm. & Salv., *l.c.* p. 728 (1901) (Honduras); Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 154 (1903) (Archidona, 640 m.).

Ithobalus lycidas, Hübner, *Verz. bek. Schmett.* p. 88. n. 916 (1818?).

Ithobalus erymanthus, id., *l.c.* n. 917 (1818?).

Papilio belus var. *lycidas*, Godart, *Enc. Méth.* ix. p. 38. n. 42 (1819).

Papilio belus var. *erymanthus* id., *l.c.*

Papilio erymanthus, Lacordaire, *Ann. Soc. Ent. Fr.* ii. p. 384 (1833) (Guyane).

♂. Upperside of abdomen (except claspers) whitish primrose-yellow, as in the allied species; a streak of similar colour on hindwing along abdominal fold. The scales of the upperside of both wings nearly all entire, being rounded at apex, except the scaling in the cell of the forewing and along the distal edge of the hindwing. The striation of the scales is strongly marked. The scales of the yellowish white markings of the hindwing are entire, acuminate, like those of the upperside of the abdomen. There is usually only one spot on the disc of the hindwing, situated between C and SC^2, but many specimens bear a complete row of spots. The red submarginal spots on the underside of the hindwing are much nearer the distal margin than in *P. belus*, there being also no white admarginal dots between the veins. The forewing bears two or three creamy white submarginal spots from hinder angle forward.

♀. Abdomen green above. White streak along abdominal fold of hindwing shorter than in male, not reaching base; there is usually a complete row of spots on the disc.

Scent-organ: the scales short, some broader than long, multidentate, others about half as long again as broad, tri- or quadridentate, less often bidentate, yellowish.

Genitalia: ♂. Harpe a slightly concave, irregularly square piece of chitin, produced at the ventral and at the distal corner each in a curved tooth, a smaller tooth at the oblique upper edge, sometimes accompanied by a second small tooth.——♀. Hairy lobes situated in the vaginal cavity somewhat acuminate, rather close together; postvaginal sclerite, which forms the roof of the cavity, with a thin mesial carina.

Early stages not known.

Hab. Guatemala southwards to Bolivia, and eastwards to Pará; may be expected to occur in the province of Goyaz, Brazil.

The species does not seem to be separated into geographical races.

In the Tring Museum 56 ♂♂, 4 ♀♀, from: Moran, W. Guatemala, 4500 ft., August 1904 (A. Hall); San José, Costa Rica (Underwood); Chiriqui; Muzo, Colombia, December 1896; R. Dagua (W. F. H. Rosenberg); Coca and Archidona, Ecuador (W. Goodfellow); R. Ucayali, and R. Cachyaco (Stuart); Palcazu, Junin (Hoffmanns); R. Mixiollo, Loreto (Baer); La Union, R. Huacamayo, Carabaya, 2000 ft., November and December 1904 (G. Ockenden); Province Sara, S. Cruz de la Sierra (J. Steinbach); Mérida, Venezuela (Briceño); Palma Sola, N. Venezuela; Snapure, September 1899, La Union, September 1901, and La Vuelta, May 1903, Caura R., Orinoco (S. M. Klages); Paramaribo, Surinam.

59. Papilio crassus Cram. (1777).

Papilio Eques Trojanus crassus Cramer, *Pap. Exot.* ii. p. 23. t. 112. fig. C. ♂ (1777) (Surinam); Goeze, *Ent. Beytr.* iii. 1. p. 85. n. 58 (1779).

Papilio Eques Trojanus belus, Fabricius (*non* Cramer, 1777, err. det.), *Spec. Ins.* ii. p. 9. n. 31 (1781) (*partim*); Jabl. & Herbst, *Naturs. Schmett.* ii. p. 95. n. 27 (1784) (*partim*); Fabr., *Mant. Ins.* ii. p. 5. n. 36 (1787) (*partim*); Gmelin, *Syst. Nat.* i. 5. p. 2233. n. 294 (1790) (*partim*); Esper, *Ausl. Schmett.* p. 80 sub n. 35, and p. 116. n. 50. t. 27. fig. 3. ♂ (1792); Fabr., *Ent. Syst.* iii. 1. p. 17 n. 53 (1793) (*partim*).

Princeps dominans *crassus*, Hübner, *Samml. Exot. Schmett.* i. t. 131 (1806—?).

Ithobalus crassus, id., *Verz. bek. Schmett.* p. 88. n. 914 (1818?); Kirby, in Hübner, *Samml. Exot. Schmett.* ed. ii. p. 92. t. 131. fig. 1. 2 (190—?).

Papilio belus var. *crassus*, Godart, *Enc. Méth.* ix. p. 38. n. 42 (1819).

Papilio crassus, Lacordaire, *Ann. Soc. Ent. Fr.* ii. p. 385 (1833) (Guyane; descr. of larva and pupa); Lucas, *Lép. Exot.* p. 33. t. 17. fig. 1. ♂ (1835); Boisd., *Spec. Gén. Lép.* i. p. 314. n. 153 (1836) (Brazil; Guyane; larva and pupa); Lucas, in Guérin, *Dict. Pitt. Nat.* vii. p. 48 (1838); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Brazil); id., West. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 232 (1846) (Brazil; Cayenne); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 307 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 79. n. 324 (1856) (Brazil; Pará); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 6. n. 91 (1857) (Brazil); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 227 (1861) (Pará; S. Paulo, Upper Amazons); id., *Journ. Entom.* i. p. 223. n. 1 (1862) (Upp. Amazons; Pará); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 130 (1864) (Surinam: Amazons; Brazil); Kirby, *Cat. Diurn. Lep.* p. 522. n. 33 (1871); Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 9 (1874) (Rio, Sept.; Botafogo, Nov.); Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 9. (1876) (Peru); Butl., *Ann. Mag. N. H.* (4). xx. p. 127. n. 59 (1877) (R. Mairo, Peru); Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 6. n. 11 (1879) (larva, pupa; Rio de Janeiro); Oberth., *Et. d'Ent.* iv. p. 99. n. 311 (1880) (Ecuador; Brazil); Staud., *Exot. Tagf.* i. p. 12. t. 8. ♂ (1884) (S. Brazil; S. Peru to Venezuela); Maass. and Weym., in Stübel, *Reisen S. Amer., Lep.* p. 91. n. 37 (1890) (S. Catharina?); Haase, *Untersuch. Mimicry* i. p. 76 (1893); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença); Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 28 (1895) (Rio de Janeiro; rather common); Peters, *Illustr. Zeitschr. Ent.* ii. p. 52 (1897) (Nova Friburgo, larva, pupa); Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 154 (1903) (Arehidona, 640 m.); Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani, Bolivia).

Papilio lepidus Felder, *Wien. Ent. Mon.* v. p. 72. n. 1. (1861) (Caracas; coll. Kaden, var. in coll. Godman); Bates, *Journ. Ent.* i. p. 223. sub n. 1 (1862) (Venezuela, local form of *crassus*); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 129 (1864) (Venezuela; Bogotá); id., *Reise Novara, Lep.* p. 40. n. 29. t. 10. fig. a. ♂ (1865) (Venezuela; Bogotá); Staud., *Exot. Tagf.* i. p. 12 (1884) (Colombia; Venezuela); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 203. n. 20 (1890) (Panama); Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani, Bolivia).

Papilio crassus var. a. *P. lepidus*, Kirby, *Cat. Diurn. Lep.* p. 522. sub n. 33 (1871) (Venezuela).

♂. White scales on upperside of abdomen acuminate: the proximal segments more or less extended green-black. Scaling of upperside of forewing denticulate; two large patches R^3—M^2, a long streak in cell and a streak behind M^2 occupying the hinder angle behind M^2 and cell, yellowish cream-colour; these patches often reduced or entirely absent; the same patches on the underside, but paler, here often preserved in specimens in which they are absent from the upperside.—— Scaling of upperside of hindwing non-dentate; a large greenish white patch between C and SC^2 reaching from subbasal cellule to near apex of C, limited in front by this vein, many specimens with a short streak behind SC^2 near distal margin; submarginal spots of underside brick-red, occasionally slightly rufous, usually accompanied by more or less distinct but minute white admarginal dots which stand at the veins (as in the allied species), not in the centre between the veins, being remnants of transverse bars; there is rarely a red spot between C and SC^2.

♀. Wings similar to those of male, but the white subcostal patch of the hindwing reduced, being represented by an ill-defined submarginal spot.

Scent-organ similar to that of *P. lycidas*, the scales being short and broad, denticulate.

Genitalia: ♂. Harpe small, short, triangular, rather broader than long, apex rounded, ventral edge dilated into a flat triangular process as in *P. belus*, *laodamas*, etc., this process standing almost vertically on the plane of the harpe, leaning dorsad, being curved basad, denticulate at distal edge, the dentition extending to apex of harpe.——♀. The two hairy flaps situated proximally in the vaginal cavity rounded, widely separated from each other.

Early stages described by Lacordaire, *l.c.* (1833), and again shortly noticed by Burmeister, *l.c.* (1879), and Peters, *l.c.* (1897).

There are no geographical forms, but the male is dichromatic in the forewing, only one form of the female being known.

a'. ♂-f. *crassus* Cram., *l.c.*——Forewing with yellowish creamy patches.

b'. ♂-f. *lepidus* Feld., *l.c.* No creamy patch on upperside of forewing.——This male form alone occurs in Venezuela, Colombia, Panama, and Costa Rica, the females from these countries not being devoid of the patch. Males with hardly any creamy scaling on the upperside of the forewing occur also in other districts, for instance Bolivia.

Hab. of *P. crassus*: from Costa Rica southwards to Rio de Janeiro.

In the Tring Museum 60 ♂♂, 10 ♀♀, from: Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall); Chiriqui; Muzo, Colombia, December 1896; Pereira, Popayan and Cali, Cauca; Zamora, Ecuador (O. T. Baron); Loja; Palcazu, Junin (Hoffmanns); Chanchamayo; Pozuzo; R. Cachyaco, affluent of R. Huallaga (Stuart); La Union, R. Huacamayo, Carabaya, 2000 ft., November and December 1904, wet season (Oekenden); R. Songo to R. Snapi, Bolivia, 1100 m., March—April 1896 (Garlepp); Mapiri, 1000 ft., September 1895 (Stuart); Villa Maria to Diamantino, Matto Grosso, January 1897 (Andeer); Tijuca; Petropolis; Amazons: Iquitos and Itaituba; Surinam; British Guiana; Caura R., Orinoco, May 1900 (S. M. Klages); Valencia, Venezuela.

SECTION II.—FLUTED SWALLOWTAILS.

(For differential characters see p. 433.)

This section contains the largest number of species. It is the most widely distributed Section, occurring in all regions, except the Antarctic, going in one species (*P. machaon*) as far north as Alaska and Kamtchatka. The variety in structure and pattern among the species is very great. Owing to the preservation of many intermediate species, the division of this Section into minor groups is not quite so well marked as in Sections I. and III.

The American species fall into two Subsections, which, taken each as a whole, are characterised, the one by the prevalence of yellow colour and the softness of the costal edge of the forewing, the other by the prevalence of black on the body and wings and the hardness of the costal margin of the forewing, the insects of this second Subsection being more strong-winged than those of the first Subsection. However, in the second Subsection there is a mimetic group of soft-winged species (*Zagreus Group*), which appears to have acquired secondarily the soft costal edge and the great amount of yellow on the wings and body. This mimetic group exhibits a most curious feature in the coloration of the head. While in all Papilios

which have the frons striped with yellow, a yellow stripe is situated on each side along the eye, *P. zagreus* and allies have a yellow line in the middle of the frons. The obtuse apex of the forewing and convex distal margin, the position of SC^3 of the forewing proximally of the upper angle of the cell, the great width of the cell and the long slender antennae are further peculiarities which separate *P. zagreus* and allies from the other American Papilios. The hard dentate costal edge of the species of the second Subsection (apart from *P. zagreus* and allies) has doubtless been evolved in connection with a strong flight. We find the same feature in a group of *Nymphalidae*, namely, the prionopterous genera *Charaxes*, *Eulepis*, and allies, which are all strong fliers, and also in the males of some *Pieridae*. The great robustness of the thorax (as compared with the size of the wings) observed in those Nymphalids is again met with in the Papilios with serrated costal edge to the forewing.

The following generic names have American species for name-types, nomina nuda not being here mentioned:

Euphoeades Hübner, *Verz. bek. Schmett.* p. 83 (1818 ?) (type: *glaucus*).

Heraclides id., *l.c.* (type: *cresphontes*).

Calaides id., *l.c.* p. 86 (1818 ?) (type: *androgeus*).

Priamides id., *l.c.* p. 87 (1818 ?) (type: *torquatus*).

Pyrrhosticta Butler, *Cist. Ent.* i. p. 86 (1872) (type: *eleotas*).

Troilides Kirby (ex Hübner, indescr.), in Allen's *Nat. Libr., Butt.* ii. p. 283 (1896) (type: *torquatus*).

Subsection C.*

Palpus yellow at side. Frons yellow, or with black mesial stripe, rarely all black. Abdomen at least with yellow dots at sides, usually with yellow stripe or for the greater part yellow. Scaling at the costal edge of forewing very dense and tough, difficult to rub off, the edge non-dentate.

We divide the American species into six groups:

a. Hindwing on underside with a subbasal and a submedian band, which unite near anal angle, forming a large black V . . . . . *Glaucus Group.*
No such bands . . . . . *b.*

b. Pronotum and underside of thorax with red or orange dots; no metallic blue spots on underside of hindwing *Anchisiades Group.*
No such spots . . . . . *c.*

c. No metallic blue spots on underside of hindwing; abdomen yellow beneath, with black line along upper edges of sternites; if this line absent, then tail with yellow marginal spot at apex; or abdomen black, with yellow line along lower edges of tergites, hindwing without regular row of yellow submarginal spots . . . . . *Torquatus Group.*
With metallic blue spots on hindwing . . . . *d.*

d. Abdomen striped with black and yellow beneath, or black dotted with yellow, there being two rows of yellow dots on each side of the tergites; cross-veins of forewing with yellow bar at least on underside . *Machaon Group.*

* For Subsection D see after Species No. 104.

Abdomen striped with black and yellow, antenna pale tawny; or abdomen black, dotted with yellow, only one row of dots on each side of the tergites, antenna black . . . . . *Troilus Group.*

Abdomen entirely yellow beneath and at sides; or all black, except a row of yellow dots situated laterally on the sternites, there being no dots on the tergites; or the abdomen black (♀♀), with a yellow line at the lower edges of the tergites, the hindwing of these females bearing a regular row of yellow submarginal spots at least on underside . . *Thoas Group.*

V. Machaon Group.

Antenna reaching to two-thirds of cell of forewing; club thick, obtuse, the last segment very short, the preceding three or four more than twice as broad as long. Abdomen either with yellow longitudinal bands, or black, with rows of yellow spots, two rows on each side of the tergites. Tail non-spatulate. Basal half of hindwing yellow or black, without the large V formed by black bands in the *Glaucus Group*. Cell of hindwing not widened. Harpe of male saw-like, the distal portion being a denticulate ridge and the proximal portion being less elevate, non-dentate, subcylindrical. In female on each side of vaginal orifice a long three-cornered flap which is dentate at the edges; proximally of these flaps a continuous, slightly elevate, ridge from side to side; behind the orifice a membranaceous tubercle clothed with extremely small hairs.

The anal eye-spot, composed of the marginal and submarginal spots, is better developed in this group than in the *Glaucus Group*. The origin of the ocellus from the two spots mentioned is well illustrated by *P. daunus* and allies; also in the present group the component submarginal and marginal spots remain occasionally separate.

With the exception of the Asiatic *P. xuthus*, which stands apart, the species of the *Machaon Group* are all very closely allied to one another. *P. indra* is the only one which is recognisable by the genital armature, all the others being identical in structure, as far as we know. The larvae also not presenting any very trenchant characters, one might well ask if *P. machaon*, the dimorphic *P. bairdi*, the variable *P. polyxenes*, the comparatively constant *P. zelicaon* and *P. nitra* are really specifically distinct from one another. Judging from the structure and pattern alone, one might be inclined to regard all these insects as individual and geographical forms of one species. However, one important fact is known which speaks entirely against this assumption. *Papilio bairdi* and *P. polyxenes asterius* occur in the same cañons in Colorado, but keep perfectly separate, the one living as caterpillar on *Umbelliferae*, the other on a Composite plant (*Artemisia dracunculoides*). If these two insects exist independently side by side—*i.e.* are true species—there is no reason to treat *P. zelicaon* otherwise than as a species by itself. And *P. machaon aliaska*, which occurs as far south as Oregon according to the two Edwardses, must also be considered independent of *P. bairdi* f. *oregonia* in spite of the close general resemblance in pattern. We doubt if *P. nitra* is more than a northern form of *P. bairdi*.

Papilio xuthus and the Pacific Palaearctic *P. machaon hippocrates* are seasonally dimorphic. In the American species dimorphism appears to be purely individual, the two varieties being produced by one female independent of the season, as is the case in some African *Precis*. However, besides the dimorphic *P. bairdi* from Colorado, no other dimorphic form has been actually reared. Breeding from the eggs of one female of *P. nitra*, of an Oregon female of *P. bairdi* f. *oregonia*, of a Mexican female of *P. polyxenes asterius*, and of a female of *P. polyxenes americus*, is a great desideratum.

Key to the American species :

a. Yellow patch M^2—SM^2 of forewing close to cell . . *b*.
Yellow patch M^2—SM^2 of forewing widely separated from cell, sometimes absent . . . . . *d*.

b. Abdominal sternites yellow, with two black lines . . *c*.
Abdominal sternites black, with or without indication of yellow lines . . . . . Species No. 63.

c. Anal ocellus with pupil . . . . . Species No. 61. *c'*.
Anal ocellus without pupil . . . . . Species No. 65. *a*.

d. Palpus and breast entirely black . . . . . Species No. 64.
Palpus yellow . . . . . *e*.

e. Abdomen dotted with yellow . . . . . *f*.
Abdomen with broad yellow lateral stripe . . . Species No. 61. *b'*.

f. Discal spots of hindwing below reddish orange, more or less edged with yellowish cream ; or the yellow band gradually shading off proximally, often extending to base ; or the discal spots of upperside small, shaded over with black, the band being distal of cell on hindwing . . . . . Species No. 60.
Orange colour of discal band of underside of hindwing more gradually shading off, the band always crossing apex of cell, never extended to base . . Species No. 61. *a'* and No. 62.

60. Papilio polyxenes Fabr. (1775).

Papilio Eques Achivus ajax Linné, *Syst. Nat.* ed. x. p. 462. n. 26 (1758) (*partim*) ; Clerck, *Icon. Ins.* ii. t. 33. fig. 3. ♂ (1764).
Papilio Eques Trojanus polyxenes Fabricius, *Syst. Ent.* p. 444. n. 10 (1775).

Linné's description of *ajax* applies, we think, to the present insect. The two references given after the description count for nothing, applying to totally different insects, the second being quoted later by Linné himself under *P. protesilaus*. In the twelfth edition of *Syst. Nat.* Linné described *P. xuthus* as being very similar to *P. ajax*. Esper (1798) tried to explain this comparison by assuming that Linné meant Clerck's *ajax*, not his own. The three facts: (1) that Linné characterised the anal ocellus of *ajax* and *machaon* by the same words (*angulo ani fulvo*), (2) that Clerck's work was executed under Linné's eyes—one might almost say under his supervision, and (3) that in 1767 Linné describes *P. xuthus* as being very similar to *ajax*, leave little doubt that the true *ajax* of Linné was the insect which Cramer named *asterius* (corrupted by Fabricius into *asterias*), which is the same species as *polyxenes* Fabr., but a different geographical race. However, since Linné himself misled later authors by the erroneous quotation of Raj. iii. 2 and Edw.

av. 34, under *ajax*, we think the wisest course to follow is to suppress the name *ajax* altogether.*

The subspecies of *P. polyxenes*, which name comes next in priority after *ajax*, do not all completely grade into one another. The differences are, however, so slight that the close connection between the various forms becomes at once evident on comparing a long series.

a. P. polyxenes americus Kollar (1850).

Papilio americus Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 354. n. 10 (1850) ("N. Granada, ad ripas fluminis Orinoco"); Doubl., Westw. & Hew., *l.c.* (1852); Gray, *Cat. Lep. Ins. Brit Mus.* i. *Pap.* p. 66. n. 294 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* 76. n. 311 (1856); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 315. n. 359 (1864) (= *sadalus*; Bogota; Venezuela; Ecuador; "Mexico?" false); Kirby, *Cat. Diurn. Lep.* p. 566. n. 322 (1871); Edw., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 13 (1877) ("S. Calif., Arizona" false; = *sadalus*); Staud., *Exot. Tagf.* p. 18. t. 12. ♂ (1884) (*partim*; Colombia; Ecuador; Venezuela); Olliff, *Proc. Ent. Soc. Lond.* p. 22 (1881) (monstr. in nenration); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 14. n. 12 (1890) (Bogotá, 2600—3000 m); iid., *l.c.* p. 34. n. 30 (1890) (Oparapo, Colombia, 1200 m.); iid., *l.c.* p. 41. n. 5 (1890) (Ales, near Pasto, 2100 m.); iid., *l.c.* p. 48. n. 11 (1890) (near Ibarra, 2370 m.); iid., *l.c.* p. 56. n. 80 (1890) (Baños, 1800 m.); iid., *l.c.* p. 58. n. 13 (1890) (Pululagua, 2500 m.); Hahnel, *Iris* iii. p. 185 (1890) (Mérida); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 243. n. 82 (1890) (*partim*; Colombia; Venezuela; Ecuador; "Angostura" false); Mayn., *Man. N. Amer. Butt.* p. 6. n. 6 (1891) (Arizona); Edw., *Butt. N. Amer.* iii. *Pap.* iii. fig. 1. 2. ♂, 3. ♀ (1891) ("Arizona" error loci; Bogota; "Southern Mexico to Ecuador" *partim*); Godm. & Salv., in Whymper, *Andes of Equator, App.* p. 109. n. 95 (1891) (Machachi, 10,000 ft.); Haase, *Untersuch. Mimicry* i. p. 92 (1893); Eimer, *Artbild. Verwandtsch. Schmett.* ii. p. 125 (1895) (*partim*;—t. 7. fig. 3. represents a Chiriqui specimen).

Papilio sardalus Becker, *Bull. Soc. Ent. France* p. 33 (1851) (*nom. nudum*! Quito).

Papilio sadalus Lucas, in Guér., *Rev. Zool.* (2). iv. p. 133. t. 10. fig. 4 (1852) (Quito); Doubl., Westw. & Hew., *l.c.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p 39. n. 185 (1852) (Quito); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 51. n. 191 (1856) (Quito; Colombia; Venezuela); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 59 (1857) (Quito); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 236 (1880) (Sta. Marta); Oberth., *Et. d'Ent.* iv. p. 68. n. 195 (1880) (*partim*; Ecuador).

Papilio asterius var. a, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. sub n. 184 (1852) (Venezuela).

Papilio asterioides, Strecker (*non* Reakirt, 1866, err. det.), *Lep. Rhop. Het.* p. 47. t. 6. fig. 4. ♀ (1873) ("Costa Rica" false).

Papilio asterius, Dewitz, in Wiegm., *Arch. Naturg.* xxxxiv. 1. p. 4. t. 1. fig. 2. 3. 4 (1878) (larva, pupa; Venezuela).

Papilio polyxenes, Staudinger (*non* Fabr., 1775, err. det.), *Exot. Tagf.* p. 18 (1884) (*partim*; Venezuela; Colombia).

Papilio sadatus (!), Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 152 (1903) (Baños, R. Pastaza, 1800 m.).

Papilio polyxenes var. *asterioides*, Maassen & Weym. (*non* Reakirt, 1866, err. det.), in Stübel, *Reisen S. Amer., Lep.* p. 38. n. 34 (1890) (Popayan).

♂♀. Specimens which resemble the following subspecies in the width of the yellow discal band can be distinguished by the last spot of this band on the forewing being produced basad and by the black basal area of the hindwing below being much less sharply defined, gradually shading off.

The subspecies is remarkably dichromatic, in one extreme the yellow colour of the hindwing extending to the very base, while in the other extreme the yellow discal band is much reduced. There are all intergradations. The black specimens were erroneously called *polyxenes* Fabr. by Staudinger, and *asterioides* Reak. by Maassen & Weymer and by Strecker.

a'. f. *americus* Kollar, *l.c.*——The discal band of the forewing, above, is often washed with orange, as is also the case in some specimens of *P. polyxenes stabilis*,

* See p. 414; also *P. marcellus*.

while one of our females (Mérida) is almost as pale as *P. indra* ; the last spot of the band is nearly always much longer than the patch M^2—SM^2. The base of the hindwing is in most individuals black as far as SC^2 or a little beyond, but in many specimens the black basal area is much restricted, having practically disappeared in a few individuals. On the *underside* the basal area of the hindwing is more or less washed out distally, the black scaling being in a large percentage of the specimens restricted to the extreme base or being altogether absent ; sometimes the forewing is also much shaded with cream-colour. The abdomen bears often a broad yellow lateral stripe, with which the dorso-lateral dots are more or less merged together. The postmedian cell-bar of the forewing is often more or less distinct on the underside.

The figures in Edwards, *Butt. N. Amer., l.c.*, represent average specimens of this form ; figs. 1 and 2 agree perfectly with typical Bogota specimens. We do not believe the original of these figures came from Arizona. If the specimen had been a straggler from the south, one would expect it to belong to the Central American form, which it does not. Some mistake in labelling is, we think, the true explanation of the record of *americus* from Arizona.

b'. f. *melasina* nov.——Yellow discal band of forewing reduced on both wings to a row of spots which are shading off proximally : bar on cross-veins of forewing present. The band rather broader on *underside*, but never entering cell of hindwing, more sharply defined on both wings than above, but occasionally gradually shading off proximally ; the basal half of the hindwing rarely washed with buff.

These black individuals resemble the dark Mexican form *asterioides* of *P. polyxenes asterius* ; however, the forewing is proportionally broader, the discal spots are powdered over with black proximally, the discocellular bar is present, the tail is shorter, etc.

This form appears to occur more frequently in the Cauca valley (probably at high altitudes) than anywhere else. Type of name from Pereira, Cauca valley. Strecker, *l.c.*, figured as *P. asterioides* Reak. a female of this form, said to be from Costa Rica. It is not impossible that a melanotic form occurs in that country, but we cannot accept Strecker's statement without further evidence. Mistakes as to locality occur easily, and we know for certain that at least in one case among Papilios Strecker gave a wrong locality, his *P. cleombrotus* being erroneously stated to have come from the Amazons.

Hab. of *P. polyxenes americus* : North Peru to Colombia and Venezuela.

The type of *americus* came doubtless from the Cordillera of Bogota, which Sulkowsky traversed on his way from the R. Magdalena to the Orinoco, going by the R. Meta.

In the Tring Museum 110 ♂♂, 37 ♀♀, and 4 pupae, from : Cayambe, N.W. Ecuador, June—July 1897, 9000 ft. (W. Rosenberg) ; Baños (R. Haensch) ; Pereira, Cauca ; "Bogota" ; Villavicencio to Monte Redondo, March 1897 (Dr. Bürger) ; Valdivia, Colombia, July 1897 (Pratt) ; Bogota to Coachi, 2800 down to 1700 m., January 1897 (Dr. Bürger) ; Mérida, Venezuela, 2000—3000 m., October to January (Briceño).

b. P. polyxenes stabilis subsp. nov.

Papilio sadalus, Butler & Druce (*non* Lucas, 1852, err. det.), *Proc. Zool. Soc. Lond.* p. 365. n. 383 (1874) (Costa Rica) : Oberth., *Et. d'Ent.* iv. p. 68. n. 195 (1880) (*partim* ; Chiriqui).

Papilio americus, Edwards, *Papilio* iii. p. 55 (1883) (Panama ; Chiriqui) ; Staud., *Exot. Tagf.* p. 18 (1884) (*partim* ; Honduras to Chiriqui) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 243. n. 82. t. 72. fig. 8. genit. (1890) (*partim* ; Costa Rica ; Chiriqui ; not farther north) ; Eimer, *Artbild. Verwandtsch. Schmett.* ii. p. 125. t. 7. fig. 3. ♀ (1895) (*partim*).

♂♀. The Central American specimens do not vary so much *inter se* as do the South American ones, the present subspecies being monochromatic. The yellow band across the disc of both wings is always broad, not varying very much in width ; the last spot of this band on the forewing is about as long as the patch before it, not projecting basad. There is sometimes a postmedian cell-bar present above and below, being larger on underside.——On the hindwing the inner edge of the band crosses the cell at point of origin of SC^2 or proximally of it.

On the *underside* the band is proximally much more sharply defined than in the South American form, the hindwing being purer black from base to band.

Hab. Costa Rica ; Chiriqui ; Sevilla I., Pacific side of Panama ; Honduras (*teste* Staudinger, *l.c.*) ; name-type from Costa Rica.

The only specimen (a ♀) from Sevilla Island which we have is of interest, the anal ocellus lacking the black dot above and below.

Eimer's figure, *l.c.*, is undoubtedly taken from a female of the present subspecies (probably from a Chiriqui specimen received from Messrs. Staudinger & Bang-Haas), though the habitat is given beneath the figure as being Colombia, Venezuela, and Ecuador, which countries are inhabited by the preceding subspecies.

The dot in the yellow spot SC^4—SC^5 is absent from one of our Chiriqui females.

In the Tring Museum 46 ♂♂, 14 ♀♀, from : Sevilla I., January 1902 (Batty) ; Chiriqui ; Boquete, Chiriqui, 3500 ft. (Watson) ; San Juan, Costa Rica, 4000 ft., September 1904 (A. Hall) ; Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall) ; S. José, 4000 ft., October 1904 (A. Hall) ; Escazu, Costa Rica, October 1903 (Underwood) ; Puriscal, October 1903 (Underwood) ; Cartago (Underwood) ; Guatil Piris, December 1901 (Underwood) ; Alahuela, 4000 ft., September 1904 (A. Hall).

c. Papilio polyxenes asterius Cram. (1782).

Petiver, *Gazoph.* t. 6. fig. 12 (1709).

Papilio Eques Achivus ajax Linné, *Syst. Nat.* ed. x. p. 462. n. 26 (1758) (*partim*) ; Clerck, *Icon. Ins.* ii. t. 33. fig. 3. ♂ (1764).

Papilio Eques Trojanus troilus, Drury (*non* Linné, 1758, err. det.), *Illustr. Exot. Ins.* i. p. 22. t. 11. fig. 2. ♂, 3. ♀, and Index (1770–71) (N. York ; Maryland ; Virginia) ; Fabr., *Syst. Ent.* p. 444. n. 7 (1775) (*partim*) ; Cramer, *Pap. Exot.* iii. p. 25. t. 207. fig. A. ♀ (1779) (N. York ; "Jamaica" false ; ocellus blind) ; Goeze, *Ent. Beytr.* iii. 1. p. 31. n. 6 (1779) (*partim*) ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 242. n. 58. t. 17. fig. 3. 4 (1784) (*partim*).

Papilio Eques Achivus asterius Cramer, *Pap. Exot.* iv. p. 194. t. 385. fig. C. D. ♂ (1782) (N. York ; Carolina ; Virginia) ; Esper, *Ausl. Schmett.* p. 47. n. 18. t. 11. fig. 1. 2 (1786) (N. York).

Papilio Eques Trojanus polyxenes, Jabl. & Herbst, *Naturs. Schmett.* ii. p. 253. t. 18. fig. 1. ♂ (1784) (= *asterius* = *ajax* Clerck ; *partim*).

Papilio Eques Trojanus asterius (!), Fabricius, *Mant. Ins.* ii. p. 2. n. 13 (1787) (*partim*) ; Gmelin, *Syst. Nat.* i. 5. p. 2228. n. 280 (1790) (*partim*) ; Fabr., *Ent. Syst.* iii. 1. p. 6. n. 16 (1793).

Papilio troilus, Abbot & Smith, *Ins. Georgia* ii. p. 1. t. 1. ♂. ♀. l. p. (1797) ; Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 249. n. 52 (1869) ("S. Domingo" perhaps erroneous, the ♀ in Brit. Mus. being like ordinary North American ♀♀).

Papilio asterius, Esper, *l.c.* p. 248. t. 40B. fig. 6. ♀ (1798) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 37. n. 184 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. p. 51. n. 193 (1856) (*partim*) ; Gosse, *Letters from Alabama* p. 78 (1859) ; Reak., *Proc. Ent. Soc. Philad.* vi. p. 123 (1867) (Colorado) , Strecker, *Butt. Moths N. Amer.* p. 71. n. 17 (1878) ; Haase, *Untersuch. Mimicry* i. p. 92 (1893) ; Grant, *Canad. Ent.* xxviii. p. 273 (1896) (Orillia, Ont., formerly common, now rare) ; Eimer, *Orthogen.* p. 37. fig. 17 (1897) ; Bubna, *Ent. News* viii. p. 98 (1897) (Cleveland, Ohio ; common

as usual); Duzee, *Bull. Buffalo Soc. N. Sci.* v. p. 107, n. 3 (1897) (Buffalo); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 271 (1897); Thoms., *Canad. Ent.* xxix. p. 263 (1897) (larva on *Ruta graveolens*!); Beutenm., *Bull. Amer. Mus. N. H.* x. p. 310 (1898) (Highland Falls, N.Y.); Fyles, *Rept. Ent. Soc. Ontario* xxix. p. 44 (1899) (on parsnip, carrot, etc.); Holland, *Butt. Book* p. 314. t. 2. fig. 17. 24. 27. larva, t. 6. fig. 13. 18. 19. pupa, t. 40. fig. 1. ♂ (1899); Webst., *Ent. News* xi. p. 577 (1900) (larva on *Cosmos*); Dent., *Moths Butt. U.S.* p. 346. fig. ♂. ♀ (1898—1900); Beutenm., *Butt. N. York City* p. 4. fig. ♂ (1902); Wasm., *Ent. News* xiii. p. 29 (1902) (a larva feeding in January); Ellsw., *ibid.* p. 104 (1902) (aberr., similar to *indra*, Lestershire, N.Y., June 17, 1899); Comst., *ibid.* xiv. p. 197 (1903) (Adirondack Mts., rare in Aug.); Laur., *ibid.* p. 296 (1903) (Miami, Fla., common).

Euphoeades asterius, Hübner, *Verz. bek. Schmett.* p. 83. n. 849 (1818?).

Papilio asterias, Godart, *Enc. Méth.* ix. p. 58. n. 91 (1819); Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 14. t. 4. ♂. ♀. l. p. (1833) (*partim*; Virginia; Georgia); Lucas, *Pap. Exot.* p. 38. t. 20. fig. 1 (1835); Boisd., *Spec. Gén. Lép.* i. p. 332. n. 175 (1836) (*partim*; U.S.A.; Mexico); Drury, ed. Westw., *Illustr. Exot. Ins.* i. p. 21. t. 11. fig. 2. 3. 5 (1837); Harris, *Ins. Inj. Veget.* p. 212 (1841); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 15 (1845); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 161 (1846); Karsten, *Arch. Anat. Phys. & Med.* p. 375. t. 11 and 12 (1848) (thoracical gland of larva); Kirtl., *Proc. Ent. Soc. Lond.* (2). i. p. 101 (1851) (larva on *Umbelliferae*, incl. of *Cicuta virosa*!); Harris, *l.c.* ed. ii. p. 231 (1852); Urban, *Canad. Nat. Geol.* ii. p. 220. fig. a. b. t. 3. fig. 2. 3 (1857); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* p. 4. n. 60 (1857) (Mexico); Vollenh., *Tijdschr. Ent.* iii. p. 85. n. 125 (1860); Morris, *Syn. Lep. N. Amer.* p. 5. n. 7 (1862); Harr., ed. Flint, *Ins. Inj. Veg.* p. 265. t. 4. f. 4. ♂, 5. ♀, 6. l, 7. p. (1862) (life history); Reak., *Proc. Ent. Soc. Philad.* ii. p. 137. n. 4 (1863) (Chiapas; syn. excl.); Weidem, *ibid.* p. 146 (1863) (*partim*); Lintn., *ibid.* iii. p. 51 (1864) (Eastern N. York, eggs, larva, pupa); Kirkp., *ibid.* p. 329 (1864) (Cleveland, Ohio, common); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 315. n. 361 (1864) (*partim*; Canada to Nicaragua); Edw., *Proc. Ent. Soc. Philad.* iv. p. 390 (1865) (hermaphrodite); Tenney, *Man. Zool.* fig. 281. 282 (1867); Reed, *Canad. Ent.* i. p. 19 (1868) (London, Ont.); Riley, *Amer. Entom.* i. p. 58 (1868); Harris, *Ent. Corr.* p. 270 (1869); Bethune, *Canad. Ent.* ii. p. 8 (1870) (Toronto, July); Parker, *Amer. Entom.* ii. p. 175 (1870) (Iowa); Riley, *Canad. Ent.* iv. p. 37 (1872) (Peterboro Co., Ont., May); Scudd., *ibid.* iv. pp. 74, 84 (1872) (Abbot's MS.); Edw., *ibid.* v. p. 8 (1873) (name to be retained!); id., *Proc. Cal. Ac. Sc.* v. p. 163 (1873) (larva descr. after Boisd.; Marin Co., Oakland); Treat, *Amer. Natural.* p. 129 (1873) (controlling sex, experiment); Bean, *Ent. Mo. Mag.* x. p. 248 (1874) (Galena, Ill., common, June and again midsummer); Mead, in Wheeler, *Rept. Expl. Surv. v. Zool.* 8. p. 740 (1875) (Colorado; N. Mexico; "California," error); Moore, *Canad. Ent.* vii. p. 60 (1875) (Fulton Co., Ohio, July, larva); French, *Trans. Dept. Agric Illin.* xv. p. 137 (1877); Saund., *Rept. Ent. Soc. Ontario* p. 37. fig. 8 (1877); Pagenst., *Verh. Nat. Med. Ver. Heidelb.* (2). i. p. 87 (1874); Edw., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 12 (1877) (Atlantic to Pacific; Canada to Gulf of Mexico; Arizona); Worth., *Canad. Ent.* x. p. 17 (1878) (♀, with "fungus"——pollen!); Drury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., common); Edw., *Canad Ent.* xi. p. 86 (1879) ("Costa Rica" false; black ♂♂); Ballard, *Ins. Lives* p. 321. fig. (1879); Oberth., *Et. d'Ent.* iv. p. 69. n. 197 (1880) (Florida; Mexico); Mddl., *Trans. Dept. Agric. Illin.* xviii. *App.* p. 74 (1880); Coq., *ibid.* p. 173 (1880); Olliff, *Proc. Ent. Soc. Lond.* p. 28 (1881) (abnormal neuration); Newm., *Proc. Ent. Soc. Philad.* i. p. 26 (1881) (N. Jersey; on *carrot*); Edw., *Papilio* iii. pp. 54, 60. t. 1. fig. 1. 2. 3. ocellus (1883) ("Panama" false); Fern., *Butt. Maine* p. 23 (1884); Edw., *Canad. Ent.* xvi. p. 115 (1884) (habits of larva); Gruber, *Jena. Zeitschr. Nat.* xvii. p. 467. t. 7. fig. 1–5 (1884) (metam.); id., *Papilio* iv. p. 84. t. 1. fig. 1–5 (1884) (transf.); Lintn., *ibid.* p. 136. n. 2 (1884) (Rio Grande); Aaron, *ibid.* p. 172 (1884) (S. Texas); Hagen, *Ent. Mo. Mag.* xx. p. 169 (1884) (hunted by *Amax longipes*); Tepper, *Ent. Amer.* i. pp. 159, 186 (1885) (variability of ocellus); Christy, *Ent. Mo. Mag.* v. p. 278 (1885) (attr. by faded leaves); Mayn., *Butt. N. Eng.* p. 51. t. 6. fig. 71. 71A (1886); French, *Butt. East. U.S.* p. 89. fig. 14. 15. 16 (1886); Riley, *Insect Life* i. p. 161 (1888) (parasites, *Trogus obsidianator* and *exesorius*); Weed, *Psyche* v. p. 52 (1888) (larvae in July, Champaign, Ohio); Hagen, *ibid.* p. 305 (1888) (caught by *Amax*); Skinn. & Aar., *Canad. Ent.* xxi. p. 126 (1889) (Philadelphia, common); Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 10 (1889) (liter. rel. to metam.); Mayn., *Man. N. Amer. Butt.* p. 8. n. 12. fig. 6. b (1891); Kent, *Insect Life* iii. p. 338 (1891) (Roxie, Miss.); Edw., *Canad. Ent.* xxiv. p. 49 (1892) (Colorado, black ♂); Foster, *ibid.* p. 192 (1892) (Marshall Pass, Colorado, 10,000—13,000 ft.); Staley, *ibid.* p. 204 (1892) (Marshall, Missouri, common); Weed, *ibid.* p. 277 (1892) (Issaquena Co., Mississippi); Davis, *Journ. N. York Ent. Soc.* i. p. 47 (1893) (Staten I., N.Y., May to Oct.); Skinn., *Ent. News* iv. p. 82 (1893) (N. Carolina); Jones, *ibid.* p. 190 (1893) (Richmond Co., N.C.); Cockerell, *Trans.*

Amer. Ent. Soc. xx. p. 353. n. 646 (1893) (Colorado); Beutenm., *Bull. Amer. Mus. N. H.* v. p. 242. t. 2. f. 1. ♂ (1893) (N. York; descr. of l., p., i.); White, *Ent. News* v. p. 175 (1894) (Brooklyn); Riley, *Insect Life* vi. p. 211 (1894) (larva on celery); Ehrm., *Canad. Ent.* xxvi. p. 292 (1894) (specimen without pupil in ocellus; larva variable); Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 127. t. 7. fig. 10. ♀ (1895); Clevel., *Ent. News* vii. p. 73 (1896) (Oneonta, N.Y.); Fiske, *ibid.* p. 241 (1896) (Webster, N.H., scarce, formerly common, two or three broods); Trum., *ibid.* p. 298 (1896) (Volga, S. Dakota, common); Wright, *Butt. West Coast* ed. ii. p. 89. n. 29. t. 29. ♂, 29b. 29 ♀ (1906) (East. States; Arizona).

Papilio asterius var. *ampliata* Ménétriés, *Enum. Corp. Anim. Mus. Petrop., Lép.* ii. p. 99. sub n. 60 (1857) ("Amér. sept. par Motschulsky";—doubtless from Mexico, where Motsch. had made collections).

Papilio asterioides Reakirt, *Proc. Ac. Nat. Sci. Philad.* p. 331. n. 27 (1866) (Mexico); Kirby, *l.c.* p. 567. n. 325a (1871).

Papilio calverleyi Grote, *Proc. Ent. Soc. Philad.* ii. p. 441. t. 10. ♂ (1864) (New Lots, Queen's Co., Long I., Aug.).

Papilio (var.?) *calverleyi*, Mead, *Amer. Natural.* p. 332 (1869) (♀, Florida, April; abdom. with six rows of yellow spots).

Papilio polyxenes, Kirby, *Cat. Diurn. Lep.* p. 566. n. 325 (1871) (*partim*); Grote, *Bull. Buffalo Soc. N. Sc.* i. p. 185 (1873) (in the Southern States the ♂ *polyxenes* seems to approach the ordinary ♀ type); Gerb., *Macro-Lep. N. Amer.* p. 25. n. 451 (1878); Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 178. n. 23 (1882) (recensio critica;—cit. ex parte ad formam insularem refer.); Staud., *Exot. Tagf.* p. 18. t. 12. ♂ (1884) (*partim*); Scudder, *Butt. East. U.S.* ii. p. 1353. t. 8. fig. 2. 3, t. 27. fig. 3, t. 35. fig. 30, t. 40. fig. 1, t. 57. fig. 2, t. 61. fig. 15. 16, t. 66. fig. 2, t. 72. fig. 11. t. 76. fig. 17. 24. 27, t. 79. fig. 56—60, t. 85. fig. 13. 18. 19 (1889); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 242 (1890) (*partim*; Mexico to Nicaragua); Soule, *Psyche* viii. p. 435 (1899) (colour var. in larvae).

Amaryssus polyxenes, Scudder, *Proc. Boston Soc. N. H.* xvii. p. 90. n. 18 (1874) (Heart R. Crossing, Yellowstone); Sprague, *Psyche* ii. p. 257 (1879) (Wollaston, Mass., May 18.); id., *l.c.* p. 259 (1879) (Mass., May 18, June 19.).

Papilio asterias var. *calverleyi*, Edwards, *Trans. Amer. Ent. Soc.* vi. p. 10. sub n. 12 (1877) (occas., Long I., Florida); Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 131. t. 8. fig. 5. ♂, 6. ♀ (1895) (cop. from Edwards); id., *Orthogen.* p. 31. fig. 9 (1897); Holland, *Butt. Book* p. 314. t. 41. fig. 6. ♀ (1899).

Papilio asterias var. *asteroides* (!), Edwards, *Trans. Amer. Ent. Soc.* vi. p. 10. sub n. 12 (1877) (S. States; Arizona; occas. in Northern States).

Papilio polyxenes var. *ampliata*, Gerhard, *l.c.*

Papilio polyxenes var. *calverleyi*, id., *l.c.*

Papilio asterius ab. *calverleyi*, Strecker, *Butt. Moths N. Amer.* p. 72 sub n. 17 (1878).

Papilio asterius var. *asterioides*, id., *l.c.*

Papilio asteroides (!), Edwards, *Canad. Ent.* xi. p. 85 (1879) (Reakirt's insect not the same as Strecker's; black ♂♂, "Costa Rica" false); Skinner, *Ent. News* xiii. p. 183 (1902) (type "so marked" in coll. of *Amer. Ent. Soc.* is *polyxenes*, not the insect fig. by Strecker as *asteroides*); Wright, *Butt. West Coast* ed. ii. p. 89. n. 30. t. 4. fig. 30. 30b. ♂. ♀ (1906) (Mt. Shasta; Mogave Desert).

Papilio polyxenes calverleyi, Scudder, *Butt. East. U.S.* ii. p. 1355 (1889).

Papilio asterias asterioides Maynard, *Man. N. Amer. Butt.* p. 8. n. 12a (1891).

Papilio asterias var. ♀, *alunata* Skinner & Aaron, *Canad. Ent.* xxi. p. 126 (1889) (Philadelphia?; submarginal spots of hindwing vestigial above, olive-buff).

Papilio astyanax, Scudder (*non* Fabr., 1793, err. det.) *Psyche*, viii. p. 210. t. 5. f. 6, *l.* juv. (1898).

Papilio asterias ab. *calverleyi*, Spengel, *Zool. Jahrb. Abt. Syst.* xii. p. 356. fig. C. D. (1899); id., *l.c.* xiii. p. 205 (1900).

Papilio polyxenes Fabr. var. *curvifascia* Skinner, *Ent. News* xiii. p. 183 (1902) (Rincon, N. Mexico).

Papilio asterias, Fabr. var. *semi-alba* Ehrmann, *Canad. Ent.* xxxii. p. 348 (1900) (♂, S.W. Penn.).

There is an interesting difference in the degree of variability between the specimens from the Nearctic Region proper and those from the Central American countries. While the North American *males*, with rare exceptions, conform more or less closely to one type, there are three distinct-looking types in the southern districts of the range, two, or in some places all three, occurring promiscuously together, one of them not being distinguishable from the ordinary North American

type. The three forms intergrade completely. The females from Central America are on the whole the same as North American ones. The development in Central America evidently tends towards a black type; the insect is still unstable, the causes which are producing the black type not taking effect in all individuals. It is one of the numerous cases where an insect is on the point of splitting up into some well-marked geographical varieties. We emphasize nomenclatorially the occurrence of the kind of variability mentioned by recording the three types of males under three names.

a'. ♂-f. *asterius* Cram., *l.c.*——Both wings with a yellow discal band of spots which enters the cell on hindwing. This is the most widely distributed form occurring from South Canada to South Mexico. The black dot in the anal ocellus is rarely absent. Ehrmann, *l.c.*, records as *semialba* 2 ♂♂ from Pennsylvania in which the spots of the forewing are pure white, while the markings of the hindwing are deep golden yellow.

b'. ♂-f. *currifascia* Skinn., *l.c.*——Shorter winged and shorter tailed than the preceding; discal band broad, but not entering the cell of the hindwing, or there being only a small spot in the cell. This is a form occurring in New Mexico, Vera Cruz and Guatemala, being in the first and last mentioned countries the prevailing if not the only form of the male. Some North American males come very close to it, and there are also West Mexican specimens which are scarcely distingnishable. Standinger's figure of *P. polyxenes*, l.c., represents the present form.

c'. ♂-f. *ampliata* Ménétr., *l.c.*; *asterioides* Reak., *l.c.*——Discal spots of fore- and hindwing, above, strongly reduced, partly obsolete, often all absent from forewing. This black form is more common in Guerrero than the ♂-f. *asterius*, intermediate specimens being about as plentiful as ♂-f. *ampliata*. Reakirt's description of *asterioides* applies to specimens with small spots on the forewing. The type specimen of *P. asterioides* preserved in the American Museum is said by Skinner to be "simply an inconstant and accidental variation, and a collector could take a dozen equally as aberrant wherever the species is common." We have not seen a single specimen from North America which agrees with Reakirt's description. The only instance of the occurrence of a black male similar to the female within the United States we know of is recorded by Edwards, *Canad. Ent.* xxiv. p. 49 (1892), who bred a male of that form from a Colorado chrysalis.

The female does not vary so much as the male ; the majority of specimens have small yellow discal spots on the upperside, in many individuals these spots are nearly all missing, while in others again the spots are large. The females received from Rincon with the specimens of ♂-f. *currifascia* are described by Skinner as being like the males, but having the spots on the forewing lighter in colour. We have a female from the same place (received from Mr. G. Franck, of Brooklyn) in which the discal spots of the forewing are obsolete except the upper two or three, the middle spots of the hindwing being also much smaller than in the males from that place. A bred female from Iowa, July 1st, 1897, killed too soon after emergence from the chrysalis, the wings being somewhat crinkly, agrees with ordinary specimens of ♂-f. *asterius*, but the spots are paler and are irregularly stained with black, the band having the appearance of being smeared over with black here and there. A specimen in which the submarginal spots of the hindwing are reduced and of a bluish colour (ab. *alunata*) has been named by Skinner & Aaron, *l.c.* A rare aberration common to both sexes is ab. *calverleyi* Grote, *l.c.*, which is well known

from Edwards' figures. We have a transitional specimen (♀) caught at Passaic, New Jersey (acquired for ourselves by Mr. G. Franck). The forewing is nearly the same above as below, the spots being smaller and the discocellular bar being vestigial. The upperside of the right hindwing is normal, while on the left wing the first submarginal spot and the anal one are enlarged, and the other submarginal spots produced discad, this additional yellow scaling, however, not being conspicuous. On the underside the specimen agrees fairly well with *calverleyi*.

Hab. of *P. polyxenes asterius*: Honduras to Arizona and Canada, in North America from Arizona and the Mississippi basin to the Atlantic; a black male recorded by Wright from North California.

In the Tring Museum 170 ♂♂, 110 ♀♀, and a series of larvae and pupae from Guatemala northwards.

In coll. Oberthür from Honduras.

d. P. polyxenes polyxenes Fabr. (1775).

Papilio Eques Trojanus polyxenes Fabricius, *Syst. Ent.* p. 444. n. 10 (1775) (America); Goeze, *Ent. Beytr.* iii. 1. p. 41. n. 7 (1779); Fabr., *Spec. Ins.* ii. p. 4. n. 13 (1781) (in Americae meridionalis insulis).

Papilio Eques Trojanus asterias (!), Fabricius, *Mant. Ins.* ii. p. 2. n. 13 (1787) (*partim* ;=*polyxenes*); Gmelin, *Syst. Nat.* i. 5. p. 2228. n. 280 (1790) (*partim*; in insulis Americae meridionali oppositis).

Papilio asterias, Boisduval & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 14 (1833) (*partim*; Antilles); Boisd., *Spec. Gén. Lép.* i. p. 332. n. 175 (1836) (*partim*; Antilles); Poey, *Mem. Soc. R. Econ. Habana* p. 235 (1846); Lucas, in Sagra, *Hist. Cuba* vii. p. 205 (1857) (*partim*); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) (*partim*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 315. n. 361 (1864) (*partim*; insular specimens have wider band).

Papilio asterius, Herrich-Sch., *Corr. Bl. Zool. Min. Ver. Regensb.* p. 172. n. 4 (1864) (Habana); Dew., *Zeitschr. Ges. Naturw.* liii. p. 158 (1879) (Cuba, larva); Neum., *Ent. Amer.* i. p. 160 (1885) (Cuba, ♀ resembling ♂); Smith, *ibid.* (1885) (relationship between *asterius*, *asterioides*, and *polyxenes*).

Papilio polyxenes, Kirby, *Cat. Diurn. Lep.* p. 566. n. 325 (1871) (*partim*); Gundl., *Papilio* i. p. 113 (1881) (Cuba); id., *Contr. Ent. Cuba* p. 136 (1881) (*partim*; Western Cuba); Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 178. n. 23 (1882) (*partim*); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 242. n. 81 (1890) (*partim*; Cuba); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 271 (1897) (diff. from *asterias*).

Papilio asterioides, Eimer (*non* Reakirt, 1866, err. det.), *Arth. Verwandtsch. Schmett.* ii. p. 121. t. 7. fig. 6. ♂, 7. ♀ (1895) ("Mexico" false); id., *Orthogen.* p. 36. 42. fig. 16 (1897) ("S. Amer.").

There is nothing in the description given by Fabricius in 1775 which points to the insect described being the present insular form; but in 1871 it is stated by him that the insect came from South American islands. As in the case of his *Sphinx lusca*, where the same locality is given, we apply the name to the Cuban form of the species.

♂♀. Very similar to ordinary North American specimens of *P. p. polyxenes*, the discal band of the hindwing broader; the sexes less dissimilar, the female bearing a discal band almost like the male, the band being narrower and somewhat paler; submarginal spots of *underside* rather larger than in *P. p. polyxenes*.

Eimer's figures are a good representation of the two sexes of this insular form. We suspect that Eimer, as in the case of *P. p. americus*, trusted implicitly in the correctness of the names under which he received the specimens from dealers.*

Hab. Cuba.

The specimens labelled S. Domingo (Tweedie) in the British Museum and

* See p. 417.

in coll. F. D. Godman agree with the North American form; we have not seen fresh material from this island.

In the Tring Museum, 4 ♂♂, 2 ♀♀, from Cuba.

d. P. polyxenes brevicauda Saund. (1868).

Papilio asterius, Gosse (*non* Cramer, 1782, err. det.), *Can. Nat. Natur.* p. 184 (1840) (Newfoundland).

Papilio brevicauda Saunders, in Packard, *Guide Ins.* p. 278 note (1868) (Newfoundland); Kirby, *Cat. Diurn. Lep.* p. 567. n. 325b (1871); Saund., *Can. Ent.* v. p. 117 (1873) (reply to Strecker's attack); Grote, *Bull. Buffalo Soc. N. Sci.* i. p. 185 (1873) (Anticosti); Edwards, *Canad. Ent.* vi. p. 20 (1874) (larva); Couper, *ibid.* vi. p. 33 (1874) (localities); Couper, *ibid.* vii. p. 18 (1875) (Percé, distr. of Gaspé, north shore of Gulf of St. Lawrence); Bates, *Ent. Mo. Mag.* xi. p. 244 (1875) (Betts Cove and Terra Nova River, Newfoundland, evidently local form of *asterias*); Edw., *Butt. N. Amer.* ii. *Pap.* t. 8 (1875); id., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 11 (1877) (Anticosti; Newfoundland; Quebec; = *anticostiensis*); Kirby, *l.c.* p. 812. n. 325b (1877); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 452 (1878); Edw., *Butt. N. Amer.* ii. *Pap.* t. 8B (1880) (transf.); Gosse, *Canad. Ent.* xv. p. 44 (1883) (Newfoundland, transformation); Gruber, *Zeitschr. Ges. Naturw.* xvii. p. 468 (1884); id., *Papilio* iv. p. 85 (1884) (transf., after Edw.); Scudd., *Butt. East. U.S.A.* iii. p. 1851 (1889); Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 10 (1889) (liter. rel. to transform.); Mayn., *Man. N. Amer. Butt.* p. 8. n. 10. fig. 6c (1891) (Newfoundland; Anticosti; Labrador; Quebec, June); Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 136. t. 7. fig. 2. ♂ (1895) (copy from Edwards); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 272 (1897) (= *polyxenes*); Winn, *Canad. Ent.* xxx. p. 304 (1898) (Kamouraska, 85 miles south of Quebec); id., *Rept. Ent. Soc. Ontario* xxix. p. 36 (1899) (range, life hist.; 85 miles south of Quebec, on south shore of St. Lawrence; Bic, Rimouski Co.; Orleans I., P.Q.; Metis; Kamouraska; all stages in August, on *Archangelica*; probably two broods); Fyles, *ibid.* p. 45 (1899) (pupation); Bethune, *ibid.* xxx. p. 104 (1900) (first specim. May 23 in breeding cage); Dyar, *Butt. U.S. Nat. Mus.* lii. p. 3. n. 21 (1902) (N.E. Coast); Lyman, *Canad. Ent.* xxxv. p. 340 (1903) (larva on parsley and other Umbellif.); Brain., *ibid.* xxxvi. p. 52 (1904) (rearing); Lyman, *Rept. Ent. Soc. Ontario* xxxvi. p. 96. n. 21 (1905) (N.-W.-River Post, Hudson Bay; Lake Melville, Ungava).

Papilio polyxenes var. *brevicauda*, Couper, *Canad. Ent.* iv. p. 202 (1872) (Anticosti).

Papilio anticostiensis Strecker, *Lep. Rhop. Het.* p. 10. t. 2. fig. 2 (1873); id., *l.c.* p. 41 and 49 (1873); id., *l.c.* 68. t. 8. fig. 13. larva (1874); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 453 (1878); Streck *l.c. Suppl.* iii. p. 17 (1900) (2♂♂, 2 ♀♀).

Papilio asterius var. *brevicauda*, Strecker, *Butt. Moths N. Amer.* p. 71. sub n. 17 (1878).

Papilio asterius var. *anticostiensis* id., *l.c.*

Papilio mediocauda (!) Eimer, *l.c.* ii. p. 119 (1895).

Papilio mediocauda Eimer, *l.c.* ii. p. 138 (1895) (hab.?, this form or *asterius* ♂-f. *curvifascia*?).

♂♀. Sexes similar. Distal margin of forewing rounded; yellow bar on cross-veins always present; no cloudy yellow spot in front of subcostal fork; discal spots often all of about the same length. Discal band of hindwing curved, usually no spot in cell, the spots often somewhat orange distally; tail shorter than in average specimens of *P. p. asterius*.

For early stages see Edwards, *l.c.* (1880), and Strecker, *l.c.* (1874).

Hab. Newfoundland: Anticosti; Gulf of St. Lawrence; and neighbouring districts, the exact range not being known.

In the Tring Museum 11 ♂♂, 8 ♀♀, from: St. John's, July 1898 (James); Baie St. Claire, Anticosti.

61. Papilio bairdi Edw. (1869).

Papilio bairdi Edwards, *Proc. Ent. Soc. Philad.* vi. p. 200 (1869) (Arizona); Kirby, *Cat. Diurn. Lep.* p. 567. n. 331 (1871) ("Mexico" false); Mead, in Wheeler, *Rept. Expl. Surv.* v. *Zool.* 8. p. 740 (1875) (New Mexico; Arizona); Edw., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 10 (1877) (Arizona); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 447 (1878) (N. Mexico); Strecker, *Butt. Moths N. Amer.* p. 72. n. 17a (1878) (Arizona); Edw., *Canad. Ent.* xi. p. 83 (1879) (♀; variability; = var. *utahensis*); id., *Butt. N. Amer.* ii. *Pap.* t. 10. ♂♀. (1880) (Arizona); Mayn., *Man. N. Amer. Butt.* p. 8. n. 11. fig. 6a (1891) (Arizona); Edw., *Canad. Ent.* xxiv. p. 50

(1892) (W. Colorado) ; id., *l.c.* xxv. p. 253 (1893) (*oregonia* bred from *bairdi* and the reverse) ; Haase, *Untersuch. Mimicry* i. p. 92 (1893) ; Edw., *Canad. Ent.* xxvii. p. 229 (1895) (*oregonia* bred from eggs of *bairdi*, and the reverse) ; id., *l.c.* p. 241 (1895) (Sioux Co., Nebraska) ; Eimer, *Artb. Verwandtsch. Schmett.* ii. p. 118. t. 7. fig. 1. ♂, 9. ♀ (1895) (copies from Edw.) ; id., *Orthogen.* p. 36. fig. 15. ♂, 18. ♀ (1897) ; Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 272 (1897) ; Bentenm., *Journ. N. York. Ent. Soc.* v. p. 101 (1897) (var. of *oregonia*, not of *asterius*) ; Edw., *l.c.* xxx. p. 11 (1898) (♀ *bairdi* produced *oregonia* (= *brucei*) and *bairdi*) ; Holland, *Butt. Book* p. 313. n. 14. t. 40. fig. 2. ♂ (1899) (Arizona northwards) ; Brown., *Ent. News* xii. p. 301 (1901) (Salt Lake City, usually rare) ; Dyar, *Bull. U.S. Nat. Mus.* lii. p. 3. n. 17 (1902).

Papilio hippocrates var. *oregonia* Edwards, *Trans. Amer. Ent. Soc.* v. p. 208 (1876) (Colombia R., ♀).

Papilio (*asterius*) var. *utahensis* Strecker, *Lep. Rhop. Het.* p. 128 (1878) (Utah).

Papilio asterius var. *utahensis* id., *Butt. Moths N. Amer.* p. 72. sub n. 17 (1878) ; id., *Lep. Rhop. Het., Suppl.* iii. p. 17 (1900) (Utah, 2 ♂ ♂, 1 ♀ ; var. of *bairdi* ; one ♂ with abdomen spotted, the other as in *machaon*).

Papilio oregonia Edwards, *Butt. N. Amer.* ii. *Pap.* t. 7. ♂ ♀ (1880) (Oregon); Stretch, *Papilio* ii. p. 119 (1882) (Washington Terr., larva on *Artemisia*, descr.) ; Edw., *ibid.* iii. p. 56. t. 1. fig. 6. 7. 8. ocellus (1883) (distinct species); id., *Butt. N. Amer.* ii. *Suppl.* p. 1 (1884); Mayn., *Man. N. Amer. Butt.* p. 6. n. 4 (1891) (Oregon ; Washington ; Vancouver's I.) ; Edw., *Canad. Ent.* xxiv. p. 52 (1892) (Utah ; West Colorado) ; id., *l.c.* xxvii. p. 241 (1895) (Sioux Co., Nebraska ; S.E. Wyoming ; Pullman, Washington ; Idaho) ; Christ, *l.c.* ix. p. 273 (1897) ; Elwes, *Proc. Ent. Soc. Lond.* p. 11. (1897) (= *machaon*) ; Wright, *Butt. West Coast* ed. ii. p. 87. n. 26. t. 3. fig. 26. ♀ (1906) (Washington).

Papilio machaon, Hagen, *Canad. Ent.* xiv. p. 178 (1882) (Washington Terr.).

Papilio oregonius (!), id., *Papilio* ii. p. 150 (1882) (cannot be separated from *zolicaon*) ; Haase, *Untersuch. Mimicry* i. p. 92 (1893).

Papilio oregonus (!), Hagen, *Psyche* iii. p. 415 (1882) (Washington Terr., " = *zolicaon* ").

Papilio hollandi Edwards, *l.c.* xxiv. p. 50 (1892) (W. Colorado) ; Holland, *Butt. Book* p. 314. n. 16. t. 40. fig. 3. ♂ (1899) (Arizona ; Colorado).

Papilio brucei Edwards, *Canad. Ent.* xxv. p. 253 (1893) (name for *oregonia* from Colorado) ; id., *l.c.* xxvii. p. 239 (1895) (Colorado ; " nov. spec.") ; id., *Butt. N. Amer., Pap.* iv. (1897) (*brucei* is result of hybridism between *P. oregonia* and *bairdi* ! ; life history, results of breeding) ; Elwes, *l.c.* p. 11 (1897) (gradation from *oregonia* through *brucei* to *zolicaon*) ; Fletch., *Rept. Ent. Soc. Ontario* xxxi. p. 56 (1900) (Regina, Canada ; also in the Kootenay Mts. at Kaslo) ; Burr., *Ent. News* xii. p. 244 (1901) (Yellowstone Nat. Park).

Papilio machaon oregonia, Eimer, *Artb. Verwandtsch. Schmett.* ii. p. 109. t. 6. fig. 2 (1895) (copy from Edw.).

Papilio bairdi oregonia, Dyar, *l.c.* (1902).

Papilio bairdi brucei, id., *l.c.*

Papilio bairdi hollandi, id., *l.c.*

♂ ♀. Trichromatic in both sexes, at least in certain districts.

a'. f. *bairdi* Edw., *l.c.*——Similar to *P. polyxenes asterius*, the sexes differing in a similar way as in the ordinary form of that insect. The discal spots are paler on the underside than in *asterius*, and gradually shade off proximally ; size of these spots very variable. Many specimens with vestige of yellow lateral stripe posteriorly on abdomen.

b'. f. *hollandi* Edw., *l.c.*——Like the preceding, but the abdomen yellow, striped with black, as in the next form.

c'. f. *oregonia* Edw., *l.c.* ; *brucei* id., *l.c.*——Similar in appearance to *P. machaon* ; anal ocellus pupilled as in the preceding forms. Colorado specimens (*brucei*) are said by Edwards to be different from Oregon individuals (*oregonia*), but we fail to find any constant distinction, the differences given by Edwards not at all holding good.

This yellow form does not occur in Arizona, the black f. *bairdi* being the only one found there, while the black form has not been met with in Oregon. Polychromatism of a species in one district and monochromatism of the same species in another country is a phenomenon often met with among insects. Edwards had

probably overlooked this fact when he advanced the hypothesis that the variable Colorado insect was the product of a cross between a black (southern) species, *P. bairdi*, and a yellow (northern) species, *P. oregonia*. A parallel case is *P. clytia* of the Oriental Region. The variability of *P. polyxenes* is also similar to that of *P. bairdi*, that species being strongly di- or trichromatic in Mexico, Guatemala, and South America, practically monomorphic (apart from occasional aberrations) in the other districts of the range.

For early stages see Edwards, *l.c.* (1897).

Hab. Arizona and New Mexico (*fide* Mead) northwards, the yellow form extending to Canada (Regina) and British Columbia (Kootenay Mts.), the black form not being known so far north (or is it represented by *P. nitra*?).

In the Tring Museum 20 ♂♂, 3 ♀♀, from: Glenwood Springs, Colorado, June 1901 (Oslar); Thumb Butte, June 1901 (Oslar); Garfield Co.; Beaver, Utah, July; Wickenburg, Arizona, May 1898 (Dr. Kunze); Ozoyoos, British Columbia (Reynolds).

62. Papilio nitra Edw. (1883).

Papilio nitra Edwards, *Papilio* iii. p. 158. 162 (1883) (Judith Mts., Montana); Fletcher, *Canad. Ent.* xix. p. 225 (1887) (Rocky Mts.; Regina, N.W.T.); id., *Rept. Ent. Soc. Ontario* xviii. p. 25 (1888) (Regina, N.W.T.; Rocky Mts.); Edw., *Butt. N. Amer.* iii. *Pap.* t. 1. ♂♀ (1889) (Canmore, June, on the summit; Regina; Montana, July); Mayn., *Man. N. Amer. Butt.* p. 6. n. 7 (1891) (Montana); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 273 (1897); Holland, *Butt. Book* p. 312. n. 11. t. 41. fig. 2. ♂ (1899); Dod, *Canad. Ent.* xxxiii. p. 171. n. 80 (1901) (Alberta, June); Baird, *Rept. Ent. Soc. Ontario* xxxiii. p. 93 (1903) (High River, Alta).

Papilio indra nitra, Dyar, *Bull. U.S. Nat. Mus.* lii. p. 3. n. 20a (1902).

This insect resembles *P. bairdi* f. *bairdi*, but is shorter winged. It is restricted to Montana and Western Canada, and is said to occur there together with *P. zelicaon* and *P. bairdi* f. *oregonia*. We believe these *oregonia* to be the yellow form of *nitra*. We have not seen Canadian *oregonia*, but have two females from Ozoyoos, British Columbia. These females are shorter winged than our Colorado specimens and than Edwards's figures of Oregon individuals, and have the abdominal margin of the hindwing more extended black. Canadian *oregonia* may be similar to these Ozoyoos specimens, which would render it probable that there is really such a connection between the black and the yellow Canadian specimens as here suggested. Breeding will decide the question. *P. indra* is quite distinct from *nitra*.

The sexes are similar, the yellow markings being rather paler in the female than in the male (they are too pale in Edwards's figure). The size of the markings is variable, also the extent and intensity of orange on the underside of the hindwing.

Early stages and food-plant not known.

Hab. West Canada; Montana.

In the Tring Museum 4 ♂♂, 1 ♀, from: Red Deer, Alberta, June 1903; Didsbury, Alberta, June 1904.

63. Papilio zelicaon Lucas (1852).

Papilio zelicaon Lucas, in Guér., *Rev. Zool.* (2). iv. p. 136 (1852) (California); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 37. n. 182 (1852) (Calif.); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 51. n. 190 (1856); Lucas, *Bull. Soc. Ent. France* p. 67 (1856) (distinct from *machaon*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 315. n. 358 (1864) (California;—" Labrador; Missuri ?" ad aliam spec. refer.).

Papilio zolicaon (!) Boisduval, *Ann. Soc. Ent. France* p. 281. n. 3 (1852) (California); Vollenh.,

Tijdschr. Ent. iii. p. 84. n. 122 (1860) (S. Francisco); Morris, *Syn. Lep. N. Amer.* p. 4. n. 5 (1862) (California); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) ("Labrador" false; U. States; hardly more than a variety of *machaon*); Kirby, *Cat. Diurn. Lep.* p. 566. n. 321a (1871) (California); Couper, *Canad. Ent.* vi. p. 34 (1874); Strecker, *Lep. Rhop. Het.* p. 46. t. 6. fig. 3. ♀ (1873); Edw., *Proc. Cal. Ac. Sc.* v. p. 163 (1873) (larva, pupa); Mead, in Wheeler, *Rept. Expl. Surv.* v. *Zool.* 8. p. 740 (1875) (Colorado; S. Utah); Edw., *Butt. N. Amer.* ii. *Pap.* t. 6. ♂. ♀. l. p. (1875) (Vancouver's I. to Lower California; Arizona; Colorado; Montana; Idaho); Kirby, *l.c.* p. 812. n. 321a (1877); Edw., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 7 (1877) (Oregon to Arizona; Montana; Colorado); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 449 (1878); Strecker, *Butt. Moths N. Amer.* p. 71. n. 14 (1878); Oberth., *Et. d'Ent.* iv. p. 68. n. 194 (1880) (Calif.; Canada); Hagen, *Psyche* iii. p. 415 (1882) (Washington Terr., "var. of *machaon*"); Edw., *Papilio* iii. p. 48. t. 1. fig. 4. 5. ocellus (1883) (distinct from *machaon, oregonia,* etc.); Lyman, *Papilio* iii. p. 109 (1883) (var. ♀, Nevada); Butl., *Journ. Linn. Soc. Lond.* xvi. p. 472. n. 59 (1883) (Mendocino); Edw., *Papilio* iv. p. 162 (1884) (early stages; mostly one brood only); Behr, *Bull. Cal. Ac. Sc.* i. p. 64 (1884) (Calif., common, l. on *Oenanthe, Angelica, Carum*); Edw., *Butt. N. Amer.* ii. *Suppl.* p. 1 (1884) (S. Bernardino; near *asterias*); id., *Bull. U.S. Nat. Mus.* xxxv. p. 9 (1889) (liter. relating to metam.); id., *Butt. N. Amer.* iii. *Pap.* t. 3. fig. a–g (1891) (transform.); Riley, *Insect Life* iii. p. 412 (1891) (parasite: *Apanteles*); Mayn., *Mon. N. Amer. Butt.* p. 6. n. 5 (1891); Foster, *Canad. Ent.* xxiv. p. 192 (1892) (Marshall Pass, Colorado, 10—13,000 ft.); Haase, *Untersuch. Mimicry* i. p. 92 (1893); Oslar, *Ent. News* iv. p. 226 (1893) (Los Angeles, Febr.); Cockerell, *Trans. Amer. Ent. Soc.* xx. p. 353. n. 647 (1893) (Rosita, Colorado); Danby, *Journ. N. York Ent. Soc.* ii. p. 33 (1894) (Vancouver I., scarce); Wiley, *Ent. News* v. p. 38 (1894) (Miles City, Montana, rare); Snyder, *ibid.* v. p. 167 (1894) (Park City, Utah); Jordan, *Canad. Ent.* xxvi. p. 257 (1894) (Napa, Calif.; metam.); Cunningh., *Ent. News* vi. p. 251 (1895) (Ft. Klamath, Oregon); Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 109. t. 6. fig. 5 (1895) (California); Walk., *Proc. Ent. Soc. Lond.* p. 11 (1897) (Vancouver I., larva and pupa not distinguishable from those of *machaon*); Twog., *Ent. News* viii. p. 31 (1897) (Riverside, Calif., rare, late Febr. & March); Snyder, *ibid.* viii. p. 164 (1897) (Utah); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 270 (1897); Holland, *Butt. Book* p. 312. n. 10. t. 38. fig. 1. ♂ (1899) (Vancouver I. to Arizona and Colorado); Denton, *Moths Butt. N. Amer.* ii. p. 350. fig. ♂ (1898—1900); Dod, *Canad. Ent.* xxxiii. p. 171. n. 79 (1901) (Alberta, June); Brown., *Ent. News* xii. p. 301 (1901) (Salt Lake City, usually scarce, up to 9500 ft.); Dyar, *Proc. U.S. Nat. Mus.* xxvii. p. 782 (1904) (Kootenai); Dennis, *Rept. Ent. Soc. Ontario* xxxiv. p. 90 (1904) (Beulah, Manitoba); Wright, *Butt. West Coast* ed. ii. p. 86. n. 24. t. 3. fig. 24 (1906) (as far north as Wrangel, Alaska).

Papilio machaon, Ménétriés, *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 58 (1857) (*partim*; California).

Papilio machaon var. *californica*, id., *l.c., Lép.* iii. p. 69. n. 58 (1863) ("= *zelicaon* Lucas").

Papilio dolicaon (!), Behr, *Stett. Ent. Zeit.* xxvii. p. 216 (1866) (Calif.).

Amaryssus zolicaon, Scudder, *Proc. Boston N. H. Soc.* xvii. p. 90. n. 19 (1874) (Yellowstone, July 18).

Papilio zelicayn (!), Dyar, *l.c.* (1902) (sub syn.).

Papilio coloro Wright, *l.c.* p. 86. n. 25. t. 3. fig. 25. ♂ (1906) (Colorado Desert, S.E. Calif.).

There may be a closer connection between the present insect and *Papilio nitra* than we suspect. But until positive proof by breeding is forthcoming, *P. zelicaon* should be treated as a separate species. Lucas's name *zelicaon* has priority over *zolicaon* of Boisduval.

The species is more constant than any of the allied forms. However, there occur promiscuously in a series some inconspicuous but significant deviations from the ordinary type. The pattern of the abdomen is by no means so constant as Edwards, *l.c.* (1883), stated it to be. The broad black dorsal stripe bears occasionally at its lateral edges on segments 4, 5 and 6 a yellow dot partly separated from the yellow side-stripe, these dots being homologous of the respective dots found in both *Papilio nitra* and *P. bairdi* f. *bairdi*. The underside of the abdomen is usually quite black, many individuals, however, bearing posteriorly on each side a vestige of a yellow stripe. These stripes are sometimes quite distinct, extending almost to the base of the abdomen in some females, there being occasionally also a thin yellow mesial line on the posterior segments.

The variability in size is not inconsiderable, the forewing measuring from 34 to 46 mm. in length in our males, and from 35 to 50 mm. in our females. The cloudy spot in front of the subcostal fork of the forewing assumes sometimes a distinct blue tint; the black dot within the fork is occasionally very small, rarely absent; the yellow cell-bar varies much in size, being vestigial in one of our numerous specimens from Mount Shasta, a male, the posterior discal patches being in this individual also rather smaller than usual. The amount of black at the base and behind the cell of the hindwing is variable; the yellow colour extends usually to the base of the cell, but the basal fourth or third of the cell is sometimes black; the width of the black distal border is quite inconstant. The cell of the forewing is, in some individuals, distinctly striped with pale yellow; some specimens have hardly any orange colour on the disc of the hindwing, while others bear conspicuous orange patches. Deep yellow individuals are ab. *coloro* Wright.

For early stages see Edwards, *l.c.*

Hab. Alaska, British Columbia, Alberta, southwards to Arizona and Colorado.

In the Tring Museum 95 ♂♂, 27 ♀♀, from: Qu'Appelle, Assiniboia, June 1901; Ozoyoos, British Columbia (Reynolds); Gold Hill, Oregon, May—July 1901 (Biedermann); Quincy, California, 3400 ft., May 1896 (Watson); Trucky, California, 6000 ft.; McCloud R., Shasta Co., June 1884 (O. T. Baron); Butte Creek, Butte Co., May 1898 (Mrs. Austin); Davis Creek, Madoc Co., 4500 ft., July 1898 (Mrs. Austin); N. Tulare R., California, July 1897 (Purpus); Siskiyou Co., California (O. T. Baron); Reno, Nevada; Chimney Gulch, Colorado, May 1901 (Oslar); Garfield Co. and Park Co., Colorado.

In coll. H. J. Adams from Calgary.

64. **Papilio indra** Reak. (1867).

♀. *Papilio indra* Reakirt, *Proc. Ent. Soc. Philad.* vi. p. 123 (1867) (Colorado, Pike's Peak).

♂♀. Sexes similar. Body black; a line bordering the mesothoracic tegula and extending forward, ending behind antennae, creamy, often somewhat ochraceous; abdomen either wholly black, or the last segments laterally creamy, or there is a creamy stripe of variable width from base of abdomen to claspers, the stripe being situated laterally on the tergites, the claspers remaining always black.

The colour of the creamy markings of the wings darkens by exposure to light, as in other pale yellow species.

Forewing.——There are usually two creamy bars across the cell, either of which or both may be wanting; the discal band is very variable in width, the submarginal spots also varying much in size; in fresh specimens the basal third of the wing is powdered with creamy scales. The discal band of the hindwing stands either outside the cell, being narrow, or enters the cell, occupying sometimes as much as the apical third of the cell; the submarginal spot M^1—M^2 is often absent; the anal orange spot (submarginal and marginal spots M^1—SM^2 merged together) is always centred with black; the orange ring is usually complete, but in a small percentage of specimens it is interrupted on the abdominal side, being occasionally open also on the discal side, in which case the orange submarginal spot stands separate from the marginal one like the other submarginal spots; the discal spot R^2—M^1 is acuminate, often also the spot in front of it, both being somewhat prolonged on the *underside*, and in many specimens stained with orange distally.

Genitalia: ♂. Saw of harpe longer than, or at least as long as, the proximal non-serrate portion of the harpe; this non-serrate portion compressed, elevate, forming a sharp ridge which is highest before joining the saw, being here somewhat curved ventrad; the saw itself somewhat curved dorsad proximally; the teeth small and close together.——♀ not dissected.

Early stages noticed by Edwards, *l.c.* (1897).

a. P. indra indra Reak. (1867).

Papilio indra Reakirt, *l.c.*; Kirby, *Cat Diurn Lep.* p. 567. n. 337 (1871); Strecker, *Lep. Rhop. Het.* p. 9. t. 2. f. 1 (1873) (Pike's Peak); id., *Proc. Ac. N. Sc. Philad.* xxviii. p. 150 (1876) (♀, Clear Creek, Colo., July 1); Putn., *Proc. Davenp. Ac. Nat. Sci.* i. t. 35. fig. 5. ♀ (1876); Kirby, *l.c.* p. 812 (1877); Edw., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 8 (1877) (Colorado; Nevada); id. *Butt. N. Amer.* ii. *Pap.* t. 9. ♂. ♀ (1878); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 454 (1878); Strecker, *Butt. Moths N. Amer.* p. 71. n. 15 (1878) (Colorado); Edw., *Papilio* iii. p. 2 (1883) (Boulder, Colo.); Butl., *Journ. Linn. Soc. Lond.* xvi. p. 472. n. 62 (1883) (Siskiyou Co.); Mayn., *Man. N. Amer. Butt.* p. 7. n. 8. fig. 6. d (1891) (Colorado; Nevada; California); Bruce, *Canad. Ent.* xxiii. p. 110 (1891) (Colorado, June, 7000 ft.); id., *Ent. News* viii. p. 134 (1897) (Denver, Colo., May 4); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 272 (1897); Edw., *Butt. N. Amer.* iii. *Suppl.* p. i. (1897) (egg and larva noticed; food plant, *Artemisia*); Holland, *Butt. Book* p. 312. n. 12. t. 41. fig. 3. ♀ (1899) (mountains of Colorado, Nevada, California); Denton, *Moths Butt. U.S. Amer.* ii. p. 350 (1898—1900); Snyder, *Ent. News* xi. p. 365 (1900) (Silver Lake, Utah); Strecker, *Lep. Rhop. Het., Suppl.* iii. p. 17 (1900) (♀, Clear Creek Cañon); Brown., *Ent. News* xii. p. 301 (1901) (Salt Lake City, quite rare, 6000 ft.). Dyar, *Bull. U.S. Nat. Mus.* lii. p. 3. n. 20 (1902) (*partim*); Wright, *Butt. West Coast* ed. ii. p. 87. n. 27. t. 4. fig. 27. ♂, 27b. ♀ (1906).

♂ ♀. Tail short.

Hab. California; Nevada; Utah; Colorado.

In the Tring Museum 122 ♂♂ from: Siskiyou Co., California (O. T. Baron); McCloud R., Shasta Co., June 1884 (O. T. Baron); Chimney Gulch, Colorado, May and June 1900 and 1901 (Oslar).

A ♀ in coll. H. J. Adams.

b. P. indra pergamus Edw. (1875).

Papilio pergamus Edwards, *Proc. Calif. Ac. Sci.* v. p. 423 (1875); Kirby, *Cat. Diurn. Lep.* p. 813. n. 383 (1877); Edw., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 9 (1877) (S. California); Strecker, *Butt. Moths N. Amer.* p. 71. n. 16 (1878) (California); Mayn., *Man. N. Amer. Butt.* p. 7. n. 9 (1891) (S. California); Beutenm., *Bull. Amer. Mus. N.H.* iv. p. 167 (1892) (type in Amer. Mus., ♂, S. Barbara); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 273 (1897) (= *indra*); Wright, *Butt. West Coast* ed. ii. p. 88. n. 28. t. 4. fig. 28. ♂, 29b. ♀ (1906) (S. California, 2000—3000 ft.).

♂. Tail longer than in the preceding form.

Hab. South California, coast range.

In the Tring Museum 2 ♂♂, June and July.

65. **Papilio machaon** L. (1758).

Papilio Eques Achivus machaon Linné, *Syst. Nat.* ed. x. p. 462. n. 27 (1758).

This species is represented in America by the following subspecies:

a. Papilio machaon aliaska Scudd. (1869).

Papilio machaon, Edwards, *Canad. Ent.* i. p. 22 (1868) (Rupert House, Hudson Bay); Strecker, *Butt. Moths N. Amer.* p. 70. n. 13 (1878); id., *Butt. N. Amer.* ii. *Pap*, in text for t. 7 (1880) (Dalles).

Papilio aliaska Scudder, *Proc. Boston N. H. Soc.* xii. p. 407 (1869) (Nulato, May 20—June 14; also E. coast of Hudson Bay); Kirby, *Cat. Diurn. Lep.* p. 566. n. 321b (1871); id., *l.c.* p. 812. n. 321b (1877); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 450 (1878); Holland, *Butt. Book* p. 312. n. 9. t. 41. fig. 1 ♂ (1899) (only in Alaska).

Papilio machaon var. *aliaska*, Edwards, *Papilio* ii. p. 75 (1882) (Hudson Bay; Alaska; common at St. Michael's on coast above outlet of Yukon R.; Dalles, Columbia R.); id., *l.c.* iii. pp. 58, 60 (1883) (=Himalayan form, false); Webster, *Canad. Ent.* xxvi. p. 117 (1894) (Alaska, eastw. to Hudson Bay); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 270 (1897); Lyman, *Canad. Ent.* xxxii. p. 119 (1900) (Dawson, Yukon); Staud. & Reb., *Cat.* ed. iii. p. 2. n. 4h (1901) (Alaska).

Papilio machaon aliaska, Maynard, *Man. N. Amer. Butt.* p. 6. n. 3a (1891) (Oregon northwards); Dyar, *Bull. U.S. Nat. Mus.* lii. p. 3. n. 16a (1902) (Alaska; North Pacific States); Wilson, *Rept. Ent. Soc. Ontario* xxxiv. p. 90 (1904) (Nagagami R., Hudson Bay slope); Keele, *ibid.* xxxv. p. 16 (1904) (common along the shores of Mayo Lake, and valley of Mayo R, Yukon Terr., July & August).

The black band of the hindwing is broader than in *P. machaon kamtschadalus* Alphér. (1897). The anal ocellus is always blind as in the other forms of *P. machaon*, the black admarginal spot standing at the distal side of the orange spot, not within it.

The insect is rare in European collections. Sometimes one finds as *aliaska* and *oregonia* Old-World specimens of *P. machaon* in collections. We have received ourselves from America two *machaon*, of which one is undoubtedly a Sikhim individual and the other a British one.

Hab. Alaska; Oregon; Hudson Bay.

In the Tring Museum one bad ♂.

VI. Thoas Group.

Underside of thorax and abdomen not striped with black, being either all yellow, or black dotted with yellow laterally or bearing a yellow lateral line. Hindwing beneath from base to disc yellow or black, no black bands forming a large V; PC at two-thirds or nearer apex of basal cellule, the latter not much produced.

Young larvae with dorsal tubercles which are replaced by small circular spots in later stages; adult larvae with yellowish side-stripe on thoracical segments, a very large pale dorsal or dorso-lateral patch occupying the central segments (V-shaped or mesially divided) and a large side-patch on the last segments tapering in front, these markings rather ill-defined.

Key to the species:

a. Tail with yellow spot in centre of widened apical portion . . *b.*
Tail without yellow spot in centre on upperside . . . *c.*

b. Forewing beneath without black band across cell . . *c.*
Forewing beneath with black band across cell continued to hindmargin . . . . . *d.*

c. Discal patch R^2—R^3 of forewing projecting much beyond patch R^3—M^1; dilated part of tail rounded; tenth tergite of ♂ bifurcate, the projections curving laterad . Species No. 67.
As before; spatule of tail more elongate; tenth tergite of ♂ short, simple . . . . . Species No. 68.
Discal patch R^2—R^3 of forewing very little projecting beyond patch R^3—M^1; cell often with yellow spot, striped with yellow and black beneath; spatule of tail elongate; tenth tergite of ♂ long . . . . . Species No. 66.

d. Yellow band of forewing parallel to distal margin . . Species No. 73.
Yellow band of forewing interrupted, both portions oblique, the posterior portion continuous with the broad cell-bar. Species No. 74.

e. Wings black, with a row of sharply defined submarginal spots, first spot on forewing standing in front of SC^4, being about 5 mm. distant from distal margin ; cell all black ; hindwing with an orange-red spot R^3—M^1 close to cell, sharply defined . . . . . Species No. 70.

Wings at least partly yellow, or the disc much paler than the base, or hindwing more or less blue on upperside ; submarginal spots of forewing absent from black specimens (which are all ♀ ♀), or the spot SC^3—SC^4 absent or close to margin ; or rufous-orange spots on underside of hindwing in a row which is separate from cell . . *f.*

f. A regularly curved row of blue halfmoons on disc of hindwing beneath, preceded by a row of rufous or orange halfmoons which are distant from cell . . . . *g.*

Hindwing beneath with a row of sharply defined rufous or orange spots around apex of cell ; no yellow spot in cell of forewing on upperside . . . . . Species No. 69.

Hindwing beneath with an irregular, but complete, row of metallic blue spots on disc, spot R^3—M^1 being more distal than the others ; the rufous red spots preceding the blue ones ill-defined, often vestigial ; no spot in cell of forewing on upperside . . . . . Species No. 72.

g. Hindwing with sharply marked yellow submarginal spots on upperside, at least in ♂ ; in ♀ disc not greenish blue, without large greenish patches . . . . *h.*

Submarginal halfmoons of upperside of hindwing thin, always washed over with black in ♂ : these spots blue or green in ♀ ; disc also blue or green or buffish green . Species No. 78.

h. Cell-patch of ♂ on forewing above produced basad beyond point of origin of M^2, occupying about one-third of the cell ; no submarginal spots on upperside of forewing ; ♀ with curved yellow band from costal to hinder margin on upperside of forewing . . . . . Species No. 75.

♂ without patch in cell on upperside of forewing ; on underside of forewing a row of small spots between discal band and submarginal spots ; submarginal spots of upperside of hindwing vestigial in ♀, being washed over with brown ; forewing with yellow markings in costal area, but no pale shadowy band on disc . . Species No. 76.

♂ with patch in cell of forewing on upperside ; ♀ with pale band on forewing or the disc much paler than the area from base to apex of cell, especially on underside . Species No. 77.

66. Papilio thoas L. (1771).

Seba, *Thesaur.* iv. p. 46. t. 38. fig. 6. 7. (1764).

Papilio Eques Achivus thoas Linné, *Mant. Plant.* p. 536 (1771) (*partim*).

Papilio thous, Godart, *Enc. Méth.* ix. p. 62. n. 103 (1819) (*partim*) ; Boisd., *Spec. Gén. Lép.* i. p. 355. n. 197 (1836) (*partim*) ; Kirby, *Cat. Diurn. Lep.* p. 541. n. 155 (1871) (*partim*) ; Haase, *Untersuch. Mimicry* p. 96 (1893).

Heraclides thous, Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 282 (1896).

The various subspecies vary so much *inter se*, and each is again individually so variable, that there is no single character in the pattern found in all forms by which to distinguish the entire species *P. thoas* from its near relative *P. cresphontes*. The genitalia are more uniformly developed in all subspecies of *P. thoas*. The tenth tergite of the ♂ is always long, spatulate; the tenth sternite has on each side a long, pointed, thornlike process, which bears proximally at the base a ridge or broad tooth; the clasper is slightly acuminate, being much less rounded than in *P. cresphontes* and dorsally less emarginate; the harpe, with the exception of the Jamaica form, gradually narrows into a long point, being subtruncate and denticulate in the Jamaican subspecies. The vaginal armature of the female is geographically somewhat variable like the genitalia of the male; the organs are similar to those of *P. cresphontes*, but there is proximally of the vaginal orifice on each side a broad and rather strongly chitinised depression, the edge of which projects as an irregular ridge.

Early stages essentially as in *P. cresphontes*, the tubercles of the head and thorax of the chrysalis shorter.

Hab. Texas to Buenos Aires; Cuba; Jamaica; not yet known from Haiti and Porto Rico, where the species may be expected to occur.

a. P. thoas melonius subsp. nov. (Pl. VIII. fig. 59).

Papilio Eques Achivus cresphontes Cramer, *Pap. Exot.* ii. p. 106 (1777) (*partim*; Jamaica).
Papilio cresphontes, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 169 (1846) (*partim*; Jamaica); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 53. n. 204 (1856) (*partim*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 294 (1864) (*partim*; Jamaica); Butl., *Proc. Zool. Soc. Lond* p. 481. n. 37 (1878) (Jamaica).

♂ ♀. A remarkably distinct form, usually of small size, resembling small specimens of *P. cresphontes*.——Yellow markings of *upperside* pale; forewing: discal patch R^2—R^3 as in *P. cresphontes* much longer than the following patch; patch M^1—M^2 acuminate distally; no spot in cell; three submarginal spots, occasionally preceded by one or two small dots; patch SC^5—R^1 entire or nearly, but sometimes deeply sinuate.——Hindwing: yellow marginal abdominal spot large, continuous with the orange-red halfmoon, at the proximal side of which there is a blue crescent; spot on tail small in male.

Underside, forewing: submarginal spots R^3—M^2 much larger than the others, spot M^1—M^2 being the largest, spot R^2—R^3 about the same size as spot M^2—SM^2 or smaller.——Hindwing: three large orange patches R^2—M^1, sharply defined, the third being the longest, being more than half the length of the pale yellow submarginal patch R^3—M^1; a complete series of pale blue spots, all the same pure colour; occasionally some orange scaling in apex of cell and behind SC^2; orange anal halfring larger than in the other forms of *P. thoas*.

Genitalia: ♂. Tenth tergite long, much slenderer than in the other subspecies, strongly spatulate, longitudinally grooved beneath, not carinate; long pointed process of sternite straight, the hairy tooth at base of this process small; harpe quite different from that of all other subspecies, being short, subtruncate, with the apex denticulate.——♀. Anterior edge of vaginal orifice not tuberculiform, on each side of the orifice a ridge, and behind the orifice two double ridges.

Hab. Jamaica.

In the Tring Museum 6 ♂♂, 3 ♀♀.

Also in coll. Grose-Smith and coll. Adams.

b. P. thoas oviedo Gundl. (1866).

Papilio thoas, Lucas, in Sagra, *Hist. Cuba* vii. p. 206 (1857) (*partim* ?).
Papilio cresphontes, Herrich-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 173 snb n. 5 (1864) (*cresphontes* = *oviedo* Gundl. i. litt., false) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 294 (1864) (*partim* ; Cuba).
Papilio oviedo Gundlach, in Poey, *Rep. Fis. Nat. Cuba.* i. p. 279. t. 5. fig. 1 (1866) ; id., *Contr. Ent. Cuba.* p. 133 (1881).
Papilio thoas var. c. *P. oviedo*, Kirby, *Cat. Diurn. Lep.* p. 541. sub n. 155 (1871) (Cuba).
Papilio thoas var. *oviedo* Gundlach, *Papilio* i. p. 113 (1881).
Papilio cresphontes var. *oviedo* id., *Berl. Ent. Zeit.* xxx. p. 132 (1886).
Papilio epithoas Oberthür, *Bull. Soc. Ent. France* p. 179. fig. 5 (1897) (" Mexico ?").
Papilio thoas var. *P. epithoas*, Godman & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 729 (1901).

♂ ♀. *Upperside :* markings deeper yellow than in the preceding ; discal band broad, especially in male ; forewing : patches R^2—M^2 of nearly equal length ; four large submarginal spots preceded by one, two, or three smaller ones.——Hindwing : yellow anal spot large, continuous with red halfmoon, a blue spot at the proximal side of the latter.

Underside much deeper yellow than in all other forms of *P. thoas* ; black colour on forewing much reduced.——Hindwing : two orange-red spots R^2—M^1, sharply defined, not so large as in the Jamaica form, but larger than in continental specimens of *P. thoas* ; a row of large pale blue discal spots, the middle ones partly yellow, especially spots R^2—M^1 ; anal crescent only slightly reddish, sometimes the same colour as the other submarginal spots ; spot on tail large above and below.

Genitalia : ♂. Tenth tergite spatulate, being constricted before apex, shorter than in continental specimens, carinate beneath, broader than in *P. thoas melonius* ; acute process of sternite comparatively short, curved ; harpe long, gradually tapering to a point.

Hab. Cuba.

The deep maize-yellow underside and the large blue patches of the hindwing are the most distinctive external features of this insect, which cannot easily be confounded with *P. cresphontes*.

In the Tring Museum 2 ♂♂, 2 ♀♀, from : Cuba (Gundlach) ; Gibara (Tollin).

c. P. thoas autocles subsp. nov.

Papilio thoas, Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 206 (1856) (*partim* ; Mexico ; Yucatan ; Nicaragua) ; Reak., *Proc. Ent. Soc. Philad.* ii. p. 138. n. 6 (1863) (Nicaragua ; syn. *partim*) ; Weidem., *ibid.* ii. p. 148 (1863) (*partim*) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 295 (1864) (*partim* ; Mexico : Yucatan ; Nicaragua ?) ; Oberth., *Et. d'Ent.* iv. p. 70. n. 210 (1880) (*partim* ; Mexico) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 223. n. 53. t. 69. fig. 4. genit. (1890) (*partim*) ; Mayu., *Man. N. Amer. Butt.* p. 14. n. 21. fig. 10b (1891) (S. Arizona ; Texas ; " probably Florida " ; *partim* ?) ; Holland, *Butt. Book* p. 311. n. 7 (1899) (*partim* ; Texas ;—t. 42. fig. 4. alia subsp.) ; Denton, *Moths Butt. U.S.A.* ii. p. 345 (1898—1900) (*partim* ; occasionally in Texas ;—fig. ad sequent. subsp. referendae) ; Godm. & Salv., *l.c.* p. 729 (1901) (Honduras).
Papilio cresphontes, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 294 (1864) (*partim* ; Mexico ; Honduras).
Papilio ornythion, Staudinger (*non* Boisd., 1836, err. det.), *Exot. Tagf.* p. 16 (1881) (Mexico ; " if my specimen is true *ornythion*, the latter is var. of *thoas* ").

♂ ♀. Paler than *P. cresphontes*, with which it occurs together, being also paler than the other continental forms of *P. thoas*.—— *Upperside*, forewing : no spot in cell or only a vestigial one ; patch SC^5—R^1 deeply excised, rarely without black sinus or spot ; spots before upper angle of cell small ; four submarginal spots,

rarely three, sometimes a complete series, the upper ones being small; last spot usually distinctly smaller than the third (from behind).

On *underside* the last submarginal spot of the forewing smaller than the fourth spot (counted from behind), the third spot being the largest; cell almost entirely pale primrose-colour, the black streaks being either short or indistinct.

Genitalia: ♂. Tenth tergite broad, narrowing apicad, constricted before apex; pointed process of sternite curved, the hairy ridge standing at its base shortened to a tooth; harpe long, gradually narrowed to a point.

Hab. Texas to Nicaragua; name-type from Guerrero.

In the Tring Museum 50 ♂♂, 7 ♀♀, from: Houston, Texas; Jalapa, July 1897 (W. Schaus); Cordoba, February 1896 (W. Schaus); Songolica, July 1896 (W. Schaus); Cuesta de Misantla, June 1896 (W. Schaus); Guerrero (O. T. Baron); Mexico City (ex coll. Felder); Escuintla, W. Guatemala, 1100 ft., September 1904 (A. Hall); San Pedro Sula, Honduras.

In coll. F. D. Godman 6 ♂♂, 2 ♀♀ from Nicaragua, and a long series from more northern localities.

d. P. thoas nealces subsp. nov.

Papilio (*Achivus*) *ajax*, Müller (*non* Linné, 1758, err. det.), *Naturs.* v. p. 575. n. 32. t. 17. fig. 3 (1774).

Papilio thoas, Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 355. n. 11 (1850) (Rio Meta, smaller than Brazilian); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 196 (1852) (*partim*; Venezuela); Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 377 (1874) (Costa Rica); Oberth., *Et. d'Ent.* iv. p. 70. n. 210 (1880) (*partim*; Muzo; Carare; Caracas); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 245 (1880) (Sta. Marta); Walk., *Ent. Mo. Mag.* xix. p. 26 (1882) (Panama, common, a fast flyer); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 223. n. 53 (1890) (*partim*); Maas. & Weym, in Stübel, *Reisen S. Amer., Lep.* p. 11. n. 41 (1890); iid., *l.c.* p. 18. n. 31 (1890); iid., *l.c.* p. 24. n. 106 (1890) (west side of Cordillera of Bogota); iid., *l.c.* p. 32. n. 135 (1890) (Colombia); iid., *l.c.* p. 66. n. 24 (1890) (Guayaquil); Hahnel, *Iris* iii. p. 149 (1890) (San Estéban); id., *l.c.* p. 201. 205 (1890) (Valera, Venez.); Eimer, *Orthogen. Schmett.* p. 138. fig. 63 (1897) (Neu-Granada); Dent., *Moths Butt. U.S.*.1. ii. p. 345. figs. (1898—1900) (*partim*;—the figures apparently taken from Costa Rica specimens); Kaye, *Trans. Ent. Soc. Lond.* p. 207. n. 198 (1904) (Trinidad).

♂ ♀. In colour intermediate between the preceding and the following form, being deeper yellow than *P. t. autocles* and paler than *P. t. thoas*.—*Upperside*, forewing: cell-spot conspicuous in nearly all specimens; small spots in front of apex of cell larger than in the preceding form, but smaller than in the following one; four submarginal spots, rarely three only, the row sometimes continued by one, two, or three small spots, last spot about as large as the third (from behind), or larger.

Underside: submarginal spots of forewing larger than in *P. t. thoas*, especially the upper ones, last spot usually about the same size as the fourth (from behind), often larger; cell with distinct black streaks.

Genitalia: ♂. Pointed process of tenth tergite long, the ridge at its base only a little lower proximally than distally, with feeble indication of being sinuate; harpe short, pointed, usually denticulate.

Hab. Nicaragua to West Ecuador, eastwards to Trinidad and the Lower Orinoco, Nicaragua specimens leading over to the preceding form; name-type from Muzo, Colombia.

In the Tring Museum 210 ♂♂, 28 ♀♀, from: Azahar de Carthago, Costa Rica, February 1899 (J. Underwood); Carillo, Costa Rica, 3000 ft., October 1904

(A. Hall); Volcan de Miravalles (Underwood); Limon, October 1904 (A. Hall); Bogava, 800 ft., and Boquete, 3500 ft., Chiriqui (Watson); Parida I., Sevilla I, Cebaco I., and Brava I., January 1902 (Batty); R. Dagua, W. Colombia (Rosenberg); Pereira, Cauca; Muzo, December 1896; Peperital to Buenavista, January 1897 (Dr. Bürger); Villavicencio to R. Ocoor, January, and Villavicencio to Monte Redondo, March 1897 (Dr. Bürger); Cananche, Cundinamarca, July 1903 (Mathan); Onaca, S. Marta, 2000 ft. (Engelke); Mocotoné and Tachira, Veneznela (Briceño); Cumana, 1300 ft. (André); Trinidad; Caparo valley (Dr. T. Rendall); La Vuelta and Snapure, Caura R., Orinoco, February and May (S. M. Klages); Paramba, N.W. Ecuador, February—June 1897 (Rosenberg); Cachabi, January 1897, Chimbo, August 1897 (Rosenberg); Rita and R. Cayapas, N.W. Ecuador (Flemming and Miketta); Quevedo (v. Buchwald).

e. P. thoas thoas L. (1771).

Seba, *Thesaur.* iv. p. 46. t. 38. fig. 6. 7. ♂ (1764); Drury, *Illustr. Exot. Ins.* i. p. 44. t. 22. fig. 1. 2. ♂ (1770) (Surinam).

Papilio Eques Achivus thoas Linné, *Mant. Plant.* p. 536 (1771) (*partim*); Drury, *l.c. Index* (1772); Fabr., *Syst. Ent.* p. 454. n. 48 (1775) (*partim*); Cramer, *Pap. Exot.* ii. p. 108. t. 167. fig. A. B. (1777) (Surinam); Goeze, *Ent. Beytr.* iii. 1. p. 71. n. 4 (1779) (*partim*); Fabr., *Spec. Ins.* ii. p. 19. n. 76 (1781) (*partim*); id., *Mant. Ins.* ii. p. 10. n. 87 (1787) (*partim*); Jabl. & Herbst, *Naturs. Schmett.* iii. p. 127. n. 90. t. 40. fig. 3. 4 (1788) (Surinam); Gmelin, *Syst. Nat.* i. 5. p. 2240. n. 321 (1790) (*partim*); Jung, *Alphab. Verz. Schm.* p. 236 (1792); Fabr., *Ent. Syst.* iii. 1. p. 32. n. 94 (1793) (*partim*); Esper, *Ausl. Schmett.* p. 198. n. 90. t. 49. fig. 1 (1797).

Papilio (*thoas*), Meerburgb, *Afb. Zeldz. Gew.* t. 21 (1775).

Princeps heroicus *thoas*, Hübner, *Samml. Exot. Schmett.* i. t. 114. fig. 1. 2 (1806—?).

Heraclides thoas, Hübner, *Verz. bek. Schmett.* p. 83. n. 852 (1818?); Kirby, in Hübner, *Samml. Exot. Schmett.* ed. ii. p. 96. t. 114. fig. 1. 2 (190—?) (literat. *partim*).

Papilio thoas, Godart, *Enc. Méth.* ix. p. 62. n. 103 (1819) (*partim*); Lacord., *Ann. Soc. Ent. Fr.* ii. p. 383 (1833) (Guyane); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 50. (1838) (*partim*); Wallace, *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons, gardens); Bates, *ibid.* (2). v. p. 347 (1861) (Pará); id., *Journ. Entom.* i. p. 228. n. 27 (1862); id., *Natural. Riv. Amaz.* p. 52 (1864) (Pará, in street); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 296 (1864) (Surinam; Pará); Möschl., *ibid.* xxvi. p. 296 (1876) (Surinam); Butler, *Trans. Ent. Soc. Lond.* p. 146. n. 231 (1877) (Serpa, April); Sharpe, *Proc. Zool. Soc. Lond.* p. 555. n. 4 (1890) (R. Araguaya); Eimer, *Orthogen. Schmett.* p. 138. fig. 62 (1897) (Surinam).

Papilio thoas var. *thoas*, Oberthür, *Et. d'Ent.* iv. p. 70. sub n. 210 (1880) (Guyane).

♂♀. As yellow in tint as the large subspecies *P. thoas cinyras*.——*Upperside*, forewing: apical spot usually small, sometimes a mere dot; spots before upper angle of cell larger than in the other forms, except *cinyras*, there being often a small additional spot within the subcostal fork; discal patch R^1—R^2 smaller than in the other forms; patch R^2—R^3 as a rule the same in size as patch R^3—M^1, rarely a little longer, the veins R^2 and backwards more narrowly black between the patches than in *P. thoas nealces* and *P. thoas thoantiades*; patch SC^5—R^1 usually without black spot or sinus; four submarginal spots, sometimes three, small; cell-patch rarely absent.

Underside: submarginal spots of forewing comparatively small, especially the upper ones; black discal area of hindwing usually broad and the blue halfmoons pure in colour as a rule, black marginal line wider and submarginal patch SC^2—R^1 on the whole less projecting basad than in *P. thoas nealces*.

Hab. The Guianas; Lower Amazons.

In the Tring Museum 12 ♂♂, 6 ♀♀, from: Demerara, Essequibo R., and Berbice R., British Guiana; Surinam.

f. P. thoas cinyras Ménétr. (1857).

Papilio lampedon Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 206 (1856) (Villa Nova; *nom. nudum*!).

Papilio cinyras Ménétriés, *Enum. Corp. Anim. Mus. Petrop., Lép.* i. *Suppl.* p. 68. n. 1124. t. 7. fig. 3. (1857) ("Bahia" error loci); id., *l.c., Descr.* p. 111. n. 1124 (1863); Gerst., *Stett. Ent. Zeit.* xix. p. 302 (1858) ("is aberrat. of *P. thoas*"); Felder, *Wien. Ent. Mon.* iii. p. 393. note (1859) ("distinct from *thoas*"); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 347 (1861) (from Villa Nova upwards); id., *Journ. Entom.* i. p. 228. n. 29 (1862) (Upper Amazons; "interior of province of Bahia" error of local. or of identif.); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 296 (1864) (*partim*; Ega; Villa Nova); Butl., *Ann. Mag. N. H.* (4). xx. p. 127. n. 62 (1877) (R. Mairo, Peru); Hopff., *Stett. Ent. Zeit.* xl. p. 52. n. 19 (1879) (Peru); Oberth., *Et. d'Ent.* iv. p. 70. n. 209 (1880) (Teffé, Obydos); Mil., *Nat. Sci.* v. p. 243 (1886) (Monaco!); Hahnel, *Iris* iii. p. 240 (1890) (Villabella, Amaz.); id., *l.c.* p. 283 (1890) (Pebas).

Papilio thoas L. var. *cinyras*, Staudinger, *Exot. Tagf.* p. 16. t. 11. ♂ (1884); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença).

Papilio thoas, Maassen & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 82. n. 50 (1890) (Upper Amazons); Dognin, *Lép. Loja* p. 37 (1891); Holland, *Butt. Book* t. 42. fig. 4 (1899); Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

Papilio cynias (!), Eimer, *Orthogen. Schmett.* p. 137 (1897).

In the south intergrading with the next subspecies.

♂♀. *Upperside*, forewing: cell-spot present, sometimes small; spots in front of apex of cell usually large, sometimes minute, patch SC^5—R^1 entire, sometimes bearing a black spot, seldom deeply sinuate; submarginal spots absent or small, usually present in Bolivian specimens.—Hindwing: yellow band broad, upper submarginal spots usually much smaller than the others; red anal crescent absent or (in southern specimens) small, blue halfmoon distinct.

Hab. Eastern Ecuador, Amazons (except delta district), southward to Bolivia.

In the Tring Museum 79 ♂♂, 9 ♀♀, from: Obidos; R. Uaupes, Upper R. Negro; Iquitos (Stuart); R. Cachyaco, affl. of R. Huallaga (Stuart); R. Napo, E. Ecuador (R. Haensch); Zamora (O. T. Baron); R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); Chanchamayo (Schunke); Palcazu (Sedlmayr); Perené R., March 1900 (Simons); R. Mixiollo, Loreto (Baer); R. Toro, La Merced, August—September 1901 (Simons); Pozuzo, Huánuco (W. Hoffmanns); La Union, R. Huacamayo, Carabaya, 2000 ft., November and December 1904 (G. Ockenden); Chirimayo, Carabaya, July 1901, 1000 ft. (Ockenden); Oroya, R. Inambari, 3500 ft., November 1901 (Ockenden); Caradoc, Marcapata, 4000 ft., February 1901 (Ockenden); R. Sluenri, S.E. Peru, 2500 ft., June 1901 (Ockenden); Salampioni, Bolivia, September 1900 (Simons); Charnplaya, 1300 m., June 1901 (Simons); R. Songo (Garlepp); Sorata (Guenther); Mapiri; Salinas, R. Beni, July 1895 (Stuart); Prov. Sara, S. Cruz de la Sierra (J. Steinbach).

g. P. thoas brasiliensis subsp. nov.

Papilio thoas, Ménétriés, *Mém. Soc. Imp. Moscou* vii. p. 188. n. 3 (1829) (Brazil, larva); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 170 (1846) (Brazil); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 196 (1852) (*partim*; Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 206 (1856) (*partim*; Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 63 (1857) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 295 (1864) (*partim*; Brazil); Prillw., *Stett. Ent. Zeit.* xxvi. p. 129 (1865) (Corcovado); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 246. n. 44 (1869) (Brazil); Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 12 (1874) (*partim*; Botafogo, August; Rio, Entre Rios; very common); Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 3. t. 2. fig. 1. 2. larva (1879) (Rio de Jan.); Oberth., *Et. d'Ent.* iv. p. 70. n. 210 (1880) (*partim*; Brazil); Jones, *Proc. Lit. Phil. Soc. Liverp.* p. 41 (1883) (metamorph.); Seitz, *Stett. Ent. Zeit.* li. p. 98 (1890) (Corcovado); Weym., *ibid.* lv. p. 315. n. 14 (1895); Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 49 (1896); Peters, *Illustr. Zeitschr. Ent.* ii. p. 51 (1897) (Nova Friburgo; larva).

Papilio cresphontes, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 294 (1864) (*partim*; Brazil).

♂♀. A large form, nearly as bright yellow as *P. thoas eingras* ; the female very little paler than the male.——*Upperside :* forewing somewhat falcate ; cell-spot absent or small ; subapical spot large in nearly all specimens, usually produced into a point ; patch SC^5—R^1 deeply sinuate, sometimes completely divided ; submarginal spots always present, usually four.——Hindwing : red anal spot present ; distal edge of yellow band crossing cell at base of M^2 or proximally of it ; upper submarginal spots usually more or less rotundate.

Underside : subapical spot of forewing large, the third and fourth submarginal spots somewhat transverse, often also the second ; black marginal band of both wings broad in the majority of specimens.

Genitalia essentially as in *P. thoas autocles* ; ♂, lateral ridge of tenth tergite not toothlike, not subsinuate ; harpe somewhat curved, ventrally denticulate before apex.——♀, edge of vaginal orifice proximally raised into a tubercle or an obtuse process.

Hab. Bahia southwards, extending westwards to South-East Bolivia, intergrading completely with the next form, and in S.E. Bolivia with the preceding subspecies, there being neither sharply defined morphological nor geographical limits.——Type of name from Petropolis.

It is probable that *P. thoas* is in these districts a wanderer like the Nearctic *P. cresphontes*, which would explain the absence of a strict line of separation between the Brazilian and Argentinian forms.

The large Brazilian specimens are usually regarded as being the same as the form from Surinam, which is the nomenclatorially typical subspecies of *P. thoas*.

In the Tring Museum 50 ♂♂, 26 ♀♀ and a larva from : Minas Geraës, February 1897 and 1901 (A. Kennedy) ; Petropolis, December and January (J. Foetterle) ; S. Paulo ; Castro, Parana (E. D. Jones) ; Yhu, Paragnay, September —December 1896 (Andeer) ; Sapucay, Paragnay (W. Foster) ; Patino Cué, Paragnay, February (Montforts), Tucuman (J. Steinbach) ; Salta (J. Steinbach) ; S. José de Chiquitos, E. Bolivia, July 22. 1904 (J. Steinbach).

h. P. thoas thoantiades Burm. (1878).

Papilio thoantiades Burmeister, *Descr. Rép. Argent.* v. *Lép.* p. 59. n. 6 (1878) (var. of *thoas*) ; id., *l.c. Atlas* t. 2. fig. 3. larva, 3a. pupa, t. 4. fig. 9. ♀ (1879) ; Oberth., *Et. d'Ent.* iv. p. 70. n. 210 (1880) (*partim* ; Buenos Aires) ; Gosse, *Entom.* xiii. p. 194 (1880) (Corrientes).

Papilio thoantides (!), Staudinger, *Exot. Tagf.* p. 16 (1884) (Argentina).

♂♀. Smaller than the preceding ; discal band of fore- and hindwing very variable in width, usually paler than in *P. thoas brasiliensis* ; discal and marginal black bands on *underside* of hindwing broad.

Genitalia : ♂, harpe more curved than in *brasiliensis*.

Hab. Province of Buenos Aires and northward.

In the Tring Museum : 30 ♂♂, 20 ♀♀ and some larvae and pupae from : Buenos Aires, January, February and March (Ruscheweyh) ; Cordoba, Paysandu, and Rosario, March (Ruscheweyh) ; La Soledad, Entre Rios, February 1899 (Chas. Britton).

67. **Papilio homothoas** spec. nov. (Pl. V., fig. 13).

Papilio cresphontes, Felder (*non* Cramer, 1777, err. det.), *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 294 (1864) (*partim* ; Bogota).

Resembling *P. thoas* ; forewing shorter ; bases of distal segments of antenna of male broadly yellow beneath ; tail shorter and more strongly spatulate, being

narrower proximally ; no spot in cell of forewing on upperside ; patch SC^5—R^1 of forewing entire or with a small sinus only, patch R^2—R^3 projecting beyond the next as in *P. cresphontes*, submarginal spot R^3—M^1 being more proximal than in *P. thoas* ; genitalia quite different.

♂. Wings, *upperside*: markings chrome-yellow, deeper in tint than in *P. thoas*.——Forewing : no spot in cell ; spots before upper angle of cell as large as in *P. thoas thoas* ; a small additional spot at base of subcostal fork ; patch SC^5—R^1 entire or with black spot or sinus, patches R^2—SM^2 contiguous, patch R^2—R^3 truncate distally, projecting beyond the next one, its outer edge being in a line with that of the preceding patch ; three submarginal spots of almost equal size standing in an oblique row.——Hindwing rather shorter posteriorly than in *P. thoas* ; tail more evenly spatulate, broader at apex and narrower proximally than in *P. thoas*.

Underside deeper yellow than in South American *P. thoas*, but not so deep as in *P. thoas oviedo* from Cuba.——Forewing : cell striped with black ; submarginal spot R^3—M^1 much larger than the others and extending much more proximad.—— Hindwing : cell yellow, except a narrow apical crescent ; black discal band narrow, each patch bearing a blue or a yellowish spot ; two orange-red spots R^2—M^1 at cell; orange-red anal spot connected with the marginal spot.

♀. Somewhat paler than male, markings of *upperside* smaller, patch SC^5—R^1 of forewing with small black sinus.

Genitalia : ♂. Tenth tergite bifurcate, the lobes projecting laterad, being narrow and pointed ; tenth sternite short, on each side with an apically sinuate lobe, the lower one of which is acute and somewhat produced. Harpe a broad concave plate, obtuse at apex, which is a little curved inward ; ventral edge parallel to edge of clasper, distally denticulate.——♀. Edge of vaginal orifice slightly elevate all round ; from this low ring extends on each side backwards a ridge which borders a large postvaginal depression, the ridge being raised close to the vaginal orifice into a pointed, triangular process ; no strongly chitinised ridge or depression proximally of the orifice.

Hab. Ciudad Bolivar, Lower Orinoco, June 1891, 1 ♂, type ; Maripa, Caura R., October 1903 (S. M. Klages), 1 ♂ ; Lower Orinoco, November 1897 (Cherrie), 1 ♀ ; Colombia, 3 ♂♂.

In coll. Godman from Colombia ; in coll. Adams from Margnerita I. ; in the British Museum from Venezuela and Bogota.

68. Papilio cresphontes Cram. (1777).

Aubent., *Planch. Enlum.* t. 69. ♀ (1765) ("Guadeloupe" false).

Papilio Eques Achivus thoas Linné, *Mant. Plant.* p. 536 (1771) (*partim*) ; Fabr., *Syst. Ent.* p. 454. n. 48 (1775) (*partim*) ; id., *Spec. Ins.* ii. p. 19. n. 76 (1781) (*partim*) ; id., *Mant. Ins.* ii. p. 10. n. 87 (1787) (*partim*) ; id., *Ent. Syst.* iii. 1. p. 32. n. 94 (1793) (*partim*).

Papilio Eques Achivus cresphontes Cramer, *Pap. Exot.* ii. p. 106. 107. t. 165. fig. A. ♀, t. 166. fig. B. ♂ (1777) (N. York ; Carolina—"Jamaica" alia subsp.) ; Goeze, *Ent. Beytr.* iii. 1. p. 86. n. 64 (1779) ; Jabl. & Herbst., *Naturs. Schmett.* iii. p. 121. n. 89. t. 39. fig. 1. 3. ♀, 2. ♂ (1788).

Papilio Eques Achivus thoas β) *Papilio cresphontes*, Gmelin, *Syst. Nat.* i. 5. p. 2240. sub n. 321 (1790).

Papilio cresphontes, Esper, *Ausl. Schmett.* p. 199. sub n. 90 (1797) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 169 (1846) (*partim* ; United Sts., Mexico) ; Kirtl., *Proc. Ent. Soc. Lond.* (2). i. p. 101) (1851) (south shore of L. Erie ; recent arrival ; = *thoas*, Boisd. & Lec.) ; Gray, *Cat. Lep. Ins. Brit.Mus.* i. *Pap.* p. 39. n. 194 (1852) (*partim*) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 53. n. 204 (1856) (*partim*) ; Mcnétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 68. n. 1123 (1857) (Mexico) ; id., *l.c., Lép. Descr.* p. 111. n. 1123 (1863) (distinct from *thoas*) ; Reak., *Proc.*

Ent. Soc. Philad. ii. p. 137. n. 5 (1863) (Honduras ; syn. excl.) ; Kirkp., *ibid.* iii. p. 329 (1864) (Cleveland, Ohio, rarely) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 294 (1864) (*partim*) ; Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 172. n. 5 (1864) (Cuba) ; Edw., *Trans. Amer. Ent. Soc.* vi. p. 11. n. 21 (1877) (S. & W. States ; occas. in Wisconsin, Michigan, and Ontario) ; Colem., *Amer. Natural.* p. 688 (1877) (Berlin, Conn., Sept. 6) ; Gerb., *Macro-Lep. N. Am.* p. 25. n. 438 (1878) ; Strecker, *Butt. Moths N. Am.* p. 68. n. 7 (1878) ; Burm., *Descr. Rép. Argent.* v. *Lép.* p. 58. n. 1 (1878) (var. of *thoas*) ; Bean, *Canad. Ent.* x. p. 35 (1878) (correct. of note in *Amer. Nat.* 1877. p. 688) ; Saund., *ibid.* p. 48 (1878) (life hist.) ; Peck, *ibid.* p. 60 (1878) (Fairfield Co., Conn.) ; Boll, *ibid.* p. 154 (1878) (Dallas, Texas, larva and pupa, on *Zanthoxylum carolinianum*) ; French, *ibid.* p. 204 (1878) (position of pupa) ; Saund., *ibid.* p. 223 (1878) ; French, *Trans. Dept. Agric. Illin.* xv. p. 139 (1878) ; Saund., *l.c.* xi. p. 203 (1879) (Ontario) ; Moffat, *ibid.* p. 240 (1879) (Hamilton, Ont.) ; Murray, *ibid.* p. 240 (1879) (Hamilton) ; Saund., *Rept. Ent. Soc. Ontario* p. 60. fig. 38 (1879) (distrib. ; food-plants) ; id., *l.c.* p. 41. fig. 19 (1880) ; French, *Rept. S. Ill. Norm. Univ.* vi. p. 43 (1880) ; Murray, *Can. l. Ent.* xii. p. 120 (1880) (Hamilton) ; Saund., *ibid.* p. 120 (1880) (larva June, imago July, larva autumn, pupa hybernating) ; Oberth., *Et. d'Ent.* iv. p. 70. n. 210 (1880) (*partim* ; Texas) ; Comst., *Rept. Dep. Agric.* p. 246 (1880) (metam.) ; Moffat, *Rept. Ent. Soc. Ontario* p. 10 (1881) (Long Point and Ridgeway) ; Saund., *ibid.* p. 41. fig. 19 (1881) ; Moffat, *Canad. Ent.* xiii. p. 115 (1881) (Hamilton) ; French, *ibid.* p. 177 (1881) (life history) ; Gundl., *Contr. Ent. Cuba.* p. 131 (1881) ;Goodall, *Papilio* ii. p. 188 (1882) (Amherst, Mass., Sept. 5) ; Bruce, *ibid.* p. 188 (1882) (Monroe Co., N.Y., larva on *Ruta graveolens*) ; Moffat, *Rept. Ent. Soc. Ontario* p. 30 (1882) (larva in October ; Hamilton, Ont.) ; Reed, *Canad. Ent.* xiv. p. 181 (1882) (London) ; Jack, *ibid.* p. 219 (1882) (15 miles south of Montreal, August) ; Saund., *ibid.* xv. p. 204 (1883 (larva on *Zanthoxylum americanum* & *Ptelea trifoliata*) ; id., *l.c.* p. 234 (1883) (egg, young larva, on *Zanthoxylum fraxineum*) ; id., *Ins. Inj. Fruit* p. 377. fig. 389-91 (1883) ; Edw., *Papilio* iii. p. 26 (1883) (Wisc., Northern N.Y., Me., Mass., Conn.) ; Colem., *ibid.* p. 43 (1883) Conn.) ; Dimmock, *Psyche* iv. p. 99 (1883) (Cambridge, Mass., August) ; Saund., *Canad. Ent.* xvi. p. 50 (1884) (Lake Erie) ; Edw., *ibid.* p. 109 (1884) (egg) ; Lintn., *Papilio* iv. p. 136. n. 3 (1884) (Rio Grande) ; Saund., *Rept. Ent. Soc. Ontario* p. 16 (1884) (larva on *Ptelea* and *Zanthoxylum*) ; Jack, *ibid.* p. 37 (1884) (Prov. Quebec, end of August) ; Neal, *Bull. Dept. Agric., Ent.* iv. p. 87 (1884) (larva destr. by ants and *Mutilla* !) ; Saund., *Rept. Ent. Soc. Ontario* xv. p. 29. 30 (1885) (Point Pelée, L. Erie) ; Hubb., *Ins. Affect. Orange* p. 137. fig. 56. t. 10. 11 (1885) ; Bates, *Canad. Ent.* xviii. p. 80 (1886) (Massachusetts) ; French, *Butt. East. U.S.A.* p. 103. fig. 20—22 (1886) ; Mayn., *Butt. N. Engl.* p. 50. n. 69. t. 5. fig. 69. 69A (1886) ; Shann., *Canad. Ent.* xix. p. 180 (1887) (Indiana ; larva on *Populus dilatata*) ; Geddes, *Rept. Ent. Soc. Ontario* xviii. p. 23. fig. 5 (1888) (Oxford, Ont.) ; Skinn., *Canad. Ent.* xxi. p. 127 (1889) (Philadelphia, occasionally) ; Riley, *Insect Life* ii. p. 2 (1889) (larva on orange) ; Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 12 (1889) (liter. on metam.) ; Riley, *Insect Life* iii. p. 32 (1890) ; Dyar, *Psyche* v. p. 421 (1890) (number of moults) ; Pack., *Fifth Rept. U.S. Ent. Comm.* p. 472, 661 (1890) (egg, various larval stages, pupa ; food-plants) ; Mayn., *Man. N. Amer. Butt.* p. 14. n. 20. fig. 10c (1891) ; Edw. & Ell., *Bull. Amer. Mus. N. H.* iv. p. 75 (1892) (egg and first three stages of larva) ; Staley, *Canad. Ent.* xxiv. p. 204 (1892) (Marshall, Missouri, iv.—x., common) ; Davis, *Journ. N. York Ent. Soc.* i. p. 47 (1893) (Staten I., N.Y., Aug., Sept. 1882) ; Beutenm., *Bull. Amer. Mus. N. H.* v. p. 245 (1893) (N. York ; descr. of l., p., i. ; two broods, June and Aug.) ; Beth., *Canad. Ent.* xxv. p. 260 (1893) (Lake Sincoe, Aug. 28) ; Holl., *ibid.* p. 311 (1893) (Pittsburgh, larva on *Zanthoxylum* and *Ptelea*, in Florida on orange and lemon) ; Soule, *Psyche* vi. p. 530 (1893) (Brookline, Mass.) ; Haase, *Untersuch. Mimicry* i. p. 96 (1893) ; Moffat. *Canad. Ent.* xxvi. p. 54 (1894) (London, larva in Oct. from being nearly full fed to little ones) ; id., *l.c.* p. 123 (1894) (London, July and Aug.) ; Ellis, *ibid.* p. 176 (1894) (Sparrow Lake, 110 miles north of L. Ontario) ; Davis, *Ent. News* v. p. 109 (1894) (Little Rock, Ark.) ; White, *ibid.* p. 175 (1894) (Brooklyn) ; Ehrm., *ibid.* v. p. 212 (1894) (Pittsburgh, Pa.) ; Weed, *Psyche* vii. p. 130. n. 37 (1894) (N.E. Miss.) ; Moffat & Saund., *Rept. Ent. Soc. Ontario* xxiv. p. 6 (1894) (London) ; Beth., *ibid.* (1894) (Lake Simcoe) ; Holl., *ibid.* p. 53. fig. 26 (1894) (Pittsburgh ; larva on *Zanthoxylum* and *Ptelea*) ; Moffat, *Canad. Ent.* xxvii. p. 147 (1895) (London, June, full-fed larva in July) ; Denton, *Psyche* vii. p. 263 (1895) (Wellesley, Mass., June 2.) ; Osburn, *Ent. News* vi. p. 282. n. 45 (1895) (Tennessee, rare, vi. to ix., two broods) ; Grant, *Canad. Ent.* xxviii. p. 273 (1896) (Orillia, Ont.) ; Truman, *Ent. News* viii. p. 29 (1897) (Volga, S. Dakota, travel-worn) ; Beutenm., *Journ. N. York Ent. Soc.* v. p. 101 (1897) (distinct from *thoas*) ; Duzee, *Bull. Buffalo Soc. N. Sc.* v. p. 107. n. 6 (1897) (Buffalo, occasional) ; Thoms., *Canad. Ent.* xxix. p. 263 (1897) (larva on *Rutaceae*, *Zanthoxylum* and *Ptelea*) ; Rowley, *Ent. News* ix. p. 37 (1898) (Louisiana, Mo., larva on hop tree and prickly

ash); Britton, *ibid.* p. 173 (1898) (Newhaven, Conn., June 15); Ashm. & Schwarz, *Proc. Ent. Soc. Washingt.* iv. p. 50 (1898) (change of food); Beutenm., *Bull. Amer. Mus. N. H.* x. p. 310 (1898) (Highland Falls, N.Y.); Holland, *Butt. Book* p. 311, n. 8. t. 2. fig. 16, t. 4. fig. 8—10, t. 42. fig. 3 (1899); Bentenm., *Butt. N. York City* p. 6. n. 4. fig. ♂ (1902); Moffat, *Rept. Ent. Soc. Ontario* xxxiii. p. 51 (1902) (Trenton, Aug.; London, Ont.); Evans, *ibid.* p. 82 (1902) (Trenton); Walk., *ibid.* p. 85 (1902) (Point Pelee, Leamington; Walpole I.); Clark, *Ent. News* xiii. p. 27 (1902) (Newtonville, Mass., Sept. 13); Field, *ibid.* xiii. p. 331 (1902) (East Alstead, N.H., June 12); Hoag, *ibid.* xiv. p. 320, 321 (1903) (Altamira & S. Louis Potosi, Mex.); Moffat, *Rept. Ent. Soc. Ontario* xxxiii. p. 58. fig. 36 (1903) (London, Ont.).

Heraclides oxilus Hübner, *Verz. bek. Schmett.* p. 83. n. 850 (1818?) (nom. nov. loco *cresphontes*).

Papilio thoas var., Godart, *Enc. Méth.* ix. p. 62. n. 103 (1819) (*partim*); Boisd., *Spec. Gén. Lép.* i. p. 355. n. 197 (1836) (*partim*); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (*partim*).

Papilio thoas, Boisduval & Leconte, *Hist. Gén. Lép. Amér. Sept.* p. 32. t. 12. fig. 1. ♀, t. 13. fig. 1. ♂, 2. larva, 3. pupa (1833) (Georgia; Florida); Lucas, in Guér., *Diet. Pitt. Hist. Nat.* vii. p. 50 (1838) (*partim*); Doubl., in Westw., *Arcana Ent.* i. p. 144 (1845) (habits); Poey, *Mem. R. Soc. Econ. Habana* p. 234 (1846); Lucas, in Sagra, *Hist. Cuba* vii. p. 206 (1857) (*partim*); Gosse, *Letters from Alabama* p. 170 (1859); Morris, *Syn. Lep. N. Am.* p. 7. n. 10 (1862); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (*partim*); Reed, *Canad. Ent.* i. p. 19 (1868) (London, Ont.); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 246. n 44 (1869) (*partim*); Parker, *Amer. Entom.* ii. p. 175 (1870) (Iowa); Bean, *Ent. Mo. Mag.* x. p. 248 (1874) (Galena, Ill.; quite uncommon, Aug. Sept.); Carey, *Rept. Ent. Soc. Ontario* p. 5 (1875) (Amherstburg); Saund., *ibid.* p. 15 (1876) (Northbridge, Ont.); Cook, *ibid.* (1876) (Lansing); Dent., *Canad. Ent.* ix. p. 160 (1877) (Ontario); Murray, *ibid.* x. p. 120 (1878) (Hamilton, Ont.); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 223. n. 53 (1890) (*partim*); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 273 (1897) (= *cresphontes*); Dyar, *Bull. U.S. Nat Mus.* lii. p. 3. n. 14 (1902) (Atl. States; Arizona; Mexico; *partim*?); Laur., *Ent. News* xiv. p. 296 (1903) (Miami, Fla., common); Sherm., *Rept. Ent. Soc. Ontario* xxxvi. p. 26. fig. 11 (1905) (N. Carolina).

Papilio thoas var. b. *P. cresphontes*, Kirby, *Cat. Diurn. Lep.* p. 541. sub n. 155 (1871) (Univ. Amer.).

Papilio thoas var. *cresphontes*, Gundlach, *Papilio* i. p. 113 (1881) (Cuba); Aaron, *Papilio* iv. p. 172 (1884) (S. Texas, common).

Papilio thoas (*cresphontes*), Dwight, *Psyche* iii. p. 327 (1882) (Dutchess Co., N.Y.); Bunker, *Canad. Ent.* xv. p. 100 (1883) (N. York, two broods); Perrin, *Rept. Ent. Soc. Ontario* xxxiv. p. 90 (1904) (15 miles from Halifax, Aug. 1901).

Heraclides cresphontes, Scudder, *Butt. East. U.S.A.* ii. p. 1334. t. 14. fig. 12, t. 27. fig. 2, t. 35. fig. 21-3, t. 41, fig. 4, t. 57. fig. 3, t. 66. fig. 3, t. 68. fig. 19, t. 73. fig. 1, t. 76. fig. 16, t. 79. fig. 62-6, t. 85. fig. 8, 9, 10 (1889) (morphol., metam., etc.;—liter. *partim* ad aliam spec. ref.); Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 282 (1896); Scudder, *Psyche* viii. p. 210. t. 5. f. 5, l. juv. (1898); Mayer, *ibid.* p. 299 (1898) (Dry Tortuga); Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 96. t. 314. fig. 3, 4 (190—?).

Papilio chresphontes (!), Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., not common); Bubna, *Ent. News* viii. p. 98 (1897) (Cleveland, Ohio; rare).

Specifically distinct from *P. thoas*, with which it occurs together in Central America, Texas, and Cuba. Dr. Holland separated it correctly from *P. thoas*, but unfortunately figured as *thoas* not the northern form of that species, but a South American specimen (doubtless from the Amazons). The difference in pattern between *P. thoas* and *cresphontes* being but slight, many authors have considered the two insects to be one species. However, that opinion is erroneous. The true distinction between the two insects is not on the surface. The sexual organs, as specified below, exhibit a divergency which is quite astonishing, and it is no less surprising that this difference has never been noticed, although one of the most peculiar features of the organs is visible without dissection.

The only constant difference in pattern between *P. cresphontes* and the northern forms of *P. thoas* is the larger size of the spot R^2—R^3 (the fifth) of the discal row of the forewing. This spot is larger in *cresphontes* than the next spot, the submarginal spot R^3—M^1 being consequently more proximal above and below than the submarginal spot R^2—R^3.

Individually variable. The patch SC^5—R^1 on the upperside of the forewing is usually excised, seldom completely divided, the black sinus being often reduced to a spot, which is sometimes altogether absent, as is always the case on the underside. Some specimens have a complete row of submarginal spots. One of the most interesting variations is represented by specimens in which there is a second yellow spot before the subcostal fork standing at the proximal side of the subapical spot, this additional spot proving the subapical spot to belong to the submarginal series, not to the discal band. The size of the discal patches is very variable, spots R^3—M^2 being more or less pointed distally. There is apparently never a yellow spot in the cell, as is so often the case in *P. thoas*.——The width of the yellow antemedian band of the hindwing is variable.

On the *underside* considerable variability obtains in the amount of black on both wings and in the size and number of the orange spots on the hindwing; these spots are occasionally of a rufous tawny tint.

There is apparently no marked variation according to season and locality. The few Cuban males which we have examined show, however, a more or less distinct orange-red spot in the cell of the hindwing below, which spot is hardly ever indicated in continental specimens; our Cuban females do not possess the spot.

The specimens from the southern Atlantic States are on the whole the largest, the Central American ones being, on the contrary, of inferior size.

The distribution is somewhat fluctuating, the occurrence in the northern districts of the range not being regular. We suspect the species to be a wanderer also in the southern districts.

P. cresphontes was originally doubtless a northern form of *P. thoas*. The ranges now overlap to a considerable extent, the insects having become so different that they are independent of one another and can exist in the same locality without fusion (compare definition of "species" in *Nov. Zool.* 1896, p. 438, and 1903 *Suppl.* p. xli; also Poulton, *Pres. Address, Ent. Soc. Lond.* 1903).

Genitalia: ♂. Tenth tergite with a very short process instead of the long spatulate process of *P. thoas*, there being in consequence an open space dorsally between the claspers; the process of *cresphontes* can be felt by gently moving the finger over the upper edge of the claspers from behind; the tenth sternite, which in *thoas* bears on each side a long curved pointed process which is proximally dilated into a hairy ridge, has in *cresphontes* a long proximal process which is somewhat irregular at the edges, being narrowed to a point; from beneath this process, *i.e.* standing distally of it, projects an acute and somewhat curved thornlike process. Clasper shorter and much more rounded than in *P. thoas*; harpe broad, hollowed out, narrowest at apex, which is rounded, the apical and ventral edges being minutely denticulate, no apical process as in *P. thoas*.——♀. Edge of vaginal orifice anteriorly raised into a small, smooth tubercle, and posteriorly into a transverse ridge; from this ridge extends on each side backwards a longitudinal ridge bordering a large mesial depression; just in front of the orifice a fold which is laterally raised into a small triangular lobe. Anal segment on inner surface with three bristles on each side.

Early stages similar to those of *P. thoas*.

Hab. Canada to Costa Rica; Cuba.

In the Tring Museum 66 ♂♂, 54 ♀♀ and some larvae and pupae from: Buffalo; Evanston, and St. Augustine, Illinois (Snyder); Nashville, Tennessee (W. Osburn); Iowa; Jefferson Co., Kentucky (Troxler); Louisiana; Florida; Cuba;

Houston, Texas ; Orizaba and Huatuxco, Vera Cruz ; Espinal, Vera Cruz, July 1896 (W. Schaus) ; Guadalajara, September—October (Dr. Butler) ; Guadalajara, July 1896 (W. Schaus) : Hermosillo, Sonora, March 1903 (Oslar) ; Guerrero (O. T. Baron) ; S. Pedro Sula, Honduras ; Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall) ; Azahar de Cartago, Costa Rica, February 1899 (Underwood).

69. Papilio paeon Boisd. (1836).

Papillon péon Roger, *Bull. Soc. Linn. Bordeaux* i. p. 161 (1826) (Chili).
Papilio paeon Boisduval, *Spec. Gén. Lép.* i. p. 356. n. 198 (1836) (Chili) ; Walk., *Ent. Mo. Mag.* xix. p. 53 (1882) (Callao ; larva and pupa).

♂ ♀. Sexes similar, the female being larger and paler than the male. Forewing resembling that of *P. thoas*. Hindwing, *below*, with a row of rufous red spots around cell ; apex of cell bearing a rufous red spot bordered distally by a black crescent, which is often double, the interspace between the two black lines and the tip of cell being buffish-yellow ; tail without yellow spot in centre ; marginal spot behind tail large.

Neuration : SC^3 of forewing strongly curved at base, stalk of $SC^{1,5}$ shorter than the two cross-veins D^2 and D^3 together, D^3 very oblique, sometimes almost in the same direction as D^1, lower angle of cell very obtuse.

Genitalia : ♂. Tenth tergite long, narrowing apicad, apex rounded ; sternite laterally inerassate in middle, the incrassation divided transversely into an anterior and a posterior toothlike ridge. Clasper rounded ; harpe broad, rounded distally, bearing several long thornlike teeth at the edge.—♀. Edge of vaginal orifice anteriorly in middle raised into a tubercle which is carinate on the anterior and convex on the posterior side ; behind the orifice a rounded tubercle which is densely covered with minute hairs ; behind this tubercle two folds extending forward into the orifice ; in front of the orifice on each side a broad shell-like ridge, with irregular edge, and laterally of this another smaller ridge ; on the posterior surface of the large ridge stands laterally of the orifice a long, slender, pointed, thornlike process. Anal segment on inner surface with four bristles on each side (this number constant ?).

Early stages described by Walker, *l.c.*

Hab. Colombia and Northern Venezuela southward to Bolivia.

There is no reliable evidence that the species occurs in Chili.

Two subspecies :

a. P. paeon thrason Feld. (1865).

Papilio pacon, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 197 (1852) (*partim* ; Bogota) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 207 (1856) (*partim*) ; Vollenh., *Tijdschr. Ent.* iii. p. 86. n. 140 (1860) (Bogota) ; Oberth., *Et. d'Ent.* iv. p. 70. n. 208 (1880) (*partim* ; Muzo ; Carare ; R. Magdalena).
Papilio thrason Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 292 (1864) (*nom. nud.* ; Bogota ; Venezuela) ; id., *Reise Novara, Lep.* p. 74. n. 57 (1865) (Venezuela ; Bogota) ; Hahnel, *Iris* iii. p. 201 (1890) (Valera, Venez.) ; Godm. and Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 224. n. 54 (1890) (Costa Rica) ; iid., in Whymper, *Andes of Equator, App.* p. 109. n. 96 (1891) (Nanegal).
Papilio paeon var. a. *P. thrason*, Kirby, *Cat. Diurn. Lep.* p. 542. sub n. 157 (1871) (New Granada).
Papilio pron var. *thrason*, Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 14. n. 14 (1890) (Honda to Bogota) ; iid., *l.c.* p. 38. n. 33 (1890) (Popayan).

♂ ♀. *Upperside :* submarginal spots of forewing usually linear, thin.—Hindwing rather longer posteriorly than in the following form ; yellow marginal

spot behind tail reaching to three-fourths of tail.——Orange-red markings on *underside* of hindwing smaller than in *P. p. paeon*; the two black crescents M^1—M^2 more widely separated; black marginal line not so broad, not so strongly arched between the veins, and not interrupted before tail; the latter longer.——Harpe usually with fewer teeth.

Hab. Colombia and Northern Venezuela; Costa Rica (von Patten).

As the specimens in von Patten's Costa Rica collection were not all from Costa Rica, it is possible that also the present insect got into the collection by some mistake.

In the Tring Museum 28 ♂♂, 6 ♀♀, from: R. Dagua, W. Colombia (Rosenberg); "Bogota"; Pereira, Cauca; Mérida, Venezuela (Briceño).

b. P. paeon paeon Boisd. (1836).

Papilio paeon Boisduval, *l.c.*; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 172 (1846) (Chili); Blanch., in Gay, *Hist. Fis. Chile, Zool.* vii. p. 8. n. 2 (1852) (Chile ?); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 197 (1852) (*partim*; "Chili"); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 207 (1856) (*partim*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 291 (1864) (Peru; Chile ?); Kirby, *Cat. Diurn. Lep.* p. 542. n. 157 (1871) (var. excl.; "Chili"; Peru); Burm., *Descr. Rép. Argent.* v. *Lép.* p. 58. n. 4 (1878) (var. of *thoas*!); Hopff., *Stett. Ent. Zeit.* xl. p. 49. n. 4 (1879) (Peru); Oberth., *Et. d'Ent.* iv. p. 70. n. 208 (1880) (*partim*; Peru); Walker, *Ent. Mo. Mag.* xix. p. 53 (1882) (Callao; larva on parsnip, descript. of various stages and pupa); Bartl.-Calv., *Cat. Lep. Chile* p. 5. n. 2 (1886) (doubtful as Chilian).

Papilio peon, Staudinger, *Exot. Tagf.* p. 16 (1884); Maass. & Weym., *l.c.* p. 72. n. 7 (1890) (Tambo de Chillo, 3000—3600 m.); Dognin, *Lép. Loja* p. 15 (1887); id., *l.c.* p. 37 (1891).

Papilio thrason, Weeks (*non* Felder, 1865, err. det.), *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

♂♀. Yellow marginal spot behind tail extending about half-way to apex of tail. Submarginal spots of *underside* of forewing more or less rounded, small; black marginal line of hindwing broad, strongly arched between the veins; orange-red spots large.——Harpe usually with four teeth or more.

Hab. Ecuador to Bolivia; the locality "Chile" of the older writers doubtless erroneous.

In the Tring Museum 25 ♂♂, 3 ♀♀, from: Chimbo, N.W. Ecuador, July 1897, 2000 ft. (Rosenberg); Ibarra, May 1897 (Rosenberg); Ambato: Zamora (O. T. Baron); Chosica, Peru, 850 m., January 1900 (Simons); Huancabamba, Cerro de Pasco (E. Boettger); R. Mixiollo, Loreto (Baer); Chanchamayo (Schunke); Carobas, Peru, 2500 ft., December 1899 (Simons); La Merced, Chanchamayo 1000 m., April 1900 (Simons); Chulumani, Bolivia, 2000 m., January 1901 (Simons); R. Tanampaya (Garlepp); Yungas de La Paz (Garlepp); R. Unduawe, Bolivia, 2000 m., February 1901 (Simons).

70. **Papilio caiguanabus** Poey (1851).

Papillon perithous Roger, *Bull. Soc. Linn. Bordeaux* i. p. 159 (1826) (Cuba).

Papilio caiguanabus Poey, *Mem. Hist. Nat. Cuba* i. p. 442. t. 15. fig 1. 2. ♀, 3. 4. ♂ (1851); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. n. 186 (1852) (Cuba); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 194 (1856) (Cuba); Lucas, in Sagra, *Hist. Cuba* vii. p. 207 (1857); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) ("West Indies"); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 286 (1864) (Cuba; = *numicus*); Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 173. n. 8 (1864) (Cuba); Kirby, *Cat. Diurn. Lep.* p. 542. n. 162 (1871) (Cuba); Oberth., *Et. d'Ent.* iv. p. 69. n. 202 (1880) (Cuba); Gundl., *Contr. Ent. Cuba* p. 127 (1881); id., *Papilio* i. p. 113. n. 162 (1881) (Cuba); Haase, *Untersuch. Mimicry* i. p. 98 (1893) (Cuba; "near relative of *P. erostratus*" false).

Papilio numicus Hopffer, *Neue Schmett.* p. 1. n. 2. t. 1. fig. 3. 4 (1856) (Cuba); Hew., *Exot. Butt.* iii. *Pap.* t. 6. fig. 17 (1864).

Roger's nomenclature being French, not Latin, his name cannot be accepted for this species. Boisduval (1836) erroneously applied the name "*pirithous* Roger" to the female of a very different insect (*P. lycophron*).

♂ ♀. Nearest to *P. thoas* and *aristor*; the discal markings of the *upperside* have nearly all disappeared, while the submarginal ones are large, the latter being opalescent white on the hindwing of the female. On the *underside* of the hindwing there are two red spots at cell as in *P. thoas*, and a row of blue discal spots as in *P. aristodemus* and *thoas*.

Genitalia: ♂. Tenth tergite long, narrowing apicad, slightly constricted just before apex; sternite armed at each side with a large, pointed, dentate process; harpe short, broad, rounded, ending in a short point.——♀. Anterior edge of vaginal orifice raised into a smooth tubercle; laterally of the orifice a large depression, the lateral edge of which is elevated, standing posteriorly in connection with the postvaginal ridges; behind the orifice a quadrangular groove with elevated edges, laterally of this strongly chitinised groove a ridge which ends anteriorly near the hinder edge of the orifice in a truncate denticulate process.

Early stages not known.

Hab. Cuba.

In the Tring Museum 7 ♂♂, 7 ♀♀, from: Gibara and Holquin (Tollin).

71. Papilio aristor Godt. (1819) (Pl. V., fig. 21).

Papilio aristor Godart, *Enc. Méth.* ix. p. 60. n. 95 (1819) (hab.?); Boisd., *Spec. Gén. Lép.* i. p. 51. n. 192 (1836) (type-specimen with three wings in Mus. Paris); Doubl., West. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 160 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 37. n. 183 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 51. n. 192 (1856); Felder, *Verh. Zool. Bot. Ges. Wien*, xiv. p. 315. n. 360 (1864); Kirby, *Cat. Diurn. Lep.* p. 566. n. 324 (1871) ("Mexico? Antilles?").

The type-specimen of this species appears to have been destroyed. According to Boisduval, *l.c.*, the specimen existed in the Paris Museum when he wrote the *Species Général*, but it is no longer in that collection—at least we have not found it there. The only specimen known to us is in the magnificent collection of Mons. Charles Oberthür, who kindly lent it to us for figuring.

♂. Abdomen black, with a subdorsal and a subventral row of buff-yellow spots, the claspers and the eighth segment being more extended yellow.

Underside of wings similar to *upper*, spots paler, anterior discal ones of forewing and submarginal ones of hindwing larger; forewing with buff subapical cell-patch, which does not extend across the cell; hindwing: the discal spots C—R^1 yellowish, vestigial in the specimen, the first indicated also on *upperside*, traces of two orange-red spots R^2—M^1 at cell, which were apparently more distinct in Godart's specimens; a row of small blue spots proximally of the submarginal spots.

Neuration: cell of forewing as in *P. caiguanabus*, asymmetrical, the lower angle being very obtuse.

Genitalia: ♂. Tenth tergite long, curved downwards at apex, spatulate: sternite at each side with a long, pointed tooth bearing proximally a rounded hairy projection; harpe broad, excavated, suddenly narrowed to a point, dentate distally at ventral edge.

Female and early stages not known.

Hab. Port-au-Prince, Haiti (F. Odile Joseph), 1 ♂ in coll. Oberthür.

72. **Papilio aristodemus** Esp. (1794).

Papilio Eques Achivus aristodemus Esper, *Magaz. Neuest. Ausl. Ins.* p. 8. t. 2 (1794); id., *Ausl. Schmett.* p. 240. n. 113. t. 59. fig. 2 (1798) ("Cuba" false).

Papilio aristodemus, Boisduval, *Spec. Gén. Lép.* i. p. 357. n. 199 (1836); Vollenh., *Tijdschr. Ent.* iii. p. 86. n. 141 (1860) (Antilles).

Papilio daphnis Gray (ex Martyn, *Psyche*, errore), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 198 (1852) (*partim*); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 209 (1856) (synon. *partim*; S. Domingo); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (West Indies, *partim*; "Mexico" false).

Papilio cresphontinus Martyn, *Psyche* (ined.), t. 3. fig. 8, t. 4. fig. 10. (1797); Kirby, *Cat. Diurn. Lep.* p. 542. n. 158 (1871); Burm., *Descr. Rép. Argent.* v. *Lép.* p. 58. n. 2 (1878) (var. of *thoas*!); Gundl., *Contr. Ent. Cuba.* p. 130 (1881) (Cuba; S. Domingo; Porto Rico; "Mexico" false).

♂♀. Antenna yellow at base of club in most specimens.

Underside of both wings more extended yellow than in *P. thoas*; cell of forewing not striped with black; cell of hindwing either all yellow or bearing a small black spot at apex; yellow submarginal spots of both wings merged together to a band which is anteriorly on forewing not separated from the basidiscal area; black discal band of hindwing narrow, bearing a row of large blue spots, and being bordered proximally by dirty rufous red scaling, which is sometimes absent or vestigial. Tail black on upperside, edged behind with yellow from base to near apex, beneath more or less yellow in middle.

Genitalia: ♂. Tenth tergite spatulate; sternite with small, obtuse, double ridge at the sides; harpe long, acuminate, nearly straight, flat, denticulate at apex, armed with a very long, thornlike process ventrally before the middle, homologous to the process of *P. lycophron*.——♀. Armature of the same type as in *P. lycophron*; edge of orifice anteriorly raised into a compressed tubercle which extends into the orifice, lateral edge elevate, thin, abruptly ending posteriorly; behind orifice a membranaceous tubercle densely covered with minute hairs; laterally of the orifice a large lobe bearing numerous long, thornlike teeth at the edge, and further laterad a small chitinised depression, the free external edge of which is rounded.

Early stages not known.

Hab. Cuba; Haiti.

Two subspecies.

The species connects *P. thoas* with *P. lycophron* and allies.

a. P. aristodemus temenes Godt. (1819).

Papilio temenes Godart, *Enc. Méth.* ix. p. 63. n. 104 (1819) ("Antilles and North America"); Oberth., *Bull. Soc. Ent. France* p. 176. fig. 4 (1897).

Papilio tecmenes (!), Lacordaire, *Ann. Soc. Ent. Fr.* ii. p. 384 (1833).

Papilio aristodemus, Boisduval, *l.c.* (1836) (= *temenes*); Poey, *Mem. R. Soc. Econ. Habana* p. 235 (1846); Lucas, in Sagra, *Hist. Cuba* vii. p. 206. t. 16. fig. 2. 2a (1857) (*partim*; Cuba); Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 174. n. 12 (1864) (Cuba).

Papilio daphnis Gray, *l.c.* (*partim*); Felder, *l.c.* xiv. p. 309. n. 290 (1864) (*partim*; Cuba).

Papilio cresphontinus, Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 173 (1846) (= *temenes*); Kirby, *Cat. Diurn. Lep.* p. 542. n. 158 (1871) (*partim*); Gundl., *Contr. Ent. Cuba.* p. 130 (1881) (*partim*; Cuba); id., *Papilio* i. p. 113 (1881) (Cuba).

This form has always been treated as being identical with the Haiti form until Mons. Charles Oberthür, *l.c.*, pointed out the differences.

♂♀. Forewing: discal band broad, of nearly even width from R^2 to hind-

margin, about as broad as the cell is wide at M^2; a row of five to seven submarginal spots.

Hab. Cuba.

In the Tring Museum 1 ♂, 2 ♀♀, from: Gibara (Tollin); Cuba (Gundlach).

b. P. aristodemus aristodemus Esp. (1794).

Papilio Eques Achivus aristodemus Esper, *l.c.*

Papilio aristodemus, Boisduval, *l.c.* (*partim*): Doubl., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 4 (1848) (Haiti?); Dewitz, *Stett. Ent. Zeit.* xxxviii. p. 234. n. 2 (1877) (Porto Rico, common, Aug. Sept.); Oberth., *Et. d'Ent.* iv. p. 70. n. 207 (1880) (Haiti).

Papilio daphnis, Gray, *ll.cc.* (*partim*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 290 (1864) (*partim*; Haiti).

Papilio cresphontianus, Martyn, *l.c.* (inedit.); Kirby, *Cat. Diurn. Lep.* p. 542. n. 158 (1871) (*partim*); Möschl., *Abh. Senkenb. Nat. Ges.* xvi. p. 91. n. 2 (1886) (= *aristodemus*; Porto Rico; common); Gundl., *An. Hist. Nat. Madrid* xx. p. 114. n. 2 (1891) (Porto Rico).

♂♀. Band of forewing much narrower than in the previous subspecies, interrupted at the veins; a row of four submarginal spots, the row much more curved than in *temenes*, spots R^2—(SM^1) standing farther away from the edge of the wing than in the Cuban form.

Hab. Haiti.

In the Tring Museum 5 ♂♂, 1 ♀ from Haiti.

73. **Papilio andraemon** Hübn. (1818— ?).

Heraclides andraemon Hübner, *Samml. Exot. Schmett.* ii. t. 98. ♂, 99. ♀ (1818—?).

Papilio andraemon, Boisduval, *Spec. Gén. Lép.* i. p. 343. n. 183 (1836) (Cuba); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845) ("Honduras" error loci); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 24. n. 108 (1852) ("Honduras" false); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 32. n. 115 (1856) ("Hondnras" false); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) ("West Indies," "Centr. Amer."); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 243 (1893) (occurrence in Mexico and Honduras requires confirmation).

♂♀. Club of antenna for the greater part yellow beneath in male, also in female partly yellow or at least tawny. On *upperside* of wings a nearly straight yellow band from apex of forewing to abdominal margin of hindwing, the cross-veins of the hindwing being within the band; a bar across cell of forewing at point of origin of R^3 and a short band from base of subcostal fork to costal margin also yellow, contiguous with the discal band.——Hindwing very strongly toothed, tooth M^1 long; tail spatulate, bearing a yellow central spot near apex.

Underside of hindwing washed with yellow from base to yellow discal band, this band deeply crenate distally, being followed by a broad black band bearing a row of blue spots; a large tawny patch R^3—M^1 proximally of the black band often preceded and followed by a small tawny spot.

Genitalia: ♂. Tenth tergite narrow, spatulate; sternite feebly chitinised, without distinct lateral process, bearing only an obtuse double ridge; harpe broad, somewhat scythe-shaped, dentienlate distally, produced ventrally into a long acute conical process directed downwards and inclining a little basad.——♀. Edge of vaginal orifice raised into a transverse rounded lobe; behind the orifice a small rounded tubercle covered with extremely small hairs; at each side a very large non-dentate lobe which is anteriorly connected with the vaginal lobe by means of a low folded ridge.

Early stages described by Gundlach, *l.c.*: see *P. a. andraemon*.

Hab. Cuba; Bahamas; Great Cayman.

Three subspecies.

a. P. andraemon andraemon Hübn. (1818?—).

Heraclides andraemon Hübner, *l.c.*; Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 96. t. 311. fig. 1. 2. t. 312. fig. 3. 4 (190—?) (Cuba; "Mexico, Guatemala," false).

Papilio andraemon, Boisduval, *l.c.*; Poey, *Mem. R. Soc. Econ. Habana* p. 235 (1846); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 87 (1846) (Cuba; "Honduras" false); Lucas, in Sagra, *Hist. Cuba* vii. p. 203 (1857); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 68. n. 1115 (1857) ("Honduras" false); Vollenh., *Tijdschr. Ent.* iii. p. 85. n. 132 (1860) (Cuba); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 287 (1864) (Cuba; "Mexico and Honduras" false); Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 172. n. 1 (1864) (Cuba); Kirby, *Cat. Diurn. Lep.* p 542. n. 161 (1871) (Cuba; "Mexico" false); Oberth., *Et. d'Ent.* iv. p. 69. n. 205 (1880) (Cuba); Gundl., *Contr. Ent. Cuba.* p. 128 (1881) (larva and pupa descr.); id., *Papilio* i. p. 113 (1881) (Cuba); Haase, *Unters. Mimicry* i. p. 95 (1893) (Cuba; "Mexico and Honduras" false)

♂♀. Forewing without submarginal spots, or the last one or two vestigial; yellow discal band as broad (or nearly) as the black marginal area.

Hab. Cuba.

In the Tring Museum 14 ♂♂, 9 ♀♀, from: Holquin (Tollin); Cuba (Gundlach).

b. P. andraemon bonhotei Sharpe.

Papilio bonhotei Sharpe, *Proc. Zool. Soc. Lond.* p. 201. t. 19. ♂♀ (1900) (Nassau).

♂♀. Yellow markings paler than in the previous; discal band much narrower; forewing with a variable number of thin submarginal spots on upperside.

Hab. Bahamas: Nassau.

In the Tring Museum 5 ♂♂, 3 ♀♀ from Nassau.

c. P. andraemon tailori subsp. nov.

♂♀. Discal band as broad as in the Cuban form; bar across cell of forewing vestigial above, while it is wider below than in the Cuban form; black antemedian band of underside of forewing more curved, and black discal patches of hindwing smaller than in *P. a. andraemon*.

Genitalia: ♂. Harpe much narrower than in Cuba specimens.

Hab. Great Cayman Island.

One pair in the Tring Museum, collected in April 1896 by Mr. Taylor.

74. Papilio machaonides Esp. (1796).

Papilio Eques Achivus machaonides Esper, *Ausl. Schmett.* p. 191. n. 86. t. 46. fig. 2 (1796) (Port au Prince).

Papilio lycoraens Godart, *Enc. Méth.* ix. p. 63. n. 105 (1819) (America); Ménétr., *Nouv. Mém. Soc. Imp. Moscou* iii. p. 116. n. 2. (1832) (Haiti).

Papilio lycoroeus (!), Lucas, *Lép. Exot.* p. 34. t. 18. fig. 1. (1835).

Papilio machaonides, Boisduval, *Spec. Gén. Lép.* i. p. 344. n. 184 (1836) (Haiti; = *lycoraeus*); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 86 (1846) (Haiti); Doubl., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 4 (1848) (Haiti); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 24. n. 107 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 31. n. 114 (1856) (Haiti); Lucas, in Sagra, *Hist. Cuba* vii. p. 206 (1857) ("Habana" false); Ménètr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 2. n. 29 (1857) (Haiti); Vollenh., *Tijdschr. Ent.* iii. p. 85. n. 134 (1860) (Haiti); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) ("West Indies"); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 289 (1864) (S. Domiugo; "Cuba" false); Kirby, *Cat. Diurn. Lep.* p. 542. n. 159 (1871) ("Antilles"); Oberth., *Et. d'Ent.* iv. p. 70. n. 206 (1880) (Haiti); Haase, *Untersu h. Mimicry* i. p. 94 (1893).

♂♀. An interrupted discal band on forewing; the posterior portion of the band continuous with a broad cell-bar; upper portion of band extending from costal margin to R^2; a complete series of submarginal spots, the first spot

corresponding to the first spot of the so-called discal band of *P. thoas* and *P. andraemon*.

Underside of hindwing yellow from base to middle of disc; no tawny or red spots at apex of cell.

Genitalia: ♂. Tenth tergite narrow, long, spatulate; sternite feebly chitinised, with a small double ridge on each side; harpe narrow, ending in a long point, angulate dorsally before middle, bearing a few teeth at the edge distally of this angle, there being also a small tooth at the ventral edge near base.——♀. Anterior edge of vaginal orifice raised into a longitudinal tubercle accompanied on each side by a fold; these folds diverging laterad, each bearing on the inner side a long, narrow process armed with a few small thornlike teeth; behind the orifice a glossy, rounded tubercle clothed with extremely small hairs.

Early stages not known.

Hab. Haiti.

So far this fine species has not been found on the other West Indian islands, where it appears to be replaced by *P. andraemon*, which does not occur on Haiti.

In the Tring Museum 4 ♂♂, 2 ♀♀, from Haiti.

75. **Papilio thersites** Fabr. (1775).

♂. *Papilio Eques Achivus thersites* Fabricius, *Syst. Ent.* p. 453. n. 43 (1775) (America; mus. Hunter): Goeze, *Ent. Beytr.* iii. 1. p. 73. n. 9 (1779); Fabr., *Spec. Ins.* ii. p. 18. n. 68 (1781); id., *Mant. Ins.* ii. p. 9. n. 78 (1787); Gmelin, *Syst. Nat.* i. 5. p. 2238. n. 313 (1790); Fabr., *Ent. Syst.* iii. 1. p. 30. n. 88 (1793).

♀. *Papilio Eques Achivus palamedes* Fabricius (*non* Drury, 1770), *Syst. Ent.* p. 454. n. 45 (1775) (America; mus. Hunter); Goeze, *Ent. Beytr.* iii. 1. p. 73. n. 11 (1779) (*partim*); Fabr., *Spec. Ins.* ii. p. 18. n. 73 (1781); id., *Mant. Ins.* ii. p. 10. n. 84 (1787); Jabl. & Herbst, *Naturs. Schmett.* iii. p. 141. sub n. 94 (1788); Gmelin, *Syst. Nat.* i. 5. p. 2239. n. 320 (1790).

♀. *Papilio Eques Trojanus acamas* Fabricius, *Ent. Syst.* iii. 1. p. 8. n. 22 (1793) (Jamaica; Drury).

♀. *Papilio Nymphalis palamedes* id., *Ent. Syst.* iii. 1. p. 68. n. 213 (1793).

♀. *Papilio acamas*, Godart, *Enc. Méth.* ix. p. 42. n. 50 (1819); Donov., *Nat. Repos., Ent.* ii. t. 18 (1823); Boisd., *Spec. Gén. Lép.* i. p. 360. n. 203 (1836) (Jamaica); Doubl., *List Lep. Ins. Brit. Mus.* i. 2. p. 17 (1845) (Jamaica?); id., Westw. & Hew., *l.c.* p. 17. n. 176 (1846) (Jamaica).

♀. *Papilio palamedes*, Godart, *l.c. Suppl.* p. 812. n. 133-4 (1824); Boisd., *l.c.* p. 359. n. 202 (1836 (= *pirithous*?); Doubl., Westw. & Hew., *l.c.* p. 21 (1847); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 72 (1852) (doubtful species); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 85 (1856).

♂. *Papilio thersites*, Donovan, *Nat. Repos., Ent.* ii. t. 24 (1823); Boisd., *l.c.* p. 353. n. 195 (1836); Doubl., Westw. & Hew., *l.c.*, p. 17. n. 166 (1846); Doubl., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 4 (1848) (Jamaica).

♂♀. *Papilio thersites*, Hewitson, *Trans. Ent. Soc. Lond.* (2). i. p. 97 (1851) (♂ of *acamas*); Doubl., Westw. & Hew., *l.c.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. n. 191 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 200 (1856) (Jamaica); Lucas, in Sagra, *Hist. Cuba* vii. p. 205 (1857) (Jamaica; "Cuba" false); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) ("West Indies"); Kirby, *Cat. Diurn. Lep.* p. 539. n. 149 (1871) ("Antilles"); Butl., *Proc. Zool. Soc. Lond.* p. 481. n. 38 (1879) (Jamaica); Oberth., *Et. d'Ent.* iv. p. 71. n. 213 (1880) (Jamaica); Haase, *Untersuch. Mimicry* i. p. 97 (1893) ("Antilles"); Towns., *Journ. Inst. Jamaica* i. p. 376 (1893) (larva); Fox & Johns., *Ent. News* iv. p. 3 (1893) (Jamaica); Robins., *ibid.* xiv. p. 20 (1903) (Jamaica).

♂♀. *Papilio acamas*, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 310 (1864) (*partim*; Jamaica); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 246. n. 45 (1869) (types of *palamedes* Fabr. *non* Drury, and *thersites* in the Hunterian coll. at Glasgow).

♂♀. Close to *P. lycophron*. The male is easily recognised by the great width of the yellow band of the forewing, the prolongation of the cell-patch halfway down to base and the absence of submarginal spots from the upperside of the forewing. In the female there is a curved yellow band on the forewing; the submarginal

spots of the hindwing are large on the underside, being usually merged together with the marginal spots.

Genitalia: similar to those of *P. lycophron*. Rasplike ridge of harpe raised, forming a narrow process which is rounded at the apex.

The caterpillar closely resembles that of *P. androgeus*.

Hab. Jamaica.

In the Tring Museum 8 ♂♂, 2 ♀♀ and 1 larva.

76. **Papilio ornythion** Boisd. (1836).

♂. *Papilio ornythion* Boisduval, *Spec. Gén. Lép.* i. p. 354. n. 197 (1836) (Yucatan); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i p. 17. n. 171 (1846); Gray, *Cat. Lep. Ins. Brit, Mus.* i. *Pap.* p. 39. n. 195 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 54. n. 205 (1856); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 293 (1864); Kirby, *Cat. Diurn. Lep.* p. 541. n. 156 (1871); Burm., *Descr. Rép. Argent.* v. *Lép.* p. 58. n. 3 (1878) (var. of *thoas*); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 227. n. 57. t. 69. fig. 7. 8. ♂ (1890) (fig. of type); iid., *l.c.* p. 729 (1901) (Coatepec; Guatemala).

♂. Close to *P. lycophron pallas*. Yellow band narrow, no spot in cell of forewing; on *underside* of forewing an additional row of linear spots between the discal band and the submarginal spots; blue spots on *underside* of hindwing large.

♀. Yellow markings of *upperside* vestigial.——*Underside*, forewing: a row of submarginal spots; ill-defined streaks between costal margin and R^2, from which two postdiscal spots SC^3—SC^5 are separated; a series of minute postdiscal spots from SC^5 to M^1; yellow cell-streaks vestigial.——Hindwing: submarginal patches large, blue crescents larger than in *P. l. pallas*; tail as long as in male, slightly spatulate.

Genitalia of male as in *P. l. pallas*.

Hab. Yucatan; West Mexico; Guatemala.

In the Tring Museum 1 ♂, 1 ♀, from Guadalajara.

77. **Papilio lycophron** Hübn. (1818—?).

Seba, *Thesaur.* p. 13. t. 8. fig. 17. 18. ♀ (1764) ("India").

♂. *Heraclides lycophron* Hübner, *Samml. Exot. Schmett.* ii. t. 100 (1818—?).

♂. *Papilio astyalus* Godart, *Enc. Méth.* ix. p. 62. n. 102 (1819) (Brazil).

♀. *Papilio pirithous* Boisduval, *Spec. Gén. Lép.* i. p. 358. n. 201 (1836) (Uruguay; "Cuba" error loci).

♂♀. Closely agreeing with *P. androgeus* in structure. Submarginal spots on *underside* of forewing larger, those of hindwing much larger above and below; tail usually somewhat spatulate, teeth R^2 and M^1 short.——♀ dichromatic in some districts.

Genitalia nearly the same as in *P. androgeus*, geographically variable, while they are not geographically variable in *P. androgeus*; rasplike ridge of harpe more dorso-ventral in direction than in *P. androgeus*, sometimes developed to a process. ——♀. Lateral dentate lobe of vaginal cavity narrower at base and wider at apex than in *P. androgeus*.

Larva similar to that of *P. thoas*, more strongly marmorated, the patches yellow.

Pupa slenderer than in *P. thoas*, the thoracic tubercle longer. On *Citrus*.

Hab. Mexico southward to Argentina and Uruguay; Santa Lucia.

We are not sure that Hübner's name has priority over that of Godart.

The Santa Lucia specimens recorded by Miss Sharpe (*Proc. Zool. Soc. Lond.* 1901. p. 223), if belonging to this species, represent doubtless a distinct subspecies.

Boisduval, *l.c.*, records a form of this species from Cuba under the name of *P. pirithous* Roger, several other authors (Doubleday, Lucas, Felder, Kirby, etc.) following suit. Gundlach (1881) rejects the species as Cuban. There is indeed no evidence that a form of *P. lycophron* occurs on that island, though Lucas (1857) records not only *P. thersites*, but also two forms of the present species from there—namely, *pirithous* and *lycophron*, the latter being stated to be common on the island. The mistake began with Boisduval, who mistook some South American females of *P. lycophron* for Roger's "Papillon pirithous." This "Papillon pirithous" being from Cuba, the locality of specimens erroneously identified as *pirithous* was accepted to be also Cuba. The description given by Roger has doubtless never been carefully read, since nobody appears to have noticed that it is a description of the male of *P. caiguanabus!*

It is quite possible that a form allied to *P. thersites* or *P. lycophron* will be discovered on Cuba or Haiti.

Seba's figure, *l.c.*, represents doubtless a form of the present species. However, we have not seen a specimen agreeing with the figure. Seba's type came possibly from Surinam.

a. P. lycophron pallas Gray (1852).

♂ ♀. *Papilio oebalus*, Gray (*non* Boisd., 1836, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 193. t. 6. fig. 1. ♂ (1852) (Mexico); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 53. n. 203 (1856); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 311 (1864) (Mexico); Kirby, *Cat. Diurn. Lep.* p. 539. n. 148 (1871) (Mexico; cit. Boisd. excl.); Oberth., *Et. d'Ent.* iv. p. 71. n. 212 (1880); Staud., *Exot. Tagf.* p. 16 (1884); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 225. n. 56. t. 69. fig. 5. 6. ♀ (1890) (Mexico to Costa Rica); Winkle, *Canad. Ent.* xxv. p. 212 (1893) (only in Mexico).

♂. *Papilio pallas* Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (*nom. nud.*; Oajaca); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 168 (1846) (*nom. nud.*; Mexico); Hewits., *Trans. Ent. Soc. Lond.* (2). i. p. 97 (1851) (*partim*); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 193. t. 6. fig. 1. ♂ (1852) (sub synon.)

Papilio lycophron, Butler & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 379 (1874) (Costa Rica).

♂. Forewing with a row of submarginal spots on *upperside*, marginal spots also distinct, band more cut up than in the South American forms, the veins SC^5, R^1, R^2, R^3 being more broadly black, the central patches of the band more or less rounded distally.——Tail variable, apparently more obtuse in Eastern Mexico than in other localities, and in the same district the black distal area of the hindwing more extended both above and below.

♀. Forewing more uniformly brown-black than in South American specimens; some buff dots distally of apex of cell; submarginal spots SC^3—SC^5, or at least the first, absent.——Hindwing: tail short, sometimes only a little more projecting than the other teeth; three rows of spots, two inner rows often more or less confluent, spots of proximal row either all red or at least the last spot, second row more distinct than in South American females, and third row nearer the margin.

On *underside* a buff band on forewing from costal margin to M^1 or SM^2, consisting of rather well-defined spots.

Genitalia: ♂. Rasplike ridge of harpe at right angles to the dorsal edge of the harpe.

Hab. Mexico to Costa Rica.

In the Tring Museum 18 ♂♂ from: Mexico; San Pedro Sula, Honduras.

A series of 8 ♀♀, besides males, from San Pedro Sula in coll. Oberthür.

b. P. lycophron hippomedon Feld. (1859).

♂. *Papilio hippomedon* Felder, *Wien. Ent. Mon.* iii. p. 393. n. 34 (1859) (hab. ?); id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 309 (1864) (Venezuela).

♂. *Papilio polycaon* var., or nov. spec., Vollenhoven, *Tijdschr. Ent.* iii. p. 86. n. 142a (1860) (Bogota).

♂. *Papilio theophron* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 308 (1864) (*nom. indescr.*; Bogota); id., *Reise Novara, Lep.* p. 76. n. 59 (1865); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 237 (1880) (Sta. Marta); Hahnel, *Iris* iii. p. 201 (1890) (Valera, Venez.).

♂. *Papilio lycophron* var b. *P. theophron* Kirby, *Cat. Diurn. Lep.* p. 540. sub n. 150 (1871) (New Granada).

♂. *Papilio lycophron* var. c. *P. hippomedon*, id., *l.c.* (Venezuela).

♂. *Papilio lycophron*, Hahnel, *l.c.* p. 201 (1890) (Valera); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 11. n. 40 (1890) (Colombia).

♂. A small form, differing from the Brazilian subspecies especially in the hindwing being more rounded, in the submarginal spots of the same being smaller and standing much nearer the edge of the wing, and in the tail being short and slender.

Genitalia: ♂. Rasplike ridge of harpe extending in the same direction as the upper edge of the harpe, being longitudinal, not transverse in direction, and being moreover somewhat angulate.

♀ not known.

Hab. Colombia and Northern Venezuela.

In the Tring Museum 8 ♂♂ from: "N. Granada"; Venezuela.

c. P. lycophron phanias subspec. nov.

♂. *Papilio lycophron*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 347 (1861) (Cametá, Tocantins); id., *Journ. Entom.* i. p. 228. n. 26 (1862); Dognin, *Lép. Loja* p. 15 (1867); id., *l.c.* p. 37 (1891); Weeks, *Illust. Diurn. Lep.* p. 20 (1905) (Cbulumani).

Papilio theophron, Hahnel, *Iris* iii. p. 283 (1890) (Pebas); Michael, *ibid.* vii. p. 213 (1894) (Sao Paulo de Olivença).

♂. Larger than *P. l. hippomedon*.——Forewing: band more broken anteriorly than in *P. l. lycophron*, and the cell-spot on the whole smaller; spot SC^3—SC^4 absent from nearly all specimens.——Hindwing more strongly dentate than in *P. l. hippomedon*, rather shorter posteriorly than in *P. l. lycophron*; submarginal spots almost in the same position as in *l. hippomedon*, being smaller and more distal than in *P. l. lycophron*.

Underside, forewing: submarginal spots linear, smaller than in *l. lycophron*, costal margin at apex and veins SC^3 to R^2 more extended black-brown.——Hindwing: black discal area bearing the rufous red and the blue spots on the whole larger than in *hippomedon* and *lycophron*; yellow submarginal spots all separated, the last three or four smaller than in the other South American forms; black marginal border a little wider than in *hippomedon*, but narrower than in the specimens of *lycophron*, in which the submarginal spots are not strongly enlarged.

♀. Only one specimen known to us, resembling the dark form of ♀ *P. l. lycophron*.

Upperside: forewing black-brown from base to apex of cell, then paler, some small ill-defined yellow spots around apex of cell; vestiges of yellow submarginal

spots in posterior half.——Hindwing strongly dentate, tail slender, non-spatulate, the specimen resembling in this respect *P. androgeus*; submarginal spots much closer to margin than in *l. lycophron*, buff, posterior ones slightly greenish, all shaded with black.

Underside.—Forewing: no distinct cell-patch; a row of small creamy buff spots around apex of cell, the row continued on disc by a triangular spot R^3—M^1, this being the largest of all, being about as long as broad, upon which follows a small indistinct double-spot M^1—M^2; a row of submarginal spots from SC^5 to SM^2, proximally of which there is a thin interrupted line disappearing anteriorly; between discal spots and apex of wing there are hardly any buff scales.——Hindwing: submarginal spots less strongly curved than in *l. lycophron*, much nearer the margin, the black marginal border being between the veins half the width of the spots or less; interspace between submarginal and rufous red discal spots about three times the width of the submarginal spots, first spot excepted; white fringe nearly continuous, being narrowly interrupted at the veins.

Genitalia as in *P. l. hippomedon.*

Hab. Eastern Ecuador (type) to Bolivia and Matto Grosso, eastwards to Pará and the Orinoco.

In the Tring Museum 48 ♂♂, 1 ♀, from: Snapure, Caura R., Orinoco, March 1899 (S. M. Klages); La Union, Caura R., August 1901 (Klages); Itaituba; Zamora (O. T. Baron); R. Cachyaco, affluent of R. Huallaga (Stuart); R. Chuchuras, affluent of R. Palcazu, 320 m. (W. Hoffmanns); Peréné, 3000 ft., October—November 1903 (Watkins); Mapiri; Reyes, August 1895 (Stuart); Villa Maria to Diamantino, Matto Grosso, January 1897 (Andeer).

d. P. lycophron lycophron Hübn. (1818— ?)

♂. *Heraclides lycophron* Hübner, *Samml. Exot. Schmett.* ii. t. 100 (1818–?).

♂. *Papilio astyalus* Godart, *Enc. Méth.* ix. p. 62. n. 102 (1819) (Brazil); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (= *thersites* ?; Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 62 (1857) (Brazil).

♂. *Papilio mentor* Dalman, *Anal. Ent.* p. 37. n. 2 (1823) (Brazil ?).

♂. *Papilio lycophron*, Boisduval, *Spec. Gén. Lép.* i. p. 352. n. 194 (1836) (Brazil; "♀ resembles ♂" false; var. A. alia species = *himeros*); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 167 (1846).

♂ ♀. *Papilio lycophron* Hewitson, *Trans. Ent. Soc. Lond.* (2). i. p. 97 (1851) (♂ of "*perithous*"); Doubl, Westw. & Hew., *l.c.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. n. 192 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 53. n. 201 (1856) (Brazil); Lucas, in Sagra, *Hist. Cuba* vii. p. 206 (1857) ("Cuba" error loci); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 306 (1864) (Brazil; Uruguay.—"Amazonia inf." alia subsp.); Kirby, *Cat. Diurn. Lep.* p. 540. n. 150 (1871) (var. b and c excl.); Burm., *Descr. Rép. Argent.* v. *Lép.* p. 60. n. 3 (1878) (*partim*; Corrientes; Buenos Aires); id., *l.c. Atlas* p. 5. n. 5 (1879); Gosse, *Entom.* xiii. p. 194 (1880) (Corrientes); Oberth., *Et. d'Ent.* iv. p. 70. n. 211 (1880) (Brazil); Honr., *Berl. Ent. Zeit.* xxxii. p. 500. fig. B (1888) (gynandromorphous specimen; Sao Paulo); Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 12 (1895) (Rio Grande do Sul); Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 26 (1896) (Sa. Theresa); Lathy, *Trans. Ent. Soc. Lond.* p. 69. n. 38 (1904) (a ♂ without submarg. spots on upperside of bindwing).

♀. *Papilio pirithous* Boisduval, *l.c.* p. 358. n. 201 (1836) (Urugnay; "Cuba" false;—"Papillon pirithous Roger" alia spec. = *caiguanabus*); Doubl., Westw. & Hew., *l.c.* i. p. 17. n. 175 (1846) (Uruguay; "Cuba ?" error loci); Ménétr., *l.c.* p. 4. n. 64 (1857 ("Cuba" false).

♀. *Papilio ocbalus* Boisduval, *l.c.* p. 360. n. 204 (1836) (hab.?); Doubl., Westw. & Hew., *l.c.* i. p. 17. n. 177 (1846) (S. America); Hewits., *Trans. Ent. Soc. Lond.* (2). i. p. 97 (1851) (= ♀ of *pallas* ?); Kirby, *l.c.* p. 539. n. 148 (1871) (*partim*).

Papilio drepanon Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 53. n. 202 (1856) (*nom. nud.*; Rio Grande do Sul—doubtless a ♀ of *lycophron*).

Papilio licophron (!), Hewitson, *l.c.* p. 97 (1851) (Brazil) ; Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 49 (1896)

Papilio perithous (!), Hewitson, *l.c.* (sub synon.).

♂♀. *Papilio pyrithous* (!), Lucas, in Sagra, *Hist. Cuba* vii. p. 267 (1857) ("Cuba" false) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 307 (1864) ("Cuba" false).

♀. *Papilio lycophron* var. a. *P. pirithous*, Kirby, *Cat. Diurn. Lep.* p. 540. sub n 150 (1871) ("Cuba" error loci).

♂. *Calaides lycophron*, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 97. t. 313. fig. 1. 2 (190—?).

♂. *Upperside*, forewing : submarginal spots often present ; subapical spots SC^3—SC^4 seldom absent ; veins SC^4 to R^2 narrowly black.——Hindwing : submarginal spots variable in size, but their centres always farther away from margin than in the other South American subspecies.

Underside, forewing : submarginal spots usually large, often joined to the marginal spots.——Hindwing : extent of black discal area very variable, often hardly any black scaling left ; submarginal spots large, contiguous, sometimes joined to the marginal spots, but in most specimens the black marginal border continuous and broader than in *P. l. hippomedon* and *phanias* ; occasionally some yellow scaling in centre of tail.

♀. Dichromatic.

a'. ♀-f. *oebalus* Boisd., *l.c.*——Hindwing from near base to black discal band pale creamy buff, this colour extending on to forewing as far as cell, there being a spot of the same colour in the apex of the cell ; in the palest specimens the buffish band reaching to costal margin.

b'. ♀-f. *pirithous* id., *l.c.*——Both wings almost uniformly brown above, with a row of pale buff submarginal spots, which are often much shaded with brown.

Hab. Brazil ; Paraguay ; Argentina.

A common insect.

In the Tring Museum : 100 ♂♂, 34 ♀♀ and some larvae and pupae from : Tucuman (J. Steinbach ; P. Girard) ; Tapia, Tucuman (Baer) ; Sapucay, Paraguay (W. Foster) ; Patino Cué, February (Montforts) ; Yhu, Paraguay, September—December 1896 (Andeer) ; Corrientes ; Blumenau ; S. Catharina ; Castro, Parana (E. D. Jones) ; S. Paulo ; Rio de Janeiro ; Espiritu Santo ; Minas Geraës ; Bahia.

78. Papilio androgeus Cram. (1775).

Merian, *Ins. Surinam.* t. 31 (1705) (♂, ♀, larva, pupa).

♂. *Papilio Eques Trojanus androgeus* Cramer, *Pap. Exot.* i. p. 24. t. 16. fig. C. D (1775) (Surinam).

Papilio (*orestes*), Meerburgh, *Afb. Zeldz. Gew.* t. 26. 30. ♂ (1775).

♂. *Papilio Eques Achivus polycaon* Cramer, *l.c.* iii. p. 17. t. 203. fig. A. B (1779) (Surinam).

♀. *Papilio Eques Achivus piranthus* Cramer, *l.c.* iii. p. 18. t. 204. fig. A. B (1779) (Surinam).

Papilio Eques Trojanus amosis, Stoll, in Cramer, *l.c. Suppl.* p. 1. t. 1. fig. 1 A. B. larva, pupa (1787) (this species ?).

♂♀. *Papilio polycaon*, Boisduval, *Spec. Gén. Lép.* i. p. 361. n. 205 (1836) (= *androgeus* = *pyranthus* ! = *laodocus*) ; Haase, *Untersuch. Mimicry* i. p. 97 (1893).

Papilio piranthous (!), Weidemeyer, *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (sub synon.).

♂♀. *Papilio androgeus*, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 312 (1864) (West Indies ; Central and South America) ; Hopff., *Stett. Ent. Zeit.* xl. p. 52. n. 21 (1879).

♂♀. *Papilio androgeos* (!), Kirby, *Cat. Diurn. Lep.* p. 539. n. 147^{bis} (1871) (South and Central America) ; Staud., *Exot. Tagf.* p. 15. t. 10. ♂♀ (1884) (Chiriqui ; Surinam ; Amazons ; Brazil).

♂♀. Sexes dissimilar in colour, the females being dichromatic in certain districts. Submarginal spots absent from upperside of forewing or vestigial, thin and linear on underside.——Hindwing : tail narrow, non-spatulate, teeth R^2

and M^1 usually somewhat produced, especially in female ; submarginal spots thin crescents on upperside ; on underside, proximally of the submarginal spots, a row of blue lunules, and proximally of these and parallel with them a row of rufous red crescents.

Genitalia : ♂. Tenth tergite spatulate. Clasper and harpe broad; the latter about two-thirds the length of the former, rounded at apex, bearing ventrally a long pointed conical process directed distad and reaching a little beyond the apex ; at dorsal margin of harpe an oblique ridge bearing numerous curved, conical, pointed teeth, forming a kind of rasp.——♀. Edge of vaginal orifice raised right and left into a rounded lobe, and proximally into a kind of smooth ridge which extends into the orifice, being narrowed posteriorly ; behind the orifice a membranaceous lobe or tubercle densely clothed with minute hairs : laterally of the orifice a broad brown flap bearing several acute teeth ; anal segment with a few short stout bristles on innerside.

Larva and pupa first figured by Merian, and later by Burmeister, Sepp, and others (see literature below). Both Sepp and Burmeister considered the caterpillar represented by Stoll, in Cramer, *Pap. Exot. Suppl.*, t. 1. fig. 1, to be that of the present species, not of *P. amosis* = *hyppason* as stated by Stoll. We are not sure that those authors were right. Stoll's figure bears distinct tubercles, such as are found in *P. epinetes* and allies, to which group *P. hyppason* belongs, while the adult caterpillar of *P. androgeus* has no distinct tubercles.

Hab. West Indies, Mexico southward to Paraguay and Parana, Brazil.

Three subspecies, which differ constantly only in the females.

a. P. androgeus epidaurus Godm. & Salv. (1890).

♂ ♀. *Papilio polycaon* var. b, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 36. sub n. 173 (1852) (Guatemala) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 48. sub n. 181 (1856) (*partim* ; S. Domingo ; Guatemala).

♂ ♀. *Papilio androgeus*, Felder, *l.c.* ; Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 172. n. 3 (1864) (Cuba) : Hopff., *l.c.* ; Gundl., *Papilio* i. p. 113 (1881) (Cuba) ; Möschl., *Abh. Senkenb. Nat. Ges.* xvi. p. 91. n. 1 (1891) (Porto Rico, ♀ *pirauthus*).

♂ ♀. *Papilio polycaon*, Poey, *Mem. R. Soc. Econ. Habana* p. 2346 (1846) (Cuba) ; Lucas, in Sagra, *Hist. Cuba* vii. p. 204 (1857) ; Bates, *Proc. Zool. Soc. Lond.* p. 242. n. 3 (1863) (Panama) ; Reakirt, *Proc. Ent. Soc. Philad.* ii. p. 137. n. 3 (1863) (syn. excl. ; Honduras) ; Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 380 (1874) (Costa Rica) ; Dewitz, *Stett. Ent. Zeit.* xxxviii. p. 233. n. 1 (1877) (Porto Rico, one ♀-form) ; Gundl., *Contr. Ent. Cuba.* p. 134 (1881) ; id., *An. Hist. Nat. Madrid* xx. p. 113. n. 1 (1891) (Porto Rico).

♂ ♀. *Papilio polycaon* var., Weidemeyer, *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (syn. excl. ; West Indies ; Central America).

Papilio pirauthus, Butler, *Proc. Zool. Soc. Lond.* p. 714 (1901) (Sta. Lucia).

Papilio androgeos (!), Staud., *Exot. Tagf.* p. 15 (1884) (*partim* ; Chiriqui).

♂ ♀. *Papilio epidaurus* Godman & Salvin, *Biol. Centr. Amer., Lep. Rhop.* ii. p. 224. n. 55. t. 69. fig. 1. 2. ♀, 3. genit. (1890) (Mexico to Panama ; S. Domingo).

♂. Yellow area of both wings on the whole more extended than in the South American forms ; the small patch in front of the subcostal fork of the forewing usually larger.

♀. Only one form known. Forewing with small yellow patches or vestiges of them around upper angle of cell, the patches larger below than above, forming a curved band ; no patch in cell or on disc, but there are sometimes some yellow scales in the apex of cell on underside.——Greenish blue scaling on disc of hindwing denser than in the other forms, the blue area being rather sharply defined proximally, entering cell.

Hab. Mexico to Panama; Cuba; Haiti; Santa Lucia.

The only S. Lucia specimen which we have seen (♂ in Brit. Mus.) has no black dorsal line on abdomen; the submarginal crescents of the hindwing are rather large.

In the Tring Museum 20 ♂♂, 6 ♀♀, from: Cuba; Haiti; Songolica, Mexico, June 1899 (W. Schans); Orizaba; Guatemala (Salvin); San Pedro Sula, Honduras; Costa Rica; Chiriqui; Bogava, Chiriqui, 800 ft. (Watson); Brava I., Cebaco I., and Parida I., January 1902 (Batty).

b. P. androgeus androgeus Cram. (1775).

Merian, *Ins. Surinam.* t. 31 (1705) (♂ ♀, larva, pupa); id., *l.c.* t. 67. ♀ (1719); Kleemann, *Beytr. Nat. Ins. Gesch.* i. p. 63. t. 8. fig. 1. 2. ♂, t. 9. fig. 1. 2. ♀ (1756); Seba, *Thesaur.* iv. p. 46. t. 38. fig. 13. 14. ♀, p. 47. t. 39. fig. 2. 3. ♂ (1764).

Papilio Eques Trojanus polydamas Linné, *Syst. Nat.* ed. x. p. 460. n. 11 (1758) (*partim*; citat. Merian t. 31); Fabr., *Syst. Ent.* p. 447. n. 22 (1775) (*partim*); id., *Ent. Syst.* iii. 1. p. 14. n. 42 (1793) (*partim*).

♀. *Papilio Eques Achivus glaucus*, Fabricius (*non* Linné, 1758, err. det.), *Syst. Ent.* p. 445. n. 14 (1775) (*partim*); Goeze, *Naturf.* ix. p. 76 (1776).

♀. *Papilio Eques Trojanus androgeus* Cramer, *l.c.*; Fabr., *Gen. Ins.* p. 251. n. 22-3 (1776); Goeze, *Ent. Beytr.* iii. 1. p. 43. n. 15 (1779); Fabr., *Spec. Ins.* ii. p. 8. n. 30 (1781); Jabl. & Herbst, *Natur. Schmett.* ii. p. 105. n. 29. t. 11. fig. 2. 3, t. 12. fig. 1 (1784) ("Merian's t. 31. erroneously quoted by Linné and Fabricius under *polydamas*"); Fabr., *Mant. Ins.* ii. p. 4. n. 32 (1787); Gmelin, *Syst. Nat.* i. 5. p. 2231. n. 290 (1790); Jung, *Alphab. Verz. Schmett.* p. 35 (1791); Fabr., *Ent. Syst.* iii. 1. p. 15. n. 43 (1793); Esper, *Ausl. Schmett.* p. 138. n. 63. t. 36. fig. 1 (1798).

♂. *Papilio Eques Achivus polycaon* Cramer, *l.c.* iii. p. 17. t. 203. fig. A, B (1779) (Surinam); Fabr., *Spec. Ins.* ii. p. 19. n. 78 (1781); id., *Mant. Ins.* ii. p. 10 n. 89 (1787); Jabl. & Herbst, *l.c.* iii. p. 133. n. 92. t. 41. fig. 1. 2 (1788) (larva excl.); Gmelin, *l.c.* p. 2236. n. 307 (1790); Fabr., *Ent. Syst.* iii. 1. p. 33. n. 96 (1793); Esper, *Ausl. Schmett.* p. 200. n. 91. t. 49. fig. 2 (1798).

♀. *Papilio Eques Achivus piranthus* Cramer, *l.c.* iii. p. 18. t. 204. fig. A. B (1779) (Surinam).

♀. *Papilio Eques Achivus peranthus* (!), Jablonsky & Herbst, *Natur. Schmett.* ii. p. 111. n. 30. t. 12. fig. 2 (1784); Esper, *Ausl. Schmett.* p. 81. n. 36. t. 20. fig. 1. 2 (1788) (Surinam; Cayenne).

♀. *Papilio Eques Trojanus androgeus* β) *Papilio acanthus* Gmelin, *Syst. Nat.* i. 5. p. 2231. sub n. 290 (1790) (*laps. cal.*; *piranthus* ?).

♂. *Calaides polycaon*, Hübner, *Verz. bek. Schmett.* p. 86. n. 891 (1818 ?).

♀. *Calaides androgeus*, id., *l.c.* n. 892 (1818 ?).

♀. *Calaides piranthus*, id., *l.c.* n. 893 (1818 ?); id., *Samml. Exot. Schmett.* ii. t. 110 (1822 ?); Kirby, *ibid.*, ed. ii. p. 98. t. 323. fig. 3. 4 (190—?) (liter. and habitat *partim*).

♂. *Papilio polycaon*, Godart, *Enc. Méth.* ix. p. 41. n. 48 (1819) (*partim*; Guyane).

♀. *Papilio androgeus*, id., *l.c.* ix. p. 41. n. 49 (1819) (*partim*; Guyane; = *laodocus* = *pyranthus* ! = *peranthus* = *glaucus*).

♂ ♀. *Papilio polycaon*, Boisduval, *Spec. Gén. Lép.* i. p. 361. n. 205 (1836) (*partim*; Guyane; = *androgeus* = *pyranthus* ! = *laodocus*); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 5 (1838) (♀ = *androgeus*); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 152 (1846) (*partim*; Guiana); Sepp, *Vlind. Surinam* iii. p. 147. 148 (1853) (larva, pupa, ♂ ♀); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons); Bates, *ibid.* (2). v. p. 346 (1861) (common in open places throughout the Amazon region); id., *Journ. Entom.* i. p. 228. n. 25 (1862) (common throughout the Amazons); id., *Natural. Riv. Amaz.* p. 52 (1864) (Pará, in street); Oberth., *Et. d'Ent.* iv. p. 72. n. 216 (1880) (Carare, Colombia; Cayenne; Santarem); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença).

♂ ♀, *Papilio androgeus*, Felder, *l.c.*; Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 238 (1880) (Sta. Marta).

♂ ♀. *Papilio androgeos* (!), Kirby, *Cat. Diurn. Lep.* p. 539. n. 147bis (1871) (*partim*); Druce, *Proc. Zool. Soc. Lond.* p. 246. n. 14 (1876) (Peru: Huasampilla, 10,000 ft.); Staud., *Exot. Tagf.* p. 15. t. 10. ♂ ♀ (1884) (*partim*; Amazons); Hahnel, *Iris* iii. p. 194 (1890) (Mérida); id., *l.c.* p. 201 (1890) (Valera, Venez.); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 18. n. 30 (1890) (Magdalena valley, 800—1500 m.); Kaye, *Trans. Ent. Soc. Lond.* p. 207. n. 197 (1901) (Trinidad).

Papilio androgeas (!), Möschler, *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304 (1883) (Surinam).

♂. Usually deeper yellow than the Brazilian form ; the spots in front of cell of forewing, *upperside*, rather larger in the majority of specimens, and the submarginal bars of the *underside* mostly thinner ; black dorsal line of abdomen often vestigial, sometimes absent.

♀. Dichromatic.

a'. ♀-f. *androgeus* Cram., *l.c.*——Forewing : yellow patches R^2—M^1 of about equal length, occasionally a spot before R^2, patch R^3—M^1 often shaded with black ; greenish or greyish blue discal area of hindwing entering cell.

b'. ♀-f. *piranthus* id., *l.c.*——Forewing without yellow patches on *upperside*, sometimes vestiges of the patches on *underside*, rarely also on *upper* ; greenish or greyish blue discal scaling of hindwing rather diffuse, entering cell.

Hab. Colombia to Trinidad, the Guianas, Amazons, southward to Bolivia and western Matto Grosso.

In the Tring Museum 58 ♂♂, 25 ♀♀, from : R. Dagua, W. Colombia (Rosenberg); Pereira, Cauca; " Bogotá " ; Marawal, Trinidad, August 1891 ; Lower Orinoco, November 1897 (Cherrie) ; Temblador, Maripa, La Vuelta and La Union, Caura R., Orinoco, May, September and October (S. M. Klages) ; Essequibo R. ; Surinam ; Obidos (Mathan) ; R. Cachyaco, affluent of R. Huallaga (Stuart) ; Paramba, N.W. Ecuador, 3500 ft. (Flemming & Miketta) ; Cachabí, N.W. Ecuador (Rosenberg) ; R. Chuchuras, affluent of R. Palcazu, 320 m. (W. Hoffmanns) ; Peréné R., March 1900 (Simons) ; Pozuzo (W. Hoffmanns) ; Chanchamayo (Schunke) ; Cuzco, February 1901 (Garlepp) ; Caradoc, Marcapata R., February 1902, 4000 ft. (Ockenden) ; Mapiri R. ; Guanay, Mapiri, 1500 ft., August 1895 (Stuart) ; Yungas de la Paz, 1000 m., September 1899 (Garlepp) ; Prov. Sara, S. Cruz de la Sierra (J. Steinbach) ; Villa Maria to Diamantino, Matto Grosso, January 1897 (Andeer).

e. P. androgeus laodocus Fabr. (1793).

♀. *Papilio Eques Trojanus androgeus* Stoll (*non* Cramer, 1779, err. det.), in Cram., *Pap. Exot.* iv. p. 317. t. 350. fig. A, B (1781) (Brazil) ; Esper, *Ausl. Schmett.* p. 138. n. 63. t. 36. fig. 2 (1798) (*partim*).

♀. *Papilio Eques Trojanus laodocus* Fabricius, *Ent. Syst.* iii. 1. p. 8. n. 23 (1793) (*partim*).

♂. *Papilio polycaon*, Godart, *Enc. Méth.* ix. p. 41. n. 48 (1819) (*partim* ; Brazil).

♀. *Papilio androgeus*, id., *l.c.* p. 41. n. 49 (1819) (*partim* ; Brazil).

♀. *Papilio laodocus*, Donovan, *Nat. Repos., Ent.* ii. t. 130 (1823) (Brazil).

♂ ♀. *Papilio polycaon*, Ménétr., *Mém. Soc. Imp. Moscou* vii. p. 188. n. 4 (1829) (Brazil, larva); Boisduval, *l.c.* ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 152 (1846) (*partim* ; Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 35. n. 173 (1852) (Brazil) ; Lucas, in Chenu, *Enc. Hist. Nat., Pap.* p. 38. t. 6. fig. 2. ♂ (1851-3) (Brazil); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 48. n. 181 (1856) (*partim* ; Brazil) ; Lucas, *Bull. Soc. Ent. France* p. 25 (1857) (♀, aberration, Rio de Jan.) ; Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 4. n. 4. t. 2. fig. 2. larva (1879) ("the same as Stoll's t. 1. fig. 1") ; Gosse, *Entom.* xiii. p. 194 (1880) (Corrientes & Paraguay) ; Seitz, *Stett. Ent. Zeit.* li. p. 97 (1890) (Corcovado) ; Bönningh., *Verh. Ver. Nat. Unterhalt. Hamburg* ix. p. 26 (1896) (Rio de Janeiro).

♂. *Calaides polycaon*, Geyer, in Hübner, *Samml. Exot. Schmett.* iii. t. 26. fig. 1. 2 (1834) (Brazil).

♂ ♀. *Papilio androgeus*, Felder, *l.c.* ; Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 247. n. 46 (1869) (Brazil).

♂ ♀. *Papilio androgeos* (!), Kirby, *Cat. Diurn. Lep.* p. 539. n. 147[bis] (1871) (*partim*) ; Staud., *Exot. Tagf.* p. 15 (1884) (*partim* ; Brazil) ; Maas. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 91. n. 39 (1890) (S. Catharina?) ; Peters, *Illustr. Zeitschr. Ent.* ii. p. 51 (1897) (Nova Friburgo, larva on *Citrus*).

Calaides androgeus, Kirby, in Allen, *Nat. Lib., Butt.* ii. p. 283 (1897).

Calaides androgeos (!), id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 98. t. 464. fig. 1. 2 (190- ?) (liter. et hab. *partim*).

♂. Yellow band pale; the small spots standing in front of upper angle of cell of forewing reduced, being often absent. Length of streak in subcostal fork as variable as in the other forms; apex of cell of hindwing sometimes black. We have a curious ♂ (Sapucay, Paraguay) bearing patches of the colour of the ♀; the left clasper of this specimen is somewhat reduced.

♀. Monochromatic, the only form corresponding to *P. a. androgeus* ♀-f. *androgeus*. Forewing: yellow patch R^3—M^1 much larger than patch R^2—R^3, the latter being reduced distally; often a small patch M^1—M^2 present, standing behind the distal portion of patch R^3—M^1.——Hindwing: greenish blue scaling forming a band of patches which stands always separate from cell.

Hab. Brazil; Paraguay.

In the Tring Museum 48 ♂♂, 14 ♀♀, from: Sapucay, Paraguay, September to February (W. Foster); Yhu, Paraguay, September to December 1896 (Andeer); Castro, Parana (E. D. Jones); Bahuru, S. Paulo (Dr. Hempel); Rio de Janeiro; Petropolis (Foetterle); Nova Friburgo; Tijuca.

VI. Glaucus Group.

Cell of the hindwing (except *P. pilumnus*) enlarged, strongly asymmetrical, much broader between SC^2 and M^2 than in any other American species. Basal cellule of hindwing long. Fifth black band of forewing connected at costal margin with distal marginal border, forming a kind of C along the costal edge; a black median band on hindwing joining posteriorly the black abdominal border, the two bands forming a large V. Abdomen beneath striped with black and yellow. *P. pilumnus* stands somewhat isolated in this group. The other five species which belong here (*P. glaucus*, *rutulus*, *alexiares*, *eurymedon* and *daunus*) are very closely allied with one another. If these five insects inhabited separate districts there would be good reasons for treating them as subspecies of one species. But as *P. daunus*, *eurymedon* and *rutulus* occur together, and are known to be independent of each other, each breeding true, and *P. daunus* and *alexiares* are also found together (in Eastern Mexico at least, *alexiares* having a restricted range), these Papilios are certainly quite distinct. As further the morphological differences between these species are not more trenchant than those between any of these insects and *P. glaucus*, we must consequently treat *P. glaucus* also as a species independent of the others. That these Papilios are developments from the same ancestral form there can be no doubt.

The sexual armature is of the same type in those five species—resembling to a certain extent the genitalia of *P. lycophron* and *aristodemus*. The tenth tergite of the ♂ is long, being slightly spatulate; the sternite bears a small oblique double ridge at each side. The harpe is broad, being produced ventrally at the apex into a long conical pointed process; the oblique dorso-apical edge of the harpe is more or less dentate, being dorsally produced into a simple or a dentate hook which is curved anad.——♀. The edge of vaginal orifice is proximally raised into a long process which is more or less lanceolate; at each side of the orifice there is a large dentate flap and proximally of this flap two folds; behind the orifice there is a membranaceous tubercle or projection which is densely covered with minute hairs.

The larva bears an eye spot on each side of the third thoracic segment subdorsally, and a black transverse dorsal line on the fourth, this line not being present in *P. pilumnus*.

Key to the species.

a. Cell of hindwing nearly symmetrical	Species No. 84.
Cell of hindwing asymmetrical . . . . . ,	*b*.
b. The subapical costal ⊃-shaped spot of forewing below with sharply defined buff or yellow centre, the edges remaining pure black	*c*.
The ⊃-mark without sharply defined buff or yellow centre	*c*.
c. Tooth M^1 of hindwing long ; fourth black band of forewing narrower than the yellow apical cell-space (♂), or at least not wider (♀)	Species No. 81.
Tooth M^1 short	*d*.
d. Submarginal spots of underside of hindwing nearly all stained with orange, at least in centre	Species No. 79.
The last two spots orange, the other buff, or the first one also orange and the middle ones with a trace of orange	Species No. 83.
e. Ground-colour buffish white	Species No. 82.
Ground-colour yellow	Species No. 80.

79. Papilio glaucus L. (1758).

Mouffet, *Ins. Theatr.* p. 98. fig. (1634) ; Petiver, *Mus.* p. 50. n. 505 (1703) ; Rajus, *Hist. Ins.* p. 111. n. 2 (1710) ; Catesby, *Nat. Hist. Car., Flo., Bahama Is.* ii. t. 83 (1743).

♀. *Papilio Eques Trojanus glaucus* Linné, *Syst. Nat.* ed. x. p. 460. n. 9 (1758) (Amer. sept.) ; Clerck, *Icon. Ins.* ii. t. 24. fig. 1. ♀ (1764).

Papilio Eques Achivus ajax Linné, *Syst. Nat.* ed. x. p. 462. n. 26 (1758) (*partim* ; cit. *Raj. ins.* iii. n. 2).

♀. *Papilio Eques Achivus antilochus* id., *Syst. Nat.* ed. x. p. 463. n. 28 (1758).

♂. *Papilio Eques Achivus turnus* id., *Mant. Plant.* p. 536 (1771) (*partim*).

♂ ♀. *Papilio glaucus*, Kirby, *Cat. Diurn. Lep.* p. 565. n. 316 (1870) (= *antilochus* = *turnus* = *alcidamas*).

♂ ♀. *Papilio turnus*, Edwards, *Trans. Amer. Ent. Soc.* vi. p. 11. n. 17 (1877) (Atlantic States to Rocky Mts. ; Brit. America to Mackenzie R. ; Alaska ; Canada ; Nova Scotia ; Newfoundland).

♂. *Upperside.*—Forewing : yellow subbasal interspace strongly narrowing costad, triangular ; subapical ⊃-mark centred with a yellow streak, the proximal and posterior edges of the spot remaining pure black ; the yellow spot SC^3—SC^4 situated immediately behind the ⊃-mark smaller than spot SC^4—SC^5 ; subapical submarginal yellow dot small, rounded.——Hindwing : first submarginal spot usually orange ; tail more or less strongly spatulate, asymmetrical.

Underside.—Forewing : ⊃-mark broadly centred with buff, the black border around the buff spot SC^3—SC^4 remaining pure black, the buff-scaling of the ⊃-mark continuous with the similarly coloured powdery line situated on the black postdiscal band ; the buff scaling absent from the ⊃-mark in one of our British Columbian specimens, the ⊃-mark being much reduced in the individual.——Hindwing : the last two submarginal spots orange, some of the other submarginal spots being also more or less washed with orange ; disc with some more or less large orange patches R^2—SM^2 situated proximally of the black postdiscal line. Several melanistic males have been found.

♀. Dichromatic in the southern districts. One form similar to male, the black bands more extended and the blue patches of the hindwing orange, more or less rounded. The second form of female blackish brown, the black bands more or less vestigial, being more distinct beneath than above, the submarginal spots remaining yellow respectively orange. Intermediate specimens rare.

Genitalia : ♂. Process of harpe situated proximally of most distal point of apex, the apical edge of the harpe being rotundate-angulate ; oblique dorsal edge of harpe bearing at least two strong hooks at the upper corner, and several prominent teeth near these hooks, there being occasionally also some teeth at the ventral edge ; individual variability considerable.——♀. Process in front of vaginal orifice lanceolate, pointed, rarely bidentate at tip; dentate lateral flaps standing farther anad than the orifice.

For early stages see Edwards and others (see literature below).

One brood in the north, two or more in the south ; the spring specimens (from hibernated pupae) of the southern districts are smaller than the summer specimens.

Hab. Alaska, British Columbia, eastwards to Newfoundland and southwards to Florida and Texas, not in the Pacific (and Rocky Mts.) district of the United States.

Two geographical forms, southern spring specimens somewhat resembling the small northern form, but being easily distingnishable by the much narrower black abdominal border to the hindwing. The geographical boundary line between the northern and southern forms is in the lake district, and it is probable that the two forms completely intergrade in Southern Canada. Observations on this point are wanting. As far as we could, we have kept separate the literature on the two forms. It is to be hoped that in future local records of this species it will be expressly stated by the authors which of the two forms occurs, this being especially desirable in records from southern Canada and the northern districts of the United States.

a. P. glaucus glaucus L. (1758).

♀. *Papilio Eques Trojanus glaucus* Linné, *l.c.* (1758) ; Clerck, *l.c.* (1764) ; Linné, *Mus. Lud. Ulr.* p. 190. n. 9 (1764) ; Houtt., *Naturl. Hist.* i. 11. p. 194. n. 9 (1767) ; Fabr., *Syst. Ent.* p. 445. n. 14 (1775) (cit. Kleem. excl. ; cit. Linn. "746" falsa) ; Cramer, *Pap. Exot.* ii. p. 64. t. 139. fig. A. B (1777) ; Goeze, *Ent. Beytr.* iii. p. 33. n. 9 (1779) ; Fabr., *Spec. Ins.* ii. p. 5. n. 18 (1781) ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 229. n. 47. t. 17. fig. 1. 2 (1784) ; Esper, *Ausl. Schmett.* p. 27. n. 9. t. 5. fig. 1 (1785) ; Fabr., *Mant. Ins.* ii. p. 3. n. 18 (1787) ; Gmelin, *Syst. Nat.* i. 5. p. 2229. n. 9 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 4. n. 11 (1793).

Papilio Eques Achivus ajax Linné, *l.c.* (*partim*).

♂. *Papilio Eques Achivus antilochus* id., *l.c.* ; id., *Mus. Lud. Ulr.* p. 207. n. 26 (1764) (Amer. sept.) ; Houtt., *Naturl. Hist.* i. 11. p. 209. n. 28 (1767) ; Fabr., *Syst. Ent.* p. 451. n. 37 (1775) ; Goeze, *Ent. Beytr.* iii. 1. p. 61. n. 35 (1779) ; Fabr., *Spec. Ins.* ii. p. 15. n. 57 (1781) ; id., *Mant. Ins.* ii. p. 8. n. 63 (1787) ; Gmelin, *Syst. Nat.* i. 5. p. 2241. n. 35 (1790) ; Fabr., *Ent. Syst.* iii. 1. p. 24. n. 70 (1793).

Papilio Eques glaucus, Lange, in Linné, *Syst. Nat.* p. 460. n. 9 (1760).

Papilio Eques antilochus, id., *l.c.* p. 463. n. 28 (1760).

Papilio Eques Achivus anthilochus (!) Linné, *Syst. Nat.* ed. xii. p. 751. n. 35 (1767).

♂. *Papilio Eques Achivus turnus* Linné, *l.c.* (1771) ; Müller, *Naturs. Suppl.* p. 284. n. 496 (1774) ; Fabr., *Syst. Ent.* p. 452. n. 41 (1775) ; Goeze, *Ent. Beytr.* iii. 1. p. 71. n. 5 (1779) ; Fabr., *Spec. Ins.* ii. p. 16. n. 66 (1781) ; id., *Mant. Ins.* ii. p. 9. n. 76 (1787) ; Jabl. & Herbst, *Naturs. Schmett.* iii. p. 136. n. 93. t. 41. fig. 3. 4 (1788) (= *alcidamas*) ; Gmelin, *Syst. Nat.* i. 5. p. 2243. n. 338 (1790) ; Jung, *Alphab. Verz. Schmett.* p. 253 (1792) ; Fabr., *Ent. Syst.* iii. 1. p. 29. n. 86 (1793) ; Esper, *Ausländ. Schmett.* p. 195. n. 88. t. 48. fig. 1 (1797).

Papilio (*Troes*) *glaucus*, Müller, *Naturs.* v. 1. p. 568. n. 9 (1774).

Papilio (*Achivus*) *antilochus*, id., *l.c.* p. 576. n. 35 (1774) (New York ; "Surinam" errore).

Papilio Eques Achivus alcidamas Cramer, *Pap. Exot.* i. p. 62. t. 28. fig. A. B (1775) ("Jamaica" error loci ; New York, Carolina) ; Goeze, *Ent. Beytr.* iii. 1. p. 77. n. 27 (1779) ; Stoll, in Cramer, *l.c.* iv., *Ordre Syst.* p. 3. n. 3 (1782) (= *turnus* = *antilochus*).

Papilio (*anthilochus*), Meerburgh, *Afb. Zeldz. Gew.* t. 40 (1775).

Papilio glaucus, Palisot, *Ins. Afr. Amer.* p. 99. *Lép.* t. 1. b. fig. a. b. ♀ (1805–21); Godart, *Enc. Méth.* ix. p. 60. n. 96 (1819) (N. Amer.; "Jamaica" false); Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 22. t. 8. 9. ♀, larva, pupa (1833) (Georgia; Virginia); Boisd., *Spec. Gén. Lép.* i. p. 335. n. 177 (1836) (Georgia; Virginia; Carolina; "Jamaica" false); Doubl., in Westw., *Arc. Ent.* i. p. 143 (1845); Lucas, in Chenu, *Enc. Hist. Nat., Pap.* 1. p. 38. t. 10. fig. 1. ♀ (1851–53); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 3. n. 32 (1857); Gosse, *Letters from Alabama* p. 122 (1859); Vollenh., *Tijdschr. Ent.* iii. p. 85. n. 128 (1860); Morris, *l.c.* n. 2 (1860); Scudd., *Canad. Ent.* iv. p. 74 (1872) (Abbot's MSS. in Brit. Mus.); id., *Rept. Geol. N. Hampsh.* i. t. A. fig. 16 (1874); Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 14. n. 9 (1882) (recensio critica); Smyth, *Ent. News* vi. p. 244 (1895) (Montgomery Co., Virginia; this the only ♀ form of *turnus* I have seen here); Dyar, *Bull. U.S. Nat. Mus.* lii. p. 2. n. 11 (1902) (*partim*; Atlantic States); Laur., *Ent. News* xvi. p. 312 (1905) (♀, "large admixture of yellow").

Papilio turnus, Palisot, *l.c.* p. 119. *Lép.* t. 2. b. fig. 1. ♂ (1805–21); Godart, *l.c.* ix. p. 55. n. 87 (1819); Say, *Amer. Ent.* iii. p. 86. t. 40 (1828); Boisd. & Lec., *l.c.* p. 19. t. 6. fig. 1. t. 7. fig. 1—3 (1833); Lucas, *Lép. Exot.* p. 35. t. 18. fig. 2 (1835); Boisd., *Spec. Gén. Lép.* i. p. 338. n. 179 (1836); Harris, *Entom.* i. p. 61 (1840) (larva solitary, covers leaf with coating of silk and binds up the sides to form a kind of trough); Doubl., in Westw., *Arc. Ent.* i. p. 143 (1845); id., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 24. n. 112 (1852); Emm., *Agric. N. York* v. p. 201. t. 38. fig. 3 (1854); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 32. n. 119 (1856); Fitch, *Rept. Ins. N. York* iii. p. 341 (1856); Durban, *Can. Nat. Geol.* ii. p. 223. fig. c. d. t. 3. fig. 1 (1857) (larva, pupa); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 2. n. 31 (1857); Gosse, *Letters from Alabama* p. 202 (1859); Morris, *Syn. Lep. N. Amer.* p. 2. n. 1 (1860); Vollenh., *Tijdschr. Ent.* iii. p. 85. n. 129 (1860) (Indiana; Tennessee); Durban, *l.c.* v. p. 87 (1860); Newm., *Proc. Ent. Soc. Philad.* i. p. 26 (1861) (N. Jersey; on *tulip-poplar*); Stauff., *ibid.* i. p. 265 (1862) (larvae of *glaucus* and *turnus* different!—They were found on different food-plants); Rid., *ibid.* i. p. 266 (1862) (*glaucus* is ♀ of *turnus*, as found by Dyson already in 1843); Walsh, *ibid.* p. 349 (1863) (in southern Illinois all ♀ ♀ black in summer 1861, on Atlantic coast all ♀ ♀ black perhaps up to 36° lat., in Mississippi valley up to 38°, north of 41° on Atlantic coast, and 43° in Mississippi valley perhaps all yellow); Harr., ed. Flint, *Ins. Inj. Veg.* p. 268. fig. 97. ♀, 98. l. (1862) (life history); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863); Lintn., *ibid.* iii. p. 50 (1864) (Eastern N. York, larva, descr. of pupa; ♀-f. *glaucus* not occurring); Kirkp., *ibid.* iii. p. 329 (1864) (Cleveland, Ohio, common, ♀-f. *glaucus* does not occur); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 314. n. 351 (1864) (*partim*; "Jamaica" false); Tenney, *Man. Zool.* fig. 281. 282 (1867); Reak., *Proc. Ent. Soc. Philad.* vi. p. 124 (1867) (Pike's Peak, Colo.; also aberr.); Edw., *Trans. Amer. Ent. Soc.* ii. p. 207 (1868) (♀ one side yellow, the other black; aberr. ♀ ♀ mottled with black); Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 248. n. 49 (1869); Riley, *Amer. Entom.* i. p. 99 (1869); Harris, ed. Flint, *Ent. Corresp.* p. 270 (1869); Parker, *Amer. Entom.* ii. p. 175 (1870) (Iowa); Morris, *Psyche* i. p. 35 (1874) (White Mts.); Scudd., *Canad. Ent.* iv. p. 84 (1874) (Abbot's MSS. in Brit. Mus.); Bean, *Ent. Mo. Mag.* x. p. 248 (1874) (Galena, Ill., scarce, sometimes not uncommon in June); Pagenst., *Verh. Nat. Med. Ver. Heidelb.* (2). i. p. 101 (1874); Mead, in Wheeler, *Rept. Expl. Surv.* v. *Zool.* 8. p. 741 (1875) (occas. in Rocky Mts.); Boll., *Tagebl. Ver. Nat. Hamburg, Beil.* 49. p. 176 (1876); Perk., *Rept. Vermont Board Agric.* ii. p. 589 (1876); Bruner, *Canad. Ent.* ix. p. 20 (1877) (Omaha, Nebraska, black ♀ more frequent than yellow; Niobrora R., both ♀ ♀); Edw., *Butt. N. Amer.* ii. *Pap.* t. 3. 4. 5 (1877 and 1884); Pack., *Half-hours* p. 180 (1877); Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., abundant); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 448 (1878); Strecker, *Butt. Moths N. Amer.* p. 69. n. 10. (1878) (*partim*); Obertb., *Et. d'Ent.* iv. p. 67. n. 188 (1880) (*partim*); Middl., *Trans. Dept. Agric. Illin.* xviii. p. 74 (1880); Coquill., *ibid.* p. 173 (1880); Skinn., *Proc. Ac. N. Sci. Philad.* p. 239 (1882) (scent-glands of larva); Saund., *Ins. Inj. Fruits* p. 83. fig. 80. 81. 82 (1883); Edw., *Canad. Ent.* xv. p. 169 (1883) (larvae of *turnus* and *rutulus* different); Gruber, *Jenn. Zeitschr. Ges. Nat.* xvii. p. 470. t. 7. fig. 9 (1884); id., *Papilio* iv. p. 86. t. 1. f. 7—11 (1884) (transf.); Fern., *Butt. Maine* p. 24. fig. 1. 2 (1884); Edw., *Canad. Ent.* xvi. p. 115 (1884); id., *l.c.* xvii. p. 113 (1885) (larva refused willow); Hoy, *Rept. Ent. Soc. Ontario* xv. p. 12 (1885) (Racine, Wisc.); Merr., *ibid.* (1885) (Central Adirondacks, common, black ♀ ♀ occurring); Fern., *Canad. Ent.* xviii. p. 50 (1886) (aberrat., Maine); Edw., *ibid.* xviii. p. 139 (1886) (food-plants, also willow); Mayn., *Butt. E. U. S.* p. 51. n. 51. t. 6. fig. 70. 70 A (1886); Morton, *Canad. Ent.* xx. p. 228 (1888) aberrat.; N. Windsor, N.Y.); Riley, *Insect Life* i. p. 161 (1888) (parasite: *Trogus exesorius*); Skinn., *Canad. Ent.* xxi. p. 127 (1889) (Philadelphia, black and yellow ♀ ♀ in about equal numbers; vars. of ♀); Fletcher, *ibid.* xxi.

p. 201. fig. 9. 11 (1889) (aberrat. ; life hist.) ; Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 11 (1889) (literat. refer. to metam.) ; Pack., *Fifth Rept. U.S. Ent. Comm.* p. 217. 472. 480. 529. 531. 536. 555. 669 (1890) (food-plants) ; id., *l.c.* p. 486 (1890) (early stages) ; Mayn., *Man. N. Amer. Butt.* p. 11. n. 15 (1891) (*partim* ; fig. alia subsp.) ; Fletcher, *Insect Life* v. p. 126 (1892) (parasite of egg: *Trichogramma*); Staley, *Canad. Ent.* xxiv. p. 204 (1892) (Marshall, Missouri, common) ; Haase, *Untersuch. Mimicry* i. p. 90 (1893) ; Brodn., *Insect Life* vi. p. 40 (1893) (larva on *Camphora officinalis*) ; Daggett, *Ent. News* iv. p. 15 (1893) (decoying) ; Skinn., *ibid.* iv. p. 82 (1893) (N. Carolina) ; Meeske, *ibid.* iv. p. 117 (1893) (Long I., reared ♀ *glaucus*) ; Jones, *ibid.* iv. p. 190 (1893) (Richmond Co., N.C.) ; Winkle, *Canad. Ent.* xxv. p. 212 (1893) (black ♂ ! !) ; Davis, *Journ. N. York Ent. Soc.* i. p. 47 (1893) (Staten I., N.Y., May to Sept.) ; Beutenm., *Bull. Amer. Mus. N. H.* v. p. 244. t. 2. f. 2. ♂ (1893) (N. York ; descr. of l., p., i.); Davis, *Ent. News* v. p. 109 (1894) (Little Rock, Ark.) ; White, *ibid.* v. p. 175 (1894) (Brooklyn) ; Weed, *Psyche* vii. p. 130. n. 36 (1894) (N.E. Miss.) ; Ehrm., *Canad. Ent.* xxvi. p. 292 (1894) (aberrat. of ♀, right forewing yellow, left black) ; How., *Ins. Life* vii. p. 44. fig. 15. 16 (1894) (melan. ♂ ; Kansas) ; Weith, *Ent. News* vi. p. 158 (1895) (Vermont, larva 3 weeks without food before dying) ; Osburo, *ibid.* vi. p. 282. n. 44 (1895) (Tennessee, common, iv. to ix., two broods ; ♀ *glaucus* frequently in Aug. & Sept.) ; Longl., *ibid.* vi. p. 314 (1895) (Chicago) ; Eimer, *Artb. Verwandtsch. Schmett.* ii. p. 79. t. 5. fig. 1. 2 (1895) ; Clevel., *Ent. News* vii. p. 73 (1896) (Oneonta, N.Y.); Fiske, *ibid.* vii. p. 241 (1896) (Webster, N.H., common, May, June); Soule, *Psyche* vii. p. 398 (1896) (Brookline, Mass., ovipositing on higher branches of young ash-trees) ; Truman, *Ent. News* viii. p. 29 (1897) (Volga, S. Dakota) ; Bubua, *ibid.* viii. p. 98 (1897) (Cleveland, Ohio ; scarce this year); Eimer, *Orthogen.* p. 32. fig. 10. ♀ (1897); Christ, *Mitth. Schweiz. Ent. Ges.* ix. p. 276 (1897) ; Duzee, *Bull. Buffalo Soc. N. Sc.* v. p. 107. n. 5 (1897) (Buffalo, common); Rowley, *Ent. News* ix. p. 37 (1898) (Louisiana, Mo.); Beutenm., *Bull. Amer. Mus. N. H.* x. p. 310 (1898) (Highland Falls, N.Y.) ; Holland, *Butt. Book* p. 309. n. 4. t. 2. fig. 15. 26. 28. larva, t. 6. fig. 1—4. pupa, t. 43. fig. 1. ♂, 2. ♀ (1899) (*partim*) ; Denton, *Moths Butt.* ii. p. 335. fig. ♀ (1898–1900) ; Beutenm., *Butt. N. York City* p. 3. n. 1. fig. ♀ (1902); Macgill. & Hought., *Ent. News* xiv. p. 265 (1903) (Adirondack Mts.); Comst., *ibid.* xiv. p. 197 (1903) (Adirondack Mts., very common in June) ; Briml. & Sherm., *ibid.* xiv. p. 230 (1903) (Raleigh, N.C., also *glaucus*, March 31) ; Heink, *ibid.* xiv. p. 335 (1903) (Meramec Highlands, St. Louis Co., April 12) ; Paxs., *ibid.* xvi. p. 328 (1905) (colour of larva harmonising with that of leaf).

Jasoniades turnus, Hübner, *Verz. bek. Schmett.* p. 83. n. 843 (1818 ?).

Euphoeades glaucus, id., *l.c.* p. 83. n. 846 (1818) ; Sprague, *Psyche* ii. p. 257 (1879) (Wollaston, Mass., May 24) ; id., *l.c.* p. 259 (1879) (Mass., May 25 to July 15) ; Morse, *Psyche* vii. p. 155 (1894) (Stamford, Conn., Aug. 22) ; Kirby, in Allen, *Nat. Libr., Butt.* ii. p. 284 (1897) ; id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p 99. t. 308. fig. 1. 2 (190—?).

Papilio antilochus, Boisduval, *Spec. Gén. Lép.* i. p. 340. n. 180 (1836) (*turnus* with artificial tail) ; Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 28. n. 26 (1882) (recensio critica ; " spec. fict.").

Papilio troilus, Jaeger, *Life N. Amer. Ins.* fig. 53. ♀ (1864).

Papilio turnus var. *glaucus*, Edwards, *Canad. Ent.* v. p. 9 (1873) (name for the black var. only) ; Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., abundant) ; Stevens., *Psyche* iv. p. 233 (1885) (Poughkeepsie, N.Y., August); Eimer, *Artb. Verwandsch. Schmett.* ii. p. 142. t. 8. fig. 1. ♀ (1895) ; Jeheb., *Ent. News* xvi. p. 111 (1905) (dark ♀ produced by diseased food !).

Papilio turnus dim. var. ♀ *glaucus*, Edwards, *Trans. Amer. Ent. Soc.* vi. p. 11. sub n. 17 (1877) (Southern New York, and Wisconsin to Gulf of Mexico ; Kansas to Texas).

Jasoniades glaucus, Scudder, *Butt. East. U.S.* ii. p. 1288. t. 8. fig. 1, t. 13. fig. 10, t. 26. fig. 8, t. 35. fig. 31—34, t. 40. fig. 10, t. 57. fig. 4, t. 61. fig. 13, t. 66. fig. 1, t. 68. fig. 18, t. 76. fig. 15. 26. 28, t. 80. fig. 7—10, t. 85. fig. 1—4 (1889) (morph., metam., habits, etc.) ; id., *Psyche* viii. p. 208. t. 5. f. 3, l. juv. (1898).

Papilio turnus dim. form. *glaucus*, Edwards, *Bull. U.S. Nat. Mus.* xxxv. p. 11 (1889) (liter. relat. to metamorphosis).

Papilio turnus glaucus, Skinner, *Ent. News* iv. p. 82 (1893) (N. Carolina) ; Jones, *ibid.* iv. p. 190 (1893) (Richmond Co., N.C.) ; Bubua, *ibid.* viii. p. 98 (1897) (Cleveland, Ohio ; three specimens); Eimer, *Orthogen.* p. 37. fig. 19. ♀ (1897).

Papilio turnus ab. *fletcheri* Kemp, *Ent. News* xi. p. 481 (1900) (N. Jersey).

Papilio turnus ♀ *glaucus*, Grote, *Canad. Ent.* xxxiv. p. 94 (1902) (♀ *glaucus* represents the original colour of the insect ! ! ; *P. turnus* allied to *troilus*).

Papilio turnus australis Maynard, *Man. N. Amer. Butt.* p. 215. n. 15a (1891) (Florida).

Papilio glaucus turnus, Dyar, *l.c.* lii. p. 2. sub n. 11 (1902).

Papilio glaucus australis, id., *l.c.*

♂. Submarginal buff spots of underside of forewing separate, but in small spring specimens more or less continuous. Black abdominal border of hindwing narrower than the yellow interspace between it and the cell.

The third black band of the forewing, above, varies from being restricted to the cell to being extended a little beyond M^2, in most specimens not quite reaching M^2. The band situated on or beyond the cross-veins bears occasionally several yellow spots. The first submarginal spot is rarely absent from the upperside. The black markings of the upperside are occasionally so much extended as to occupy the greater part of the wing. The melanism of these males, of which several have been described, is not the same as that of the females, in the black female the ground-colour having assumed a blackish or brown tint, the bands remaining normal, while in these black males the bands are extended.

♀. The form resembling the male is the ordinary one in the northern districts of the range, while in the southern districts the dark form is the more frequent of the two. Intermediate specimens are comparatively rare. Specimens have been recorded in which the left side resembles the one female, while the right side resembles the other.

We have four females which are intermediate between the two female forms. In one of them (New Jersey, July 1898), a black female, the postdiscal area of the hindwing is more or less ochraceous in posterior half of wing, both above and below. The second black female (Staten Island, August 1901) has traces of the yellow ground-colour on both wings, especially on the underside. The third specimen (Jefferson Co., Kentucky, September 1897, C. R. Troxler, senr.) is much more extended yellow than the second, especially on the disc of the hindwing. The fourth female has the yellow parts merely shaded with black (Baltimore, August 1894). The two forms of the female may conveniently be referred to as ♀-f. *glaucus* and ♀-f. *turnus*.

Hab. Atlantic district, from Florida to New England, westward to the Mississippi basin.

In the Tring Museum 100 ♂♂, 32 ♀♀, and some larvae and pupae from: Texas; Florida; Carolina; Georgia; Tennessee; Kentucky; Staten I.; New Jersey; Buffalo; Illinois.

b. P. glaucus canadensis subspec. nov.

Papilio turnus, Kirby (*non* Linné, 1771, err. det.), *Fauna Bor. Amer.* iv. p. 286. n. 401 (1837) (Canada); Gosse, *Canad. Natur.* p. 183. fig. (1840); id., *l.c.* p. 194. 223. 293 (1840) (habits); Felder, *l.c.* (1864) (*partim*); Reed, *Canad. Ent.* i. p. 19 (1868) (London, Ont.); Saund., *ibid.* i. p. 22. 74 (1869) (London, Ont.; early stages; imago in May and later, perhaps two broods); Bethune, *ibid.* ii. p. 8 (1869) (Toronto, July); Riley, *ibid.* iv. p. 37 (1872) (Peterboro Co., Ont., May); Grote, *Bull. Buffalo Soc. Nat. Sci.* i. p. 185 (1873) (Anticosti; small); Saund., *Canad. Ent.* vi. p. 2. fig. 1 (1874); id., *l.c.* p. 140 (1874) (Essex Co.); Lym., *ibid.* p. 158 (1874); Saund., *Rept. Ent. Soc. Ontario* p. 20. fig. 13. 14 (1874) (life hist.); Bates, *Ent. Mo. Mag.* xi. p. 244 (1875) (Newfoundland; small, pale, with narrow black border to hindwing); Edw., *Butt. N. Amer.* ii. *Pap.* t. 5. fig. 1. ♂ (1877); Bethune, *Canad. Ent.* x. p. 217 (1878) (Canada); Saund., *Rept. Ent. Soc. Ontario* p. 73. fig. 40. 41 (1880); Fletcher, *ibid.* p. 62. fig. 45 (1881); Gosse, *Canad. Ent.* xv. p. 48 (1883) (Newfoundland); Saund., *ibid.* p. 204 (1883) (larva on *Magnolia acuminata*, exceptional); id., *Rept. Ent. Soc. Ontario* p. 16 (1884) (larva on *Magnolia*); Fyles, *ibid.* p. 63. fig. 32 (1884); id., *ibid.* p. 44 (1889) (on apple, etc.); Moffat, *ibid.* p. 101 (1899) (London, Ont.); Fletcher, *ibid.* p. 79. 83 (1889) (Nepigon, L. Superior; eggs laid on aspen, early in July); Mayn., *Man. N. Amer. Butt.* p. 11. n. 15. t. 1. fig. 1. ♂ (1891) (*partim*); Fletcher, *Rept. Ent. Soc. Ontario* xx. p. 38. fig. 12. 13. 14 (1890) (life hist., melanic ♂); Fyles, *ibid.* xxiv. p. 39. fig. 19 (1894) (Quebec, larva on *Amelanchier canadensis*); Danby, *Journ. N. York Ent. Soc.* ii. p. 33 (1894) (Vancouver I., common); Grant, *Canad. Ent.* xxviii. p. 273.

fig. 23. aberr. (1896) (Orillia, Ont., usually common, v. vi. vii.) ; Holland, *Butt. Book* p. 309 n. 4 (1899) (*partim* ; Sitka ; Canada) ; Lyman, *Canad. Ent.* xxxii. p. 119 (1900) (Dawson, Yukon) ; Bethune, *Rept. Ent. Soc. Ontario* xxx. p. 101 (1900) (parasites : *Trogus fulvipes* rare, *T. exesorius* common) ; id., *l.c.* p. 104 (1900) (first specim. of *turnus* May 28) ; Dod, *Canad. Ent.* xxxiii. p. 171. n. 81 (1901) (Alberta, June, fairly common) ; Moffat, *Rept. Ent. Soc. Ontario* xxxii. p. 51. fig. 30 (1902) (middle of May to middle of Aug. this year) ; Gibson, *ibid.* xxxiii. p. 76. fig. 53 (1903) (larva) ; Dyar, *Proc. U. S. Nat. Mus.* xxvii. p. 782 (1904) (Kootenai).

Papilio thoas, Heust. (*non* Linné, 1771, err. det.), *Canad. Ent.* xi. p. 239 (1879) (St. John's, N.B.).

Papilio glaucus, Linn., var. *turnus*, Linn., Weir, *Entom.* xiv. p. 99 (1881) (Hudson Bay, July).

Papilio glaucus, Dyar, *Bull. U.S. Nat. Mus.* lii. p. 2. n. 11 (1902) (*partim* ; Canada ; Alaska).

Papilio glaucus L. a. turnus, Cockle, *Rept. Ent. Soc. Ontario* xxxiv. p. 90 (1904) (Kaslo, B.C.).

♂ ♀. A small form. On the *upperside* the third band (from base) of the forewing reaches nearly always down to M^2 in male, to SM^2 in female; marginal spots thinner and longer than in *P. glaucus glaucus*.——The black abdominal border of the hindwing broader than the yellow interspace between it and the cell.

On the *underside* the submarginal spots of the forewing form a continuous band, only the last one or two spots being separated.——The abdominal border of the hindwing as broad as above ; submarginal spots on the whole less curved than in *P. g. glaucus* ; the blue spots larger, and the black proximal borders to them on the whole more straight.

Hab. Newfoundland ; Anticosti ; New Brunswick ; Canada ; northern districts of British Columbia ; Alaska ; name-type from Newfoundland.

In the Tring Museum 80 ♂♂, 2 ♀♀, from : Newfoundland, June 1898; Baie St. Claire, Anticosti ; Rainy Lake, June 1892 (Daggett) ; Ottawa; Didsbury, Alberta, June 1904 ; British Columbia.

80. **Papilio rutulus** Lucas (1852).

Papilio rutulus Lucas, in Guér., *Rev. Zool.* (2). iv. p. 158 (1852) (March ; California) ; Boisd., *Ann. Soc. Ent. France* p. 279. n. 1 (1852) (California) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852) ("*rutulus* Lucas" ; Boisd. not mentioned, his description being of a later date) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 24. n. 111 (1852) ("var." excl.) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 32. n. 118 (1856) ("var." excl.) ; Morris, *Syn. Lep. N. Amer.* p. 3. n. 3 (1862) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 314. n. 350 (1864) (California ; Sonora) ; Behr, *Stett. Ent. Zeit.* xxii. p. 215 (1866) (Calif.) ; Reak., *Proc. Ent. Soc. Philad.* vi. p. 125 (1867) (Pike's Peak, Colo. ; diff. from *turnus* and *daunus*) ; Kirby, *Cat. Diurn. Lep.* p. 565. n. 315 (1871) ("var." excl.) ; H. Edw., *Proc. Cal. Ac. Sc.* v. p. 165 (1873) (chrysalis) ; Mead, in Wheeler, *Rept. Expl. Surv.* v. *Zool.* 8. p. 741 (1875) (S. Utah ; Colorado, June, one brood only) ; Edw., *Trans. Amer. Ent. Soc.* vi. p. 11. n. 16 (1877) (Pacific States ; Rocky Mts.) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 445 (1878) ; Strecker, *Butt. Moths N. Amer.* p. 70. n. 11 (1878) (Calif. ; Oregon, etc.) ; Edw., *Papilio* ii. p. 112 (1882) (early stages) ; Hagen, *ibid.* ii. p. 160 (1882) (charact. and distrib. ; "Kamschatka" *loci error*) ; id., *Psyche* iii. p. 415 (1882) (Washington Terr., western form and *turnus* eastern form ; *rutilus* found as far east as Salt Lake, Utah, and Fort Bridger, Wyom.) ; Edw., *Papilio* iii. p. 4 (1883) (dist. spec.) ; id., *Canad. Ent.* xv. p. 169 (1883) (larva diff. from that of *turnus*) ; Butl., *Journ. Linn. Soc. Lond.* xvi. p. 472. n. 60a (1883) (Lake and Tehama Cos.) ; Behr, *Bull. Cal. Ac. Sc.* I. p. 64 (1884) (Calif. common ; l. on *Amygdalaceae*) ; Edw., *Butt. N. Amer.* ii. *Pap.* t. 12. 13. (1884) (♂ ♀ *metham.*) ; id., *Canad. Ent.* xvii. p. 112 (1885) (larva on willow) ; Denton, *ibid.* xxi. p. 111 (1889) (Nevada) ; Skion., *ibid.* xxi. p. 238 (1889) (Ft. Qu'Appelle, N.W. Terr.) ; Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 12 (1889) (liter. relat. to metamorph.) ; Mayn., *Man. N. Amer. Butt.* p. 12. n. 17. fig. 9 B (1891) ; Pack., *Fifth Rept. U.S. Ent. Comm.* p. 625 (1891) (egg and larval stages) ; Wright, *Canad. Ent.* xxiv. p. 73 (1892) (how to get eggs from ♀) ; Haase, *Untersuch. Mimicry* i. p. 89 (1893) ; Oslar, *Ent. News* iv. p. 226 (1893) (Los Angeles, Feb.) ; Cockerell, *Trans. Amer. Ent. Soc.* xx. p. 353. n. 645 (1893) (Colorado) ; Snyder, *Ent. News* v. p. 133 (1894) (Park City, Utah) ; Cunningh., *Ent. News* vi. p. 251 (1895) (Ft. Klamath, Oregon) ; Twog., *ibid.* viii. p. 31 (1897) (Riverside, Calif, common, Feb. to Oct.) ; Christ, *Mitth. Schweiz. Ent. Ges.* ix. p. 278 (1897) ; Holland, *Butt. Book* p. 309 .

n. 3. t. 45. fig. 1 ♂ (1899); Denton, *Moths Batt. U.S.A.* ii. p. 337. fig. (1898—1900); Brown, *Ent. News* xii. p. 301 (1901) (Salt Lake City, common); Dyar, *Bull. U.S. Nat. Mus.* lii. p. 2. n. 10 (1902) (Pacific States, Rocky Mts.); id., *Proc. U.S. Nat. Mus.* xxvii. p. 782 (1904) (Kootenai; larva on birch, etc.); Wright, *Butt. West Coast* ed. ii. p. 84. n. 19. t. 3. fig. 19 (1906) (lowland species).

Papilio rutulus, var. or ab. *l*, Strecker, *Lep. Rhop. Het.* p. 128 (1877) (Arizona).

Papilio turnus var. (geogr.) *rutulus*, Oberthür, *Et. d'Ent.* iv. p. 68. sub n. 188 (1880).

Papilio rutulus var. *arizonensis* Edwards, *Papilio* iii. p. 4 (1883) (Arizona); id., *Butt. N. Amer.* ii. *Pap.* t. 13. ♂ ♀ (1884); Winkle, *Canad. Ent.* xxv. p. 212 (1893).

Papilio turnus, Butler, *Journ. Linn. Soc. Lond.* xvi. p. 472. n. 61 (1883) (Tehama and Mendocino Co.).

Papilio rutulus var. *ammoni* Behrens, *Canad. Ent.* xix. p. 199 (1887) (orange colour); Winkle, *l.c.* xxv. p. 212 (1893).

Papilio nitulus (!), Cockerell, *Trans. Amer. Ent. Soc.* xx. p. 353 (1893) (*laps. cal.*).

Papilio turnus rutulus, Eimer, *Arth. Verwandtsch. Schmett.* p. 83 (1895).

Papilio rutulus arizonensis, Maynard, *Man. N. Amer. Butt.* p. 13. n. 17a. fig. 10a (1891) (Arizona; New Mexico; Colorado); Dyar, *Bull. U.S. Nat. Mus.* lii. p. 2. sub n. 10 (1902).

Papilio rutulus ammoni, Maynard, *l.c.* (Nevada); Dyar, *l.c.*

Papilio arizonensis, Wright, *Butt. West Coast* ed. ii. p. 85. n. 20. t. 3. fig. 20 (1906) (S. Arizona).

Papilio ammoni, id., *l.c.* n. 21 (1906) ("not seen").

♂ ♀. Sexes similar. Forewing on the whole rather more pointed than in *P. glaucus*, the subapical ∽-mark rarely centred with yellow, or at least the yellow colour within the mark rarely so extended as to leave only the edges of the spot pure black, the ∽-mark proximally often separate from SC^4, the proximal portion being often almost isolated, especially on underside; first submarginal spot linear like the others, usually larger than the second; the subbasal yellow band less narrowed costally than in *P. glaucus*, the third black band on the whole longer than in specimens of *P. glaucus* of the same size, reaching usually beyond M^2; yellow fringe-spots very thin.——Black abdominal border of hindwing always wider than the yellow interspace between it and cell; first submarginal spot small or absent, seldom nearly as large as the second, never orange in either sex.

The buff submarginal spots of the *underside* of the forewing merged together to a continuous line.——No orange patches on disc of hindwing, or only traces of them; submarginal spots less orange than in *P. glaucus*, usually only the last two being of this colour.

We do not find any fairly constant differences between specimens from Arizona and California.

Early stages see Wright, *l.c.*

Genitalia: ♂. Harpe truncate, apex not produced beyond base of process; dorsal hook longer than in *P. glaucus*, simple, non-dentate, there being never two hooks, as is always the case in *P. glaucus*.——♀. Antevaginal process obtuse; lateral dentate flaps larger than in *P. glaucus*, extending farther frontad than in that species.

Hab. British Columbia to Arizona.

One of our specimens from the Frazer R. (June 1901) is worthy of being specially mentioned. The upper submarginal spots on the upperside of the forewing are rounded, being connected with the margin by means of dispersed yellow scales. The submarginal spots of the underside of both wings are extended to the margin, forming a nearly continuous marginal band, a very little of the black marginal line being left at the apex of most veins.

In the Tring Museum 270 ♂♂, 46 ♀♀, from: Senator, Arizona, July 1898 (Dr. Kunze); South Park, August 1901, Chimney Gulch, June 1900, Grand Junction, July 1901, Colorado (Oslar); Garfield Co.; Reno, Nevada; North Tulare R.,

California, July 1897 (Purpus); McCloud R., Shasta, June 1884 (O. T. Baron); Siskiyou Co. (O. T. Baron); Hoopa valley, July 1896 (Dougherty); Quincy, California, 3400 ft., June and July 1897 (Watson); Davis Creek, Modoc Co., June 1898 (Mrs. Austin); Butte Creek, Butte Co., April 1898 (Mrs. Austin); Pine Creek, Oregon, June 1898 (Mrs. Austin); San Reno, California, June 1897; Sonora (Lorquin; coll. Felder); Gold Hill, Oregon, June and July 1901 (Biedermann); Nicomin I., Frazer R., May and June 1900; Qu'Appelle, Assiniboia, June 1901; Vancouver (A. H. Bush); Ozoyoos (Raynolds).

81. Papilio daunus Boisd. (1836).

Papilio daunus Boisduval, *Spec. Gén. Lép.* i. p. 342. n. 182 (1836) (Mexico); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845) (Oajaca); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 88 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 24. n. 109 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 32. n. 116 (1856) (Oajaca); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 2. n. 30 (1857) (Mexico); Vollenh., *Tijdschr. Ent.* iii. p. 85. n. 131 (1860) (Mexico); Rid., *Proc. Ent. Soc. Philad.* i. p. 278. fig. 2 (1862) (Kansas); Felder, *Verh. Zool. Bot. Ges. Wien.* xiv. p. 313. n. 346 (1864); Reak., *Proc. Ent. Soc. Philad.* vi. p. 124 (1867) (Colorado); Kirby, *Cat. Diurn. Lep.* p. 564. n. 312 (1871); Strecker, *Lep. Rhop. Het.* p. 45. t. 6. fig. 1. ♂, 2. ♀ (1873) (Rocky Mts.; Vera Cruz); H. Edw., *Proc. Cal. Ac. Sc.* v. p. 325 (1874) (pupa, larva noticed); id., *Butt. N. Amer.* ii. *Pap.* t. 2. ♂ (1875); Mead, in Wheeler, *Rept. Expl. Surv.* v. *Zool.* 8. p. 741 (1875) (Colorado, S. Utah); Kirby, *l.c.* p. 811 (1877); Edw., *Trans. Amer. Ent. Soc.* vi. p. 11. n. 18 (1877) (Arizona to Montana; Oregon); Uhler, in Hayd., *Bull. U.S. Geol. Geogr. Surv.* iii. p. 356 (1877) (Clear Creek, Colo.); id., *l.c.* p. 765 (1877) (Clear Creek and Ute Pass, Aug. 6—13); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 446 (1878); Strecker, *Butt. Moths N. Amer.* p. 68 (1878) (Colorado; N. Mexico; Mexico; Central America); Oberth., *Et. d'Ent.* iv. p. 68. n. 191 (1880) (Mexico; type); Hagen, *Psyche* iii. p. 415 (1882) (probably the same as *rutulus*); id., *Papilio* ii. p. 163 (1882) (doubtfully distinct from *rutulus*); Edw., *ibid.* iii p. 2. (1883) (Arizona, larva & pupa; Boulder, Colo.); id., *l.c.* iii. p. 158 (1883) (Montana); id., *Butt. N. Amer.* ii. *Suppl.* p. 1 (1884) (larva); Schaus, *ibid.* iv. p. 100 (1884) (adult larva descr.); Behr, *Bull. Cal. Ac. Sc.* I. p. 64 (1884) (Calif., local, l. on *Prunus demissa*); Denton, *Canad. Ent.* xxi. p. 111 (1889) (Nevada); Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 12 (1889) (liter. relat. to metam.); Mayn., *Man. N. Amer. Butt.* p. 13. n. 18. fig. 9. ♂ (1891) (Arizona to Montana; Utah; Nevada; Oregon; Mexico); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 240. n. 78. t. 70. fig. 9. genit. (1893) (Oregon and Montana southward to Guatemala; open grassy tracts in the highlands); Haase, *Untersuch. Mimicry* i. p. 89. fig. 9 (1893); Snyder, *Ent. News* v. p. 166 (1894) (Park City, Utah, larva, eggs); Eimer, *Artb. Verwandtsch. Schmett.* p. 87. t. 5. fig. 6. ♂, 7. ♀ (1895); Christ, *Mitth. Schweiz. Ent. Ges.* ix. p. 278 (1897); Eimer, *Orthogen.* p. 30. fig. 8 (1897); Edwards, *Butt. N. Amer.* iii. *Suppl.* p. 1 (1897) (larva); Holland, *Butt. Book* p. 310. t. 38. fig. 2. ♂ (1899) (eastern valleys of Rocky Mts., Arizona, Mexico); Denton, *Moths Butt. U.S.A.* ii. p. 338. fig. (1898—1900) (Colorado; New Mexico; Mexico; occas. in Kansas and Texas); Brown, *Ent. News* xii. p. 301 (1901) (Salt Lake City, common, June, up to 7000 ft.; Dyar, *Bull. U.S. Nat. Mus.* lii. p. 2. n. 8 (1902) (Rocky Mts.); Hoag, *Ent. News* xiv. p. 321 (1903) (S. Luis Potosi, Mex.); Honeym., *Rept. Ent. Soc. Ontario* xxxv. p. 61. n. 8 (1904) (Regina); Wright, *Butt. West Coast* ed. ii. p. 82. n. 16. t. 3. fig. 16 (1906) (rapid flight; food plants).

Papilio multicaudata Kirby (ex Peale, ined.), *Papilio* iv. p. 104 (1884) (= *daunus*).

♂♀. Sexes similar, the black bands and blue spots being larger in the female than in the male. The hindwing is as a rule much more strongly dentate than in the allied species, the tail being very long and tooth M^1 being prolonged to a second tail. However, sometimes the dentition is hardly more prominent than in *P. rutulus*. The black bands are always narrower than in *P. rutulus*; the ↄ-shaped subapical mark of the forewing is always centred with yellow; the fourth black band is narrower than the yellow apical cell-space; second black band seldom as broad as the yellow cell-space situated at its distal side; the third band in the male often stopping short at the median vein, while in some other males

and in almost all females it reaches to near SM^2; the fifth band also very variable in length.——The median band of the hindwing is often very thin, sometimes vestigial; the black abdominal border is narrower than in *P. rutulus*, while the distal border is usually broader. The ground-colour becomes deep yellow (also in the allied species) in consequence of exposure to light and damp.

In many specimens there are large orange patches on the *underside* of the hindwing, the disc being sometimes washed with orange at the black distal border also on the upperside.

Mexican specimens are on the whole larger than those from Oregon, Washington, and British Columbia, the females especially being often very large. However, we cannot find any fairly constant character by which to distinguish northern and southern specimens, the species being strongly variable individually in all districts.

Genitalia: ♂. Harpe broad, either truncate, or the dorsal edge slanting down to the base of the process; this edge with two or more teeth; one dorsal hook, usually bearing a few teeth.——♀. Antevaginal lobe triangular; lateral ridge very large, strongly dentate.

For early stages see Edwards, Wright, etc.

Hab. British Columbia and Alberta southwards to Guatemala, eastwards to Colorado and Vera Cruz.

In the Tring Museum 170 ♂♂, 65 ♀♀, from: Ozoyoos, British Columbia (Raynolds); Gold Hill, Oregon, July 1901 (Biedermann); Modoc Co., July 1897, and Butte Co., April 1898 (Mrs. Austin); Verdi, Nevada, 7000 ft., June 1896; McCloud R., Shasta, June 1884 (O. T. Baron); Siskiyou Co. (O. T. Baron); Tuckee, California, 6000 ft.; North Tulare R., California, July 1897 (Purpus); Quincy, California, June (Watson); Prescott and Senator, Arizona, June, July and August (Dr. Kunze); Verde R., Copper Basin, Thumb Butte and Huachuca Mts., Arizona, July—September 1903 (Oslar); Denver, Colorado (Mason); Grand Junction, South Park and Chimney Gulch, Colorado, June—August 1900 and 1901 (Oslar); Las Vigas, May 1896, Jalapa, July 1896, Cholula, March 1896, Orizaba, March 1896 (W. Schaus); Oaxaca, July 1896 (W. Schaus); Guadalajara, August 1896 (W. Schaus); Cuernavaca, 4000 ft., July 1904 (A. Hall); Guerrero (O. T. Baron); Salvatierra, Guanajuato.

82. Papilio eurymedon Lucas (1852).

Papilio eurymedon Lucas, in Guérin, *Rev. Zool.* (2). iv. p. 140 (1852, March) (California); Boisd., *Ann. Soc. Ent. France* p. 280. n. 2 (1852) (California); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852) (quote "*eurymedon* Lucas," not mentioning Boisd., whose description came out later); Morris, *Syn. Lep. N. Amer.* p. 4. n. 4 (1862); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863); Behr, *Stett. Ent. Zeit.* xxvii. p. 215 (1866) (Calif.); Reak., *Proc. Ent. Soc. Philad.* vi. p. 126 (1867) (Pike's Peak, Colo.; Washington Terr.); Kirby, *Cat. Diurn. Lep.* p. 565. n. 314 (1871); Strecker, *Lep. Rhop. Het.* p. 25. t. 4. fig. 1 (1873) (California; Washington; Vancouver I.); H. Edw., *Proc. Cal. Ac. Sc.* v. p. 164 (1873) (larva, pupa); Edw., *Butt. N. Amer.* ii. *Pap.* t. 1 (1874) (metam.); Mead, in Wheeler, *Rept. Expl. Surv.* v. *Zool.* 8. p. 742 (1875) (Colorado); Edw., *Trans. Amer. Ent. Soc.* vi. p. 11. n. 15 (1877) (Calif. to Brit. Col.; Arizona to Montana); Gerh., *Macro-Lep. N. Am.* p. 25. n. 444 (1878); Strecker, *Butt. Moths N. Am.* p. 70. n. 12 (1878) (Calif.; Oregon; Vancouver I.); Oberth., *Et. d'Ent.* iv. p. 68. n. 189 (1880); Edw., *Papilio* iii. p. 158 (1883) (Montana); Behr, *Bull. Cal. Ac. Sc.* i. p. 64 (1884) (Calif., common, l. on *Rhamnus californica*); Denton, *Canad. Ent.* xxi. p. 111 (1889) (Nevada); Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 12 (1889) (literat. rel. to metamorphosis); Mayn., *Man. N. Amer. Butt.* p. 12 n. 16 (1891); Haase, *Untersuch. Mimicry* i. p. 89 (1893); Dyar, *Ent. News* iv. p. 243 (1893) (life history; on *Rhamnus californica*); Cunningh., *ibid.* vi. p. 251 (1895) (Ft. Klamath, Oregon); Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 90. t. 5. fig. 5

(1895) (California) ; id., *Orthogen.* p. 28. fig. 2 (1897) ; Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 278 (1897) ; Twog., *Ent. News* viii. p. 31 (1897) (Riverside, Calif., one ex., Aug.) ; Holland, *Butt. Book* p. 308. n. 2. t. 44. fig. 5. ♂ (1899) (Mexico to Alaska, eastwards to Colorado); Denton, *Moths Butt. U.S.A.* ii. p. 340 (1898—1900) ; Brown, *Ent. News* xii. p. 301 (1901) (Salt Lake City, common from 4500 to 6000 ft.) ; Dyar, *Bull. U.S. Nat. Mus.* lii. p. 2. n. 9 (1902) (Pacific States ; Colorado) ; id., *Proc. U.S. Nat. Mus.* xxvii. p. 782 (1904) (Kootenai, June, larva on *Ceanothus*) ; Wright, *Butt. West Coast* ed. ii. p. 83. t. 3. fig. 17 (1906) (mountain species, up to 8000 ft.).

Papilio rutulus var. a. *Papilio eurymedon* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 24. sub n. 111 (1852) (California) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 32. sub n. 118 (1856).

Papilio rutulus var. *eurymedon*, Vollenhoven, *Tijdschr. Ent.* iii. p. 85. n. 133 (1860).

Papilio eurimodon (!), Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 348 (1864).

Papilio albanus Felder, *l.c.* xiv. p. 314. n. 349 (1864) (nom. indescr. ; California) ; id., *Reise Novara, Lep.* p. 93. n. 71. (1865) ; Edw., *Papilio* ii. p. 122 (1882) (♂♂ in the mountains or at 2000 ft. are nearly always this form) ; Butler, *Journ. Linn. Soc. Lond.* xvi. p. 472. n. 60 (1883) (=? *eurymedon* ; Mendocino) ; Wright, *Butt. West Coast* ed. ii. p. 84. n. 18 (1906) (characters do not hold good).

Papilio rutulus var. a. *P. albanus*, Kirby, *Cat. Diurn. Lep.* p. 565. sub n. 315 (1871).

Papilio lewisi Kirby (ex Peale, ined.), *Papilio* iv. p. 104 (1884) (= *eurymedon*).

Papilio eurymedon var. *albanus*, Winkle, *Canad. Ent.* xxv. p. 212 (1893).

Papilio rutulus, Danby, *Journ. N. York Ent. Soc.* ii. p. 33 (1894) (Vancouver I., common ; = *eurymedon*, as stated on p. 141).

Papilio eurymedon albanus, Dyar, *l.c.* (1902).

♂♀. The black bands on both sides of the wings much heavier than in either *P. rutulus* or *daunus*, but their width very variable. At higher altitudes there occur often specimens in which the black distal marginal border is much reduced, being about the same width on the forewing between R^2 and M^2 as the yellowish white discal band. This is Felder's *P. albanus*, *l.c.*, which may nomenclatorially be distinguished from the ordinary form as—

f. mont. *albanus* Feld. (1865).

Besides two specimens from Felder's collection we have this form from Colorado and California.

The costal ⌒-mark of the forewing is not centred with creamy buff in *P. eurymedon* either above or below ; the submarginal spots of the forewing above are more or less linear ; the powdery buffish line on the black postdiscal band of the underside of the forewing is narrow or absent. In Colorado specimens the black bands are on the whole a little narrower than in Californian ones.

Genitalia : ♂. Harpe dorsally less elevate in the allied species, the hook being shorter, bearing usually a few teeth, there being generally no other prominent teeth at the oblique dorsal edge of the harpe ; but this edge occasionally minutely denticulate, the ventral edge being also often provided with one or two teeth ; apex of harpe as in *P. rutulus*, not produced, the process standing at the ventral apical corner.——♀. Antevaginal process pointed, lateral flaps rather larger than in *P. rutulus*.

For early stages see Dyar, *l.c.* (1893).

Hab. British Columbia to Southern California and Colorado.

Holland, in *Butt. Book*, records it from Alaska and Mexico, which requires confirmation.

In the Tring Museum 180 ♂♂, 32 ♀♀, from : Glenwood Springs and Chimney Gulch, Colorado, June 1900 and 1901 (Oslar); Mendocino, California, August (O. T. Baron) ; McCloud R., Shasta, June 1884 (O. T. Baron) ; Quincy, California, May, June and July 1897 (Watson); Butte Co., Lake Co., and Modoc Co., June

and July 1897 and 1898 (Mrs. Austin); Hoopa Valley, July 1896 (Dongherty); Gold Hill, Oregon (Biedermann); Ozoyoos, British Columbia (Raynolds); Nicomin I., Frazer R., May and June 1900; Kaslo; New Westminster (A. D. Jones); Qu'Appelle, Assiniboia, July 1901.

83. Papilio alexiares Hopff. (1866).

Papilio alexiares Hopffer, *Stett. Ent. Zeit.* xxvii. p. 31. n. 12 (1866) (Mexico).

♂♀. In shape of wings intermediate between *P. rutulus* and *P. glaucus*. Forewing: distal margin straight or feebly concave; subbasal yellow interspace acutely triangular, more pointed anteriorly than in *P. glaucus*; third band reaching to M^2 or beyond.——Hindwing: black abdominal border a little narrower than or as broad as the yellow interspace between it and cell at base of M^2; black median band proximal of SC^2.

Underside: costal ⊃-mark of forewing centred with yellow, the posterior edge or the proximal dilated portion remaining pure black; the yellow scaling within this mark continuous with the greyish or buffish yellow band situated on the black postdiscal band, the pure black edges of the latter being sharply defined both proximally and distally; yellow submarginal spots linear, forming a continuous (or nearly) band which perceptibly widens costally.——Hindwing with large or small orange patches on disc from R^1 backwards.

Genitalia: ♂. Apex of harpe produced beyond base of ventral process, acuminate, a long, curved, simple, conical tooth at dorsal angle, a few small teeth between it and the apex of the harpe.——♀ not dissected.

Early stages not known.

Hab. Eastern Mexico.

Two subspecies.

a. P. alexiares garcia subsp. nov.

♂. *Upperside:* black bands of both wings much narrower than in *P. alex. alexiares*. Forewing: third black band not extending beyond M^2; yellow apical cell-band about as wide as the black band outside it; black distal border not wider between R^2 and M^2 than the yellow discal band; a row of eight distinct submarginal spots, which are larger than in *P. alex. alexiares*; yellow discal spots SC^5—R^3 also larger than in that form.——Hindwing: black distal border narrower than in *P. alex. alexiares*, especially behind, the yellow internervular patches around apex of cell therefore larger; submarginal spots and orange anal marginal spot much larger, tail slenderer and less curved than in the next form; submarginal spot M^1—M^2 orange, small.

Underside: yellow submarginal line of forewing more or less distinctly interrupted at the veins.——Hindwing: on disc between R^1 and SM^2 large elongate-triangular orange patches; first and sixth submarginal spots and anal marginal spot totally or for the greater part orange, the other submarginal spots slightly or not at all touched with orange.

Hab. Monterrey, San Luis Potosi.

In the Tring Museum 3 ♂♂.

b. P. alexiares alexiares Hopff. (1866).

Papilio alexiares Hopffer, *l.c.*; Kirby, *Cat. Diurn. Lep.* p. 567. n. 328 (1871); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 241. n. 80. t. 72. fig. 6. 7. ♂ (1893) (Cuesta de Misantla).

♂♀. *Upperside.*—Forewing: the yellow portions often more or less shaded

over with black ; third black band extending beyond M^2 ; yellow apical cell-band narrower than the black band standing at its distal side ; black distal border wider throughout than the yellow discal band ; submarginal spots thin, posterior ones absent or vestigial.——Hindwing : anal marginal spot small, slightly orange ; black distal border sometimes almost touching cell.

Underside : yellow submarginal line of forewing broad, continuous, only the last one or two spots standing separate.——Hindwing : orange discal spots small.

Hab. Vera Cruz : Cuesta de Misantla.

In the Tring Museum 2 ♂♂, 2 ♀♀.

84. **Papilio pilumnus** Boisd. (1836).

Papilio pilumnus Boisduval, *Spec. Gén. Lép.* i. p. 340. n. 181 (1836) (Mexico) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845) (Mexico) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 89 (1846) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 24. n. 110 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 32. n. 117 (1856) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. *Suppl.* p. 68. n. 1116. t. 7. fig. 2. ♀ (1857) (Mexico) ; id., *l.c.* ii. p. 110. n. 1116 (1863) ; Vollenh., *Tijdschr. Ent.* iii. p. 85. n. 139 (1860) (Mexico) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 149 (1863) ("probably ♀ of *P. daunus*") ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 345 (1864) ("not ♀ of *daunus*") ; Reak., *Proc. Ent. Soc. Philad.* vi. p. 127 (1867) (New Mexico ; ?also Texas and Mexico) ; Kirby, *Cat. Diurn. Lep.* p. 564. n. 311 (1871) ; Streeker, *Lep. Rhop. Het.* p. 13. t. 2. fig. 3 (1873) (New Mexico ; Vera Cruz) ; Mead, in Wheeler, *Rept. Expl. Surv.* v. *Zool.* 8. p. 741 (1875) (New Mexico) ; Edw., *Trans. Amer. Ent. Soc.* vi. p. 11. n. 19 (1877) (Arizona ; New Mexico) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 456 (1878) (New Mexico) ; Streeker, *Butt. Moths N. Amer.* p. 68. n. 8 (1878) (New Mexico ; Mexico ; Central America) ; Oberth., *Et. d'Ent.* iv. p. 68. n. 190 (1880) (Mexico ; 2 ♂♂, typ. specim.) ; Schaus, *Papilio* iv. p. 100 (1884) (descr. of larva & pupa) ; Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 12 (1889) (literat relat. to metamorph.) ; id., *Butt. N. Amer.* iii. *Pap.* t. 2. ♂. ♀ (1889) ; Mayn., *Man. N. Amer. Butt.* p. 14. n. 19. fig. 9. c (1891) (Arizona ; Mexico) ; Haase, *Untersuch. Mimicry* i. p. 90 (1893) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 241. n. 79. t. 72. fig. 10. genit. (1893) (New Mexico ; Mexico ; Guatemala ; open grassy plains ; "Colorado" errore ?) ; Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 84. t. 5. fig. 3 (1895) (Mexico) ; Christ, *Mitth. Schweiz. Ent. Ges.* ix. p. 278 (1897) (southern form of *daunus* ?) ; Edw., *Butt. N. Amer.* iii. *Suppl.* p. 8 (1897) ; Holland, *Butt. Book* p. 310. t. 38. fig. 3. ♂ (1899) (Mexico ; occasionally in Arizona) ; Denton, *Moths Butt. U.S.* i. ii. p. 339 (1898—1900) ; Dyar, *Bull. U.S. Nat. Mus.* lii. p. 2. n. 7 (1902) (Texas ; Arizona ; Mexico).

In pattern a primitive form, being of all species the nearest approach to the ancestral form from which the groups of *thoas, lycophron, glaucus* and *troilus* originated. It agrees in pattern best with the *Glaucus Group* of species, but differs in having in the hindwing the nearly symmetrical cell of *P. lycophron*. The tibiae and tarsi are as pale as in *P. thoas*, but less green. The two sharply defined orange spots M^1—SM^2 on the *upperside* of the hindwing and the broad black antemedian band of the *underside* centred with drab are the most characteristic features in the pattern of *P. pilumnus*. These orange spots are sometimes preceded by two more spots, which are of the same colour, but not sharply defined. The discal portion of the apical cell-band of the forewing is rather variable, being usually continuous, while in a few specimens the last vein-spot is separated from the band, being minute or vestigial. The yellow or yellowish line distally of the yellow tripartite band on the upperside of the forewing is sometimes absent, while it is rather broad in other specimens, especially in Guatemalan individuals.

Genitalia : ♂. Tenth tergite long, feebly spatulate ; sternite on each side with an obliquely transverse double ridge, both low, but rather sharply cariniform ; harpe broad, produced at apex into a sharp tooth, ventral edge nearly straight, the short,

oblique, dorsal edge dentate, the number and size of the teeth variable.—— ♀ no dissected.

Early stages described by Schaus, *l.c.*, nearest to those of *P. troilus*.

Hab. Arizona to Guatemala.

In the Tring Museum 28 ♂♂, 1 ♀, from : Arizona ; Monterey, Mexico ; Las Vigas, Mexico, June 1896 (W. Schaus); Orizaba, May 1896 (W. Schaus) ; Jalapa, February 1896 (W. Schaus) ; Oaxaca; Guerrero (O. T. Baron) ; Palin, W. Guatemala, 2500 ft., August—September 1904 (A. Hall) ; La Antigua, W. Guatemala, 5000 ft., August 1904 (A. Hall).

VII. Troilus Group.

Closely allied to the *Anchisiades Group*.

SC^2 of forewing in middle or at two-fifths between SC^1 and SC^3 ; lower angle of cell not much more obtuse than upper angle ; D^2 shorter than D^3; basal cellule of hindwing longer than in the *Anchisiades Group*, PC more strongly curved. Two widely separated rows of spots on underside of forewing; hindwing below with metallic blue patches.

Genitalia : ♂. Harpe with ventral tooth and apical process, resembling the harpe of the *Anchisiades Group*.—— ♀. Vaginal armature also of the type of *P. anchisiades*.

Larva with eye-spot on each side of thorax.

Two species.

Antenna and legs black . . . . . Species No. 85.

Antenna tawny, tibiae and tarsi pale yellowish green . . Species No. 86.

85. Papilio troilus L. (1758).

Papilio Eques Trojanus troilus Linné, *Syst. Nat.* ed. x. p. 459. n. 6 (1758).

The close relationship between *P. troilus* and *P. palamedes* becomes at once evident on comparing the pattern and structure of the two insects. The pale subbasal band on the underside of the hindwing so characteristic of *P. palamedes* is sometimes represented in southern specimens of *P. troilus* by a line which is continued across the forewing, there being a diffuse yellow costal streak at the base of the forewing in all specimens. The subapical cell-spot, usually double, on the underside of the forewing corresponds to the bar of *P. palamedes* ; it is occasionally missing. While most specimens have on the disc of the forewing above and below only one row of spots, which are usually small on the upperside, being often absent, some females bear two rows. These rows are in some males represented anteriorly by a dot in the subcostal fork and a more proximal dot before the fork. Besides the orange costal spots the upperside of the hindwing bears sometimes in the female a small orange spot behind SC^2. One of the most interesting features in the pattern of *P. troilus* is the disappearance of the orange spot R^3—M^1 on the underside of the hindwing. Most specimens bear a few orange scales where the spot has been, sometimes there is even a distinct but small orange spot, but in the majority of specimens the spot is suppressed, the scales having assumed a glaucous buff tint.

First protarsal segment longer than the other four together.

The variability in the dentition of the scaling of the underside is of some interest. The scales have in most females one tooth less than in the males, being on the anterior area of the forewing tri- or quadridentate and in the posterior area

bidentate or entire. On the hindwing the scales of the central orange spots of the discal row have also on the whole one tooth less than the upper and posterior discal spots and the submarginal spots.

Neuration : SC^2 of forewing about halfway between SC^1 and SC^3, the latter often a little proximal of apex of cell ; D^1 before middle of cell ; subbasal cellule of hindwing narrow, long, PC angulate.

Genitalia : ♂. Tenth tergite spatulate ; sternite with a lateral lobe which is more strongly chitinised than the rest of the sternite, divided by an oblique transverse depression or groove into two ridges. Clasper elongate-triangular, the tip being rounded off ; harpe ending in a long and slender, smooth, acute process as in *P. anchisiades*, the nearly straight ventral margin bearing in the middle a prominent tooth ; the short dorso-apical edge oblique, dentate.——♀. Armature of the same type as in *P. anchisiades* ; edge of orifice proximally produced into a long lobe which widens apically, the apex being truncate and bearing some teeth ; anterior surface of lobe longitudinally impressed, posterior surface carinate, except at apex ; sides of orifice raised into a smaller lobe or ridge ; behind orifice a membranous tubercle densely covered with minute hairs ; a large lateral ridge, dentate, gradually becoming lower towards the mesial line of the body, curving towards the middle lobe on the anterior surface of which it disappears ; between this ridge and the orifice on each side of the latter a large dentate lobe which stands in connection with the lateral ridge as well as with the elevate edge of the orifice. Bristles on inner surface of anal segment numerous but short.

Early stages first described by Abbot and Smith.

Hab. Atlantic district of the Nearctic Region.

Two subspecies.

a. P. troilus troilus L. (1758).

Papilio Eques Trojanus troilus Linné, *Syst. Nat.* ed. x. p. 459. n. 6 (1758); id., *Mus. Lud. Ulr.* p. 187. n. 6 (1764) ; Houtt., *Naturl. Hist.* i. 11. p. 192. n. 5 (1767) ; Linné, *Syst. Nat.* ed. xii. p. 746. n. 6 (1767) ; Fabr., *Syst. Ent.* p. 444. n. 7 (1775) (*partim*) ; Goeze, *Ent. Beytr.* iii. 1. p. 31. n. 6 (1779) ; Cramer, *Pap. Exot.* iii. p. 25. t. 207. fig. B. C (1779) ; Fabr., *Spec. Ins.* ii. p. 3. n. 9 (1781) (*partim*) ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 242. n. 58 (1784) (*partim* ; *nec* fig.) ; iid., *l.c.* p. 291. t. 20. fig. 2 (1784) ; Esper, *Ausl. Schmett.* p. 21. n. 6. t. 3. fig. 2. ♂ (1784) (cit. *partim*) ; Panzer, *Drury's Abbild.* p. 55. t. 11. fig. 2. 3. 5 (1785) ; Fabr., *Mant. Ins.* ii. p. 2. n. 9 (1787) (*partim*) ; Gmelin, *Syst. Nat.* i. 5. p. 2225. n. 6 (1790) (*partim*) ; Fabr., *Ent. Syst.* iii. 1. p. 4. n. 10 (1793) (*partim*).

Papilio Eques troilus, Lange, in Linné, *Syst. Nat.* p. 459. n. 5 (1760) (" in Indiis ").

Papilio (Troes) troilus, Müller, *Naturs.* v. 1. p. 567. n. 6 (1774).

Papilio (troilus), Meerburgh, *Afb. Zeldz. Gew.* t. 4. 7 (1775).

Pterourus troilus, Scopoli, *Intr. Hist. Nat.* p. 433 (1777) ; Scudder, *Syst. Rev. Amer. Butt.* p. 44 (1872) ; Sprague, *Psyche* ii. p. 257 (1879) (Wollaston, Mass., May 25.) ; id., *l.c.* p. 259 (1879) (Mass., May 25 to Aug 5).

Papilio ilioneus Abbot & Smith, *Ins. Georgia* i. p. 3. t. 2. fig. 1 (1797) (larva, pupa, ♂, ♀) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 315. n. 362 (1864) ; Kirby, *Cat. Diurn. Lep.* p. 567 n. 326 (1871).

Euphoeades troilus Hübner, *Verz. bek. Schmett.* p. 83. n. 847 (1818 ?) ; id., *Samml. Exot. Schmett.* ii. t. 96 (1822 ?) ; Scudd., *Butterfl.* p. 304. 309. fig. 50. 51. 63. 173 (1881) ; id., *Butt. East. U.S.* ii. p. 1313. t. 8. fig. 4. 5, t. 27. fig. 1, t. 35. fig. 19. 20, t. 40. fig. 3, t. 57. fig. 6, t. 61. fig. 48. 56, t. 66. fig. 13, t. 68. fig. 20, t. 72. fig. 8. 9, t. 76, fig. 18. 19. 22, t. 79. fig. 69-73, t. 82. fig. 4-6, t. 85. fig. 5-7, t. 86. fig. 20-23. 34. 35. 78-80, t. 87. fig. 6. 15. 24 (1889) (metam., morphol., etc.) ; id., *Psyche* viii. p. 209. t. 5. f. 4, l. juv. (1898) ; Durand, *ibid.* ix. p. 87 (1900 (N. Toronto, once-brooded).

Papilio troilus, Godart, *Enc. Méth.* ix. p. 60. n. 97 (1819) (cit. Drury excl. ; " Jamaica " false) ; Charpent., in Esper, *Ausl. Schmett., Append.* p. 5 (1830) ; Boisd. & Lec., *Hist. Gén. Lép. Amér.*

Sept. p. 26. t. 10. fig. 1-4 (1833)(larva, pupa, ♂ ; Georgia ; Virginia) ; Boisd., *Spec. Gén. Lép.* i. p. 331. n. 176 (1836) ; Harris, *Entom.* i. p. 61 (1840) (larva solitary, covers leaf with coating of silk and binds up the sides to form a kind of trough) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 15 (1845) ; id , Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 85 (1846) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 23. n. 106 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 31. n. 113 (1856) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 2. n. 28 (1857) ; D'Urb., *Canad. Nat. Geol.* ii. p. 312. fig. a. b., t. 4. fig. 1 (1857) ; Gosse, *Lett. Alabama* p. 78 (1859) ; Newm., *Proc. Ent. Soc. Philad.* i. p. 26 (1861) (N. Jersey ; on *sassafras*) ; Morris, *Syn. Lep. N. Amer.* p. 5. n. 6 (1862) ; Harr., ed. Flint, *Ins. Inj. Veg.* p. 266 (1862) (life history) ; Reak., *Proc. Ent. Soc. Philad.* ii. p. 135. n. 1 (1863) ("Chiapas" false) ; Weidem., *ibid.* ii. p. 148 (1863) (Canada to Mexico ; "West Indies" false) ; Lintn., *ibid.* iii. p. 51 (1864) (Eastern N. York, very rare) ; Kirkp., *ibid.* iii. p. 329 (1864) (Cleveland, Ohio, common) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 316. n. 363 (1864) ; Saund., *Canad. Ent.* i. 73 (1868) (early stages ; London ; imago appearing in June) ; Riley, *Amer. Entom.* i. p. 60 (1868) ; Pack., *Guide Study Ins.* p. 247 (1868) ; Bethune, *Canad. Ent.* ii. p. 8 (1869) (Toronto, July) ; Harris, *Ent. Corresp.* p. 271. t. 2. fig. 1, t. 4. fig. 16 (1869) ; Scudd , *Canad. Ent.* iv. p. 84 (1872) (Abbot's MSS.) ; Saund., *ibid.* vi. p. 140 (1874) (Essex Co.) ; Bean, *Ent. Mo. Mag.* x. p. 248 (1874) (Galena, Ill., scarce, late Aug.) ; Pagenst., *Verh. Nat. Med. Ver. Heidelb.* (2). i. p. 89 (1874) ; Edw., *Trans. Amer. Ent. Soc.* vi. p. 10. n. 14 (1877) (Atlantic States ; Mississippi valley ; = *ilioneus*) ; Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., common) ; Gerb., *Macro-Lep. N. Amer.* p. 25. n. 455 (1878) ; Streck., *Butt. Moths N. Amer.* p. 72. n. 18 (1878) ; French, *Trans. Dept. Agric Illin.* xv. p. 138 (1878) ; Oberth., *Et. d'Ent.* iv. p. 69. n. 198 (1880) ; Middl., *Trans. Dept. Agric. Illin.* xviii. p. 74 (1881) ; Skinn., *Proc. Ac. N. Sci. Philad.* p. 239 (1882) (scent-organ of larva) ; Auriv., *K. Sv. Vet. Ak. Handl.* xix. 5. p. 12. n. 6 (1882) (Recensio critica) ; Edw., *Canad. Ent.* xvi. p. 115 (1884) (habits of larva) ; French, *Butt. East. U.S.* p. 93 (1884) ; Gruber, *Papilio* iv. p. 87. t. 2. f. 12-15 (1884) (transf.) ; Saund., *Rept. Ent. Soc. Ontario* xv. p. 30 (1885) (Point Pelee, L. Erie) ; Mayn., *Butt. N. Engl.* p. 49. n. 68. t. 7. fig. 68. 68a. ♂ (1886) ; Mil., *Nat. Sicil.* v. p. 243 (1886) (Monaco ?) ; Riley, *Insect-Life* i. p. 161 (1888) (parasite : *Tragus exesorius*) ; Skin. & Aaron, *Canad. Ent.* xxi. p. 127 (1889) (Philadelphia, common) ; Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 10 (1889) (literat. on metam. ; cit. Gundl. ad speciem *P. polyxenes* dictam referenda) ; Pack., *Fifth Rept. U.S. Ent. Comm.* p. 650 (1890) (early stages) ; id., *l.c.* p. 663. 669. 909 (1890) (food-plants) ; Riley, *Insect Life* iii. p. 462 (1890) (parasite : *Pimpla notanda*) ; Mayn., *Man. N. Amer. Butt.* p. 10. n. 13. fig. 8. d (1891) ; Staley, *Canad. Ent.* xxiv. p. 204 (1892) (Marshall, Missouri, iv.—x. not very common) ; Haase, *Untersuch. Mimicry* i. p. 91 (1893) ; Skinn., *Ent. News* iv. p. 82 (1893) (N. Carolina) ; Meeske, *ibid.* iv. p. 117 (1893) (Long I., common) ; Jones, *ibid.* iv. p. 190 (1893) (Richmond Co., N.C.) ; Davis, *Journ. N. York Ent. Soc.* i. p. 47 (1893) (Staten I., N.Y., May to Sept.) ; Riley, *Insect Life* v. p. 207 (1893) (Falls Church, Va., larva abundant, November) ; Beutenm., *Bull. Amer. Mus. N. H.* v. p. 242 (1893) (N. York ; descr. of l., p., i.) ; White, *Ent. News* v. p. 175 (1894) (Brooklyn) ; Weed, *Psyche* viii. p. 130. n. 38 (1894) (N.E. Miss.) ; Osburn, *Ent. News* vi. p. 282. n. 47 (1895) (Tennessee, common. vii. to ix., two broods) ; Longl., *ibid.* vi. p. 314 (1895) (Chicago) ; Eimer, *Artb. Verwandtsch. Schmett.* ii. p. 143. t. 8. fig. 2. ♂ (1895) ("nearest to *Pap. asterias*") ; Clevel., *Ent. News* vii. p. 73 (1896) (Oneonta, N.Y.) ; Fiske, *ibid.* vii. p. 241 (1896) (Webster, N.H., not so common as *turnus*, June, July, second brood rare in Aug.) ; Bubaa, *ibid.* viii. p. 98 (1897) (Cleveland, Ohio, May 2 and 3) ; Dazey, *Bull Buffalo Soc N. Sc.* v. p. 107. n. 4 (1897) (Buffalo) ; Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 273 (1897) ; Rowley, *Ent. News* ix. p. 37 (1898) (Louisiana, Mo., larva making silken case by drawing the edges of the leaf together) ; Holland, *Butt. Book* p. 315. n. 18. t. 2. fig. 18. 19. 20. larva, t. 6. fig. 5. 6. 7. pupa, t. 41. fig. 5. ♂ (1899) ; Denton, *Moths Butt. U.S.* p. 351. fig. larva and pupa, plate ♀ (1898-1900) ; Walk., *Rept. Ent. Soc. Ontario* xxxii. p. 85 (1902) (Point Pelee, Leamington) ; Beutenm., *Butt. N. York City* p. 5. n. 3. fig. ♀ (1902) ; Dyar, *Bull. U.S. Nat. Mus.* lii. p. 3. n. 13 (1902) (Atlantic States ; N.W. Territory) ; Heink, *Ent. News* xiv. p. 335 (1903) (Meramec Highlands, St. Louis Co., April 12) ; Franck, *Ent. News* xv. p. 111 (1904) (aberration) ; id., *l.c.* xvi. p. 91 (1905) (Passaic, N. Jersey, aberration).

Papilio troilus (!), Edwards, *Papilio* ii. p. 76 (1882).

Papilio troilus var. *ilioneus*, Haase, *Untersuch. Mimicry* i. p. 91 (1893).

Pterurus (!) *troilus*, Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 289 (1896) ; id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 100. t. 309. fig. 1. 2 (190—?).

Pterurus ilioneus, Kirby, in Allen's *Nat. Libr., l.c.*

Papilio troilus var. *radiatus* Strecker, *Lep. Rhop. Het. Suppl.* iii. p. 17 (1900) (Washington, D.C. ; Allegheny Co., Pa.).

♂ ♀. Submarginal spots of both wings smaller than in southern specimens, those of hindwing more or less bluish. We have received from the American Ent. Co. (Mr. G. Franck, who has shortly described it in 1905, *l.c.*) a curious specimen which deserves special description, as it corresponds in pattern to the ab. *calverleyi* of *P. polyxenes asterius*. It was captured in June at Westfield, New Jersey.——*Upperside.*—Forewing : submarginal spots enlarged, extended to edge of wing, where they are confluent; costal edge thinly creamy white at apex ; distal margin slightly undulate.——Hindwing : orange costal spot small, discal band olive-buff, rather well defined and narrow, not entering cell ; submarginal spots extended to margin, bluish, fringe entirely creamy white ; a yellow anal submarginal streak, a yellow marginal spot M^1—M^2, and another behind M^2 ; dentition of wing feeble ; the colour of the submarginal spots pervading the tail, except a black central streak.——On *underside* the marginal bands as above, but the spots composing that of the hindwing a little more distinctly separate and all orange mesially; the orange discal spots all present, inclusive of spot R^3—M^1 ; tail black, except at edges. The specimen has also a very peculiar neuration.——Forewing : costal vein forked before middle of wing, the fork being on a level with the point of origin of SC^1, the short additional (anterior) branch extending a little beyond apex of cell : SC^3 before angle of cell ; M^2 forked in middle, the two branches remaining separate in the left wing, while in the right wing the branches unite again before reaching the edge of the wing ; on both wings there is an additional discal spot between the two branches, and on the left wing also an additional spot at the margin ; spur of median nervure continued distad for one-third the way to distal margin—this additional vein being the so-called first submedian, of which the spur of *Papilionidae* is the remnant. On the hindwing M^2 forked on the left wing beyond the orange discal spots of the underside, on the right wing before these spots, there being on the latter wing an additional discal spot and also a spot at the margin.

Hab. Georgia northward to Canada, westward to Texas and the Mississippi plains, in the north-west as far as the North-West Territory of Canada.

In the Tring Museum 70 ♂♂, 50 ♀♀ and some larvae from : Rayleigh, N. Carolina (Brimley) ; Nelson Co., Virginia (Wirt Robinson) ; Jefferson Co., Kentucky (Troxler); Nashville, Tennessee (Osburn) ; Makanda, Illinois (Snyder) ; Texas.

b. P. troilus texanus Ehrm. (1900).

Papilio troilus var. *texanus* Ehrmann, *Canad. Ent* xxxii. p. 348 (1900) (" Houston, Texas").
Papilio troilus texanus, Dyar, *l.c.* p. 3. n. 13a (1902) ; Skinn., *Ent. News* xiv. p. 275 (1903) (Chokoloskee, Fla.).
Papilio troilus, Laurent, *ibid.* p. 296 (1903) (Miami, Fla., common).

♂ ♀. Submarginal spots of both wings large. On underside rather often a pale subbasal band on hindwing or on both wings, and a streak behind SM^2.

Hab. Florida.

Described by Ehrmann from a single specimen said to be from " Houston, Texas." The Texas specimens which we have seen agree much better with the previous form than with Florida individuals. The locality given by Mr. Ehrmann is perhaps erroneous.

In the Tring Museum 14 ♂♂, 2 ♀♀, from : Chokoloskee, June 1903 ; Titusville, August 1894 ; Florida, August—September 1895 (Pridday).

86. **Papilio palamedes** Drury (1770).

Papilio Eques Achivus palamedes Drury, *Illustr. Exot. Ins.* i. p. 37. t. 19. fig. 1. 2. & Index (1770) (Carolina).

♂ ♀. Antenna tawny. Tibiae and tarsi pale greenish, as in *P. thoas* and allies. In neuration and genitalia similar to *P. troilus*.

Discal band of hindwing, *above*, usually distal of cell, often touching cell, many specimens bearing a small pale yellow cell-spot. Cell-bar of forewing sometimes vestigial on upperside; yellow subbasal band of underside of hindwing often continued across cell of forewing.

Genitalia: ♂. Tenth tergite longer and narrower than in *P. troilus*; harpe as in that species, but the ventral tooth shifted towards the apex, standing close to the apical process.—— ♀. Mesial process standing at vaginal orifice sinuate apically, non-dentate, lateral lobe less strongly dentate than in *P. troilus*, lateral ridge non-dentate, but the edge irregular. Bristles on inner surface of anal segment as in *P. troilus*.

For early stages see Boisd. & Lec. (1833).

Hab. Southern Atlantic district of the Nearctic Region, extending into Mexico.

Two subspecies.

a. P. palamedes palamedes Drury (1770).

Seba, *Thesaur.* iv. p. 51. t. 43. fig. 3. 4 (1764).

Papilio Eques Achivus palamedes Drury, *l.c.*; Cramer, *Pap. Exot.* i. p. 146. t. 93. fig. A. B (1776) (N. York); Goeze, *Ent. Beytr.* iii. 1. p. 73. n. 11. (1779) (*partim*); Jung, *Alphab. Verz.* p. 77 (1792) (= *chalcus*).

Papilio Eques Achivus chalcas Fabricius, *Syst. Ent.* p. 453. n. 44 (1775); Goeze, *Ent. Beytr.* iii. 1. p. 73. n. 10 (1779); Fabr., *Syst. Ent.* iii. 1. p. 31. n. 90 (1793).

Papilio Eques Achivus flavomaculatus Goeze, *Ent. Beytr.* iii. 1. p. 87. n. 72 (1779) (nom. pro Sebae t. 43. fig. 3. 4).

Papilio Eques Achivus chalcus Fabricius, *Spec. Ins.* ii. p. 18. n. 70 (1781); id., *Mant. Ins.* ii. p. 9. n. 80 (1787); Jabl. & Herbst, *Nat. Schmett.* iii. p. 139. n. 94. t. 42. fig. 1. 2 (1788) (= *palamedes* Drury); Gmelin, *Syst. Nat.* i. 5. p. 2239. n. 315 (1790).

Papilio Eques Achivus calchas Esper, *Ausl. Schmett.* p. 229. n. 106. t. 56. fig. 3 (1798) (nom. nov. loco *chalcas*).

Papilio calchas, Godart, *Enc. Méth.* ix. p. 59. n. 92 (1819); Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 17. t. 5. fig. 1—4 (1833) (larva, pupa, ♂); Boisd., *Spec. Gén. Lép.* i. p. 337. n. 178 (1836); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845) (E. Florida; Georgia); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 91 (1846) (U.S.; Mexico; "Jamaica" false); Gosse, *Letters from Alabama* p. 169. 272 (1859).

Papilio palamedes, Drury, ed. Westw., *Illustr. Exot. Ent.* i. p. 36. t. 19. fig. 1. 2 (1837); Poey, *Mem. Hist. Nat. Cuba* i. p. 197. n. 12 (1851) (Cuba?; *palamedes* has priority); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 25. n. 113 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 33 n. 120 (1856) (E. Florida; Georgia); Lucas, in Sagra, *Hist. Cuba* vii. p. 203 (1857) ("Cuba" false); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (U.S.; "West Ind." false); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 316. n. 364 (1864); Jaeg., *Life N. Am. Ins.* p. 210 (1864); Butler, *Cat. Diurn. Lep. descr. Fabr.* p. 250. n. 53 (1869); Kirby, *Cat. Diurn. Lep.* p. 543. n. 166 (1871); Edw., *Trans. Amer. Ent. Soc.* vi. p. 11. n. 20 (1877) (Florida to Virginia; Gulf States; = *calchas*); Gerh., *Macro-Lep. N. Amer.* p. 25. n. 439 (1878); Streck., *Butt. Moths N. Amer.* p. 73. n. 19 (1878) (Virginia southward, south-west to Louisiana); Oberth., *Et. d'Ent.* iv. p. 69. n. 199 (1880) (Florida); Edw., *Canad. Ent.* xiii. p. 119 (1881) (life hist.); id., *l.c.* xvi. p. 115 (1884) (habits of larva); Aaron, *Papilio* iv. p. 172 (1884) (S. Texas); Edw., *l.c.* xviii. p. 15 (1886) (Glencoe, Nebraska); French, *Butt. East. U.S.* p. 95 (1886); Edw., *Bull. U.S. Nat. Mus.* xxxv. p. 11 (1889) (liter. on metam.); Skinn., *Ent. News* i. p. 110 (1890) (Philadelphia, one specimen); Mayn., *Man. N. Amer. Butt.* p. 10. n. 14. fig. 8. a (1891); Jones, *Ent. News* iv. p. 190 (1893) (Richmond Co., N.C.); Haase, *Untersuch. Mimicry* i. p. 90 (1893) ("the

Palamades Group shows close affinities with the *Daunus* Group"); Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 145. t. 8. fig. 3. ♂, fig. 4. ♀ (1895) ("closely related to *asterioides*, *asterias* and *brevicauda* on one side and to *bairdi* ♀ on the other"); id., *Orthogen.* p. 34. fig. 13 (1897); Christ, *Mitt. Schweiz. Ent. Ges* ix. p. 270 (1897) ("near relative of *zolicaon*"); Holland, *Butt. Book* p. 315. n. 19. t. 42. fig. 1, ♀ (1899); Dent., *Moths Butt. U.S.* p. 353. 354. fig. (1898—1900); Comst., *Ent. News* xiii. p. 75 & 77 (1902) (L. Josephine, Fla., quite common, Feb. 20 to March 25); Dyar, *Bull. U.S. Nat. Mus.* lii. p. 3. n. 12 (1902) (S. Atl. States).

Papilio chalcas, Morris, *Syn. Lep. N. Amer.* p. 7. n. 9 (1862).

Pterurus palamedes, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 101. t. 115. fig. 3. 4 (190-?)

♂ ♀. The discal spots on the underside of the hindwing on the whole less extended orange in Florida specimens than in individuals from other places, and the orange portion of the spot R^3—M^1 often reduced.

Hab. Florida to Philadelphia, westwards to the Mississipi plains.

In the Tring Museum 24 ♂♂, 14 ♀♀, from: Texas; New Orleans, April 1902 (A. Hall); Titusville, Florida, August—September 1894 and 1895.

b. P. palamedes leontis subsp. nov.

♂ ♀. A small form. *Upperside.*—Forewing: discal spots smaller than in the previous, in the female being smaller than the submarginal ones; streak in front of SC^3 absent or vestigial; cell-bar absent or faintly vestigial.——Hindwing: discal band narrower than in *P. p. palamedes*, the spots R^2—M^2 better defined.

Underside.—Forewing: cell-bar smaller than in the preceding form, often reduced to two small dots; discal spots also smaller; no subbasal band across cell. ——Hindwing: discal band narrower and on the whole more extended orange, and the glossy blue spots larger, than in *P. p. palamedes*.

Hab. Monterey, Mexico.

In the Tring Museum 6 ♂♂, 1 ♀.

VIII. Anchisiades Group.

Pronotum, or underside of thorax, or both, spotted with red or orange; abdomen black, at base with a lateral dot or short streak which is of the same colour as the thoracical spots, no yellow or buff lateral line on abdomen. Cell of forewing beneath not streaked with yellow. Hindwing without blue spots.

Neuration: SC^2 of forewing very much nearer SC^1 than SC^3; D^2 longer than D^3; lower angle of cell very obtuse; PC of hindwing long and gradually curved.

Genitalia: ♂. Tenth tergite spatulate; sternite laterally in middle incrassate to form a small double ridge or two teeth, of which the proximal one is hairy. Harpe long and (with the exception of *P. hyppason*) flat, being apically produced into a long and nearly straight point.——♀. Edge of vaginal orifice proximally raised into a prominent curved process, which is bicarinate or channelled in front and deeply grooved on posterior side; behind the orifice a membranous tubercle clothed with minute hairs; laterally a spatulate and dentate lobe or a pointed process, and further proximad a ridge which is shell-like laterally.

The larvae are gregarious, feeding chiefly on *Citrus*.

A. Sexes dissimilar; SC^2 of hindwing much more proximal than M^2; a red basal patch on underside of hindwing behind cell; spots of pronotum rufous red, those on underside of thorax and at base of abdomen pale buff . . . . . Species No. 87.

B. Sexes similar, with long spatulate tail; a creamy white band across disc (No. 88); or this band vestigial, in the latter case the marginal spots of both wings large (No. 89) . Species No. 88. 89.

C. Sexes similar; no sharply marked band across forewing; marginal spots of forewing small or absent, or the tail absent

a. Hindwing without tail, marginal spots all large, cream-colour . . . . . Species No. 99.

Hindwing with or without tail, marginal spots small, except the first spot on the hindwing, which is often somewhat enlarged . . . . . *b*.

b. On upperside of hindwing two parallel rows of spots, well separated from one another, the proximal or the distal row often missing . . . . . *c*.

The submarginal spots of hindwing close to the discal ones, touching them or being merged together with them, the submarginal spots R^3—M^2 enlarged . . . *d*.

c. Submarginal spots of hindwing above cream-colour in ♂; marginal spots of hindwing large in ♀, almost entirely orange-red above and below . . . . Species No. 93.

Submarginal spots of hindwing red in both sexes; marginal spots of ♀ moderately large, more white than orange-red below . . . . . Species No. 92.

Submarginal spots absent or vestigial, only one row on upperside, consisting of a few small spots . . . Species No. 94.

d. Forewing above with yellowish white patch from hind-margin forward to M^2, vestigial below . . . Species No. 91.

No such patch . . . . . *e*.

e. Hindwing with short acute tail; harpe non-dentate . . *f*.

Hindwing without tail, or tooth R^3 projecting, broad; harpe dentate . . . . . Species No. 95.

f. Forewing below with white patch across apex of cell . . Species No. 97.

Forewing below without white patch across apex of cell . Species No. 96.

87. **Papilio hyppason** Cram. (1775).

♂. *Papilio Eques Trojanus hyppason* Cramer, *Pap. Exot.* i. p. 46. t. 29. fig. E (1775) (Surinam); Goeze, *Ent. Beytr.* iii. 1. p. 37. note (1779) ("var. of *P. aeneas*"); Esper, *Ausl. Schmett.* p. 63. n. 28 (1788).

♀. *Papilio Eques Trojanus amosis* Cramer, *l.c.* iii. p. 139. t. 269. fig. A. B (1780) (Surinam); Stol., *ibid., Suppl.* p. 1. t. 1. fig. 1A, 1B (1787) (larva, pupa; this species? or *P. androjeus*?).

♂. *Papilio Eques Trojanus hippason*, Esper, *l.c.* t. 16. fig. 2 (1788).

♀. *Papilio Eques Trojanus amosis*, id., *l.c.* p. 64. n. 29. t. 76. fig. 3 (1788).

Papilio Eques Trojanus aeneas, Fabricius, *Spec. Ins.* ii. p. 8. n. 32 (1781) (*partim*).

Papilio Eques Trojanus aeneas γ) *P. hyppason*, Gmelin, *Syst. Nat.* i. 5. p. 2233. sub n. 16 (1790).

Papilio Eques Trojanus dimas Fabricius, *Ent. Syst.* iii. 1. p. 16. n. 47 (1793) (*partim*).

Princeps dominans hyppason, Hübner, *Samml. Exot. Schmett.* i. t. 124 (1806—?).

Priamides amosis, id., *Verz. bek. Schmett.* p. 87. n. 905 (1818?).

Priamides hippason, id., *l.c.* p. 87. n. 906 (1818?) (*partim*).

♂ ♀. *Papilio amosis*, Godart, *Enc. Méth.* ix. p. 35. n. 29 (1819) (Guyane).

♂. *Papilio hippason*, id., *l.c.* ix. p. 35. n. 30 (1819) (Guyane; "*euristeus*" excl.).

♂ ♀. *Papilio hippason*, Boisduval, *Spec. Gén. Lép.* i. p. 281. n. 106 (1836) (*amosis* = ♀ of *hippason*; Surinam); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 11 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 214 (1847) (Guiana); Erichs., in Schomb., *F. F. Brit. Guiana*

p. 593 (1848) (♀ probably = *amosis* Cram.); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 58. n. 268. t. 10. fig. 3. ♀ (1852) (Demerara; Surinam; Pará); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Pará; forest); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 70. n. 284 (1856) (Demerara; Surinam; Pará); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 68. n. 1127 (1857) (Guiana); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 337 (1861) (Guiana; Pará); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 131 (1864) (Surinam; Pará); Kirby, *Cat. Diurn. Lep.* p. 523. n. 34 (1871) (Guiana); Oberth., *Et. d'Ent.* iv. p. 80. n. 263 (1880) (Surinam); Staud., *Exot. Tagf.* i. p. 13 (1884) (Surinam; Amazons; Peru); Haase, *Untersuch. Mimicry* i. p. 99. t. 10. fig. 73. ♀ (1893) (Surinam; Pará on plate; figure not correct).

Papilio hippason, Cram. Local var. *paraensis*, Bates, *Journ. Entom.* i. p. 225. n. 9 (1862) (Pará); Oberth., *Et. d'Ent.* iv. p. 116. n. 263 (1880) (Pará).

Papilio hippason var. a. *P. hipp.* var. *paraensis*, Kirby, *Cat. Diurn. Lep.* p. 523. sub n. 34 (1871) (Pará).

Papilio hyppason, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 295 (1876) (♀, Surinam).

Papilio amasis (!), Burmeister, *Descr. Rép. Argent.* v. *Lép.* p. 4. sub n. 4 (1879) (Stoll's t. 1 fig. 1. "is larva of *P. polycaon*").

♂. *Papilio hippasonides* Grose-Smith, *Rhop. Exot.* iii. *Pap.* t. 22. fig. 3. 4 (1902) (Yungas, Bolivia).

Ithobalus amosis, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 92. t. 125. fig. 3. 4 (190– ?) ('not the ♀ of *P. hippason* Cram.," errore).

While Bates, Felder, Kirby (1871) and Standinger, deceived by the pattern of the insect, put *P. hyppason* in the *Ariarathes Group*, Haase placed it with *P. pharnaces* and *anchisiades*. That is indeed the correct position, as is borne out by the structure of the imago. In the new edition of Hübner the species is placed by Kirby in *Ithobalus*, the type of which is an Aristolochia-Swallowtail. The insect has many peculiarities separating it from the other members of the *Anchisiades Group*. It is individually rather variable, but does not appear to have split up into geographical forms. The species can easily be recognised by the presence of a large red spot on the underside of the hindwing behind cell close to base. Kirby, *l.c.*, makes the erroneous statement that the marginal spots of the hindwing of *P. hyppason* are red.

♂♀. Antennae in male a little extending beyond apex of cell of forewing, in female not reaching apex of cell; club gradual and long, end-segment conical, basally broader than in the allied species. Palpus black. Spots of breast grey or buff, those on pronotum rufous red. Scales of upperside of forewing obtusely (♂) or more acutely (♀) tridentate, the white ones partly bidentate, those of the upper layer of the last patch in male entire; on underside the scales strongly bidentate, those of the upper layer entire from the middle of the hindmargin forward, especially the white ones. The spots of the hindwing consist of rufous red and white scales; the red scales narrow, long, entire or feebly sinuate, opalescent, many being yellow at base; some of the dark scales at the edge of these spots or within them bright metallic blue under the lens.

Neuration: M^1 and M^2 of forewing closer together than R^3 and M^1; PC of hindwing evenly curved, SC^2 more proximal than in the allied species, standing closer to base than to R^1.

Genitalia: ♂. Tenth tergite spatulate, beneath carinate, except at apex; tenth sternite laterally with two teeth projecting upwards, the second tooth pointed, the first much shorter, hairy; clasper short, broad, rounded; harpe broad, the ventral margin raised and distally produced into a tapering process; beyond this process the harpe narrowed to a slightly spatulate lobe, which is curved ventrad and bears a variable number of teeth at the rounded apical edge.——♀ Edge of vaginal aperture raised, denticulate laterally, bisinuate in front, the mesial frontal lobe triangular; in front of the orifice a high ridge, strongly chitinised; between

this ridge and the orifice on each side of the latter a rather long and slender pointed process.

Each sex dichromatic, with intergradation. These forms are :—

a'. ♂-f. *hyppason* Cram. *l.c.* ; *hippasonides* Grose-Smith, *l.c.*——Band of forewing broader than the interspace between the band and cell, its inner edge crossing vein SM^3.

b'. ♂-f. *ptilion* nov.—Band of forewing narrow, farther away from cell than in the preceding form, and usually continued farther forward, the spots separate ; hindwing above with four or five red spots, seldom less.——Type of name from Iquitos.

c'. ♀-f. *amosis* Cramer, *l.c.*——Forewing with hardly a trace of a white patch.

d'. ♀-f. *paraensis* Bates, *l.c.*——Forewing with large white or buffish patch, variable in extent, often entering cell.

Early stages not known with certainty. Stoll's figures may belong here, though Burmeister refers them to *P. androgeus* (= *polycaon*).

Hab. The Guianas ; Amazons ; Peru ; Bolivia.

In the Tring Museum 25 ♂♂, 13 ♀♀, from : R. Demerara, British Guiana; Paramaribo, Surinam ; Pará (Stuart, Bates) ; R. Jurua ; Iquitos ; Salinas, R. Beni, July 1896 (Stuart) ; R. Songo to R. Suapi, Bolivia, 1100 m., March—June 1896 (Garlepp) ; Province Sarra, S. Cruz de la Sierra, February—April 1904 (J. Steinbach.)

88. **Papilio pelaus** Fabr. (1775).

Papilio Eques Trojanus pelaus Fabricius, *Syst. Ent.* p. 444. n. 9 (1775) ("India," Drury).
Papilio ornofagus Weidemeyer, *l.c.* p. 147 (1863) (sub syn.).

In Jones's unpublished drawings *P. pelaus* is figured from Drury's collection. As Fabricius described the insect from this collection, Jones's figure may be taken as representing the type of *pelaus*. The figure agrees best with specimens from Jamaica, from which island Drury possessed many insects. Westwood's figure (1842) was apparently taken from the same specimen.

♂♀. Sexes similar, but the markings rather larger and the submarginal spots of the upperside usually more numerous in female than in male, and larger beneath than above.——Forewing with a creamy band from costal margin to hinder angle standing just outside cell or entering it.——A row of rufous red submarginal spots on hindwing parallel to distal margin, the upper spots absent from male on upperside, the last spot more or less creamy ; a discal row of small creamy spots on underside, sometimes rufous, rarely absent, in female occasionally marked also on upperside.

Genitalia : ♂. Tenth tergite spatulate ; harpe of the same type as in *P. anchisiades*, long, non-dentate, apex produced into an acute process.——♀. Proximal ridge of vaginal cavity membranaceous in middle and here hardly raised, laterally dilated, rounded; lateral dentate lobe spatulate, rounded at apex ; bearing two or three teeth ; the process standing at orifice short, broad, widened laterad, triangular ; the mesial ridge extending from this process forward bicarinate, the edges being raised.

Larva described by Cockerell (1893).

Hab. Jamaica ; Cuba ; Haiti ; Porto Rico.

a. P. pelaus pelaus Fabr. (1775).

Papilio Eques Trojanus pelaus Fabricius, *l.c.* ; Goeze, *Ent. Beytr.* iii. 1. p. 41. n. 6 (1779) ; Fabr. *Spec. Ins.* ii. p. 4. n. 12 (1781) ; id., *Mant. Ins.* ii. p. 2. n. 12 (1787) ; id., *Ent. Syst.* iii. 1. p. 5. n. 15 (1793) (cit. Cram. excl.).

Papilio Eques Trojanus peleus (!), Gmelin, *Syst. Nat.* i. 5. p. 2228. n. 279 (1790) (*partim*).

Heraclides pelaus, Hübner, *Verz. bek. Schmett.* p. 83. n. 853 (1818 ?) (*partim*); Godart, *Enc. Méth.* ix. p. 61. n. 99 (1819) (descr. from Fabric.) ; Boisd., *Spec. Gén. Lép.* i. p. 367 n. 210 (1836) (descr. from Fabric.); Westw., *Arc. Ent.* i. p. 107. t. 18. fig. 1. 2 (1842) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (Jamaica) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 40. n. 202 (1852) (Jamaica) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. n. 213 (1856) (Jamaica) ; Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* xvi. p. 141 (1862) (Cuba) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (*partim*) ; Herr.-Sch., *l.c.* xviii. p. 173. n. 9 (1864) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 284 (1864) (*partim* ; Cuba, Jamaica) ; Butl., *Cat. Diurn. Lep. descr. Fabric.* p. 246. n. 42 (1869) (Jamaica) ; Kirby, *Cat. Diurn. Lep.* p. 542. n. 164 (1871) (*partim*) ; Dewitz, *Stett. Ent. Zeit.* xxxviii. p. 234. n. 4 (1877) (Porto Rico) ; Butl., *Proc. Zool. Soc. Lond.* p. 481. n. 35 (1878) (Jamaica) ; Gundl., *Papilio* i. p. 113 (1881) (Cuba) ; id., *Contr. Ent. Cuba.* p. 126 (1881) (*partim* ; Eastern Cuba, Jamaica, Porto Rico) ; Möschl., *Abh. Senkenb. Nat. Ges.* xvi. p. 91. n. 4 (1891) (Porto Rico) ; Gundl., *An. Hist. Nat. Madrid* xx. p. 114. n. 4 (1891) (Porto Rico) ; Haase, *Untersuch. Mimicry* i. p. 98 (1893) (*partim* ; Jamaica, Cuba) ; Fox & Johns., *Ent. News* iv. p. 3 (1893) (Jamaica) ; Cocker., *Psyche* vi. p. 450 (1893) (full-grown larva, July) ; id., *Journ. Jamaica Inst.* i. p. 179 (1893) (larva) ; Ehrm., *Ent. News* vi. p. 303 (1895) (♀, Jamaica) ; Swains., *Journ. N. York Ent. Soc.* ix. p. 78 (1901) (larva) ; Robins., *ibid.* xiv. p. 19 (1903) (Jamaica).

♂ ♀. Band of forewing close to cell, in female always entering it, sometimes also in male, especially often beneath, the last spot of the band usually ill-defined. ——On the hindwing there are in male three or more submarginal spots, the female having six, the spots variable in size, larger and on an average more numerous in Cuban specimens than in Jamaican individuals.

Hab. Jamaica ; Cuba ; Porto Rico, this form ?

In the Tring Museum 9 ♂♂, 5 ♀♀, from : Bath, S. Thomas, Jamaica (Taylor) ; Cuba (Gundlach).

b. P. pelaus imerius Godt. (1819).

Papilio imerius Godart, *Enc. Méth.* ix. p. 69. n. 121 (1819) ("Ind. orient.") ; Boisd., *Spec. Gén. Lép.* i. p. 312. n. 150 (1836) (Haiti) ; Grimsh., *Trans. Roy. Soc. Edinb.* xxxix. 1. No. 1. p. 8 (1897) (="*zetes* Westw." err. det.).

Papilio augias Ménétriés, *Bull. Moscou* ii. p. 293. n. 3 (1832) (Haiti).

Papilio pelaus, Doubleday, West. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 179 (1846) (*partim* ; Haiti) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 65 (1857) (Haiti) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (*partim*) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309 n. 284 (1864) (*partim* ; S. Domingo) ; Kirby, *Cat. Diurn. Lep.* p. 542. n. 164 (1871) (*partim*) ; Obertb., *Et. d'Ent.* iv. p. 69. n. 203 (1880) (Haiti) ; Haase, *Untersuch. Mimicry* i. p. 98 (1893) (*partim*) ; Haiti).

Papilio pelaus var., Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. sub n. 213 (1856) (Haiti).

♂ ♀. Band of forewing anteriorly narrower than in the preceding, more straight, not narrowing behind, the last spot being proportionally larger than in the preceding subspecies, spot SC^2—SC^3 reduced in ♂ or absent, the band not entering cell either above or below.——Submarginal spots of hindwing smaller.

Hab. Haiti.

In the Tring Museum 2 ♂♂.

89. **Papilio oxynius** Hübn. (1834 ?).

Laertias oxynius Hübner, *Samml. Exot. Schmett.* iii. t. 5 (1834 ?) (Cuba).

Papilio augustus Boisduval, *Spec. Gén. Lép.* i. p. 358. n. 200 (1836) (Cuba) ; Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vi[e] p. 50 (1838) (Cuba).

Papilio oxynius, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 174 (1846); Poey, *Mem. R. Soc. Econ. Habana* p. 236 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 39. n. 199 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. n. 210 (1856) (Cuba); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 285 (1864) (Cuba); Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 173. n. 6 (1864) (common); Kirby, *Cat. Diurn. Lep.* p. 542. n. 163 (1871) (Cuba); Oberth., *Et. d'Ent.* iv. p. 69. n. 204 (1880); Gundl., *Papilio* i. p. 113 (1881) (Cuba); id., *Contr. Ent. Cuba.* p. 127 (1881); id., *Berl. Ent. Zeitschr.* xxxv. p. 131 (1890) (descr. of larva); Honr., *Sitzber. Berl. Ent. Zeitschr.* xxxiii. 1889. p. 8 (1890) (larva social, on *Zanthoxylum*); Riley, *Insect Life* iii. p. 32 (1890) (larvae social acc. to Gundlach); Haase, *Untersuch. Mimicry* i. p. 99 (1893).

Papilio (*Laertias*) *oxynius*, Lucas, in Sagra, *Hist. Cuba* vii. p. 207 (1857).

Pterurus (!) *oxynius*, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 100. t. 459. fig. 1 2 (190-?).

♂♀. Similar to *P. pelaus*; marginal spots of both wings larger; band of forewing more or less vestigial, in male usually absent from upperside.

Genitalia: ♂. Harpe broad, denticulate.

Larva gregarious at night, resting together on the trunk of the tree of which the leaves serve as food.

Hab. Cuba.

In the Tring Museum 4 ♂♂, 1 ♀.

90. **Papilio epenetus** Hew. (1861).

Papilio epenetus Hewitson, *Exot. Butt.* ii. *Pap.* t. 5. fig. 14. 15. ♂ (1861) (Ciuchona, Ecuador); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 319 (1864) (hab. ?); Kirby, *Cat. Diurn. Lep.* p. 539. n. 146 (1871); Haase, *Untersuch. Mimicry* i. p. 99 (1893); Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 151 (1903) (Balzapamba, W. Ecuador, larva on orange-trees in June, short descr. of larva and pupa).

♂♀. Sexes similar, female a little paler than male. Forewing with a row of buffish yellow patches on underside. Hindwing, on upperside, with or without some red dots on disc; on underside a complete row of red discal spots, and rather close to it a row of buffish yellow submarginal spots, of which the posterior ones are somewhat larger than the anterior ones; marginal spots large above and below, buffish yellow.

Genitalia: ♂. Tenth tergite elongate, slightly spatulate. Clasper ventrally somewhat emarginate before apex; harpe of the same type as in *P. anchisiades*, ending in an acute process which is slightly curved towards the clasper; proximally of the process there is or is not a small marginal tooth.——♀ not dissected.

Larva and pupa described by Haensch, *l.c.*, closely agreeing with those of *P. anchisiades*.

Hab. Western Ecuador.

In the Tring Museum 3 ♂♂, 2 ♀♀, and several larvae and pupae, from: Balsapamba (R. Haensch); Celica to Sapatillo, July 1899 (Simons).

In coll. Oberthür from Chimbo and Balsapamba.

91. **Papilio chiansiades** Westw. (1872).

Papilio chiansiades Westwood, *Trans. Ent. Soc. Lond.* p. 101. t. 3. fig. 4. 5. ♂ (1872) (R. Topo, Ecuador); Oberth., *Et. d'Ent.* iv. p. 116. n. 258bis (1880) (Teffé; Pebas).

Papilio chinsiades (!), Kirby, *Cat. Diurn. Lep.* p. 812. n. 353 (1877); Kirby, *Trans. Ent. Soc. Lond.* p. 353 (1881) (Sarayacu); Staud., *Exot. Tagf.* p. 16. t. 11. ♀ (1884) (Amazons; Ecuador); Haase, *Untersuch. Mimicry* i. p. 99 (1893); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença); Eimer, *Orthogen. Schmett.* p. 327 (1897) (*alyattes* group ! !).

♂ Forewing, *above*, with large yellowish white patch from hinder margin to near M^2, the patch being vestigial *below*.——Hindwing, on *upperside*, with two

small discal and three larger submarginal spots, all red, often much shaded with black, the last submarginal spot distal of the one before it; on *underside* two discal spots M^1—SM^2 and a complete row of submarginal spots, those between R^3 and M^2 being the largest and partly white.

♀ and early stages not known.

Hab. Eastern slopes of Ecuador and Peru; Upper Amazons.

In the Tring Museum 11 ♂♂ from: Pebas; S. Paulo de Olivença; Iquitos; R. Cachyaco, affl. of R. Huallaga (Stuart); Coca, Ecuador (R. Haensch); Archidona (W. Goodfellow); R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); La Union, R. Huacamayo, Carabaya, 2000 ft., January 1905, wet season (G. Ockenden).

92. **Papilio pharnaces** Doubl. (1846).

Papilio pharnaces Doubleday, *Ann. Mag. N. H.* xviii. p. 374 (1846) ("America merid."); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 216 (1847) ("Bolivia"); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. n. 282. t. 5. fig. 1. ♂ (1852) (Guatemala?); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 73. n. 298 (1856) (Mexico); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 321 (1864) (Mexico; "Guatemala"); Kirby, *Cat. Diurn. Lep.* p. 539. n. 145 (1871) (Mexico); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 231. n. 64 (1890) (Mexico: Oaxaca, Putla); iid., *l.c.* p. 730 (1901) (Guanajuato); Haase, *Untersuch. Mimicry* i. p. 99. t. 9. fig. 63 (1893).

♂. *Papilio phanostratus* Godman & Salv., *l.c.* p. 232. n. 65 (1890) (Jalapa).

♂. *Papilio polycharmus* iid., *l.c.* n. 66. t. 70. fig. 10 (1890) (Mazatlan).

♂♀. Hindwing with two rows of spots, the distal row about halfway between cell and distal margin, red, the proximal spots variable in number on upperside. Tail very variable in length; in one of our West Mexican females, from Colima, little more prominent than the other teeth, while it is long in another female from the same place. We do not find any fairly constant difference between specimens from East, West, and South Mexico.

Genitalia: ♂. Tenth tergite slightly spatulate; sternite laterally with obtuse ridge which is transversely impressed, bearing hairs proximally. Harpe dentate at apex dorsally and ventrally.——♀. Vaginal armature as in *P. anchisiades*; the curved process standing at the orifice shorter, the lateral dentate lobes with fewer teeth.

Hab. East, South, and West Mexico.

In the Tring Museum 56 ♂♂, 25 ♀♀, from: Orizaba, April and May 1896 (W. Schaus); Huatuxco; Guadalajara, September—October 1889 (Dr. Buller); Guadalajara, July, August and October, 1896 (W. Schaus); Oaxaca, 6000 ft., June 1904 (A. Hall); Cuernavaca, end of August 1904 (Dr. Gadow).

93. **Papilio erostratus** Westw. (1847).

Papilio erostratus Westwood, *Trans. Ent. Soc. Lond.* v. p. 36. t. 3. fig. 2. 2* (1847) (Guatemala); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852); Boisd., *Consid. Lép. Guatem.* p. 8 (1870) (Mexico; Honduras; *rhetus* = ♀ of *erostratus* teste Godman & Salvin); Kirby, *Cat. Diurn. Lep.* p. 540. n. 153 (1871) (Guatemala); Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 378 (1874) (Costa Rica, teste van Patten); Oberth., *Et. d'Ent.* iv. p. 80. n. 259 (1880) (Guatemala; Mexico); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 61. t. 69. fig. 9. genit. (1890) (Brit. Honduras; Guatemala; "Costa Rica" teste van Patten); Haase, *Untersuch. Mimicry* i. p. 99. t. 9. fig. 60. ♂. 61, ♀ (1893) (Guatemala).

♀. *Papilio rhetus* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 288. t. 11. fig. 5 (1852) (Guatemala); id., *List Lep. Ins. Brit. Mus.* i. p. 75. n. 305 (1856); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 140 (1864) (Guatemala); Kirby, *Cat. Diurn. Lep.* p. 523. n. 38[bis] (1871); id., *l.c.* p. 810. n. 153 (1877) (= ♀ of *erostratus*).

Papilio herostratus, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 302 (1864) (Guatemala).

This and the preceding insect (*P. pharnaces*) occur together in Western Mexico, remaining perfectly distinct. There can be no doubt that they are specifically distinct, though they are closely allied.

Sexes dissimilar.

♂. Submarginal spots of upperside of hindwing cream-colour, the last one being usually red ; discal spots red or creamy red, never all present, always small, sometimes all absent, most specimens bearing three small spots ; on underside both rows red. On the forewing there are posteriorly some creamy submarginal spots, which appear occasionally also on upperside. Fringe-spots of hindwing creamy.

♀. Creamy marginal spots of forewing rather large, the submarginal ones of underside often joined to them. Discal and submarginal spots of hindwing red above and below, larger than in female of *P. pharnaces* ; marginal spots red, also large, the extreme fringe being white, last submarginal spot of upperside connected anteriorly with the anal marginal one ; tail very slender, being also in male slenderer than in *P. pharnaces*.

Genitalia : ♂. Harpe angulate dorsally, bearing dorsally one or more teeth, and ventrally no teeth or only one.

Early stages not known.

Hab. Guatemala and British Honduras, the record from Costa Rica (van Patten) being very doubtful.

In the Tring Museum, 9 ♂♂, 1 ♀, from : Ciudad de Guatemala (Rodriguez) ; Palin, W. Guatemala, August—September 1904, 2500 ft. (A. Hall) ; Guatemala (Salvin).

94. Papilio rogeri Boisd. (1836).

Papilio rogeri Boisduval, *Spec. Gén. Lép.* i. p. 278. n. 102 (1836) (Yucatan), Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 221 (1847) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 62. n. 278 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 72. n. 294 (1856) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 318 (1864); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 231. n. 63. t. 70. fig. 8. 9. ♂ (1890) (Yucatan ; Brit. Honduras).

Papilio pompeius var. d. *P. rogeri*, Kirby, *Cat. Diurn. Lep.* p. 539. sub n 144 (1871) (Yucatan).

♂. Disc of forewing, *above*, pale from costal to hinder margin, this area widening costad, its inner edge almost evenly curved ; on *underside* a row of grey spots at distal side of black basi-discal area.——Hindwing with short tooth R^3, the red spots on disc arranged in two rows as in the preceding insects, the discal row being represented by only a few spots, usually R^2—M^2 on upper, and R^2—SM^2 on under side, some black dots continuing the series to costal vein ; submarginal series not marked on upperside, or the first as well as the last spot are vestigial ; these two spots usually distinct on underside, while the other submarginal spots are either absent, or are indicated by shadowy blackish dots, bearing rarely a few red scales ; marginal spots creamy, anal one red.

♀. Hindwing with two rows of red spots.

Genitalia : ♂. Harpe more strongly rounded ventrally before apex than dorsally, bearing a few teeth at both edges.

Early stages not known.

Hab. Yucatan ; British Honduras.

In the Tring Museum 1 ♂ from Yucatan (received from Messrs. Standinger and Bang-Haas).

95. Papilio anchisiades Esp. (1788).

Papilio Eques Trojanus anchisiades Esper, *Ausl. Schmett.* p. 53. n. 22. t. 13. fig. 1. ♂, 2. ♀ (1788).
Papilio pompeius, Kirby (*non* Fabricius, 1781, err. det.), *Cat. Diurn. Lep.* p. 538. n. 144 (1871) (*partim*).

♂♀. Hindwing comparatively shorter in the costal region and longer abdominally than in *P. isidorus* and *P. rhodostictus* ; tail absent or short, always broader than in the species mentioned, but in one of our Bolivian females fully as long as in those insects. Markings very variable individually and geographically. The white markings of underside of forewing form occasionally a discal and a submarginal band.

Genitalia : ♂. Harpe always denticulate, the number of teeth quite variable individually.——♀. A long curved channelled process at proximal side of vaginal orifice ; laterally a broad multidentate lobe, and further proximad a high ridge, the posterior surface of which is concave, shell-like.

Early stages several times described and figured : see below.

Hab. Mexico to Southern Brazil.

Three subspecies.

The name *pompeius*, proposed by Fabricius for *panthonus* Cramer, was meant to supersede this earlier name. Why Kirby has applied this Fabrician name to the present insect we do not know ; it was perhaps a mere oversight.

a. P. anchisiades idaeus Fabr. (1793).

Papilio Eques Trojanus idaeus Fabricius, *Ent. Syst.* iii. 1. p. 16. n. 48 (1793) ("Madras," Drury ; Jones's fig.).
Papilio idaeus, Donovan, *Ins. Ind.* t. 18. fig. 2 (1800) ("Madras") ; Godart, *Enc. Méth.* ix. p. 32. n. 20 (1819) ; Donov., ed. Westw., *Ins. Ind.* p. 32. t. 19. fig. 2 (1842) ("Madras") ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 279 (1852) (*partim* ; Mexico ; Honduras) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 316 (1864) (hab. ?) ; Butler, *Cat. Diurn. Lep. descr. Fabric.* p. 247. n. 48 (1869) (Honduras) ; id. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 382 (1874) (Costa Rica).
Papilio ideus (!), Boisduval, *Spec. Gén. Lép.* i. p. 299. n. 132 (1836) (South America ?).
Papilio anchisiades var. a, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. sub n. 280 (1852) (Honduras); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 73. sub n. 296 (1856) (Honduras).
Papilio idaeus var. a, id., *l.c.* p. 72. sub n. 295 (1856) (*partim* ; Mexico).
Papilio pandion Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 338 (1861) (Mexico ; Honduras ; *nom. indescr.*) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 315 (1864) (*nom. indescr.* ; Mexico ; Honduras) ; id., *Reise Novara. Lep.* p. 79. n. 61 (1865) (Mexico) ; Butl. & Druce, *l.c.* p. 365. n. 381 (1874) (Costa Rica); Staud., *Exot. Tagf.* p. 16 (1884) (Central America); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 230. n. 62. t. 70. fig. 6. 7. ♂, 11. genit. (1890) (Mexico to Panama).
Papilio anchisiades var. *pandion* Bates, *Proc. Zool. Soc. Lond.* p. 242. n. 5 (1863) (Panama).
Papilio anchisiades, Weidemeyer, *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) (Central America).
Papilio evander, Oberthür, *Et. d'Ent.* iv. p. 80. n. 257 (1880) (*partim* ; Mexico).
Papilio capys var. *pandion*, id., *l.c.* iv. p. 80. sub n. 258 (1880) (Mexico).
Papilio pompeius var. *pandion*, Schaus, *Papilio* iii. p. 187 (1883) (descr. of adult larva, pupa ; on Orange and Japote Blanco).
Papilio pandonius Staudinger, *Iris* vii. p. 104. note (1894) (nom. nov. loc. *pandion* Feld. *non* Wallace).

♂♀. Forewing : a buffish white patch in apex of cell, either above and below or only below, often vestigial; on *underside* the disc in male usually buffish white from M^1 forward, no spot behind M^1 or only a trace of it, rarely a distinct spot M^1—M^2, this spot being sometimes found in specimens which bear a cell-patch on upperside; the buffish white patches larger in female, the row often extending backwards to SM^2, there being submarginal bars distally of the patches in many

individuals.——Hindwing somewhat variable in shape, being proportionally shorter in some specimens than in others ; the two rows of red spots on *underside* are sometimes widely separated and small, such individuals resembling rather closely non-tailed specimens of *P. pharnaces*, but are recognisable by the more proximal position of the anterior row of spots, by the paler colour of the spots R^2—M^2 of the distal row, and by the marginal spots being entirely white or buffish white, not being marked with rufous-tawny ; the cell frequently with a red apical dot, especially often in females.

Jones's figure represents a female of the present subspecies.

Hab. Mexico to Panama.

In the Tring Museum 80 ♂♂, 60 ♀♀, from : Mexico (Sallé) ; Jalapa, April and June 1896 (W. Schaus) ; Huatuxco ; Cordoba, June 1904, 2800 ft. (A. Hall) ; Guatemala (Salvin) ; Mazatenanga, W. Guatemala, 1000 ft., September 1904 (A. Hall) ; Amatitlan, W. Guatemala, 4800 ft., August 1904 (A. Hall) ; San Pedro Sula, Honduras ; San José, Costa Rica, 4000 ft. September 1904 (A. Hall) ; Carreblanco, Costa Rica (Lankester) ; Escazu, Costa Rica, August—September 1903 (Underwood) ; Alahuela, Costa Rica, 4100 ft., September 1904 (A. Hall) ; Bagava, Chiriqui, 800 ft. (Watson) ; Boquete, 2500 ft. (Watson) ; Parida I., January 1901 (Beck).

b. P. anchisiades anchisiades Esp. (1788).

Merian, *Surin. Ins.* t. 17 (1705).

Papilio Eques Trojanus anchises Linné, *Syst. Nat.* ed. x. p. 460. n. 10 (1758) (*partim* ; sub citat.) ; Cram., *Pap. Exot.* iv. p. 58. t. 318. fig. A. B. C (1780) (Surinam, ♂ ♀) ; Jabl. & Herbst, *Naturs. Schmett.* ii. p. 24. n. 15. t. 9. fig. 1. 2. 3 (1784) (synon. *partim*) ; Stoll, in Cram., *l.c. Suppl.* p. 3. t. 1. fig. 2. larva (1787) ; Fabr., *Mant. Ins.* ii. p. 4. n. 28 (1787) (*partim* ; sub citat.) ; Gmelin, *Syst. Nat.* i. 5. p. 2230. n. 11 (1790) (*partim*) ; Fabr., *Ent. Syst.* iii. 1. p. 13. n. 40 (1793) (*partim*).

Papilio Eques Trojanus anchisiades Esper, *Aust. Schmett.* p. 53. n. 22. t. 13. fig. 1. ♂, 2. ♀ (1788).

Papilio dominans anchises, Hübner, *Samml. Exot. Schmett.* i. t. 119. fig. 1. 2. ♂ (1806—?).

Priamides hipponous id., *Verz. bek. Schmett.* p. 87. n. 896 (1818 ?) (nom. nov. loco *anchises* Cram.).

Papilio archelaus Godart, *Enc. Méth.* ix. p. 32. n. 19 (1819) (= *anchises*, Cram.; Guyane ; "Brazil" alia subsp.) ; Lacord., *Ann. Soc. Ent. Fr.* ii. p. 385 (1833) (larva on orange, social, large numbers ; Stoll's fig. exact).

Papilio anchises, Constable, *Miscell. Butt.* p. 141. t. 14 (1832) (Surinam).

Papilio anchisiades, Boisduval, *Spec. Gén. Lép.* i. p. 279. n. 103 (1836) (= *archelaus* = *anchises*, Cram. ; Guyane) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Pará ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 73. n. 296 (1856) (*partim* ; Santarem) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 338 (1861) (Amazons) ; Bates, *Journ. Entom.* i. p. 225. n. 10 (1862) (common throughout the Amazons ; larva on the [imported] orange-tree ; approach to "var. *isidorus*" at Ega) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 313 (1864) (Surinam ; Cayenne ; Amazons) ; Guenée, *Ann. Soc. Ent. France* p. 308 (1867) (fig. of Merian quoted by Linné under *anchises* is *anchisiades*) ; Druce, *Proc. Zool. Soc. Lond.* p. 246. n. 15 (1876) (Peru) ; Dew., *Arch. Naturg.* xliv. 1. p. 1 (separ.) (1878) (larva, pupa) ; Hopff., *Stett. Ent. Zeit.* xl. p. 52. n. 22 (1879) (*partim* ; Surinam, Peru) ; Ernst, *Ent. Nachr.* xii. p. 79 (1886) (pupa) ; Caracc., *Ent. News* ii. p. 52 (1891) (larva) ; Lathy, *Trans. Ent. Soc. Lond.* p. 69. n. 37 (1904) (Cayenne, ♂ with the patches of the hindwing blue instead of red).

Papilio anchisiades var. *isidorus*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 338 (1861) (Ega).

Papilio theramenes Felder, *Wien. Ent. Mon.* v. p. 74. n. 9 (1861) (Caracas, Venezuela, ♀) ; id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 311. n. 314 (1864) (Venezuela ; Bogota) ; id., *Reise Novara, Lep.* p. 78. n. 60 (1865) (♂ ♀ ; Colombia ; Venezuela) ; Butl., *Ann. Mag. N.H.* (4). xx. p. 127 n. 61 (1877) (Cayaria, Peru) ; Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 239 (1880) (Sta. Marta) ; Habnel, *Iris* iii. p. 194 (1890) (Mérida) ; id., *l.c.* p. 203 (1890) (Valera) ; Michael, *ibid.* vii. p. 213 (1894) (Sao Paulo de Olivença).

Papilio pompeius var. a. *P. anchisiades*, Kirby, *Cat. Diurn. Lep.* p. 538. sub n. 144 (1871) (Guiana ; Amazons).

Papilio pompeius var. b. *P. theramenes*, Kirby, *l.c.* p. 539. sub n. 144 (1871) (Venezuela ; Colombia).
Papilio pompejus var. *anchisiades*, Möschler, *Verh. Zool. Bot. Ges. Wien* xxvi. p. 296 (1877) (Surinam).
Papilio pompeius var. *theramenes*, Staudinger, *Exot. Tagf.* p. 16. t. 11. ♂ (1884) (Amazons ; northern S. America).
Papilio idaeus, Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 31. n. 133 (1890) (Colombia) ; iid., *l.c.* p. 38. n. 32 (1890) (Popayan).
Priamides pompeius, Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 284 (1896).
Priamides anchisiades, id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 98. t. 119. fig. 1. 2 (190-?) (" *anchisses* !, *archalaus* ! " laps. typ.).
Papilio pompeius, Kaye, *Trans. Ent. Soc. Lond.* p. 207. n. 197 (1904) (Trinidad ; "*anchisiades* and *theramenes* bred from the same batch of eggs ").

♂ ♀. Both sexes dichromatic, the differences being neither local nor seasonal, the forms completely intergrading, and each varying again considerably in the details of the pattern.

In the specimens named *anchisiades* by Esper and *theramenes* by Felder the forewing bears two white patches M^1—SM^2 on the disc, either on both sides or on underside only. These patches are very variable in size. There is on *underside* often a patch in cell and also frequently a spot before M^1 and a second before R^3, the spot R^3—M^1 being occasionally also present on *upperside*. The posterior fringe-spots of the hindwing are usually not much reduced.

In a smaller proportion of specimens the basi-discal area of the forewing is much deeper brown-black than the apex of the cell and the disc beyond, the pale area widening costad, bearing on the *underside* a row of white patches, of which the discal ones are either in the same position as in the Brazilian *P. a. capys*, which these specimens closely resemble, or are more proximal. The posterior marginal spots of the hindwing are usually very small in these specimens.

Hab. Colombia to Pará, southward to Bolivia ; common everywhere.

In South-Eastern Bolivia the majority of specimens agree with the following subspecies.

In the Tring Museum 160 ♂♂, 70 ♀♀, and a series of larvae and pupae.

c. P. anchisiades capys Hübn. (1806—?).

Papilio dominans capys Hübner, *Samml. Exot. Schmett.* i. t. 120. fig. 3. 4. ♀ (1806— ?).
Priamides capys id., *Verz. bek. Schmett.* p. 87. n. 897 (1818 ?); Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 98. t. 120. fig. 3. 4, t. 325. fig. 1. 2 (190-?).
Papilio evander Godart, *Enc. Méth.* ix. p. 32. n. 18 (1819) (Brazil) ; Boisd., *Spec. Gén. Lép.* i. p. 277. n. 101 (1836) (Brazil ; = *capys*) ; Swains., *Zool. Illustr.* iii. t. 101 (1822) (Brazil) ; Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 47 (1838) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 317 (1864) (Brazil) ; Jones, *Proc. Lit. Philos. Soc. Liverp.* p. 43. n. 38 (1883) (larva, pupa) ; Meldola, *Proc. Ent. Soc. Lond.* p. 24 (1883) (larva gregarious).
Priamides evander, Hübner, *Samml. Exot. Schmett.* ii. t. 112 (1822 ?).
Papilio hipponous, Ménétriés, *Mém. Soc. Imp. Moscou* vii. p. 188. n. 5 (1829) (Brazil, larva).
Papilio idaeus, Doubleday (*non* Fabricius, 1793, err. det.), *List Lep. Ins. Brit. Mus.* i. p. 11 (1845) (Brazil; synon. *partim*); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 219 (1847) (Brazil; = *evander* = *capys*) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 279 (1852) (*partim* ; Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 72. n. 295 (1852) (*partim* ; Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 5. n. 85 (1857) (Brazil) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 91. n. 38 (1890) ; Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1896) (Rio de Janeiro, common).
Papilio idaeus var. a. *Papilio pompeius*, Gray (*non* Fabricius 1781, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. sub n. 279 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 73. sub n. 295 (1856) (*partim* ; Brazil).
Papilio anchisiades, id., *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 280 (1852) (Brazil "var. a." alia subsp.) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 73. n. 296 (1856) (*partim* ; Brazil).

Papilio pompejus, Capronnier, *Ann. Soc. Ent. Belg.* xvii. p. 8. n. 2 (1874) (Paquetá, Aug.); Staud., *Exot. Tagf.* p. 16 (1884) (Brazil); Seitz, *Stett. Ent. Zeit.* li. p. 98 (1890) (Corcovado); Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 11 (1895) (Rio Grande do Sul); Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 45 (1896).

♂ ♀. Forewing without white patches on *upperside*, bearing always a pale band which widens costad, its inner edge crossing cell at or just beyond base of R^3; this band emphasized on *underside* by a row of white patches, one of which occupies apex of cell in all specimens.——Tooth R^3 of hindwing often projecting.

Hab. Plains of Eastern Bolivia; North Argentina; Paraguay; and Brazil.

In the Tring Museum 64 ♂♂, 26 ♀♀, from: Sapucay, Paraguay (W. Foster); Yhu, E. Paragnay (Andeer); La Soledad, Entre Rios (Chas. Britton); R. Grande do Sul; Castro, Paraná (E. D. Jones); Bahnru, S. Paulo (Dr. Hempel); Petropolis, Tijuca, Rio de Janeiro (Foetterle; E. May); Minas Geraës (Kennedy); Ceara.

96. **Papilio isidorus** Doubl. (1846).

Papilio isidorus Doubleday, *Ann. Mag. N. H.* xviii. p. 375 (1846) (Bolivia).

♂ ♀. Forewing below without a buffish white patch across the cell, the discal patch just entering cell in most males, being absent from other males and from the female (only one seen); the male bearing usually a buffish white discal patch also on upperside, the patch being here much smaller than below and much shaded with black.——The last red spot of the submarginal row of the hindwing stands distally of the large spot which is at its discal side. Hindwing much shorter posteriorly than in *P. anchisiades*, tail more or less distinct, narrow.

Genitalia: ♂. Harpe non-dentate, its dorsal edge more strongly rounded near the apical process than the ventral edge.

Early stages not known.

Hab. Chiriqui to Bolivia.

The geographical forms are not quite constant.

As previous authors did not strictly distinguish *P. isidorus* from *P. rhodostictus*, we have discarded all references which appear doubtful.

a. P. isidorus chironis subsp. nov.

♂. Forewing, *upperside*, with buffish white spots R^2—M^2, the first one minute, the third not quite reaching M^2, a small spot in cell; on *underside*, these patches all large, the cell-spot being the smallest, the triangular spot R^2—R^3 coming next in size, while patch R^3—M^1 is the largest, being about twice as long as broad.—— Hindwing, *above*, with the two red spots R^2—R^3 merged together; discal spots R^3—M^2 of *underside* well marked, not separate from the submarginal ones.

Hab. Chiriqui.

In the Tring Museum 1 ♂ (received from Messrs. Staudinger & Bang-Haas).

b. P. isidorus brises subsp. nov.

♂. Forewing, *underside*, with greyish white spots R^3—M^2 or R^2—M^2, upper spot small; no spot in cell.——Hindwing, *above*, with two red spots R^2—M^1, the proximal (= discal) portion of spot R^2—M^1 about as large as the distal (= submarginal) portion; on *underside* the discal portions of spots R^3—M^2 standing separate from the submarginal ones, small, vestigial.

Hab. Bogota; probably the Magdalena valley.

In the Tring Museum 2 ♂♂.

c. P. isidorus flavescens Oberth. (1880).

Papilio isidorus var., Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 64. sub n. 281 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 73. sub n. 297 (1856) (hab. ?).
Papilio isidorus var. *flavescens* Oberthür, *Et. d'Ent.* iv. p. 79. sub n. 254 (1880) (Colombia).
Papilio isidorus var. *leucostictus* Honrath, *Berl. Ent. Zeitschr.* xxix. p. 276 (1885) (Colombia) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 31. sub n. 134 (1890) ("Bogota") ; Dognin, *Lép. Loja* p. 37 (1891).
(?) *Papilio ceus* "Boisd.," Dognin, *l.c.* i. p. 15 (1887) (*nom. nud.*).
Papilio isodorus, Maassen & Weym., *l.c.* p. 77. n. 33 (1890) (Rioja to Moyobamba).

♂. Forewing, *underside*, the white patch reduced.——Hindwing usually with one spot in cellule R^2—R^3 on upperside ; this spot as well as the next one mostly white, either on both sides or only on one side of the wing ; discal portion of spots R^3—M^1 of underside separate from the distal (= submarginal) portion, or obliterated.

♀. Forewing above and below paler brown distally in cell and beyond than in basi-discal area ; on *underside* a row of ill-defined white submarginal spots from R^3 to SM^2.——Hindwing above and below with the basi-discal area paler than in male ; submarginal patches R^3—M^2 much enlarged, white ; four submarginal spots C—R^3, the fourth white, the others more or less reddish, almost entirely rufous red on underside, a rufous red anal submarginal spot ; five discal spots, small or vestigial, spots R^3—M^2 being merged together with the large white patches ; tail short, acute.

Hab. Colombia (probably the south-east) ; Eastern Ecuador ; North Peru.

In the Tring Museum 8 ♂♂, 1 ♀, from : Archidona, April 1899 (W. Goodfellow) ; Coca, R. Napo, May—July 1899 (W. Goodfellow) ; Mirador, February 1899 ; Zamora (O. T. Baron) ; Loja.

In coll. Oberthür from : "Bogota" ; Ambato ; Archidona ; Moyobamba.

d. P. isidorus isidorus Doubl. (1846) (Pl. VIII. fig. 56).

Papilio isidorus Doubleday, *l.c.* (1846) (Bolivia) ; id., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 3 (1848) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 63. n. 281. t. 7. fig. 4. ♂ (1852) (Bolivia) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 73. n. 297 (1856) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 320 (1864) (*partim*) ; Druce, *Proc. Zool. Soc. Lond.* p. 246. n. 16 (1876) (Pozuzo) ; Hopff., *Stett. Ent. Zeit.* xl. p. 53. n. 23 (1879) (distinct from *anchisiades* ; *partim* ; "Brazil," Peru, Bolivia) ; Haase, *Untersuch. Mimicry* i. p. 99 (1893) ; Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).
Papilio pompeius var. e. *P. isidorus*, Kirby, *Cat. Diurn. Lep.* p. 539. sub n. 144 (1871) (*partim*).

♂. Forewing, on *underside*, with white patch which nearly always enters the cell and is often vestigial also on *upperside*, some specimens, however, being without trace of this patch.——Red spots R^3—M^2 of hindwing, *above*, on the whole larger than in the previous form, two spots in cellule R^2—R^3, separate from one another ; on *underside* the small discal spots separate from the submarginal ones.

Hab. Eastern slopes of Bolivia and Peru, as far north as Huánuco.

In the Tring Museum 21 ♂♂ from : Pozuzo, Huánuco, 800—1000 m. (W. Hoffmanns) ; Chanchamayo (Schunke) ; Caradoc, Marcapata, 4000 ft., February 1901 (Ockenden) ; Perené R., March 1900 (Simons) ; Palcazu (Sedlmayr) ; Cuzco, March 1901 (Garlepp) ; Mapiri.

97. **Papilio rhodostictus** Butl. & Druce (1874).

♂. *Papilio rhodostictus* Butler & Druce, *Proc. Zool. Soc. Lond.* p. 364. n. 370 (1874) (Costa Rica).

♂. In shape of the wings agreeing with *P. isidorus*. Forewing, either on both sides or only below, with a white patch across the cell near apex ; on disc two white patches R^2—M^1, always present *below*, but on *upperside* either both present, or the first, or the second, or both absent ; on *underside* only an additional white streak behind M^1.——Hindwing : spots R^2—M^2 larger than in *P. isidorus*, the discal and submarginal spots being confluent forming three large patches on *upperside* ; seldom the two spots in cellule R^2—R^3 slightly separate, the line of separation, however, being often indicated ; on *underside* the two spots R^2—R^3 mostly separated, nearer the cell than in *P. isidorus*, and therefore the submarginal spot R^1—R^2 much more distal than the spot R^2—R^3.

♀. Similar to male, wings broader, markings larger.

Genitalia : ♂. Harpe more symmetrical than in *P. isidorus*, the dorsal and ventral edges being almost equally rounded near apical process.

Early stages not known.

Hab. Costa Rica to Western Ecuador.

a. P. rhodostictus rhodostictus Butl. & Druce (1874).

Papilio rhodostictus Butler & Druce, *l.c.* (1874) (Costa Rica) ; Kirby, *Cat. Diurn. Lep.* p. 814. n. 388 (1877) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 232. n. 67 (1890) (♂ ♀ ; Costa Rica ; Chiriqui ;—" Ecuador " alia subsp.).

♂♀. Cell-patch of forewing narrow, discal spot R^2—R^3 larger than spot R^3—M^1, the latter sometimes absent from *upperside*, rarely larger than the preceding spot but then more or less shaded over with black.

Hab. Costa Rica ; Chiriqui.

In the Tring Museum 3 ♂♂ from : Boquete, Chiriqui, 3500 ft. (Watson) ; Chiriqui.

b. P. rhodostictus pacificus subsp. nov. (Pl. VIII. fig. 49).

Papilio rhodostictus, Godman & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 232. n. 67 (1890) (*partim* ; Ecuador).

Papilio pandion ?, iid., in Whymper, *Andes of Equator, App.* p. 109. n. 97 (1891) (west of Quito, with spot at end of cell of forewing).

♂♀. Forewing : cell-patch larger than in the preceding, discal spot R^2—R^3 smaller than R^3—M^1, sometimes vestigial on *upperside*.

Hab. West Colombia and West Ecuador.

In the Tring Museum 24 ♂♂, 1 ♀, from : R. Dagua (Rosenberg), type ; Paramba, W. Ecuador, 3500 ft., May—June 1897, dry season (Rosenberg) ; Lita, 3000 ft. (Flemming).

In coll. Oberthür a series of males from Juntas, R. Dagua.

c. P. rhodostictus nymphius subspec. nov. (Pl. VIII. fig. 48).

♂. Forewing without white spot on *upperside* ; the markings of *underside* as in *P. r. pacificus*, but smaller.——The three patches of hindwing sometimes creamy white above and below, very often creamy white bordered with red, normally red above.

Hab. Central and Eastern Colombia, rather frequently found in Bogota collections.

In the Tring Museum 40 ♂♂ from: Muzo, July 1903 (M. de Mathan); Muzo (Lindig, coll. Felder); "Bogota."

IX. Torquatus Group.

Palpus yellow; breast yellow or spotted with yellow; abdomen for the greater part yellow, or at least with a yellow lateral line; both sexes tailed: the sexes different in colour; red discal spots of underside of hindwing round, not luniform, or the row represented by one or a few spots only; in male, cell of forewing below striped with yellow or entirely yellow, no bar across it.

Neuration: SC^2 of forewing at about one-third from SC^1 to SC^3; lower angle of cell much more obtuse than upper; D^2 longer than D^3; basal cellule of hindwing very little prolonged beyond PC, almost truncate; PC strongly arched.

Larva similar in colour to that of *P. androgeus*, with four rows of rather prominent tubercles.——Thoracical projection of pupa long.

Key to the species:

A. *Males.*

a. Band of forewing not broadly interrupted, the uppermost spot standing before SC^4 or in fork, separate from base of fork . . . . . *b.*

Band of forewing broadly interrupted, or continued to costal margin around apex of cell, uppermost spot at base of subcostal fork small, often absent, or the band quite short . . . . . *d.*

b. Patch SC^5—R^1 of band of forewing (second or third from apex) long, reaching beyond base of subcostal fork . *c.*

This patch smaller than the next, widely separate from base of fork . . . . . Species No. 100.

c. Tail with yellow spot at apex . . . . . Species No. 98.

Tail without yellow spot at apex . . . . . Species No. 99.

d. Band of forewing complete, extending from inner to costal margin, or interrupted . . . . . *e.*

Band abbreviated, extending from inner margin to about middle . . . . . Species No. 103.

e. Band of forewing complete, consisting of a series of spots which are all separated from one another . . . Species No. 104.

Band either broadly interrupted at R^2 or continuous, the veins not black . . . . . *f.*

f. Hindwing below with two orange-red spots behind M^2, band of forewing always broadly interrupted . . Species No. 102.

Hindwing below with one red spot behind M^2, band of forewing often complete, tooth M^1 of hindwing as prominent as tooth M^2. . . . . Species No. 101.

B. *Females* (not known of several species).

g. Hindwing with a row of strongly arched submarginal spots, either on one side or on both . . . . . *h.*

Hindwing without curved submarginal spots, but with two or three large patches R^2—M^2 which touch cell . *i.*

h. Tail with yellow spot at apex . . . . . Species No. 98.

Tail without yellow spot at apex . . . . . Species No. 100.

i. Hindwing crossed by a white band which extends to abdominal margin . . . . . Species No. 103.

Hindwing without such a band . . . . . Species No. 102.

98. Papilio himeros Hopff. (1866).

♂. *Papilio mentor* Boisduval (*non* Dalman, 1823), *Spec. Gén. Lép.* i. p. 351. n. 193 (1836) (Brazil).

♀. *Papilio himeros* Hopffer, *Stett. Ent. Zeit.* xxvii. p. 26. n. 7 (1866) (Brazil).

Both sexes bear a yellow spot at the apex of the tail. Cell of forewing beneath yellow, at least not merely striped.

♂. Band of wings very broad, on hindwing extending beyond apex of cell; on forewing a yellow spot distally of upper angle of cell.

♀. Band narrower than in male, and the patch SC^5—R^1 of forewing much smaller; no spot before upper angle of cell.——Submarginal spots of hindwing small, red, except upper two, which are yellow.

Genitalia: ♂. Tenth tergite non-spatulate. Harpe long, reaching close to apex of clasper, gradually tapering, being elongate-triangular, acute.——♀ not dissected.

Early stages not known.

Hab. Brazil.

Two subspecies.

a. P. himeros baia subsp. nov.

♂. Yellow band of wings a little narrower than in the following subspecies, the black distal area of hindwing nearly touching cell; the additional spot before upper angle of cell of forewing small; cell of forewing below brown, striped and washed with yellow; yellow submarginal band of forewing below about half the width of the brown band situated at its proximal side; submarginal spots of hindwing a little smaller than in *P. h. himeros*.

♀. Yellow band very much narrower than in the following form, on forewing much narrower than the brown distal border, not touching cell, on hindwing extending to apex of cell, the extreme tip of cell remaining brown, proximal edge of band crossing cell at point of origin of SC^2 and just proximally of M^2.

Hab. Bahia.

In the Tring Museum 1 ♂, 1 ♀.

b. P. himeros himeros Hopff. (1866).

Papilio mentor Boisduval, *l.c.*; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 165 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. n. 190 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 199 (1856) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 305 (1864) (Brazil); Kirby, *Cat. Diurn. Lep.* p. 540. n. 151 (1871) (Brazil); Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 5. n. 6 (1879) (Corcovado); id., *l.c.* p. 61 (1879) (descr. of ♀); Oberth., *Et. d'Ent.* iv. p. 71. n. 214 (1880) (Brazil; *types of mentor*); Staud., *Exot. Tagf.* p. 16 (1884); Haase, *Untersuch. Mimicry* i. p. 96, 100 (1893); Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1896) (Santa Theresa, Rio de Janeiro, rare).

♀. *Papilio lycophron* var. A., Boisduval, *l.c.* p. 352. n. 194 (1836) (*partim*; "tail with yellow spot at apex").

♀. *Papilio himeros* Hopffer, *Stett. Ent. Zeit.* xxvii. p. 26. n. 7 (1866) (Brazil); Kirby, *Cat. Diurn. Lep.* p. 567. n. 336 (1871).

♀. *Papilio herodotus* Capronnier, *Ann. Soc. Ent. Bely.* xvii. p. 10. n. 14 (1874) (nom. indescr.; Batofogo, August); Oberth., *Et. d'Ent.* iv. p. 71. n. 215. t. 4. fig. 2 (1880) (Brazil).

♂. *Papilio lycophron* var. minor: *P. mentor*, Burmeister, *Descr. Rép. Argent.* v. *Lép.* p. 60. sub n. 2 (1878).

"Dalman a donné le nom de *Mentor*," says Boisduval, *l.c.*, "à un autre *Papilio* qui est le suivant, et qu'Hubner avait fait connaître avant lui sous le nom de *Lycophron*; nous avons cru pouvoir prendre sans inconvénient le nom de Dalman pour l'appliquer à celui-ci qui est nouveau." This is a mischievous practice to which also Fabricius adhered, causing much confusion.

The yellow band of the upperside touching cell on forewing and extending beyond tip of cell on hindwing, broader on forewing of both sexes than black marginal border. Some males with a vestige of a yellow spot in cell of forewing.

Hab. Brazil: Minas Geraës; Rio de Janeiro.

In the Tring Museum 5 ♂♂, 2 ♀♀, from Rio de Janeiro.

99. **Papilio lamarchei** Staud. (1892).

Papilio lamarchei Staudinger, *Iris* v. p. 428 (1892) (Bueyes, Bolivia; *torquatinus* Esp. var. ?).

♂. *Upperside.*—Forewing: yellow band narrower than in *P. himeros*, the apical spot absent, the next spot larger than in *P. himeros*, the black marginal border narrowing apicad; spot SC^5—R^1 enlarged as in *P. himeros*, being much larger than in *P. hectorides*; no additional spot distally of upper angle of cell.—Hindwing even more strongly dentate than in *P. hectorides*, tail fringed with yellow, not bearing a yellow spot at apex, yellow band not extending to apex of cell.

Underside resembling that of *P. hectorides*, but more extended yellow.

♀ not known.

Genitalia: ♂. Harpe short, apex rounded and dentate.

Hab. Northern Argentina and Bolivia.

Nearest to *P. hectorides*, but approaching also a little *P. himeros*.

In the Tring Museum 11 ♂♂ from: Tucuman (J. Steinbach); Tapia, Tucuman (Baer); Bueyes; R. Tanampaya (Garlepp).

100. **Papilio hectorides** Esp. (1794).

♀. *Papilio Eques Trojanus hectorides* Esper, *Magaz. Ausl. Ins.* i. p. 5. t. 1. fig. 1 (1794); id., *Ausl. Schmett.* p. 249. n. 115. t. 40c fig. 1 (1798) ("Ost-Indien").

♂. *Papilio Eques Achivus torquatinus* id., p. 206. n. 94. *l.c.* t. 51. fig. 2 (1798) ("Surinam").

♂. *Papilio pandrosus* Godart, *Enc. Méth.* ix. p. 62. n. 101 (1819) ("Guyane"; Brazil); Swains., *Zool. Illustr., Ent.* ii. t. 93 (1822) (Rio de Janeiro).

♀. *Papilio lysithous* Godart, *Enc. Méth.* ix. p. 73. n. 136 (1819) (Brazil); Lucas, *Lép. Exot.* p. 32. t. 16. fig 2 (1835); id, in Chenu, *Enc. Hist. Nat., Pap.* i. t. 10. fig. 2. ♀ (1851-53).

♀. *Thoas lysithous*, Swainson, *l.c.* ii. t. 121 (1822) (Brazil).

♀. *Menelaides chirodamas* Hübner, *Samml. Exot. Schmett.* ii. t. 103 (1822?).

♀. *Papilio hectorides*, Donovan, *Nat. Repos., Ent.* t. 177 (1827); Boisd., *Spec. Gén. Lép.* i. p. 303. n. 137 (1836) (Brazil); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep* i. p. 17. n. 180 (1846) (Brazil).

♂. *Papilio torquatinus*, Boisduval, *Spec. Gén. Lép.* i. p. 368. n. 212 (1836) (= *pandrosus*; Brazil); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 143 (1846) (Brazil); Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 34. n. 165 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 173 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lép.* i. p. 4. n. 52 (1857) (Brazil).

♀. *Papilio mezentius* Doubleday, *Ann. Mag. N. H.* xiv. p. 417 (1844) (West Coast of America); id., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 181 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 40. n. 205. t. 3. fig. 4 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 216 (1856); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) ("Mexico," errore); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 304 (1864); Kirby, *Cat. Diurn. Lep.* p. 540. n. 152a (1871) ("Amer. occ."); Wood, *Ins. Abroad* p. 549. fig. 299 (1883); Staud., *Exot. Tagf.* p. 16 (1884) ("perhaps a ♀ form from western (?) America)."

♀. *Papilio argentus* Martyn, *Psyche* t. 14. fig. 3. 4 (1797) (ined.); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 40. n. 204 (1852) (♂ = *lysithous* Godt., ♀ = *argentus* Martyn—error, both ♀ ♀); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 215 (1856) (Brazil).

♂ ♀. *Papilio argentus*, Felder, *l.c.* p. 310. n. 303 (1864) (♂ = *torquatinus*); Hopffer, *Stett. Ent. Zeit.* xl. p. 52. n. 20 (1879) (♀ = *hectorides*, ♂ = *torquatinus*; Brazil, Maxos in Bolivia).

♂ ♀. *Papilio hectorides*, Kirby, *Cat. Diurn. Lep.* p. 540. n. 152 (1871) (♀ = *argentus* = *chirodamas* = *lysithous*; ♂ = *torquatinus* = *pandrosus*); Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 10. n. 15 (1874) (Itaipu, October); Staud., *Exot. Tagf.* p. 16. t. 11. ♂ ♀ (1884) (Brazil); Seitz, *Stett. Ent. Zeit.* li. p. 97 (1890) (Corcavado, common); Haase, *Untersuch. Mimicry* i. p. 97. t. 10. fig. 67. ♂, 68. ♀ (1893); Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 13 (1895) (Rio Grande do Sul); Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 46. t. 1. fig. 3. ♂ (1896); Peters, *Illustr. Zeitschr. Ent.* ii. p. 52 (1897) (Nova Friburgo, both sexes black with white band, errore; larva, on *Anagyris foetida*?); Schröder, *ibid.* p. 485. fig. 1. 2 (1897) (l., p.); id., *l.c.* p. 497. fig. 3. 4 (♂, ♀) (1897).

♂ ♀. *Papilio torquatinus*, Burmeister, *Descr. Rép. Argent.* v. *Lép., Atlas* p. 5. n. 8 (1879) (larva and pupa; on a species of *Piperaceae*); Obertb., *Et. d'Ent.* iv. p. 78. n. 251 (1880) (Brazil); Gosse, *Entom.* xiii. p. 194 (1880) (Paraguay, Dec. to March); Bönningh., *Verh. Ver. Naturw. Unterh. Hamburg* ix. p. 26 (1896) (common; larva on *Citrus* and *Piperaceae*).

♀. *Papilio torquatinus* aberr. ♀, *melania* Obertbür, *Et. d'Ent.* iv. p. 78. sub n. 251. t. 3. fig. 3 (1880) (Brazil); Weym., *Stett. Ent. Zeit.* lv. p. 315. sub n. 13 (1895) (R. Grande do Sul).

♀. *Papilio hestorides* (!), Peters, *l.c.* ii. p. 51 (1897) (Nova Friburgo; larva; "♂ of *hectorides*," false).

Troilides hectorides, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 97. t. 317. fig. 3. 4 (190-?) (Esper "1785" false).

The sexes dissimilar, the females being again dichromatic. The hindwing strongly dentate.

♂. *Upperside:* band almost gradually widening from apex of forewing to abdominal margin of hindwing, narrower than in *P. lamarchei*, varying somewhat in width and also in tint; many specimens with a spot before SC^5, others being without it.——Hindwing: from one to six red spots on disc, the anal submarginal spot being also red.—Cell of forewing striped beneath.

♀. Band of wings, if present, white, usually not extending to abdominal margin of hindwing, stopping at M or at M^1 or M^2; on forewing somewhat different in position from the band of male, being nearly parallel to distal margin, slightly curving away from it anteriorly, crossing the subcostals just outside fork.——Submarginal spots of hindwing red, thin. Three colour-forms:

a'. ♀-f. *hectorides* Esp., *l.c.*; *mecentius* Doubl., *l.c.*; *argentus* Gray (ex Martyn), *l.c.*—Both wings with white band; the band in one of our specimens continued to abdominal margin of hindwing by means of two white spots which are merged together with the last two red spots of the discal series; the band very variable in width.

b'. ♀-f. *catamelas* nov.—Band vestigial on forewing, distinct on hindwing, but rather narrower than in ♀-f. *hectorides*.

c'. ♀-f. *melania* Oberth., *l.c.*—Band vestigial on both wings or absent.

Genitalia: ♂. Tenth tergite long, spatulate; sternite laterally with a ridge which is transversely divided into two short tubercles or teeth, the proximal one being long-hairy. Clasper emarginate ventrally at the apex; harpe long, flat, its ventral

margin nearly straight ; apex truncate, bearing several long teeth.——♀. Edge of the circular orifice raised in front to a very short glossy lip, the long process found in *P. torquatus* being absent ; on each side a little way from the orifice a large, variable, dentate lobe ; behind vaginal orifice rather strongly chitinised brown sclerite, this large plate posteriorly incised in the middle ; anal segment on innerside without the usual curved bristles or bearing only two rather thin ones (accessories in ovipositing).

Early stages described by Burmeister, *l.c.*, and figured by Schröder, *l.c.*

Hab. Brazil ; Paraguay.

In the Tring Museum 66 ♂♂, 45 ♀♀, from : Sapucay, Paraguay, all months from July to February (W. Foster) ; Yhu, Paraguay, September—December 1897 (Andeer) ; Bahia ; Minas Geraës, December 1898, February 1901 (A. Kennedy) ; Espiritu Santo ; Rio de Janeiro ; Corcovado ; Nova Friburgo ; Petropolis ; Sao Paulo ; Castro, Parana (E. D. Jones) ; S. Catharina ; Blumenau ; Porto Alegre.

101. **Papilio garleppi** Staud. (1892).

♂. *Papilio garleppi* Staudinger, *Iris* v. p. 427 (1892) (S. Mateo, R. Juntas, Chaparé).

♂. *Upperside :* yellow band much broader than in *P. torquatus*, extending beyond apex of cell on hindwing.——Forewing, the band interrupted or not, the spots composing the costal portion large. Hindwing : tooth M^1 prominent, acute, longer than in *P. torquatus* ; the red anal spot preceded by two or three spots which are composed of dispersed yellowish buff and bluish white scales ; these spots on a level with the red anal one, corresponding to the bluish spots of the underside ; no red spots proximally of them.

On *underside* the hindwing bears a row of rufous red discal spots as in *P. torquatus*, but the spot behind M^2 is replaced by a tiny bluish dot, and spot M^1—M^2 is the largest of the series ; the yellow submarginal spots are more or less luniform.

♀ not known. Standinger, when describing in 1892 a subspecies of *P. garleppi*, referred to the yellow-spotted female of *P. torquatus* figured by Gray (*P. patros* var.) as being possibly the female of *P. garleppi*. However, Gray's specimen is undoubtedly a female of *P. torquatus*.

Genitalia : ♂. Very different from those of *P. torquatus* ; tenth tergite very slender, long, curved ; sternite on each side with a curved, smooth ridge which is posteriorly produced into a tapering point, the ridges of the two sides curved towards each other, being hairy on innerside. Clasper emarginate ventrally at apex ; harpe ending in a long, sharp point, and bearing ventrally beyond middle a long pointed process.

Hab. Bolivia to the Upper Amazons.

Two subspecies.

a. P. garleppi interruptus Staud. (1892).

Papilio torquatus, Staudinger (*non* Cram., 1777, err. det.), *Exot. Tagf.* t. 11. ♂ (1884).

♂. *Papilio garleppi* var. *interruptus* id., *Iris* v. p. 427 (1892) (S. Paulo de Olivença, Shanusi, Chanchamayo ; "*patros* Gray perhaps ♀ of this insect") ; Michael, *ibid.* vii. p. 209 (1894).

Band of forewing interrupted between R^2 and R^3 as in *P. torquatus*.

Hab. Upper Amazons ; Eastern Peru, as far south as Carabaya.

In the Tring Museum 3 ♂♂ from : La Union, R. Huacamayo, Carabaya, S.E. Peru, 2000 ft., December 1904 and January 1905, wet season (Ockenden).

b. P. garleppi garleppi Staud. (1892).

♂. *Papilio garleppi* Staudinger, *l.c.*

Band of forewing not interrupted, but there is usually a more or less distinct vestige of an interruption.

Hab. Bolivia.

In the Tring Museum 6 ♂♂ from Mapiri.

102. Papilio torquatus.

♂. *Papilio Eques Achivus torquatus* Cramer, *Pap. Exot.* ii. p. 123. t. 177. fig. A. B (1777) (Surinam).
♀. *Princeps* dominans *caudius* Hübner, *Samml. Exot. Schmett.* i. t. 117 (1806—?).

Sexes very dissimilar, the female resembling certain females of Aristolochia Papilios, occurring like these in forests, while the male frequents more open localities. The female bears also a close resemblance to *P. isidorus* and *P. rhodostictus*, being, however, easily recognised by the colour of the spots on the thorax and the buffish line on each side of the abdomen.

♂. The band of the forewing is interrupted between R^2 and R^3; however, there is occasionally a spot in front of R^3 which is sometimes so large as to bridge over the gap, though not entirely filling it up. On the underside of the hindwing there is a discal row of five or six rufous red spots, variable in size, the last standing before abdominal margin proximally of the anal submarginal spot; of this row the fifth spot counted from behind is the largest in nearly every specimen.

♀. Wings brown-black. Forewing with or without white patches, in our only Bolivian specimen on underside a creamy buff, submarginal, ill-defined band.——Hindwing, on *upperside*, with a complete row of red submarginal spots and an incomplete row of red discal ones, the discal row extending from SM^2 forward to R^1 or R^2; the discal and submarginal spots R^3—M^2 in the South American forms always merged together to large elongate patches, often also spots R^2—R^3 forming together a third patch, these patches occasionally creamy on the Amazons, the development being on the same lines as in *P. isidorus* and *P. rhodostictus*; the rows of spots remaining separated in the Mexican form.

Genitalia: ♂. Tenth tergite spatulate, sternite on each side with a distally truncate ridge which is more strongly chitinised than the rest of the segment, the ridges of the two sides forming in dorsal view a pair of ( ). Clasper somewhat acuminate; harpe broad, widening distally, being widest a short distance from apex, the ventral edge almost straight, the dorsal edge slightly angulate, apex obtuse, the surface feebly concave, distally practically flat and longitudinally wrinkled, the edges apically densely denticulate, dispersed minute teeth also along the ventral edge.——♀. Edge of vaginal orifice raised proximally into a large obtuse process which is curved distad, being longitudinally impressed on the proximal surface, slightly tapering apically, the apex being truncate; behind the orifice a small rounded lobe densely covered with minute hairs; laterally of the vaginal process several low ridges connected with one another, no large dentate lobe as in *P. anchisiades* and *P. hectorides*.

Early stages described by Burmeister, *Descr. Rép. Argent.* v. Lép., *Atlas* p. 5. n. 7 (1879).

Hab. Mexico to South-East Bolivia, Paraguay, and Rio de Janeiro.

Six subspecies.

a. P. torquatus tolus Godm. & Salv. (1890).

Papilio tolus Godman & Salvin, *Biol. Centr. Amer., Lep. Rhop.* ii. p. 228. n. 59. t. 70. fig. 1. 2. ♂, 3. 4. ♀ (1890) (Tampico ; Mexico) ; Haase, *Untersuch. Mimicry* i. p. 98 (1893).

♂. Band of forewing narrow, streak SC^5—R^1 long, streak R^1—R^2 short, a large spot R^2—R^3, the gap in the band being narrow, some small spots at upper angle of cell.——Tail broad, submarginal spots large.

♀. No spots on forewing.——Hindwing with two separate rows of red spots, only spots R^3—M^1 connected with one another by some diffuse red scaling ; tail long, spatulate.

Hab. Mexico.

b. P. torquatus tolmides Godm. & Salv. (1890).

Papilio tolmides Godman & Salvin, *l.c.* p. 229. n. 60. t. 70. fig. 5. ♂ (1890) (Panama ; Bugaba, Chiriqui, Veragua).

♂. Forewing : band broader than in the preceding form, no spots before upper angle of cell or only minute ones ; streak SC^5—R^1 longer than streak R^1—R^2, patch R^2—R^3 present, the gap in the band being sometimes almost completely filled up.——Tail narrower than in *P. t. tolus*, very feebly spatulate.

Harpe slightly sinuate or incised dorsally.

♀ not known.

Hab. Panama : from Chiriqui southwards ; Sevilla I.

May be expected to occur in Costa Rica.

In the Tring Museum 3 ♂♂ from : Chiriqui ; Sevilla I., January 1902 (Batty).

c. P. torquatus orchamus Boisd. (1836).

♀. *Papilio orchamus* Boisduval, *Spec. Gén. Lép.* i. p. 300. n. 133 (1836) (Colombia) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 192 (1846) (Colombia) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 44. n. 222. t. 7. fig. 6 (1852) (Venezuela) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 59. n. 235 (1856) (Venezuela) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 297 (1864) (Venezuela) ; Oberth., *Et. d'Ent.* iv. p. 79. n. 253 (1880) (Colombia, *type*).

♀. *Papilio torquatus* var. c. *P. orchamus*, Kirby, *Cat. Diurn. Lep.* p. 541. sub n. 154 (1871) (Venezuela).

♂ ♀. *Papilio orchamus*, Oberthür, *l.c.* p. 116. n. 253. t. 6. fig. 3. ♂ (1880) (Colombia) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 228. sub n. 59 (1890) (Colombia, Venezuela).

♂. *Papilio torquatus*, Hahnel, *Iris* iii. p. 201 (1890) (Valera, Venezuela).

♀. *Papilio torquatus* var. *orchamus*, Haase, *Untersuch. Mimicry* i. p. 98 (1893) (Venezuela).

♂. *Upperside.*—Forewing : yellow spots before upper angle of cell small, the spot before $SC^{4\text{-}5}$ especially smaller than in most specimens from Guiana and the Amazons ; patch SC^5—R^1 a little longer than the next spot or distally on a level with it, some specimens approaching the preceding form, bearing a spot before R^2 like *tolmides*.——Hindwing : submarginal spots usually clearly marked.

♀. Forewing : a patch across apex of cell ; a discal patch R^3—M^1, usually accompanied by a patch R^2—R^3 and a vestigial patch M^1—M^2.——Four to six large red patches on hindwing, the last standing behind M^2 ; a rather large spot in cell ; tail short, acute, non-spatulate.

Hab. Colombia ; Northern Venezuela.

In the Tring Museum 28 ♂♂, 2 ♀♀, from : "Bogota" ; Cananche, Cundinamarca, July 1903 (Mathan) ; Muzo, December 1896.

In coll. Oberthür a series of ♂♂ from Juntas, West Coast of Colombia ; in one of these the upper streak of the subapical patch on the forewing is longer than the second, and there is also a spot before R^3, the specimen resembling the preceding subspecies.

d. P. torquatus leptalea subsp. nov. (Pl. V. fig. 18).

♂. *Upperside.*—Forewing : spots at upper angle of cell minute ; streak SC^5—R^1 shorter than the next, tapering, both narrow, the second streak not extended to R^2 ; band narrower than in all the other forms, being narrower than the black marginal area.——Hindwing : submarginal spots clearly marked ; tail spatulate.

Underside.—Forewing : submarginal spots rather large, especially the double spot M^2—SM^2.——Hindwing : apex of cell black at least as far as base of R^1 and M^1.

♀. Like the female of *P. t. orchamus* ; spot R^2—R^3 of forewing and the cell-patch smaller ; discal and submarginal spots R^2—R^3 of hindwing separate, discal patch M^2—(SM^1) less enlarged.

Hab. Western Ecuador.

In the Tring Museum 1 ♂, 1 ♀ from Naranjas (O. T. Baron) ; Zaruma, 1000 m. vii. 1899 (Simons).

In coll. Oberthür several males from Chimbo and Balsapamba, a ♂ from the latter place being here figured (type of name).

e. P. torquatus torquatus Cram. (1777).

Seba, *Thesaur.* iv. p. 12. t. 7. fig. 21. 22. ♂ (1764).

♂. *Papilio Eques Achivus torquatus* Cramer, *l.c.* ; Goeze, *Ent. Beytr.* iii. 1. p. 86. n. 65 (1779); Jabl. & Herbst, *Naturs. Schmett.* ii. p. 270 (1784) ; iid., *l.c.* iii. p. 175. n. 104. t. 45. fig. 5. 6 (1788) ; Esper, *Ausl. Schmett.* p. 148. n. 69. t. 39. fig. 1 (1793).

Papilio Eques Achivus pelaus Fabricius, *Spec. Ins.* ii. p. 4. n. 12 (1781) (*partim*) ; Jung, *Alphab. Verz. Schmett.* p. 91 (1792) (*partim*) ; Fabr., *Ent. Syst.* iii. 1. p. 5. n. 15 (1793) (*torquatus* quoted as syn. with ?).

Papilio Eques Trojanus peleus, Gmelin, *Syst. Nat.* i. 5. p. 2228. n. 279 (1790) (*partim*).

♀. *Princeps* dominans *caudius* Hübner, *Samml. Exot. Schmett.* i. t. 117 (1806— ?).

♂. *Heraclides pelaus*, id., *Verz. bek. Schmett.* p. 83. n. 853 (1818 ?) (*partim*).

♀. *Priamides caudius*, id., *l.c.* p. 87. n. 895 (1818 ?).

♂. *Papilio torquatus*, Godart, *Enc. Méth.* ix. p. 62. n. 100 (1819) (Guyane ;—"Brazil" alia subsp.) ; Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 51 (1838).

♀. *Papilio caudius*, Boisduval, *Spec. Gén. Lép.* i. p. 301. n. 135 (1836) ("Brazil") ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 191 (1846) ("Brazil") ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 42. n. 220 (1852) (Pará) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Amazons ; gardens) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* 59. n. 233 (1856) (Pará ; Villa Nova) ; Wood, *Ins. Abroad* p. 546. 547. fig. 296. 297 (1883) ("♂" false ; "Java" false).

♀. *Papilio patros* Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 43. n. 221. t. 7. fig. 7 (1852) (Ega) ; Wall., *l.c.* p. 256 (1854) (Upper Amazons ; forest) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 59. n. 236 (1856) (Ega) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 297. p 358. n. 173 (1864) (Ega) ; Wood, *Ins. Abroad* p. 545. fig. 295 (1883).

♀. *Papilio patros* var. a, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 43. sub n. 221. t. 7. fig. 8 (1852) (Ega).

♀. *Papilio patros* var. b, Gray, *l.c.* p. 43. sub n. 221. t. 7. fig. 5 (1852) (Ega).

♂. *Papilio torquatus*, Wallace, *l.c.* p. 255 (1854) (Amazons ; gardens) ; Bates, *Natural. Riv. Amaz.* p. 52 (1864) (Pará, in street).

♂ ♀. *Papilio caudius*, id., *Trans. Ent. Soc. Lond.* (2). v. p. 1 (1859) (this is the ♀ of *P. torquatus* ; found a pair in copula) ; Butler, *ibid.* p. 146. n. 230 (1877) (Serpa, Amazons, April).

♂ ♀. *Papilio torquatus*, Bates, *Trans. Ent. Soc. Lond.* (2). v. 347 (1861) (*caudius* and *patros* ♀ ♀ of *torquatus* ; *torq.* and *caud.* found in copula) ; id., *Journ. Entom.* i. p. 228. n. 30 (1862) (Pará and Lower Amazons, abundant ; ♀ var. *patros* Upper Amazons) : Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 297 (1864) (Surinam, Amazons) ; Kirby, *Cat. Diurn. Lep.* p. 541. n. 154 (1871) (Surinam ; Amazons) ; Oberth., *Et. d'Ent.* iv. p. 78. n. 252 (1880) (*partim* ; Cayenne ; Amazons) ; Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304 (1883) (Surinam) ; Staud., *Exot. Tagf.* p. 16. t. 11. ♂ (1884) (Surinam ; Cayenne ; Amazons) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 228. sub n. 59 (1890) (Guiana ; Lower Amazons) ; Hahnel,

Iris iii. p. 283 (1890) (Pebas); Haase, *Untersuch. Mimicry* i. p. 97 (1893); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença).

♀. *Papilio torquatus* var. a. *P. patros*, Kirby, *l.c.* (Upper Amazons).

♀. *Papilio torquatus* var. *flavida* Oberthür, *Et. d'Ent.* iv. p. 115. n. 252 (1880) (Teffé).

♂♀. *Papilio patros*, Godman & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 228. sub n. 59 (1890) (Upper Amazons).

♀. *Papilio torquatus* var. *flava*, Haase, *Untersuch. Mimicry* i. p. 98 (1893) (laps. cal.; "Pará" false).

♀. *Papilio torquatus* var. *caudius*, id., *l.c.* (Pará).

♀. *Papilio torquatus* var. *patros*, id., *l.c.*

There is in the Tring Museum from the old collection of Lennep a male which agrees with Cramer's figure, and is probably the type specimen. This figure has several characteristic features which are also found in that specimen. The band of the forewing is rather narrower than usually in the present subspecies, the spots at the upper angle of the cell are small; the submarginal spots of the hindwing, on upperside, are comparatively large, and the apex of the cell is more extended black on underside than is usually the case.

Since Bates's classical paper in 1861 the specimens from the Guianas and the Lower Amazons have generally been regarded as different from the individuals found on the Upper Amazons. The material examined by us does not bear out this opinion. However, we find that in the males from Bolivia and Peru there are usually only five red discal spots on the underside of the hindwing, while there are mostly six in the specimens from the Amazons and Guiana. Having unfortunately only one female from the former districts, we do not know whether its peculiarities are merely individual or geographical.

♂. The spots at the upper angle of cell of forewing are mostly larger than in the other subspecies; streak SC^5—R^1 shorter than the next, both being broad; the band broader than in *P. t. leptalea* and *orchamus*, varying from being half as wide again to twice the width of the black distal border.——Submarginal spots of hindwing usually much shaded with black.

Submarginal spots of forewing below generally thin.

♀. Tail slender, pointed, rarely somewhat spatulate. There are five principal forms; the markings of the hindwing individually variable in number and size.

a'. ♀-f. *theras* nov.——Forewing with cell-spot, which does not reach across cell; one or more white patches on disc, usually only patch R^3—M^1 well developed.——Surinam, Upper Amazons.

b'. ♀-f. *caudius* Hübn., *l.c.*——Forewing without cell-spot; one to three patches on disc, spot M^1—M^2 being usually the best developed, often alone present, sometimes no other patches than M^1—SM^2.——The Guianas; Lower and Upper Amazons.

c'. ♀-f. *patros* Gray, *l.c.*——No white patch on forewing; patches of hindwing red.——Upper Amazons; Cayenne (coll. Oberthür).

d'. ♀-f. *flavida* Oberth.; *patros* var. *b* Gray, *l.c.*; *flava*, Haase, *l.c.*——Forewing without white spots; patches of hindwing creamy.——Upper Amazons: Ega.

e'. ♀-f. *cleolas* nov.——Forewing without white spots, but with a kind of submarginal buffish band on underside, consisting of short double streaks R^1—R^3 and a row of small spots R^3—SM^2.——Bolivia (Mus. Tring).

Hab. Orinoco; Patao, Guiria; the Guianas; Amazons; Eastern slopes of Ecuador, Peru and Bolivia.

In the Tring Museum 34 ♂♂, 13 ♀♀, from: Patao, Guiria, August 1891; La Vuelta, Caura R., May 1903 (Klages); Surinam; Teffé, January 1905 (Mathan); Ohidos (Mathan); Juhuty, April 1905 (Mathan); Itaituba; Iquitos; R. Cachyaco,

affluent of R. Huallaga (Stuart); Archidona, April 1899 (W. Goodfellow); Zamora (O. T. Baron); Peréné R., 3000 ft. (Watkins); Peréné R., March 1900 (Simons); Upper R. Toro, La Merced (Simons); R. Colorado, 2500 ft., September—October 1903 (Watkins & Tomlinson); Guanay, Mapiri, 1500 ft., August 1895 (Stuart); Salinas, R. Beni, July 1895 (Stuart); Mapiri; Encuentra Grande, mouth of La Paz R., August 1895 (Stuart); Prov. Sara, S. Cruz de la Sierra (J. Steinbach).

f. P. torquatus polybius Swains. (1823).

♂. *Papilio torquatus*, Godart, *Enc. Méth.* ix. p. 62. n. 100 (1819) (Brazil—"Guyane" alia subsp.); Boisd., *Spec. Gén. Lép.* i. p. 367. n. 211 (1836) (Brazil); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 142 (1846) (Brazil); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 34. n. 164 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. n. 172 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 3. n. 51 (1857) (Brazil); Prillw., *Stett. Ent.* xxvi. p. 130 (1865) (Corcovado).

♀. *Papilio polybius* Swainson, *Zool. Illustr., Ent.* ii. t. 94 (1823) (Minas Geraës); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 193 (1846) (Brazil); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 44. n. 223 (1852) (Brazil—var. a. *alia spec.*); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 59. n. 236 (1856) (Brazil—var. a. excl.); Ménétr., *l.c.* p. 5. n. 74 (1857) (Brazil).

♀. *Troilides tros* Hübner, *Samml. Exot. Schmett.* ii. t. 111 (1822?).

♀. *Papilio trojanus* Boisduval, *Spec. Gén. Lép.* i. p. 301. n. 134 (1836) (nom. nov. loco *tros* Hübn. *non* Fabr.; Brazil).

♀. *Papilio tros*, Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 13 (1845) (Brazil); Prillw., *Stett. Ent. Zeit.* xxvi. p. 129 (1865) (Corcovado).

♂ ♀. *Papilio polybius*, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 297, p. 358. n. 172 (1864) (Brazil); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 228. sub n. 59 (1890) (South-Eastern Brazil; ♀ = *tros* = *trojanus*).

♂ ♀. *Papilio torquatus*, Lucas, in Chenu, *Enc. Hist. Nat., Pap.* i. p. 38. t. 6. fig. 1. ♂ (1851–53) (Brazil); Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 13 (1874) (Entre Rios, Sept.); Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 5. n. 7 (1879) (Rio de Janeiro; larva, pupa); Oberth., *Et. d'Ent.* iv. p. 78. n. 252 (1880) (*partim*; Brazil, ♀); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 91. n. 40 (1890); Bönningb., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 26 (1896) (common).

♂ ♀. *Papilio torquatus*, var. b. *P. polybius*, Kirby, *Cat. Diurn. Lep.* p. 541. sub n. 154 (1871).

Papilio torquatus ♀ var. *polybius*, Haase, *Untersuch. Mimicry* i. p. 98 (1893).

♂ ♀. *Troilides torquatus*, Kirby, in Allen, *Nat. Libr., Butt.* ii. p. 283 (1897); id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 97. t. 118. fig. 1. 2, t. 324. fig. 1. 2 (190—?).

♂. Forewing: the spots before upper angle of cell small; submarginal spots of underside rather large.——Hindwing: submarginal spots usually distinct, not or little shaded with black; cell below entirely or almost entirely yellow, the black spot in apex being on an average smaller than in *P. t. torquatus*; tail broad.

♀. Monomorphic. Forewing: a cell-patch and a large discal patch M^1—M^2, no spot R^2—R^3, but often a spot R^3—M^1 and a streak behind M^2; tail spatulate, rounded at tip.

Hab. Brazil; Paraguay; Matto Grosso.

In the Tring Museum 36 ♂♂, 16 ♀♀, from: Bahia; Minas Geraës (R. Haensch); Tijuca; Petropolis; Rio de Janeiro; Villa Maria to Diamantino, Matto Grosso, January 1897 (Andeer).

103. **Papilio tasso** Staud. (1884).

♀. *Papilio polybius* var. a, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 44. sub n. 223 (1852) (hab. ?)

♂ ♀. *Papilio tasso* Staudinger, *Exot. Tagf.* p. 19. t. 13. ♂ (1884) (hab. ?, probably Brazil; ♀ Brazil).

♂. Forewing: band abbreviated, the subapical spots SC^5—R^2 of *P. torquatus* being absent.——Hindwing: three yellow submarginal spots on *upperside*, farther away from margin than in *P. torquatus*.

♀. A broad white band from near R^3 of forewing to abdominal margin of hindwing; tail narrow, not spatulate; cell of forewing below with some yellow streaks.

Hab. Brazil.

104. Papilio peleides Esp. (1793).

Papilio Eques Trojanus pelaus ?, Jablonsky & Herbst, *Naturs. Schmett.* ii. p. 265. n. 51. t. 19. fig. 1 (1784) (*partim*).

Papilio Eques Trojanus peleides Esper, *Ausl. Schmett.* p. 150. n. 70. t. 39. fig. 2 (1793) (copy of Jabl.'s figure).

Papilio peleides, Boisduval, *Spec. Gén. Lép.* i. p. 366. n. 209 (1836) (artefact ?); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 144 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 34. n. 166 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 174 (1856) (S. America); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 310. n. 301 (1864) (hab. ?); Kirby, *Cat. Diurn. Lep.* p. 541. n. 154a (1871) (spec. fict. ?); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 228. sub u. 59 (1890).

Besides Jablonsky's figure and description there is no evidence of the existence of this insect. Jablonsky expressly states that the figure was carefully drawn from a specimen. The individual may have been an artefact, as suggested by Boisduval, but the figure does not give us that impression. Considering that of many American Papilios only very few specimens are known, it is quite conceivable that *P. peleides* has not been rediscovered, as is the case also with *P. tasso*, which was described from an old pair without precise indication of locality.

Hab. Presumably South America.

Subsection D.

Palpus with a white (rarely yellow) dot, sometimes quite black. Frons black, or with a yellow *central* line, never yellow along eyes. Costal margin of forewing somewhat incrassate, more or less dentate, the scaling of the edge easily rubbed off, with the exception of the *Zagreus Group*.

The *Zagreus Group* is a mimetic offshoot of this subsection, having acquired several peculiarities which render it difficult to give a general characterisation of the whole Subsection inclusive of the *Zagreus Group*. Apart from these mimics, the species of the present Subsection are generally strong-winged species with heavy neuration in the forewing. Black is the prevailing colour on the body and wings. The abdominal margin of the hindwing is clothed with long hairs in the males.

Key to the groups:

A. Costal margin non-serrate; frons with yellow mesial line; abdomen for the greater part orange-yellow . . . . *Zagreus Group.*
B. Costal margin almost smooth, the serration being vestigial . *Scamander Group.*
C. Costal margin serrate . . . . . *Homerus Group.*

X. Zagreus Group.

Frons with yellow mesial line. Antenna long, very slender, with thin club, yellow, except proximally. Breast obliquely striped with yellow; abdomen orange-buff, with a black mesial stripe above and below, or only on one side. Distal margin of forewing convex, farthest point about R^1, costal margin non-serrate; cell very broad, upper and lower angles obtuse; SC^3 usually before angle of cell; stalk SC^{1+5} very variable in length. Hindwing ovate, longest centrally; long-

hairy at abdominal margin in male; basal cellule long and narrow, spur near its apex, SC near its base; SC^2 from before middle of cell. Tenth abdominal tergite of male bifurcate; harpe long, gradually tapering to a point, somewhat flexuose, similar in the three species. Spines on upperside of tibiae and tarsi few in number and short in both sexes.

Key to the species:

a. Hindwing black for the greater part . . . . . Species No. 107.
Hindwing with large central orange area . . . . . *b*.

b. Hindwing with a black spot in cell and several around cell. Species No. 105.
No such spots on hindwing . . . . . Species No. 106.

105. **Papilio zagreus** Doubl. (1847).

Papilio zagreus Doubleday, *Ann. Mag. N. H.* xix. p. 174 (1847) (Venezuela); id., Westw. & Hew., *Gen. Diurn. Lep.* i. t. 1. fig. 1. ♀ (1847); iid., *l.c.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 8. n. 30 (1852) (Venezuela; "Quito" alia species); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 9. n. 33 (1856); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 349 (1861) (Ega, November, one example); id., *Journ. Ent.* i. p. 229. n. 35 (1862) (Upper Amazons); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 322 (1864) (Bogota; Venezuela; Ega); Kirby, *Cat. Diurn. Lep.* p. 538. n. 142 (1871); Druce, *Proc. Zool. Soc. Lond.* p. 246. n. 17 (1876) (Pozuzo); Hopff., *Stett. Ent. Zeit.* xl. p. 53. n. 24 (1879) (N. Granada, Venezuela, Amazons, Bolivia); Oberth., *Et. d'Ent.* iv. p. 99. n. 312 (1880) (Guayaquil); Staud., *Exot. Tagf.* p. 15. t. 10. ♂ (1884) (Sonth Peru to Venezuela); Dognin, *Lép. Loja* p. 15 (1887); Hahnel, *Iris* iii. p. 149 (1890) (San Estéban); Dognin, *l.c.* p. 37 (1891); Haase, *Untersuch. Mimicry* i. p. 94 (1893); Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 284 (1896); Eimer, *Orthogen.* p. 209 (1897).

♂♀. In spite of the large area inhabited by this species there is no decided geographical variation. The individnal variability in the size of the creamy and orange markings of the forewing and in the black spots of the hindwing being considerable, all the differences between specimens from northern and southern localities which may be discovered in a small series of individnals disappear when a larger number of specimens is compared. The only difference which approaches constancy is in the colour of the cell-bar of the upperside of the forewing, this bar being pure cream-colour in Colombian and Veneznelan males, rarely showing a trace of orange, while it is more or less orange at the discal end in the majority of the specimens from Ecuador, Peru and Bolivia. The black dorsal stripe of the abdomen is absent from the female; in one of our Ecuadorian males the black ventral stripe of the abdomen is wanting.

Genitalia: ♂. The proeesses of the tenth tergite long, similar to those of *P. bachus*, being much longer than in *P. ascolius*. Harpe long, very narrow, the apex being curved inwards.——♀. Lobe situated in front of the vaginal orifice short, rotundate-truncate; lateral flap very large; transverse fold or low ridge situated behind vaginal orifice continued laterad, disappearing on the inner side of the lateral flaps.

Early stages not known.

Hab. Veneznela, Colombia, southward to Bolivia.

In the Tring Musenm 47 ♂♂, 1 ♀, from: Onaca, S. Marta, 2000 ft. (Chas. Engelke); Villavicencio to Monte Redondo, March—April 1897 (Dr. Bürger); Villavicencio to R. Ocoor, Jannary 1897 (Dr. Bürger); "Bogota"; Zamora (O. T. Baron); Chanchamayo, Peru (Schunke); Pozuzo, Huánuco, 800—1000 m. (W. Hoffmanns); La Union, R. Huacamayo, Carabaya, 2000 ft., November 1904 (G. Ockenden); Reyes, R. Beni, Augnst 1895 (Stuart); Guanay, Mapiri R., August 1895, 1500 ft. (Stuart).

106. Papilio ascolius Feld. (1865).

Papilio zagreus, Gray (*non* Doubleday, 1847, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 8. n. 30 (1852) (*partim* ; Quito, in coll. Hewitson).

Papilio ascolius Felder, *Verh. Zool. Bot. Ges. Wien.* xiv. p. 312. n. 323 (1864) (nom. indescr. ; Quito ; Bogota) ; id., *Reise Novara, Lep.* p. 82. n. 63 (1865) (Bogota, ♂) ; Staud., *Exot. Tagf.* p. 15 (1884) (Ecuador ; Colombia ; Chiriqui).

♂ ♀. Differs from *P. zagreus* especially in the hindwing, the basi-discal area bearing no black patches in the cell and between R^1 and abdominal margin ; besides the black subcostal streak, which is always present, the wing bears only one black discal spot SC^2—R^1 either on both sides or only below, this spot being absent from many specimens ; the black distal border of the hindwing is usually broader than in *P. zagreus*, often touching cell, but in Panama individuals the border does not surpass in width that of *P. zagreus*. The abdomen of the female is on the back either entirely ochraceous or blackish brown, there being no sharply defined dorsal black mesial stripe as in the male.

Genitalia : ♂. The processes of the tenth tergite short, the dorsal lateral edge of the tergite irregularly dentate and sinuate, the two sides not being exactly identical ; harpe flattened beyond middle and here broader than in *P. zagreus*, the apex straight, not curved inward.— ♀. Lobe at vaginal orifice slightly acuminate, narrower and longer than in *P. zagreus* ; lateral flap not so large as in that species, its posterior edge continuous with the low transverse ridge standing behind the vaginal orifice.

Early stages not known.

Hab. Chiriqui to Western Ecuador.

The four subspecies differ only in pattern, each form varying considerably. There are in a long series of specimens all intergradations from one subspecies to the other.

a. P. ascolius zalates Godm. & Salv. (1890).

Papilio zalates Godman & Salvin, *Biol. Centr. Amer., Lep. Rhop.* ii. p. 233. n. 68. t. 71. fig. 1. 2. ♂, 3. genit. (1890) (Chiriqui).

♂. *Upperside.*—Forewing : cell-patch more or less densely shaded with black ; subapical cell-spot narrow ; discal spots short, spot R^1—R^2 as large as the next one or larger ; no spots R^3—M^2 at cell or only traces of them.——Hindwing : distal marginal border narrower than in the other forms ; no black discal spot SC^2—R^1.

Underside.—Hindwing, deeper orange than in the other forms ; submarginal spots smaller ; no black spot SC^2—R^1.

♀ not known.

Hab. Panama ; Chiriqui ; Bugaba ; Veragua.

In the Tring Museum 3 ♂♂ from Chiriqui.

b. P. ascolius daguanus subsp. nov.

♂. *Upperside.*—Forewing : basal cell-patch as in *zalates*, subapical cell-patch as in *zalates* or larger ; discal spots as in *ascolius*, spot R^1—R^2 large, but much shorter than the next one ; slight traces of spots R^2—M^2 at cell.——Hindwing : basi-discal area of the same colour as the spots of forewing, slightly washed with orange distally, but much less so than in the palest specimens of *ascolius*, agreeing in this character best with pale individuals of *rosenbergi* from West Ecuador ; black subcostal streak broader than in *zalates* and *ascolius*, invading cell a little ;

a large black discal spot SC^2—R^1, almost touching the subcostal streak ; creamy spots around apex of cell nearly as large as in *zalates*.

Underside.—Basi-discal area of hindwing nearly as pale as above, orange-tawny at costal margin and distally ; black subcostal streak broader than in the other forms, washed out at the edges, entering cell ; black discal spot SC^2—R^1 triangular, larger than in the other subspecies.

Hab. West Colombia : Rio Dagua.

In the Tring Museum 2 ♂♂.

A long series of males in coll. Oberthür from Juntas, R. Dagua.

c. P. ascolius ascolius Feld. (1865).

Papilio ascolius Felder, *l.c.* (*partim* ; Bogota) ; Kirby, *Cat. Diurn. Lep.* p. 538. n. 142b (1871) ; Oberth., *Et. d'Ent.* iv. p. 99. n. 313 (1880) (Colombia) ; Staud., *l.c.* (1884) (*partim*) ; Eimer, *Orthogen.* p. 209 (1897).

♂. Basal cell-patch of forewing always clearly marked, subapical cell-patch narrow or broad, occasionally continuous with the basal patch posteriorly ; discal spot R^1—R^2 usually as large as the last discal spot, rarely a mere dot ; the discal spots very variable in size, in some specimens only one-third the size as in others ; the spots R^3—M^2 at cell never absent, but often small, sometimes joined to the discal spots.——Hindwing always orange in cell and beyond ; the orange spots around apex of cell very variable, spot R^2—R^3 often absent, sometimes both spots R^2—M^1 mere specks ; black discal spot SC^2—R^1 often vestigial, diffuse.

Underside.—The discal spots situated distally of cross-veins on forewing very rarely reduced to dots.——Basi-discal area of hindwing usually pale in middle, but sometimes the pale colour reduced to some traces situated at the black subcostal streak ; black discal spot SC^2—R^1 present in most specimens.

♀. A specimen in Mr. Godman's collection from Muzo. Abdomen black-brown above ; proximal cell-patch of forewing and patches between cell and hindmargin orange ; patches R^3—(SM^1) extended to cell ; a broad streak along hindmargin. ——Black subcostal streak of hindwing reduced.

Hab. Colombia : Magdalena valley ; Cordillera of Bogota.

In the Tring Museum 27 ♂♂ from : "Bogota" ; Muzo, December 1896.

d. P. ascolius rosenbergi Druce (1903).

Papilio zagreus, Gray, *l.c.* (*partim* ; "Quito").
Papilio ascolius Felder, *l.c.* (*partim* ; Quito).
Papilio rosenbergi Druce, *Ann. Mag. N. H.* (7). xii. p. 221 (1903) (Paramba).

♂. *Upperside*.—Forewing, subapical cell-patch large, more or less rounded distally ; spots R^3—M^2 situated at cell absent or well marked ; discal spot R^1—R^2, which is nearly always large in the other forms, usually minute, sometimes absent, seldom as large as the last spot of the discal row ; discal spots R^2—M^1 usually longer than in the other subspecies ; submarginal spots R^1—SM^2 as a rule smaller than in the preceding form, often vestigial, the posterior ones being sometimes absent. ——Hindwing, basi-discal area paler than in *ascolius*, usually hardly at all washed with orange, but sometimes more extended orange than in the palest specimens of *P. a. ascolius* ; width of black distal border as in *ascolius*, variable ; black discal spot SC^2—R^1 mostly absent.

Underside.—Subapical cell-patch of forewing rounded distally.——Basi-discal area of hindwing either pale in middle, or the pale colour marked only at the black subcostal streak ; discal spot SC^2—R^1 varying from black to tawny, often vestigial,

never absent : the black streak usually washed out at the edges ; submarginal spots small.

♀. Abdomen ochraceous above. Discal patches R^3—M^2 of forewing more proximal than in male ; spots M^1—(SM^1) situated at cell large but ill-defined.

Hab. West Ecuador.

In the Tring Museum 11 ♂♂, 1 ♀, from : Paramba, 3500 ft., March, April and May 1897 ; and Chimbo, 1000 ft., August 1897 (W. Rosenberg).

107. **Papilio bachus** Feld. (1865).

Papilio bachus Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 324 (1864) (nom. indescr. ; Bogota); id., *Reise Novara, Lep.* p. 80. n. 62. t. 14. fig. a. b. ♂ (1865) (Bogota).

♂. The two cell-patches of the forewing are usually confluent behind, the black space at the costal side of the proximal patch being often reduced to a small subbasal streak ; the discal spots SC^3—R^2 are always present, the upper two being sometimes very small, the third reaching occasionally from cell halfway to outer margin ; three long patches from cell to near outer margin, the second and third often imperfectly divided into a proximal portion corresponding to the spots R^3—M^2 situated in *P. ascolius* and *zagreus* close to the cell, and a distal portion homologous to the discal spots of the allied species ; the submarginal series of spots usually absent from upperside, but occasionally the spots partly distinct partly vestigial, the last three spots R^3—SM^2 often represented by minute dots.—— The hindwing is quite black, except a narrow band separating the basi-discal area from the marginal border, the latter being narrower than in the other species ; that orange band often reduced to some small spots ; creamy submarginal spots distinct; the veins partly creamy in some specimens.

The *underside* is somewhat paler than the upper; the hindwing is more extended tawny-orange, the black area being often divided up into patches by the veins being bordered with tawny. In one of our specimens of the southern subspecies (Pozuzo, Peru) the marginal band of the hindwing is creamy for the greater part, sharply defined spots situated in the middle of the cellules between the blue dots being black and therefore very conspicuous on the pale ground ; the same specimen bears on the forewing, above and below, ill-defined creamy streaks at the distal margin from SC^3 to R^3, the first being the longest and most indistinct.

♀ not known.

Genitalia : ♂. Tenth tergite similar to that of *P. zagreus* ; the two apical projections long ; harpe also as in that species, a little broader beyond middle.

Hab. Colombia, Peru and Bolivia.

Two subspecies.

a. P. bachus bachus Feld. (1865).

Papilio bachus Felder, *l.c.* ; Kirby, *Cat. Diurn. Lep.* p. 538. n. 142a (1871).

♂. Markings of forewing pale above and below; proximal cell-patch and posterior discal patches washed with orange ; discal streaks R^2—M^2 narrowed distally on upper- and underside ; vestiges of three submarginal spots SC^3—R^1, the first spot standing distally of the fork.——Veins of hindwing partly creamy.

Apparently rare, at least in collections.

Hab. Colombia.

In the Tring Museum 3 ♂♂ from : "Bogota" (Lindig, type) ; Villavicencio to Monte Redondo, March—April 1897, beginning of rainy season (Dr. Bürger).

b. P. bachus chrysomelus subsp. nov.

Papilio bachus, Staudinger, *Exot. Tagf.* p. 15 (1884) (Peru); Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani, Bolivia).

♀. Basi-discal area of forewing orange above and below, more or less creamy yellow at costal margin; discal streaks R^2—M^2 distally less acuminate on underside than in the preceding subspecies.

The individual variability is considerable. Some specimens have hardly any cream-colour on the upperside, while in others the costal half of the subapical cell-patch, the patches outside the short cross-veins and the distal portion of the streak R^2—R^3 are creamy. The amount of tawny orange on the hindwing is very variable.

Hab. Pern; Bolivia.

In the Tring Museum 24 ♂♂ from: Pozuzo, Huánuco, 800—1000 m. (W. Hoffmanns); Chanchamayo (Schunke; Hoffmanns); Montanas, R. Madre de Dios, September 1901 (Ockenden); R. Sluculi, S.E. Peru, June 1901, 2500 ft., dry season (Ockenden); La Union, R. Huacamayo, S.E. Peru, 2000 ft., November 1904, wet season (Ockenden); R. Songo to R. Suapi, Bolivia, 1100 m., March—June (Garlepp); Salinas, R. Beni, June 1895 (Stuart); Mushay, R. Beni, August 1895 (Stuart); S. Augustin, R. Mapiri, 3500 ft., September 1895 (Stuart); Charuplaya, May 1901, 1300 m., some rain (Simons).

XI. Scamander Group.

Dentition of costal margin of forewing vestigial.

Of all the species of Subsection D a member of the present group, namely *P. hellanichus*, appears to us to stand in pattern nearest the ancestral form. The mimetic *Zagreus Group* is probably an offshoot from some such insect as *P. hellanichus*.

The dentition of the costal edge of the forewing is very feebly developed, but on denuding the margin small teeth become visible, being especially distinct towards the base of the wing.

Key to the species:

a.	A yellow band of spots across the upperside of both wings	*b.*
	No yellow band on upperside	*c.*
b.	Hindwing, upperside, with large yellow spot in cell, discal spots more or less orange distally	Species No. 108.
	Band of hindwing, upperside, not entering cell, or cell-spot very small	Species No. 109.
c.	Abdomen with large creamy side-band or patch . .	Species No. 111.
	Abdomen black	Species No. 110.

108. Papilio hellanichus Hew. (1868).

Papilio hellanichus Hewitson, *Exot. Butt.* iv. *Pap.* t. 9. fig. 27. 28 (1868) (Uruguay); Kirby, *Cat. Diurn. Lep.* p. 566. n. 323 (1871) (Uruguay); Oberth., *Et. d'Ent.* iv. p. 69. n. 196 (1880) (Brazil); Haase, *Untersuch. Mimicry* i. p. 92 (1893) (belongs to the "Machaon Group"); Eimer, *Arth. Verwandtsch. Schmett.* ii. p. 138. t. 7. fig. 5. ♂ (1895) (near *P. americus*); id., *Orthogen.* p. 37 (1897); Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 272 (1897).

Papilio hellanicus (!) Hewitson, *l.c. Index* (1871).

Papilio cleotas, Burmeister (*non* Gray, 1832, err. det.), *Descr. Rép. Argent.* v. p. 61. n. 3 (1878) (mouth of R. Paraná; Entre Rios; Rosario; Gualeguaychu; Cordova; Las Conchas; *P. hellanicus*! sub syn.).

♂♀. With the exception of Burmeister, all authors have regarded this insect as a near relative of *P. americus* and allies. However, it has nothing to do with the *Machaon Group*, the resemblance to those insects being quite superficial. We are astonished to find that the pattern of the upperside deceived even Haase, who in many other cases has shown such a keen insight in the true relationship of many species of *Papilio* over which other authors had blundered. *P. hellanichus* is in structure practically identical with *P. scamander*, and the close agreement in pattern will also become at once evident to every one who compares the underside of *P. hellanichus* with that of *P. scamander scamander*. In fact, *P. hellanichus* is nothing else but the most southern development of *P. scamander*; the two insects may be specifically distinct, as we believe they are, but are nevertheless very closely related. The patch in the cell of both wings gives the species an *americus*-like appearance; but even these patches are nothing new in the species, as the cell-spot of the forewing occurs on the underside in *P. scamander*, while the hindwing of *P. scamander* often bears a small cell-spot on both sides.

Early stages not known.

Hab. Uruguay and the adjacent districts of Brazil and Argentina.

In the Tring Museum 10 ♂♂, 3 ♀♀, from: S. Isidor, north of Buenos Aires (Ruscheweyh); La Soledad, Entre Rios, border of Uruguay, October, December, January (Chas. Britton); La Soledad, March and December (Miss E. A. Britton).

In coll. Oberthür from Zarate, January and February 1881 (Kinkelin), and a ♀ labelled "Brézil."

109. **Papilio scamander** Boisd. (1836).

Papilio scamander Boisduval, *Spec. Gén. Lép.* i. p. 363. n. 206 (1836) (Brazil).

♂♀. *Upperside.*—Forewing: costal edge practically non-serrate; no spot in cell; a curved discal row of rounded spots from costal to hinder margin; a submarginal row of much smaller spots from costal margin, not reaching to hinder margin.——Hindwing: a curved discal band of spots parallel to distal margin situated outside cell, often touching it, there being sometimes a small spot in cell, cream-colour or buff-yellow like the bands of the forewing; a row of submarginal spots, red or pale orange-buff, the first ones being sometimes cream-colour; tail thin, tooth M^1 produced, sometimes also tooth M^2.

Underside of forewing similar to upper, the cell bearing sometimes a spot at apex, and the submarginal spots being enlarged in one of the subspecies.——Hindwing: ground-colour either brown-black, or yellowish buff, or intermediate, the three subspecies being different in the colour and pattern of the wing.

Neuration: D^2 of forewing half the length of D^3 or less; SC^2 of hindwing midway between base and R^1 or beyond middle.

Genitalia: ♂. Tenth tergite long, spatulate, the tip being rounded; upper edge of sternite strongly chitinised, smooth, bearing anally two processes, the anterior one being conical, pointed and proximally hairy, the posterior one being subcylindrical, feebly increasing in width apically. Harpe gradually widening from base, somewhat twisted, suddenly narrowed at apical third of clasper from the ventral side, ending in a slightly curved acute process, the ventral edge bearing one or more small teeth proximally of the apical process.——♀. In front of vaginal orifice a lanceolate, flat process, slightly irregular at the edges, carinate on the anterior surface; lateral edges of orifice feebly elevate, forming posteriorly together

a short, flattened, longitudinal ridge which bears a rounded tubercle behind the orifice, the tubercle being covered with extremely small hairs; the whole area at each side of the orifice brown, chitinised, the lateral edge being free, projecting; between this ridge and the postvaginal mesial ridge a deep groove in front of which there is a long, pointed, curved process.

Early stages several times described and figured; see literature under *grayi*.

Hab. Brazil.

Three subspecies.

a. P. scamander grayi Boisd. (1836).

Papilio grayi Boisduval, *l.c.* p. 365. n. 208 (1836) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 338 (1836) (Bras. austr.); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 51 (1838); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 18 (1845); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 151 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 35. n. 171 (1852); Lucas, in Chenu, *Enc. Hist. Nat., Pap.* i. t. 16. fig. 2. ♂ (1853); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 179 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 53 (1857) (Brazil); Vollenh., *Tijdschr. Ent.* iii. p. 87. n. 145 (1860) (Brazil); Kirby, *Cat. Diurn. Lep.* p. 537. n. 130 (1871); Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 5. n. 9. t. 2. fig. 4. 4a (1879) (larva, pupa; Nova Friburgo; Petropolis); Oberth., *Et. d'Ent.* iv. p. 74. n. 223 (1880) (*partim*; type); Jones, *Proc. Lit. Phil. Soc. Liverpool* xxxvi. p. 42. n. 45. t. 4. fig. 10 (1883) (larva; pupa; Sao Paulo); Bönuingh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 28 (1896) (not at Rio; common at Petropolis; larva on *Canella* and *Magnolia*); Peters, *Illustr. Zeitschr. Ent.* ii. p. 52 (1897) (Bahia, rather common; larva, on *Laurus*).

♂ ♀. The row of submarginal spots of forewing not angulate; posterior discal spots larger than anterior ones.——Submarginal spots of hindwing red, sometimes several red spots on disc outside the yellowish buff band.

Basal area of *underside* of hindwing a little paler than forewing, but never washed with buff; a row of red spots distally of and separate from the creamy white discal band.

Hab. Bahia to Parana, southern specimens often similar to the next form.

In the Tring Museum 22 ♂♂, 10 ♀♀, from: Espiritu Santo; Petropolis, October 1897 and January 1898 (Foetterle); Sao Paulo; Castro, Parana (E. D. Jones).

b. P. scamander curymander Hopff. (1866).

Papilio curymander Hopffer, *Stett. Ent. Zeit.* xxvii. p. 29 n. 10 (1866) (Brazil); Kirby, *Cat. Diurn. Lep.* p. 567. n. 335 (1871).

Papilio grayi, Müller, *Kosmos* p. 187 (1878) (agreeable odour in ♂); id., *Trans. Ent. Soc. Lond.* p. 219 (1878) (variability); Oberth., *l.c.* (1880) (*partim*; Rio Grande do Sul).

♂ ♀. Discal band of forewing wider than in the preceding, of about even width throughout, or the anterior spots larger than the posterior ones; submarginal row of spots angulate, the upper two or three spots being more proximal than the others.——Band of hindwing on the whole more widely separate from cell; at least the upper submarginal spots creamy-yellow.

Forewing occasionally with spot in cell on *underside*.——Basal area of hindwing paler than in the preceding subspecies, often washed with buff; red discal spots smaller, closer to the band, often obsolete; the blue bars beyond them more distinct; submarginal spots paler. Abdomen sometimes spotted with buff at the sides.

Hab. Santa Catharina; northern districts of Rio Grande do Sul.

Intergrading with the next.

In the Tring Museum 6 ♂♂, 4 ♀♀, from: S. Catharina; Theresopolis, 800—1000 ft., November 1904 to February 1905 (J. Michaelis).

c. P. scamander scamander Boisd. (1836) (Pl. V. fig. 22).

Papilio scamander Boisduval, *l.c.* (Brazil); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 146 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 35. n. 168 (1852); Lucas, in Chenu, *Enc. Hist. Nat. Pap.* i. t. 16. fig. 1. ♂ (1851-3); Gray, *List Lep. Ins. Brit. Mus. Pap.* i. p. 47. n. 176 (1856); Lucas, in Casteln., *Voy. Amér. Sud, Ent.* p. 199. t. 1. fig. 2. ♂ (1857) (Interior of Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 339 (1864); Kirby, *Cat. Diurn. Lep.* p. 537. n. 129 (1871); Oberth., *Et. d'Ent.* iv. p. 73. n. 222 (1880) (type).
Papilio grayi var. *scamander*, Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 45 (1896).

♂♀. Discal band of *upperside* more yellow than in the other forms; on forewing wider in front than behind, spots SC^5—R^2 being the longest, the band posteriorly more distal than in the other two subspecies; submarginal row angulate.——Hindwing: submarginal spots buff-yellow, the posterior ones often washed with red.

Underside very different from that of the other forms.——Forewing: anterior submarginal spots enlarged to large patches which extend close to margin.——Hindwing: basal area the same creamy yellow colour as discal band, the veins remaining black; no red discal spots; blue crescents conspicuous; submarginal spots varying from being milky white to being red.

Hab. Rio Grande do Sul, some specimens agreeing closely with extreme specimens of *eurymander*.

In the Tring Museum 2 ♂♂, 1 ♀, from Rio Grande do Sul.

110. Papilio birchalli Hew. (1863).

Papilio birchalli Hewitson, *Trans. Ent. Soc. Lond.* (3). i. p. 517 (1863) (Bogota).

♂. Abdomen black, claspers more or less creamy at sides. Costal edge of forewing practically non-serrate; some indistinct or small spots around apex of cell and a postdiscal and a submarginal row of spots creamy, the upper postdiscal spots more or less shadowy.——Hindwing: a broad creamy discal band, slightly greenish as all the markings of the upperside, narrowing behind, entering cell, the cell-spot varying in size, being sometimes very small; a submarginal row of olive-buff spots, between which and discal band there is occasionally another row of small spots; no tail, tooth R^3 being very little longer than the other teeth.

On *underside* of forewing a greenish creamy cell-patch, and from lower angle of cell to hindmargin a row of greenish creamy patches; four submarginal spots from R^3 backwards, sometimes a fifth vestigial.——Discal band of hindwing consisting of a rather large costal creamy spot and a similar subanal spot connected with one another by a row of minute red spots, some of which are often vestigial, spot M^1—M^2 being creamy; submarginal spots red, halfmoon-shaped, the first alone being usually straight, spot M^1—M^2 being the largest.

♀. Similar to male, but the markings of the *upperside* more bluish green and the discal band of the hindwing much wider. On the *underside* the costal spot of the discal band of the hindwing is red and smaller than in male, while the small intermediate spots are larger than in male.

Neuration: SC^2 of hindwing at one-third (or a little beyond) from subbasal cellule to R^1.

Genitalia: ♂. Tenth tergite long and broad, spatulate; double process of sternite not deeply divided, the two projections short, the anterior one slightly more acuminate than the second; harpe very long, tapering, acute, dorsally angulate, and bearing between this angle and the apex many small teeth, the

apical portion of the harpe somewhat resembling a shark's tail.——♀. Edge of vaginal orifice anteriorly raised into a rather broad, deeply sinuate flap, each lobe of which is pointed ; lateral edges of orifice continued beyond the orifice as a mesial double fold; behind the orifice a rounded, densely folded, tubercle, which is glabrous, bearing minute hairs only posteriorly at the base ; in front of this tubercle, within the orifice, there is a transverse ridge ; behind the orifice there is on each side of the double mesial fold a deep impression, at the side of which there stands a long, pointed, somewhat scythe-shaped process ; the whole lateral area of the vaginal depression strongly chitinised, the edge projecting free, being continuous with the anterior surface of the sinuate vaginal flap.

Early stages not known.

Hab. Panama ; Colombia ; Argentina.

The last locality requires confirmation.

Two subspecies.

a. P. birchalli godmani subspec. nov.

Papilio birchalli, Godman & Salvin, *Biol. Centr. Amer.. Lep. Rhop.* ii. p. 237. n. 74. t. 71. fig. 8. 9. ♂. 10. geuit. (1890) (*partim* ; Chiriqui ; Bugaba).

This form stands in some collections as *godmani* ; we fail to find the description, but accept the name.

♂. Discal band of upperside of hindwing posteriorly obsolete, anteriorly broader than the black distal marginal area.

♀. Discal band of hindwing very broad, including apical third of cell, posteriorly irrorated with black, the greenish scaling not being dense.

Genitalia: ♂. Harpe angulate at apical two-fifths.——♀. As described above.

Hab. Panama : Chiriqui ; Bugaba.

In the Tring Museum 2 ♂♂, 1 ♀, from Chiriqui (received from Messrs. Staudinger & Bang-Haas).

b. P. birchalli birchalli Hew. (1863).

Papilio birchalli Hewitson, *l.c.* (Bogota) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 327 (1864); Kirby, *Cat. Diurn. Lep.* p. 538. n. 139 (1871) (*partim*); Staud., *Exot. Tagf.* p. 15 (1884); Oberth., *Et. d'Ent.* xii. p. 3. t. 2. fig. 6. ♂ (1888) (Muzo) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 237. n. 74 (1890) (*partim* ; Colombia ; Cauca valley ; R. Quarto, Cordova, Argeutina) ; Maass. & Weym.. in Stübel. *Reisen S. Amer., Lep.* p. 11. n. 39 (1890) (Colombia) ; Haase, *Untersuch. Mimicry* i. p. 94 (1893).

♂. Discal band of hindwing narrower than in the preceding, extending to abdominal margin ; cell-spot smaller.

♀ not known.

Genitalia : Harpe somewhat shorter than in the preceding, dorsally angulate at apical fourth.

Hab. Colombia : Magdalena and Cauca valleys.

In the Tring Museum 7 ♂♂ from " Bogota."

111. **Papilio xanthopleura** Godm. & Salv. (1868).

Papilio xanthopleura Godman & Salv., *Ann. Mag. N. H.* (4). ii. p. 150. n. 25 (1868) (R. Huallaga) ; Hew., *Exot. Butt.* iv. *Pap.* t. 10. fig. 32. ♂ (1869); Kirby, *Cat. Diurn. Lep.* p. 538. n. 140 (1871); Druce, *Proc. Zool. Soc. Lond.* p. 246. n. 19 (1876) (Lower Huallaga) ; Hopff., *Stett. Ent. Zeit.* xl. p. 53. n. 25 (1879) (Peru) ; Godm. & Salv., *Biol. Centr. Amer.. Lep. Rhop.* ii. p. 238. sub n. 74

(1890) (smooth costa) ; Hahnel, *Iris* iii. p. 297 (1890) (Iquitos) ; Staud., *ibid.* iv. p. 63 (1891) (Iquitos ; S. Thomar, R. Negro ; S. Paulo de Oliv. ; ♂, ♀); Haase, *Untersuch. Mimicry* i. p. 94 (1893).

♀. *Papilio xanthopleura* Salv. & Godm. var. *diaphora* Staudinger, *l.c.* (1891) (Manicoré ; also Sao Paulo de Olivença acc. to Michael).

♂ ♀. Thorax with short yellow mesial stripe, corresponding to the mesial stripe of *P. zagreus* and allies. Abdomen with broad creamy yellow lateral stripe. Costal edge of forewing practically non-serrate. Disc of hindwing *above* with greyish green or greyish blue patches. No discal band on *underside* of hindwing ; a creamy spot near anal angle being all that is left of the band ; red submarginal spots large. The female is dimorphic :

a'. ♀–f. *xanthopleura* is similar to the male, the bluish area of the hindwing being larger.

b'. ♀–f. *diaphora* Staud., *l.c.*, bears a large creamy yellow central area on the forewing occupying the greater part of the cell and the disc between the median and lower radial veins, the bluish scaling of the hindwing being reduced to a narrow band.

Neuration : SC^2 of hindwing at one-third from base to R^1.

Genitalia: ♂. Tenth tergite long, strongly narrowing distad, rounded-dilated at the apex ; sternite on each side with two processes, the anterior one triangular, multidentate, the posterior one rather longer, narrower, slightly acuminate, concave on proximal surface ; harpe broad, gradually narrowed from middle to base, dorsal edge of apical half somewhat elevate, densely denticulate, apex rotundate, longitudinally grooved, bearing a great number of small conical teeth at and near the edge ; no process.—— ♀ not examined.

Early stages not known.

Hab. Upper Amazons and eastern slopes of Peru ; may be expected to occur in Eastern Ecuador and Eastern Bolivia.

In the Tring Museum 2 ♂ ♂ from Iquitos (Stuart).

XII. Homerus Group.

Costal margin of forewing dentate, the teeth especially prominent in male. Abdomen without spots, entirely black, or the underside tawny-olive. Frons much wider than the eye is high (frontal aspect). Antenna short; club rather strong. Upper cross-vein of forewing (D^2) longer than the second (D^3).

A. Hindwing, on underside, with a band of spots across disc, the spots rounded on distal side, at least the central ones :

a. Males . . . . . *b*.
Females . . . . . *d*.

b. Discal patch R^3—M^1 of forewing about three times as long as broad, extended to cell ; cell-patch very large, at least on underside . . . . . Species Nos. 115 and 116.
Discal patch R^3—M^1 widely separated from cell . . *c*.

c. Discal band on underside of hindwing consisting of separate red spots . . . . . Species No. 112.
This band continuous, more or less creamy white, at least along its proximal edge . . . . Species Nos. 113 and 114.

d. Discal spots of underside of hindwing small, red, edged with black, last one entirely red or only a small portion of it creamy white . . . . . Species No. 112.

Last discal spot of underside of hindwing for the greater part creamy white . . . . . *e.*

e. Underside of forewing with a large shadowy patch in cell near its middle . . . . . Species No. 115.

Cell-patch, if present, situated close to apex of cell . . Species No. 114.

B. Hindwing below with continuous pale band (sometimes washed over with brown) which is dentate upon the veins, being sinuate between the veins. Hindwing above with broad pale yellow continuous band across middle, or the posterior submarginal spots of the forewing beneath orange, or there is a discal row of orange-red lunules, or a dentate orange-red band on hindwing . . . . . *e.*

Hindwing without such a band on upperside ; no orange spots . . . . . Species No. 119.

e. Last one or two submarginal spots on underside of forewing orange . . . . . Species No. 120.

No orange spots on forewing; submarginal spots of underside of hindwing orange or red . . . . *f.*

f. Pale band of underside of hindwing washed over with brown . . . . . Species No. 118.

This band very sharply defined, strongly dentate on distal side . . . . . Species No. 117.

C. Hindwing rounded, without band ; forewing with large orange-red patches . . . . . Species No. 121.

112. **Papilio victorinus** Doubl. (1844).

Papilio victorinus Doubleday, *Ann. Mag. N. H.* xiv. p. 418 (1844) (♀, west coast of Amer.) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 35. n. 69. t. 6. fig. 3. ♀ (1852).

♂. *Upperside.*—Forewing : a row of creamy buff submarginal spots, and a discal row of similar spots, this row curving costad, the upper spots usually absent or vestigial, sometimes the whole row absent ; some specimens with an additional row of indistinct olivaceous buff blotches anteriorly between the discal and submarginal series ; costal margin serrate.——Hindwing : a discal row of more or less rounded or ovate spots, widely separated from one another, and a row of submarginal crescents, all creamy buff, in between the two rows a series of olivaceous buff blotches, which are absent from the Costa Rica form (of which only one specimen is known !) ; no tail, tooth R^3 usually a little more prominent than the others.

Underside.—Forewing : discal row of spots complete ; anterior submarginal spots vestigial, brown.——Hindwing : a discal row of red rounded spots, all nearly the same size, the last one creamy posteriorly ; submarginal halfmoons red ; some specimens with buffish blotches at the outer side of the discal spots.

♀. Dimorphic, at least in certain districts, perhaps everywhere. One form resembling the male, bearing larger postdiscal olivaceous buff blotches on the upperside of the hindwing, the second form bearing instead of these blotches and

the discal spots a broad olive band, which narrows anteriorly ; submarginal spots sometimes orange on upperside.

Neuration : lower angle of cell of forewing obtuse ; SC^2 of hindwing midway between base and R^1, or more proximal.

Genitalia : ♂. Tenth tergite long, spatulate, rather narrow before apex; sternite laterally with a transversely divided ridge, the proximal portion acuminate, the distal portion shorter, rounded, its anal edge irregular; beneath this second lobe, on the anal side, a small but distinct tooth ; harpe long, slender, of almost even width from base to near apex, dentate distally, ending in a long tapering process which is curved upwards.—— ♀. In front of the vaginal orifice an acuminate or sinuate flap; lateral edges of orifice converging posteriorly, forming behind the orifice a channelled mesial ridge at each side of which there is a deep impression ; laterally of this groove and somewhat more frontad there is a long, sharply pointed, curved, twisted process, which stands on the inner side of a long and strongly chitinised plate, the free edge of which is continuous with the anterior surface of the vaginal flap ; this process often dentate on the posterior side.

Early stages described by Schaus (see literature below, under *P. v. victorinus*).

Hab. Mexico to Costa Rica.

Three subspecies.

a. P. victorinus morelius subsp. nov.

♂ ♀. Only one form of female known. *Upperside :* distal spots of forewing absent or small, those of hindwing also smaller than in the next form.

Underside : no spot in cell of forewing ; submarginal spots of hindwing larger and more strongly arched than in the next.

Genitalia : ♂. Apical process of harpe longer and more strongly curved than in the next subspecies ; teeth less numerous but larger, one or more long teeth on dorsal side.

Hab. West Mexico : Guerrero ; Oaxaca.

In the Tring Museum 16 ♂♂, 5 ♀♀, from: Guerrero (O. T. Baron), type ; Los Cojones, 17. August 1904, and Balsas R., near Ignala, Guerrero, 26. August 1904 (Dr. Gadow).

In the Hope collection at Oxford from Oaxaca.

b. P. victorinus victorinus Doubl. (1844).

Papilio victorinus Doubleday, *l.c.*; id., *List Lep. Ins. Brit. Mus.* i. p. 18 (1845); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 147 (1846) ; Gray, *l.c.* ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 177 (1856) (West Coast of America) ; Vollenh., *Tijdschr. Ent.* iii. p. 87. n. 144 (1860) (Vera Cruz) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 337 (1864) ; Kirby, *Cat. Diurn. Lep.* p. 537. n. 131 (1871); Oberth., *Et. d'Ent.* iv. p. 73. n. 221 (1880) ("Ecuador" error loci); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 235. n. 71 (1890) (Vera Cruz, Oaxaca , Guatemala ; Honduras ; Nicaragua ; = *amphissus* = *helleri*) ; Haase, *Untersuch. Mimicry* i. p. 94 (1893).

♀. *Papilio helleri* Felder, *l.c.* n. 336 (1864) (Mexico ; *nom. indescr.*) ; id., *Reise Novara, Lep.* p. 91. n. 70. t. 13. fig. c. d. ♀ (1865) (Mexico) ; Schaus, *Papilio* iv. p. 101 (1884) (descr. of larva and pupa).

♀. *Papilio amphissus* Hopffer, *Stett. Ent. Zeit.* xxvii. p. 27. n. 8 (1866) (Mexico); Kirby, *l.c.* p. 567 n. 329 (1871).

Papilio victorinus var. a. *P. helleri*, Kirby, *l.c.*

♂. *Upperside :* discal row of spots on forewing represented at least by three spots ; most specimens with a row of postdiscal olivaceous buff or bluish blotches.

——Hindwing: discal spots larger than submarginal ones, outside them a row of olivaceous buff spots, which are sometimes very small.

On *underside* a spot of variable size in cell of forewing.

♀. Dichromatic. One form resembling the male, but the postdiscal spots usually larger, sometimes confluent with the discal ones (♀-f. *victorinus*). In the type-specimen the olivaceous or bluish blotches are very small (they are not indicated in Gray's figure of the type). In the second form (♀-f. *amphissus*) the markings of the *upperside* are bluish or greenish, and the discal and postdiscal spots of the hindwing are replaced by a broad band.

Genitalia: ♂. Harpe more densely dentate distally than in the preceding, the teeth being also smaller.

Hab. Eastern Mexico to Nicaragua.

In the Tring Museum 18 ♂♂, 8 ♀♀, from: Cuesta de Misantla, June 1896, Jalapa, July 1897, Espinal, June 1896, Orizaba, March 1896, Vera Cruz (W. Schaus); Cordoba, 2800 ft., July 1904 (A. Hall); S. Pedro Sula, Honduras.

c. P. victorinus vulneratus Butl. (1872).

Papilio vulneratus Butler, *Cist. Ent.* i. p. 85 (1872) (Costa Rica); Kirby, *Cat. Diurn. Lep.* p. 814. n. 394 (1877); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 236. n. 72 (1890) (Costa Rica).

Pyrrhosticta vulnerata Butler, *Lep. Exot.* p. 165. t. 58. fig. 3. ♂ (1874); id. & Druce, *Proc. Zool. Soc. Lond.* p. 366. n. 385 (1874) (Costa Rica).

♂. Only one imperfect specimen known. Discal spots of both wings, on *upperside*, larger, and the submarginal ones smaller, than in the preceding forms; no bluish postdiscal blotches on upperside of hindwing.

Hab. Costa Rica.

One specimen (type) in coll. F. D. Godman.

113. **Papilio cephalus** Godm. & Salv. (1890).

Papilio cephalus Godman & Salvin, *Biol. Centr. Amer., Lep. Rhop.* ii. p. 235. n. 70. t. 71. fig. 4. 5. ♂ (1890) (Chiriqui, in coll. Staudinger).

♂. One specimen only is known. Perhaps an aberration of *P. cleotas archytas*, which we think could easily be proved or disproved by an examination of the innerside of the clasper.

The row of discal spots on the *upperside* of the forewing extends to SM^2, spots R^3—SM^2 not reaching to cell; submarginal row of spots evenly curved. *Underside* of hindwing with a row of blue crescents distally of the discal band; tail long. Head and pronotum are said to be without dots.

Hab. Chiriqui.

One specimen in coll. Staudinger. We have not examined the insect.

114. **Papilio cleotas** Gray (1832).

Papilio cleotas Gray, in Griffith, *Anim. Kingdom* xv. p. 673. t. 86. ♂ (1832) (Brazil).

The evidence that this and the next species (*P. aristeus*) are both represented in some districts rests on the record of two single specimens belonging to *P. aristeus bitias*. Messrs. Godman & Salvin (1890) mention under the name of *bitias* a specimen of *P. aristeus* from Chiriqui (Staudinger, collected by Trötsch). The second specimen is recorded by Felder from Bogota, and described as *P. ctesias*. This latter specimen has the body much compressed, looking as if it had been carried in a pocket-book. It may have been brought to Bogota from the eastern

side of Ecuador. If Standinger's Chiriqui example is not authentic, the various forms of *P. cleotas* and of *P. aristeus* represent each other geographically and should accordingly all be regarded as forms of one species. This would be a rational systematic treatment of the insects, considering that the distinguishing characters are individually variable, that some forms differ constantly and others do not, that some differ only in pattern or colour, others in structure, and others again in structure and pattern. The geographical distribution of the forms of *P. cleotas* (Costa Rica, Panama, Colombia, Venezuela, and S.E. Brazil), and of *P. aristeus* (Ecuador to Bolivia, Upper Amazons, Guiana, S.E. Brazil; and "Bogota," "Chiriqui," as mentioned above), renders it highly probable that we have here to do with one species only, the occurrence of *P. aristeus bitias* in "Chiriqui and Bogota," being accidental or the records being erroneous. This conclusion is corroborated by the fact that the Brazilian form of *P. cleotas* agrees in structure better with the Andesian forms of *P. aristeus* than with the northern forms of *P. cleotas*. However, as we may hope to get soon further evidence of the actual distribution of these insects, we deem it sufficient for the present to have drawn attention to *P. cleotas* and *P. aristeus* being only doubtfully distinct from one another.

♂. Costal margin of forewing serrate; a submarginal row of spots nearly parallel to distal margin, curving costad in front; a discal row of large spots from lower angle of cell to hindmargin, oblique or curved, approaching the submarginal row posteriorly; the two rows very strongly diverging anteriorly, there being usually a row of olivaceous buff or greyish blue blotches between them; cell-patch large, small, or absent; often some spots distally of cross-veins.——Hindwing: tail acute or absent; a creamy discal band of variable width; a submarginal row of spots.

Underside always with a patch in cell of forewing; hindwing always with a discal band of spots, these spots red, proximally more or less creamy, sometimes more extended creamy than red, last spot always creamy yellow, often also the first.

♀. Dimorphic; one form resembling the male, the other having the markings of the *upperside* more or less bluish or olive-buff.

Genitalia: ♂. Tenth tergite long, spatulate; sternite geographically and individually variable, the usual double ridge on each side, the first projection being usually pointed and often dentate, the second tooth more obtuse, bearing often on anal side a tooth; at apex of sternite mesially several teeth one behind the other, or one tooth, or a tooth right and left, or no teeth. Harpe long, of nearly even width, slightly curved, apical portion geographically and individually variable, mostly produced into a fork, fishtail-shaped, often the dorsal prong reduced and the ventral one curved upwards, sometimes three processes, in most forms a number of teeth in between the prongs and proximally of them.——♀. Similar to the armature of *P. victorinus*; lateral process dentate; proximal flap variable, dentate or simple, long or short.

Early stages not known.

Hab. Costa Rica; Panama; Colombia; North Venezuela; South-East Brazil.

a. P. cleotas archytas Hopff. (1866).

Papilio archytas Hopffer, *Stett. Ent. Zeit.* xxvii. p. 28. n. 9 (1866) (♂, Central America); Kirby, *Cat. Diurn. Lep.* p. 567. n. 330 (1871) (Amer. centr.).

Papilio laetitia Butler, *Cist. Ent.* i. p. 84 (1872) (Costa Rica); Kirby, *Cat. Diurn. Lep.* p. 813. n. 370 (1877); Staud., *Exot. Tagf.* p. 15. t. 10. ♂ (1884) (Costa Rica; Chiriqui, 2000—2500 m., ♀ similar to ♂).

Pyrrhostieta laetitia Butler, *Lep. Exot.* p. 161. t. 58. fig. 4 (1874) ; id. & Druce, *Proc. Zool. Soc. Lond.* p. 366. n. 384 (1874) (Costa Rica).

Papilio phaeton var. *laetitia*, Oberthür, *Et. d'Ent.* iv. p. 73. sub n. 220 (1880) (Chiriqui).

Papilio phaeton, Godman & Salvin, *Biol. Centr. Amer., Lep. Rhop.* ii. p. 234. n. 69. t. 71. fig. 6. genit. (1890) (variab. of ♀ ; Costa Rica ; Panama ; 4000—5000 ft. ;—"Colombia" alia subsp.).

♂. The middle discal spots and the cell-patch of the forewing on the whole larger and the submarginal spots smaller than in the Colombian form ; hindwing obtusely dentate. The cell-patch is very variable, being sometimes almost square and sometimes nearly obsolete ; the discal spots also vary much in size. The upper submarginal dots of the forewing are usually smaller than the posterior ones, the first one being occasionally absent ; the spots around apex of cell mentioned in Hopffer's description are seldom all present.

♀. The two forms are each individually very variable, some specimens standing intermediate between the two forms :

a^1. ♀-f. *archytas* similar to the male, spots of forewing on the whole smaller, if sharply defined, or large and ill-defined.

b^1. ♀-f. *panthias* nov., markings of *upperside* more or less greenish or bluish (type of name from Chiriqui).

Genitalia : ♂. Harpe with three apical prongs, there being besides the usual two prongs one on the surface proximally of the ventral one of the usual pair ; this additional prong is a prolonged tooth, there being mostly several other but smaller teeth between the prongs.—— ♀. Vaginal flap acuminate, dentate, long ; lateral processes with several prominent teeth.

Hab. Costa Rica ; Panama ; Brava I.

In the Tring Museum 12 ♂♂, 5 ♀♀, from : Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall) ; Guatil Piris, Costa Rica, December 1901 (Underwood) ; Chiriqui (Gounelle) ; Volcano de Chiriqui, 5000—9000 ft. (Watson) ; Boquete, 3500 ft. (Watson) ; Brava I., January 1902 (Batty).

b. P. cleotas phaeton Lucas (1857).

Papilio phaeton Lucas, in Castelnau, *Voy. Amér. Sud, Lép.* p. 197. t. 2. fig. 1. ♂ (1857) ("Brézil intérieur" false) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 332 (1864) (*partim* ; Bogota) ; Kirby, *Cat. Diurn. Lep.* p. 537. n. 136 (1871) (Amer. mer.) ; Oberth., *Et. d Ent.* iv. p. 73. n. 220 (1880) (var. excl. ; N. Granada, type) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 234. n. 69 (1890) (*partim* ; Colombia) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 17. n. 15 (1890) (east side of Bogota Cordillera, 1300—1500 m.).

Papilio phaëton, Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 18 (1845) (Colombia ; nom. nudum) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 149 (1846) (nom. nud.) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 35. n. 170 (1852) (nom. nud.) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 178 (1856) (nom. nud.) ; Hopff., *Stett. Ent. Zeit.* xl. p. 54. n. 28 (1879) (*partim*) ; Staud., *Exot. Tagf.* p. 15 (1884).

Papilio clearchus Felder, *l.c.* p. 313. n. 332 (1864) (nom. indescr. ; Bogota) ; id., *Reise Novara, Lep.* p. 88. n. 67 (1865) (Bogota) ; Kirby, *Cat. Diurn. Lep.* p. 537. n. 134 (1871) (Bogota).

♂. Size of cell-patch and of discal spots on upperside of forewing very variable, the cell-patch sometimes absent, usually more oblique than in the preceding subspecies ; upper submarginal spots larger than the posterior ones.——Width of band of hindwing likewise variable, the spots composing it sometimes separated from one another ; tail longer than in *P. c. archytas*.

On *underside* the posterior submarginal spots of forewing usually close to the discal ones, often joined to them.

Felder's name *clearchus* is based on specimens without cell-patch on upperside of forewing, with small discal spots, and with the band of the hindwing, above, cut

np into spots. Such specimens are hardly distinguishable from the next form, except by the genitalia.

♀. Only that form of this sex is known to us which is similar to the male.

Genitalia : ♂. Tenth sternite usually with a small mesial tooth at apex as in *P. aristeus* ; harpe ending in a hook which is strongly curved internad, the dorsal prong of the fork reduced to a short dentate projection which is more proximal than the dorsal prong in *P. c. archytas*, the oblique edge between the dentate projection and the apical hook more or less dentate.——♀ not dissected.

Hab. Colombia : Magdalena and Cauca valleys, and Cordillera of Bogota.

No representative is known from the West Coast of Colombia.

In the Tring Museum 90 ♂♂, 1 ♀, from : "Bogota" ; Muzo, November 1896 ; Pereira, Cauca ; Cauca (Child) ; Guadalite, Cundinamarca July 1903 (M. de Mathan).

c. P. cleotas coroebus Feld. (1860).

♂ *Papilio cleotas*, Kollar (*non* Gray, 1832, err. det.), *Sitz. Ber. K. Ak. Wiss. Wien, Math. Nat. Cl.* i. p. 355. n. 12 (1850) (Angostura, Venezuela ;—locality correct ?).

♀. *Papilio coroebus* Felder, *Wien. Ent. Mon.* v. p. 75. n. 11 (1860) (Mérida, coll. Kadeu) ; id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 326 (1864); id., *Reise Novara, Lep.* p. 84. n. 64. t. 13. fig. a. b. (1865) (Mérida) ; Staud., *Exot. Tagf.* p. 15 (1884).

♂. *Papilio philocleon* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 333 (1864) (nom. nud. ; Colombia); id., *Reise Novara, Lep.* p. 89. n. 68 (1865) (hab. ?); Kirby, *Cat. Diurn. Lep.* p. 537. n. 135 (1871) (Colombia).

♀ *Papilio corebus* (!), Hewitson, *Exot. Butt.* iv. *Pap.* x. text sub *xanthopleura* (1869).

♀ *Papilio birchalli* var. a. *P. coroebus*, Kirby, *l.c.* p. 538. sub n. 139 (1871) (Venezuela—"Yucatan" error loci).

♂. *Papilio phaëton*, Hopffer, *Stett. Ent. Zeit.* xl. p. 54. n. 28 (1879 (*partim*).

♂ *Papilio lycortas* Felder. *ll.cc.* (*partim* ; R. Negro); Staud., *l.c.* p. 15. t. 10. ♂ (1884) (Venezuela); Habnel, *Iris* iii. p. 194 (1890) (Mérida) ; Eimer, *Orthogen.* p. 221. fig. 169 (1897) (diagr. copy of Staud.'s fig. ; neur. of hindw. erroneous).

♂. *Papilio cleotas* var. *lycortas*, Oberthür, *Et. d'Ent.* iv. p. 73. sub n. 219 (1880) (Mérida).

In pattern not sharply separated from the preceding form.

♂. Discal spot R^3—M^1 of *upperside* of forewing more proximal than in *P. c. phaeton*, the last two spots of this row comparatively larger, the submarginal spots on the whole smaller, cell-patch vestigial or absent, never so sharply marked as it is in many *phaeton*.——Hindwing : third and fourth spots of discal band smaller than in *phaeton*, all the spots separated, the third occasionally obsolescent ; submarginal spots small in most individuals.

♀. Dichromatic.

a'. ♀-f. *dione* nov. ; similar to the male, usually with buffish blue scaling proximally of discal band of upperside of hindwing.

b'. ♀-f. *coroebus* Felder, *l.c.* ; markings of *upperside* nearly olive-buff or bluish, the spots of forewing reduced or ill-defined ; discal band of hindwing, *above*, widening behind ; discal band of *underside* of hindwing narrower than in ♀-f. *dione*, more extended red.

Genitalia : ♂. Harpe similar to that of *phaeton*, broader before apex, the proximal dorsal prong rather longer, pointed, the teeth between this prong and the apical hook longer and more regular in position.——♀. Vaginal flap broad and long, dentate, lateral process armed with several long teeth.

Hab. Eastern side of the Cordillera of Bogota ; Venezuela.

In the Tring Museum 33 ♂♂, 10 ♀♀, from : Peperital to Buenavista, East Colombia, 400—1200 m., January 1897, dry season, forest (Dr. Bürger) ; Mérida, Tachira and Mocotoné, Venezuela (Briceño).

d. P. cleotas cleotas Gray (1832).

♂. *Papilio cleotas* Gray, in Griffith, *Anim. Kingd.* xv. p. 673. t. 86 (1832) (Brazil); Boisd., *Spec. Gén. Lép.* i. p. 364. n. 207 (1836 (Brazil ; Uruguay : ♂, ♀); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 18 (1845) (Brazil) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 50 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 35. n. 172 (1852) (*partim*) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 180 (1856) (*partim*) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 360. n. 184 (1864) ; Kirby, *Cat. Diurn. Lep.* p. 537. n. 133 (1871) (Brazil ; Uruguay) ; Burm., *Descr. Rép. Argent.* v. *Lép.* p. 61. n. 3 (1878) (*partim* ;—descriptio ad spec. *P. hellanichus* dictam referend.) ; Oberth., *Et. d'Ent.* iv. p. 73. n. 219 (1880) (Uruguay) ; Haase, *Untersuch. Mimicry* i. p. 94 (1893) ; Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 10 (1895) (Rio Grande do Sul) ; Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 28 (1896) (Petropolis).

Papilio lycortas Felder, *Wien. Ent. Mon.* v. p. 75. n. 10 (1860) ("Caracas" error loci) ; id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 335 (1864) (*partim* ; "Caracas") ; id., *Reise Novara, Lep.* p. 90. n. 69 (1865) (*partim* ; "Caracas") ; Kirby, *Cat. Diurn. Lep.* p. 537. n. 132 (1871).

Papilio oleotas (!), Felder, *l.c.* p. 313. n. 334 (1864) (Bras. austr. ; Uruguay).

Papilio phaëton, Hopffer (*non* Lucas, 1857, err. det.), *Stett. Ent. Zeit.* xl. p. 54. n. 28 (1879) (*partim*).

Papilio cleothas (!), Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 46 (1896).

Papilio cleotas var. od. n. sp. ?, Bönningh., *l.c.* ("markings green"—doubtless ♀).

Felder's *lycortas*, which is based on specimens supposed to be from Caracas (Kaden), is the same as *cleotas* ; Kaden's specimens were doubtless Brazilian.

♂. Discal band of forewing, *upperside*, more oblique than in the other subspecies, spot M^2—SM^2 small or vestigial; cell-patch small or absent; a row of large olivaceous buff blotches from costal margin backwards between the discal and submarginal rows of spots.——Band of hindwing always broken up into spots ; the last four or five submarginal spots red in most specimens.

♀. Dichromatic.

a'. ♀-f. *cleotas* similar to the male, easily distinguished from *P. cleotas coroebus* ♀-f. *dione* by the row of olivaceous buff blotches on the forewing and the smallness of the discal patch M^2—SM^2.

b'. ♀-f. *adaea* nov.——Name-type from Blumenau. An oblique discal row of bluish blotches on upperside of forewing, the row gradually disappearing in front, usually not extending forward beyond lower angle of cell ; postdiscal row of similar blotches from costal margin backwards ; sometimes the posterior postdiscal spots merged together with the discal ones ; a submarginal row of spots as in male, the upper ones being more or less bluish.——Hindwing : a discal and a postdiscal band of spots buffish blue, the discal band broader than the postdiscal one, the first and the last discal spot often partly creamy ; submarginal spots buffish blue, anterior ones more or less creamy, last one usually red.——Discal band of *underside* of hindwing more extended red than in ♀-f. *cleotas* ; last spot creamy on abdominal side.

Genitalia : ♂. Tenth sternite with or without anal mesial tooth ; harpe similar to that of *P. aristeus bitias*, with two straight prongs at apex of nearly the same length, both directed anad, there being often a very few teeth between the prongs, some specimens bearing some minute teeth on the hinder side.——♀. Lobe in front of vaginal orifice short, simple or dentate, lateral process slender, very sharply pointed, bearing a tooth on the posterior side.

Hab. Brazil ; Uruguay (teste Boisduval).

In the Tring Museum 9 ♂♂, 6 ♀♀, from : Petropolis, March 1898 (J. Foetterle) ; Espiritu Santo ; Theresopolis, S. Catharina, November 1894—February 1895 (J. Michaelis) ; Blumenau.

115. Papilio aristeus Cram. (1781).

♀. *Papilio aristeus* Cramer, *Pap. Exot.* iv. p. 139. t. 361. fig. A. B (1781) (Surinam).

Since the *P. aristeus* of Cramer's plate 318 belongs to the Kite-Swallowtails, and therefore will stand in another genus when the Swallowtails are generically revised, there is no objection against retaining the name *aristeus* also for the present insect. There is no reference to this species in the Index of Cramer's volume.

We have explained above, under *P. cleotas*, our reasons for regarding *P. aristeus* as being doubtfully distinct as a species from *P. cleotas*.

♂. Cell-patch of forewing very large; discal patches R^3—M^2 very long, contiguous with the cell-patch, sometimes patch M^1—M^2 obsolescent.——Hindwing with or without broad creamy discal band.

♀. Dichromatic. One form resembling the male. In the second form the markings of upperside bluish, submarginal dots the same colour or partly creamy; forewing with band of ill-defined patches on disc; hindwing with broad discal band, widening behind, entering cell.

Cell-patch of forewing below more or less distinct, large.

Genitalia similar to those of *P. cleotas*; tenth sternite of male always with mesial apical tooth or several teeth standing one behind the other; harpe with two apical processes and some teeth.——♀. Nearly the same as in *P. cleotas cleotas*; lobe in front of vaginal orifice short, broad, dentate, carinate on hinder surface.

Early stages not known.

Hab. Dutch and French Guiana; Upper Amazons; Ecuador to Bolivia; Sao Paulo (S.E. Brazil); Bogota and Chiriqui.

We doubt the correctness of the record from the last two localities.

a. P. aristeus aristeus Cram. (1781).

♀. *Papilio aristeus* Cramer, *l.c.* (Surinam).

♀. *Calaides menatius* Hübner, *Verz. bek. Schmett.* p. 86. n. 894 (1818 ?) (nom. nov. loco *aristeus*).

♀. *Papilio bitias* a. *Papilio aristeus*, Godart, *Enc. Méth.* ix. p. 39. sub n. 43 (1819).

♀. *Papilio coristheus* Boisduval, *Spec. Gén. Lép.* i. p. 323. n. 166 (1836) (nom. nov. loco *aristeus*); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 246 (1847); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 67 n. 298 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 77. n. 315 (1856); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 325 (1864).

♀ *Papilio aristaeus* (!), Boisduval, *l.c.* (sub syn.).

♀. *Papilio menatius*, Kirby, *Cat. Diurn. Lep.* p. 538. n. 141 (1871) (Surinam); Haase, *Untersuch. Mimicry* i. p. 94 (1893).

♂. *Papilio ctesias* var. (geographica ? An species distincta ?), *bari* Oberthür, *Et. d'Ent.* iv. p. 72. sub n. 217. t. 5. fig. 3 (1880) (Guyane française).

♂. *Upperside.*—Forewing: cell-patch rhombiform; discal spot R^2—R^3 long, patch R^3—M^1 nearly reaching submarginal spots, ill-defined distally, patch M^1—M^2 represented by a narrow shadowy streak situated along M^1.——Hindwing: discal band represented by two creamy patches M^1—SM^2 and vestiges of the other spots.

Discal patch M^1—M^2 of *underside* of forewing much larger than above, extending to M^2.

♀. The figure of Cramer appears to be all that is known of this sex. A row of long, ill-defined, greyish blue streaks on disc of forewing from costal to inner margin; blue band of hindwing very broad.

Hab. French and Dutch Guiana.

One ♂ in coll. Oberthür. We have not seen this insect in other collections.

b. P. aristeus etesiades subsp. nov.

♂. *Papilio etesias* Hahnel (*non* Felder, 1865, err. det.), *Iris* iii. p. 297 (1890) (Iquitos).
♂. *Papilio etesias* var., Staudinger, *Iris* iv. p. 64 (1891) (Upper Amazons).

This form has been distributed by Messrs. Staudinger and Bang-Haas under the name *etesiades*, which we retain.

The name has apparently not been published by the late Dr. Staudinger.

♂. Cell-patch of forewing, *upperside*, placed along median vein, nearly reaching to base, touching SC near base; discal patches R^3—M^2 large, there being also a spot behind M^2 occupying the angle formed by this vein and M.——No discal band on hindwing, but occasionally traces of the last two spots of this band.

Discal spots of *underside* of hindwing red, small, the first one or two and the last one or two creamy white.

♀ not known.

Hab. Upper Amazons.

In the Tring Museum 2 ♂♂ from Iquitos.

In coll. Oberthür from: Iquitos; Cavallo Cocho, Peru, May—July (Mathan).

c. P. aristeus dysmias subsp. nov.

Papilio bitias, Godman & Salv. (*non* Godart, 1819, err. det.), *Biol. Centr. Amer., Lep. Rhop.* ii. p. 237. sub n. 73 (1890) (S.E. Brazil).

♂. Similar to *P. a. etesiades*.——*Upperside*, forewing: cell-patch smaller, being narrower, not extending to the base; a small spot at apex of cell and a dot beyond cross-vein D^3; two large patches R^3—M^2 on disc, the first not quite reaching R^3, the second distally somewhat narrowed, joining the subcostal spot, a small patch behind base of M^2, as in *etesiades*, but smaller; submarginal spots SC^3—R^3 elongate. ——Hindwing as in *bitias*, the discal band being represented by a single spot C—SC^2 and some bluish dispersed scales posteriorly on disc; submarginal spots much larger than in *etesiades*.

Underside: cell of forewing with a large blotch at upper angle; discal patches as above, the first being rather wider, patch behind base of M^2 vestigial; three distinct submarginal spots.——Hindwing as in *bitias*.

Hab. Province Sao Paulo (Rogers), probably from the interior; may be expected to occur in Goyaz and Matto Grosso.

1 ♂ in coll. F. D. Godman.

Connects *etesiades* with *bitias*.

d. P. aristeus bitias Godt. (1819).

♂. *Papilio bitias* Godart, *Enc. Méth.* ix. p. 39. n. 43 (1819) (South America.—quot. Cram. exel.); Boisd., *Spec. Gén. Lép.* i. p. 323. n. 165 (1836); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 245 (1847); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 67. n. 297 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 76. n. 314 (1856) (South America); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 329 (1864) (hab.?); Kirby, *Cat. Diurn. Lep.* p. 537. n. 138 (1871); Staud., *Exot. Tagf.* p. 15. t. 10. ♂ (1884) (Chanchamayo); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 77. n. 32 (1890) (Rio Mayo, N. Peru); Haase, *Untersuch. Mimicry* i. p. 94 (1893) ("New Granada"); Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 153 (1903) (Sa. Inez. R. Pastaza, 1250 m.).

♂. *Papilio curotas* Felder, *Wien. Ent. Mon.* vi. p. 66. n. 2 (1862) (R. Negro); id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 328 (1864); id., *Reise Novara, Lep.* p. 85. n. 65 (1865) (Upper Rio Negro); Hopff., *Stett. Ent. Zeit.* xl. p. 53. n. 26 (1879) (Chanchamayo; = ? *bitias*); Staud., *l.c.* p. 15 (1884); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 237. n. 73. t. 71. fig. 7. genit. (1890) (Chiriqui).

♂. *Papilio etesias* Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 330 (1864) (nom. nud. ; New Granada) ; id., *Reise Novara, Lep.* p. 86. n. 66. t. 14. fig. c. d (1865) (Bogota) ; Druce, *Proc. Zool. Soc. Lond.* p. 246. n. 18 (1876) (Pozuzo, Cosnipata, Ucayali, Huasampilla) ; Oberth., *Et. d'Ent.* iv. p. 72. n. 217 (1880) (var. excl. ; Ecuador).
Papilio bitias var. a. *P. eurotas*, Kirby, *Cat. Diurn. Lep.* p. 538. sub n. 138 (1871).
Papilio bitias var. b. *P. etesias*, id., *l.c.*
Papilio lacordairei Borre (Belval ined.), *C. R. Soc. Ent. Belg.* xxviii. p. 126 (1884) (= *etesias*).
Papilio bitias var. *etesias*, Dognin, *Lép. Loja* p. 14 (1887).

The characters by which Felder distinguished *eurotas* and *etesias* are purely individual. The body of the type-specimen of *etesias* is much compressed; it may have been brought to Bogota from Eastern Ecuador in a pocket-book. The specimens named *eurotas* are said to be from the Upper Rio Negro, where no recent collections have been made. The species probably extends eastwards between the Amazons and Rio Meta.

♂. Cell-patch of forewing more transverse than in the preceding form, very variable in size like the discal spots.——Discal band of hindwing, above, obsolete or at least widely interrupted.

♀. Dimorphic.

a'. ♀-f. *bitias* resembling the male ; a specimen from Sarayaçu in coll. F. D. Godman.

b'. ♀-f. *therapes* nov.——Bluish discal patches of forewing and discal area of hindwing less extended than in female of *P. a. aristeus* ; cell-patch of forewing below partly creamy yellow.

Hab. Eastern Ecuador and Eastern Peru; Upper Rio Negro; "Bogota"; "Chiriqui"; the last two localities requiring confirmation.

In the Tring Museum 225 ♂♂, 1 ♀, from : "Bogota" and "Upper R. Negro" (coll. Felder) ; Zamora, Ecuador (O. T. Baron) ; Loja ; R. Mixiollo, Loreto (Baer) ; Pozuzo, Huánuco (W. Hoffmanns) ; Chanchamayo (Schunke, Hoffmanns) ; Peréné R., March 1900 (Simons) ; Huayabamba ; La Merced (Watkins & Tomlinson) ; R. Toro, La Merced, August—September 1901 (Simons) ; Caradoc, Marcapata, 4000 ft., February 1901 (Ockenden) ; Cajon, Cuzco, October 1900 (Garlepp) ; Oroya, R. Inambari, 3500 ft., November 1901 (Ockenden) ; La Union, R. Huacamayo, Carabaya, January 1901, 2000 ft., wet season (Ockenden).

A female from Ecuador in coll. Hewitson.

e. P. aristeus vilcanotus subsp. nov.

♂. We know only three specimens, two of which are in the collection of Mons. Charles Oberthür, who received them from Staudinger under the above name, which we accept, a third specimen from the same source being in coll. Adams.

They agree with the preceding form, but differ in the cell-patch of the forewing and the costal spots of the hindwing being ochraceous on the *upperside*, the discal patches of the forewing above being washed with buff proximally ; cell-patch below clayish.

Hab. Vilcanota, South Peru.

f. P. aristeus coelebs subsp. nov. (Pl. V. fig. 14).

♂. *Papilio lenaeus*, Oberthür (*non* Doubleday, 1846, err. det.), *Et. d'Ent.* iv. p. 72. n. 218 (1880) (Tambillo, Peru).

♂. *Upperside.*—Forewing : cell-patch narrow, often a mere bar ; discal patch R^3—M^1 reduced distally and on costal side, patch M^1—M^2 narrow, triangular,

not reaching cell, widest distally; a row of large olivaceous buff blotches from R^3 to costal margin, a more or less distinct similar blotch in apex of cell; submarginal spots large, a spot at hinder margin close to angle.——Hindwing: band complete, entering cell or not, the veins traversing it less extended black than in *lenaeus*; a row of rather large olivaceous buff spots at outerside of band; submarginal spots creamy yellow, large.

Underside paler than in *lenaeus* and *bitias*.——Forewing: cell-patch larger than above, but much smaller than in *bitias* and *lenaeus*; a blotch in upper angle of cell, as in most *bitias*; submarginal spots as in *bitias*, four or five clearly marked, the others vestigial.——Discal band of hindwing creamy white, each spot except the last bearing a rufous red spot distally, the veins narrowly black, the band not being broken up into separate spots.

♀ not known.

Hab. North-West and North-Central Peru.

In coll. Oberthür a small series from Tambillo and Chachapoyas.

In coll. Dognin from Loja (probably western side).

g. P. aristeus lenaeus Doubl. (1846).

♂. *Papilio lenaeus* Doubleday, in Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 148. t. 4. fig. 2. ♂ (1846) (Bolivia); id., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 4 (1848); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 312. n. 331 (1864) (Bolivia); Kirby, *Cat. Diurn. Lep.* p. 537. n. 137 (1871); Hopff., *Stett. Ent. Zeit.* xl. p. 54. n. 27 (1879) (Bolivia); Haase, *Untersuch. Mimicry* i. p. 94 (1893); Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

Papilio cleotas, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 35. n. 172 (1852) (*partim*; "*lenaeus* = ♀ of *cleotas*" false); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 47. n. 180 (1856) (*partim*).

Papilio phaëton, Hopffer, *l.c.* xl. p. 54. n. 28 (1879) (*partim*); Weeks, *l.c.* (1905) (Chulumani).

♂. Cell-patch of forewing on the whole less oblique than in *bitias*, discal spot R^2—R^3 always present, patch M^1—M^2 strongly narrowing proximally.——Band of hindwing complete or narrowly interrupted, often entering cell.

♀ not known.

Hab. Eastern Bolivia, and S.E. Peru.

In the Tring Museum 17 ♂♂ from: R. Songo to R. Suapi, 1100 m., March—June 1896 (Garlepp); Gnanay, Mapiri R., 1500 ft., March 1895 (Stuart); S. Augustin, Mapiri R., 3500 ft., and Mapiri, 1800 ft., September 1895 (Stuart); Reyes and Muschay, R. Beni, August 1895 (Stuart); R. Tanampaya (Garlepp); Province Sara, S. Cruz de la Sierra, February—April 1904 (J. Steinbach).

116. **Papilio judicaël** Oberth. (1888).

♂. *Papilio judicaël* Oberthür, *Et. d'Ent.* xii. p. 3. n. 6. t. 2. fig. 4 (1888) (Huambo, N. Peru).

♂. *Upperside.*—Forewing: a narrow patch across cell and a band of four discal spots from lower angle of cell to SM^2 dirty ochraceous; a row of small submarginal spots of the same colour.——Hindwing resembling in outline that of *P. warscewiczi*; tooth R^3 prolonged to a tail which is less acute than in *P. aristeus*, tooth M^1 also long, and tooth M^2 long, broad and obtuse; a row of vestigial ochraceous buff discal blotches, the first and the last spot being more distinct, an incomplete row of postdiscal blotches, and a submarginal row of small spots.

Underside.—Forewing: cell-patch and discal patches large, clayish ochraceous; submarginal spots small.——Hindwing: a discal band as in the allied species, dirty white, distally slightly washed with orange-red; submarginal spots rufous-red, the upper ones shaded with olive-buff.

♀ not known.

Genitalia as in *P. aristeus*, but tenth sternite anally in middle with two teeth side by side, not one behind the other. Harpe with two simple prongs as in *P. aristeus* and *P. cleotas eleotas*, the upper prong a little longer than the lower, not lying close on the clasper, the dorsal apical edge of the harpe being a little twisted away from the latter.

Hab. Huamba, Dept. Amazonas, North Peru; in coll. Oberthür.

Only one specimen is known. The insect stands intermediate between *P. aristeus* and *P. eleotas*, but has longer tails than these species. The band in the middle of the forewing being very narrow above and very broad below is an interesting character.

117. **Papilio garamas** Hübn. (1834?).

♀. *Euphoeades garamas* Hübner, *Samml. Exot. Schmett.* iii. t. 19 (1834?) (Mexico).
♂. *Heraclides asclepius* id., *l.c.* iii. t. 20 (1834?) (Mexico).

This purely Central American species consists of five subspecies, of which the differences in pattern, though not very striking, are almost constant in a series, being moreover accompanied by interesting differences in the genitalia.

♂. Costal edge of forewing serrate; a pale yellow band from costal margin proximally of apex of cell to distal third of hindmargin; a row of submarginal spots of the same colour, starting at distal fourth of costal margin, consisting of four or more spots, the fourth and following spots standing near the distal margin.—— Hindwing strongly dentate, teeth M^1 and M^2 prolonged, tail long, asymmetrically spatulate; a continuous discal band as on forewing, of about even width, strongly and regularly dentate on distal side; a row of submarginal bars, sometimes absent; a row of blue postdiscal blotches, varying in number, often small or vestigial.

Underside like upper, bands paler, especially that of hindwing; submarginal row of spots of forewing usually continued to hinder angle.——Band of hindwing edged with orange-tawny distally; submarginal crescents longer than above, more or less orange or tawny-orange.

♀. Dichromatic, at least in Mexico. One form is devoid of the yellow discal band on both wings. The forewing bears a row of olivaceous buff postdiscal blotches and a row of small submarginal spots, there being on the hindwing a row of strongly arched discal crescents which are bright brick-red or orange-rufous, followed by a row of blue patches and a row of submarginal spots; on the *underside* of the forewing there is sometimes a trace of the discal band of the male.

The other form resembles the ♂. There are occasionally some small spots at the distal side of the cross-veins of the forewing, corresponding to the distal branch of the forked band of *P. homerus*.

Genitalia of the same type as in *P. aristeus*, *vietorinus*, etc. ♂. Tenth tergite long, strongly compressed beneath, prismatical, except at apex; sternite with a broad lateral lobe, which is divided by a groove and a sinus into a proximal and a distal projection, there being anally in the middle sometimes a distinct conical tooth as in *P. aristeus*. Harpe long, flat, similar to that of *P. aristeus* and *P. homerus*, geographically variable.——♀. Almost exactly as in *P. homerus*, the vaginal tubercle and the lateral process somewhat dentate, the posterior lateral ridge visible without dissection.

Early stages not known.

Hab. Mexico to Panama.

a. P. garamas abderus Hopff. (1856).

♂. *Papilio abderus* Hopffer, *Neue Schmett.* ii. p. 1. n. 1. t. 1. fig. 1. 2 (1856) (Mexico); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 343 (1864); Kirby, *Cat. Diurn. Lep.* p. 537. n. 125 (1871).

♂ ♀. *Papilio asclepius*, Godman & Salvin (*nom* Hübner, 1834 ?, err. det.), *Biol. Centr. Amer., Lep. Rhop.* ii. p. 238. n. 75. t. 72. fig. 3. genit. (1890) (*partim*; Jalapa; Orizaba).

Papilio electrion (!), Barrett (*non* Bates, 1864, err. det.), *Ent. News* xi. p. 428 (1900) (Orizaba, descr. of ♀, similar to ♂; distinct from *P. asclepius*).

♀. *Upperside*, forewing: four submarginal spots, fifth often vestigial. Hindwing: band always entering cell; no submarginal spots.

Underside: submarginal row of spots of forewing continued to SM^2, more or less distinctly angulate at R^2, usually some traces of spots on disc between the median band and the submarginal series. Hindwing: orange-red projections of median band shorter than in the preceding, of the same length on both sides of each vein.

♀. Dichromatic.

a'. ♀-f. *abderus*.—Similar to male. Forewing, above, occasionally with more postdiscal spots than four and with blotches of buffish scales on disc; band of hindwing not always entering cell, the distal projections more or less orange-red above, and the submarginal spots often vestigial, red on upperside.

b'. ♀-f. *amerias* nov.—*Upperside*, forewing: a row of obscure olivaceous buff blotches on disc; a submarginal row of spots from costal margin to SM^2, the spots small, not sharply defined. Hindwing: orange-red crescents very large (corresponding to the distal portion of the median band of male), strongly arched, except the first one, crescents R^3—M^2 being the largest; submarginal spots large, pale tawny-orange, upper ones creamy proximally.——*Underside*: forewing with some creamy scaling in cell representing the cell-patch of male; blotches on disc as above, but larger; proximally of them some other blotches, which are a remnant of the median band; submarginal spots small. Hindwing: all the discal crescents strongly arched, paler than above, and the posterior ones not so broad; submarginal spots only slightly curved.

Genitalia: Harpe straight, apical processes also straight, lower one shorter than the upper.

Hab. Eastern Mexico: Vera Cruz.

In the Tring Museum 9 ♂♂, 5 ♀♀, from: Orizaba, February and March, Jalapa, July, Espinal and Cuesta de Misantla, June (W. Schaus); Jalapa, August; Monterey; Huatuxco.

b. P. garamas garamas Hübn. (1834 ?).

♀. *Euphoeades garamas* Hübner, *l.c.*

♂. *Heraclides asclepius* id., *l.c.*; Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 99. t. 458. fig. 1. 2, t. 460. fig. 1. 2 (190-?) (Mexico; synon. *partim*; *concinnatus* (!) laps. typ.).

♂. *Papilio cincinnatus* Boisduval, *Spec. Gén. Lép.* i. p. 346. n. 186 (1836) (Mexico); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 50 (1838).

♂. *Papilio asclepius*, Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (*partim*); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 84 (1846) (*partim*; Mexico); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 23. n. 105 (1852) (*partim*; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 31. n. 112 (1856) (*partim*; Mexico); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 342 (1864) (*partim*; Mexico); Kirby, *Cat. Diurn. Lep.* p. 537. n. 126 (1871) (*partim*).

♀. *Papilio garamas*, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 178 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 40. n. 201 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 55. n. 212 (1856); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 344 (1864); Kirby, *Cat. Diurn. Lep.* p. 537. n. 124 (1871).

Papilio concinnatus (!), Gray, *ll.cc.* (sub syn.).

Papilio asclepius, Oberthür, *Et. d'Ent.* iv. p. 74. n. 225 (1880) (Cuernavaca); Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 238. n. 75 (1890) (*partim*; Oaxaca); Haase, *Untersuch. Mimicry* i. p. 93 (1893); Barrett, *Ent. News* xi. p. 428 (1900) (Central and Western Mexico).

Papilio asclepuis (!), id., *l.c.*

Messrs. Godman and Salvin were wrong in considering Hübner's figures as representing two females; the second figure is that of a male of the present subspecies. The Mexican material at the disposal of these authors was insufficient, which explains that the West and East Mexican forms were treated by them as being identical, while the forms from Guatemala and farther south are described as belonging to two separate species.

The West Mexican specimens are larger than East Mexican individuals, the dentition of the hindwing is stronger, the tail is more spatulate, and the pattern is different.

♂. *Upperside.*—Forewing: an evenly curved row of five or six submarginal spots, often a seventh or even an eighth spot indicated; no olivaceous buff blotches on disc; proximal edge of median band more even than in *P. g. abderus.*—Hindwing: median band not entering cell, or only just the extremity; submarginal spots distinct.

Underside: no blotches on disc of forewing.—Hindwing: distal orange projections of band shorter than in *abderus*, the anterior portion of each projection shorter than the portion behind the vein.

♀. Two forms.

a'. ♀-f. *amisa* nov.—Similar to male; forewing often with some small spots at upper angle of cell and distally of the cross-veins, the spots being larger below.

b'. ♀-f. *garamas* Hübn., *l.c.*—Resembling *abderus* ♀-f. *amerias*. Postdiscal olivaceous buff spots of forewing arched; crescents of hindwing much smaller than in ♀-f. *amerias*, their horns being much shorter; blue spots larger; submarginal spots thinner; no vestiges of median band, or only a very few buff scales in cell.

Genitalia: ♂. Proximal lobe of tenth sternite broad, denticulate, sometimes sinuate; mesially at apex of the sternite a tooth as in *P. aristeus*.

Hab. West Mexico: Guadalajara, Cuernavaca, Oaxaca.

In the Tring Museum 25 ♂♂, 7 ♀♀, from: Cuernavaca, 4000 ft., July 1904 (A. Hall); Cuernavaca, end of August 1904 (Dr. Gadow); Coantla, Morelos, June 1904, 3000 ft. (A. Hall); Salvatierra; Uruapan; Mexico City (coll. Felder).

c. P. garamas baroni subsp. nov.

♂. *Upperside.*—Forewing: a row of five submarginal spots, the fifth spot small, standing several mm. nearer the margin than the fourth.—Hindwing: median band entering cell, its proximal margin crossing cell halfway between R^3 and M^1; blue spots small; submarginal spots vestigial.

Underside: apex of forewing and basal area of hindwing paler than in the previous forms.—Forewing: submarginal spots SC^3—R^2 continuous, this narrow band followed from R^2 to SM^2 by a much thinner line which begins at R^2 distally of the bands.—Hindwing: projections of median band as short as in *P. g. garamas*, almost the same length at both sides of the veins; four upper submarginal spots

connected with one another, as is often the case in *P. g. abderus*; dentition prominent, tail long, spatulate.

♀ not known.

Genitalia : Tenth sternite as in *g. garamas* ; harpe quite different, the upper prong being very much shorter than the lower.

Hab. Sierra Madre do Sul, Guerrero (O. T. Baron).

1 ♂ in the Tring Museum.

d. P. garamas electryon Bates (1864).

Papilio asclepius Doubleday (*non* Hübner, 1834 ?, err. det.), *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (syn. excl. ; Honduras) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n. 84 (1846) (*partim* ; Honduras) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 23. n. 105 (1852) (syn. excl. ; Honduras) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 31. n. 112 (1856) (*partim* ; Honduras) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 342 (1864) (*partim* ; Honduras) ; Kirby, *Cat. Diurn. Lep.* p. 537. n. 126 (1871) (*partim* ; Honduras ; "*P. achelous*" alia species).

♂. *Papilio electryon* Bates, *Ent. Mo. Mag.* i. p. 3. n. 4 (1864) (Guatemala) ; Felder, *l.c.* p. 313. n. 341 (1864) (cit. falsa) ; Kirby, *l.c.* p. 537. n. 126a (1871) ; Godm. & Salv., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 239. n. 76. t. 72. fig. 1. 2. ♂ (1890) (Guatemala).

♂. *Upperside.*—Forewing : cell-patch narrowing costally ; four or five submarginal spots, the second smaller than the third, sometimes a sixth spot indicated ; the first four larger than in Mexican males.——Hindwing : median band entering cell as in *P. g. abderus* ; blue spots small, often vestigial ; submarginal spots absent ; tail spatulate ; red anal marginal spot rarely present.

Underside : band of forewing strongly dentate on disc ; submarginal line angulate at R^2 ; no blotches on disc.——Projections of band of hindwing about as long as in *P. g. garamas*, nearly the same length on both sides of each vein ; submarginal spots linear, red.

♀ not known.

Genitalia : Proximal lobe of tenth sternite narrower than in *P. g. garamas*, denticulate, mesial apical tooth present or vestigial ; harpe quite different from that of the other forms, curved, denticulate, strongly widened at apex, the upper prong curved downwards.

Hab. Guatemala ; Honduras (*fide* Doubleday, but there are no Honduras specimens in the British Museum, only West Mexican ones !).

In the Tring Museum 9 ♂♂ from : Ciudad de Guatemala (Rodriguez) ; Guatemala.

e. P. garamas syedra Godm. & Salv. (1878).

Papilio syedra Godman & Salvin, *Proc. Zool. Soc.* p. 271. n. 19 (1878) (Chiriqui) ; iid., *Biol. Centr. Amer., Lep. Rhop.* ii. p. 239. n. 77. t. 72. fig. 4. ♂, 5. ♀ (1890) (Costa Rica ; Chiriqui).

♂. *Upperside.*—Forewing : cell-patch of even width ; five to seven submarginal spots, third the largest, fifth and following thin.——Hindwing : median band entering cell, more strongly and regularly dentate than in *electryon* ; blue patches large ; no submarginal spots ; tail long, spatulate, teeth M^1 and M^2 also long.

Underside : apex of forewing and basal area of hindwing as pale brown as in *baroni* ; dentition of median band of hindwing as in *electryon*, the orange-red border deeper in colour, broader in between the veins.

♀ like ♂ : seven submarginal spots on forewing ; median band of hindwing partly edged with orange-red above ; no submarginal spots.

Genitalia: Tenth tergite shorter than in *P. g. electryon*; harpe peculiar, twisted, lower process long, gradually broadening proximally, the upper process, which is short, appearing as a tooth at the dorsal edge of the harpe.

Hab. Costa Rica; Chiriqui.

In the Tring Museum 10 ♂♂, 1 ♀, from: Azahar de Cartago, Costa Rica (Underwood); San José, May—June 1899, Guatil Piris, December 1901 and February 1903, Costa Rica (Underwood); Chiriqui (Gounelle); Chiriqui.

118. Papilio homerus Fabr. (1793).

Papilio Eques Achirus homerus Fabricius, *Ent. Syst.* iii. 1. p. 29. n. 85 (1793) (America; "Latham coll." false, teste Donovan); Esper, *Ausl. Schmett.* p. 190. n. 85. t. 46. fig. 1 (1796).

Papilio homerus, Donovan, *Nat. Repos.* ii. *Ent.* t. 19 (1823) (Jamaica); Godart, *Enc. Méth.* ix. *Suppl.* p. 811. n. 105-6 (1824); Boisd., *Spec. Gén. Lép.* i. p. 345. n. 185 (1836); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 13. n 83. t. 4. fig. 1. ♀ (1846) (Jamaica); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 23. n. 104 (1852); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 31. n. 111 (1856); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (West Indies); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 309. n. 288 (1864) (Jamaica); Kirby, *Cat. Diurn. Lep.* p. 542. n. 160 (1871); Rutherf., *Ent. Mo. Mag.* xv. p. 28 (1878) (Jamaica, habits); Butler, *Proc. Zool. Soc. Lond.* p. 481. n. 36 (1878) (Jamaica); Gosse, *Proc. Ent. Soc. Lond.* p. 55 (1879) (larva; habits); Oberth., *Et. d'Ent.* iv. p. 74. n. 226 (1880) (Jamaica); Lucas, *Bull. Soc. Ent. France* p. 64 (1883) (Jamaica); Aaron, *Canad. Ent.* xxv. p. 258 (1893) (S. Domingo, Cibas range; Jamaica, Sulphur R. and Devil's R.; *Ipomoea* food-plant of larva); Panton, *Journ. Ins. Jamaica* i. p. 375 (1893); Fox & Johns., *Ent. News* iv. p. 3 (1893) (Pt. Antonio, Jamaica); Haase, *Untersuch. Mimicry* i. p. 95 (1893); Taylor, *Ent. News* v. p. 101 (1894) (descr. of larva and pupa; on "Water Wood," prob. *Chimarrhis cymosa*, Nov. 27); id., *Trans. Ent. Soc. Lond.* p. 409 (1894) (larva and pupa); Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 282 (1896) (Jamaica); Swains., *Journ. N. York Ent. Soc.* ix. p. 77 (1901) (larva, on *Thespesea populnea*); Robins., *Ent. News* xiv. p. 19 (1903) (capture of a series); Swains., *Proc. Ent. Soc. Lond.* p. 55 (1904).

Felder, and also Haase, regarded this species as a near ally of *P. machaonides*. However, it is closely related to *P. garamas* (= *asclepius*), near which it was placed by Oberthür. The shape of the hindwing is practically the same in *P. homerus*, *garamas*, *warscewiczi*, and *judicaël*. The serration of the costal margin of the forewing is not quite so strong in *P. homerus* and *garamas* as in the other species. The agreement in pattern between *P. homerus*, *warscewiczi*, *cacicus*, *garamas*, etc., is easily perceived in spite of the specific differences. The white spot on the palpus so characteristic for *P. aristeus*, *P. cleotas*, and allies is also preserved in *P. homerus*. The cell of the hindwing of *P. homerus* is short and broad, being widest near the apex, as in many specimens of *P. garamas syedra*.

Genitalia: ♂. Tenth tergite broad proximally, strongly narrowing towards apex; sternite on each side with short projections, the anterior one being somewhat acuminate, anally in middle a conical tooth as in *P. aristeus*; harpe similar to that of *P. aristeus*, nearly as long as the clasper, linear, flat, truncate at apex, the two angles produced into a straight thornlike process, the lower one being sometimes very short.—♀. Edge of vaginal orifice anteriorly raised into a short, broad, smooth, rounded tubercle, which is concave on the posterior side; on each side far back a high ridge which separates further frontad into two ridges, the inner one ending in a long acute process as in *P. aristeus* and allies.

Early stages described by Taylor, *l.c.*

Hab. Jamaica; Santo Domingo (interior of, *teste* Aaron, *l.c.*).

In the Tring Museum 3 ♂♂, 6 ♀♀ and 1 pupa.

In coll. H. J. Adams a fine series of 7 ♂♂, 8 ♀♀.

119. Papilio warscewiczi.

♂. *Papilio warscewiczi* Hopffer, *Stett. Ent. Zeit.* xxvii. p. 29. n. 11 (1866) (Bolivia).

♂. *Underside* of abdomen densely covered with tawny-olive hair-scales, similar hairs on the breast. Costal margin of forewing serrate ; two rows of spots on *upperside*, no cell-patch, discal row sometimes partly obsolete, the two rows almost parallel, the submarginal row angulate at SC^5, the first two spots being more distal than the third spot, the submarginal spots larger than the discal ones, except the two upper ones.——Hindwing with long obtuse tail, teeth M^1 and M^2 being also prolonged ; submarginal spots large, creamy or yellowish, shaded with black, a discal band or a row of spots of the same colour, distant from cell, the spots often obsolete, a postdiscal row of blue spots.

Underside resembling *P. cleotas* in so far as there is the same kind of markings, though differently developed ; forewing black from base to hinder angle and anteriorly beyond cell (as far as the wing is covered by the hindwing, when at rest), apical area cinnamon like the hindwing ; a creamy or yellow cell-patch ; discal and submarginal spots larger than above, the upper submarginal spots often enlarged to broad patches.——Hindwing : a broad continuous discal band, its inner edge even, slightly curved, the outer edge crenate, the band creamy white, often washed with cinnamon ; submarginal spots the same colour, large, upper ones often much enlarged, extending from edge of wing to discal band, being either merged together with the latter or separated from it by their cinnamon crescents ; hairs in posterior area tawny-olive ; shoulder often creamy.

♀ not known.

Genitalia : Tenth tergite very long, subprismatical, the underside being somewhat roof-shaped except at apex, which is flat above and below, appearing sinuate beneath in lateral view ; sternite strongly chitinised laterally, separated by an oblique groove into a larger anterior portion which is produced into a proximal and a distal tooth, both more or less denticulated, and into a smaller posterior portion which is obtuse. Harpe similar to that of *P. aristeus*, flat, with two apical processes.

Early stages not known.

Hab. Ecuador to Bolivia.

Three subspecies.

a. P. warscewiczi jelskii Oberth. (1881).

Papilio jelskii Oberthür, *Et. d'Ent.* vi. p. 113. n. 1. t. 20. fig. 6 (1881) (Tambillo, Peru) ; Dognin, *Lép. Loja* p. 14 (1887) ; id., *l.c.* p. 37 (1891).

♂. Similar to the next form ; discal spots of forewing ill-defined ; the underscales being all black, except in the spots at costal margin.——Discal band of hindwing rather strongly curved ; ill-defined ; blue spots narrow, curved ; last submarginal spot orange-red.

Discal spots on *underside* of forewing large and brown, distal marginal area much widened before middle. Posterior brown postdiscal spot R^3—M^1 of hindwing smaller than in the other forms ; submarginal spot M^1—M^2 orange in middle.

Genitalia (Loja specimen) : Tenth tergite broad, non-spatulate, apex less curved downward than in the Bolivian form ; first and second tooth of sternite close together, the interspace being much smaller than that between the second and third, the first tooth long, strongly denticulate. Upper prong of harpe much longer than the lower one, both straight.

Hab. Loja, Ecuador; North and North-West Peru: Chachapoyas, Tambillo.
In the Tring Museum 1 ♂ from Loja.
In coll. Oberthür several males from Tambillo and Chachapoyas.
In coll. Dognin a series from Loja.

b. P. warscewiczi mercedes subsp. nov.

Papilio warscewiczi, Hopffer (*non* id., 1866, err. det.), *Stett. Ent. Zeit.* xl. p. 54. n. 30 (1879) (Chanchamayo); Druce, *Proc. Zool. Soc. Lond.* p. 246. n. 20 (1876) (Cosnipata).

♂. Closely agreeing with the preceding form; discal spots of forewing *above* on the whole larger; blue spots of hindwing broader; brown distal marginal border of *underside* of forewing narrower before middle, and discal spots R^3—M^2 smaller; brown postdiscal band of hindwing on the whole broader, especially spot R —M^1, submarginal spot M^1—M^2 without orange scales.

Genitalia: Tenth segment similar to that of the next form, the second tooth of the sternite standing close to the third; both prongs of the harpe straight, usually of the same length as the lower one, a little shorter than the upper.

Hab. Central Eastern Peru: Huánuco.

In the Tring Museum 11 ♂♂ from: Pozuzo, Huánuco, 800—1000 m. (W. Hoffmanns), *type*; Chanchamayo (W. Hoffmanns); Cushi, Huánuco, 1820 m. (W. Hoffmanns); Huancabamba, Junin (Böttger).

c. P. warscewiczi warscewiczi Hopff. (1866).

Papilio warscewiczi Hopffer, *Stett. Ent. Zeit.* xxvii. p. 29. n. 11 (1866) (Bolivia); Hewits., *Exot. Butt.* iv. *Pap.* t. 10. fig. 30. ♂ (1869) (Apolobamba, type of *soratensis*); Kirby, *Cat. Diurn. Lep.* p. 537. n. 128 (1871).
Papilio soratensis Godman & Salvin, *Ann. Mag. N.H.* (4). ii. p. 152. n. 26 (1868) (Apolobamba).
Papilio wardscewicsi (!), Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

♂. Markings of *upperside* on the whole paler than in the previous forms, less yellow. Discal spots of forewing much smaller than the submarginal ones, often minute and some of them absent. Discal band of hindwing broken up into spots, sometimes vestigial.

Discal band of hindwing *below* usually entering cell, in many specimens this band and the submarginal spots washed with brown.

Genitalia: Apex of tenth tergite more strongly curved downwards than in the other forms; sternite as in *mercedes*, dentition individually variable. Upper prong of harpe strongly curved, often several minute teeth on and in between the two prongs.

Hab. Bolivia and South-East Peru.

In the Tring Museum 22 ♂♂ from: R. Inambari, S.E. Peru, 1000 m., July 1900 (Simons); Chirimayo, 1000 ft., July 1901, R. Sincuri, June 1901, 2500 ft., S. Domingo, 6000 ft., January 1901, and Limbani, April 1904, Carabaya, S.E. Peru (G. Ockenden); Charuplaya, Bolivia, 1300 m., May 1901 (Simons); S. Antonio, Bolivia, 1800 m., March—June 1896 (Garlepp); R. Tanampaya (Garlepp); R. Songo, Prov. Yungas (Garlepp); Bueyes.

120. **Papilio cacicus** Lucas (1852).

Papilio cacicus Lucas, in Guérin, *Rev. Zool.* (2). iv. p. 132 (1852) (Colombia).

♂. Closely allied to *P. warscewiczi*; forewing with three bands on *upperside*: a creamy yellow median band interrupted at lower angle of cell, the posterior

portion being continuous with a variable cell-patch, which is rarely absent, a postdiscal row of glaucous buff spots, and a row of submarginal spots of which the posterior one, two, or three are orange, cell-patch sometimes washed with orange.——Hindwing with a broad creamy or creamy yellow median band, tapering behind, always entering cell ; a postdiscal row of blue spots ; and a submarginal row of creamy ones, sometimes shaded with black ; last spot orange as a rule, usually merged together with the marginal one.

Underside: apical area of forewing and the hindwing cinnamon-brown.—— Forewing : discal band and cell-patch broader than above, upper submarginal spots absent or vestigial.——Discal band of hindwing milky white or creamy, wider posteriorly than above, externally bordered by black bars or crescents, except towards costa ; submarginal spots vestigial.

♀. Trichromatic ; one form like male, but wings broader, band of hindwing wider. The other forms with large cell-patch and complete discal band on forewing which are tawny-orange or white ; hindwing without discal band on *upperside*, the band vestigial on *underside*.

Genitalia : ♂. Tenth tergite long, curved, transversely dilated beneath at the base, apex sharply pointed ; sternite divided at each side by a transverse groove into two processes, the first being strongly chitinised and pointed, and the second being paler and obtuse. Harpe vestigial, being represented by a flat piece of chitin of about half the length of the clasper, not separated from the latter, tip acuminate.—— ♀. Edge of vaginal orifice and the area around strongly chitinised, the cavity in which the orifice proper is situated appearing heart-shaped, the edges of the cavity meeting behind the orifice, forming here a brown tubercle; within this cavity several transverse folds, and in front of the cavity also some transverse folds ; no processes.

Early stages not known.

a. P. cacicus cacicus Lucas (1852).

Papilio cacicus Lucas, *l.c.* ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 40. n. 203 (1852) (Quito) ; id., *List Lep. Ins. Brit Mus.* i. *Pap.* p. 55. n. 214 (1856) ; Lucas, in Casteln., *Voy. Amér. Sud, Lép.* p. 199. t. 1. fig. 3. ♂ (1857) (Colombia); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 313. n. 340 (1864) (Ecuador ; Colombia) ; Kirby, *Cat. Diurn. Lep.* p. 537. n. 127 (1871) (Amer. mer.) ; Oberth., *Et. d'Ent.* iv. p. 74. n. 224 (1880) (" Brazil " error loci) ; id., *l.c.* vi. p. 4. n. 8 (1881) (Muzo, ♀) ; Honr., *Deutsche Ent. Zeit.* p. 223 (1889) (*zaddachi* = ♀ of *cacicus*) ; Dewitz, *ibid.* p. 224 (1889) ; Hahnel, *Iris* iii. p. 194 (1890) (Mérida) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 31. n. 132 (1890) (Colombia) ; Haase, *Untersuch. Mimicry* i. p. 94 (1893) ; Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 151 (1903) (Balzapamba, W. Ecuador).

Papilio zaddachi Dewitz, *Mitth. Münch. Ent. Ver.* i. p. 85. t. 2. fig. 1 (1877) (Colombia) ; id., *Deutsche Ent. Zeit.* p. 332 (1888) (distinct from *cacicus* ; against Honrath).

Papilio cacicus ab. ♀ *zaddachi*, Honrath, *Berl. Ent. Zeit.* xxxii. p. 253 (1888) (a second specimen of this form of ♀ from Colombia ; not specifically distinct from *cacicus*).

♂. There is considerable variability in the size of the markings.——Forewing : the cell-patch, which is occasionally washed with orange, is sometimes a broad band reaching across the cell, while it is reduced in other specimens to a small spot, being altogether absent in one of our specimens from Bogota.——In this Bogota individual the band of the hindwing is more distal in position than usually, just entering apex of cell.

♀. Trichromatic.

a'. ♀-f. *cacicus* similar to the male.

b'. ♀-f. *zaddachi* Dewitz, *l.c.*——Discal band of forewing continuous, not being interrupted at apex of cell, and like the large patch in cell tawny-orange ; hindwing without discal band on *upperside*, the band being vestigial below.

c'. ♀-f. *nais* nov.——Like the preceding, but the discal band and cell-patch of forewing white. Coll. Oberthür.

Hab. Mérida ; Colombia ; Ecuador.

On comparison of a larger material than we have examined it will perhaps be found that there are several subspecies in the districts mentioned. In Mérida specimens the last submarginal spot of the forewing, on upperside, appears to be always (?) absent or vestigial ; in our two individuals from the Cauca valley and the Rio Dagua the first spot of that row is obsolescent and the last small, the band of the hindwing being also more evenly tapering than in Bogota specimens.

In the Tring Museum 16 ♂♂, 1 ♀, from : Mérida, Venezuela, June 1898 (Briceño); "Bogota" ; Bogota to Pandi, December 1896, dry season (Dr. Bürger) ; Pereira, Canca ; R. Dagna, west coast of Colombia (W. Rosenberg) ; Ecuador.

In coll. Oberthür from Ambato and Balsapamba, Ecuador.

b. P. cacicus inca subsp. nov.

Papilio cacicus, Hopffer, *Stett. Ent. Zeit.* xl. p. 54. n. 29 (1879) (Peru ; this form ?).

♂. *Upperside.*—Forewing : cell-patch much more oblique than in the preceding, forming a very acute angle with M on basal side ; last three spots of postdiscal row close to the submarginal spots ; first submarginal spot vestigial, second small, the others also smaller than in *c. cacicus*, partly shaded with black, last one orange-red.——Hindwing : discal band more convex distally than in the preceding subspecies, broad anteriorly, strongly tapering ; blue postdiscal spots large ; submarginal spots narrow, shaded with black, no orange anal spot ; black discal area wider centrally than in the preceding, the wing being longer in middle ; tail narrow, non-spatulate.

Underside.—Forewing : discal band extending to base of M^2, its proximal edge almost on a level with the edge of the cell-patch, which is more proximal than in the previous subspecies ; black discal area much wider in middle than in front and behind ; upper postdiscal spots large, contiguous, forming an oblique band, posterior spots of that row thin, close to the submarginal spots.——Hindwing : black discal bars sharply defined, luniform, separated from the discal band by a narrow interspace of the brown ground-colour ; a minute orange-red anal submarginal spot, separated from fringe.

Genitalia : Anterior process of tenth tergite shorter than posterior one ; apex of harpe not raised into a small tubercle or point.

Hab. Eastern Peru : Upper Rio Toro, Chanchamayo district, August—September 1901 (Simons).

1 ♂ in the Tring Museum ; not seen in other collections, but the specimen recorded by Hopffer, *l.c.*, may belong here.

121. **Papilio euterpinus** Godm. & Salv. (1868).

Papilio euterpinus Godman & Salvin, *Ann. Mag. N. H.* (4). ii. p. 150. n. 24 (1868) (Guadalquiza, Ecuador) ; Hewits., *Exot. Butt.* iv. *Pap.* t. 10. f. 31. ♂ (1869) (type in G. & S. coll.) ; Kirby, *Cat. Diurn. Lep.* p. 538. n. 143 (1871) ; id., *Trans. Ent. Soc. Lond.* p. 351 (1881) (Chiquinda ; moist places at a high elevation ; descr. of worn ♀) ; Staud., *Exot. Tagf.* p. 15 (1884) ; Haase, *Untersuch. Mimicry* i. p. 94 t. 11. fig. 83. ♂ (1893) (Ecuador.—neuration erroneous in fig.) ; Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 153 (1903) (Sa. Inez, R. Pastaza, 1250 m.).

This peculiar species has generally been associated with *P. zagreus*. However, its true position is near *P. cacicus* and *P. warscewiczi*, with which it agrees in the short antenna, serrate costal margin of the forewing, the short cell of the hindwing, the origin of the subcostal vein of the hindwing from close to the base of the subbasal cellule, the hairs of the underside of the body and hindwing, and in the genitalia (of ♂, ♀ not examined). The hindwing has lost the tails and the markings, only the submarginal row being represented by two or three orange spots situated from anal angle forwards, the row being sometimes continued by some olive-buff spots. The cell-patch of the forewing and the three discal spots R^2—M^2 correspond to the respective spots of *P. cacicus*, the two posterior discal spots being prolonged as in *P. aristeus bitias*, usually touching the submarginal dots, which are homologous to the posterior orange submarginal spots of *P. cacicus*. On the *underside* the pattern of the forewing agrees often rather closely with that of *P. cacicus cacicus* ♀-f. *zaddachi* in the discal row of patches being continued to costal margin by some orange and creamy spots situated at the distal side of the cross-veins.

Genitalia: ♂. Tenth tergite very broad, rounded at apex, beneath at base transversely dilated as in *P. cacicus*; sternite on each side with only one long acute process, which is somewhat angulate on the anal side; this process is homologous to first and second process of *P. cacicus*, the first process being shifted anad in *P. euterpinus* and the two processes having become merged together, the small projection on the hinderside of the long process of *P. euterpinus* being homologous to the second process of *P. cacicus*. Harpe as in *P. cacicus*, but a little longer, not so completely fused with the clasper, the edges and especially the acuminate apex being free.

Early stages not known.

Hab. West Colombia; Ecuador; North Peru.

In the Tring Museum 2 ♂♂ from: Sante Inez (R. Haensch); Zamora (O. T. Baron).

In coll. Oberthür 7 ♂♂ from: Honda, West Colombia; Moyobamba and Chachapoyas, Peru.

A ♀ in coll. H. Grose-Smith from Chiquinda.

SECTION III.—KITE-SWALLOWTAILS.

(For characters see p. 434.)

There is considerable divergency among the New-World Kite-Swallowtails, the American forms presenting a greater variety in structure, shape, and pattern than the Old-World species. The two types of hindwing, the tailed triangular type and the non-tailed rounded type, which we find in the Eastern Hemisphere, obtain also in America, but here the two types are connected by a third type, a more or less rounded hindwing bearing a thin tail (*dolicaon* and allies). The development of the subcostal veins of the forewing exhibits interesting features in this Section of Papilios. In one of the American species the first subcostal is lost (*bellerophon*)—the only instance among true Swallowtails of a reduction in the number of veins. We take as the most generalised state that venation in which the five subcostals are all present, and end free in the margin of the wing. This state obtains in a large percentage of American species, while only two Old-World species have the same neuration—namely, the Palaearctic *podalirius* and the Australian *leosthenes*,

none of the African Kite-Swallowtails having all the subcostals free. The next phyletic stage is represented by those species in which the first subcostal is anastomosed with the costa, and in the third stage both the first and second subcostals are joined to the costa. Both the less and the more advanced specialisations are observed among the American Papilios, some of the species exhibiting a remarkable fluctuation in this respect among the individuals.

The scent-organ in the abdominal fold of the hindwing of the males is another structure which exhibits interesting variety among these Papilios, and striking variation within many of the species. The scent-scales differ in some of the species enormously, while in others the differences are less marked, and in others again the scent-scales are apparently identical. The geographical variation of the scent-organ is very marked in several species of this Section. In quite a number of American and Old-World species the scent-organ is vestigial or absent, though the fold remains always slightly indicated at the base of the wing.*

The genitalia of the American Kite-Swallowtails are in some groups of great uniformity, while they are different in every species, and sometimes even subspecies, in other groups. One organ, the tenth abdominal segment of the male, is however of remarkable constancy all through the American species of this Section, with the exception of one species (*P. celadon*), which one would not expect to deviate so much from the normal, considering that the aberrant-looking mimetic forms have the tenth tergite of the same trifid type as *P. protesilaus*, *dolicaon*, *marcellus*, etc. This exception from the normal is instructive. It is one of the instances we meet with so frequently among Lepidoptera of the simplification of an organ by reduction, the tenth tergite of *P. celadon* having become simple in consequence of the loss of the side-lobes.

The edge of the eighth abdominal tergite of the male is very characteristically modified in the American Kite-Swallowtails, the smooth erect scaling at this edge not being met with in other American Papilios.

We know deplorably little about the larvae and pupae of the various species. There are some points in the variability of the species, especially the mimetic ones, which breeding from a female would put beyond dispute. Under *P. phaon* and *P. lysithous* we have united quite a number of differently coloured forms which other authors have considered distinct species. Though we have no doubt about these insects being polymorphic, it is nevertheless desirable that this polymorphism be investigated by breeding from the eggs.

The following two generic names have American species as types:

Iphiclides Hübner, *Verz. bek. Schmett.* p. 82 (1818?) (type: *dolicaon*).

Eurytides Kirby (ex Hübner, indescr.), in Allen, *Nat. Libr., Butt.* ii. p. 272 (1896) (type: *dolicaon*).

Since some Old-World species are apparently close allies of American species, and may perhaps come into one or the other American Group when we classify all the Papilios, we abstain from giving a detailed characterisation of the two Subsections in which the American Kite-Swallowtails fall.

Subsection E.

Underside of wings with red spots at the base, or hindwing with a red line parallel to abdominal margin, extending from costal margin before middle towards the anal angle. Subcostals of forewing always free.

* The result of our investigation into the variation of this organ will be the subject of a special paper.

Here come three groups :

a. Underside with red spots at base, either on both wings or only on hindwing . . . . . *Lysithous Group.*

b. Underside of hindwing with red line parallel to abdominal margin, extending from costal edge proximally of middle in the direction of the anal angle, being bordered with black on both sides at least at costal margin . . . . . *Marcellus Group.*

c. Red line on underside of hindwing as before, but bordered with black only on one side . . . *Protesilaus Group.*

Subsection F.

Underside of hindwing with a red or tawny band on disc parallel (or nearly) with distal margin, commencing beyond middle of costa, or no red or tawny band or spots on underside.

d. Hindwing below with red or tawny line (or row of spots) parallel with distal margin; first subcostal of forewing free . . . . . *Thyastes Group.*

e. Hindwing below without red line; SC^1 of forewing anastomosed with C . . . . *Dolicaon Group.*

XIII. Lysithous Group.

With the exception of *P. asius*, which stands a little apart, the species of the present group are all closely related with one another. They resemble in pattern various members of the Aristolochia-Papilios, with which they have been associated by nearly every author, Haase alone having recognised their close relationship with the *Marcellus* Group. The red basal spots on the underside of the wings are a distinguishing character peculiar to these mimics. The species are modifications of an ancestral form which, in the shape of the hindwing, the number of red basal and subbasal spots on the same, and the development of the scent-organ in the abdominal fold, resembled *P. asius*. This insect has preserved the triangular shape of the hindwing peculiar to the *Marcellus*, *Protesilaus*, and *Leucaspis* Groups, while in most other species of the Mimetic Group the hindwing has assumed a more or less rounded shape. Of the five red markings in the basal area of the underside of the hindwing of *P. asius* the other mimics have preserved only four, three or two, the spot between C and SC not being marked in any other species. One should expect this spot to be occasionally vestigial in the species with four red spots (*P. ilus, branchus, thymbraeus*, etc.), but we have not come across a specimen in which such a spot is indicated.

The scent-organ of *P. asius* is far less reduced than that of the other species. With the exception of *P. asius*, the abdominal edge of the hindwing (♂) is not curved upwards, and the scent-scales are restricted to the basal third or half, forming a narrow greyish stripe. In several species (*P. protodamas, pausanias*, and *xynias*) the scent-organ is altogether lost, while in *P. euryleon* it is lost only in the subspecies from East Ecuador. The scent-scales of *P. asius* are similar to those of *P. agesilaus*, being spindle-shaped, with both poles produced into a threadlike

process. In the other species the scent-scales resemble narrow ordinary non-dentate scales.

The genitalia are of great sameness, the differences between the species, if there are any constant differences, being very slight. They agree also closely with the genitalia of *P. philolaus*.

The larva is bright-coloured, bearing numerous longitudinal bands and behind the middle a V-shaped dorsal patch, the thorax being dotted; no spinelike tubercles. The pupa is short; the abdomen is widest in middle, being somewhat barrel-shaped.

Sixteen species:

a. Forewing below without red spots . . . . . *b.*
Forewing below with one or two red spots . . . *k.*

b. Hindwing below with two red spots at costal margin . *c.*
Hindwing below with one red spot at costal margin . . *g.*

c. Hindwing below with five red spots at base, there being a spot between C and SC . . . . . Species No. 137.
Hindwing below with four red spots at base, there being no spot before SC . . . . . *d.*

d. Hindwing with red band on disc . . . . . *e.*
Hindwing with straw-coloured band across both wings . Species No. 123.

e. Forewing all black, or a white spot or patch on disc at and near lower angle of cell . . . . . *f.*
Forewing with large grey patch M^2-SM^2, besides some other greyish or buffish patches . . . . . Species No. 132.

f. Red band of hindwing distant from cell . . . . Species No. 134.
Red band of hindwing close to cell . . . . . Species No. 133.

g. Hindwing without markings on upperside, except a row of small white submarginal lunules . . . . Species No. 122.
Hindwing with red, or buffish green, or straw-coloured band or patch . . . . . *h.*

h. Posterior segments of abdomen and sterna with red spots *i.*
Thorax and abdomen with buffish markings . . . Species No. 124.

i. Forewing with a submarginal row of buffish straw-coloured spots, discal patches absent or vestigial . . . *j.*
Forewing with large patches on disc, either in centre or before inner margin; hindwing with red discal patch or band . . . . . Species No. 126.

j. Hindwing with pale pink band on upperside from R^1 to abdominal margin . . . . . Species No. 127.
Hindwing with greyish green or greyish blue discal band, or the whole central area this colour, or the band carmine red and extended to costal margin . . Species No. 125.

k. Forewing with two red spots at base . . . . . *l.*
Forewing with one red spot at base standing at costal margin, the cell spot being absent . . . . *m.*

l. Hindwing with tail; posterior basal spot of hindwing produced to form a streak . . . . . Species No. 136.
Hindwing without tail; posterior basal spot of hindwing a dot . . . . . Species No. 131.

m. Hindwing with four basal spots on underside, there being two spots at costal edge . . . . . Species No. 135.
Hindwing with two or three basal spots, one only at costal edge . . . . . *n.*
n. Patch of upperside of forewing pale green (♂ ; ♀ not known) . . . . . Species No. 130.
Patch of upperside of forewing grey or white, or absent . *o.*
o. Hindwing rounded, red spot R^3—M^1 of upperside usually larger than spot M^1—M^2 . . . . . Species No. 128.
Anal angle of hindwing more produced, red spot R^3—M^1 of upperside not larger than spot M^1—M^2 . . . Species No. 129.

122. **Papilio pausanias** Hew. (1852).

Papilio pausanias Hewitson, *Tr. Ent. Soc. Lond.* (2). ii. p. 22. t. 6. fig. 2 (1852) (British Guiana ; Ega).

♂ ♀. Abdomen with broad buffish lateral streak. Forewing proximally and nearly the whole upper surface of the hindwing metallic greenish blue ; a straw- or primrose-yellow area on forewing, consisting of a large cell-patch and two large discal patches R^3—M^2, there being often a small additional spot before R^2 and another behind M^2.——Hindwing without discal markings, but with a row of more or less distinct white curved submarginal bars ; shape of hindwing variable, distal margin (apart from dentition) often straight, especially in female.

Underside brown, without distinct black cell-streaks ; hindwing with three red basal spots which are often developed to streaks ; a row of red postdiscal lunules, also often produced basad, forming more or less distinct streaks.

Scent-organ absent, vein SM^2 being clothed with metallic blue scales, only a few of the scales being greyish.

Genitalia not essentially different from those of *P. protodamas* ; the dorso-ventral dentate ridge of the harpe ventrally a little more curved, apical lobe a little larger, and the teeth beneath this lobe rather more numerous.

Early stages not known.

Hab. Costa Rica southward to Bolivia and the Brazilian province of Goyaz.

Three subspecies.

a. P. pausanias prasinus subsp. nov.

♂. Similar to *cleombrotus*. *Upperside* of wings more green in tint, this metallic colour also more extended, the costal area of the hindwing being hardly less metallic green than the disc.——Forewing rather shorter ; discal patches longer, reaching three-fourths the way from cell to distal margin.——Hindwing : white submarginal spots minute, upper ones vestigial, practically absent both above and below ; red basal spots of underside smaller than in *cleombrotus*.

Hab. Carillo, Costa Rica, June—July 1903 (C. Underwood); one ♂ in the Tring Museum.

b. P. pausanias cleombrotus Streck. (1885).

Papilio cleombrotus Strecker, *Proc. Ac. Nat. Sc. Philad.* xxxvii. p. 175 (1885) ("Upper Amazons" error loci) ; id., *Lep. Rhop. Het. Suppl.*, iii. p. 17 (1909) ("Pebas" false).

The locality given for this form by Strecker is erroneous. We know the subspecies only from the West Coast of Colombia, but it occurs presumably also in

Panama, whence Strecker had received Lepidoptera. The description fits our specimens from the Rio Dagua.

♂. Pale apical patch of forewing absent; posterior area of forewing and distal area of hindwing more extended metallic green-blue, costal area of hindwing practically black. *Underside* deeper black-brown than in *P. p. pausanias*; red basal spots of hindwing not prolonged to streaks, no pale or reddish streaks on disc; red postdiscal spots, especially the last one, larger than in *P. p. pausanias*. Forewing occasionally with vestiges of creamy submarginal spots on upper as well as on underside.

♀ not known.

Hab. Rio Dagua, West Colombia.

In the Tring Museum 6 ♂♂ (W. F. H. Rosenberg).

2 ♂♂ from Juntas, R. Dagua, in coll. Oberthür.

c. P. pausanias pausanias Hew. (1852).

Papilio pausanias Hewitson, *l.c.* (1852); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 313 (1852) (Ega; var. a. "Honduras and Guatemala," no such specimens in Brit. Mus.); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 80. n. 330 (1856) (Ega; Demerara; "var. a" excl.); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons; banks of rivers); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 6. n. 94 (1857) (Brazil); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 335 (1861) (Villa Nova; Ega; habits different from those of its model, *Heliconius clytia*); id., *Journ. Entom.* i. p. 224. n. 7 (1862) (Upp. Amazons as far down as Villa Nova); Felder, *Verh. Zool. Bot. Ges. Wien.* xiv. p. 299. n. 153 (1864) (Demerara; Amazons; Venezuela; Bogota; "Honduras, Guatemala"—error loci); Kirby, *Cat. Diurn. Lep.* p. 524. n. 52 (1871) (Amer. mer.); Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 10 (1876) (Peru; Chamicuras); Hopff., *Stett. Ent. Zeit.* xl. p. 52. n. 17 (1879) ("Brazil," Surinam, Brit. Guiana, Venezuela, N. Granada, Bolivia;—"Honduras, Guatemala" error loci); Oberth., *Et. d'Ent.* iv. p. 97. n. 296 (1880) (Ecuador; Santarem); Staud., *Exot. Tagf.* i. p. 12. t. 8 (1884) (Para to Peru; Colombia); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 24. n. 104 (1890) (Villavicencio, 450 m.); iid., *l.c.* p. 31. n. 126 (1890) (Colombia); Hahnel, *Iris* iii. p. 268 (1890) (Teffé); id., *l.c.* p. 285 (1890) (Pebas); Haase, *Untersuch. Mimicry* i. p. 87 (1893); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença; ♀ seen).

Papilio hermolaus Guenée, *Mém. Soc. Phys. Hist. Nat. Genève* xxii. p. 379 (1872) (♀, Porto Cabello;—now in coll. Oberthür); Hew., *Pet. Nouv. Ent.* p. 213 (1872) (= *pausanias*); Kirby, *ibid.* p. 809. n. 52 (1877) (= *pausanias*); id., *Cat. Diurn. Lep.* p. 239 (1872) (= *pausanias*).

Papilio pausanias (!), Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

♂ ♀. Apex of forewing with large greyish patch, the black upper scales being mostly absent from this patch.——*Underside* of hindwing with pale discal streaks which join the red postdiscal spots; red basal spots variable in length; outline of hindwing variable, in our Bogota female the hindwing short, being sharply truncate, in other females hindwing not shorter than in male, or even more rounded than in that sex.

Hab. Central Colombia to the Guianas, southward to Bolivia and the province of Goyaz in Brazil.

In the Tring Museum 30 ♂♂, 2 ♀♀, from: "Bogota"; Ecuador; La Vuelta, Canra R., Orinoco, May 1904 (S. M. Klages); Rio Demerara; Surinam; Ega; Pebas; R. Uaupes, Upper R. Negro; Iquitos (Stuart); Rioja, near Moyobamba; R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); Guanay and Mushay, R. Mapiri, Bolivia (Stuart); Jatahy, Goyaz.

123. **Papilio microdamas** Burm. (1878).

Papilio microdamas Burmeister, *Descr. Rép. Argent.* v. Lép. p. 63. n. 5 (1878) (Corrientes); id., *l.c. Atlas* p. 19. t. 5. fig. 8. ♀ (1879); Oberth., *Et. d'Ent.* xii. p. 2. n. 5. t. i. fig. 3. ♂ (1888) (Caraça, Brazil).

♂ ♀. Sexes similar. A band of yellowish buff patches from costal margin of forewing to anal angle of hindwing, above and below, straight on forewing, curved on hindwing, variable in tint, somewhat paler on hind- than on forewing; spot within subcostal fork of forewing usually vestigial.——Hindwing with a red anal spot, which is larger above than below, and four red basal spots on underside, the last continuous with a red line on abdominal fold; forewing without red spots.

Scent-organ: numerous narrow grey scales on SM^2.

Genitalia: ♂. Apical lobe of harpe rather small, dorso-ventral ridge irregularly and rather heavily dentate, central process dentate; ventral process short.

Early stages not known.

Hab. Paragnay and adjacent districts of Argentina; Caraça, Brazil.

In the Tring Museum 5 ♂♂, 2 ♀♀, from: Patino Cué, Paraguay, February (Montforts); Sapucay, Paraguay, September and December (W. Foster); Entre Rios.

124. **Papilio protodamas** Godt. (1819).

Papilio protodamas Godart, *Enc. Méth.* ix. p. 40. n. 45 (1819) (Brazil; "♂" exel.).
Ithobalus hyperion Hübner, *Samml. Exot. Schm.* ii. t. 114 (1822?); Burm., *Descr. Rép. Argent.* v. Lép., *Atlas* p. 6. t. 2. fig. 5 (1879) (larva and pupa).

Godart described as *P. protodamas* a specimen of the present insect, adding the description of another insect which he believed to be probably the ♂ of the former. The first-described insect was, in our opinion, also a ♂, but that point is of no great importance. The name *protodamas* must be applied to the first insect, not to the second, of which Godart says: "Nous avons actuellement à parler d'un individu qui pourrait bien être le mâle de celui-ci."

Hübner, *l.c.*, figures on t. 114 the first insect, to which he gives the new name *hyperion*, and on t. 115 the second insect, to which he applies Godart's name *protodamas*. From the fact that Hübner figures these two insects in the same order as they are described by Godart, and that to one of them the name *protodamas* is given, we conclude (1) that Hübner knew of Godart's descriptions when he put the names on his plates 114 and 115, (2) that Hübner's plates 114 and 115 appeared *after* 1819, the year of issue of Godart's work *), and (3) that *hyperion* sinks as a synonym of *protodamas*, both names being proposed for the same insect. In any case, we give precedence to Godart's names, of which the year of publication is known, since there is no means of proving that Hübner's names have priority.

♂ ♀. Dichromatic in both sexes, the one form possessing on the forewing a large straw-coloured patch in the cell and two large patches on the disc, while the other form has only a vestigial cell-patch and small discal patches; intergradations between the two forms are rare. Scales of discal spots of hindwing either entire or more or less denticulate. Forewing without red spots at base on underside, and hindwing with three red spots.

Scent-organ absent.

Genitalia: ♂. Dorso-ventral dentate ridge of harpe slightly curved towards

* Godart's name *crander* for the Brazilian form of *P. anchisiades* appears on Hübner's pl. 112, which confirms the above statement.

base ventrally ; rounded apical lobe rather small, bearing only very few teeth on its under surface; apex of central process obliquely truncate, its ventral apical angle acuminate.

Early stages figured by Burmeister, *l.c.*

a'. P. protodamas f. *protodamas* Godt. (1819).

Papilio protodamas Godart, *l.c.* (1819) (Brazil ; "♂" excl.).
Ithobalus hyperion Hübner, *l.c.* (after 1819) ; Kirby, *ibid.* ed. ii. p. 92. t. 327. fig. I. 2 (190— ?).
Papilion hyperion, Boisduval, *Spec. Gén. Lép.* i. p. 319. n. 159 (1836) (Brazil) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14. (1845) (S. Amer.) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 236 (1846) (Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 310 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 79. n. 327 (1856) (Rio de Jan.) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 150 (1864) (Brazil) ; Kirby, *Cat. Diurn. Lep.* p. 521. n. 26 (1871) (Brazil) ; Staud., *Exot. Tagf.* i. p. 12 (1884) (Brazil) ; Haase, *Untersuch. Mimicry* i. p. 87, and ii. p. 69 (1893) ; Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 28 (1895) (Rio de Janeiro ; S. Theresa and Nictheroy) ; Mabilde, *Guia Pract. Borbol. R. Grande do Sul* p. 44 (1896).
Papilio zonaras, Perty, *Del. Anim. Artic.* p. 152. t. 29. fig. 3. 3b (1830-34) (Amazon, false ?).
Papilio zonaros (!) Kirby, *l.c.* (1871) (sub syn.).

♂. Forewing with two rows of spots, the upper ones merged together into streaks ; an ill-defined patch in cell, more or less vestigial.

♀. Streaks of forewing less distinct than in ♂, cell-patch absent from upperside (always ?).

Known from Rio Grande do Sul northward to Minas Geraës.

b'. P. protodamas f. *choridamas* Boisd. (1836).

Papilio choridamas Boisduval, *Spec. Gén. Lép.* i. p. 318. n. 158 (1836) (Rio de Janeiro) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) ("West Indies, Demerara," error loci) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 237 (1846) (Brazil ; "Guiana" error loci) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 68. n. 309 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 79. n. 326 (1856) ("Demerara, West Indies," error loci) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 152 (1864) (Brazil ; "Demerara, Ind. occid.," error loci) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 51 (1871) (Amer. mer.) ; Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 8 (1874) (Copa Cabana, Sept. ; Botafogo, Sept.) ; Burm., *Descr. Rép. Argent.* v. Lép. p. 7. sub n. 14 (1879) (var. of *hyperion*) ; Oberth., *Et. d'Ent.* p. 97. n. 297 (1880) (Brazil) ; Staud., *Exot. Tagf.* i. p. 12 (1884) (N. Brazil ; Surinam) ; Haase, *Untersuch. Mimicry* i. p. 87, and ii. p. 69 (1893) ; Bönningh., *l.c.* p. 28 (1895) (Corcovado).

♂♀. Forewing with a large patch in cell and two on disc ; submarginal dots variable in size and number, occasionally absent ; the streaks found in apical third of wing of the preceding form usually absent from *choridamas* or only vestigial.

This form is known to us from the provinces of Rio de Janeiro and Minas Geraës.

Hab. of *P. protodamas :* Minas Geraës southward to Rio Grande do Sul.

In the Tring Museum 11 ♂♂, 1 ♀, of f. *protodamas*, from : Minas Geraës ; S. Catharina ; Castro, Parana (C. D. Jones) ; Blumenau.——8 ♂♂, 2 ♀♀, of f. *choridamas* from : Minas Geraës ; Copa Cabana, September ; Alto de Theresopolis ; Rio de Janeiro (E. May).

125. **Papilio phaon** Boisd. (1836).

Papilio phaon Boisduval, *Spec. Gén. Lép.* i. p. 319. n. 160 (1836) (Mexico ; Peru ;—coll. Oberthür)

♂♀. Sexes similar. Spots of breast and abdomen red, posterior segments of abdomen with red lateral patches ; spot on palpus creamy. Pattern of wings very variable ; markings of *upperside* of forewing usually straw-colour or creamy, the

discal ones of hindwing grey-blue, occasionally replaced by a red band.——*Underside* brownish black ; no distinct black cell-streaks ; forewing without red basal spot ; hindwing with three red spots at base, but the one in cell often vestigial.

Scent-organ : numerous small greyish scales on SM^2.

Genitalia : ♂. Apical lobe of harpe irregularly rounded ; dorso-ventral ridge somewhat curved, dentate ventrally, the lower ventral angle of this ridge not produced basad.

Early stages not known.

Two principal forms, each variable :

a'. P. phaon f. loc. *xenarchus* Hew. (1861).

Papilio xenarchus Hewitson, *Exot. Butt.* ii. *Pap.* t. 5. fig. 12. ♀ (1861) (Mexico) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 147 (1864) (Mexico) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 46 (1871) ; Staud., *Exot. Tagf.* i. p. 12 (1884) (Mexico) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 210. n. 33 (1890) (Jalapa) ; Haase, *Untersuch. Mimicry* i. p. 87 (1893).

Papilio eridamas Reakirt, *Proc. Ac. Nat. Sc. Philad.* xviii. p. 248. n. 25 (1866) (Mexico) ; Kirby, *l.c.* p. 524. n. 47 (1871) ; Godm. & Salv., *l.c.* p. 210. n. 34. t. 67. fig. 10. ♂ (1890) (Mexico ; Atoyac, Cordova, Omealca).

♂ ♀. A red band on hindwing, the patches composing the band either large and contiguous (*xenarchus*) or smaller and separate (*eridamas*).

There is a broad-banded male in coll. Godman and another in coll. Charles Oberthür, and two females in coll. Hewitson (Brit. Mus.). Narrow banded specimens appear to occur more often. In a male in coll. Hewitson the red spots are proximally more or less extended grey-blue ; a similar transition to the next form is in coll. Staudinger.

The red-banded form is known only from Eastern Mexico, where it occurs together with the next, being much the rarer of the two.

b'. P. phaon f. *phaon* Boisd. (1836).

Papilio phaon Boisduval, *l.c.* (1836) (Mexico ;—coll. Oberthür) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Honduras ; Oaxaca) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 20. n. 239 (1846) (Mexico ; Honduras) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 311 (1852) (Mexico ; Honduras ; Venezuela) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 80. n. 328 (1856) ; Reak., *Proc. Ent. Soc. Philad.* ii. p. 141. n. 14. (1863) (Honduras) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 148 (1864) ; Boisd., *Consid. Lép. Guatem.* p. 6 (1870) (Mexico ; Honduras ; Costa Rica) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 48 (1871) (Mexico ; Honduras) ; Oberth., *Et. d'Ent.* iv. p. 97. n. 298 (1880) (Mexico) ; Godm. & Salv , *Trans. Ent. Soc. Lond.* p. 126. n. 241 (1880) (Sta. Marta) ; iid., *Biol. Centr. Amer., Rhop.* ii. p. 211. n. 35. t. 67. fig. 9. genit. (1890) (Mexico ; Brit. Honduras ; Guatemala ; Honduras) : Staud., *Exot. Tagf.* i. p. 12. t. 8 (1884) (Mexico ; Guatemala ; Honduras ; Venezuela) ; Haase, *Untersuch. Mimicry* ii. p. 69 (1893).

Papilio ulopos Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 69. n. 312 (1852) (Mexico ;—Mus. Brit.) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 80. n. 329 (1856) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 151 (1864) (Mexico) ; Kirby, *l.c.* p. 524. n. 50 (1871) (Mexico) ; Oberth., *Et. d'Ent.* iv. p. 117. n. 298^{bis} (1880) (Polochic Valley ; = *immarginatus*) ; Staud., *Exot. Tagf.* i. p. 12 (1884) (Mexico) ; Godm. & Salv., *l.c.* p. 212. n. 38 (1890) (Mexico ; Brit. Honduras ; Guatemala ; Honduras).

Papilio ulopas (!), Weidemeyer, *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (Mexico).

Papilio therodamas Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 149 (1864) (Bogota ; *nom. nud.*) ; id., *Reise Novara, Lep.* p. 45. n. 34. t. 10. fig. c. ♂ (1865) (Bogota ;—Mus. Tring) ; Kirby, *l.c.* p. 524. n. 49 (1871) (N. Granada) ; Haase, *l.c.* i. p. 87 (1893).

Papilio metaphaon Butler, *Trans. Ent. Soc. Lond.* p. 434. n. 3 (1874) (Mexico ; coll. Kaden, now in coll. Godman) ; Kirby, *Cat. Diurn. Lep.* p. 813. n. 376 (1877) ; Godm. & Salv., *Biol. Centr.*

Amer., Rhop. ii. p. 212. n. 37 (1890) (Mexico? ; Colombia) ; iid., *l.c.* p. 729. t. 111. p. 13. 14. ♂ (1901) (*type*).

Papilio phaon var. *immarginatus* Oberthür, *Et. d'Ent.* iv. p. 97. sub n. 298 (1880) (Mexico ;—coll. Oberthür).

Papilio pharax Godman & Salv., *l.c.* p. 211. n. 36. t. 67. fig. 8. ♂ (1890) (Brit. Honduras ;—coll. Godman) ; id., *l.c.* p. 729 (1901) (Mexico ; Coatepec).

♂ ♀. Markings (band or large patch) on disc of hindwing greenish or bluish grey.

Very variable, but not separable into more or less sharply defined forms. If specimens agreeing with the types of *ulopos*, *therodamas*, *metaphaon*, *phaon*, and *pharax* were treated under separate names as f. *ulopos*, f. *therodamas*, etc., a host of other names would have to be proposed for the numerous individual varieties which are not covered by those names. However, we do not think it necessary to deal with the present assemblage of individuals under more than one name.

The forewing bears usually a row of creamy or straw-colonred submarginal spots, the last ones being the largest ; sometimes there are, proximally of this row, some large discal patches, while in other individuals the forewing is practically devoid of markings. The hindwing has occasionally some small red dots distally of the discal band in specimens from Mexico and Honduras, such individuals occurring presumably in all the countries from Nicaragua to Mexico ; the discal band has either developed to a large central patch which enters the cell to a more or less great extent, or it is more band-like, standing distally of the cell. The name *pharax* is based on an individual from British Honduras in which the hindwing has the band situated outside the cell and bears a red anal spot; *ulopos* (= *immarginatus*) was proposed for specimens which have only small or vestigial spots on the forewing, the band of the hindwing entering the cell ; Felder's individuals which he called *therodamas* have the spots on the forewing well marked, and the band of the hindwing placed distally of cell ; in the type of *phaon* there are submarginal spots on the forewing, but no discal patches, and the band of the hindwing just enters the cell ; in the type of *metaphaon* the central area of the hindwing is large, occupying a good part of the cell.

In a male in coll. Hewitson the spots on the breast and abdomen are buffish pink, not carmine red.

Hab. of *P. phaon* : Mexico to West Ecuador and Venezuela.

In the Tring Museum 42 ♂♂ of f. *phaon* from : Orizaba (Bilimek) ; Polochic, Guatemala; San Pedro Sula, Honduras ; Rio Dagua, W. Colombia (Rosenberg) ; Bogota ; Tachira and Mocotoné, Venezuela (Briceño) ; Paramba, W. Ecuador.

126. Papilio euryleon Hew. (1855).

Papilio euryleon Hewitson, *Exot. Butt.* i. *Pap.* t. 2. fig. 6. ♂ (1855) (New Granada—Mus. Brit.) ; Felder, *Reise Novara, Lep.* p. 44. n. 33. t. 6. fig. 4. ♀ (1865) (Bogota).

♂. Spots of breast and abdomen red ; posterior segments of abdomen with red side-patches.——Forewing, *above*, with buffish grey area on disc behind cell, variable in extent and position, either reaching to hinder margin or being separate from it; sometimes a patch in cell ; occasionally a row of submarginal spots.—— Hindwing : a discal band of red spots, more or less continuous, either restricted to centre of wing or continued to abdominal margin, entering cell or separate from it, the band often reduced to two spots, occasionally pinkish grey ; a row of admarginal spots, upper one large, the others usually minute or vestigial, all grey or the

posterior ones reddish, these spots absent from one of our specimens of *P. curyleon clusoculis*.

Underside paler than upper ; no distinct black cell-folds.——Forewing without red basal spots ; either entirely greenish brown, with basal and posterior areas deeper in tint, or marked with one or two grey discal patches.——Hindwing : three red basal spots, but the one in cell usually absent or vestigial, the costal one being also often very small ; discal band of spots much more restricted than above and pale pink in colour, sometimes vestigial or absent ; a row of red submarginal spots, often vestigial ; a row of grey admarginal dots as above.

♀. Forewing : a patch across cell and two patches R^2—M^1 on disc white.—— Band of hindwing much broader than in male, not broken up into spots or incised distally on the veins, all red, or pinkish buff washed with red distally.——In *P. c. clusoculis* the female similar to male.

Scent-organ : basal third of vein SM^2 either densely covered with numerous greyish scales, which are smaller than the metallic scales situated before and behind this vein, or the scales on SM^2 also metallic and not reduced in size. The absence of the scent-organ in the subspecies inhabiting Eastern Ecuador is a very remarkable character. The length of the portion of SM^2 covered with scent-scales in the other subspecies is not constant.

Genitalia : ♂. Not essentially different from those of *P. harmodius* and *P. phaon* ; apical lobe of harpe large, asymmetrically rounded ; dorso-ventral ridge dentate only ventrally ; central process at apex irregularly rounded and denticulate ; ventral process individually variable in width and length, sometimes triangular, obtuse.

Early stages not known.

Hab. Costa Rica, southwards to Ecuador.

Five subspecies.

a. P. curyleon clusoculis Butl. (1872).

Papilio clusoculis Butler, *Cist. Ent.* i. p. 85 (1872) (Costa Rica) ; id., *Lep. Exot.* p. 163. t. 58. fig. 2. ♂ (1874) ; Kirby, *Cat. Lep. Rhop.* p. 812. n. 354 (1877) ; Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 364. n. 368 (1874) (Costa Rica) ; Staud., *Exot. Tagf.* i. p. 19 (1884) (Chiriqui) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 209. n. 32 (1890) (Costa Rica ; Panama).

♂. *Upperside :* patches of forewing purer grey than in the other subspecies ; discal patches extending in extreme specimens from SM^2 forward beyond R^3, while in the other extremes only one patch M^1—M^2 and a small streak before M^1 are present ; cell with or without patch.——Hindwing : red band broad, always entering cell, last two spots sometimes vestigial only ; spot SC^2—R^1 very variable, sometimes large, but usually small or absent ; rarely a dot before SC^2 ; in one of our specimens a row of red submarginal spots confluent with the discal patches, no grey spots in this specimen.

Underside : forewing with two or three grey patches.

♀. Similar to male ; on forewing a creamy patch R^3—M^1, and a smaller one M^1—M^2, no spot in cell ; red patch of hindwing a little larger than in male.

Scent-organ present.

Hab. Costa Rica ; Chiriqui.

In the Tring Museum 15 ♂♂ from : Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall) ; Carillo, June—July 1903, and San José, Costa Rica (Underwood).

A female in coll. H. Grose-Smith.

b. P. euryleon pithonius subsp. nov. (Pl. VIII. fig. 55. 58).

Papilio euryleon, Maassen & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 36. n. 34 (1890) (La Plata, Cauca, 1000 m.).

♂. *Upperside :* patch of forewing very much reduced (*type*), or as large as in the following subspecies.——Hindwing with three to five red spots which stand usually well away from cell, seldom touching it, rarely a dot in apex of cell.

Underside : red submarginal spots of hindwing minute or absent.

♀. Forewing : cell-patch anteriorly broader than in ♀ *P. e. euryleon.*—— Hindwing : discal band narrower ; red submarginal spots of *underside* smaller.

Scent-organ present.

Hab. Cauca valley, and Rio Dagua, West Colombia.

In the Tring Museum 14 ♂♂, 4 ♀♀, from : Cauca Valley ; Rio Dagua (Rosenberg).

c. P. euryleon euryleon Hew. (1855) (Pl. V. fig. 23).

Papilio euryleon Hewitson, *l.c.* (New Granada) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 70. n. 283 (1856) ; Felder, *Wien. Ent. Mon.* v. p. 73. n. 4 (1860) (♀ descr.) ; id., *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 146 (1864) (Bogota) ; id., *Reise Novara, Lep.* p. 44. n. 33. t. 6. fig. 4. ♀ (1865) (Bogota) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 44 (1871) (New Granada) ; Oberth., *Et. d'Ent.* iv. p. 82. n. 269 (1880) (Carare, and from Bogota to Buenaventura, Colombia) ; Stand., *Exot. Tagf.* i. p. 19 (1884) (Colombia).

♂. Patch of forewing variable in extent, twice the size in some specimens as in others, mostly reaching from M^1 to inner margin, but the streak behind SM^2 often missing, there being on the other hand often a streak in front of M^1.—— The band of the hindwing consists usually of four spots standing closely around apex of cell, and two more or less distinct spots before abdominal margin, there being also a spot or some red scales in the apex of the cell in about half the specimens.

On the *underside* the forewing bears occasionally a vestigial patch M^1—M^2. The discal spots of the hindwing are pale pink, spots R^3—M^2 are always present, spot R^2—R^3 is often vestigial, spot M^2—SM^1 standing proximally of red anal submarginal spot either present or absent ; anal spot with or without white proximal border.

♀. Cell-patch of forewing more or less narrowed anteriorly ; band of hindwing entering cell, red or pinkish buff.

Scent-organ present, but variable in extent.

Hab. Colombia : Magdalena valley and Cordillera of Bogota.

The male common in Bogota collections.

In the Tring Museum 84 ♂♂, 3 ♀♀, from : " Bogota " ; El Lumbo, Cundinamarca, July 1903 (Mathan) ; Muzo, November and December 1896.

d. P. euryleon haenschi subsp. nov. (Plate VIII. fig. 54).

♂. *Upperside.*—Forewing : patches purer grey than in *P. e. euryleon*, different in shape and position, extending from M^1 to SM^2, there being often a few white scales before M^1 and sometimes a streak behind SM^2, the patch M^1—M^2 projecting beyond the second patch.——Hindwing : a small spot in apex of cell, seldom absent, and three to five spots around apex of cell, the last one being vestigial ; a trace of a sixth spot at abdominal margin.

Underside.—Forewing : a large white patch M^1—M^2, both the upper and under scales of the patch being white, or a portion of the upper scales brown, a greyish

patch M^2—SM^2 corresponding to the patch of upperside ; on this greyish patch the under scales are white, the upper layer being brown.——Hindwing : three pinkish discal spots, the first and second touching cell ; often a trace of a fourth spot behind M^2.

♀. *Upperside.*—Forewing : cell-patch not reaching across cell, being abbreviated anteriorly ; patch R^3—M^1 followed by a smaller patch shaded with black, and in one (of the three specimens seen) preceded by a small whitish spot. ——Hindwing : a red band from R^1 to abdominal margin, entering cell, proximally whitish behind cell, more or less shaded with black towards abdominal margin, pink on underside.

Scent-organ present.

Hab. Western Ecuador.

In the Tring Museum 4 ♂♂ from : Balsapamba (R. Haensch), type ; Paramba (W. Rosenberg).

4 ♂♂ and 3 ♀♀ in coll. Charles Oberthür from Balsapamba.

3 ♂♂ in the British Museum from the valley of Chimborazo and Porvenir.

e. P. euryleon anatmus subsp. nov. (Pl. VIII. fig. 53).

Papilio euryleon, Dognin, *Lép. Loja* p. 14 (1887) ; id., *l.c.* p. 37 (1891) ; Haensch, *Berl. Ent. Zeitschr.* xlviii. p. 153 (1903) (Sa. Inez, R. Pastaza, 1250 m.).

♂. *Upperside.*—Forewing : grey patch more speckled with black scales than in *P. e. euryleon*, on the whole larger, extending from inner margin beyond M^2, touching cell, there being often a streak in cell proximally of origin of M^2, streak in front of M^2 elongate-triangular, narrowing towards cell ; some specimens with submarginal spots.——Hindwing : three red spots R^2—M^1 on disc, well separated from cell, occasionally pinkish grey, the second the longest, first occasionally absent, sometimes the second alone distinct.

Underside : forewing without a trace of white patches.——Hindwing : discal spots R^2—M^2 usually grey, rarely pinkish, usually a little nearer cell than distal margin, often vestigial ; red submarginal spots R^3—SM^1 distinct, last one (anal) without white border, or the border very thin.

♀ not known.

Scent-organ **absent.**

Hab. East Ecuador.

In the Tring Museum 85 ♂♂ from : Archidona (W. Goodfellow) ; Zamora (O. T. Baron), name-type ; Loja.

127. **Papilio hipparchus** Staud. (1884).

Papilio hipparchus Staudinger, *Exot. Tagf.* i. p. 20. t. 13. ♂ (1884) (Cauca valley).

Not known to us. The hindwing is figured as having only one red spot at the base, but that may be an error of the colourist, the colouring of the figure not being quite correct according to Staudinger, *l.c.*

♂. Forewing black, with a row of grey submarginal spots.——Hindwing with pale pink distal band from R^1 to abdominal margin, the band absent (or vestigial ?) on underside, except the last spot, submarginal and admarginal spots as in *P. euryleon.*

♀ not known.

Hab. Cauca valley, Colombia.

128. **Papilio harmodius** Doubl. (1846) (Pl. V. fig. 16. 19 ; Pl. VIII. fig. 52).

Papilio harmodius Doubleday, *Ann. Mag. N.H.* xviii. p. 374 (1846) (Bolivia) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 59. n. 272. t. 7. fig. 2 (1852) (Bolivia).

Sexes different ; female dimorphic, one form somewhat resembling the male, the other form quite different. Geographically variable.

♂. Dots on head, palpus, collar and coxae buffish. Forewing semitransparent in apical half, the scales being reduced in size ; a white patch of variable size before inner margin, sometimes reduced to a narrow streak situated behind SM^2, never reaching forward as far as R^3, but occasionally extending across M^1 ; rarely a vestige of a band across cell.——Hindwing : a row of red spots on disc, variable in size and number ; a row of white arched submarginal spots, which are vestigial or absent in most specimens.

Underside much paler than upper, cell of both wings with black folds.—— Forewing with a red costal spot.——Hindwing with three red spots at base, the one in cell being small and often vestigial or even absent ; discal spots more or less pinkish white proximally.

♀$_1$. Forewing with white band across cell continuous with two large discal patches R^2—M^1 ; spots of hindwing white or yellowish, or red centred with white.

♀$_2$. Forewing with trace of the white markings of female ; spots of hindwing red.

Scent-organ : numerous greyish scales on SM^2 of hindwing, these scales much smaller than the scales situated before and behind this vein.

Genitalia : ♂. Distal lobe of harpe large, rounded, proximal angle of ventral dentate edge not produced.—— ♀ not dissected.

Early stages not known.

Hab. Colombia to Bolivia.

The coloration of the first kind of female agrees with that of the females of *P. erlaces*, the Ecuador females of both insects being white-banded on the hindwing, the females from Northern Peru yellowish-banded, and the females from Southern Peru and Bolivia red-banded.

a. P. harmodius isus Oberth. (1880).

Papilio xeniades var. *isus* Oberthür, *Et. d'Ent.* iv. p. 81. sub n. 268 (1880) (Colombia).
Papilio aristogiton Staudinger, *Exot. Tagf.* i. p. 19. t. 13 (1884) (Cauca).

♂. Forewing : white patch large, reaching from hinder margin to M^2 or beyond, being large also on the *underside*.——Hindwing : a band of six or seven red spots which are paler in the centre than at the edges, being occasionally pinkish white edged with red; white submarginal bars usually absent.

♀ not known.

Hab. Cauca valley, Colombia.

5 ♂♂ in coll. Oberthür, and 1 ♂ in coll. Godman.

b. P. harmodius halex subsp. nov. (Pl. VIII. fig. 52).

Papilio xeniades, Maassen & Weym. (*non* Hewitson, 1868, err. det.), in Stübel, *Reisen S. Amer.*, *Lep.* p. 24. n. 103 (1890) (Villavicencio).

♂. Forewing as in the preceding.——Hindwing above with five red spots which are not paler in centre, the upper two spots vestigial or minute.

♀. *Upperside.*—Forewing with white patch from R^3 beyond M^2, just entering cell.——Hindwing with five pinkish red spots ; tooth R^3 prominent.

Hab. "Bogota," Colombia.
In the Tring Museum 5 ♂♂ from "Bogota."
A female in coll. Adams from "Colombia."

c. P. harmodius xeniades Hew. (1868).

Papilio xeniades Hewitson, *Trans. Ent. Soc. Lond.* (3). v. p 561. n. 1 (1868) (Ecuador ; ♂ & "♀" ; this "♀" is ♂) ; id., *Exot. Butt.* iv. *Pap.* t. 9. fig. 26 (1868) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 45 (1871) (Ecuador) ; Oberth., *Et. d'Ent.* iv. p. 81. n. 268 (1880) (Ecuador) ; Kirby, *Trans. Ent. Soc. Lond.* p. 353 (1881) (Rio Topo, Ecuador ; "hardly distinct from *gayi* Luc.") ; Staud., *Exot. Tagf.* i. p. 20 (1884).

Papilio harmodius, Kirby, *l.c.* p. 524. n. 44 (1871) (*partim* ; Ecuador) ; Hopff., *Stett. Ent. Zeit.* xl. p. 52. n. 16 (1879) (*partim* ; Ecuador) ; Staud., *Exot. Tagf.* i. p. 19 (1884) (*partim* ; Ecuador) ; Dogn., *Lép. Loja* p. 15 (1887) ; id., *l.c.* p. 37 (1891).

♂. White patch of forewing very variable in size, often reduced to a streak situated at inner margin, in other specimens the patch being extended beyond M^2, in most individuals excised in front or obliquely truncate, its distal edge extending beyond M^2, while proximally the patch does not reach M^2 ; on *underside* the patch always small.——Hindwing : three to five red spots, variable in size, occasionally centred with pinkish white, being on underside pinkish white edged with red distally ; white submarginal bars more often absent than present ; white marginal spots very variable in size ; tooth R^3 in some specimens more prominent than in others.

♀. Dichromatic :

a^1. ♀-f. *androna* nov. (Pl. V. fig. 19).——Forewing with some grey scales on disc between lower angle of cell and M^2 and in cell.——Hindwing : a row of five red spots, spot R^3—M^1 the longest, almost three times as long as broad, uppermost spot small ; the spots pink-white on underside, slightly edged with red distally.——One specimen in the Tring Museum from Zamora (O. T. Baron).

a^2. ♀-f. *virginia* Kirby (1881).

Papilio virginia Kirby, *Trans. Ent. Soc. Lond.* p. 352 (1881) (Rio Copataza, affluent of Rio Pastaza ; "allied to *P. lacydes*"!) ; Grose-Smith & Kirby, *Rhop. Exot.* ii. *Pap.* t. 16. fig. 3. 4 (1897) (fig. of type).——Resembling the female of *P. lacydes*. In coll. Oberthür from Ambato ; in coll. Grose-Smith from the Rio Capataza ; in Mus. Tring from the neighbourhood of Zamora.

Forewing : a large patch across apex of cell, two large patches R^2—M^1 and a streak behind M^1 white.——Hindwing : a complete band of white patches, some of them slightly edged with red both above and below.

Hab. of *P. harm. xeniades :* West coast of Colombia (Rio Dagua), and Ecuador ; apparently common in Eastern Ecuador.

The females from West Ecuador and West Colombia may possibly be different from the East Ecuadorian females. The long series of males in coll. Oberthür from Honda, Pacific slope of Colombia, agree on the whole with the specimens from Eastern Ecuador, but the range of variation is somewhat different. One of the Honda individuals has a vestigial band across the cell.

In the Tring Museum 120 ♂♂, 3 ♀♀, from : Zamora (O. T. Baron) ; Ambato ; Santa Inez (R. Haensch) ; Archidona (W. Goodfellow).

d. P. harmodius imaus subsp. nov. (Pl. V. fig. 16).

Papilio harmodius, Hopffer, *Stett. Ent. Zeit.* xl. p. 52. n. 16 (1879) (*partim* ; Peru) ; Staud., *Exot. Tagf.* i. p. 19 (1884) (*partim* ; Peru).

Papilio xeniades var. *harmodius*, Oberthür, *Et. d'Ent.* iv. p. 81. sub n. 268 (1880) (Peru).

♂. Like the following ; white patch of *underside* of forewing often reduced, in most specimens a white streak behind SM^2.

♀. Forewing similar to that of *xeniades* ♀-f. *virginia*, but the cell-patch costally more or less reduced, and the upper discal patch smaller than in ♀-f. *virginia*.——Band of hindwing yellowish buff on upperside, almost white on underside, spots R^2—M^2 long, spot R^3—M^1 being nearly four times as long as broad, extending close to cell, last (double) spot and one or two of the others somewhat edged with red both on upper and under surface.

Hab. North-East and East Central Peru; *type*: ♀ from Cushi.

In the Tring Museum 27 ♂♂, 3 ♀♀, from: Pozuzo (W. Hoffmanns); Cushi, Huánuco, 1800 m. (W. Hoffmanns); R. Chuchuras, affl. of R. Palcazu, 320 m. (Hoffmanns); Huayabamba R., S.E. of Chachapoyas, 3500 ft. (O. T. Baron).

c. P. harmodius harmodius Doubl. (1846).

Papilio harmodius Doubleday, *l.c.* (1846) (Bolivia); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 223 (1846) (Bolivia); Doubl., *List Lep. Ins. Brit. Mus.* i. *Appx.* p. 3 (1848) (Bolivia); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 59. n. 272. t. 7. fig. 2. ♂ (1852) (Bolivia); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 71. n. 288 (1856) (Bolivia); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 145 (1864) (Bolivia; "Ecuador" loci error, teste specim. in coll. Felder); Kirby, *Cat. Diurn. Lep.* p. 524. n. 43 (1871) (*partim*; Bolivia); Hopff., *Stett. Ent. Zeit.* xl. p. 52. n. 16 (1879) (*partim*; Bolivia); Staud., *Exot. Tagf.* i. p. 19 (1884) (*partim*; Bolivia); Haase, *Untersuch. Mimicry* i. p. 86 (1893); Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

♂. Forewing always with a large patch M^1—SM^2, consisting of two large spots, both above and below, there being in most specimens a small white streak behind SM^2, and occasionally another streak in front of M^1; the white spots often larger on underside than on upper.——Hindwing with five red spots, the second being the smallest, the third and fourth occasionally pale in centre, all the spots more or less extended pinkish white on the underside of the wing; often a series of white submarginal bars present, the bars being usually more distinct above than below.

♀. Forewing: white cell-patch not reaching across cell; white discal area consisting of three patches R^2—M^2, the upper patch small, the third as long as the middle one.——Spots of hindwing larger than in male, red, spots R^2—M^1 being whitish in centre; marginal tooth R^3 obtuse, not longer than tooth R^2.

Hab. Bolivia and South-East Peru; the only female seen being in coll. Charles Oberthür, from Cochabamba.

A common insect.

In the Tring Museum 66 ♂♂ from various places, from Chanchamayo to the Mapiri River.

129. **Papilio trapeza** spec. nov. (Pl. V. fig. 15).

♂. Body as in *P. harmodius xeniades*, but the hairs of the frons shorter.

Wings, *upperside*.—Forewing proportionally narrower than in *P. harmodius*, the hinder margin being shorter; a creamy, faintly greenish, patch, from hinder margin towards M^2, which it does not reach, the second partition of this patch broader and longer than in *P. harmodius xeniades*, reaching proximally to vein SM^3.——Hindwing more triangular than in *P. harmodius*, more acutely dentate, vein R^2 somewhat shorter than cell, while in *P. harmodius* this vein is as long as, or longer than, cell; white fringe-spots thinner; three red spots from R^3 to abdominal margin, the first shaded over with black, the second elliptical, in one of the specimens examined also shaded with black, the third spot much the largest, being the same length as the second, but twice the width.

Underside.—Forewing : patch creamy white, smaller than above, but the streak along hinder margin broader and longer than in any form of *P. harmodius*, the upper patch not reaching beyond the fold (SM^1).——Hindwing with four red spots on disc, there being here an additional spot R^2—R^3, which is not present on the upperside ; first and fourth spots small, second the largest, about twice as long as broad, white proximally or in centre, or white with red distal border ; third spot one-third shorter than second, with trace of white proximally or in centre, or similarly coloured as second spot ; three white curved submarginal bars R^2—M^2, which are not present above.

Scent-organ : vein SM^2 densely covered with greyish brown scales as in *P. harmodius*, but these scales rather broader than in that species.

Genitalia as in *P. harmodius*, the central process of the harpe being a little broader than in most specimens of *P. harmodius* which we have examined.

Hab. East Ecuador.

In the Tring Museum 2 ♂♂ from : Rio Napo (R. Haensch), *type* ; Rio Curarai (Simson).

In coll. F. D. Godman 3 ♂♂ from : Santa Inez and Aguamo. In coll. Oberthür from Sarayaçu (Buckley).

This insect cannot easily be confounded with *P. harmodius xeniades* from the same district, the shape and markings of the hindwing and the different development of the patch of the forewing distinguishing *P. trapeza* at a glance.

In coll. H. Grose-Smith there is a male from "Ecuador" which is doubtless an individual of the present species, though it differs from the specimens described above in several points, the most remarkable difference being the total absence of a patch from the upper and underside of the forewing. The hindwing bears on the upperside three distinct red spots besides the vestige of a fourth, there being on the underside four distinct spots and a vestigial fifth. The white submarginal spots of the hindwing described above are absent. This specimen may be a geographical form or an individual aberration of *P. trapeza*.

130. **Papilio xynias** Hew. (1875).

Papilio xynias Hewitson, *Ent. Mo. Mag.* xii. p. 153 (1875) (Bolivia) ; id., *Exot. Butt.* v. *Pap.* t. 15. fig. 48. ♂ (1877) ; Kirby, *Cat. Diurn. Lep.* p. 814 (1877) (Bolivia) ; Haase, *Untersuch. Mimicry* i. p. 86 (1893) ("N. Granada" error loci) ; id., *l.c.* ii. p. 69. t. 9. fig. 66 (1893).

♂. Allied to *P. harmodius* ; hairs of frons as short as in *P. trapeza*.—— Wings, *upperside* : scaling of forewing non-dentate or feebly dentate ; a pale green patch from M^2 to inner margin, variable in length, apparently never extending beyond M^2, always touching hindmargin, the scales entire, while in *P. harmodius* and *P. trapeza* the scales of the patch are dentate.——Hindwing : acutely dentate, tooth R^3 developed to a more or less distinct tail ; three red spots R^3—SM^2, the last large, often reaching halfway down to base, the first and second elongate, occasionally reduced, rarely absent ; scales of these spots entire or a few of them slightly dentate ; three to five white admarginal bars.

Underside much paler than upper ; cell-fold and red basal spots as in *P. harmodius*.——Forewing : patch of forewing paler and rather smaller than above, but very distinct.——Hindwing : four red spots, the second and third longer than broad, more or less pinkish white proximally, the last one double, about half the

length of the third, which is longer than the second; white submarginal bars rather larger than above ; cell a little longer than vein R^2.

♀ not known.

Scent-organ : no modified scales on SM^2 of hindwing, the scales upon this vein being the same size and colour as those in front of and behind the vein, *P. xynias* differing in this respect remarkably from all its allies.

Early stages not known.

Hab. Bolivia and Peru, eastern slopes.

In the Tring Museum 15 ♂♂ from : Pozuzo, Huánuco, 800—1000 m. (W. Hoffmanns) ; Chanchamayo (Schunke) ; La Union, R. Huacamayo, Carabaya, 2000 ft., December 1904, wet season (G. Ockenden) ; Mapiri, Bolivia.

In coll. Oberthür from Hillapani, Tarapoto and Chanchamayo.

131. **Papilio ariarathes** Esper (1788) (Pl. V. fig. 17, VIII. fig. 57).

Papilio Eques Trojanus ariarathes Esper, *Ausl. Schmett.* p. 57. n. 24. t. 14. fig. 2. ♀ (1788) (S. Amer.; "var." fig. 3 alia species).

Papilio ariarathes, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 336 (1861) (variability) ; id., *Journ. Entom.* i. p. 224. n. 8 (1862) (geogr. variability ; *cyamon*, *gayi*, *evagoras* are local vars.) ; Kirby, *Cat. Diurn. Lep.* p. 523. n. 35 (1871).

♂ ♀. Buffish grey dots on occiput, pronotum, palpus and coxae. Spination of legs rather heavy. Wings, *beneath*, with two red spots at base of forewing, one in cell and the other before it, and three basal spots on hindwing, the second situated in cell being often vestigial or absent.

Very variable in both sexes ; forewing of male with a whitish or buffish band or patch on upperside extending from inner margin forward, being seldom vestigial, ——Hindwing of male with a discal series of red patches in most specimens, sometimes only one or two distinct patches present on upperside, situated near abdominal margin ; cell rather narrower in middle than in the allied species.

In the female the forewing has usually one or more white patches on disc and often a small patch in cell, but is sometimes all black.——A red discal band on hindwing, variable in width, often entering cell.

Scent-organ : basal third of vein SM^2 densely covered with small greyish scales.

Genitalia : ♂. Apical lobe of harpe short ; ventral lobe of dorso-ventral ridge slightly curved upwards in a view from the base of the clasper, obliquely rounded ; central process spatulate, dentate, usually rounded at apex, but sometimes obliquely truncate.

Early stages not known.

Hab. Colombia to Bolivia, and eastwards to the Guianas, Pará, and the Brazilian province of Goyaz.

With the exception of the form from Goyaz, the subspecies do not appear to be sharply defined. In the case of species individually so variable as *P. ariarathes* it requires a large material from many districts to obtain a correct view of the geographical variation. The material of *P. ariarathes* which we have seen in various collections is not quite sufficient for this purpose. Therefore we are not sure that our division of *P. ariarathes* into six subspecies is quite true to nature. The species varies in different localities according to the models mimicked, the females from different districts being generally more obviously different than the males.

a. P. ariarathes ariarathes Esper (1788).

Papilio Eques Trojanus ariarathes Esper, *l.c.* ♀ (1788).

Papilio ilus, Godart (*non* Fabr., 1793, err. det.), *Enc. Méth.* ix. p. 33. n. 21 (1819) (syn. excl. ; ♂, "America") ; Boisd., *Spec. Gén. Lép.* i. p. 280. n. 104 (1836) ("America") ; Oberth., *Et. d'Ent.* iv. p. 81. p. 264 (1880) (*partim* ; Cayenne).

Papilio ariarathes, Boisduval, *Spec. Gén. Lép.* i. p. 287. n. 14 (1836) (Surinam ; ♀) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 18. n. 207 (1846) (Guiana) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 61. n. 275 (1852) (descr. of ♂ ; "N. Granada?" error) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 136 (1864) (*partim*) ; Kirby, *Cat. Diurn. Lep.* p. 523. n. 35 (1871).

Papilio acestes Boisduval, *l.c.* p. 288. sub n. 14 (1836) (nom. maxime superfluum).

♂. Forewing : a rather narrow patch from inner margin to M^2, nearly as large below as above.——Hindwing : four to six red spots, separated from one another, distant from cell.

♀. Forewing with white patches, or these patches vestigial. Five or six red spots on hindwing, spots R^2—M^2 being long, touching cell or nearly.

a'. ♀-f. *ariarathes* Esp., *l.c.*—Forewing with one to three white patches on disc and often a narrow patch posteriorly in cell.

b'. ♀-f. *eumelea* nov.—White markings of forewing vestigial (name-type from Surinam).

Hab. French and Dutch Guiana.

In the Tring Museum 4 ♀♀ from Surinam.

b. P. ariarathes menes subsp. nov. (Plate VIII. fig. 57).

Papilio ariarathes, Erichson, in Schomb., *F. F. Brit. Guiana* p. 593 (1848) (descr. of ♂) ; Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 336 (1861) (*partim*) ; Brit. Guiana).

♂. Forewing, *above*, with band from inner margin to M^1 or M^2, the posterior spot often much reduced, patch M^2—SM^2 sometimes alone distinct, 4 to 6 mm. wide ; this patch always present on underside, where it is a little smaller than above. the spot behind SM^2 and the one before M^2 also present below in the specimens which have them clearly marked on the upperside.——Hindwing rather strongly dentate, tooth R^3 prominent ; three or four red spots on upperside, standing about halfway between cell and distal margin ; five, seldom four, spots on underside, spot R^3—M^1 being pale proximally.

♀. Forewing with a large patch R^3—M^1, a smaller one M^1—M^2, often reduced to a streak, a vestigial spot in cell and occasionally another vestigial one before R^3 (*type*).——Hindwing : five or six red spots, all well separate from cell, spots R^3—M^2 longer than the others.

Hab. British Guiana ; *type* : ♀.

In the Tring Museum 5 ♂♂, 5 ♀♀, from : Christianburg, R. Demerara ; Bartica, 26. February 1904 (R. Haensch) ; Upper Real Berbice R.

c. P. ariarathes evagoras Gray (1852).

Papilio ilus, Doubleday (*non* Fabr., 1793, err. det.), *List Lep. Ins. Brit. Mus.* i. *App.* p. 3 (1848) (*partim* ; Venezuela) ; Oberth., *Et. d'Ent.* iv. p. 81. n. 264 (1880) (*partim* ; Pará).

Papilio evagoras Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 61. n. 276. t. 9. fig. 3. ♂, 4. ♀ (1852) (Venezuela) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 72. n. 292 (1856) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 132 (1864) (*partim* ; Venezuela) ; Oberth., *Et. d'Ent.* iv. p. 81. n. 265 (1880) (Caracas) ; Staud., *Exot. Tagf.* i. p. 13 (1884) (Venezuela) ; Haase, *Untersuch. Mimicry* i. p. 97 (1893) ("New Granada" errore).

Papilio ariarathes local var. *evagoras*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 336 (1861) (*partim* ; Venezuela).

Papilio ariarathes var. *P. evagoras*, Kirby, *Cat. Diurn. Lep.* p. 523. sub n. 35 (1871).

♂. Forewing : a narrow band, extending from inner margin to M^1 or beyond, situate halfway between cell and distal margin at R^3 and M^1 or nearer the cell ; the band represented on *underside* by two or three clearly marked spots.——Hindwing : four or five red spots, spots R^2—M^2 close to cell as a rule, spot R^1—R^2 less distant from cell than in the other forms, especially on *underside*, the band therefore appearing more curved ; spots R^2—M^2 pinkish white beneath with red distal border, sometimes partly buffish white on *upperside*.

♀. Three white or buffish discal patches on forewing and a rather large cell-patch.——Hindwing : six large patches around cell (sometimes buffish) and apical half or two-fifths of cell red ; abdominal margin at least partly red.

Hab. Venezuela, from Caracas to the Orinoco.

In the Tring Museum 5 ♂♂, 1 ♀, from : "Venezuela" (Moritz) ; Porto Cabello ; Caicara, Orinoco, 1898 (Cherrie) ; Ciudad Bolivar, 5. September 1898 (S. M. Klages).

d. P. ariarathes metagenes subsp. nov.

Papilio ariarathes, Wallace, *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Pará) ; Bates, *l.c.* (1861) (*partim* ; Pará) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 136 (1864) (*partim* ; Pará).
Papilio cyamon, Haase (*non* Gray, 1852, err. det.), *Untersuch. Mimicry* i. p. 87. ♂. t. 10. fig. 71. ♀ (1893) (Pará).

♂. Forewing : usually with a band from hinder margin beyond R^3, gradually disappearing, vestigial on underside.——Hindwing : four or five red spots, separate from cell, upper one or two small, spots R^3—M^2 elongate, longer on upper than underside ; tooth R^3 prominent.

♀. Forewing : a white band along hinder side of cell consisting of two large patches R^3—M^2, a smaller patch R^2—R^3, and a fourth (much variable in size) behind M^2, the white scaling sometimes nearly reaching inner margin of wing ; cell with or without white streak.——Hindwing : six red spots, R^2—M^2 touching cell, at least on upperside.

Hab. Pará.

The female resembles the females of some Aristolochia-Swallowtails (*P. anchises thelios*, *P. aglaope*).

Name-type in coll. Oberthür.

e. P. ariarathes gayi Lucas (1852).

Papilio gayi Lucas, *Rev. Zool.* p. 193 (1852) (Cuzco, Peru) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 60. n. 273 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 71 n. 289 (1856) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 134 (1864) (Cuzco ; Ega) ; Hopff., *Stett. Ent. Zeit.* xl. p. 51. n. 11 (1879) (Peru) ; Staud., *Exot. Tagf.* i. p. 13 (1884).
Papilio cyamon Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 60. n. 274. t. 7. fig. 1. ♂, t. 11. fig. 3. ♀ (1852) (Ega, ♂ ; ♀ hab.? ; var. ♂ "Brazil") ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 71. n. 290 (1856) (Ega ; Villa Nova ; Rio Negro) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Upper Amazons ; forest) ; Felder, *l.c.* p. 298. n. 135 (1864) (Ega ; Villa Nova ; Rio Negro) ; Hopff., *l.c.* p. 51. n. 15 (1879) (Brazil, Peru) ; Staud., *l.c.* p. 13 (1884) (distinct species ; Amazons).
Papilio evagoras Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 62. sub n. 277 (1852) (*partim* ; ♂, Burra) ; Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 256 (1854) (Upper Amazons ; forest) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 132 (1864) (*partim* ; Ega ; R. Negro).
Papilio ariarathes local var. *cyamon*, Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 336 (1861) (Upper Amazons).
Papilio ariarathes local var. *gayi*, id., *l.c.* (1861) (Ega).
Papilio ariarathes local var. *evagoras*, id., *l.c.* p. 337 (1861) (Ega).
Papilio aristagoras Felder, *l.c.* p. 298. n. 133 (1864) (Bogota) ; id., *Reise Novara, Lep.* p. 41. n. 30. t. 5. fig. e. ♂ ab., f. ♀ (1865) (Bogota).

Papilio ariarathes var. *P. cyamon*, Kirby, *Cat. Diurn. Lep.* p. 523. sub n. 35 (1871).
Papilio ariarathes var. *P. gayi*, id., *l.c.*
Papilio ariarathes var. *P. aristagoras*, id., *l.c.*
Papilio ilus, Oberthür (*non* Fabr., 1793, err. det.), *Et. d'Ent.* iv. p. 81. n. 264 (1880) (*partim* ; Obydos ; variability of "*ilus*").
Papilio charoba Kirby, *Trans. Ent. Soc. Lond.* p. 352 (1881) (R. Pastazza).
Papilio arianus Staudinger, *Exot. Tagf.* i. p. 12 (1884) (Amazons : R. Maués to R. Huallaga ; Esper's fig. of *ariarathes* erroneously consid. ♂); Michael, *Iris* vii. p. 213 (1894) (Sao Paulo de Olivença).
Papilio ariarathes, Staudinger, *l.c.* t. 8. ♂ (1884).

♂ ♀. There are three principal individual forms, connected by intergradations. Most specimens of the male have no sharply marked white spots on the underside of the forewing or only small spots.

a'. P. a. gayi f. *anargus* nov. ; *P. a.* var. *cyamon* ♀, Bates (*non* Gray, err. det.), *l.c.*—Forewing without white band or patches ; in male a few grey scales indicating the band ; hindwing of female with a vestige of a red dot in apex of cell. ——Middle and Upper Amazons ; name-type : ♀, from Iquitos.

b'. P. a. gayi f. *cyamon* Gray, *l.c.* ; *P. charoba* Kirby, *l.c.*—♂. Similar to male of *P. a. exagoras* ; forewing with a band which is on the whole a little more distal than in *exagoras*.——Hindwing : four or five red spots, middle ones either reaching cell or separate from it.——♀. With narrow vestigial band on forewing ; hindwing with red cell-spot ; sometimes nearly all the spots of the hindwing creamy.

Middle and Upper Amazons ; Ecuador ; Peru ; Bolivia.

c'. P. a. gayi f. *gayi* Lucas *l.c.* ; *P. aristagoras* Feld., *l.c.* ; *P. arianus* Staud., *l.c.* ; *P. cyamon* Gray, *l.c.*, ♀ *non* ♂.—♂. Forewing : a large buffish patch before inner margin ; seldom white, varying much in size, sometimes not reaching M^2, in other specimens externally produced forwards, this projection corresponding to the band of the next form (♂-f. *cyamon*).——Hindwing : two to five red spots (occasionally creamy), sometimes only the last spot distinct, spots variable in size, sometimes approaching cell.——♀. Forewing : one or two large white patches on disc, usually a small third spot and often a cell-spot.——Hindwing mostly with cell-spot.——Middle and Upper Amazons ; Colombia ; Peru ; Bolivia.

Hab. of *P. a. gayi* : Middle Amazons to Colombia and southward to Bolivia.

In the Tring Museum 48 ♂♂, 5 ♀♀, from : Bogota ; Archidona and Coca, E. Ecuador (W. Goodfellow) ; Aguamo, R. Napo (R. Haensch) ; Manáos ; Juhuty, April 1905 (Mathan) ; Yurimaguas ; Thomar ; Iquitos ; Sao Paulo de Olivença ; R. Cachyaco, affl. of R. Huallaga (Stuart) ; Chanchamayo (Schunke) ; La Merced (Watkins) ; Reyes, August 1895 (Stuart) ; Prov. Sara, S. Cruz de la Sierra, February 1904 (J. Steinbach).

f. P. ariarathes leuctra subsp. nov. (Pl. V. fig. 17).

♂. Forewing : a pure white patch from inner margin beyond M^1, of almost even width, 6 mm. broad behind M^1, hardly narrower below than above, the spot behind SM^2 sometimes absent.——Hindwing : a band of six long red spots, the last double, spots R^2—M^2 touching cell, some grey and red scales between C and SC^2 representing a seventh spot ; in one of the specimens some grey scales in apex of cell on underside of hindwing.

Hab. Goyaz, Brazil.

4 ♂♂ in coll. Charles Oberthür ; also in the Hope collection, Oxford, collected by Burchell.

132. Papilio ilus Fabr. (1793) (Pl. VIII. fig. 59).

Papilio Eques Tros ilus Fabricius, *Ent. Syst.* iii. 1. p. 17. n. 51 (1793) (Amer., "Jon. fig. pict. i. tab. 29").

Papilio ilus, Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 59. n. 271 (1852) (synon. *partim*); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 71. n. 287 (1856) (synon. *partim*); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 335 (1861); id., *Journ. Entom.* i. p. 224. sub n. 8 (1862) (prob. = *hostilius* Feld.); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 143 (1864); Butl., *Cat. Diurn. Lep. descr. Fabr.* p. 238. n. 16 (1869); Kirby, *Cat. Diurn. Lep.* p. 523. n. 41 (1871); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 240 (1880) (Sta. Marta); iid., *Biol. Centr. Amer., Rhop.* ii. p. 208. n. 30 (1890) (♂ ♀, Panama; Colombia; Venezuela; = *hostilius*).

Papilio hostilius Felder, *Wien. Ent. Monatschr.* v. p. 73. n. 5 (1861) (Prov. Mérida); id., *Verh. Zool. Bot. Ges. Wien.* xiv. p. 299. n. 144 (1864) (Caracas); id., *Reise Novara, Lep.* p. 43. n. 32. t. 9. fig. a (1865) (Venezuela, coll. Kaden;—type now in coll. Godman); Kirby, *Cat. Diurn. Lep.* p. 523. n. 42 (1871).

Papilio guaco Staudinger, *Verh. Zool. Bot. Ges. Wien* xxv. p. 91. n. 1. (1876) (Chiriqui); id., *Exot. Tagf.* i. p. 13 (1884) (Chiriqui); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 209. n. 31. t. 67. fig. 1. ♂ (1890) (Chiriqui).

Judging from a small series of specimens of this apparently rare insect—rare in collections at least—we come to the conclusion that the differences between the types of *ilus* (Jones's figure), *hostilius* and *guaco* are individual, not specific or geographical.

♂ ♀. Close to *P. branchus*, of which it is perhaps a southern form, the patches of the forewing being, however, in a different position. Forewing with or without buffish white spot in cell; two or three patches of the same colour behind cell, patch M^2—SM^2 being the largest; distal margin with small white spots, except at apex.——Hindwing: a row of red spots from R^2 or R^3 to abdominal edge, the spots variable in size, separate from cell or close to it, larger in female than in male.

Underside: forewing black-brown, patch M^2—SM^2 vestigial or distinct, but always smaller than above. Hindwing with four basal spots as in *P. belesis* and *branchus*; discal spots much paler than above, being more or less whitish pink, at least proximally.

Early stages not known.

Hab. Northern Venezuela; Colombia: Sta. Marta and Valdivia; Panama: Lion Hill and Chiriqui.

In the British Museum, coll. Godman, and coll. Grose-Smith.

133. Papilio branchus Doubl. (1846).

Papilio branchus Doubleday, *Ann. Mag. N. H.* xviii. p. 373 (1846) (Honduras).

♂ ♀. Some spots on occiput and collar red; frons usually black, often with two red vittae; a white dot laterally on forecoxa, a pink or red dot each on meso- and metasternite and at base of first abdominal segment. Palpi usually with white dot or dots. Wings black, opaque, paler below than above.——Forewing with white patch situated on disc and in cell, separated into two, three, or four spots by the black veins, or this patch absent; fringe white between veins, but these spots often very small, usually absent from apex of wing.——Hindwing: a broad band of six, seldom seven red spots; spots R^2—M^2 long, situated near cell.

Underside: white patch of forewing usually a little larger than above, no red spot at base.——Hindwing: four red spots at base, the posterior one continuous, with a line situated on abdominal fold; red discal spots much paler than above, pinkish white, shading into red distally.

Genitalia: ♂. Apical lobe of harpe slightly triangular, rounded off; dentate ridge rather strongly elevate ventrally and heavily dentate.

Early stages not known.

There are two individual forms:

a'. P. branchus f. *branchus* Doubl. (1846).

Papilio branchus Doubleday, *l.c.* (Honduras); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 217 (1846); Doubl., *List Lep. Ins. Brit. Mus.* i. *Append.* p. 3 (1848); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 62. n. 277. t. 7. fig. 3. ♀ (1852) (Honduras; Guatemala); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 72. n. 293 (1856); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 137 (1864) (Honduras; Guatemala; Mexico); Boisd., *Consid. Lép. Guatem.* p. 7 (1870) (Honduras; Mexico: = *hephaestion* errore): Kirby, *Cat. Diurn. Lep.* p. 523. n. 36 (1871) (Amer. centr.; Mexico); Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 364. n. 369 (1874) (Costa Rica); Oberth., *Et. d'Ent.* iv. p. 81. n. 266 (1880) (Honduras); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 207. n. 26. t 67. fig. 7. genit. (1890) (Mexico: Cordova, Omealca, Atoyac, Oaxaca; Guatemala; Honduras; Nicaragua; Costa Rica).

♂ ♀. Forewing with white central patch. This patch variable in size. It consists in the male of a large cell-spot, a large spot R^3—M^1, and a minute spot R^2—R^3, there being occasionally also a spot M^1—M^2; spot R^2—R^3 rarely absent. In the female, spot R^2—R^3 much larger than in the male.

This form occurs from Vera Cruz in Mexico to Costa Rica.

b'. P. branchus f. *belephantes* Godm. & Salv.

Papilio belephantes Godman & Salv., *l.c.* p. 208. n. 29. t. 67. fig. 6. ♂ (1890) (Mexico: Atoyac; Guatemala; Honduras).

♂. Forewing without white patch.

This form is much rarer than the preceding one. It has apparently the same distribution, but is so far known only from Southern Mexico, Guatemala, and Honduras.

Hab. of *P. branchus*: Mexico to Costa Rica.

In the Tring Museum 26 ♂♂ and 2 ♀♀ of f. *branchus* from: Cordoba, Vera Cruz, 2800 ft., July 1904 (A. Hall); Songolica, June 1899 (W. Schaus); Mazatenanga, W. Guatemala, 1000 ft., September 1904 (A. Hall); Guatemala, San Pedro Sula, Honduras; Cartago and Guatil Piris, Costa Rica (Underwood).——1 ♂ of f. *belephantes*, no locality.

134. **Papilio belesis** Bates (1864).

Papilio belesis Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 74. n. 300 (1856) (Mexico; *nom. nud.*); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) (Mexico; *nom. nud.*); Bates, *Ent. Mo. Mag.* i. p. 1. n. 1 (1864) (Guatemala).

♂ ♀. Close to *P. branchus*. Forewing usually quite black, but sometimes with one or two white spots on disc; fringe-spots nearly always distinct, except at apex of wing, rarely vestigial.——Hindwing variable in length; a row of six or seven red spots, situated parallel to distal margin and nearer to the margin than to the cell; the middle spots not so much larger than the others as in *P. branchus*; size of the spots very variable.

Genitalia: ♂. Apical lobe of harpe shorter and more evenly rounded than in *P. branchus*, dentate ridge more narrowly elevate ventrally, dentition less heavy.

Early stages not known.

Two individual forms:

a'. P. belesis f. *hephaestion* Feld. (1865).

Papilio hephaestion Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 298. n. 139 (1864) (Mexico ; *nom. nud.*) ; id., *Reise Novara, Lep.* p. 42. n. 31. t. 6. fig. b (1865) (Mexico—Mus. Tring) ; Kirby, *Cat. Diurn. Lep.* p. 523. n. 38 (1871) (Mexico) ; Oberth., *Et. d'Ent.* iv. p. 81. n. 267 (1880) (Mexico); Godm. & Salv., *Biol. Cent. Amer., Rhop.* ii. p. 208. n. 28 (1890) (Mexico; Guatemala; Honduras).

Papilio branchus, Boisduval, *Consid. Lép. Guatem.* p. 7 (1870) (*hephaestion* = *branchus*! false).

♂. Forewing with a white spot R^2—R^3 and sometimes a trace of a spot R^3—M^1 ; there are also some buffish scales behind R^3 and near the hinder angle in our specimens.——♀ not known.

This form is known to us from: Mexico, Guatemala, and Honduras (San Pedro Sula, in coll. Charles Oberthür).

b'. P. belesis f. *belesis* Bates (1864).

Papilio belesis Bates, *l.c.* (Guatemala) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 298 n. 138 (1864) (cit. falsa ; Guatemala) ; Kirby, *Cat. Diurn. Lep.* p. 523. n. 37 (1871) ; Godm. & Salv., *l.c.* p. 207. n. 27. t. 67. fig. 3. 4. ♂, 5. genit. (1890) (Mexico : Atoyac ; Guatemala ; Nicaragua) ; iid., *l.c.* p. 729 (1901) (San Pedro Sula, Honduras).

♂ ♀. Forewing without white spot on disc and in cell. In one of four males from Guerrero, Mexico, the red submarginal spots of the hindwing are minute, while in the only female we have from that province they are as large as in *P. branchus*, but have a position as distant from the cell as in ordinary specimens of *P. belesis*.

We know this form from Mexico: Atoyac and Guerrero, Guatemala, Honduras, and Nicaragua.

Hab. of *P. belesis*: Mexico to Nicaragua.

While in *P. branchus* the form with white patch on the forewing is the common one, in *P. belesis* the white-spotted form is the rarer one.

In the Tring Museum 2 ♂♂ of f. *hephaestion* from Orizaba and "Mexico."——12 ♂♂ and 1 ♀ of f. *belesis* from: Orizaba; Guerrero (O. T. Baron) ; Escuintla, W. Guatemala, 1100 ft., August 1904 (A. Hall); Polochic valley ; San Pedro Sula, Honduras.

135. **Papilio thymbraeus** Boisd. (1836).

Papilio thymbraeus Boisduval, *Spec. Gén. Lép.* i. p. 302. n. 136 (1836) (Tlatlecope, Mexico) ; Schaus, *Papilio* iii. p. 186 (1883) (descr. of adult larva & pupa ; on *Chirimoya*).

♂ ♀. Some dots on head, a dot on palpus, on pro-, meso- and metasternum and first abdominal segment, and some speckles on the other abdominal segments, on the sternites as well as the tergites, buffish, often somewhat pinkish.

Wings, *upperside*, olivaceous black, distinctly metallic blue or green. Forewing without markings, fringe white, often brown at apex of wing.——Hindwing with a slender non-spatulate tail, and one or two rows of red spots.

Underside pale olive, somewhat metallic; no black cell-streaks.——Forewing with a red costal basal spot. Hindwing with four basal spots as in *P. branchus* and allies, the posterior one continuous with a line situated on abdominal fold ; red submarginal spots edged with buffish white proximally ; a row of buffish white curved admarginal bars.

Genitalia: ♂. Apical lobe of harpe finely dentate ; dorso-ventral ridge highest dorsally, becoming gradually lower ventrally, with feeble dentition ; central process practically non-dentate; ventral process broad, obtuse.

Mature larva and pupa described by Schaus, *l.c.*

Hab. Mexico to Honduras.

Two subspecies.

a. P. thymbraeus thymbraeus Boisd. (1836).

Papilio thymbraeus Boisduval, *l.c.* (Tlatlecope); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 19. n. 228. t. 4. fig. 3 (1846); Doubl., *List Lep. Ins. Brit. Mus.* i. *App.* p. 3 (1848) (Mexico); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 289 (1852) (Mexico); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 75. n. 306 (1856) (Guatemala; Mexico); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. *Suppl.* p. 68. n. 1129 (1857) (Mexico); Reak., *Proc. Ent. Soc. Philad.* ii. p. 140. n. 11 (1863) (Chiapas); Weidem., *ibid.* p. 148 (1863 (Mexico; Centr. Amer.); Feld, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 142 (1864) (Mexico; Guatemala); Kirby, *Cat. Diurn. Lep.* p. 523. n. 40 (1871) (Mexico; Guatemala); Oberth., *Et. d'Ent.* iv. p. 80. n. 260 (1880) (Mexico); Schaus, *Papilio* iii. p. 186 (1883) (all the year; open country); Staud., *Exot. Tagf.* i. p. 15. t. 9 (1884) (Mexico; Guatemala); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 206. n. 24. t. 67. fig. 2. genit. (1890) (Mexico: Vera Cruz, Oaxaca; Brit. Honduras; Guatemala); Haase, *Untersuch. Mimicry* i. p. 86. t. 9. fig. 64. ♀ (1893).

Papilio thymbraus (!), Guenée, *Mém. Soc. Phys. Hist. Nat. Genève* p. 379 (1872).

♂ ♀. Hindwing with two rows of red spots.

Hab. Eastern Mexico: Vera Cruz, southward to Honduras.

One of our males from Jalapa has a red dot on the underside of the left forewing between R^1 and R^2.

In the Tring Museum 28 ♂♂, 9 ♀♀, from: Jalapa, February 1896 and July 1897, and Espinal, June 1896, Vera Cruz (W. Schaus); Orizaba, Vera Cruz, June 1904 (A. Hall); Palin, W. Guatemala, 2500 ft., Aug., Sept. 1904 (A. Hall); Guatemala (Salvin).

b. P. thymbraeus aconophos Gray (1852).

Papilio aconophos Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 65. n. 290. t. 9. fig. 1. ♀ (1852) (Puebla, Mexico); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 75. n. 307 (1856) (Puebla); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 141 (1864) (Mexico); Kirby, *Cat. Diurn. Lep.* p. 523. n. 39 (1871) (Mexico); Oberth., *Et. d'Ent.* iv. p. 80. n. 261 (1880) (Mexico); Wood, *Ins. Abroad* p. 548. fig. 298 (1883); Staud., *Exot. Tagf.* i. p. 15 (1884) (Mexico); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 206. n. 25 (1890) (Mexico: Puebla, Oaxaca); Haase, *l.c.* (1893); Godm. & Salv., *l.c.* p. 729 (1901) (Guanajuato).

Papilio aconophas (!), Weidemeyer, *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) (Mexico).

♂ ♀. Hindwing with one row of red spots, the discal spots being absent.

Hab. Central and Western Mexico: Puebla, Guanajuato, Jalisco, Guerrero, Oaxaca.

In the Tring Museum, 33 ♂♂, 5 ♀♀, from: Guadalajara, October 1896 (W. Schaus): Guadalajara (Dr. Butler); Coantla, Morelos, 3800 ft., June 1904 (A. Hall); Cuernavaca (Bilimet); Cuernavaca, end of August 1904 (Dr. Gadow); Ayutla, Guerrero, 5. August 1904 (Dr. Gadow); Guerrero (O. T. Baron).

136. **Papilio lysithous** Hübn. (1822 ?).

Hectorides lysithous Hübner, *Samml. Exot. Schm.* ii. t. 106 (1822 ?).

Papilio harrisianus, Godart, *Enc. Méth.* ix. *Suppl.* p. 812. n. 138-9 (1824).

Papilio claudius Boisduval, *Spec. Gén. Lép.* i. p. 311. n. 149 (1836) (Rio de Jan.; *harrisianus, laius* and *claudius* perhaps one species).

Papilio lysithous, Burmeister, *Descr. Rép. Argent.* v. Lép., *Atlas* p. 9. n. 24 (1879) (Petropolis; N. Friburgo; larva & pupa).

Papilio ——, Jones, *Proc. Lit. Philos. Soc. Liverpool* xxxiv. t. 65. fig. 1 (1880) (larva, pupa).

Papilio lysithous, id., *l.c.* xxxvi. p. 44. n. 42 (1882) (larva, pupa).

We unite under this heading all the tailed specimens from Brazil belonging to the present group of *Papilio*, namely the forms described as *lysithous*, *harrisianus*, *athous*, *sebastianus*, *rurik*, *pomponius*, and *eupatorion*, which have hitherto been considered distinct species. Intergradations between the various forms are rather rare. There are no structural differences between them. Fortunately, the absence of structural differences and the occasional occurrence of intermediate examples are not the only reasons which induce us to treat all these different-looking forms as specifically identical. Three of the forms have been bred from one female (by a correspondent of Mr. H. Wernicke, of Blasewitz). These forms are *pomponius*, *rurik*, and *lysithous*—i.e., the forms with comparatively small red submarginal spots on the hindwing. The various varieties are imitations of species of *Papilio* feeding on *Aristolochia* (*P. ascanius*, *agavus*, etc.).

♂ ♀. Body black ; a grey spot on palpus ; a grey or buffish line ventro-laterally on abdomen in many specimens. Wings densely scaled above ; forewing varying from being all black to being crossed by a broad white band, the band crossing cell, or standing outside cell, or being reduced to a large patch ; a red spot at base, often absent.——Hindwing with or without white central area ; a series of red submarginal spots, variable in size, the last four larger than the upper three, these three often absent ; tail variable in length and width, usually spatulate.

Underside : forewing paler than above, scales smaller in distal area ; two red spots at base, one standing in cell and the other before it.——Hindwing as black as above, no distinct cell-lines, three red basal spots, the posterior one produced into a long line on abdominal fold.

Genitalia : ♂. Apical edge of harpe very little produced, broadly rounded ; dorso-ventral ridge ending abruptly ventrally, the ventral corner not more elevate than the rest of the ridge ; central process widened at apex, dentate apically and dorso-apically, ventral apical angle marked by a rather prominent tooth, proximally of which there are no other teeth.

Early stages described by Mr. E. D. Jones, *l.c.*, and Burmeister, *l.c.*

Hab. Brazil ; Eastern Paraguay.

We arrange the varieties in two groups :

A. Red submarginal spots of hindwing large, longer than broad above.

a'. P. lysithous f. *platydesma* nov.

Papilio harrissianus (!), Boisduval (*non* Swainson 1822, err. det.), *Spec. Gén. Lép.* i. p. 310. n. 147 (1836) (Brazil).

Papilio harrisianus, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 184 (1846) (*partim* ; Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 210 (1852) (*partim* ; Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 222 (1856) (*partim* ; Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 68 (1857) (Brazil) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 154 (1864) (Brazil) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 53 (1871) (*partim* ; Brazil) ; Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 9. n. 7 (1874) (Gavia, August) ; Burm., *Descr. Rép. Argent.* v. Lép., *Atlas* p. 9. n. 23 (1879) (Rio de Jan. ; larva & pupa) ; Oberth., *Et. d'Ent.* iv. p. 76. n. 240 (1880) (Brazil) ; Staud., *Exot. Tagf.* i. p. 15 (1884) (Brazil) ; Haase, *Untersuch. Mimicry* i. p. 85 (1893) (Brazil) ; id., *l.c.* ii. p. 92 (1893) ; Bönningb., *Verh. Ver. Nat. Unterh.* ix. p. 27 (1895) (Rio).

♂ ♀. White band of forewing broad, continued across cell. On hindwing the band usually reaching to M^2, the last partition of the band merged together with the red submarginal patch, the band mostly rather narrower in male than in female, being in the male reduced proximally, the white cell-patch occasionally absent in

this sex, and the white discal patches small and much shaded with black ; a row of seven red submarginal spots, the last double.

We know this form from the Province of Rio de Janeiro and from Matto Grosso ; it is doubtless more widely distributed.

In the Tring Museum 7 ♂♂, 2 ♀♀, from : Tijuca, Rio de Janeiro.

A specimen from Matto Grosso in coll. Adams.

b'. P. lysithous f. *harrisianus* Swains. (1822).

Papilio harrisianus Swainson, *Zool. Illustr.* iii. *Ent.* ii. t. 109 (1822) (hab.? prob. S. Amer.) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Brazil) ; id., Westw. & Hew. *Gen. Diurn. Lep.* i. p. 17. n. 184 (1846) (*partim* ; Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 210 (1852) (*partim* ; Brazil) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 53 (1871) (*partim*).

Papilio claudius Boisduval, *Spec. Gén. Lép.* i. p. 311. n. 149 (1836) (*partim*).

Papilio athous Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 155 (1864) (*nom. nud.*) ; id., *Reise Novara, Lep.* p. 46. n. 35 (1865) (Brazil) ; Kirby, *l.c.* p. 524. n. 54 (1871) ; Staud., *Exot. Tagf.* i. p. 15 (1884) (Brazil).

A specimen in the British Museum agreeing with Swainson's figure is presumably the type of *harrisianus*. Boisduval (1836) described the preceding form as *harrisianus* (erroneously spelling the name *harrissianus*), since when that broad-banded form has always been treated as being the true *harrisianus*. Felder's *athous* is nothing but Swainson's *harrisianus*.

♂♀. White band of forewing in male from inner margin to SC^3, the first and last spot often absent, the band standing outside cell, but usually touching it at lower angle, where the band is more or less angulate or interrupted ; occasionally a vestige of a white patch in apex of cell ; in female the band vestigial from lower angle of cell forward.——White discal area of hindwing not extending beyond M^1, much narrower in female than in male, the patch occupying in male more than half the cell, in female restricted to apex of cell and proximally ill-defined ; upper three red submarginal spots absent or vestigial in male, more or less distinct in female.

We know this form from Rio de Janeiro and Espiritu Santo.

In the Tring Museum 4 ♂♂, 2 ♀♀, from : Rio de Janeiro ; Leopoldina, Espiritu Santo.

c'. P. lysithous f. *oedipus* Feld. (1865).

Papilio harrisianus, Godart, *Enc. Méth.* ix. *Suppl.* p. 812. n. 138-9 (1824) (*partim*).

Papilio oedipus Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 299. n. 156 (1864) (*nom. nud.*) ; id., *Reise Novara, Lep.* p. 47. n. 36 (1865) (Brazil) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 55 (1871) (Brazil); Staud., *Exot. Tagf.* i. p. 15 (1884) (Brazil).

Papilio sebastianus Oberthür, *Et. d'Ent.* iv. p. 76. n. 241. t. 2. fig. 4 (1880) (Brazil).

♂♀. White band of forewing reduced to a large double patch M^1—SM^2, there being usually also a small streak behind SM^2 and another in front of M^1, the latter streak occasionally developing to a triangular patch. In one of our males from Bahia the white double patch is replaced by a narrow yellowish one which, anteriorly, does not reach M^1.——Hindwing without white band or patch ; the four posterior submarginal spots large, the anterior ones small and often absent.

Known to us from Bahia, Minas Geraës, Espiritu Santo.

In the Tring Museum 13 ♂♂ from : Bahia ; Minas Geraës ; Espiritu Santo.

d'. P. lysithous f. *lysithous* Hübn. (1822 ?).

Hectorides lysithous Hübner, *Samml. Exot. Schm.* ii. t. 106 (1822 ?) ; Kirby, *ibid.* ed. ii. p. 90. t. 319. fig. 3. 4. (190— ?).

Papilio claudius Boisduval, *Spec. Gén. Lép.* i. p. 311. n. 149 (1836) (*partim*).

Papilio lysithous, Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 14 (1844) (Brazil) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 182 (1846) (*partim* ; Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 209 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 221 (1856) (Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 66 (1857) (Brazil) ; Oberth., *Et. d'Ent.* iv. p. 77. n. 242 (1880) (Brazil) ; Staud., *Exot. Tagf.* i. p. 14. t. 9 (1884) (Brazil) ; Haase, *Untersuch. Mimicry* i. p. 85 (1893) (Brazil) ; id., *l.c.* ii. p. 92. t. 10. fig. 70 (1893) ; Bönningh., *Verh. Ver. Naturw. Unterh. Hamburg* ix. p. 27 (1895) (Organ Mts. ; not at Rio) ; Eimer, *Orthogen.* p. 137 (1897).

Papilio lysithous var. *brevifasciatus* Weymer, *Stett. Ent. Zeit.* lv. p. 312 (1895) (Rio Grande do Sul).

Papilio extendatus id., *l.c.* p. 313 (1895) (Rio Grande do Sul).

Papilio agavus, Peters, *Illustr. Zeitschr. Ent.* ii. p. 52 (1897) (Nova Friburgo, *partim*).

♂ ♀. Forewing : white band narrow (rarely buffish on both wings), usually reaching SC^3, but often not extending forward beyond lower angle of cell (*brevifasciatus*), in most specimens tapering, but sometimes of almost even width, variable in breadth, being posteriorly in some individuals twice as wide as in others ; a row of distinct white marginal spots in some specimens, such spots being often indicated in the preceding forms.——White band of hindwing usually stopping short at M^1, but occasionally reaching to M^2 (*extendatus*), in the latter case the band mostly a little more distal in position, the cell-patch being smaller and the spots around apex of cell larger than in ordinary specimens ; red submarginal spots variable in size and number, the last four smaller than in the preceding forms ; white marginal spots sometimes a little enlarged ; tail sometimes with red spot on *underside*.

In a male from Minas Geraës in coll. Hewitson (Brit. Mus.), with broad band on fore- and hindwing and white fringe-spots to forewing, there is some white scaling proximally of the red submarginal spots of the hindwing.

We know this form from the provinces of Minas Geraës, Rio de Janeiro, Santa Catharina, Parana, Sao Paulo, Rio Grande do Sul.

In the Tring Museum 35 ♂♂, 6 ♀♀, from : Petropolis, January 1898 (J. Foetterle) ; Nova Friburgo (Peters) ; Jundiahy ; Sao Paulo ; Castro, Parana (E. D. Jones) ; Rio Grande do Sul.

e'. P. lysithous f. *rurik* Eschsch. (1821).

Papilio rurik Eschscholtz, in Kotzeb., *Reise* iii. p. 202. n. 1 (1821) (S. Catharina).

Papilio rurikia id., *l.c.* t. 1. fig. 1a. 1b (1821) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 207 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 56. n. 218 (1856) (Rio Grande do Sul) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 304. n. 159 (1864) (S. Catharina ; Rio Grande do Sul) ; Kirby, *Cat. Diurn. Lep.* p. 524. n. 58 (1871) (Brazil) ; Staud., *Exot. Tagf.* i. p. 15 (1884) (Brazil) ; Haase, *Untersuch. Mimicry* i. p. 86 (1893) ; Weym., *Stett. Ent. Zeit.* lv. p. 312. n. 3 (1895) (= *laius*).

Papilio harrisianus, Godart, *Enc. Méth.* ix. *Suppl.* p. 812. n. 138-9 (1824) (*partim*).

Papillon laius Roger, *Bull. Soc. Linn. Bordeaux* i. p. 160 (1826) (Brazil).

Papilio laius Boisduval, *Spec. Gén. Lép.* i. p. 311. n. 148 (1836) (Brazil) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Brazil) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 183 (1846) (Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 41. n. 208 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 57. n. 220 (1856) (Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 67 (1857) (Brazil) ; Felder, *l.c.* p. 304. n. 158 (1864) (var. of *rurikia* ?) ; Kirby, *l.c.* p. 524. n. 57 (1871) ; Staud., *l.c.* p. 15 (1884) (Brazil) ; Oberth., *Et. d'Ent.* xii. p. 5. n. 9. t. 7. fig. 47 (1888) (Paraguay) ; Haase, *l.c.* p. 86 (1893) ; Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1895) (Icaraby) ; Mahilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 47 (1896).

♂♀. White band of forewing as in f. *oedipus*, very variable in width, sometimes not wider than in broad-banded specimens of f. *lysithous*, never continued to costal margin, occasionally reduced to a patch M^2—SM^2 and a streak behind SM^2, occasionally buffish; white marginal dots sometimes very distinct.——No white band or patch on hindwing; usually seven red submarginal spots, upper three not rarely vestigial or absent (from upperside), last four sometimes nearly as large as in f. *oedipus*; white marginal spots often somewhat enlarged; tail with red spot on *underside* in a small percentage of specimens (as in Eschscholtz's figure).

We know this form from Paraguay, Santa Catarina and Rio Grande do Sul.

In the Tring Museum 32 ♂♂, 19 ♀♀, from: Sapucay, Paraguay, August 1900 and October 1904 (W. Foster); Yhu, Paraguay, September—December 1896 (Andeer); Theresopolis, S. Catharina, November 1904—February 1905 (J. Michaelis); Rio Grande do Sol.

f'. P. lysithous f. *pomponius*.

Papilio pomponius Hopffer, *Stett. Ent. Zeit.* xxvii. p. 25. n. 5 (1866) ("Mexico" error loci); Kirby, *Cat. Diurn. Lep.* p. 567. n. 341 (1871) ("Mexico"); Honr., *Berl. Ent. Zeitschr.* xxx. p. 296. t. 6. fig. 4. ♀ (1886) (Rio Grande do Sul; ♂♀); Weym., *Stett. Ent. Zeit.* lv. p. 314. n. 6 (1895) (Rio Grande do Sul); Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1895) (one specimen, 8 miles from Nova Friburgo); Mabilde, *Guia Pract. Borbol. Rio Grande do Sul* p. 48 (1896).

Papilio lysithous, Lathy, *Trans. Ent. Soc. Lond.* p. 69. n. 36 (1904).

♂♀. Forewing black, usually with white marginal spots; white band absent, often vestigial, rarely represented by a distinct line from near costal to inner margin, or by a short band extending from M^1 to inner margin.——Hindwing without white band or patch, fringe-spots large as a rule; four to seven red submarginal spots, the three upper ones usually vestigial; proximally of these spots sometimes some white scales.

We know this form from Santa Catharina and Rio Grande do Sul (where its model, *Papilio perrhebus*, is also found); Bönninghansen records it from Nova Friburgo.

In the Tring Museum 8 ♂♂, 2 ♀♀, from: S. Catharina and Rio Grande do Sul.

g'. P. lysithous f. *eupatorion* Lucas (1857).

Papilio eupatorion Lucas, in Casteln., *Voy. Amér. Sud, Zool.* iii. *Ent.* t. 2. fig. 2 (1857—coll. Oberthür); Kirby, *Cat. Diurn. Lep.* p. 567. n. 334 (1871) (Am. mer.); Oberth., *Et. d'Ent.* iv. p. 76. n. 239 (1880) (Brazil; type).

♂. Like f. *pomponius*; but forewing with a broad buffish white marginal band, marginal spots of hindwing enlarged and white dots at proximal side of red submarginal spots distinct, the upper ones larger than the respective red spots.

Only one specimen known, in coll. Oberthür, from Brazil.

137. **Papilio asius** Fabr. (1781).

Papilio Eques Trojanus asius Fabricius, *Spec. Ins.* ii. p. 5. n. 17 (1781) (S. Amer.); Fabr., *Mant. Ins.* ii. p. 3. n. 17 (1787); Gmelin, *Syst. Nat.* i. 5. p. 2229. n. 283 (1790) (S. Amer.); Fabr., *Ent. Syst.* iii. 1. p. 8. n. 21 (1793).

Papilio Eques Trojanus astyagas Drury, *Illustr. Exot. Ins.* iii. p. 47. t. 35. fig. 4. & Index (1782) (Rio de Janeiro).

Iphiclides asius, Hübner, *Samml. Exot. Schm.* ii. t. 92 (1818 ?) ; Kirby, *ibid.* ed. ii. p. 93. t. 306. fig. 1. 2 (190– ?).

Papilio asius, Godart, *Enc. Méth.* ix. p. 55. n. 84 (1819) (Brazil) ; Boisd., *Spec. Gén. Lép.* i. p. 309. n. 146 (1836) (Rio de Janeiro); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 48 (1838) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 14 (1845) (Brazil) ; Butler, *Cat. Diurn. Lep. descr. Fabr.* p. 239. n. 18 (1869) (Rio de Janeiro) ; Oberth., *Et. d'Ent.* iv. p. 76. n. 238 (1880) (Brazil) ; Staud., *Exot. Tagf.* i. p. 14 (1884) ; Haase, *Untersuch. Mimicry* i. p. 85 (1893) (Brazil) ; Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1895) (Nictheroy, Rio de Janeiro, rare) ; Eimer, *Orthogen.* p. 137 (1897).

Papilio manlius Perty, *Delect. Anim. Art.* p. 151. t. 29. fig. 1. 1b (1830–34) (Minas Geraës).

Papilio astyagas, Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 185 (1846) (Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* p. 42. n. 219 (1852) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 59. n. 232 (1856) (Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 4. n. 69 (1857) (Brazil) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 160 (1864) (Brazil).

Papilio asius (!), Kirby, *Cat. Diurn. Lep.* p. 524. n. 59 (1871) (Brazil).

Papilio assius (!), Mabilde, *Guia Pract. Borbolet. Rio Grande do Sul* p. 47 (1896).

A very interesting species, connecting the *lysithous* group with the *marcellus* group.

♂. The band of the wings is variable in width, often entering the cell of the forewing, this cell-spot occasionally extending down to M^1 ; scales of forewing somewhat reduced in width. Besides a spot on the abdominal fold and an anal spot there are never more than two red spots situated between R^3 and M^2, the upper one being often missing ; these spots are repeated on the underside, the abdominal one being produced proximad to near base, four more red spots being present in the basal area, namely two at costal margin, one behind C and the fourth in the cell. In shape of the hindwing *asius* resembles more the *marcellus* group than the members of the present group.

Scent-organ better developed than in any other member of the present group ; the abdominal edge bent upwards, forming a narrow pocket ; vein SM^2 and a narrow stripe in front of SM^2 and another behind it covered with small scent-scales, the scaling having partly a somewhat woolly appearance.

Genitalia : ♂. Apical lobe of harpe asymmetrical, large, long, denticulate ventrally ; dorso-ventral ridge with some prominent teeth ventrally ; central process spatulate, entire or feebly denticulate ; ventral process small.

Early stages not known.

Hab. Brazil and Eastern Paraguay.

In the Tring Museum 52 ♂♂ from : Bahia ; Minas Geraës ; Espiritu Santo ; Petropolis ; (G. Foetterle) ; Rio de Janeiro (E. May) ; Bahurn, Sao Panlo (Dr. Hempel) ; Castro, Parana (E. D. Jones) ; Yhu, Paraguay (Andeer).

A ♀ in coll. H. J. Adams.

XIV. Marcellus Group.

For characters see p. 655.

Ten species :

1. SC′ of forewing present.
   - *a*. Forewing black from apex of cell to distal margin, with a pale submarginal line or row of spots and one or two short pale costal bands within this black area.
     - *a′*. Red line of underside of hindwing edged with white proximally . . . . . Species No. 138.

b'. Red line without white border.
*a*². Hindwing, above, with complete black median band.
*a*³. Green subapical cell-bar of forewing widely separate from green discal band . . . . . Species No. 140.
*b*³. White or greenish subapical cell-bar of forewing continuous with the discal band.
*a*⁴. Fourth and fifth green cell-bars of forewing merged together . Species No. 139.
*b*⁴. These bars widely separate.
*a*⁵. Submarginal spots of forewing more or less rounded. Species No. 141.
*b*⁵. These spots transverse, linear . . . . Species No. 142.
*b*². Median band of upperside of hindwing widely interrupted or marked only at costal margin.
*c*³. Black subbasal band of upperside of hindwing very thin beyond cell . Species No. 143.
*d*³. This band broad throughout.
*c*⁴. Red line of underside of hindwing stopping short at cell . Species No. 144.
*d*⁴. Red line continued to brown distal border . . . . Species No. 145.
b. Forewing with very broad transparent submarginal area . Species No. 146.
II. SC′ of forewing absent . . . . . Species No. 147.

138. **Papilio marcellus** Cram. (1777).

Petiver, *Mus. Petiv. Cent.* p. 50. n. 502 (1699); Catesby, *Nat. Hist. Carol.* ii. p. 100. t. 100 (1743); Edw., *Nat. Hist. Birds* i. p. 34. t. 34 (1743).

Papilio Eques Achivus ajax Linné, *Syst. Nat.* ed. x. p. 462. n. 26 (1758) (*partim*, only cit. "Edw. av. 34"; descript. and cit. "Raj. ins. iii. n. 2" do not apply to this species); id., *Syst. Nat.* ed. xii. p. 750. n. 32 (1767) (*partim*); Fabr., *Syst. Ent.* p. 455. n. 49 (1775) (*partim*); Esper, *Schm.* i. *Forts.* p. 1. t. 51. fig. 1 (1780) ("S. France" errore); Fahr., *Spec. Ins.* ii. p. 20. n. 79 (1781) (*partim*); id., *Mant. Ins.* ii. p. 10. n. 90 (1787); Schneid., *Europ. Schm.* p. 54. n. 3 (1788); Villiers, *Car. Linn. Ent.* ii. p. 2. n. 1 (1789) (Amer. bor., "Helvetia and Germania" errore); Jabl. and Herbst, *Naturs. Schm.* iii. p. 144. n. 96. t. 42. fig. 5. 6 (1790) (synon. *partim*); Gmelin, *Syst. Nat.* i. 5. p. 2238. n. 32 (1790) (*partim*); Fabr., *Ent. Syst.* iii. 1. p. 33. n. 97 (1793).

Papilio Eques Achivus protesilaus Linné, *Syst. Nat.* ed. x. p. 463. n. 29 (1758) (*partim*; citat. Catesb.); id., *Mus. Lud. Ulr.* p. 209. n. 28 (1764) (*partim*; var. β., cit. "Seb. mus. i. t. ii. f. 2" excepta); Gmelin, *Syst. Nat.* i. 5. p. 2243. n. 39 (1790) (sub citat.).

Papilio Eques aiax, Lange, in Linné, *Syst. Nat.* p. 462. n. 26 (1760) (*partim*).

Papilio Eques Achivus marcellus Cramer, *Pap. Exot.* ii. p. 4. t. 98. fig. F. G. (1777) (spring form).

Papilio ajax, Seligmann, transd. Houtt., *Verz. Uitl. Zeldz. Vogel.* ii. p. 54. t. 67 (1772) (Maryland); Borkh., *Nat. Eur. Schm.* i. p. 112. n. 3 (1788) ("S. France"; N. Amer.); id., *l.c.* p. 249. n. 3 (1788) (synon. *partim*); Abbot & Smith, *Ins. Georgia* i. p. 7. t. 4 (1797) (metam.); Fabr., *Epit. Ent. Nomencl.* p. 128 (1797) (*partim*; Am. bor.); Palisot, *Ins. Afr. Amer.* p. 71. *Lep.* t. 2. fig. 2 (1805); Ochsenh., *Schm. Eur.* i. 2. p. 117. n. 1 (1808) ("Italy and S. France," errore); Laspeyr., *Jen. Allg. Lit. Zeit.* p. 98 (1809) (Linné's *ajax* is not the *ajax* of Esper!); Ochsenh., *Schm. Eur.* iv. p. 149 (1816); Godart, *Enc. Méth.* ix. p. 52. n. 79 (1819) (synon. *partim*); Lucas, *Lép. Eur.* p. 9. t. 14. fig. 2 (1834) ("Greek Archip."; fig. mala); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 9 (1845); id., in Westw., *Arc. Ent.* i. p. 61 (1845) (Florida, habits); id., Westw. &

Hew., *Gen. Diurn. Lep.* i. p. 15. n. 133 (1846) ; Kirtl., *Proc. Ent. Soc. Lond.* (2). i. p. 101 (1851) (south shore of L. Erie ; Ohio ; larva on *Anona triloba*) ; Gray, *List Lep. Ins. Brit. Mus.* i. p. 33. n. 155 (1852) (*marcellus* = var. of *ajax*) ; Lucas, in Chenu, *Enc. Hist. Nat. Pap.* i. fig. 1 (1851-53) ; Dutreux, *Stett. Ent. Zeit.* xv. p. 142 (1854) (Faro, Portugal ;—imported, or local. erroneous); Keferst., *ibid.* p. 330 (1854) (Dutreux's *ajax* from Portugal is *ajax* Boisd.); Lucas, *Bull. Soc. Ent. France* p. 9 (1855) (" Portugal " teste Keferstein, " Greece " teste Lucas); Gray, *List Lep. Ins. Brit. Mus.* i. p. 44. n. 163 (1856) ; Ménétr. *Enum. Corp. Anim. Petrop., Lép.* i., p. 3. n. 47 (1857) ; Gosse, *Letters from Alabama* p. 51. figs. (1859) (larva, pupa) ; id., *l.c.* p. 148 (1859) ; Morris, *Syn. Lep. N. Am.* i. p. 8. n. 11 (1862) (*ajax* = *marcellus*) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) (*marcellus* ?); Kirkp., *ibid.* iii. p. 328 (1864) (Cleveland, Ohio, common) ; Butl., *Cat. Diurn. Lep. descr. Fabr.* p. 241. n. 26 (1869) ; Parker, *Amer. Entom.* ii. p. 175 (1870) (Iowa) ; Edw., *Canad. Ent.* ii. p. 115. 133. 162 (1870) (*ajax* and *marcellus* one species, proved by breeding) ; id., *l.c.* iii. p. 70 (1871) (bred) ; Scudder, *ibid.* iv. p. 74. 81 (1872) (Georgia, Abbot's MS.) ; Meldola, *Ann. Mag. N. H.* (4). xii. p. 301 (1873) (substance waste in pupal state) ; Pagenst., *Verh. Nat. Med. Ver. Heidelb.* i. p. 108 (1874) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 443 (1878) ; Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., common) ; French, *Rep. Ins. Illin.* vii. p. 135 (1878) ; Morris, *Canad. Ent.* xi. p. 203 (1879) (Ontario, local) ; Oberth., *Et. d'Ent.* iv. p. 65. n. 176 (1880) ; Clayp., *Canad. Ent.* xii. p. 120 (1880) (Ohio, April) ; Middl., *Rep. Ins. Illin.* x. p. 74 (1881) ; Edwards, *Canad. Ent.* xiv. p. 27 (1882) (connection between *ajax*, *walshi* and *telamonides* ; life history) ; Auriv., *Kongl. Sv. Vet. Ak. Handl.* xix. 5. p. 30. n. 28a (1882) (recensio critica) ; Gruber, *Jena. Zeitsch. Naturw.* xvii. p. 473. t. 7. f. 16-19. l. (1884) ; id., *l.c.* xviii. p. 881 (1884) ; id., *Papilio* iv. p. 88. t. 2. f. 16-19 (1884) (transf.) ; id., *l.c.* p. 188 (1884) (correction).; Edw., *Ent. Amer.* i. p. 213 (1885) (larvae will not eat sassafras and spice-wood) ; id., *Canad. Ent.* xviii. p. 15 (1886) (larva on *Pawpaw*, refusing spice-wood and sassafras in W. Va.) ; French, *Butt. East. U. St.* p. 84 (1886) ; Hancock, *Amer. Nat.* xx. p. 976 (1886) (Chicago, migrating northward) ; Hulst, *Ent. Amer.* ii. p. 182 (1886) (Long I., end June '86, one specim.) ; Riley, *Insect Life* i. p. 161 (1888) (parasite : *Trogus exesorius*, *Pimpla annulipes*) ; Edw., *Bull. U. St. Nat. Mus.* xxxv. p. 9 (1889) (liter. on transf.) ; Skinner & Aaron, *Canad. Ent.* xxi. p. 126 (1889) (Philadelphia, rare) ; Eimer, *Arth. Verwandtsch. Schmett.* p. 195 (1889) ; Pack., *Fifth Rept. U.S. Ent. Comm.* p. 669 (1890) (larva on *Asimina triloba*) ; Mayn., *Man. N. Amer. Butt.* p. 3. n. 1 (1891) ; Staley, *Canad. Ent.* xxiv. p. 203 (1892) (Marshall, Missouri, f. *telamonides* rare, *marcellus* not uncommon) ; Davis, *Journ. N. York Ent. Soc.* i. p. 47 (1893) (Staten I., N.Y., 2 ex.) ; Jones, *Ent. News* iv. p. 190 (1893) (Wilmington, N.C.); Beutenm., *Bull. Amer. Mus. N. H.* v. p. 241 (1893) (N. York ; descr. of l., p., i.) ; Weed, *Psyche* vii. p. 130 (1894) (N.E. Miss.) ; Davis, *Journ. N. York Ent. Soc.* iii. p. 141 (1895) (Staten I., N.Y., seen June 30) ; Osburn, *Ent. News* vi. p. 282. n. 43 (1895) (Tennessee, common, iv. to x., two broods) ; Deard., *ibid.* vi. p. 296 (1895) (Lonsdale, R.I., July 19, one ex.) ; Langl., *ibid.* vi. p. 314 (1895) (Chicago) ; Hills, *Canad. Ent.* xxviii. p. 190 (1896) (Toronto, June); Anonym., *ibid.* xxviii. p. 190 (1896) (Port Hope, Ontario ; never before observed so far east) ; Gibson, *ibid.* xxviii. p. 294 (1896) (Toronto, June) ; Bubua, *Ent. News* viii. p. 98 (1897) (Cleveland, Ohio ; plentiful, three forms) ; Edw., *Butt. N. Amer.* iii. *Pap.* v. (1897) (results of breeding); Gibson, *Rept. Ent. Soc. Ontario* xxvii. p. 105 (1897) (Toronto, June and July) ; Moffat, *ibid.* p. 109. n. 79 (1897) (Pt. Hope, end of May and June ; Toronto) ; Duzee, *Bull. Buffalo Soc. N. Sc.* v. p. 107. n. 1 (1897) (Buffalo) ; Snyder, *Canad. Ent.* xxix. p. 119 (1897) (Evanston, Ill., very rare) ; Christ, *Mitt. Schweiz. Ent. Ges.* ix. p. 279 (1897) ; Eimer, *Orthogen.* p. 399 (1897) ; Troxler, *Canad. Ent.* xxx. p. 257 (1898) (Louisville, Ky., ♀ with yellow markings, May) ; Holl., *Butt. Book* p. 307. n. 1. t. 2. f. 14, t. 6. fig. 11. 12, t. 44. fig. 1-4 (1899); Wenzel, *Ent. News* xi. p. 643 (1900) (Wildwood, N.J., two ex.); Beutenm., *Butt. N. York City* p. 7. n. 5. fig. ♂ (1902) ; Comst., *Ent. News* xiii. p. 76 (1902) (L. Josephine, Fla.) ; Walk., *Rept. Ent. Soc. Ontario* xxxii. p. 85 (1902) (Point Pelee, Leamington); Briml. & Sherm., *Ent. News* xiv. p. 230 (1903) (Raleigh, N.C.).

Papilio protesilaus, Fabricius, *Ep. Ent. Nomencl.* p. 128 (1797) (*partim* ; Am. Sept.).

Princeps heroicus *ajax* Hübner, *Samml. Exot. Schm.* i. t. 106 (1806—?).

Iphiclides ajax, id., *Verz. bek. Schm.* p. 82. n. 836 (1818 ?) ; Scudd., *Proc. Boston Soc. N.H.* xvi. p. 117 (1873) (substance waste ; *walshi* and *telamonides* from wintering pupae, *marcellus* offspring of both these forms ; id., *Amer. Nat.* viii. p. 257 (1874) ; Meldola, *Ann. Mag. N. H.* (4). xiv. p. 239 (1874) (substance waste) ; Scudder, *Butt. East. U. St. & Can.* ii. p. 1264. t. 15. fig. 11. t. 35. fig. 26—29. genit., t. 56. fig. 9. head, etc. (1889) ; id., *Psyche* viii. p. 208. t. 5. f. 2. l. juv. (1898) ; Dyar, *Bull. U. St. Nat. Mus.* lii. p. 2. n. 5 (1902) ; Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 99. t. 106. fig. 3. 4 (190–?).

Papilio marcellus, Boisduval & Leconte, *Hist. Gén. Lép. Amér. Sept.* i. p. 8. t. 2. fig. 1—4. l., p., i.

(1835) (summer form); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 45 (1838); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 8 (1845); id., in Westw.. *Arc. Ent.* i. p. 61 (1845) (Virginia, Ohio. etc.); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 132 (1846); Kirtl., *Proc. Ent. Soc. Lond.* (2). i. p. 101 (1851) (differs from *ajax* in flight); Ménétr., *Enum. Corp. Anim. Petrop., Lép.* i. p. 3. n. 46 (1857); Newm., *Proc. Ent. Soc. Philad.* i. p. 26 (1861) (N. Jersey; on *Pawpaw*); Morris, *Syn. Lep. N. Am.* i. p. 9. n. 12 (1862); Weidem., *Proc. Ent. Soc. Philad.* iii. p. 146 (1863) (= *ajax*?); Kirkp., *Proc. Ent. Soc. Philad.* iii. p. 328 (1864) (Cleveland, Ohio, common); Edw., *Amer. Entom.* ii. p. 305 (1870) (ovipositing); id., *Canad. Ent.* iii. p. 70 (1870) (bred); Saund., *ibid.* vi. p. 140 (1874) (Essex Co.); Ison, *Rept. Ent. Soc. Ontario* p. 15 (1876) (Cleveland, rather common); Moffat, *ibid.* p. 10 (1881) (Long Point & Ridgeway); Mundt, *Canad. Ent.* xv. p. 89 (1883) (Pontiac, Illin., May and later); Saund., *ibid.* xvi. p. 50 (1884) (Lake Erie); id., *Rept. Ent. Soc. Ontario* xv. p. 20 (1885) (Point Pelee, L. Erie); Pack., *Fifth Rept. U.S. Ent. Comm.* p. 669 (1890) (larva on *Asimina triloba*); Moffat, *Rept. Ent. Soc. Ontario* xxvii. p. 79 (1897) (London, Ont.); Bethune, *ibid.* xxviii. p. 33 (1898) (Pt. Hope); id., *ibid.* xxx. p. 101 (1900) (Pt. Hope).

Papilio protesilaus "Drury," Reitzenstein, *Cat. Lep. N. Orleans* (1863) (Greville, rare;—doubtless an error of identification, probably form of *marcellus*).

Pathysa marcellus, Reakirt, *Proc. Ent. Soc. Philad.* iii. p. 504 (1864).

Papilio ajax var. *marcellus*, Fletcher, *Canad. Ent.* xxxi. p. 8 (1899) (Cowichan Rd., Vancouver I., strange occurrence!).

Owing to Linné's short and vague descriptions, and his frequent quotation of figures and previous descriptions which have nothing to do with the animal described, the nomenclature of many Linnean species is much involved. The nomenclatorial difficulties created by Linné have often been enhanced by post-Linnean authors, many of whom were quite arbitrary in the application of names and non-critical to an amazing degree. However, the difficulties would have long disappeared to a great extent, if the authors of the second third of the nineteenth century, when it was still early enough to mend matters without much inconvenience, had had the courage of being thorough in nomenclatorial matters. The *Asimina* Swallowtail of North America, usually called *ajax* Linné, is a striking instance.

The Swallowtails found in the Atlantic States are all common insects. There occur five species, not counting the southern species *P. palamedes* and *polydamas*. As three of the five are recognisably described by Linné in *Syst. Nat.* ed. x. and later, there remain two—namely, the *Asimina* Swallowtail allied to the European *podalirius* and the Parsnip Swallowtail allied to *machaon*. For which of the two species did Linné propose the name *ajax*?

Linné's description in *Syst. Nat.* ed. x. p. 462 (1758) is as follows:

Ajax. 26. P.E. alis obtuse caudatis concoloribus fuscis; fasciis flavescentibus, angulo ani fulvo.

Raj. ins. III. *n.* 2. *Edw. av.* 34.

Habitat in America *boreali.*

This description certainly does not fit the *Asimina* Swallowtail, which has a red anal angle; but applies very well to the Parsnip Papilio, Linné describing the similar, but more extended yellow *machaon* as follows:

Machaon. 27. P.E. alis caudatis concoloribus flavis; fasciis fuscis: angulo ani fulvo.

We draw attention to *angulo ani fulvo* appearing in both descriptions.

Linné quotes two previous authors under *ajax*. However, the insects described by Ray and the one described and figured by Edwards are not only widely different from one another, but Linné's description fits neither the one nor the other. The insect of Ray is doubtless the yellow female or the male of *Papilio glaucus*. Ray's description is as follows:

2. *Papilio alis amplissimis, flavicante et nigro coloribus pulcherrime variegatis, interioribus caudatis, major* Virginiana. *Diurnarum prima, omnium maxima*, Mouffet. *Theat. Insect.* p. 98.

Haec praecedenti,* excepta magnitudine, qua eam excellit, simillima est, ut dubitem an accidentaliter potius quam specifice, ut vocant, ab ea differat: ideoque quamvis exotica sit, a praecedente minime separandam censemus.

Mouffet's figure referred to by Ray is a bad representation of a yellow *P. glaucus*. The figure is very large, the apex of the forewing being produced into a long acute hook, and the tail being long, curved and pointed. Linné says of *ajax*: *alis obtusc* (!) *caudatis*.

The second reference under Linné's *ajax* is Edwards, *Nat. Hist. Birds* i. t. 34.

The insect here represented is the *Asimina* Swallowtail. The anal spot is expressly described in the text as being bright red, while Linné calls that spot of *ajax* fulvous, as in the case of *machaon*. How is it that Linné quotes this figure under *ajax*, although it does not at all conform to the description? We think it was a mere oversight; he did not mean to put the reference to Edwards's figure under *ajax* but under *protesilaus*, as appears to us proved by the description of *protesilaus* and the various references given by Linné under that heading. The description of *protesilaus* and the references are in *Syst. Nat.* ed. x. p. 463, as follows:

Protesilaus. 29. P.E. alis caudatis subconcoloribus albidis: fasciis fuscis: unica subtus sanguinea, angulo ani rubro.

Pet. Mus. 50. *n.* 502.
Sloan. jam. 2. *p.* 218. *t.* 239. *f.* I. 2.
Mer. surin. 43. *t.* 43.
Seb. mus. I. *t.* 11. *f.* 2.
Catesb. car. 2. *t.* 100.
Habitat in America *septentrionali.*
Simillimus Podalirio *Europae australis & Africae; an satis diversus?*

Now, the first citation under *protesilaus* (Petiver) and the last quotation (Catesby) refer both to recognisable descriptions and figures of the North American *Asimina* Swallowtail!! Merian's figure represents the white South American insect usually known by the name of *protesilaus*. Seba's and Catesby's figures represent some species of the Nymphalid genus *Megalura*. Since Linné considered all these insects as being one species—which, moreover, was in his opinion only doubtfully distinct from the European *podalirius*—is it likely that he believed Edwards's figure to represent a different species? An unambiguous answer is given by Linné in *Mus. Lud. Ulr.* p. 209 (1764). In this work, in which a page is devoted to each species of Lepidoptera, the descriptions being far superior to those in *Syst. Nat.*, the figure of Edwards is quoted under *protesilaus*!, where it ought to have been quoted also in *Syst. Nat.*

Perhaps the most striking evidence that Linné himself treated the Parsnip Swallowtail as being *ajax* is offered in the 12th edition of *Syst. Nat.* Here the Eastern Palaearctic *P. xuthus* is described on p. 751, being placed after *P. machaon*, while *P. ajax* is placed before *P. machaon*. This *P. xuthus* Linné describes as being **very similar** to *P. ajax* ("simillimus *P. ajaci*"). Now, *P. xuthus* is utterly different from the *Asimina* Swallowtail, while it resembles *P. machaon* as well as the Parsnip Swallowtail.

Considering all this evidence without bias, it appears to us to be beyond doubt

* Namely, *machaon*.

that the name *ajax* "Linné" cannot possibly be employed for the *Asimina* Swallowtail. In our opinion the description under the heading *ajax* was meant for the Swallowtail now called *polyxenes* or *asterius*. But as the description is quite insufficient for precise recognition, and as, further, by the reference to Ray yellow specimens of *Papilio glaucus* are included in the "species *ajax* Linné," we deem it correct to treat the name *ajax* as a synonym of *glaucus*,* which name is described before *ajax*, and to quote it again as a doubtful synonym under *polyxenes*. A change in the names of the North American Swallowtails is thus rendered unnecessary, except that the name *ajax* is dropped altogether, the name *marcellus*, which comes next in priority, and with which everybody is familiar, being employed instead for the species. The wings of *protesilaus* being described by Linné as white, we restrict this name to the white insect figured by Merian and Clerck.

♂♀. Antenna tawny, carinate beneath (except club), the two patches of sensory hairs of each segment being impressed; scaling of upperside usually fallen off, scales of distal segments brown or black, of proximal segments white. Tibiae and tarsi pale green, the former bearing scales in fresh specimens (the scaling may be present also on the tarsi when the specimen emerges from the chrysalis, but we have no information on this point); mid- and hindtibial spurs longer than the tibia is broad.

Forewing with eight pale bands, the third very narrow, not extending beyond cell, fourth and fifth continuous with the discal band, sixth distally of apex of cell, reaching down to R^2, seventh represented by a spot situated before SC^{4+5}, eighth submarginal, more or less separated into spots, of which the posterior ones are luniform.

Red line of *underside* of hindwing bordered with white proximally, distally of the red line and proximally of white one a black band, the distal black band being the thinner one, the white line situated just outside cell, being contiguous with the cross-veins D^2. Scales of upper surface nearly all dentate.

Neuration: Praecostal spur of hindwing at three-fourths of basal cellule.

Scent-organ resembling that of *P. protesilaus*, being very different from that of *P. philolaus*; vein SM^3 covered with white scales of the ordinary shape but obliquely truncate at apex, being either more or less dentate or entire; between this vein and abdominal edge of fold a dense covering of thin, white, long hairs, intermixed with a small proportion of much longer and thicker ones; these latter slightly but distinctly widening towards apex, which is rather abruptly narrowed to a point.

Genitalia: ♂. Tenth tergite narrow, slightly-widened distally, divided into three lobes. Dorso-ventral ridge of harpe not extending ventrad beyond the central process, being almost continuous with the non-dentate dorsal edge of the apical lobe of the harpe; central process long, curved ventrad; ventral process triangular. ——♀. Walls of vaginal cavity very strongly wrinkled, the wall elevate in front of the vaginal aperture, but there is no sharply separate process or ridge.

Early stages well known. Except in first stage, the segments of the caterpillar bear each six black or brown transverse lines, besides a short line in front and another behind which are connected with one another; the interspaces between lines 2 and 3 and between 4 and 5 very narrow, these lines being usually more or less merged together.——Frontal prominences of chrysalis divergent, carinate above, frons broadly concave between them in dorsal aspect. Thoracic prominence vertical, slightly concave behind, lateral carina continued to cremaster without

* See page 414.

break; puncturation of abdomen rather dense, segments 2 to 8 with transverse carina before apex, tenth segment hardly one-third longer than broad; hooks of cremaster pale.——Food-plant: *Asimina triloba* and other species of *Asimina*, rarely *Ericaceae* and *Lauraceae*.

A seasonally variable species. Two principal forms: a variable spring form emerging from hibernated pupae, and a summer form emerging from pupae which have not wintered. As the size and markings of the specimens appear to depend on the temperature of the period critical for the chrysalis, the late spring specimens approach the summer and autumn specimens, and the early spring individuals from the most southern districts of the range of the species resemble in certain characters the late spring specimens of the more northern districts. The time of appearance in spring varies also with the latitude of the locality.

I. Spring forms.——Hairs on frons long. Pupa hibernated.

a'. P. marcellus f. hib. *marcellus* Cram. (1777).

Papilio Eques Achivus marcellus Cramer, *Pap. Exot.* ii. p. 4. t. 98. fig. F. G (1777) (Virginia); Stoll, in Cram., *Pap. Exot.* iv., *Ordre Syst.* p. 3. n. 4 (1782) (= *ajax*, false).
Papilio marcellus Stoll, *l.c.* iv. p. 195 (1782) (= *ajax L.*, false).
Papilio ajax, Abbot & Smith, *l.c.*; Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* i. p. 4. t. 1. fig. 1—4. l., p., i (1833); Boisd., *Spec. Gén. Lép.* i. p. 258. n. 82 (1836); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 303. n. 206 (1864).
Papilio ajax var. *walshi* Edwards, *Butt. N. Am.* i. *Pap.* i. fig. 1—5 (1868); id., *Canad. Ent.* iii. p. 70 (1871); Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., common).
Papilio ajax var. *walshi* subvar. *abboti* Edwards, *Butt. N. Am.* i. *Pap.* I. fig. 6 (1868).
Papilio ajax dim. var. *walshi* id., *Trans. Amer. Ent. Soc.* vi. p. 9 (1877) (= *marcellus*).
Papilio ajax sub-var. *abboti* id., *l.c.* (1877).
Papilio ajax var. *abbotti*, Gerhard, *Macro-Lep. N. Amer.* p. 25. n. 443c (1878).
Papilio walshi, Mundt, *Canad. Ent.* xv. p. 87 (1883) (Pontiac, Illin., March).
Papilio abboti, id., *l.c.* xv. p. 87 (1883) (Pontiac, Illin., March).
Papilio ajax walshi sub-var. *abbotti*, Scudder, *Butt. E. U. St. and Can.* ii. p. 1269 (1889).
Papilio ajax walshi, Eimer, *Artb. Verwandtsch. Schmett.* p. 195. t. 3. fig. 12 (1889); Heink, *Ent. News* xiv. p. 335 (1903) (Meramec Highlands, St. Louis Co., April 12).
Papilio ajax var. *abbotti*, Holland, *Butt. Book* p. 307 (1899).

The early spring form.

♂ ♀. Pale bands broad; usually no distinct pale band along abdominal fold of hindwing; only tip of tail white; red anal spot large, not divided into spots.

Specimens with some of the red discal spots of the hindwing more or less distinct on upperside are ab. *abboti*.

b'. P. marcellus f. loc. hib. *floridensis* Holl. (1899).

Papilio ajax winter form *floridensis* Holland, *Butt. Book* p. 307. t. 44. fig. 2 (1899).

The early spring form of Florida.

♂ ♀. The black bands broader than in f. hib. *marcellus*.

c'. P. marcellus gen. hib. *telamonides* Feld. (1864).

Papilio telamonides Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 303. n. 205 (1864); id., *Reise Novara, Lep.* p. 60. n. 46 (1865); Mundt, *Canad. Ent.* xv. p. 88 (1883) (Pontiac, Illin., later than *walshi*); Pack., *Fifth Rept. U.S. Ent. Comm.* p. 669 (1890) (larva on *Asimina triloba*).
Papilio ajax var. *telamonides*, Edwards, *Butt. N. Am.* i. *Pap.* ii. fig. 1—8 (1868); Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., common).
Papilio ajax dim. var. *telamonides*, Edwards, *Trans. Amer. Ent. Soc.* vi. p. 9 (1877).
Papilio ajax telamonides Eimer, *Artb. Verwandtsch. Schm.* p. 195 (1889).
Papilio ajax f. *telamonides*, Moffat, *Canad. Ent.* xxxiv. p. 170 (1902) (Kingsville, Lake Erie, May).

The late spring form.

♂♀. Wings rather longer than in gen. hib. *marcellus*; black bands on the whole a little wider; white colour of tail more extended laterally. Transition to the summer form.

II. Summer and autumn form.——Large; hairs on frons short; wings longer and forewing more falcate than in the spring forms; white colour of tail extending laterally at least to middle.——Only one form, the various broods not appearing to differ from one another.

d'. P. marcellus f. aest. *lecontei* nom. nov.

Papilio marcellus, Boisduval & Leconte (*non* Cramer, 1777, err. det.); *Hist. Gén. Lép. Amér. Sept.* i. p. 8. t. 2. fig. 1—4. l., p., i (1833); Boisd., *Spec. Gén. Lép.* i. p. 257. n. 81 (1836); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 303. n. 204 (1864).
Papilio ajax var. *marcellus*, Edwards, *Butt. N. Am.* i. *Pap.* iii. fig. 1—6 (1868).
Papilio ajax dim. var. *marcellus*, id., *Trans. Amer. Ent. Soc.* vi. p. 9 (1877).
Papilio ajax var. *marcellus*, Dury, *Cincinnati Soc. Nat. Hist.* i. p. 12 (1878) (Cinc., common).
Papilio ajax marcellus Eimer, *Artb. Verwandtsch. Schm.* p. 195. t. 4. fig. 5 (1889).
Iphiclides ajax ajax, Scudder, *Butt. East U. St. & Can.* ii. p. 1264. t. 15. fig. 11 (1889).

There is no valid name available for this form, which was erroneously figured by Boisduval and Leconte as the true *marcellus* of Cramer. We do not know what nomenclatorial considerations induced W. H. Edwards to rename the early spring form as *walshi*, sinking *marcellus* Cram. as a synonym of *walshi*, and to employ *marcellus* Boisd. & Lec. (1834; *non* Cramer, 1779) for the summer form. Scudder correctly referred to the early spring form as *marcellus* Cram.

♂♀. Black bands of body and wings broader than in the spring forms; hindwing usually with distinct pale band along abdominal fold, second red spot of upperside much reduced, in male very often, in female always, absent.

Name-type of *lecontei* from Nashville.

Hab. P. marcellus occurs from Florida and Texas to southern Canada, westwards extending to the Mississippi plains; in the northern districts it is more a visitor than a resident.

One specimen found on Vancouver Island; chrysalis imported (?).

In the Tring Museum 120-odd specimens, and several larvae and pupae from: Nashville, Tennessee (W. Osburn); Jefferson Co., Kentucky (C. Troxler); Nelson Co., W. Virginia (Wirt Robinson); Sanford, Florida.

139. **Papilio marcellinus** Doubl. (1845).

Sloane, *Voy. Jamaica* ii. p. 218. t. 239. fig. 17. 18 (1725).
Papilio Eques Achivus protesilaus Linné, *Mus. Lud. Ulr.* p. 209. n. 28 (1764) (sub citat.: "*Sloan. jam.* 2. p. 218. t. 239. f. 17, 18"); Drury, *Illustr. Exot. Ins.* i. p. 45. (and Index) t. 22. fig. 3. 4 (1770) (Jamaica).
Papilio Eques Achivus sinon Fabricius (*non* Poda, 1761), *Syst. Ent.* p. 452. n. 39 (1775) (*partim*; "India"); id., *Spec. Ins.* ii. p. 15. n. 59 (1781) (*partim*); Goeze, *Ent. Beytr.* iii. 1. p. 72. n. 7 (1779) (*partim*); Cram., *Pap. Exot.* iv. p. 57. t. 317. fig. C. D (1780) ("Jamaica"; syn. excl.); Fabr., *Mant. Ins.* ii. p. 8. n. 67 (1787) (*partim*); Gmel., *Syst. Nat.* i. 5. p. 2241. n. 329 (1790) (*partim*); Fabr, *Ent. Syst.* iii. 1. p. 26. n. 75 (1793) (*partim*; "India").
Papilio sinon Fabricius, *Nomencl.* p. 128 (1797) ("India"); Godart, *Enc. Méth.* ix. p. 53. n. 80 (1819) (*partim*); Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 11 (1833) (*partim*); Boisd., *Spec. Gén. Lép.* i. p. 260. n. 83 (1836) (*partim*); Morris, *Syn. Lep. N. Am.* p. 9. n. 13 (1862) (*partim*; sub synon.); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 302. n. 200 (1864) (*partim*); Butl., *Cat. Diurn. Lep. descr. Fabr.* p. 240. n. 25 (1869) (Jamaica; type in coll. Banks); Kirby, *Cat. Diurn. Lep.* p. 557. n. 269 (1871) (Jamaica); Butl., *Proc. Zool. Soc. Lond.* p. 481.

n. 34 (1878) (Jamaica) ; Möschl., *Abh. Senkenb. Nat. Ges.* xiv. *Schm. Jamaica* p. 26. n. 1 (1888) ; Eimer, *Arth. Verwandtsch. Schm.* p. 183. t. 3. fig. 11 (1889) (Jamaica); id., *Orthogen.* pp. 44. 131. 139. 305 (1897) (Jamaica).

Iphiclides sinon, Hübner, *Verz. bek. Schm.* p. 82. n. 838 (1818 ?) (*partim*).

Papilio marcellinus Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 8 (1845) (*nom. nov.* loco *protesilaus* Drury ; Jamaica) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 131 (1846) (Jamaica) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 32. n. 152 (1852) (Jamaica) ; id., *List Lep. Ins. Brit. Mus.* i. p. 44. n. 160 (1856) (Jamaica) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 303. n. 203 (1864) (Jamaica) ; Oberth., *Et. d'Ent.* iv. p. 65. n. 172 (1880) (Jamaica).

♂ ♀. Abdominal tergites edged with white, the white edge incomplete above. Tibiae and tarsi pale green, tarsal segments somewhat ochraceous at apices ; no scaling ; external spur of mid- and hindtibiae a little longer than internal.

Wings, *upperside*, with pale green bands ; scales nearly all denticulate, those of the pale markings small, comparatively few in number, easily falling off, leaving the bands naked.——Forewing : a basal and a subbasal band from costal to inner margin, a very thin line across cell just proximally of M^2, a broad band beyond middle of cell, divided costally by a black line or spot, the band continuous with a broad discal band ; a short costal band SC^2—R^1 proximally of subcostal fork ; a row of seven submarginal spots, there being no spot or only a trace of one behind M^2.—— Hindwing : black submedian band complete, reaching to black distal border.

Pale bands of *underside* scaled, the scales smaller than the brown ones on forewing. Red line of hindwing very broad, reaching to brown distal border of wing, the line edged with black distally, especially in costal region, thinly edged with black proximally.

Scent-organ : Fold small, scent-scales long, similar to those of *agesilaus*, but longer and more slender.

Genitalia : ♂. Tenth tergite elongate but broad, divided apically by two narrow incisions into three lobes. Dorso-ventral ridge of harpe reaching ventral edge about middle, ending dorsally in an acute, somewhat conical process or tooth ; ventral process short but distinct.——♀ not dissected.

Early stages and food-plant not known.

As Poda gave the name *sinon* in 1761 to the European *P. podalirius*, which belongs also to the present section of *Papilio*, the same name cannot be employed for the Jamaican insect. Doubleday was quite right in renaming the species.

Hab. Jamaica.

In the Tring Museum 6 ♂♂ from : S. Thomas, Jamaica, May 1892 (Taylor) ; "Jamaica."

Several pairs in coll. Oberthür.

140. **Papilio celadon** Lucas (1852).

Seba, *Thesaur.* iv. p. 45. t. 37. fig. 13. 14 (1764).

Papilio Eques Achivus sinon Cramer (*non* Poda, 1761 ; *non* Cramer, fig. C. D.), *Pap. Exot.* iv. p. 57. t. 317. fig. E F (1780) ; Fabricius, *Mant. Ins.* ii. p. 8. n. 67 (1787) (*partim*) ; Jabl. & Herbst, *Naturs. Schm.* iii. p. 159. n. 101. t. 44. fig. 5 (1788) (*partim* ; fig. copy of Cramer's fig. E); Gmelin, *Syst. Nat.* i. 5. p. 2241. n. 329 (1790) (*partim* ; "India" !) ; Fabr., *Ent. Syst.* iii. 1. p. 26. n. 75 (1793) (*partim* ; "India" !).

Papilio sinon, Godart, *Enc. Méth.* ix. p. 53. n. 80 (1819) (*partim*) ; Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 11 (1833) (*partim*); Boisd., *Spec. Gén. Lép.* i. p. 260. n. 83 (1836) (*partim*) ; Duncan, in Jard., *Nat. Libr., Ent.* v. p. 106. t. 4. fig. 2 (1843) (syn. *partim*) ; Poey, *Mem. Real Soc. Econ. Habana* p. 236 (1846); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lép.* i. p. 3. n. 45 (1857) (*partim*) ; Herr.-Sch., *Corresp. Bl. Zool. Min. Ver. Regensb.* p. 172. n. 2 (1864) (Cuba) ; Felder, *Verh. Zool. Bot Ges. Wien* xiv. p. 302. n. 200 (1864) (*partim*) ; Edw., *Trans. Amer. Ent. Soc.* vi. p. 9. n. 2

(1877) (Florida, occasionally Cuba) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 442 (1878) (Florida) ; Strecker, *Butt. Moths N. Amer.* p. 68. n. 6 (1878) (Florida ? ; Antilles ; *partim*).

Iphiclides sinon, Hübner, *Verz. bek. Schm.* p. 82. n. 838 (1818 ?) (*partim*).

Papilio celadon Lucas, *Rev. Zool.* (2). iv. p. 130 (1852) (" Amer. Sept.") ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852) (" N. America ") ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 31. n. 153 (1852) (" N. America ") ; id., *List Lep. Ins. Brit. Mus.* i. p. 44. n. 161 (1856) (" N. America ") ; Lucas, in Sagra, *Hist. Fis. Cuba* vii. p. 204 (1857) (Cuba) ; Morris, *Syn. Lep. N. Am.* p. 10. n. 14 (1862) (" California—Oregon ?," error) ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) (= *sinon* = *marcellinus*, error) ; Felder, *l.c.* xiv. p. 303. n. 202 (1864) (*partim*) ; Kirby, *Cat. Diurn. Lep.* p. 557. n. 268 (1871) (" Antilles ") ; Oberth., *Et. d'Ent.* iv. p. 65. n. 173 (1880) (Cuba) ; Gundl., *Papilio* i. p. 113 (1881) (Cuba) ; id., *Contr. Ent. Cubana* p. 125 (1881) (Cuba) ; Eimer, *Arth. Verw. Schmett.* p. 182. t. 3. fig. 10 (1889) (Cuba) ; id., *Orthogen.* p. 44. 131. 305 (1897) (Cuba).

Papilio serion (!), Edwards, *Canad. Ent.* xiv. p. 120 (1882) (Cuba, perhaps also Florida).

Iphiclides celadon, Kirby, in Allen's *Nat. Libr., Lep. Butt.* ii. p. 274. t. 68. fig. 2. (1896) (Cuba ; " Jamaica," errore).

♂ ♀. Thongh in general aspect not unlike *P. marcellinus*, there are very important differences, of which we mention the following : On the forewing it is the third and fourth pale green cell-bands (instead of the fourth and fifth) which are continuons with the discal band ; these two cell-bands narrowing costad, separated by a black band which usnally extends to M ; a pale green cell-band close to apex of cell, widely separate from the discal band ; fifth submarginal spot enlarged and, like the second, somewhat more proximal than the others. Red line of hindwing below thin, bordered with black on both sides, the red scaling not extending beyond cell, often restricted to costal region, the line and its borders continued to the brown distal area as a brown band.

Neuration : Cell of hindwing broader apically than in *P. marcellinus*, veins R^2, R^3 and M^1 being less close together and the apical angle less acute.

Genitalia : ♂. Tenth tergite long, narrow, slightly compressed, rodlike in dorsal aspect, a little curved downwards, tip acute, with a very feeble notch at each side indicating the lateral lobes of the allied species. Apical lobe of harpe much larger than in *P. marcellinus* ; ventral process absent ; dorso-ventral ridge not ending dorsally in a tooth or process.——♀. Within vaginal cavity, at the proximal side of the orifice, a tubercle which is mesially channelled ; at each side of the vaginal orifice, but a little farther back, a deep impression, the two grooves being separated in consequence of the mesial portion of the segment being non-depressed ; there are some long bristles on this mesial part, doubtless of sensory function. Anal segment with some short stout spines.

Early stages and food-plant not known.

Fresh specimens are pale bluish green, which colour fades, by exposure, into greenish white or yellowish green.

Hab. Cuba ; probably also in Florida.

There is no authentic record of this insect from Florida ; but the species may be expected to occur in southern Florida, like so many Cuban insects.

In the Tring Museum 8 ♂♂, 7 ♀♀, from : Holquin and Gibara, January and April—May 1904 (Tollin) ; Cotorro.

141. **Papilio zonaria** Butl. (1869).

Aubenton, *Planch. Enlum.* i. t. 18. fig. 1. 2 (1765).

Papilio Eques Achirus sinon Fabricius (*non* Poda, 1761), *Syst. Ent.* p. 452. n. 39 (1775) (*partim* ; " India ") ; id., *Spec. Ins.* ii. p. 15. n. 59 (1781) (*partim*) ; Goeze, *Ent. Beytr.* iii. 1. p. 72. n. 7 (1779) (*partim*) ; Fabr., *Mant. Ins.* ii. p. 8. n. 67 (1787) (*partim*) ; Jabl. & Herbst, *Naturs.*

Schm. iii. p. 159. n. 101. t. 44. fig. 6 (1788) (*partim* ; fig. is copy of Anbent.'s fig. 2) ; Gmelin, *Syst. Nat.* i. 5. p. 2241. n. 329 (1790) (*partim* ; "India") ; Fabr., *Ent. Syst.* iii. 1. p. 26. n. 75 (1793) (*partim* ; "India").

Papilio sinon, Godart, *Enc. Méth.* ix. p. 53. n. 80 (1819) (*partim*) ; Boisd. & Lec., *Hist. Gén. Lép. Amér. Sept.* p. 11. t. 3. fig. 1. 2 (1833) (*partim* ; "Florida," error ? ?) ; Boisd., *Spec. Gén.* i. p. 260. n. 83 (1836) (*partim*) ; Doubl., in Westw., *Arc. Ent.* i. p. 60 (1845) (not the same as Drury's *protes.*); Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 32. n. 151 (1852) ("N. Amer. & Jamaica"); id., *List Lep. Ins. Brit. Mus.* i. p. 43. n. 159 (1856) (St. Domingo ; synon. *partim*) ; Lucas, in Sagra, *Hist. Fis. Cuba* vii. p. 204 (1857) ("Cuba, Jamaica, Florida," error) ; Ménétr., *Enum. Corp. Anim. Mus. Petr., Lép.* i. p. 3. n. 45 (1857) (*partim*) ; Morris, *Syn. Lep. N. Am.* p. 9. n. 13 (1862) (synon. *partim* ; "Southern States") ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 302. n. 200 (1864) (*partim*) ; Oberth., *Et. d'Ent.* iv. p. 65. n. 171 (1880) (S. Domingo).

Iphiclides sinon, Hübner, *Verz. bek. Schm.* p. 82. n. 838 (1818 ?) (*partim*) ; Dyar, *Bull. U. St. Nat. Mus.* lii. p. 2. n. 6 (1902) (*partim*).

Papilio zonaria Butler, *Cat. Diurn. Lep. descr. Fabr.* p. 240. n. 24 (1869) (San Domiogo) ; id., *Ent. Mo. Mag.* v. p. 271. n. 3 (1869) (S. Domingo) ; Kirby, *Cat. Diurn. Lep.* p. 557. n. 267 (1871) (*partim*) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 441 (1878) ("Union !") ; Eimer, *Arth. Verwandtsch. Schmett.* p. 186 (1889) ("Jamaica," errore).

Papilio celadon, Weidemeyer, *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) (= *sinon* = *marcellinus*, errore).

Papilio zonaria = *scrion* (!), Edwards, *Canad. Ent.* xiv. p. 120 (1882) ("Cuba," errore).

♂ ♀. Closely related to *P. marcellinus* ; in aspect similar to *P. philolaus* in consequence of the reduction in width of the pale bands. On forewing the fourth and fifth pale green cell-bands continuous with the narrow discal band, third cell-band thin, as in *P. marcellinus*, but a little more distal in position, fourth and fifth bands much thinner than in *P. marcellinus*, much more distal and completely separate from one another ; a small pale dot distally of short sixth band. Red line of underside of hindwing bordered with black on both sides, reaching to brown distal area or nearly.

Scent-organ and neuration essentially as in *P. marcellinus*.

Genitalia as in *P. marcellinus*, but apical lobe of harpe longer and more evenly rounded.

Early stages not known.

Hab. Haiti.

The early records of this insect from Florida, Cuba, or Jamaica are not authentic ; *marcellinus* and *celadon* were doubtless confounded with *zonaria*. All the specimens of *zonaria* which we have seen were from the island of San Domingo (Haiti).

If a representative of this group occurs on Porto Rico, it is most likely *zonaria* or a form closely allied to it.

In the Tring Museum 1 ♂.

In coll. Oberthür 5 ♂♂, 1 ♀ ; also a small series in coll. F. D. Godman.

142. **Papilio philolaus** Boisd. (1836).

Papilio philolaus Boisduval, *Spec. Gén. Lép.* i. p. 256. n. 80 (1836) (Mexico) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 8 (1845) (Oaxaca) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 129 (1846) (Mexico) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 33. n. 154 (1852) (Mexico) ; id., *List Lep. Ins. Brit. Mus.* i. p. 44. n. 162 (1856) (Mexico ; Nicaragua) ; Ménétr., *Enum. Corp. Anim. Mus. Petr., Lép.* i. *Suppl.* p. 68. n. 1121 (1857) (Mexico) ; id., *l.c.* iii. p. 110. n. 1121. t. 7. fig. 1 (1863) ("Amer. Sept.," errore) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 303. n. 201 (1864) (Mexico ; Nicaragua ; "Amer. Sept.," errore) ; Boisd., *Cons. Lép. Guat.* p. 6 (1870) (Honduras ; Mexico); Kirby, *Cat. Diurn. Lep.* p. 557. n. 266 (1871) (Amer. centr. ; "Amer. bor.," errore) ; Gerh., *Macro-Lep. N. Amer.* p. 25. n. 440 (1878) ; Oberth., *Et. d'Ent.* iv. p. 65. n. 174 (1880) (Mexico); Stand., *Exot. Tagf.* i. p. 18. t. 12. ♂ (1884) (Guatemala ; Mexico) ; Eimer, *Arth. Verwandtsch.*

Schmett. p. 210. t. 4. fig. 1. 7 (1889); Godm. & Salv., *Biol. Centr. Amer., Rhop.* p. 220. n. 49. t. 68. fig. 12. harpe (1890) (Mexico; Guatemala; Brit. Honduras; Honduras; Nicaragua); Eimer, *Orthogen.* p. 400 (1897) ("Nord Amer.," errore; Mittel Amer.).

Papilio xanticles, Rogenhofer, in Staud., *Exot. Tagf.* i. p. 305 (1888).

Papilio philolaus ajax Eimer (*non* Linné, 1758), *Arth. Verwandtsch. Schmett.* p. 212. t. 4. fig. 1 (1889) (Mexico).

Papilio philolaus nigrescens id. (*non* id., 1889, *podalirius nigrescens*), *l.c.* p. 213 (1889) (Honduras).

Papilio philolaus niger id., *l.c.* 214 (1889) (Honduras).

Papilio philolaus ab. *felicis* Fruhstorfer, *Soc. Ent.* p. 25 (1904) (Honduras).

♂ ♀. Antenna black, more or less feebly tawny at base. Tibiae and tarsi pale green, tarsal segments slightly ochraceous at apex; mid- and hindtibial spurs about as long as the tibia is broad, the spurs being shorter than in *P. marcellus*; claw also shorter than in that species. Seventh pale band of forewing represented by a spot SC^3—SC^{4+5}, there being often some pale scales costally of this spot; hindwing *above* with two red spots between M^1 and abdominal margin, black median band running across apex of cell, being contiguous with the oblique cross-vein D^2, very seldom slightly separate from this vein, this band not interrupted, always extending to the black distal area.

On *underside* the red median line of hindwing is bordered with black on both sides, at least costally; it is undulate costally and is always contiguous with cross-vein D^2. The praecostal vein stands close to the apex of the basal cellule; the apical angle of the cell of the hindwing is acute, D^2 being very oblique; D^3 is short, being about one-fourth the length of D^2; D^3 and D^4 are together shorter than D^2. The scales of the upperside, apart from the anal area and the tail, are nearly all entire.

Scent-organ: scent-scales short, with numerous long filaments, the shape of the scales and the number of filaments being variable.

Genitalia: ♂. Dorsal ridge of harpe reaching ventral edge nearly in middle. —♀. A deeply sinuate lobe in front of vaginal cavity, the lobe plicate; laterally of cavity a larger lobe of which the edge is simply convex.

Early stages not known.

The species does not vary geographically, but there is considerable individual variability, especially in the width of the bands. The red markings of the hindwing are occasionally pinkish yellow (a male from San Pedro Sula in Mus. Tring). The third pale line of the forewing is often washed over with black, the line being sometimes distinct only near the costal margin; the second pale line is also reduced in length in some specimens. The sixth pale band is rarely so much prolonged as to nearly extend to the discal band. The latter is usually very much narrower than the black band situated between it and the submarginal row of greenish spots, but there occur also specimens in which the greenish white band is wider between M^1 and hinder margin than the black band situated distally of it. The submarginal spots of both the fore- and hindwing are largest in the specimens with wide discal band, the last of the forewing and the first and last of the hindwing being often vestigial in individuals with narrow pale bands. The specimens with broad pale bands are a little more short-winged than the darker specimens, the forewing being on the whole also less falcate. As these differences are somewhat similar to those observed between the seasonal varieties of the North American *P. marcellus*, it is possible that the dark and the pale specimens of *P. philolaus* belong to different broods; but no observations have been made towards this point. The pale band along the abdominal margin of the underside of the hindwing is

often somewhat washed with red, reminding one of the corresponding red line of *P. asius*.

The female is dichromatic.

a'. ♀-f. *philolaus* Boisd. (1836) is similar to the male, differing especially in the underside being paler. The vestige of a pale postdiscal band on the undersurface of the forewing is on the whole more distinctly marked than in the male.

b'. ♀-f. *niger* Eimer (1889) (=*felicis* Fruhst., *l.c.*) has lost all the pale bands, the row of submarginal spots being however more or less distinct. The red markings of the hindwing are also preserved. The black surface of the wings has not been attained by a widening of the black bands, but by the pale bands being washed over with black, these bands remaining as faint shadows. It is the same development which we observe in the African *P. illyris* and *kirbyi*, and the North American *P. glaucus glaucus* ♀-f. *glaucus*.

Hab. of *P. philolaus*: Mexico to Nicaragua and Honduras.

In the Tring Museum 55 ♂♂, 7 ♀♀, from: Sangolica, June 1897, Espinal, June 1896, Vera Cruz (W. Schaus); Guerrero (O. T. Baron); Guatemala (Salvin); San Pedro Sula, Honduras.

Ménétriés, when describing and figuring this species, *l.c.*, gave North America as the country where Motschoulsky had obtained the specimens, and since then several authors (Felder, Kirby, Eimer) have included "Amer. Sept." in the range of the species. However, the species does not occur north of Mexico. In the list of 1857 Ménétriés correctly gave Mexico as habitat.

143. **Papilio xanticles** Bates (1863).

Papilio xanticles Bates, *Proc. Zool. Soc. Lond.* p. 241. n. 1. t. 29. fig. 3 (1863) (Panama); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 302. n. 199 (1864) ("Guatemala," false); Kirby, *Cat. Diurn. Lep.* p. 557. n. 265 (1871) (Panama); Oberth., *Et. d'Ent.* iv. p. 67. n. 186 (1880) (Panama); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 234 (1880) (Manaure, Sta. Marta); Eimer, *Arth. Verwandtsch. Schmett.* p. 178. fig. U (1889); Godm. & Salv., *Biol. Centr. Amer., Rhop.* p. 221. n. 50. t. 68. fig. 10. ♀, 11. ♂ (1890) (Lion Hill, Panama; Colombia).

Papilio plaesiolaus Staudinger, *Exot. Tagf.* i. p. 17 (1884) (Sta. Martha); Eimer, *l.c.* p. 182 (1889) (var. of *arcesilaus*, errore).

♂♀. Pale bands of *upperside* of wings buffish straw-yellow; the cell-bands of forewing rather wider than in *P. philolaus*, sixth pale band extending to R^2 where it joins the discal band, the latter continued costad to SC^3, the single spot SC^2—SC^4 of *P. philolaus* being replaced in *P. xanticles* by a band which is continuous with the broad discal band, being the direct prolongation of the same.—— Black subbasal band of hindwing much thinner than in *P. philolaus*; black median band widely interrupted; red anal spots smaller than in *P. philolaus*; submarginal spots larger.

On *underside*, position of red line of hindwing as in *P. philolaus*, central portion of line thin. Pale streaks on abdomen broader than in *P. philolaus*.

The species does not vary much. The ♀, however, appears to be dimorphic as in *philolaus*:

a'. ♀-f. *xanticles* Bates (1863) similar to the ♂. This form is not known, but doubtless exists.

b'. ♀-f. *scheba* nov., wings black, except a row of yellowish submarginal spots and two red anal spots.

Though somewhat resembling in colour *P. arcesilaus*, of which it has generally been considered a near ally, *P. xanticles* is in fact hardly more than a southern

form of *P. philolaus*. There is no structural difference between *P. xanticles* and *philolaus*, *xanticles* having all the peculiarities in the structure of the scent-organ, the genitalia and legs which we have mentioned under *P. philolaus*. In pattern the two insects are well separated. However, we must bear in mind that, *P. philolaus* being known to occur as far south as Nicaragua, and *xanticles* having been found only in Colombia and Panama, there is a geographical gap between the two Papilios, where possibly an intermediate form exists which has as yet escaped observation.

The fact that the extended-black *P. philolaus* and the much less extended-black *P. xanticles* are two closely related species, if they are not geographical varieties of one species, appears to us to upset one of those "laws" of development established on insufficient evidence by Eimer and accepted by others. In *Orthogenesis*, p. 401, Eimer comparing the characters of *philolaus* with those of the various seasonal forms of *marcellus* (*ajax*, auct. *non* Linné) comes to the conclusion that the black bands of *philolaus* are strongly developed **because** *philolaus* is a more southern insect than *marcellus*. However, if high temperature and moisture, as Eimer says, were the real causes which have turned the less extended-black ancestral *philolaus* into the extended-black present-day *philolaus*, then the ally of *philolaus* which lives in a hotter and more moist climate than *philolaus* itself, ought to be more extended-black than *philolaus*. We find, on the contrary, that *P. xanticles* from the coast of Panama and the north coast of Colombia is far less black than *philolaus* from Nicaragua and the countries northwards, inclusive of Mexico, and even than the North American *marcellus*.

Eimer makes another mistake when talking of the lines of development of *P. philolaus* and *P. marcellus*. He calls the black form of *philolaus*—Eimer did not know that this black form is restricted to the female sex—as being arrived at by extension of the black bands. That is not correct. The pale bands have **not** become narrower and narrower until they finally disappeared, but the pale bands have become suppressed by the scaling turning black. This assumption of black colour on the part of the scales of the pale bands is a new kind of development (see *P. ph.* ♀-f. *niger*), the black wing of these females being not at all the final result of *Orthogenesis*, *i.e.* of a gradual widening of the black bands.

The *Papilio plaesiolaus* Stand. (1884), which is the same as *xanticles*, is treated by Eimer, *l.c.*, as being a variety of *arcesilaus*, a very different species. However, Eimer knew *xanticles* only from Bates's figure and description, and *plaesiolaus* from Staudinger's description.

In the Tring Museum 8 ♂♂ from Panama.

In coll. F. D. Godman a series of males and the only known female. One of the males, from Manaure, S. Martha, has the yellow discal areas of both wings and the submarginal spots of the forewing enlarged.

144. **Papilio oberthueri** spec. nov. (Pl. VI. fig. 25).

♂. Body, antenna, and legs essentially as in *P. philolaus*.

Wings, *upperside*: less deep black than in *P. philolaus*, the scales nearly all uni- or bisinuate.——Forewing semitransparent distally, pale bands white, proximal ones greenish, submarginal spots also greenish; these bands broader than in *P. philolaus*; second pale band about two-thirds the width of the black band situated distally of it, sixth band extending to R^2, being separated from the white discal area only by the black vein R^2, costally a little more distal in position than in

philolaus; spot SC^3—SC^4 as in *philolaus*, white discal area about half as wide again at M^2 as the black distal area; third black cell-band extending a very little beyond M, there being only a small black dot at the base of cellule M^1—M^2; upper submarginal spots larger than in *philolaus*, the posterior ones vestigial.——Hindwing narrower than in *philolaus*; black median band stopping at cell, not reaching across apex of cell as is the case in *philolaus*; black distal area a little paler than in *philolaus*, narrower, veins R^2, R^3, and M^1 thinly black; upper submarginal spot vestigial, the others more or less washed with black.

Underside: black bands somewhat paler than in *philolaus*.——Forewing: last submarginal spot more or less vestigial; black dot at base of cellule M^1—M^2 very small or absent.——Hindwing: black subbasal band narrower than in *philolaus*; red line not undulate, crossing cell between M^1 and R^3 or at M^1, the posterior portion of the line more or less vestigial, 2 or 3 mm. distant from apex of cell; the line bordered with black distally and very feebly or not at all proximally; two red anal spots as in *philolaus*; submarginal spots less distinct than in *philolaus*, especially the upper ones.

Neuration: cell of hindwing much less acute at apex than in *philolaus*, M^1 less close to R^3, and D^2 less oblique; praecostal spur more proximal.

Scent-organ: scales longer than in *philolaus*, the lateral filaments shorter.

Genitalia similar to those of *P. philolaus*.

Hab. San Pedro Sula, Honduras (Wittkugel); 3 ♂♂ in coll. Charles Oberthür.

145. **Papilio arcesilaus** Lucas (1852).

Papilio arcesilaus Lucas, *Rev. Zool.* p. 131. t. 10. fig. 2 (1852) ("Amér. du Nord" errore;—coll. Oberthür); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852) ("North America," errore); Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 33. n. 156 (1852) ("N. America"); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 164 (1856) ("N. America"); Morris, *Syn. Lep. N. Am.* p. 11. n. 15 (1862) ("California—Oregon?", errore); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863) ("U.S.A." errore); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 302. n. 197 (1864) (Caracas); id., *Reise Novara, Lep.* p. 60. sub n. 45 (1865) (Venezuela); Kirby, *Cat. Diurn. Lep.* p. 557. n. 264 (1871) (Venezuela); Oberth., *Et. d'Ent.* iv. p. 65. n. 175 (1880) (Colombia; Valera, Venezuela); Staud., *Exot. Tagf.* i. p. 16. t. 11. ♂ (1884) (Valera, Venezuela; ♀, Caracas); Eimer, *Artb. Verwandtsch. Schmett.* p. 179. t. 3. fig. 9 (1889) (Venezuela; Bogota); Hahnel, *Iris* iii. p. 200. 203 (1890) (Valéra); Eimer, *Orthogen.* p. 44 (1897).

Papilio anaxilaus Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 302. n. 198 (1864) (Bogota); Godm. & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 233 (1880) (Sta. Marta); Staud., *Exot. Tagf.* i. p. 17 (1884) (Antioquia, Colombia).

Papilio arcesilaus var. a. *P. anaxilaus*, Kirby, *l.c.* (1871) (Bogota).

Papilio arcesilaus-anaxilaus, Eimer, *Artb. Verwandtsch. Schmett.* p. 181 (1889) (Colombia).

♂♀. Antenna black, beneath slightly tawny proximally; scaling of upperside black. Tibiae and tarsi pale green, not scaled, or only a very few scales present; mid- and hindtibial spurs as long as the tibia is broad, outer spur a little shorter than inner.

Wings, *upperside:* scales nearly all entire, apart from tail and anal area. Forewing: six greenish white bands and a row of submarginal spots, sixth band short, reaching only to R^1 or R^2, being separate from the greenish white discal area. ——Hindwing: black median line marked only costally, sometimes vestigial.

Red median line of *underside* of hindwing reaching to blackish brown distal band, contiguous with cross-veins D^1 and D^2, there being no white spot in apex of cell outside the red line or only a trace of such a spot; the line bordered with black on both sides costally, especially on the proximal side.

Scent-organ : scales similar to those of *P. agesilaus*.

Genitalia : ♂. Harpe resembling that of *P. philolaus*, dentition slightly different, proximal edge of central process subdentate, ventral process vestigial. The three lobes of tenth tergite a little longer.—— ♀ not dissected.

Early stages not known.

The species does not vary much. The fourth black band of the forewing reaches usually to the median vein, but is often narrowed behind or abbreviated. The submarginal spots of the forewing vary in size and distinctness, the whole series being sometimes more or less washed with black. In a male from Venezuela, in coll. Godman, the cell-bands of the forewing are washed over with black. The single Colombian specimen in the Felder collection differs rather obviously from the only Venezuelan individual which Dr. Felder had for comparison when he described the former specimen as belonging to another species, which he named *anaxilaus*. The differences are, however, not constant. The small series of Colombian specimens which we have seen proves that the individuals vary *inter se*.

Hab. Venezuela and Colombia.

In the Tring Museum 6 ♂♂ from : Valera ; " Venezuela " (Moritz) ; Bogota.

146. **Papilio epidaus** Doubl. (1846).

Papilio epidaus Doubleday, in Doubleday, Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 138. t. 3. fig. 1 (1846) (Mexico ; Honduras).

♂ ♀. Antenna black, occasionally brown at the apex of the segments ; scaling black, usually fallen off. Tibae and tarsi pale green ; mid- and hindtibial spurs about as long as the tibia is broad, inner one a little longer than outer.

Scaling of wings peculiar. Forewing, *upperside :* black bands densely scaled, scales dentate, those of marginal band somewhat narrower than the scales of the other bands ; the white scales all very narrow, sinuate, distant from each other, therefore the wing more or less transparent, the hinder portion, however, appearing opaque owing to the denser white scaling of the undersurface shining through. If the wing is looked at in a slanting position, the eye being between light and specimen, a broad elongate-triangular band situated between distal margin and cell appears transparent, while the rest of the wing is more or less white, apart from the black bands ; this transparent band is covered with minute black scales on the upperside, being quite naked on the underside. The homology of this band is easy to perceive, the band corresponding to the postdiscal band of *P. agesilaus*, which is a double one ; the pale line which divides this postdiscal band of *P. agesilaus* (most distinctly in *P. agesilaus autosilaus*) is represented in *P. epidaus* by a white costal spot. The external edge of the transparent band of *P. epidaus* is usually more densely scaled than the centre, at least at the costal margin, forming a black proximal border to the white submarginal band, the border extending often down to M^2. The proximal portion of the postdiscal band of *P. agesilaus* is in *P. epidaus* represented by a black costal spot situated proximally of the subcostal fork, and by a black band which runs from the lower angle of the cell towards the hinder angle of the wing, being a direct continuation of the discocellular band. The subapical cell-band is represented by a costal spot in most specimens, there being from this spot across the cell a faint band of dispersed minute black scales ; occasionally the band is distinct as far as middle of cell. Most of the scales in the costal and central area of the hindwing are entire.

The transparent spaces of the *underside* of the forewing are practically devoid of scales ; the white scales of the posterior area are entire. The scales of the hindwing are dentate, except at the abdominal margin and between the subbasal and median bands.

Markings very characteristic. Second band of forewing reaching hinder margin beyond middle, discocellular band continued to M^2 or hinder angle, as explained above. Abdominal edge of hindwing black ; subbasal band heavy, continued to anal spot ; median band complete or posteriorly vestigial on *upperside*, bordering cell, on *underside* the band bordered with black proximally down to anal spots, its distal black border either being restricted to the costal region, or being thinner than the proximal border, at least from SC^2 to R^2.

Neuration : lower angle of cell of forewing obtuse ; cell of hindwing broad, widest at origin of nervule SC^2 ; D^1 and D^2 variable, sometimes nearly the same in length, sometimes D^1 almost twice the length of D^2; D^3 always very short ; D^1 about half or two-thirds the length of D^2 ; praecostal spur elbowed, not evenly curved.

Scent-organ : fold small ; scent-scales nearly as in *P. agesilaus*.

Genitalia : ♂. Tenth tergite trilobate as in *P. agesilaus* ; harpe strongly elevate where the dorso-ventral ridge meets the ventral edge, apical lobe broadly rounded, short.——♀. A small, feebly chitinised tubercule at the proximal side of the vaginal orifice ; behind the orifice, laterally on each side, a deep large groove, the walls of which are rather strongly chitinised ; anal segment with numerous very short spines.

Early stages not known.

Hab. Central America : Mexico to Honduras ; Nicaragua (according to Ménétriés).

Butler and Druce record it from Costa Rica. The record is certainly erroneous. This specimen is in the Godman collection. It agrees with *P. epidaus epidaus*, which would hardly be the case if the specimen came from Costa Rica. The record from Nicaragua, though requiring confirmation, may be correct, since Nicaragua belongs to the northern faunistic district of Central America.

Three subspecies.

a. P. epidaus epidaus Doubl. (1846).

Papilio epidaus Doubleday, in Doubl., Westw. & Hew., *l.c.* p. 15. n. 138. t. 3. fig. 1 (1846) (Mexico ; Honduras) ; id., *List Lep. Ins. Brit. Mus.* i. *App.* p. 2 (1848) (Honduras ; Yucatan); Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 34. n. 161 (1852) (Honduras ; Yucatan, acc. to Becker); id., *List Lep. Ins. Brit. Mus.* i. p. 46. n. 169 (1856) (Nicaragua ; Honduras ;—? Becker coll.) ; Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i p. 3. n. 50 (1857) (Nicaragua); Reak., *Proc. Ent. Soc. Philad.* ii. p. 135. n. 2 (1863) (Honduras ; good description) ; Weidem., *ibid.* p. 147 (1863) (Mexico ; Central America) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 302. n. 196 (1864) (Mexico ; Honduras) ; Boisd., *Cons. Lép. Guatem.* p. 6. (1870) (Mexico ; Honduras ; Nicaragua; —"Colombia," error) ; Kirby, *Cat. Diurn. Lep.* p. 557. n. 262 (1871) (Amer. centr.) ; Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 376 (1874) ("Costa Rica," errore) ; Obertb., *Et. d'Ent.* iv. p. 65. n. 177 (1880) (Mexico) ; Eimer, *Arth. Verwandtsch. Schm.* p. 51. 111. t. 1. fig. 7 (1889) (Central Amer.) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* p. 221. n. 51. t. 68. fig. 5. genit. (1890) (Mexico : Vera Cruz, Yucatan ; Brit. Honduras ; Guatemala ; Honduras ; Nicaragua.— "Costa Rica" error loci ; "San Blas" alia subsp.) ; Eimer, *Orthogen.* p. 47. 109. 311. 397 (1897).

♂ ♀. *Upperside :* second black band of forewing half the width or less of the interspace between it and third band ; fifth band not joining the marginal band behind, stopping short at M^2 or at least not reaching this vein.——Median band of

hindwing vestigial beyond cell or very thin; red anal spots bordered with white in front; black distal band not broader between SC^2 and R^1 than the greenish white submarginal halfmoon.

In one of our females (Honduras) the fifth band of the forewing reaches well beyond SM^2, nearly touching the marginal band.

Hab. Eastern Mexico: Vera Cruz, Yucatan; Guatemala; British Honduras; Honduras; "Nicaragua" (according to Ménétriés).

The black submarginal line of the forewing is often clearly marked down to M^2, while in other specimens it is restricted to a costal spot.

In the Tring Museum 15 ♂♂, 4 ♀♀, from: Espinal, Vera Cruz, June 1896 (W. Schaus); Guatemala (Salvin); San Pedro Sula, Honduras.

b. P. epidaus tepicus subsp. nov.

Papilio epidaus Godman & Salv., *Biol. Centr. Amer., Rhop.* p. 221. n. 51 (1890) (*partim*; San Blas).

♂. Wings. *Upperside.*—Forewing: first and second black bands broader than in *ep. epidaus*, fifth band continued to hinder angle where it joins the marginal band.——Hindwing longer than in *ep. epidaus* and costally narrower, median band broad in front, more distinct beyond cell than in *ep. epidaus*; subbasal band thinner from cell backwards than in front; white border of red spot M^1—M^2 thinner; black patch R^3—M^1 larger, greenish white submarginal spots larger; tail more extended silvery white.

Underside: the same differences as above, but white border of red spot M^1—M^2 of hindwing as large as in *ep. epidaus*.

Hab. West Mexico: Jalisco.

In the Tring Museum 1 ♂ from Jalisco; several specimens in coll. F. D. Godman from San Blas.

c. P. epidaus fenochionis Godm. & Salv. (1868).

Papilio fenochionis Godman & Salvin, *Ann. Mag. N. H.* (4). ii. p. 150 (1868) (Oaxaca); iid., *Biol. Centr. Amer., Rhop.* p. 222. n. 52. t. 68. fig. 13. 14. ♂ (1890) (Oaxaca).

♂♀. Fifth band of forewing extended to hinder angle. Subbasal and median bands of hindwing broad above and below, median band always reaching to the black distal area, which is much more extended than in the other two subspecies; red anal spots above without distinct white border, or the border very thin, the red spots being larger than in the other forms. Width of black bands of hindwing very variable; interspace between subbasal band and abdominal border often almost completely filled in with black-brown scaling.

Hab. South-Western Mexico: Oaxaca; Guerrero.

In the Tring Museum 64 ♂♂, 2 ♀♀, from: Guerrero (O. T. Baron); Salina Cruz, Tehuantepec, July 1904 (A. Hall); Oaxaca, July 1896 (W. Schaus).

147. **Papilio bellerophon** Dalm. (1823).

Papilio bellerophon Dalman, *Anal. Ent.* p. 37. n. 1 (1823); Boisd., *Spec. Gén. Lép.* i. p. 264. n. 87. (1836) (Bahia; Pernambuco); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 135 (1846); Doubl., *List Lep. Ins. Brit. Mus.* i. *Appendl.* p. 3 (1848) (Brazil); Gray, *Cat. Lep. Ins.* i. *Pap*; p. 33. n. 157 (1852) (Brazil); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 165 (1856) (Brazil). Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 3. n. 48 (1857) (Brazil); Felder, *Verh Zool. Bot. Ges. Wien* xiv. p. 301. n. 175 (1861) (Bras. austr.); Kirby, *Cat. Diurn. Lep.* p. 555. n. 245 (1871) (Brazil); Oberth., *Et. d'Ent.* iv. p. 67. n. 184 (1880) (Brazil); Eimer, *Artb.*

Verwandtsch. Schm. p. 53. 112. fig. N. t. i. fig. 12 (1889); Fickert, in Eimer, *l.c.* ii. p. 62. fig. E (1895) (neuration).
Papilio coresilaus Godart, *Enc. Méth.* ix. *Suppl.* p. 810. n. 61–2 (1824).
Protesilaus swainsonius Swainson, *Zool. Illustr.* ii. t. 104 (1833).

♂ ♀. Antenna black, scaling of upperside black, usually fallen off. Black hairs of frons long. Tibiae and tarsi pale green, scales preserved in fresh specimens only; inner tibial spur longer than outer.

Wings yellowish white.—Forewing semitransparent; four black bands, one across cell, stopping short in front of M^2, a second on cross-veins, joined at lower angle of cell to the third, which extends from costal margin to hinder angle or close to the angle, a fourth being marginal; scales of yellowish white areas very narrow, separate, sinuate, in posterior and basal areas alternately hair-shaped and triangular; on underside as above, but scales large and entire in posterior area of wing.—Hindwing much denser scaled than forewing, scales entire in costal area, abdominal and central areas from base to median band rather densely hairy; black median band thin, vestigial in front, slightly curved, touching apex of cell; the band complete on underside, centred with a more or less incomplete red line; scales of yellowish areas much narrower than on upperside, interspersed with fine hairs from base to median band.

The female larger than male; wings broader, distal margin of forewing more convex, red line of median band of hindwing vestigial on upperside; the median band more or less dilated in centre of wing on distal side, reminding one of *P. salvini*.

Neuration: SC^1 of forewing **absent**; C ending farther distad than in other species; PC of hindwing elbowed or nearly evenly curved; D^1 of hindwing about twice the length of D^2, D^3 as long as or a little shorter than D^4, angle of cell a little less than 90°.

Scent-organ: fold woolly, scales before and behind SM^2 entire, large, some scales of this kind also beneath the wool, which consists of thin long hairs, widest in middle, and of longer and thicker stiff hairs which end in an abrupt point.

Genitalia: ♂. Tenth tergite long, compressed, trilobate at apex; dorso-ventral ridge of harpe nearly continuous with dorsal edge of apical lobe, extending close to the rounded apex of this lobe, ventral margin of harpe dentate, the harpe produced proximally into a rounded lobe which reaches close to the ventral process, central process strongly compressed, abruptly pointed.—♀ not dissected.

Early stages not known.

Hab. Brazil.

In the Tring Museum 13 ♂♂, 1 ♀, from: Minas Geraës, February 1901 (A. Kennedy); Castro, Parana (E. D. Jones); Theresopolis, S. Catharina (J. Michaelis).

XV. Protesilaus Group.

The species of this group resemble one another so closely in pattern that many authors have treated them as mere individual varieties of one single species, with the exception of *P. agesilaus*, the distinctness of which the more recent authors at least have not doubted. We have studied this group carefully, the result being that we recognise no less than nine distinct species (as opposed to geographical and individual forms). These species are distinguished in the genitalia, in pattern and, at least partly, also in the scent-organ of the hindwing. Five of these species occur side by side over the greater part of tropical South America, while the others have

a more restricted range, Brazil being inhabited by no less than eight out of the nine species, of the ninth so far only a few Ecuadorian specimens being known. Two of these insects extend northwards to Mexico (*P. agesilaus* and *P. protesilaus*), a third species (*glaucolaus*) being found as far north as the isthmus of Panama.

The various species as they occur in the same district are in most cases easily distinguished from one another, but there is often hardly any difference in pattern between the individuals of one species from one district and the individuals of another species from another district, or two species are very different in one locality and almost identical in pattern in another. This renders it practically impossible to give a workable key to the species based on pattern only. Therefore we only group the species together according to pattern, and then give a key based on the genitalia of the males, the females being so rare in this group that for want of material we cannot take them into account in this key.

a. Inner edge of black postdiscal band of hindwing, upperside, quite straight down to M^1, the partitions R^2—M^1 of this band not uniform

A line of black spots in middle of upperside of hindwing . Species No. 153.

No black spots in middle of upperside of hindwing . . Species No. 152.

b. Inner edge of black postdiscal band of hindwing incised on veins R^2, R^3 and M^1, the partitions R^2—M^1 of the band being more or less uniform

Ad- and submarginal interspaces of hindwing yellow . Species Nos. 154 and 156.

Ad- and submarginal interspaces of hindwing white or slightly buffish . . . . . Species Nos. 149, 150, 151, 155.

c. Red line on underside of hindwing bordered with black on outerside, not on innerside as it is in all the other species . . . . . Species No. 148.

Key based on the ♂-genitalia and scent-organ; Species No. 148 not included, as it can easily be recognised by the pattern. See fig. 1, 2, and 3 on p. 708.

a. Dorso-apical ridge of harpe only slightly deflexed, being vertical on the plane of the clasper; the ridge continuous from dorsal edge of clasper to apex of harpe . Species No. 149.

Dorso-apical ridge of harpe strongly deflexed, lying almost flat on the main body of the harpe . . . *b.*

b. This ridge dilated into a rounded lobe or a large tooth . *c.*

The ridge very narrow, hardly at all widened . . . *d.*

c. The ridge rounded-dilated, not produced into a prominent tooth . . . . . Species No. 150.*

The ridge dilated into a large triangular tooth . . . Species No. 151.

d. Hair-scales of scent-organ very thin . . . . *e.*

Hair-scales of scent-organ shorter and broader than in *P. protesilaus* and the other species except *agesilaus*. Species No. 156.

e. Ventral process of harpe reaching to ventral edge of clasper . . . . . *f.*

* See also the subspecies *a*, *b*, and *c* of Species No. 151.

	Ventral process of harpe not reaching to ventral edge of clasper	*g*.
f.	Deflexed edge of dorso-apical ridge of harpe non-dentate .	Species No. 154.
	Deflexed edge of dorso-apical ridge of harpe serrate proximally	Species No. 152.
g.	Central process of harpe short, broad, strongly dentate .	Species No. 155.
	Central process of harpe slender, its teeth vestigial . .	Species No. 153.

148. **Papilio agesilaus** Guér. (1835).

Papilio Eques Achivus protesilaus, Esper (*non* Linné, 1758, err. det.), *Ausl. Schmett.* p. 207. n. 95. t. 52. fig. 1 (1803?) (*partim*).

Papilio protesilaus, Godart, *Enc. Méth.* ix. p. 50. n. 73 (1819) (*partim*).

Papilio agesilaus Guérin & Percheron, *Gen. Ins. Lép.* t. 1. fig. 1 (1835) (R. Magdalena, Colombia); Boisd., *Spec. Gén.* i. p. 263. n. 86 (1836) (Mexico; Colombia); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 136 (1846) (Mexico; Colombia); Eimer, *Arth. Verwandtsch. Schm.* p. 98 (1889); id., *Orthogen.* pp. 44. 47. 111. 139. 217. 497 (1897).

♂ ♀. Antenna brownish black, scaled black on upperside in fresh specimens. Tibiae and tarsi pale green, scaled white, scales easily falling off, tips of tarsal segments ochraceous; mid- and hindtibial spurs a little shorter than the tibia is broad.

Wings greenish white; a few scales on disc of forewing, *upperside*, the scales from SC^2 of hindwing to costal margin and a large percentage of the scales between SC^2 and R^3 of hindwing, entire: on *underside* the scales all denticulate, except between SM^2 of hindwing and abdominal margin; scales in apical area of forewing reduced, those of the transparent submarginal band very narrow, as are those in the costal area proximally of the black postdiscal band. Forewing with seven black bands, subapical cell-band the most variable one, sometimes vestigial.—— Hindwing, *below*, with black subbasal band which is almost parallel to abdominal margin, a black median band converging with the former, beginning at costal margin proximally of middle, meeting the subbasal band distally, or being abbreviated, bordered with red on **proximal** side; a red costal spot at distal side of subbasal band, another distally at proximal side of the band, besides the two red transverse spots situated near anal angle; these anal spots present also above, bordered with white in front, at least on the underside.——The female is like the male, but has rather larger pale submarginal spots on the hindwing.

Neuration: D^2 of hindwing shorter than $D^3 + D^4$, seldom as long as these cross-veins together.

Scent-organ: scent-scales forming a layer of black-brown wool; long hairs black-brown, thin, ending in a long fine point, not ending abruptly as in *P. telesilaus* or *P. marcellus*; no scales underneath the wool, except on SC^3.

Genitalia: ♂. Tenth tergite trilobate; dorso-ventral ridge of harpe reaching ventral edge proximally of middle, the apical lobe of harpe being long, ventral process present.

Early stages not known.

Hab. From Goyaz, Brazil, and Bolivia to Panama, and again from Honduras to Mexico; not yet known from Costa Rica and Nicaragua.

Four very distinct geographical races.

There are some peculiarities in the variability of this species which are worth special notice. The subbasal band of the hindwing is present on the upperside

in the two Central American subspecies and in the South American subspecies, but is usually absent or only vestigial in the subspecies inhabiting Colombia, Panama, and North Venezuela. In this geographically intermediate subspecies the submedian band of the underside of the hindwing crosses the cell at or proximally of M^1, while in the northern races and in the southern one this band is much more distal. On the other hand, the Central American and Colombian races differ from the southern subspecies in the scales of the black marginal and postdiscal bands of the forewing being broader and the bands therefore more deeply black, the postdiscal band being moreover not divided, and the black distal band of the hindwing, above, not bearing a distinct white spot R^2—R^3 proximally of the white submarginal spot which stands in front of the tail.

Another interesting feature of *agesilaus* are the opposite lines of development obtaining in the subbasal and submedian bands of the hindwing. The subbasal band, if not complete, is on the upperside usually more or less distinct from the cell backwards, the costal portion being missing. The submedian band of the upperside, if not altogether absent, is present only in the costal region, the posterior portion being missing.

a. P. agesilaus fortis subsp. nov.

Papilio neosilaus, Godm. & Salv. (*non* Hopffer, 1866, err. det.), *Biol. Centr. Amer., Rhop.* p. 219. n. 48 (1890) (Oaxaca ; Atoyac).

♂. Black bands broad. Forewing: first and second black bands about two-thirds the width of the interspace between them, both extending to inner margin, or the second at least beyond SM^2; pale submarginal band not wider, or even narrower, than black postdiscal band ; the latter not including a distinct pale line ; the scales of this band and of the marginal one rather broad.——Hindwing : abdominal edge black from base to anal angle, black subbasal band complete ; submedian band usually distinct from costal edge to cell, or at least vestigial ; red anal spots separate from each other, each completely surrounded by black scaling, their white anterior borders vestigial or very narrow.

On *underside* the red submedian line of the hindwing extends to hinder edge of cell, its black border being heavy.

♀ not known.

Hab. Guerrero, South-west Mexico ; Oaxaca ; and Atoyac.

The Atoyac specimens (in coll. F. D. Godman) are a transition to the next form, the Oaxaca specimens also partly inclining towards the next.

In the Tring Museum 4 ♂♂ from Guerrero (O. T. Baron) ; name-type.

b. P. agesilaus neosilaus Hopff. (1866).

Papilio agesilaus, Boisduval, *Spec. Gén. Lép.* i. p. 263. n. 86 (1836) (*partim* ; "Mexico") ; Weidem., *Proc. Ent. Soc. Philad.* ii. p. 146 (1863).

Papilio neosilaus Hopffer, *Stett. Ent. Zeit.* xxvii. p. 26. n. 6 (1866) ("Mexico," coll. Deppe) ; Kirby, *Cat. Diurn. Lep.* p. 556. n. 248a (1871) (Mexico) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* p. 219. n. 48. t. 8. 9. ♂ (1890) (Guatemala ; Brit. Honduras ; Honduras).

Papilio conon, Oberthür (*non* Hew., 1854, err. det.), *Et. d'Ent.* iv. p. 66. n. 179 (1880) (*partim* ; Mexico).

Papilio agesilaus neosilaus, Eimer, *Arth. Verwandtsch. Schm.* p. 100. 101 (1889) (Honduras ; Mexico).

♂. Black bands of wings narrower than in *P. a. fortis* ; first and second bands of forewing about half the width (or less) of the interspace between them at M ; transparent submarginal band broader than the black band standing at its proximal

side.——Abdominal edge of hindwing partly white, submedian band absent from *upperside* or vestigial ; red anal spots with broad white border in front, black scaling in front and behind the red spots much more restricted than in *fortis*, and black border to red submedian line of *underside* of hindwing narrower.

Subapical cell-band of forewing vestigial in one of our specimens from Espinal, Vera Cruz.

Hab. Vera Cruz, East Mexico ; Guatemala ; British Honduras ; Honduras.

In the Tring Museum 10 ♂♂ from : Espinal, Vera Cruz, June 1896 (W. Schaus) ; S. Pedro Sula, Honduras.

c. P. agesilaus eimeri subsp. nov.

Papilio agesilaus, Godman & Salv., *Biol. Centr. Amer., Rhop.* p. 219. n. 47 (1890) (Panama).
Papilio agesilaus agesilaus, Eimer, *Arth. Verwandtsch. Schm.* p. 99. t. 1. fig. 10 (1889) (S. Juan, West Colombia).

♂ ♀. Transparent submarginal band of forewing as narrow between SC^4 and SC^5 as the black band standing at its proximal side, or even narrower.

Hab. Rio Dagua, West Colombia ; Upper Cauca valley.

In the Tring Museum 5 ♂♂ from : R. Dagua (W. F. H. Rosenberg) ; Popayan (Lehmann).

The Panama specimens stand intermediate between this form and ordinary Bogota specimens. Both sexes are from this locality in coll. F. D. Godman.

d. P. agesilaus agesilaus Guér. (1835).

Papilio Eques Achivus protesilaus, Esper (*non* Linné, 1758, err. det.), *l.c.*
Papilio agesilaus Guérin & Percheron, *Gen. Ins., Lép.* t. 1. fig. 1 (1835) (R. Magdalena, Colombia) ; Boisd., *Spec. Gén. Lép.* i. p. 263. n. 86 (1836) (*partim* ; Colombia) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. n. 176 (1864) (N. Granada ; Venezuela) ; Kirby, *Cat. Diurn. Lep.* p. 555. n. 247 (1871) (N. Granada ; Venezuela) ; Oberth., *Et. d'Ent.* iv. p. 66. n. 178 (1880) (N. Granada ; Venezuela) ; Staud., *Exot. Tagf.* i. p. 16 (1884) ; Hahuel, *Iris* iii. p. 149. 156 (1890) (San Estéban) ; id., *l.c.* p. 203. 205 (1890) (Valéra).
Papilio conon Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 33. n. 159 (1852) (*nom. nud.* ; Bogota) ; Hew., *Trans. Ent. Soc. Lond.* (2). ii. p. 246. t. 22. fig. 3 (1854) (N. Granada) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 167 (1856) (Bogota).
Papilio agesilaus agesilaus, Eimer, *Arth. Verwandtsch. Schm.* p. 99. t. 1. fig. 11 (1889) (Colombia ; Venezuela).
Papilio agesilaus agesilaus septemlineatus id., *l.c.* p. 100 (1889) (N. Granada).
Papilio agesilaus Boisd. ab. *septemlineatus* id., *l.c.* t. 1. fig. 11 (1889).
Papilio agesilaus var. *conon*, Maassen & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 24. n. 109 (1890) (west side of Cordillera of Bogota).
Papilio agesilaus septemlineatus Eimer, *Orthogen.* p. 47 (1897).

♂. Black postdiscal band of forewing, above, not centred by a pale line, the scales of this and the marginal band rather broad ; anterior half of transparent submarginal band broader than black postdiscal band.——Subbasal black band of hindwing absent from upperside, except a thin line on M^2 ; submedian band absent, merely showing through ; no white spot R^2—R^3 in black postdiscal band.

Underside.—Submedian band of hindwing crossing cell proximally of or at M^1, the band complete as a rule, joining the subbasal band at an acute angle.

Genitalia : Distal lobe of harpe broad, ventral edge ending proximally in a rather heavy tooth.

This subspecies varies a great deal in size, some specimens being almost twice as large as others. We do not know if the variation is seasonal. Dr. Bürger

obtained only large specimens during the dry season and at the beginning of the wet season on the eastern side of the Andes of Bogota. We have also a large specimen from Muzo, besides some small ones. The submedian band of the *underside* of the hindwing is occasionally vestigial beyond cell. In a specimen from the Felder collection, bearing no locality label, but coming probably from Bogota, there are two whitish halfmoons R^2—M^1 within the black distal band, the black scaling situated proximally of these halfmoons being ill-defined.

Hab. Magdalena valley, Colombia, eastwards to North Venezuela.

In the Tring Museum 94 ♂♂ from: "Bogota"; Valdivia, Colombia, July 1897 (Pratt); Muzo, December 1896; Villavicencio to R. Ocoor, January 1897, 350—400 m., dry season (Dr. Bürger); Villavicencio to Monte Redondo, end of March—early April 1897, 400—1300 m., beginning of rainy season (Dr. Bürger); Peperital, Buenavista, January 1897 (Dr. Bürger); Mocotoné, Venezuela (Briceño).

e. P. agesilaus autosilaus Bates (1861).

Papilio agesilaus, Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 9 (1845) (S. Amer.); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 166 (1856) (S. Amer.; Brazil); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 254 (1854) (Amazons); Sharpe, *Proc. Zool. Soc. Lond.* p. 555. n. 6 (1890) (R. Araguaya).

Papilio autosilaus Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 348 (1861) (Ega); id., *Journ. Ent.* i. p. 229. n. 34 (1862) (Upper Amazons); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. n. 177 (1864) (Ega; "Mexico," error); Kirby, *Cat. Diurn. Lep.* p. 555. n. 246 (1871) (Ega); Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 12 (1876) (Ucayali); Oberth., *Et. d'Ent.* iv. p. 66. & 115. n. 180 (1880) (French Guiana; Teffé; "Colombia," errore); Mo-chl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304 (1883) (Surinam); Staud., *Exot. Tagf.* i. p. 16. t. 11 (1884) (Amazons); Hahnel, *Iris* iii. p. 250 (1890) (Manáos): id., *l.c.* p. 283 (1890) (Pebas); Michael, *ibid.* v. p. 214 (1894) (Sao Paulo de Olivença, only during the dry months); Haensch, *Berl. Ent. Zeitschr.* xlvii. p. 154 (1903) (Archidona, 640 m.).

Papilio conon, Oberthür, *Et. d'Ent.* iv. p. 66. n. 179 (1880) (*partim*; Peru).

Papilio agesilaus autosilaus, Eimer, *Arth. Verwandtsch. Schm.* p. 100. 101. t. 1. fig. 9 (1889) (Amazons).

♂. Scales of black marginal border and postdiscal band of forewing narrower than in the other forms, these bands therefore less deep black; postdiscal band divided longitudinally by a usually distinct pale line; transparent submarginal band of forewing narrower than in the other subspecies, always narrower between SC^4 and SC^5 than the black postdiscal band.——Subbasal band of hindwing present on *upperside*, submedian band of *underside* of hindwing crossing cell at M^1, curved behind, often feebly developed in and beyond cell, sometimes vestigial beyond cell; red subanal spot M^1—M^2 vestigial or absent, apparently never so well developed as it is in most specimens of the preceding races; a more or less distinct white spot within black band proximally of white spot R^2—R^3 of hindwing above, seldom vestigial only, often a second spot between R^3 and M^1, and the vestige of a third between R^1 and R^2, rarely also a trace of the spot SC^2—R^1.

The black subapical cell-band of the forewing varies very much; it is vestigial in a Felder specimen (without locality).

Genitalia: Apical lobe of harpe narrower than in the other races, the dentate ventral edge proximally not produced into a prominent tooth.

The specimens from British Guiana have rather heavier black bands: the second band of the forewing is nearly as broad in the cell as the interspace between the first and second bands; the marginal and postdiscal bands are deeper black than in *autosilaus* from the Amazons and Andes, the pale line within the postdiscal band being practically absent from the upperside. The interspace between the post-

discal band and the discocellular band is narrower than the postdiscal band, while in nearly every specimen from other districts this interspace is wider at and before lower angle of cell than the black postdiscal band. On the hindwing, the black submedian line of the *underside* is rather heavy beyond cell, ending in a black spot M^1—M^2 which is larger than in ordinary *autosilaus*.

The black bands are on the whole rather narrower in the specimens from Bolivia, South-Eastern Peru and Goyaz (Brazil) than in the individuals from the more northern localities (Peru, Ecuador, Amazons).

Eimer's fig. 9, *l.c.*, said to be taken from an Amazonian specimen, has a very short hindwing, the anal area being far less prolonged than is the case in all our specimens. The individual which served as model may have been an imperfectly developed specimen.

Hab. Bolivia to Eastern Ecuador; Amazons; Goyaz; Guiana; Orinoco.

In the Tring Museum 140 ♂♂ from: Suapure, Caure R., Orinoco, February and June 1899 (S. M. Klages); Essequibo R., Brit. Guiana; British Guiana; Manicoré; Iquitos; R. Cachyaco, affl. of R. Huallaga (Stuart); Zamora, Ecuador (O. T. Baron); Loja; Archidona (W. Goodfellow); R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); Palcazu (Sedlmayr); Chanchamayo (Schunke); Peréné R., 3000 ft., October—November 1902 (Watkins & Tomlinson); Peréné R., March 1900 (Simons); Caradoc, Marcapata, February 1901, 4000 ft. (Ockenden); Montanas, R. Madre de Dios, September 1901 (Ockenden); R. Sluenri, Carabaya, June 1901, 2500 ft., dry season (Ockenden); Chirimayo, Carabaya, 1000 ft., July 1901 (Ockenden); Callanga, Cuzco, 1500 m. (Garlepp); Cajon, Cuzco, September 1900 (Garlepp); Mapiri; Reyes, R. Beni, August 1895 (Stuart); R. Tanampaya (Garlepp); Yungas de La Paz, December 1899 (Garlepp); Province Sara, S. Cruz de la Sierra, February—April 1904 (J. Steinbach); Sapucay, Paraguay, July 1902 (W. Foster); Jatahy, Goyaz.

149. **Papilio glaucolaus** Bates (1864) (Pl. IX. fig. 63. 64. 65).

Papilio glaucolaus Bates, *Ent. Mo. Mag.* i. p. 4. n. 7 (1864) (Panama).

The species has not been recognised by any of the authors who have dealt with this group of Papilios. Standinger, in *Exot. Tagf.* i. p. 18 (1884), speaks of *glaucolaus* from Panama as being larger than *macrosilaus* from Honduras; his *glaucolaus* was doubtless *protesilaus*, since the true *glaucolaus* from Panama is smaller than the average specimens of *macrosilaus*. In Eimer, *Arth. Verwandtsch. Schm.* p. 102 ff. (1889), the various species and subspecies are all muddled up. In this work *glaucolaus* is called the largest *protesilaus*, while in fact *P. glaucolaus* from Panama and Colombia is decidedly smaller than the forms of *P. protesilaus* with which it occurs together.

We recognise three geographical forms of *glaucolaus*. While the two northern forms (Panama and Colombia) are easily recognised by the distinctions in pattern, the third subspecies almost exactly resembles *P. protesilaus protesilaus*, being distinguishable with certainty only by comparison of the genitalia.

♂. Postdiscal band of forewing more widely separate from lower angle of cell than in *P. p. protesilaus*, or the hindwing more obtusely dentate at R^1 and R^3 and the posterior submarginal spots slightly buffish, the wings not being so pure white as in *P. p. protesilaus*.

Scent-organ as in *P. protesilaus*.

Genitalia : Harpe shorter than in *P. protesilaus* : deflexed dorso-apical ridge (*dr*) subvertical on the harpe, continued to apex, enlarged into a prominent dentate tooth (*t*); ventral process (*vp*) short, reaching halfway (or less) to ventral edge of clasper ; central process (*cp*) also short (Fig. 1).

♀ not known.

Hab. Panama to Matto Grosso, not known to us from the Brazilian subregion.

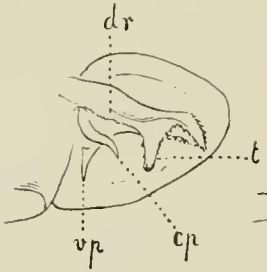


Fig. 1.

Fig. 2.

Fig. 3.

a. P. glaucolaus glaucolaus Bates (1864) (Pl. IX. fig. 64).

Papilio glaucolaus Bates *l.c.* (Panama).
Papilio protesilaus var. e. *P. glaucolaus*, Kirby, *Cat. Diurn. Lep.* p. 556. sub. n. 248 (1871) (Panama).
Papilio protesilaus, Oberthür, *Et. d'Ent.* iv. p. 66. sub n. 181 (1880) (Carare, greenish, this insect *teste* Jordan).
Papilio protesilaus, Godman & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 213. n. 39 (1890) (*partim*).

♂. Both wings pervaded with a greenish tint, which becomes very distinct if a series of *P. gl. glaucolaus* are put side by side with *P. protesilaus*. Forewing similar in appearance to that of *P. ag. agesilaus*; bands 1 and 2 stopping at SM^2, 2 often not reaching this vein ; fifth band narrowed to a point, mostly not quite reaching lower angle of cell ; sixth band more distal in position than in *P. protesilaus*, being $1\frac{3}{4}$ to 3 mm. distant from lower angle of cell, gradually widening costad, not narrowed before R^2; transparent submarginal interspace at SC^5 at least twice the width of the black marginal band.——Hindwing : red anal spot often much reduced, being overpowdered with black scales at the abdominal side ; black spot situated in front of red one usually oblong, often continued abdominad beyond M^2.

Underside : fifth band of forewing mostly reaching across cell, extended at least to third cell-fold in our series.——Subbasal band of hindwing touching apex of basal cellule ; median band a little distal of base of M^1, the band usually not touching the point of origin of this vein ; cross-veins partly bordered with red, sometimes the red scaling forming a complete ring in apex of cell.

Genitalia : Harpe tapering ; tooth of dorso-apical ridge broad ; central process slightly spatulate.

Length of forewing : 40 to 47 mm.

Hab. Panama ; Colombia, except S.W. coast ; probably also Northern Venezuela.

In the Tring Museum 20 ♂♂ from : Panama ; Muzo, December 1896; " Bogota ; " La Vega de San Juan.

b. P. glaucolaus melaenus subsp. nov. (Pl. IX. fig. 63).

Papilio spec. ?, Staudinger, *Exot. Tagf.* i. p. 18 (1884) (R. San Juan).

♂. Black bands of the forewing on the whole broader than in the preceding; the submarginal transparent interspace narrower, being usually only a little broader at SC^5 than the black marginal band, or as broad as this band, specimens in which the submarginal interspace is unusually wide being recognizable as belonging to *P. glaucolaus melaenus* by a corresponding reduction of the interspace between bands 5 and 6.

In this as well as the preceding form the black postdiscal band of the forewing stands often distally of the point of bifurcation of the subcostals SC^4 and SC^5, which is rarely the case in the following form.

Length of forewing: 40 to 50 mm.

Hab. Rio Dagua, West Colombia; Upper Cauca valley.

In the Tring Museum 22 ♀♀ from: R. Dagua (W. F. H. Rosenberg), type; Popayan (Lehmann).

c. P. glaucolaus leucas subsp. nov. (Pl. IX. fig. 65).

♂. Wings not pervaded with green, except base, which is distinctly green up to second band on forewing; postdiscal band of forewing in the same position as in *P. p. protesilaus*, being much nearer the lower angle of cell than in the preceding forms of *P. glaucolaus*, and being, moreover, narrowed before R^2 in most specimens; transparent submarginal interspace wider than in *P. gl. glaucolaus*; white interspaces of cell covered with narrower scales, therefore appearing less densely scaled than in the preceding forms. Subbasal band of *underside* of hindwing entering basal cellule.

Genitalia: Harpe shorter and more obtuse at apex than in *P. gl. glaucolaus* and *melaenus*, the tooth of the dorso-apical ridge narrower, and the central process longer, pointed (Fig. 1, p. 708).

Resembling in pattern more closely *P. p. protesilaus* than the Colombian forms of *P. glaucolaus*; differs from *P. p. protesilaus* in the hindwing being more obtusely dentate, in the ad- and submarginal spots being pervaded with buff, which colour becomes rather distinct if specimens of *P. p. protesilaus* and *P. gl. leucas* are compared side by side; the second band of the forewing is on the upperside usually much narrower from the cell backwards than on the underside, this portion of the band appearing on the upperside much blurred in consequence of the band of the underside shining through, and being in some individuals very thin or even absent; the fourth cell-band is shorter on the whole than in Guiana specimens of *P. protesilaus*. The frons has always clearly defined white lateral bands, never being all fuscous as it is in many specimens of *P. p. protesilaus*. The scales of the pale blue admarginal spots of the hindwing are dentate, while in *P. p. protesilaus* they are mostly entire.

Length of forewing: 41 to 48 mm.

Hab. Orinoco, Caura R.; British Guiana; Amazons; Eastern Ecuador; Peru; Matto Grosso.——Name-type from Rio Chuchuras.

In the Tring Museum 60 ♂♂ from: Snapure, Caura R., Orinoco, apparently all the year (S. M. Klages); La Vuelta, Caura R., May 1903 (S. M. Klages); R. Demerara, August 1897; Upper Real Berbice R.; R. Negro; R. Uaupes, R. Negro; Coca and Archidona (W. Goodfellow); Upper Amazons; R. Chuchuras,

affl. of R. Palcazu, 320 m. (W. Hoffmanns); Rio Cachyaco, affl. of R. Huallaga (Stnart); R. Ucayali (Stnart): Iquitos (Stnart); Chanchamayo (Schnnke); Peréné R., 4000 ft., August—September 1902 (Watkins & Tomlinson); Villa Maria to Diamantino, Matto Grosso, January 1897 (Andeer).

150. **Papilio molops** spec. nov. (Pl. IX. fig. 60. 61. 62).

As in *P. glaucolaus* there are also in the present species no striking characters in the pattern by which one could recognise *P. molops* with absolute certainty, except the *molops* form from the coast of Ecuador and Colombia and the form from Brasilia, which differ very conspicuously from the forms of *P. protesilaus* occurring in the same districts. However, as the genitalia of *molops* (of the male, the female being unknown) are constantly different from those of the various South American subspecies of *protesilaus*, it is not very difficult to distinguish also the *molops* specimens from Surinam, the Amazons and the Andes from *protesilaus* as well as from *glaucolaus*.

♂. Frons always greyish white at the sides, inclusive of the Brazilian form with black antenna. Both the first and second black bands of the forewing extending to hinder margin, or the second slightly abbreviated, or the first abbreviated; in the last case the postdiscal band very broad, being at lower angle of cell as broad as the transparent submarginal band; fourth band reaching nearly across cell, seldom stopping at third cell-fold.——Hindwing less strongly dentate than in *P. protesilaus archesilaus*, but more strongly than in *P. glaucolaus*; black admarginal bar R^2—R^3 as slender as in *P. protesilaus*, while the admarginal bars R^3—M^2 are usually broader than in that species.

On the *underside*, the subbasal and median bands of the hindwing on the whole closer together than in *P. protesilaus*, the interspace less widening costad and that portion which lies behind the cell longer, the black patch M^1—M^2 which connects posteriorly the subbasal and median bands being smaller; red anal bar usually quite close to the black anal marginal spot, the white spot separating them from one another being reduced to a small dot in nearly every specimen.

Scent-organ as in *P. protesilaus*.

Genitalia: Dorso-apical deflexed ridge of harpe rounded-dilated, denticulate, but not produced into a prominent triangular tooth (Fig. 2, p. 708).

Early stages not known.

Hab. South America.

Three subspecies.

a. P. molops molops subsp. nov. (Pl. IX. fig. 62).

♂. Antenna tawny, club black, at least on upperside; black lateral streak of abdomen as broad as the buffish white streak situated above it.

Wings.—*Upperside:* first band of forewing stopping at SM^2, second band strongly tapering, reaching hinder margin, broad in cell, third and fifth bands also broad, interspace between fifth and sixth bands not wider than the sixth band, which is broader than in all the other forms of the species allied to *P. protesilaus*, the white costal dot of this interspace minute, the sixth band very close to lower angle of cell, therefore differing considerably in position from

the band of *P. glaucolaus*; marginal band also broad, the submarginal interspace therefore narrower than in the other *molops* forms, being at R^2 about as wide as the marginal bands.——Hindwing: red anal spot large, stopping halfway between M^1 and M^2, obliquely truncate, the black spot M^1—M^2 in front of it large, trapeziform, somewhat produced basad at M^1, no black bar M^2—SM^2 proximally of red spot; postdisco-marginal band broad, partition R^2—R^3 wider in middle than the white admarginal lunule R^2—R^3; partition R^3—M^1 also broad, its edges not sharply defined, the white (slightly buffish) submarginal lunule which stands at its distal side reduced, somewhat powdered with black, as is the white submarginal spot M^1—M^2; the postdiscal black bar bordering this latter spot proximally joining the black anal spot; white marginal spot before R^2 small, the one before tail less extending distad than in the next form; first admarginal lunule vestigial, submarginal lunule R^1—R^2 also densely shaded with black.

Underside:—fourth band of forewing extending across cell or very nearly.—— Subbasal band of hindwing distally of basal cell, not entering it; red scaling of median band extending along cross-veins, forming a more or less complete ring in apex of cell; red transverse bar M^2—SM^2 heavy; red bar M^1—M^2 ⌐-shaped; black arrowhead-shaped patch on abdominal fold large, white lunules R^3—M^2 small.

Genitalia: Deflexed dorso-apical ridge of harpe more or less abruptly dilated, the lobe sinnate in one of our two Ecuadorian specimens, no teeth beyond the lobe; teeth on ventral edge of harpe irregularly placed and of different sizes; central process rather broadly spatulate, denticulate on dorsal side, the teeth somewhat curved in the direction of the base of the process; ventral process acute, nondentate, not quite reaching the ventral edge of the clasper, its apex somewhat curving distad and away from the clasper.

Hab. N.W. Ecuador: R. Cayapas (Flemming and Miketta), *type*; Cachabi; low country, January 1897 (W. F. H. Rosenberg).

2 ♂♂ in Mus. Tring. In coll. Charles Oberthür, from Juntas, R. Dagua, West Colombia (M. de Mathan).

b. P. molops hetuerius subsp. nov. (Pl. IX. fig. 61).

♂. Very closely agreeing in pattern with *P. protesilaus protesilaus*; the Colombian specimens smaller than the Colombian *P. p. archesilaus*, the hindwing less strongly dentate. Frons never entirely brown-black, as is so often the case in Andesian specimens of *P. p. protesilaus*. First band of forewing always extending to hinder margin, second band very broad in cell, reaching to hinder margin in most specimens, or at least close to it.——Hindwing with a white submarginal lunule R^1—R^2, which is thinner than the admarginal one, being occasionally vestigial; black admarginal spots R^3—M^2 rather larger than in *P. p. protesilaus*, especially M^1—M^2.

Underside: interspace between subbasal and median bands of hindwing longer than in *protesilaus*.

Genitalia: Deflexed dorso-apical ridge of harpe (Fig. 2, p. 708) usually dentate beyond the proximal dentate lobe; ventral edge of harpe more densely dentate than in *P. m. molops*, central process more slender and its teeth shorter, ventral process longer, reaching edge of clasper, curved towards this edge, not away from it, usually with some teeth on the distal side or at the apex.

Hab. Guiana; Amazons; Colombia and Ecuador (Pacific side excepted); Peru; Bolivia; *type* from Saramacca R., Surinam.

In the Tring Museum 17 ♂♂ from: "Bogota"; Villavicencio to Rio Ocoor, East Colombia, January 1897 (Dr. Bürger); R. Demerara; Saramacca R., Surinam, May 1893; Iquitos; "Amazons"; Archidona, N.E. Ecuador, April 1899 (W. Goodfellow); Coca, R. Napo (W. Goodfellow); R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); Mapiri, Bolivia.

c. P. molops megalurus subsp. nov. (Pl. IX. fig. 60).

♂. Antenna black, as in *P. protesilaus nigricornis*, but sides of frons white; white dorso-lateral stripe of abdomen narrow. First and second band of forewing, *upperside*, reaching hinder margin, but second strongly tapering, interspace a little wider than in the preceding form; sixth band separate from lower angle of cell; transparent submarginal interspace narrower than in *P. m. hetaerius*, not being wider within subcostal fork than the interspace between fourth and fifth bands measured at third cell-fold.——Black markings a little more extended than in *hetaerius*, first white admarginal lunule hardly traceable, second very thin, or also vestigial, no white submarginal lunule R^1—R^2, the admarginal one being alone present, the other white ad- and submarginal spots also smaller than in *hetaerius*; red anal spot longer, the white spot M^1—M^2 standing at its discal side correspondingly smaller, the black spot M^1—M^2 in front of the red spot larger, continued abdominad and produced basad in the abdominal fold, the spot somewhat widened also discally at M^1, there being some black scales between the spot and the cell corresponding to the outer edge of the median band of the underside; tail longer and broader than in the other two forms.

Interspace between subbasal and median bands of *underside* of hindwing rather wider than in the two preceding forms, the median band being distinctly more distal, crossing cell at base of M^1; white lunule C—SC^2 hardly vestigial, only one white lunule R^1—R^2, the other white lunules also reduced.

Genitalia: Distal lobe of harpe narrow, teeth small; deflexed dorso-apical ridge less dilated than in the other forms of *molops*: central process curved proximad at tip, teeth vestigial; ventral process not quite reaching edge of clasper, curved towards this edge, non-dentate.

Hab. Brazil: Leopoldina.

In the Tring Museum 2 ♂♂.

151. **Papilio protesilaus** L. (1758) (Pl. IX. fig. 66. 67).

Merian, *Ins. Surinam* t. 43 (1705); Gronov., *Zoophyl.* ii. p. 188. n. 726 (1764); Seba, *Thesaur.* iv. p. 44. t. 36. fig. 11. 12 (1764); Anbent., *Planch. Enlum.* t. 44. fig. 1. 2 (1765).

Papilio Eques Achivus protesilaus Linné, *Syst. Nat.* ed. x. p. 463. n. 29 (1758) (*partim*); Cterck, *Icon. Ins.* ii. t. 27. fig. 2 (1764) (fig. sat mala); Linné, *Mus. Lud. Ulr.* p. 209. n. 28 (1764) (*partim*); id., *Syst. Nat.* ed. xii. p. 752. n. 39 (1767) (*partim*); Fabr., *Syst. Ent.* p. 450. n. 36 (1775) (*partim*); Sulzer, *Gesch. Ins.* i. p. 143; ii. t. 11. fig. 5 (1776) (synon. *partim*); Goeze, *Ent. Beytr.* iii. 1. p. 64. n. 39 (1779) (cit. "Pet. Mus." excl.); Cram., *Pap. Exot.* iii. p. 16. t. 202. fig. A. B (1779) ("North & South America"); Fabr., *Spec. Ins.* ii. p. 14. n. 56 (1781) (*partim*); id., *Mant. Ins.* ii. p. 7. n. 62 (1787) (*partim*); Jabl. & Herbst, *Natur. Schm.* iii. p. 147. n. 97 (1788) (*partim*; Sulzer, ed. Roem., *Gesch. Ins.* p. 17. t. 14. fig. 5 (1789) ("Am. sept." errore); Gmelin, *Syst. Nat.* i. 5. p. 2243. n. 39 (1790) (*partim*); Fabr., *Ent. Syst.* iii. 1. p. 23. n. 69 (1793) (*partim*); Turton, *Syst. of Nat.* iii. 2. p. 16 (1806) (*partim*).

Papilio Eques protesilaus, Lange, in Linné, *Syst. Nat.* p. 463. n. 29 (1760) (*partim*).
Papilio (Achirus) protesilaus, Müller, *Naturs.* v. 1. p. 577. n. 39 (1774) ("N. Am." error).
Papilio Eques Achivus protesilens (!), Menschen, in Gronov., *Zoophyl., Index* (1781).
Papilio protesilaus Godart, *Enc. Méth.* ix. p. 50. n. 73 (1819) (*partim*); Lucas, *Lép. Exot.* p. 41 (1835) (*partim*; Brazil; *nec fig.*); Boisd., *Spec. Gén. Lép.* i. p. 262. n. 85 (1836) (French Guiana; Brazil); Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 46 (1838) (*partim*); Duncan, in Jard., *Nat. Libr.* xxxvi. p. 104. t. 4. fig. 2 (1843) (*partim*); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 9 (1845) (Brazil; Brit. Guiana); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 137 (1846) (syn. *partim*; Honduras; Guiana; Brazil); Erichs., in Schomb., *F. F. Brit. Guiana* p. 593 (1848); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 33. n. 160 (1852) (*partim*); Burm., *Abh. Naturf. Ges. Halle* p. 63 (1854) (Merian's plate 43); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 168 (1856) (Brazil; R. Demerara); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 348 (1861) (*partim*); id., *Journ. Ent.* i. p. 229. n. 33 (1862) (*partim*); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (*partim*); Bates, *Proc. Zool. Soc. Lond.* p. 241. n. 2 (1863); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. n. 178 (1864); Kirby, *Cat. Diurn. Lep.* p. 555. n. 248 (1871) (*partim*); id., *l.c.* p. 811. n. 248 (1877); Burm., *Descr. Rép. Argent.* v. *Lep., Atlas* p. 3. n. 1 (1879) (mixture of many species); Hopff., *Stett. Ent. Zeit.* xl. p. 52. n. 18 (1879) (Surinam, Brazil, Peru); Auriv., *K. Sv. Vet. Akad. Handl.* xix. 5. p. 29. n. 28 (1882) (recensio critica; cit. "Herbst t. 43" et "Lucas t. 21" exceptae); Eimer, *Arth. Verwandtsch. Schm.* p. 50. 103. 108. t. 1. fig. 5. 6 (1889) (*partim*); Haase, *Untersuch. Mimicry* i. p. 82 (1893); Eimer, *Orthogen.* p. 33. 44. 47. 48. 217. 397 (1897) (*partim*).
Protesilaus leilus Swainson, *Zool. Illustr.* ii. t. 93 (1832) (nom. nov. loco "protesilai").
Cosmodesmus protesilaus, Kirby, in Allen, *Nat. Libr., Lep.* i. p. 273 (1896).
Iphiclides protesilaus, id., *l.c.* t. 68. fig. 2 (1896)

Under the name of *protesilaus* Linné described a mixture of several banded species of Papilionids and Nymphalids. As the wings are said in his diagnosis to be white, we restrict the name to a black-banded white Papilio, as has been done by every author since Linné's time. However, which of the various species of the present group the white Papilio of Linné was, nobody can possibly tell with certainty from the description given by Linné and the figures quoted by him. In Clerck's figure the hindwing is obviously too obtusely dentate. There is a specimen (without abdomen) in the collection of the Linnean Society of London which agrees fairly well with Clerck's figure.* Anbenton's figure, which is very good for that time, represents doubtless the most common one of the different white species, to which insect we apply the name *protesilaus*. As Linné's Neotropical Lepidoptera were practically all from Surinam, we treat also in this case the Surinam form as nomenclatorially typical.

♂ ♀. Submarginal interspaces of hindwing white, rarely slightly washed with yellow; dentition of hindwing stronger than in *P. glaucolaus*. The first and second band of the forewing on the whole shorter and narrower than in *P. molops*. Frons often all black or slightly whitish at sides.

Scent-organ: wool long and dense, consisting of long and thin hairs which are widest in centre, being much thinner than in *P. telesilaus*.

Genitalia different in the various subspecies; dorso-apical ridge of harpe slightly or strongly dilated, always strongly dentate, in the South American forms widened to a large triangular tooth (Fig. 3; p. 708); the ridge strongly deflexed, lying almost flat upon the main body of the harpe.

Early stages not known. The larva figured by Merian, *l.c.*, is not that of this species, but of a *Heliconius*. It is much to be desired that the early stages of this and the allied species be carefully observed.

Hab. Mexico to Paraguay and Rio Grande do Sul.

* See p. 413.

a. P. protesilaus penthesilaus Feld. (1865).

Papilio penthesilaus Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. n. 181 (1864) (Mexico; *nom. nud.*); id., *Reise Novara, Lep.* p. 52. n. 40. t. 11. fig. C (1865); Staud., *Exot. Tagf.* i. p. 18 (1884) (Mexico); Godm. & Salv., *Biol. Centr. Amer., Rhop.* p. 214. n. 40 (1890) (Mexico; Atoyac, Oaxaca, Yucatan).

Papilio protesilaus var. c. *P. penthesilaus*, Kirby, *Cat. Diurn. Lep.* p. 556. sub n. 248 (1871) (Mexico).

Papilio archesilaus var. *penthesilaus*, Oberthür, *Et. d'Ent.* iv. p. 67. n. 182 (1880) (Mexico).

♂. A large form. Dorsal stripe of abdomen very narrow. First band of forewing stopping at SM^2, second band reaching a little beyond SM^2, strongly tapering behind, fourth band short, triangular, rarely reaching to second cell-fold, sixth band separate from lower angle of cell, slightly narrower from R^2 to SC^3 than behind R^2, posteriorly almost separated from the marginal band in most specimens, there being a semitransparent space behind M^2 between the two bands; submarginal transparent interspace bearing very narrow scales which are widest at their apex, the apical sinus being more or less distinct, these scales easily falling off.——Red anal spot of hindwing large; black postdiscal lunules R^2—M^1 more or less separate from each other; black admarginal lunules reduced; edge of wing white, except the very tips of veins C, SC^2, R^1 and M^2; dentition very prominent, especially at R^2.

Underside: second band of forewing broader than above between M and SM^2. Subbasal band of hindwing about half the width of the median band; red scaling of the latter more or less extended along cross-veins, often forming a ring in apex of cell; red bar R^3—M^1 not much continued along M^1.

♀ not known.

Genitalia: ♂. Apical lobe of harpe acuminate, the apical and ventral margins dentate, dorso-apical deflexed ridge rounded, widened distally of the central process, serrate; central process long, slender, slightly spatulate, somewhat denticulate at the apex; ventral process reaching a little beyond the edge of the valve, non-denticulate, pointed, applied to the valve, somewhat S-shaped, its curvature corresponding to that of the inner surface of the valve.

Early stages not known.

Hab. Mexico: Vera Cruz, Yucatan, Atoyac, Oaxaca.

Felder's specimens were from Oaxaca. The individuals from East and South Mexico are not always different from the next form.

In the Tring Museum, 4 ♂♂ from: Oaxaca (ex coll. Felder); Motzorongo; Orizaba.

b. P. protesilaus macrosilaus Gray (1852).

Papilio protesilaus var. b *Papilio macrosilaus* Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 34. sub n. 160 (1852) (Honduras); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 46. sub n. 168 (1856) (Honduras).

Papilio protesilaus, Weidemeyer, *Proc. Ent. Soc. Philad.* ii. p. 148 (1863) (*partim*); Boisd., *Cons. Lép. Guatem.* p. 6 (1870) (*partim*; Guatemala); Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 375 (1874) (Costa Rica); Godm. & Salv., *Biol. Centr. Amer., Rhop.* p. 214. n. 40. t. 68. fig. 7. genit. (1890) (*partim*; Guatemala: Vera Paz, Cubilguitz, Polochic valley, Cahabon; Brit. Honduras: Corosal, R. Sarstoon; Honduras; Nicaragua: Chontales).

Papilio protesilaus var. ? a. *macrosilaus*, Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. sub n. 178 (1864) (Honduras).

Papilio protesilaus var. a. *P. macrosilaus*, Kirby, *Cat. Diurn. Lep.* p. 556. sub n. 248 (1871) (Honduras).

Papilio macrosilaus, Staudinger, *Exot. Tagf.* i. p. 18 (1884) (Honduras).

Papilio protesilaus rubrocinctus macrosilaus, Eimer, *Artb. Verwandtsch. Schm.* p. 107 (1889) (Honduras).

♂ ♀. Similar to *penthesilaus*, paler in appearance. Subbasal band of forewing thinner, second band also narrower, stopping short at SM^2, crossing M one mm. proximally of M^2, the interspace between bands 1 and 2 being rather narrower at M than that between bands 2 and 3; band 4 absent, or vestigial at costal margin, or represented by a distinct costal spot; band 5 subangulate at R^2, narrow from R^2 costad, merged together with the marginal band at M^2 or close behind it, the pale insterstitial spot behind M^2, if at all present, being smaller than in *penthesilaus*; marginal band less sharply defined and a little paler than in *penthesilaus*, the scales composing it being narrower; submarginal transparent interspace bearing very narrow hairlike scales which do not fall off easily, being present even in worn specimens, while the respective scales of *penthesilaus*, which are much broader, are usually lost even in comparatively fresh specimens.—— Red anal spot of hindwing narrower than in the Mexican form; black postdiscal lunules R^2—M^1 on the whole more reduced, while the costal portion of the black postdiscal band is a little wider than in that subspecies.

On the *underside* the red line of the median band continues along M^1, reaching usually the red transverse bar M^1—M^2, this red bar more or less widely interrupted, being, like the anal red bar, thinner than in *penthesilaus*.

Genitalia: ♂. Apex of harpe subtruncate, more obtuse than in *penthesilaus*; deflexed dorso-apical ridge less rounded-dilated than in *penthesilaus*; central process much shorter, spatulate, strongly dentate at apex; ventral process also much shorter, not reaching ventral edge of valve, curving distad. The clasper figured by Godman & Salvin *l.c.*, is that of this form.

Hab. Guatemala; British Honduras; Honduras; Nicaragua.

In the Tring Museum 12 ♂♂, 1 ♀, from: Vera Paz, Guatemala; San Pedro Sula, Honduras.

c. P. protesilaus leucones subsp. nov.

Papilio protesilaus, Godman & Salv., *Trans. Ent. Soc. Lond.* p. 126. n. 235 (1880) (Sta. Marta).

♂. Resembling *P. p. macrosilaus*. Black dorsal line of abdomen absent (type), or very narrow. Wings, *upperside*.—Forewing: first band thin, stopping short at SM^2, second band continued to hinder margin or nearly (type), interspace between second and third band of the same width at M as between second and first band; fourth band short; sixth band narrow from R^2 forward; transparent submarginal space with hair-scales as in Honduras specimens of *macrosilaus*, the wing in costal region less densely scaled than in *archesilaus* and *dariensis*.—— Hindwing: red spot large, black postdiscal lunules R^2—M^1 ill-defined, shaded with white, white ad- and submarginal interspaces large, especially the submarginal spot R^2—R^3; edge of wing white, except at tip of veins, but the fringes partly black between C and R^2; dentition of wing much less prominent than in the other Colombian forms and the Central American ones.

Underside.—Forewing: postdiscal band more straight from M^1 to SM^2 than in the allied forms of *P. protesilaus*.——Hindwing: median band half as broad again as subbasal band; black admarginal bars C—R^3 thin; white submarginal spot R^1—R^2 nearly as wide as the admarginal lunule; white submarginal spot R^2—R^3 twice as broad as the admarginal spot.

Genitalia resembling those of *macrosilaus*, but differ in one or more of the teeth at the ventral edge of the harpe being prolonged, and vertical on the plane

of the clasper. Ventral process of harpe simple, pointed, not reaching ventral edge of clasper ; central process spatulate, strongly dentate at apex, the teeth more or less curving dorsad.

Hab. Sta. Marta, North Colombia : 2 ♂♂ in coll. Godman ; type from Manaure (F. Simons).

d. P. protesilaus daricnsis subsp. nov.

Papilio protesilaus var. *macrosilaus*, Boisduval, *Cons. Lép. Guatem.* p. 6 (1870) (Costa Rica ; = *archesilaus* = *Flambé du Pérou* ex errore).
Papilio archesilaus var. *macrosilaus*, Oberthür, *Et. d'Ent.* iv. p. 67. sub n. 182 (1880) (Costa Rica).
Papilio penthesilaus, Godman & Salvin (*non* Felder, 1865, err. det.), *Biol. Centr. Amer., Rhop.* p. 214. n. 40 (1890) (*partim* ; Chiriqui ; Panama).

Nearest to *archesilaus*, with which it agrees in the black dorsal stripe of the abdomen being broad, in the distal edge of the hindwing being entirely or almost entirely black between C and R^1, in the ventral process of the harpe being denticulate, etc.

Wings less pure white than in *archesilaus*, a little more extended green at base, slightly broader ; bands of forewing on the whole thinner, first band always stopping short at SM^2, second band tapering behind, seldom reaching a little beyond SM^2, often not extending to this vein, fourth band short, triangular, rarely attaining second cell-fold, sixth band usually well separate from lower angle of cell, evenly curved, not narrowed before R^2 or only a little, white scaling of cell denser than in *macrosilaus*, the scales being larger both on upper- and underside, hair-scales in submarginal transparent space also broader.——Tooth R^2 of hindwing on the whole less prominent than in *archesilaus*, the greyish blue admarginal lunules smaller ; black admarginal spots C—R^2 not separated from edge of wing, there being only a small white spot in front of SC^2 and R^1 appearing as an anterior prolongation of the white lunules standing behind these veins, the fringe remaining usually black also at these small white spots.

On the *underside*, the subbasal band of the forewing narrower than in *archesilaus* ; red median line forming a more or less complete ring in apex of cell, as in *archesilaus*, the line continued along M^1, joining the red transverse halfring M^1—M^2.

♀. Wings pervaded with yellow, especially in anal region of hindwing.

Genitalia: ♂. Harpe on the whole a little shorter than in *archesilaus*; deflexed dorso-apical edge widened proximally, the dilated portion ending distally in a triangular tooth, which is more distal in position than the respective tooth of *archesilaus* ; ventral process more or less denticulate on the distal side from base to apex.——♀ not dissected.

Length of forewing : ♂, 43 to 53 mm. ; ♀, 47 to 56 mm.

Hab. Costa Rica ; Panama : Chiriqui, *type* ; islands near the west coast of the Isthmus of Darien : Gobernador, Brava, Jicaron, Cebaco.

The specimens from those islands are partly a transition to *archesilaus*, while the Costa Rica individuals approach *macrosilaus*.

In the Tring Museum 29 ♂♂, 2 ♀♀, from : Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall) ; Chiriqui ; Boquete, Chiriqui, 3500 ft. (Watson); Gobernador I., Jicaron I., Brava I., and Cebaco I., January and February 1902 (J. H. Batty).

e. P. protesilaus archesilaus Feld. (1867) (Pl. IX. fig. 66).

Papilio archesilaus Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. n. 180, p. 345. n. 89 (1864) (Bogota); id., *Reise Novara, Lep.* p. 51. n. 39. t. 11. fig. a. b (1865) (Bogota); Oberth., *Et. d'Ent.* iv. p. 67. n. 182 (1880) (*partim*; Muzo, October); Hahnel, *Iris* iii. p. 203 (1890) (Valera; large insect).
Papilio protesilaus var. d. *P. archesilaus*, Kirby, *Cat. Diurn. Lep.* p. 556. sub n. 248 (1871).
Papilio protesilaus, Eimer, *Artb. Verwandtsch. Schm.* t. 1. fig. 5 (1889).
Papilio podalirius var. *archesilaus*, Staudinger, *Exot. Tagf.* i. p. 17 (1884) (Venezuela).
Papilio penthesilaus, Godman & Salvin (*non* Felder, 1865, err. det.), *Biol. Centr. Amer., Rhop.* p. 214. n. 40 (1890) (*partim*; Colombia).
Papilio protesilaus rubrocinctus archesilaus, Eimer, *l.c.* p. 106 (1889) (Colombia).
Papilio glaucolaus, Eimer (*non* Bates, 1864, err. det.), *l.c.* p. 107 note (1889).
Papilio protesilaus rubrocinctus archesilaus glaucolaus, id., *l.c.* p. 108 (1889) (this form? Panama wrong locality?; on p. 107 "largest *protesilaus*").

♂. Usually larger than *p. protesilaus*, hindwing more strongly dentate, median band of underside of hindwing mostly more distal; the apex of the cell more or less bordered with red inside, ventral process of harpe on the whole more densely denticulate. In the specimens from the Rio Dagua (West Coast) and from the Canca valley the red line R^3—M^1 of the underside of the hindwing is shorter than in individuals from other places, being only a little produced along M^1. The individual variability in the bands appears to be considerable; band 4 of forewing rarely absent, sometimes reaching almost across the cell.—♀ not known to us.

Length of forewing: ♂, 50 to 60 mm.

Hab. Colombia, Northern Veneznela, Western Ecuador.

Eimer, *l.c.*, says under what he terms "*protesilaus rubrocinctus* mihi": "Here belong the large forms which live in the neighbourhood of the Equator, from Colombia to Mexico." The purport of this innocent-looking statement will be understood if one remembers that according to Eimer there is a "law" that the forms of a species are the smaller the farther away from the Equator (non-tropical countries) they live. Now, in the case of *protesilaus* this statement is very unfortunate, inasmuch as the form of *protesilaus* living under or near the Equator (namely in the Amazon valley, East Ecuador and Peru) is smaller than the more northern forms.

In the Tring Museum 114 ♂♂ from: R. Dagua (Rosenberg); "Bogota"; Peperital to Buenavista, January 1897, dry season (Dr. Bürger); Guayaquil, Colombia, January; Paramba, N.W. Ecuador, 3500 ft., March 1897, dry season (Rosenberg); Mocotoné and Mérida, Venezuela (Briceño); Campo Alegre, Cumana, January 1899 (André).

f. P. protesilaus protesilaus L. (1758) (Pl. IX. fig. 67).

Papilio Eques Achivus protesilaus Linné, *l.c.* (1758) (*partim*).
Papilio protesilaus, Godart, *l.c.* (1819) (*partim*); Boisd., *l.c.* (1836) (*partim*); Lacord., *Ann. Soc. Ent. Fr.* ii. p. 383 (1833) (Guyane); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 9 (1845) (*partim*; Brit. Guiana); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 254 (1854) (Amazons, habits); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 168 (1856) (*partim*; R. Demerara); Butler, *Cat. Diurn. Lep. descr. Fabr.* p. 239. n. 21 (1869) (Demerara); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 296 (1876) (Surinam; *partim*); Butler, *Ann. Mag. N. H.* (4). xx. p. 127. n. 60 (1877) (Ucayali); id., *Trans. Ent. Soc. Lond.* p. 146. n. 228 (1877) (R. Manés, May; Uraria, May; R. Negro, near Manaos, June); Oberth., *Et. d'Ent.* iv. p. 66. n. 181 (1880) (*partim*; Obydos; Cayenne); Hahnel, *Iris* iii. p. 250 (1890) (Manés); id., *l.c.* p. 283 (1890) (Pebas); Sharpe, *Proc.*

Zool. Soc. Lond. p. 555. n. 5 (1890) (R. Araguaya); Godm. & Salv., *Biol. Centr. Amer., Rhop.* p. 213. n. 39 (1890) (*partim*); iid., in Whymper, *Andes of Equator, App.* p. 109. n. 93 (1891) (Nanegal); Michael, *Iris* v. p. 214 (1894) (Sao Paulo de Olivença).

Papilio archesilaus, Staudinger (*non* Felder, 1865, err. det.), *Exot. Tagf.* i. t. 12 (1884) (Amazons).

Papilio protesilaus var., Staud., *l.c.* p. 17 (1884).

Papilio protesilaus protesilaus, Eimer, *Artb. Verwandtsch. Schm.* p. 104 (1889) (Amazons; Peru; "Brazil" alia subsp.).

Papilio pouthesilaus, Godm. & Salv. (*non* Felder, 1865, err. det.), *Biol. Centr. Amer., Rhop.* p. 214. n. 40 (1890) (*partim*; Peru).

Papilio macrosilaus, Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

This form is individually so variable in every locality that none of the slight differences found in specimens from different districts appear to hold good. On the whole the median band of the hindwing below is more proximal in the individuals from the Guianas and the Lower and Middle Amazons than in the Andesian specimens. In many of the Andesian individuals the frons is nearly or quite as extended brown as in the Brazilian subspecies.

The first and second bands of the forewing reach usually beyond SM^2, sometimes extending to the hindmargin, but there occur also specimens in which both bands stop short at SM^2. The fourth band extends mostly across two-thirds the cell, often nearly attaining the hindmargin of the cell, sometimes being reduced to a small costal spot. The cell-bands are usually rather heavy in Guiana specimens, the fourth reaching often nearly or entirely across cell. The transparent submarginal interspace bears in costal third, sometimes nearly all over, brown scales instead of white ones, these brown scales occupying on the whole a larger portion of the transparent space than in the preceding geographical forms. The position of the median band of the hindwing is somewhat variable, the Andes specimens agreeing in the position of the band and the extent of the red scaling with *archesilaus*. The apex of the cell of one of our numerous Zamora (Ecuador) examples has the apex of the cell of the hindwing filled in with red scales. In an individual from Rio Demerara, British Guiana, July 1897, the sixth band (postdiscal) of the forewing is much shaded with white behind, not joining the marginal band.

Genitalia: The harpe exhibits also considerable variability. In nearly all the specimens the dorso-apical deflexed ridge is produced into a more or less denticulate triangular tooth of variable dimensions (fig. 3, p. 708); this tooth is occasionally absent, the ridge being rounded-dilated proximally and simply serrate. This reduction of the tooth obtains in our four specimens from Archidona, N.E. Ecuador, and in one of our individuals from the Rio Chuchuras, Huánuco, Peru.

Hab. Orinoco; the Guianas; Amazons, from Pará to the Andes; Eastern Ecuador; Peru; Bolivia.

In the Tring Museum 220 ♂♂ from: Caura R., various places, February and September to November (S. M. Klages); R. Demerara, August 1897; Aroewarwa Creek, Surinam, July 1905 (S. M. Klages); R. Uaupes, R. Negro; Pozuzo, Huánuco, 800—1000 m. (W. Hoffmanns); R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); Chanchamayo (W. Hoffmanns; Schunke); Palcazu (Sedlmayr); Cajon, Cuzco, October 1900 (Garlepp); Cuzco, March 1901 (Garlepp); Chirimayo, S.E. Peru, 1000 ft., July 1901, dry season (G. Ockenden); Montanas, Madre de Dios, September 1901 (Ockenden); R. Sluculi, 2500 ft., June 1901 (Ockenden); Salinas, R. Beni, Bolivia, July 1896 (Stuart); Salampioni, Bolivia, 800 m., September 1900 (Simons); Charnplaya, 1300 m., June 1901 (Simons); Mapiri; S. José de Chiquitos, East Bolivia, July 22. 1904 (J. Steinbach).

g. P. protesilaus nigricornis Staud. (1884).

Papilio protesilaus, Godart, *l.c.* (1819) (*partim*; Brazil); Boisd., *l.c.* (1836) (*partim*; Brazil); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 9 (1845) (*partim*; Brazil); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 45. n. 168 (1856) (*partim*; Brazil, Rio de Jan.); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. p. 3. n. 49 (1857) (Brazil); Capronn., *Ann. Soc. Ent. Belg.* xvii. p. 8. n 1 (1874) (Botafogo, Oct.); Weym., *Stett. Ent. Zeit.* lv. p. 315. n. 15 (1895) (*partim* ?); Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1895) (Rio, rare; Petropolis more common); Peters, *Illustr. Zeitschr. Ent.* ii. p. 52 (1897) (Nova Friburgo).
Protesilaus leilus Swainson, *Zool. Illustr.* ii. t. 93 (1832) (*fig. super.*; new name for *protesilaus* L.).
Papilio protesilaus var. *nigricornis* Staudinger, *Exot. Tagf.* i. p. 17 (1884) (S. Paulo, Brazil).
Papilio protesilaus protesilaus, Eimer, *Artb. Verwandtsch. Schm.* p. 104 (1889) (*partim*; Brazil).

Swainson's figure was taken, we think, from a Brazilian specimen, judging from the colour of the antenna and frons. His name *leilus*, however, was proposed to replace Linné's name *protesilaus*, this latter term being employed by Swainson for what he called a **subgenus**. As *leilus* Swains. is, therefore, nothing more than another term for *protesilaus*, it is a synonym pure and simple of *protesilaus*, and cannot be accepted as a name for the particular Brazilian form which Swainson figured.*

♂ ♀. Antenna brownish black, seldom tawny. Frons brownish black, the sides not being creamy white; this character often met with also among *P. prot. protesilaus* from the Andes.

Genitalia: ♂. Deflexed dorso-apical ridge of harpe dilated into a large denticulate tooth, which is much larger than in the other subspecies; central process spatulate, denticulate at apex; ventral process more or less denticulate.

Hab. East Paraguay; Brazil.

In the Tring Museum 30 ♂♂, 5 ♀♀, from: Yhu, East Paraguay, December 1896 (Andeer); Minas Geraës, February 1901 (A. Kennedy); Tijuco; Petropolis; Rio de Janeiro (E. May); Nova Friburgo; Leme, Sao Paulo; Parana; Leopoldina, S. Catharina; Blumenau.

Together with *P. protesilaus nigricornis* in the same districts and at the same season there occur specimens which differ very remarkably in several points. Two of these specimens from the Province of Parana agree with *P. protesilaus nigricornis*, except in the hindwing being somewhat diffused with yellow, the admarginal and submarginal spots R^2—M^2 being more or less distinctly yellow.

In several other individuals from Parana the yellow diffusion is present in both wings, being especially distinct on the underside of the hindwing, the forewing is practically naked from M^2 forward, the postdiscal band of the hindwing is broad, etc.

We thought at first that these yellowish individuals were the product of crossing between *P. protesilaus nigricornis* and *P. telesilaus* or *stenodesmus*. But as they do not combine the characters of these species, standing for instance in the broad, straight, black, postdiscal band of the hindwing quite outside the limits of variation of these species, and as they differ also in the genitalia, we can but treat them as belonging to a distinct species, described below. That there are several closely allied species in Brazil occurring in the same district is nothing unusual; but the question of specific distinctness is in this case rendered very difficult to decide from a small series of specimens, since there occur individuals which stand just intermediate between *P. protesilaus nigricornis* and the new species. These individuals have the forewing practically naked from M^2 forward, have yellow ad- and submarginal spots on the hindwing, etc., as in the new

* See p. 418.

species, but differ from the new species in the harpe being practically like that of *nigricornis*. Moreover, in some of the characters—for instance, the development of the black postdiscal band of the upperside of the hindwing, and the black line along the abdominal edge on the underside of this wing—the specimens incline decidedly towards *nigricornis*. The teeth of the hindwing are, however, on the whole rather more acute than in either *nigricornis* or the new species. In one of these individuals, from Minas Geraës, February, the antennae are tawny, not black; a second specimen from Minas Geraës, August, has unfortunately only a remnant of one antenna, which is black. What are these specimens? Their characters are such that the individuals may be hybrids between the new species and *nigricornis*. Besides the two Minas Geraës specimens we have one from Castro, Parana, September, and two labelled simply "Brazil," all males. Is it likely that we should have received five hybrids, while we got only six specimens of one of the supposed parent species? Moreover, the tawny antenna of one of the Minas Geraës specimens could hardly be explained by assuming the specimen to be the product of two parent-species which have both black antennae. It would be necessary to assume further that in this individual there was also the blood of *P. telesilaus*, which has a tawny antenna. We are inclined to believe that the specimens belong to a third species; they may even be the Atlantic representatives of the insect figured Pl. VI. fig. 29, though they resemble in colour much more Pl. VI. fig. 30. We purposely abstain from giving a name to these individuals, believing it to be much wiser to wait till a larger material has been examined. One necessary desideratum is also the knowledge of the extent of variation of *P. protesilaus nigricornis* during the dry and wet seasons. After our discovery of a slight but distinct difference in the genitalia of the seasonal forms of *Papilio xuthus*,* it would not be very astonishing if some such variability should be proved by breeding to obtain also in *P. protesilaus*. The difference in the density of the scaling of the forewing is a character known to vary with the season in *P. podalirius* and allies.

152. **Papilio helios** spec. nov. (Pl. VI. fig. 30).

♂ ♀. Antenna and frons black as in *P. protesilaus nigricornis*. Wings more or less pervaded with yellow. Forewing transparent, the scaling of the *upperside* dense only from hindmargin to M^2, but even in this area the scales somewhat reduced in size, not covering one another as in *P. protesilaus*, either rounded at apex, entire, or obtusely bidentate; white scaling between M^2 and costal margin more or less completely fallen off, the scales narrow, those in the distal interspaces between the black bands rather broader than in *P. protesilaus*; first band stopping short at SM^2, there being only a very few black scales behind this vein; second band mostly reaching beyond SM^2, but not attaining hindmargin, interspace between these bands wider than that between second and third band; fourth band short or vestigial; fifth band not narrowing to a point at lower angle of cell, postdiscal band closely approaching lower angle of cell, posteriorly almost separated from the marginal band, the white interspace M^2—(SM^1) being obscurely continued to SM^2.——Hindwing more sharply dentate than in *P. protesilaus nigricornis*, especially at C, SC^2 and R^1; black postdiscal band with more or less straight proximal edge, the partitions R^2—M^1 of this band not separate from one another, larger and proximally more sharply defined than in *P. protesilaus*, red anal spot

reaching to M^1, the black spot M^1—M^2 in front of it more or less distinctly connected with the black postdiscal band, and the white spot M^1—M^2 behind the red one reduced, often to a minute dot; submarginal and marginal spots from R^2 backwards yellow, marginal spots somewhat paler, yellow spot at anal angle not divided, the vein M^2 traversing it being distinctly black only proximally; black submarginal bar R^2—R^3 straight as a rule, the yellow ad- and submarginal spots R^3—M^1 not regularly crescent-shaped, the submarginal one irregularly triangular or trapeziform; most specimens with a black bar behind M^2 in front of the red anal spot.

Underside more yellow than upper. Forewing practically naked from M^2 forwards; the small costal spot between discocellular band and postdiscal one separated from the latter by yellowish scaling, the extreme costal edge remaining black; scales of hinder area entire, not touching one another.——Hindwing: subbasal and median bands a little more widely apart at costal edge and the black postdiscal band broader, therefore the discal area proportionately narrower costally than in *P. p. nigricornis*; red line with distinct white border on **distal** side; thin black submarginal bar R^3—M^1 incomplete, not reaching R^3, yellow anal spot not separated from spot M^1—M^2, or incompletely, M^2 being only partially black between these spots or not at all; black arrowhead-shaped spot which stands proximally of red anal bar very little produced basad, being smaller than in *P. protesilaus*; a distinct black line on abdominal fold of male extending from base at least two-thirds to anal angle, this line absent or vestigial in *P. protesilaus*.

Scent-organ as in *P. protesilaus*.

Genitalia: ♂. Deflexed dorso-apical ridge of harpe serrate proximally, not dilated into a large tooth, apex of harpe tapering almost to a point, tip of central process curved proximad in dorsal aspect, teeth vestigial; ventral process reaching edge of clasper, non-dentate.

Length of forewing: ♂, 42 mm.; ♀, 45 mm.

Hab. Brazil.

In the Tring Museum 5 ♂♂, 1 ♀, from: Castro, Parana, December 1898 (E. D. Jones); Parana, name-type.

The white distal border to the red median line of the hindwing below is a remarkable character, which is vestigial in the allied species *P. protesilaus*, *P. telesilaus*, and *P. stenodesmus*, being more distinct in *P. stenodesmus* than in the others. The white border is best noticed in these species if one looks at the hindwing from the upperside, with the eye between specimen and light.

153. **Papilio orthosilaus** Weym. (1899) (Pl. VI. fig. 29).

Papilio orthosilaus Weymer, *Ent. Nachr.* xxv. p. 195 (1899) (Paraguay).

♂. Similar to *P. helios*, larger. Antenna tawny, not black. Frons broadly buff at eyes, not all black.

Wings somewhat narrower than in *P. helios*. *Upperside:* forewing transparent as in *P. helios*; first and second band continued to hindmargin, third band extending just beyond M, the vein itself being black and there being some black scales distally of the vein, fourth band vestigial, discocellular band as in *P. helios*, postdiscal band not so close to lower angle of cell as in *P. helios*, posteriorly a little wider than in that species.——Hindwing: black median band incompletely represented also above from near costal margin to M^1, a black half-crescent inside the apex of the cell connected with this band; postdiscal band

broad, much broader than in *P. helios*, admarginal and submarginal spots yellowish, but paler than in *P. helios*, all small, yellow anal marginal spot separated from submarginal spot M^1—M^2, the vein M^2 being black; red anal spot very large, yellowish spot M^1—M^2 behind it reduced to a minute bar, black spot M^1—M^2 contiguous with the red patch; blue spots R^3—M^2 rather large, but not sharply defined proximally; marginal teeth C—R^2 sharp, distal edge of wing black from C to tail, there being only a minute yellowish spot close to the margin in front of tail.

Underside more green at base than in *P. helios*; anal and subanal pinkish spots of hindwing large; black line along abdominal edge extending to anal angle, postdiscal band broad, yellowish ad- and submarginal spots narrow.

♀ not known.

Scent-organ as in *P. protesilaus*.

Genitalia as in *P. helios*, but apical lobe of harpe much shorter and broader, rounded at apex; ventral process also shorter.

Hab. Paraguay; Brazil.

A ♂ in coll. Weymer, from Paraguay. The type-specimen, also from Paraguay, is no longer in coll. Fruhstorfer; we have been unable to find out in which collection it is now contained; the bands, especially the marginal one of the forewing, are narrower than in our figure, according to a sketch which Herr G. Weymer has kindly sent us.

The ♂ here figured is from Goyaz, Brazil, in coll. Oberthür.

154. **Papilio stenodesmus** spec. nov. (Pl. IX. fig. 68).

♂♀. Antenna black. Frons white at sides. Transparent area of forewing much more extended than in *P. protesilaus* and *P. telesilaus*, the opaque (densely white-scaled) area reaching from hinder margin to M^2, not entering cell; the scales of this opaque space narrow, sinnate, becoming more and more narrow towards cell and in basal half of cell, assuming a hairlike shape in the apical half of the wing; the white scales at the costal edge between the black bands about the same size as those in the posterior area of the wing; the hairlike scales of the transparent spaces usually fallen off to a great extent; the scales of the black bands about twice or three times as long as broad, denticulate, some narrow; scaling of *underside* as above, but transparent spaces practically denuded of scales, the sockets of the scales, however, being present; scales larger than above and entire from M^2 to inner margin, except distally; seven comparatively thin black bands, the first not quite reaching inner margin, stopping at SM^3, the second extending usually beyond SM^2, but never reaching inner margin, a little more oblique and therefore posteriorly more distal than in *telesilaus*; interspace between these two bands about half as wide again as that between second and third band, the latter stopping at M, fourth band reduced to a costal spot, usually triangular, rarely reaching halfway across the cell, fifth and sixth bands usually touching each other at lower angle of cell, seldom here 1½ mm. distant, sixth always reaching to hinder angle, here joining the marginal band; transparent submarginal band reaching costally beyond SC^3 and posteriorly beyond M^2, there being in black costal border a thin transparent streak before SC^3.——Hindwing more elongate than in *P. protesilaus* and *P. telesilaus*, often slightly yellow; the marginal teeth R^2, M^1 and M^2 longer, submarginal spots R^2—M^2 pale yellow, paler

than in *P. telesilaus*; medium band of *underside* a little curved, crossing cell closer to apex than in *P. protesilaus* and *P. telesilaus*.

Neuration and scent-organ as in *P. protesilaus*.

Genitalia: ♂. Tenth tergite narrow, trilobate at apex, a little longer than in *P. protesilaus*; apical lobe of harpe broad, obtuse or pointed, about two and a half or three times as long as broad in middle, finely denticulate at convex apical edge and in middle of ventral margin, deflexed dorso-apical edge not dilated; ventral process reaching ventral margin of clasper, central process pointed in dorsal view, the tip being curved proximad.——♀ not dissected.

Early stages not known.

Hab. Paraguay; Brazil.

A combination of black antenna, white (or greyish) sides of the frons, broad interspace between the first and second black bands of the forewing, and a strongly dentate hindwing is not met with in the allied species. The frons of the Brazilian *P. protesilaus*, which has black antennae, is nearly as black at the sides as in the centre; and *P. telesilaus*, small specimens of which resemble *P. stenodesmus*, has always tawny antennae.

We have seen specimens said to be from outside the range as given above. But as they were obtained from a Continental dealer, we do not believe that the localities are authentic, and therefore abstain from publishing them.

In the Tring Museum 68 ♂♂, 1 ♀, from: Sapucay, Paraguay, August to October 1901 and 1904 (W. Foster), *type*; Yhu, Paraguay, September—December 1896 (Andeer); Rio de Janeiro (E. May); Petropolis, December 1897 (Foetterle); Leme, S. Paulo, February and March 1898; Bahuru, S. Paulo (Dr. Hempel); S. Paulo, August 1884 (E. D. Jones); Castro, Parana, September 1898 (E. D. Jones); Espiritu Santo, September 1896 (Foetterle); S. Catharina; Blumenau.

155. **Papilio earis** spec. nov. (Pl. VI. fig. 32).

♂. Frons buffish white at sides. Antenna dark tawny. Abdomen beneath more or less ochraceous. Wings pervaded with buff, especially on the *underside*, which is mostly washed with pink.

Forewing: first band stopping at SM^2, second prolonged a little beyond that vein or also stopping short at it; interspace between these bands a little narrower than the interspace between second and third bands; fourth band reduced to a costal dot; sixth close to lower angle of cell, narrower from R^2 forwards than backwards.——Hindwing: red anal spot elongate, extending to near M^1 proximally, black bar in front of it restricted to cellule M^1—M^2; black postdiscal spots R^2—R^3 luniform, narrow, more or less distinctly separate from spot R^3—M^1; ad- and submarginal interstitial spots buffish, narrow; dentition of wing rather more sharp than in *P. prot. protesilaus*.

Underside: ad- and submarginal buffish spots of hindwing smaller than in *P. p. protesilaus*, upper two more or less washed with brown, submarginal buffish bar R^1—R^2 very thin; white distal border of red anal bar wider than in the form just mentioned, the black arrowhead spot on abdominal fold not reduced as in that form.

Scent-organ as in *P. protesilaus*.

Genitalia: Deflexed dorso-apical ridge of harpe slightly widened, with some teeth; ventral process simple, not reaching ventral edge of clasper, somewhat

curving apicad ; central process broad, short, spatulate, heavily dentate, the teeth somewhat curving basad, the process bearing one or two teeth on the ventral side near the base.

♀ and early stages not known.

Hab. Ecuador : Zamora, 3000—4000 ft. (O. T. Baron), *type* ; Zaruma, 1000 m., June 1899, wet season (Simons) ; three ♂♂ in the Tring Museum.

Judging from the genitalia, it appears to us possible that *P. earis*, *P. orthosilaus* and *P. helios* may turn out to be geographical races of one species. However, the material examined is as yet quite insufficient to decide the question.

156. Papilio telesilaus Feld. (1864).

Papilio Eques Achivus protesilaus, Jablonsky & Herbst (*non* Linné, 1758, err. det.), *Naturs. Schm.* iii. p. 147. n. 97. t. 43. fig. 3. 4 (1788) ("Carolina & Jamaica," errore).

Princeps heroicus *protesilaus*, Hübner, *Samml. Exot. Schm.* i. t. 108 (1806—?).

Iphiclides protesilaus, id., *Verz. bek. Schm.* p. 82. n. 834 (1818?)

Papilio protesilaus, Godart, *Enc. Méth.* ix. p. 50. n. 73 (1819) (*partim*).

Papilio telesilaus Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. n. 179 (1864) (Amazonia ; Nova Granada ; Brasilia austral.).

♂♀. Body and wings more pervaded with yellow than in *P. protesilaus*. Antenna always tawny, though varying in depth of colour. Frons always yellowish white at sides.——Forewing less densely scaled in costal area than in South American *P. protesilaus*, the small scales falling easily off, the anterior and discal portions of the wing appearing naked, glossy ; first and second bands closer together than second and third in nearly every specimen ; fourth band sometimes reaching as far as third cell-fold, usually very short, often reduced to a dot, not rarely absent ; sixth band close to lower angle of cell, which it touches in many specimens, more or less reduced in width from this angle of cell forwards, this costal portion sometimes practically separate from the posterior portion, the latter then being continuous with the discocellular band.——Hindwing : submarginal spots R^2—M^2 buffish yellow, often the whole anal region strongly pervaded with yellow above and below ; blue admarginal scales entire, or some with small teeth.

Scent-organ : hair-scales long, but decidedly shorter and broader than in *P. protesilaus*.

Genitalia : ♂. Deflexed dorso-apical ridge of harpe not or very little dilated, not enlarged into a tooth ; ventral process reaching ventral edge of clasper ; central process either simple or bearing at the base on the ventral side a dentate ridge, the apex being in this case also strongly dentate.——♀ not dissected.

Early stages not known.

Hab. Panama to Southern Brazil and Paraguay.

a. P. telesilaus dolius subsp. nov.

Papilio protesilaus var. *macrosilaus*, Bates (*non* Gray, 1852, err. det.), *Proc. Zool. Soc. Lond.* p. 241. n. 2 (1863) (Panama).

Papilio telesilaus, Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 215. n. 41 (1890) (Panama; "S. America" alia subsp.).

♂. First band of forewing not continued along SM^3 to hinder margin, stopping short at SM^2.——Fringe of hindwing more extended white between C and R^2 than in the following form, black postdiscal lunules R^2—M^1 on the whole smaller, the black submarginal bar R^2—R^3 reaching R^3 halfway between the black postdiscal

and marginal lunules R^3—M^1; subbasal band of *underside* not entering apex of basal cellule.

Genitalia: Deflexed dorso-apical ridge of harpe very narrow, hardly at all dentate; central process slender, without basal dentate ridge, apex often entire, non-dentate, never so strongly dentate as in the following form.

Hab. Panama and west coast of Colombia; *name-type* from the Rio Dagua, West Colombia.

In the Tring Museum 14 ♂♂ from: Panama (Salvin); R. Dagua (W. F. H. Rosenberg).

b. P. telesilaus telesilaus Feld. (1864).

Papilio Eques Achivus protesilaus, Jablonsky & Herbst (*non* Linné, 1758, err. det.), *l.c.*

Princeps heroicus *protesilaus*, Hubner, *l.c.*

Papilio protesilaus, Godart, *l.c.* (1819) (*partim*); Kollar, *Denkschr. K. Ak. Wiss. Wien. Math. Nat. Cl.* i. p. 352. n. 2 (1850) (syn. *partim*); Möschl., *Verh. Zool. Bot. Ges. Wien* xxvi. p. 296 (1876) (Surinam; *partim*); Auriv., *K. Sv. Vet. Akad. Handl.* xix. 5. p. 29. n. 28 (1882) (Recensio critica; sub synon.).

Papilio protesilaus var. a., Gray, *Cat. Lep. Ins. Brit. Mus.* i. p. 34. sub. n. 160 (1852) (Brazil).

Papilio telesilaus Felder, *l.c.* (1864) (Amazonia; Nova Granada; Brasilia austral.): Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 13 (1876) (Ucayali): Staud., *Exot. Tagf.* i. p. 17 (1884) (Amazons); Eimer, *Artb. Verwandtsch. Schm.* p. 104. t. 1. fig. 6 (1889); Hahnel, *Iris* iii. p. 250. 253 (1890) (Maués); id., *l.c.* p. 283 (1890) (Pebas); Michael, *Iris* v. p. 214 (1894) (Sao Paulo de Olivença); Eimer, *Orthogen.* p. 21 (1897).

Papilio protesilaus, Linn., var. b. *P. telesilaus*, Kirby, *Cat. Diurn. Lep.* p. 556. sub n. 248 (1871).

Papilio protesilaus var. *telesilaus*, Oberthür, *Et. d'Ent.* iv. p. 66. sub n. 181 (1880) (Pará; Cayenne); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304 (1883) (Surinam; in one specim. red anal spot absent from upperside); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 24. sub n. 110 (1890) (west side of Cordillera of Bogota); iid., *l.c.* p. 82. n. 51 (1890) (Upper Amazons).

Papilio protesilaus telesilaus, Eimer, *l.c.* p. 47. 48 (1897).

Cosmodesmus telesilaus, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 93. t. 108. fig. 1. 2 (190—?).

♂ ♀. First band of forewing continued along SM^3; subbasal band of hindwing below entering basal cellule.

The specimens from Brazil have on the whole thinner black bands than the individuals from the Andes, Amazons and Guianas, the median band of the hindwing is often a little more distal, and both wings are more frequently conspicuously pervaded with yellow.

There is considerable variability in the width of the wings as well as in the size of the markings in the distal area of the hindwing.

Genitalia: Deflexed dorso-apical ridge of harpe distinctly widened, dentate; central process spatulate, dentate, the teeth standing on the dorsal side, and being more or less curved, a conspicuous dentate ridge on the central process at its base.

Hab. Colombia: Magdalena valley eastwards; Venezuela; the Guianas; Amazons; Eastern Ecuador to Bolivia; Paraguay; Brazil as far south as Rio Grande do Sul.

In the Tring Museum 110 ♂♂, 2 ♀♀, from: "Bogota": Villavicencio to Rio Ocoor, January 1897 (Dr. Bürger); Temblador, Suapure, and La Union, Caura R., Orinoco, February, June, September and October (S. M. Klages); R. Demerara, August 1898; Essequibo R.; Aroewarwa Creek, Maroewym valley, Surinam, June and July 1905 (S. M. Klages); Manicoré; Thomár; Obidos; R. Uanpes, Upper R. Negro; R. Napo (W. Goodfellow); Archidona, N.E. Ecuador (W. Goodfellow); R. Cachyaco, affl. of R. Huallaga (Stuart); R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); Palcazu (Sedlmayr); Peréné R.; Prov. Sara, S. Cruz de la Sierra, February—April 1904 (J. Steinbach); S. José de Chiquitos, East

Bolivia, July 1904 (J. Steinbach); Sapucay, Paraguay, September 1902 (W. Foster); Yhu, East Paraguay, December 1896 (Andeer); Villa Maria to Diamantino, Matto Grosso, January 1897 (Andeer); Minas Geraës, February 1899 and 1901 (A. Kennedy); Petropolis; Rio de Janeiro (E. May); Bahuru, S. Paulo (Dr. Hempel); S. Catharina; Blumenau.

XVI. Thyastes Group.

This group is very closely related to the following one, the two together contrasting rather strongly with the previous group in pattern as well as structure. The genitalia of the *Thyastes* and *Dolicaon* Groups are practically the same, the differences between the species being very slight in these organs. The females are even rarer in collections than those of the *Protesilaus* Group.

Six species:

a. Hindwing below with a tawny band on disc . . . Species No. 157.
Hindwing below with a line of red spots on disc . . *b*.

b. Forewing with row of sharply marked submarginal spots in apical area . . . . . *c*.
Forewing without sharply marked submarginal spots in apical area . . . . . Species No. 162.

c. Hindwing, on upperside, with a yellow spot M^1—M^2 beside the marginal anal spot . . . . . Species No. 158.
Only the marginal spot present. . . . . *d*.

d. Pale discal area of forewing not reaching to lower angle of cell . . . . . Species No. 159.
Pale discal area of forewing reaching to lower angle of cell . . . . . *e*.

e. Submarginal spot R^2—R^3 of forewing distant from discal area, or absent . . . . . Species No. 160.
Submarginal spot R^2—R^3 of forewing contiguous with spot R^2—R^3 of discal area, always present . . . Species No. 161.

157. Papilio marchandi Boisd. (1836).

Papilio marchandi Boisduval, *Spec. Gén. Lép.* i. p. 350. n. 192 (1836) (Mexico); Strecker, *Lep. Rhop. Het.* p. 25. t. 4. fig. 2 (1873) (Panama; Costa Rica; Honduras); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 218. n. 46. t. 68. fig. 5. harpe (1890) (East and South Mexico; Guatemala; Brit. Honduras; Costa Rica; Panama; Colombia); Haase, *Untersuch. Mimicry* i. p. 83 (1893) (Colombia; Guatemala).

♂ ♀. Instead of the discal row of red spots on the underside of the hindwing of the allied species *P. marchandi* bears a tawny band, the wing being more or less washed with the same colour distally of the black subbasal band and along the abdominal fold. The tail is broadly bordered with yellow from base to tip on hindside. Individual variability obtains on the forewing especially in the size of the yellow submarginal spots and in the upper discal spots, of which spot R^1—R^2 is usually absent or vestigial, and on the hindwing in the size of the black bands of the underside. Some of the specimens from Ecuador and Colombia exhibit an interesting character on the upperside of the hindwing. The upper three yellow bars belong to the admarginal series, the fourth spot, which stands on a level

with the third, belonging to the submarginal series. In the specimens referred to there are from one to three submarginal bars between C and R^2.

Scent-organ: wool brown; scales beneath the wool somewhat elongate, narrowed towards apex, mostly truncate or feebly bidentate, partly entire.

Genitalia: ♂. No ventral process on valve; central ridge of harpe widest above, obliquely truncate, without a row of teeth across its lateral surface.

Early stages not known.

Hab. Mexico to West Ecuador.

Two subspecies.

a. P. marchandi marchandi Boisd. (1836).

Papilio marchandi Boisduval, *l.c.* (Mexico); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845) ("Brazil," errore); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 17. n. 164 (1846) (Mexico); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. n. 189 (1852) (Guatemala; "Brazil," errore); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 197 (1856) (Guatemala); Weidem., *Proc. Ent. Soc. Philad.* ii. p. 147 (1863) (Mexico; Centr. Amer.); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 172 (1864) (Guatemala); Lucas, *Ann. Soc. Ent. France* p. 532 (1869) (Cordoba, Orizaba; Guatemala); Boisd., *Consid. Lép. Guatem.* p. 5 (1870) (Honduras; Mexico); Kirby, *Cat. Diurn. Lep.* p. 555. n. 242 (1871) (Guatemala); Strecker, *l.c.* (*partim*; Honduras); Kirby, *l.c.* p. 811. n. 242 (1877); Oberth, *Et. d'Ent.* iv. p. 75. n. 236 (1880) (Mexico); Staud., *Exot. Tagf.* i. p. 18 (1884) (Centr. Amer.); Godm. & Salv., *l.c.* (*partim*; East & West Mexico; Guatemala; Brit. Honduras); Haase, *l.c.* (*partim*; Guatemala).

♂♀. The tawny discal band of the underside of the hindwing is usually somewhat curved anteriorly; its black or brown proximal border is narrow as a rule, but is sometimes as broad as, or even broader than, the tawny band between SC^2 and R^3; the pale central area is usually rounded off. The submarginal spot R^2—R^3 on the upperside of the hindwing is small in most specimens, the admarginal bar at its outer side is vestigial or absent, and the submarginal spot R^3—M^1 is small or absent.

Genitalia: Apical edge of harpe with a few more teeth than in the following form.

Hab. West and East Mexico; Guatemala; Brit. Honduras; "Honduras" (*teste* Boisduval); presumably also in Nicaragua.

In the Tring Museum 11 ♂♂ from: Orizaba (Bilimet); Guatemala (Salvin).

b. P. marchandi panamensis Oberth. (1880).

Papilio marchandi var. *panamensis* Oberthür, *Et. d'Ent.* iv. p. 75. sub n. 236 (1880) (Panama).

Papilio marchandi, Strecker, *l.c.* (*partim*; Costa Rica; Panama); Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 374 (1874) (Costa Rica); Godm. & Salv., *l.c.* (*partim*; Costa Rica; Panama; Colombia); Haase, *l.c.* (*partim*; Colombia).

♂. The yellow markings of the upperside on the whole paler, but sometimes deeper yellow, than in certain Central American specimens (does the colour darken with age?); the yellow submarginal spots R^2—M^2 of the hindwing larger, spot R^3—M^1 being always distinct and the admarginal bar R^2—R^3 never (?) absent; the yellow discal band of the forewing deeper incised on the veins above and below; the black bands of the underside of the hindwing rather wider, the tawny discal band more straight, the pale central area less rounded distally, and the wing narrower between R^1 and R^2, the distance from apex of cell to tip of R^1 being somewhat shorter in *P. m. panamensis* than in *P. m. marchandi*. None of these characters are constant, the two forms completely intergrading.

Hab. Costa Rica to West Ecuador.

In the Tring Museum 20 ♂♂ from : Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall); Chiriqui ; R. Dagua, West Colombia (Rosenberg) ; " Bogota " ; Pambelar and Paramba, West Ecuador ; Cachabi, W. Ecuador, low country, January 1897 (Rosenberg).

158. **Papilio thyastes** Drury (1782).

Papilio Eques Achivus thyastes Drury, *Illustr. Exot. Ins.* iii. p. 47. t. 35. and *Index* (1782) (Rio de Janeiro) ; Fabr., *Ent. Syst.* iii. 1. p. 26. n. 77 (1793).
Iphiclides diaphorus Hübner, *Samml. Exot. Schm.* ii. t. 93 (1820 ?).
Papilio thyastes, Godart, *Enc. Méth.* ix. p. 54. n. 83 (1819) (Brazil).

♂. Similar to *P. calliste* ; ground-colour of upperside varying from maize- to chrome-yellow : one red anal spot on hindwing, a spot M^1—M^2 occasionally vestigial ; yellow submarginal spot R^3—M^1 much smaller than spot M^1—M^2. Red bars R^3—M^2 of underside of hindwing broken up into dots. Hairs on frons short. Yellow dorso-lateral line of abdomen broader than the black lateral line.

Scent-organ : wool buffish, scales beneath it denticulate, mostly broad, those in front of fold mostly entire, acuminate.

Genitalia : . No ventral process on clasper ; central ridge of harpe almost square, its ventral angle not produced basad, the tooth at this angle large, conical ; no row of teeth across the lateral surface.

♀ and early stages not known.

Hab. Ecuador to Bolivia ; Brazil.

Three subspecies.

The most striking feature in the pattern of *P. thyastes* and *P. calliste* appears to us to be the development in different directions of the yellowish ad- and submarginal spots R^3—M^2 in the hindwings of the two species. In *P. calliste* there are on the *upperside* of the hindwing no ad- and submarginal spots M^1—M^3 or only traces of them, while *P. thyastes* has a large submarginal spot M^1—M^2. On the other hand, in cellule R^3—M^1 there is in *P. calliste* a large submarginal spot and a sharply defined admarginal curved bar, *P. thyastes* bearing in this cellule only a reduced submarginal spot. A similar contrast is observed on the underside of the two insects. We find in *P. thyastes* between the discal area of the forewing and the so-called submarginal line a yellowish line which represents the true submarginal interspaces ; on the hindwing there is a corresponding row of spots between C and R^2. These markings are entirely lost in *P. calliste*, while in this species the admarginal spots R^2—M^2, which are vestigial in *P. thyastes*, are large.

a. P. thyastes thyastinus Oberth. (1880).

Papilio thyastinus Oberthür, *Et. d'Ent.* iv. p. 75. n. 235. t. 2. fig. 3 (1880) (Ecuador) ; Hahnel, *Iris* iii. p. 282 (1890) (Pebas) ; Michael, *ibid.* v. p. 214 (1894) (Sao Paulo de Olivença).
Papilio thyastes, Staudinger, *Exot. Tagf.* i. p. 18. t. 12 (1884) (Pebas, *thyastinus=thyastes*) ; Haensch. *Berl. Ent. Zeitschr.* xlvii. p. 154 (1903) (Archidona, 640 m.).

♂. Submarginal spot R^2—R^3 of forewing separate from the discal spot ; discal band usually broadly interrupted at R^3 ; first submarginal spot absent from upperside or ill-defined. Apex of cell of hindwing black.

In some of our Peruvian specimens the subapical cell-bar of the forewing, above, and the discal costal bar are interrupted. The position of the central red spots on the underside of the hindwing is variable ; many specimens have an additional red spot situated in the cell. One Peru specimen has the spots buffish pink instead of bright red.

Hab. North-East Ecuador to East Central Peru ; Upper Amazons.

In the Tring Museum 30 ♂♂ from : Coca, R. Napo, May—August 1899 (W. Goodfellow); R. Chuchuras, affl. of R. Palcazu, 320 m (W. Hoffmanns) : Palcazu (Sedlmayr) ; Pozuzo (W. Hoffmanns) ; Iquitos ; Pebas.

b. P. thyastes zoros subsp. nov.

♂. Like the preceding ; but first submarginal spot of upperside of forewing sharply defined. In the majority of specimens the upper outer angle of discal patch R^3—M^1 of forewing not rounded off, the apex of the cell of hindwing a little less extended black than in *P. th. thyastinus*, and the yellow patch at base of cellule R^3—M^1 longer. The individuals of *thyastinus* from the Upper Amazons and the eastern slopes of the Peruvian Andes completely connect the Ecuador form with the Bolivian one.

Hab. S.E. Peru ; Bolivia (*name-type* from Mushay).

In the Tring Museum 10 ♂♂ from : S. Domingo, Carabaya, 4500 ft. (G. Ockenden) ; Mushay, R. Beni, March 1895 (Stuart) ; Mapiri.

c. P. thyastes thyastes Drury (1782).

Papilio Eques Achivus thyastes Drury, *l.c.* (Rio de Janeiro).

Iphiclides diaphorus Hübner, *l.c.*

Papilio thyastes, Godart, *l.c.* ; Boisd., *Spec. Gén. Lép.* i. p. 349. n. 191 (1836) (Brazil) ; Doubl., *List Lep. Ins. Brit. Mus.* i. p. 17 (1845) (Brazil) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 163 (1846) (Brazil) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. n. 188 (1852) (Brazil) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 196 (1856) (Brazil) ; Ménétr., *Enum. Corp. Anim. Mus. Petr., Lép.* i. p. 4. n. 61 (1857) (Brazil) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 173 (1864) (Bras. austr.) ; Butl., *Cat. Diurn. Lep. descr. Fabr.* p. 239. n. 20 (1869) (Brazil) ; Kirby, *Cat. Diurn. Lep.* p. 555. n. 243 (1871) (Brazil) ; Oberth., *Et. d'Ent.* iv. p. 75. n. 234 (1880) (Brazil) ; Staud., *Exot. Tagf.* i. p. 18 (1884) (Southern Brazil) ; Haase, *Untersuch. Mimicry* i. p. 83 (1893).

Iphiclides thyastes, Kirby, in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 94. t. 307. fig. 1. 2 (190–?).

♂. Paler than the Andesian forms, with a slightly greenish tint in the yellow colour ; discal band of forewing not interrupted at R^3, or only the vein itself black, submarginal spot R^2—R^3 merged together with the respective discal spot, or (rarely) the two spots separated by a very narrow black line. Black distal border of hindwing not entering cell ; most specimens with a minute red dot M^1—M^2 on upperside, which is rarely marked in the Andesian forms.

Genitalia : Central dentate ridge of harpe smaller than in the other forms ; dorso-apical ridge more densely hairy on proximal side.

Hab. Brazil.

No representative of *P. thyastes* is known from Paraguay, Matto Grosso, the Middle and Lower Amazons and the Guianas.

In the Tring Museum 16 ♂♂ from : Bitalha, S. Paulo ; Castro, Parana (E. D. Jones) ; S. Catharina ; Blumenau.

159. **Papilio dioxippus** Hew. (1855).

Papilio dioxippus Hewitson, *Exot. Butt.* i. *Pap.* t. 2. fig. 3. 4. ♂ (1855) (N. Granada) ; Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 198 (1856) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 170 (1864) (Bogota) ; Kirby, *Cat. Diurn. Lep.* p. 555. n. 240 (1871) ("var." excl.) ; Hopff., *Stett. Ent. Zeit.* xl. p. 47. n. 2 (1879) (*partim* ; N. Granada) ; Oberth., *Et. d'Ent.* iv. p. 75. n. 233 (1880) (Muzo ; Carare) ; Staud., *Exot. Tagf.* p. 17 (1884) ("Peru bis Columbien" errore) ; Haase, *Untersuch. Mimicry* i. p. 83 (1893).

One of the commonest Papilios in Bogota collections. It is known from the Cauca and Magdalena valleys, and occurs also on the eastern side of the Cordillera of Bogota. The insect comes very close to *P. lacandones*. As we know as yet nothing of the occurrence of *P. lacandones* in Colombia, and as *dioxippus* is apparently restricted to that country, it is not impossible that *dioxippus* may turn out to be the Colombian representative of *lacandones*. However, as the *lacandones* form which occurs from Ecuador to Bolivia agrees both in structure and pattern closely with the Central American form, it is hardly probable that the Colombian *dioxippus*, which differs in structure and pattern from both *lacandones* forms, is a third form of the same species.

♂. Forewing with two to five submarginal spots ; discal area often reaching beyond R^3, but never up to R^2 ; the two distal posterior spots in cell usually merged together, rarely quite separated from one another; the brown excision, at the base of M^1, of the yellowish discal area is seldom absent (for instance, in type specimen). The purplish white submarginal spots R^2—M^2 on the underside of the hindwing are always present, the posterior one being, however, often much reduced.

Scent-organ : wool creamy ; scales beneath it mostly entire, truncate, apically broader than in *P. marchandi*.

Genitalia : Upper angle of dentate ridge of harpe rounded.

♀ and early stages not known.

Hab. Colombia : Magdalena and Cauca valleys ; Llanos of Rio Meta.

In the Tring Museum 140 ♂♂ from : "Bogota" ; Muzo, December 1896 ; Pereira, Cauca.

In coll. Godman from : Cauca valley (Ribbe) ; Quindia, 4000 ft. (Wheeler) ; Muzo ; Llanos de R. Meta (Child).

160. **Papilio lacandones** Bates (1864).

Papilio lacandones Bates, *Ent. Mo. Mag.* i. p. 4. n. 6 (1864) (Guatemala).

♂. Near *P. dioxippus* Hew. (1855), with which it apparently occurs together in Colombia. The yellowish discal area of the forewing extends anteriorly to R^2 or beyond ; the remnant of the yellowish subapical cell-band stands distally of base of R^3, being widely separate from the cell-spot which precedes it at hinder edge of cell. The hindwing is proportionately longer than in *P. dioxippus*, the pale submarginal spot M^1—M^2 of the underside absent or just vestigial, and the cell narrower.

Scent-organ as in *P. dioxippus* ; the white scales beneath the wool and discally of the fold rather broader and mostly rounded at apex.

Genitalia as in *P. dioxippus*, but the upper angle of the dentate ridge acuminate, not rounded.

♀ and early stages not known.

Hab. Guatemala to Bolivia ; two subspecies.

a. P. lacandones lacandones Bates (1855).

Papilio lacandones Bates, *l.c.* (Guatemala) ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 216. n. 43. t. 67. fig. 11. 12. ♂, 13. harpe (1890) (Guatemala ; Panama ; "Ecuador ; Peru" alia subspecies).

Papilio lacandores (!), Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 169 (1864) (Guatemala ; cit. falsa).

Papilio dioxippus var. a. *P. lacandones*, Kirby, *Cat. Diurn. Lep.* p. 555. sub n. 240 (1871) (Guatemala).

Papilio dioxippus, Hopffer, *Stett. Ent. Zeit.* xl. p. 47. n. 2 (1879) (*partim* ; Guatemala).

Four submarginal spots on forewing, thin, the first usually vestigial ; yellowish discal area extended beyond R^2, spot R^2—R^3 truncate at R^2 ; subapical posterior cell-spot about 5 mm. long, reaching from R^3 nearly to angle of cell ; distal marginal border narrower at M^1 than yellowish discal area.——Yellowish ad- and submarginal spots of hindwing shaded with brown, small; whitish submarginal spots R^2—M^1 of underside vestigial or very small.

Hab. Guatemala ; Panama.

In the Tring Museum : 2 ♂♂ without precise locality.

In coll. F. D. Godman a series of males.

b. P. lacandones diores subsp. nov.

Papilio lacandones, Godman & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 216. n. 43 (1890) (*partim* ; Cururai, Ecuador, and Cosnipata, Peru).

♂. Wings a little broader than in *l. lacandones*. Forewing : five submarginal spots, larger than in the preceding form, spot SC^3—SC^4 distinct, spot R^2—R^3 seldom vestigial ; yellowish discal area a little straighter distally, slightly incised on the veins, stopping at R^2, the spot R^2—R^3 triangular, not truncate at R^2 ; subapical posterior cell-spot small, about as large as submarginal spot R^1—R^2, usually less than half the respective cell-spot of *l. lacandones*.——Ad- and submarginal yellowish spots of hindwing larger above and below, especially the whitish submarginal spots R^2—M^1 of underside, upper bars nearer edge of wing than in *l. lacandones*.

Hab. Ecuador ; Peru ; Bolivia (*name-type* from R. Slucuri).

In the Tring Museum 14 ♂♂ from : Chanchamayo (W. Hoffmanns) ; R. Slucuri, S.E. Peru, 2500 ft., June 1901, dry season (G. Ockenden) ; Chirimayo, S.E. Peru, July 1901, dry season, 1000 ft. (G. Ockenden) ; S. Domingo, S.E. Peru, 4500—6000 ft., July—August 1901 (G. Ockenden) ; La Pampa, R. Huacamayo, 2500 ft., November 1904 (G. Ockenden) ; Mapiri, Bolivia.

161. **Papilio calliste** Bates (1864).

Papilio calliste Bates, *Ent. Mo. Mag.* i. p. 3. n. 5 (1864) (Guatemala).
Papilio lorzae Boisduval, *Insect. Agric.* p. 103 (1869) (Guatemala).

♂. Nearest to *P. dioxippus* and *P. lacandones*. Hairs of frons long. Pale dorso-lateral line of abdomen narrow. Pale bands and spots of wings greenish yellow or primrose-colour. Submarginal line of spots of forewing curved, spot R^2—R^3 of this line confluent with the respective spot of the discal band. Hindwing, above, with two red spots, sometimes with traces of a third dot R^3—M^1 ; while the ad- and submarginal greenish yellow spots R^2—M^1 are strongly developed, there are only slight traces of such spots between M^1 and M^2.

On the *underside* of the hindwing the yellowish and whitish spots at and near the distal edge are merged together, forming a pale border to the wing ; red spot M^1—M^2 bordered with white in front like the anal one, not divided into dots.

Scent-organ as in *P. lacandones*, a portion of the scales beneath the wool rather strongly bidentate.

Genitalia : ♂. No ventral process on valve ; central ridge of harpe widest above, with large teeth at edge, ventral edge not produced basad, no row of teeth across lateral surface.

Female and early stages not known.

Hab. Mexico to Costa Rica.

Two subspecies.

a. P. calliste calliste Bates (1864).

Papilio calliste Bates, *l.c.* (Guatemala) ; Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 171 (1864) (Guatemala ; cit. falsa) ; Kirby, *Cat. Diurn. Lep.* p. 555. n. 241 (1871) (Guatemala) ; Staud. *Exot. Tagf.* i. p. 18 (1884) ("northern Centr. Amer.") ; Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 217. n. 45. t. 68. fig. 1. 2 (1890) (Atoyac, Mexico ; Guatemala ; Brit. Honduras ;—"Costa Rica" alia subsp.) ; Haase, *Untersuch. Mimicry* i. p. 83 (1893) ("N. Granada" errore ; Guatemala).

Papilio lorzae Boisduval, *l.c.* (Guatemala).

♂. Forewing, *above* : apical cell-band and the following band clearly marked ; postmedian cell-band also present, but usually more or less shaded with brown in middle, while the submedian cell-band is vestigial, being rarely distinct ; discal area excised on cell-side between M^1 and M^2, the sinus rounded, an indication of a sinus also between R^3 and M^1 ; outer edge of discal area slightly irregular ; a distinct submarginal spot R^3—M^1. Black distal area of hindwing entering or touching cell ; yellowish marginal spot M^1—M^2 distinct.

On *underside*, the submarginal line of forewing continued to SM^2.

Hab. Mexico : Jalisco ; Guatemala ; British Honduras.

In the Tring Museum 15 ♂♂ from : Motzorongo, Mexico ; Polochic valley, Guatemala ; "Guatemala."

b. P. calliste olbius spec. nov.

Papilio calliste, Butler & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 373 (1874) (Costa Rica ; this form according to specimen in coll. Godman) ; Oberth., *Et. d'Ent.* iv. p. 75. n. 237 (1880) (Costa Rica) ; Godm. & Salv., *l.c.* (*partim* ; Costa Rica).

♂. A little larger than the preceding. Forewing, *upperside* : submedian cell-band absent, postmedian one much shaded with brown, only an anterior and a posterior spot being clearly marked, subapical cell-band also shaded with brown in middle ; discal costal band very thin except costally ; discal area wider than in the preceding subspecies, its distal edge more straight, the sinus M^1—M^2 on costal side reduced ; submarginal spot R^3—M^1 vestigial.——Hindwing : black distal area narrower than in *calliste* in front, not widening costad, not touching cell ; black basi-abdominal band also a little narrower ; yellowish marginal spot M^1—M^2 vestigial.

Underside.—Submarginal line of forewing vestigial from M^1 to hindangle ; the bands less distinctly washed with sulphur-yellow than in the preceding.——Hindwing : brown discal band of almost even width from costal margin to M^1, not triangular.

Hab. Costa Rica.

In the Tring Museum 4 ♂♂ from : Cachi, Costa Rica, May 1901 (Underwood), *type* ; Carillo, Costa Rica, 3000 ft., October 1904 (A. Hall).

162. **Papilio leucaspis** Godt. (1819).

Papilio leucaspis Godart, *Enc. Méth.* ix. p. 55. n. 85 (1819) (Peru ?) ; Grimsh., *Trans. Roy. Soc. Edinb.* xxxix. 1. p. 8 (1897) ("type" from Dufresne collection).

♂. Frons all brown-black, hairs long. Abdomen black above, pale lateral line vestigial, buff-yellow or clay-colour beneath. Brown area of wings paler than in *P. dioxippus, thyastes*, etc. Cell-folds of forewing distinct ; greenish straw-yellow cell-bars represented by spots situated at costal margin and at hinder side of cell ; discal area triangular, stopping short at R^2, but there is usually a small dot in front of this vein ; a spot in front of subcostal fork as in *P. dioxippus* ; brown marginal area with deep brown or (beneath) black lines which are more distinct beneath than

above, four in number, the two middle ones confluent costally.——Greenish straw-yellow area of hindwing triangular, extending beyond apex of cell ; abdominal fold brown ; a red line from R^2 to abdominal edge, interrupted at the veins, the line of spots continued to costal margin on underside.

Scent-organ : Wool buffish, scales beneath it denticulate, mostly asymmetrical, those in front of fold mostly short, truncate, feebly denticulate.

Genitalia : Central dentate ridge of harpe narrowed at base, widest above, longer than broad, the dentate edge incrassate, bearing conical teeth, no row of teeth across its lateral surface ; no ventral process on clasper.

♀ and early stages not known.

Hab. Colombia to Bolivia.

Two subspecies.

a. P. leucaspis lamis subsp. nov.

Papilio leucaspis, Hewitson, *Exot. Butt.* i. *Pap.* t. 2. fig. 5 (1855) (Colombia) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 168 (1864) (*partim* ; Bogota) ; Kirby, *Cat. Diurn. Lep.* p. 555. n. 239 (1871) (*partim* ; Colombia); Oberth., *Et. d'Ent.* iv. p. 75. n. 232 (1880) (Toquiza and Llanos de San Martin, Colombia) ; Staud., *Exot. Tagf.* i. p. 17 (1884) (*partim* ; Colombia).

♂. Forewing somewhat distinctly falcate ; posterior spots of cell large, very distinct also below, the subapical one at least as long as the interspace between the two spots. The red spots of the upperside of the hindwing and the yellow submarginal spot R^2—R^3 on the whole somewhat larger than in the following subspecies.

Hab. Colombia : Magdalena valley, presumably also Cauca valley.

A specimen from Frontino, Antioquia (T. K. Salmon), in coll. Godman, approaches in the size of the cell-spots Ecuadorian examples of *P. l. leucaspis*.

In the Tring Museum 12 ♂♂ from : " Bogota " ; Antioquia.

b. P. leucaspis leucaspis.

Papilio leucaspis Godart, *l.c.* (Peru ?) ; Boisd., *Spec. Gén. Lép.* i. p. 349. n. 190 (1836) (Peru ?) ; Lucas, in Guér. *Dict. Pitt. Hist. Nat.* vii. p. 50 (1838) (Peru) ; Doubl., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 162 (1846) (Peru ?) ; Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 38. n. 187 (1852) (Peru ?) ; id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 52. n. 195 (1856) (Peru ?) ; Felder, *l.c.* (*partim* ; Ecuador) ; Kirby, *l.c.* (*partim* ; Ecuador) ; Hopff., *Stett. Ent. Zeit.* xl. p. 47. n. 1 (1879) (Peru) ; Staud., *l.c.* (*partim* ; Peru) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 64. n. 91 (1890) (Huamboya) ; iid., *l.c.* p. 80. n. 14 (1890) (N. Peru) ; Haensch, *Berl. Ent. Zeitschr.* xlvii. p. 154 (1903) (Archidona, 640 m.) ; Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani).

♂. The spots in the cell of the forewing small, generally absent from the underside or vestigial, the interspace between the two posterior spots much wider than in the preceding subspecies, the subapical spot standing about halfway between lower angle of cell and R^3 ; this spot on the whole larger in Ecuadorian specimens than in Peruvian and Bolivian ones. Many individuals have in front of R^2 a small discal dot, which does not appear to be ever present in *P. l. lamis*.

The specimen (name-type) in the Royal Scottish Museum belongs to this form.

Hab. Eastern Ecuador to Bolivia.

In the Tring Museum 100 ♂♂ from : Zamora (Gaujon, and O. T. Baron) ; Pozuzo, Huánuco, 800—1000 m. (W. Hoffmanns) ; Chanchamayo (Schunke) ; Huancabamba, Cerro de Pasco (E. Böttger) ; Caradoc, Marcapata, 4000 ft., February 1901 (G. Ockenden) ; R. Inambari, S.E. Peru, July 1900, 1000 m. (Simons) ; R. Slucuri, S.E. Peru, June 1901, 2500 ft. (G. Ockenden) ; Oroya to Limbani

Carabaya, S.E. Peru, January 1901 (G. Ockenden); S. Domingo, Carabaya, 4500—6000 ft., January 1901 (G. Ockenden); Charnplaya, Bolivia, 1300 m., June 1901 (Simons).

XVII. Dolicaon Group.

One of the most interesting features of this group is the anastomosis according to species of one or of two subcostal veins of the forewing with the costal vein. The character appears to be constant within most species.

The scent-organ is practically the same in all the species. The wool consists of long and very thin hairs which are widest in the centre. The fold is densely scaled beneath the wool.

Six species:

a. Forewing with broad black band across cell joining the black distal border	*b.*
The band across cell not reaching to distal border . .	*c.*
b. Underside of hindwing with two pale postdiscal spots R^2—M^1 separated from the greenish white basi-discal area by a brown band	Species No. 163.
These spots absent	Species No. 164.
c. Veins SC^1 and SC^2 of forewing confluent with C . .	*d.*
Only vein SC^1 of forewing confluent with C . . .	*e.*
d. Black distal border of hindwing narrow; a narrow discal band on underside from costal margin to anal spot .	Species No. 166.
Black distal border of hindwing very broad; a short discal band on underside from costal margin to distal border, which it reaches before middle . . .	Species No. 165.
e. A red anal spot on hindwing	Species No. 167.
No red anal spot on hindwing	*f.*
f. Wings greenish white above	Species No. 168.
Wings creamy buff above	Species No. 169.

163. Papilio serville Godt. (1824).

Papilio serville Godart, *Enc. Méth.* ix. *Suppl.* p. 809. n. 46-7 (1824) (Amer. merid.).
Papilio servillei (!), Boisduval, *Spec. Gén. Lép.* i. p. 346. n. 187 (1836) (America).

♂. The only reliable difference between this insect and *P. columbus* Kollar which we can find is the presence, on the underside of the hindwing in *P. serville*, of two pale spots R^2—M^1, which are separated from the pale basi-discal area by a black-brown band.

If the whole range of *P. serville* is taken into consideration, the characters by which the two insects are usually distinguished in books do not hold good. The clayish lateral streak on the abdomen, the brown streaks in the cell of the forewing, the dots on the underside of the head and on the breast, which are said to characterise *P. serville*, are not always present in the specimens of this species from Venezuela and Colombia. More constant in all localities, but by no means quite constant, is the slightly different position of the short greenish costal band of the forewing, situated proximally of the subcostal fork, this band being more oblique in *P. columbus* than in *serville*; and further, the colour of the submarginal area of the underside of the forewing, which is more purplish white in *columbus* than in *serville*, the black streaks in this area, moreover, being more prominent in *serville* than in

columbus. The clayish streak on the underside of the abdominal fold is more distinct in *serville* than in *columbus*.

The clasping organs are individually somewhat variable in both insects. We have not found any distinction between the two species in these organs.

The specimens of *P. serville* from Venezuela are the most interesting. They look exactly like a cross between Colombian *serville* and Colombian *columbus*. However, as *P. columbus* is not known from Venezuela, there can be no question of hybridisation, to which describers so often resort in order to get easily over difficulties.

Godart did not know from which locality the type came. Hitherto Colombian specimens have usually been regarded as typical. This is apparently erroneous; though Godart's description, being taken from a single specimen,—probably lost: Boisduval, *l.c.*, says that he had seen the type, but does not add anything to Godart's description,—is naturally not so precise as to enable us to say with absolute certainty from which country the type came. However, there is one point in his description which bears on this question. The abdomen is said to be like that of *P. dolicaon*. Now, in *P. dolicaon* the pale stripes of the abdomen are always broad. This is the case only in the southern subspecies of *P. serville*. Therefore we have to accept as typical the southern form of *serville*, not the northern. The Colombian insects were not yet known at Godart's time; all the very common Colombian forms have been described later. The South American species of the *Enc. Méth.* were from Brazil, Surinam (and Guyane), and from Peru. We may therefore safely assume that the specimen of *P. serville* also came from Peru. The "Peru" of that time, however, included what became Bolivia in 1825. Therefore it is impossible to say whether the Peruvian specimens came from what is now termed Peru, or whether they came from some part of the present-day Bolivia.

Neuration: SC^1 and SC^2 of forewing confluent with C, SC^2 seldom free.

Genitalia: Ventral process of clasper minute; central ridge of harpe a half-crescent, acuminate ventrally and dorsally, the ventral angle being produced basad.

♀ and early stages not known.

Hab. Northern Venezuela, Colombia to Bolivia.

Two subspecies.

a. P. serville acritus subsp nov.

Papilio servillei, Gray (*non* Godart, 1824, err. det.), *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 36. n. 174 (1852) (Colombia); id., *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 48. n. 182 (1856) (*partim*); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 166 (1864) (Bogota; Venezuela); id., *Reise Novara, Lep.* p. 49. n. 38 (1865) (Bogota); Kirby, *Cat. Diurn. Lep.* p. 555. n. 238 (1871) (Colombia; "var." excl.); Butl. & Druce, *Proc. Zool. Soc. Lond.* p. 364. n. 371 (1874) ("Costa Rica" errore); Oberth., *Et. d'Ent.* iv. p. 74. n. 230 (1880) (Colombia); Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 24. n. 108 (1890) (west side of Cordillera of Bogota); iid., *l.c.* p. 36. n. 38 (1890) (Guayabo, Cauca); Haase, *Untersuch. Mimicry* i. p. 84 (1893).

♂. Dots on head and breast usually small, sometimes absent; abdomen often all black, the clayish lateral stripe absent or thin. The cell-streaks on forewing often absent, seldom heavy. The pale submarginal spot C—SC^2 on underside of hindwing standing usually in middle between distal margin and pale basi-discal area.

Hab. Northern Venezuela; Eastern and Central Colombia; *name-type* from Venezuela.

In the Tring Museum 28 ♂♂ from: Tachira, Venezuela (Briceño); Mocotoné, Venezuela (Briceño); "Bogota"; Muzo, December 1896; Casanare, October 1898.

b. P. serville serville Godt. (1824).

Papilio serville Godart, *l.c.*

Papilio servillei, Boisduval, *l.c.* ; id., *Bull. Soc. Ent. France* p. 153 (1874) (distinct from *hippodamus* ; Ecuador) ; Hopff., *Stett. Ent. Zeit.* xl. p. 47. u. 3 (1879) (Chanchamayo ; dist. from *hippodamus*); Staud., *Exot. Tagf.* i. p. 17 (1884) (Peru ; Ecuador) ; Haensch, *Berl. Ent. Zeitschr.* xlvii. p. 154 (1903) (Archidona, 640 m.).

Papilio servillaei (!), Lucas, in Guér., *Dict. Pitt. Hist. Nat.* vii. p. 50 (1838) (hab ?).

Papilio boliviana Weeks, *Illustr. Diurn. Lep.* p. 20 (1905) (Chulumani ; this insect ? *nomen nudum* ! dealer's name ?).

♂. Dots on head and breast always present ; abdomen always with two pale stripes on each side, the upper one being broad. Cell-streaks of forewing heavier than in *P. s. acritus* ; the subapical cell-patch always washed with brown. The pale patches in the distal area of the underside of the hindwing on the whole more distinct, and the upper one of them nearer the basi-discal area than in *acritus*; the hindwing on an average less elongate.

Hab. Western Colombia : Cauca ; Ecuador to Bolivia.

In the Tring Museum 110 ♂♂ from : Archidona (W. Goodfellow) ; Loja ; Zamora (O. T. Baron) ; Chanchamayo (W. Hoffmanns ; Schunke) ; Marcapata, 4500 ft. ; Pozuzo, Huánuco (W. Hoffmanns) ; Perené R. (Simons ; Watkins & Tomlinson) ; S. Domingo, La Union, and Oroya, Carabaya (G. Ockenden) ; Huancabamba, Cerro de Pasco, Junin (E. Böttger) ; Chulumani, Bolivia, January 1901 (Simons) ; R. Tanampayo, Bolivia (Garlepp).

164. **Papilio columbus** Kollar (1850).

Papilio columbus Kollar, *Denkschr. K. Ak. Wiss. Wien, Math. Naturw. Cl.* i. p. 351. n. 1. t. 42. fig. 1. 2 (1850) (Rio Meta).

Papilio hippodamus Doubleday, *List Lep. Ins. Brit. Mus.* i. p. 9 (1845) (*nom. nud.*, Colombia) ; id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 15. n. 134 (1846) ; iid., *l.c.* ii. p. 529 (1852) (*hippodamus* synon. of *servillei* = *columbus* Koll.) ; Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 167 (1864) (Bogota ; "Venezuela," errore) ; Boisd., *Bull. Soc. Ent. France* p. 153 (1874) (distinct from *servillei* = *columbus*) ; Oberth., *Et. d'Ent.* iv. p. 74. n. 231 (1880) (Muzo ; Carare) ; Maass. & Weym., in Stübel, *Reisen S. Amer., Lep.* p. 32. n. 136 (1890) (Colombia) ; Prinz. Theresa, *Berl. Ent. Zeitschr.* xlvi. p. 241. n. 5 (1901) (Bogota, bought).

Papilio servillei, Gray, *Cat. Lep. Ins. Brit. Mus., Pap.* i. p. 36. n. 174 (1852) (*partim*).

Papilio burtoni Reakirt, *Proc. Acad. Nat. Sci. Philad.* p. 89. n. 55 (1868) (Issagasuga, Colombia) ; Strecker, *Lep. Rhop. Het.* p. 15 (1873) (= "*columbus* Hew." errore); id., *l.c. Suppl.* iii. p. 17 (1900) (type ; = *hippodamus*).

Papilio servillei var. a. *P. hippodamus*, Kirby, *Cat. Diurn. Lep.* p. 555. sub n. 238 (1871) (Colombia ; Venezuela).

Papilio hippodamus var. *fulva* Oberthür, *Et. d'Ent.* iv. p. 74. sub n. 231 (1880) (Muzo).

Papilio servillei Godt. var. *hippodamus*, Standinger, *Exot. Tagf.* i. p. 17. t. 12 (1884) (North Colombia ; Venezuela) ; Haase, *Untersuch. Mimicry* i. p. 84 (1893).

The name *hippodamus* can unfortunately not stand for this species. The name appears first in Doubleday's *List* of 1845, where it is a mere *nomen nudum*, placed between *P. agesilaus* and *P. philoxenus*, not the slightest indication being given as to what kind of *Papilio* the name was meant to designate. In Doubleday's "Genera" of 1846 the name again appears as a *nomen nudum*, here standing between (*ajax* =) *marcellus* and *bellerophon* ; but we gather from a note by Oberthür, *l.c.* (1880) and a reference given by Felder, *l.c.* (1864), to a figure in Doubleday's "Genera," that some copies of the first number of the "Genera"—advance copies no doubt—were distributed which contained a plate without number on which were figured *P. evan*, *hippodamus* and *polycuctes*. We do not think that this plate can

be considered "published." In the Appendix to the "Genera" (1852) Westwood says that *hippodamus* is the same as *serville*, and that also *columbus* Kollar is a synonym of the same. This is the first published statement of what *hippodamus* is like, though the statement is in so far erroneous, as *hippodamus* cannot be identical with *serville* as well as with *columbus*, these two names applying to two different species. The first description of *hippodamus* was given by Felder in 1864, Kirby, in his Catalogue, enumerating for this reason the insect as *hippodamus* Felder. As the *nomen nudum* of 1845 and 1846 (*hippodamus*) cannot supersede the name *columbus* of 1850, we have to employ the latter name for the present insect. Kirby, *l.c.*, appears to have sunk *columbus* Kollar as a synonym of *hippodamus* not because *hippodamus* had in his opinion a claim to priority, but because there is another Papilio called *columbus* by Hewitson, which name Kirby dates also 1850. However, Hewitson's name was published in 1851—*i.e.* after Kollar's *columbus*.

This species has a very restricted range, being found only in Colombia and North-west Ecuador. Kollar, and after him Felder, *ll.cc.*, gave Venezuela as habitat. However, the type came from the Rio Meta, eastern side of the Cordillera of Bogota, no specimens from Venezuela proper being known.

The black distal area of the hindwing is usually separated from the cell, but occasionally touches it, though it never enters it, as the band so often does in *P. serville*. The size of the small greenish costal band of the forewing and of the subapical cell-patch is very variable. In one of our specimens the anal spot of the hindwing is not red, but nearly as pale as the ground-colour of the wing. Oberthür, *l.c.*, mentions a similar colour-aberration as ab. *fulva*.

The female resembles the male, the black bands being a little less extended.

Hab. Colombia: Cordillera of Bogota to west coast; North-west Ecuador.

In the Tring Museum 140 ♂♂ from: R. Dagua (Rosenberg); Cauca (Child); Pereira, Cauca; "Bogota"; Muzo, December 1896; Lita, W. Ecuador, 3000 ft. (Flemming & Miketta); Paramba, W. Ecuador, 3500 ft., March 1897 (Rosenberg); Paramba, January—May 1898 (Flemming & Miketta).

A female in coll. Adams from the Cauca valley, the only one which we have seen.

In coll. Godman from: Muzo; Llanos de Rio Meta; Frontino, Antioquia.

165. **Papilio orabilis** Butl. (1872).

Papilio orabilis Butler, *Cist. Ent.* i. p. 84 (1872) (Costa Rica).

♂. Similar in appearance to *P. serville* and *columbus* Kollar (1850, *non* Hew. 1851), but easily recognised by the club of the antenna being black, seldom slightly tawny, by the black median band of the forewing stopping short at or before M^2, not joining the distal black border, the cell of the forewing being proportionately longer, the red spot M^1—M^2 of the hindwing being well marked above and below, etc.

Genitalia: ♂. Ventral process of clasper much larger than in *P. serville* and *columbus*, central ridge of harpe wider, proximal ventral edge of harpe not produced basad.

♀ and early stages not known.

Hab. Guatemala to West Colombia.

The occurrence in Guatemala requires confirmation.

Two subspecies.

a. P. orabilis orabilis Butl. (1872).

Papilio orabilis Butler, *l.c.*; id., *Lep. Exot.* p. 163. t. 58. fig. 1 (1874); id. & Druce, *Proc. Zool. Soc. Lond.* p. 365. n. 372 (1874) (Costa Rica): Kirby, *Cat. Diurn. Lep.* p. 813. n. 380 (1877) (Costa Rica); Staud., *Exot. Tagf.* i. p. 17 (1884); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 216. n. 42. t. 67. fig. 14. ♂, 15. genit. (1890) (Guatemala; Costa Rica; Panama.—"Colombia" alia subsp.).

♂. The black oblique discal band of the hindwing not marked on the upperside, only shining through from below. Discal spot R^1—R^2 of forewing, upperside, usually absent, oblique black median band often not reaching M^2, the portion between cell and M^2 being shaded with greenish white, especially often in Costa Rica specimens.

Hab. Guatemala (a specimen in the Berlin Museum, doubtful?); Costa Rica; Bugaba and Chiriqui, Panama.

In the Tring Museum 8 ♂♂ from: Carillo, Costa Rica, June—July 1903 (Underwood); Carillo, 3000 ft., October 1904 (A. Hall); Volcan de Chiriqui, 5000—8000 ft. (Watson).

b. P. orabilis isocharis subsp. nov.

Papilio orabilis, Godman & Salv., *l.c.* (*partim*; Colombia).

♂. *Upperside.*—Forewing: black median band always extending to M^2; distal border a little wider than in *P. o. orabilis*; greenish white discal spot R^1—R^2 always present.——Hindwing: black distal border wider than in the preceding form, sending out obliquely forward a spur corresponding to the oblique band of the underside, the spur not reaching beyond SC^2 (a similar spur found in *P. iphitas*, *dolicaon*, etc.).

Underside.—The pale postdiscal band situated in the brown-black distal border narrower than in the Central American subspecies.——Hindwing: submarginal lunules R^2—M^1 rather larger.

Clayish streaks of abdomen on the whole narrower than in *P. o. orabilis*.

Hab. West Colombia.

In the Tring Museum 8 ♂♂ from R. Dagua (W. F. H. Rosenberg).

A long series in coll. Charles Oberthür from Juntas, R. Dagua.

166. **Papilio salvini** Bates (1864).

Papilio salvini Bates, *Ent. Mo. Mag.* i. p. 4. n. 8 (1864) (Guatemala); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 301. n. 174 (1864) (cit. falsa); Hew., *Exot. Butt.* iii. *Pap.* t. 8. fig. 23 (1865); Boisd., *Consid. Lép. Guatem.* p. 5 (1870) (Yucatan; Costa Rica); Kirby, *Cat. Diurn. Lep.* p. 555. n. 244 (1871); Oberth., *Et. d'Ent.* iv. p. 67. n. 183 (1880) (Guatemala; "Mexico"); Godm. & Salv., *Biol. Centr. Amer., Rhop.* ii. p. 217. t. 68. fig. 3. ♂, 4. genit. (1890) (Yucatan; Guatemala; Brit. Honduras); Haase, *Untersuch. Mimicry* i. p. 85 (1893) (near *bellerophon*, errore).

Papilio eacus Hewitson, *l.c.* (Boisd. *MS.*).

In appearance reminding one of *P. bellerophon*, of which *salvini* has generally been considered a near ally; but the species is in point of fact a relative of *P. orabilis* and *callias*.

♂. Body as in *P. callias* and *P. dolicaon*. Antenna tawny. Cell of forewing long, as in *P. columbus* Kollar (1850, *non* Hewitson 1851) and *orabilis*; the same kind of pattern, but the black cell-bar narrow, not extending beyond cell, at right

angles to costal edge, greenish white discal band much wider and longer than in *P. callias* and *orabilis*.——Black distal marginal border of hindwing narrower than in the allied species; yellowish white admarginal lunules R^2—M^2 regularly curved, not interrupted in middle. Scales of upper layer of fore- and hindwing (except costal area of the latter) narrow.

Underside glossy, excepting posterior area of forewing, where the scales are entire and have an opaque appearance.——Forewing: brown discocellular band continued to M^2 or beyond, remaining separate from the narrow brown distal border, the interspace having become white (secondarily).——Hindwing: brown discal band from costal margin nearly straight to red anal spots, corresponding to the costal portion of the forked band of *P. callias* and the inner arm of the fork, the outer arm of the fork being indicated in *P. salvini* by a slight projection from the band before R^2; brown distal border about as broad as the discal band.

Neuration: SC^1 and SC^2 of forewing confluent with C, the tip of C curving towards SC^2.

Genitalia: A broad denticulate ventral process on clasper; central ridge of harpe narrowed apicad, without a row of teeth transversely across the lobe; ventral proximal edge of harpe not produced basad.

♀ and early stages not known.

Hab. Mexico, Yucatan; Guatemala; British Honduras.

The locality Yucatan requires confirmation.

In the Tring Museum 9 ♂♂ from: Vera Paz, Guatemala; "Guatemala."

167. **Papilio callias** nom. nov.

Papilio columbus Hewitson (*non* Kollar, 1850), *Trans. Ent. Soc. Lond.* (2). i. p. 80. t. 10. fig. 1 (1851) (Villa Nova, Amazons); Doubl., Westw. & Hew., *Gen. Diurn. Lep.* ii. p. 529 (1852) (Amazons); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 36. n. 175 (1852) (Amazons); Wall., *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 49. n. 183 (1856) (Amazons); Bates, *Trans. Ent. Soc. Lond.* (2). v. p. 348 (1861) (Villa Nova, November; Ega; R. Japura); id., *Journ. Ent.* i. p. 229. n. 32 (1862) (Upper Amazons); id., *Natural. Riv. Amaz.* p. 156 (1864); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 161 (1864) (Villa Nova; Ega; R. Japura); Kirby, *Cat. Diurn. Lep.* p. 554. n. 236 (1871) (Amaz. sup.); Oberth., *Et. d'Ent.* iv. p. 74. n. 229 (1880) (Teffé); Staud., *Exot. Tagf.* i. p. 16. t. 11 (1884) (Rio Maués to Ecuador and Peru); Hahnel, *Iris* iii. p. 250 (1890) (Maués); id., *l.c.* p. 283 (1890) (Pebas); Haase, *Untersuch. Mimicry* i. p. 84 (1893) (Amazons); Michael, *Iris* vii. p. 214 (1894) Sao Paulo de Olivença).

Though Westwood as well as Gray and Felder, *ll.cc.*, give Kollar's *columbus* priority over Hewitson's *columbus*, they accept nevertheless the name *columbus* for the later discovered insect. We think they were guided in doing this by the Fabrician habit in nomenclature of employing again in the same genus for another species a name which is a synonym, *columbus* Kollar being treated by those authors as a synonym of *hippodamus*. Kirby, *l.c.*, dates both *columbus* Hew. and *columbus* Kollar from 1850, in which he is wrong, the former being published in 1851. The present species, therefore, has no valid name.

♂. Body clayish white beneath, with the usual black lines on abdomen; clayish dorso-lateral stripe of abdomen broad. Antennae brownish black (Haase, *l.c.*, erroneously describes the club as tawny).

Wings, *upperside*: forewing subtransparent apically, the scales being reduced in width; pattern nearest to that of *P. dolicaon*, greenish white area distally almost

evenly rounded; short costal discal band usually stopping short at R^1, never extending beyond R^2, variable in width from 1 to 4 mm.——Hindwing shorter than in *P. salvini*, *orabilis*, *dioxippus*, etc., but distinctly triangular, dentate, tooth R^2 usually prolonged to a short tail, tail R^3 thin; black distal marginal area produced discad on veins R^2 and following, usually a black bar on disc in front of and again behind SC^2 corresponding to the discal band of underside; red anal spot varying from being large and rounded to being transverse and thin.

On *underside* the most interesting character in pattern is the black forked discal band of the hindwing; the proximal branch usually touches apex of cell, being seldom so far proximal that the extremity of the cell is occupied by a spot of the ground-colour. The outer branch is short, joining the distal marginal area at R^2. The greenish white interspaces between the two branches vary much in width, being sometimes shaded over with brown. The development of the two branches in the allied species is peculiar: in *P. salvini* the outer branch has disappeared, in *P. orabilis*, *serville*, and *columbus* Kollar (1850) the inner branch has become obliterated, being often indicated by a thin line between R^2 and R^3, and in *P. dolicaon* and *iphitas* both branches are preserved, but the proximal one has been shifted basad, standing at right angles (or nearly) to the abdominal margin. Now, in the female of *callias* the whole band is shifted distad, crossing R^2 about 3 mm. from cell; the costal interspace between the band and the distal border is practically absent, there being just a pale shadow between C and SC^2, and the spots of the ground-colour between the two branches of the band are reduced to small spots of a buffish tint.

♀. Besides the difference in the discal band of the hindwing as just mentioned, the female differs from the male in the black cell-band of the forewing being narrowed to a point. The red anal spot of the upperside is large; the greenish white spot M^1—M^2 standing near the red spot is surrounded with black, being separated from the greenish white basi-discal area, which is occasionally the case also in male.

Neuration: SC^1 of forewing joining C; SC^2 free.

Genitalia: ♂. No ventral process on clasper; ventral proximal angle of harpe produced basad; central ridge with transverse dentate ridge.——♀ not dissected.

Early stages not known.

Hab. East Ecuador; Peru, eastwards to Oyapock R., Lower Amazons.

In the Tring Museum 30 ♂♂ from: Coca, R. Napo, May—July 1899 (W. Goodfellow); R. Chuchuras, affl. of R. Palcazu, 320 m. (W. Hoffmanns); Palcazu (Sedlmayr); Pozuzo (W. Hoffmanns); R. Uaupes, Upper R. Negro.

Two ♀♀ from R. Oyapock in Mus. Göldi, Pará, one of which has been kindly transferred to the Tring Museum by the owner.

168. **Papilio dolicaon** Cram. (1775).

Papilio Eques Achivus dolicaon Cramer, *Pap. Exot.* i. p. 25. t. 17. fig. C, D. (1775) (East Indies!).

Though there are considerable differences between *P. dolicaon* and *serville*, the two species have much in common.

♂. Head and breast black, dotted with white; abdomen buffish clay-colour, black lines usually broader basally than apically. Apex of antenna tawny ochraceous.

——Forewing : black patch across cell oblique, continued anteriorly to base ; greenish white subapical interspace of cell often washed with black on upperside, as in *P. serville* ; a row of three to six spots distally of cell from costal margin to R^3, rarely a spot behind R^3, the spots more or less elongate, separate ; on underside this row of spots replaced by a very broad, glossy, purplish buff band, which usually extends to M^2 or beyond.——Hindwing broader and shorter than in *P. serville*, costal margin not much shorter than distal margin ; black distal border broad, usually dentate at some of the veins, dilated between SC^2 and R^1 in most specimens, a spot of the ground-colour being isolated between these veins ; a row of pale blue admarginal dots, two in each cellule, those between C and R^1 usually absent or vestigial ; two rows of such spots on underside ; no red anal spot ; black discal band crossing cell at M^2, the branch across cell standing at right angles (or nearly) to the costal portion, which is about parallel to abdominal margin ; tail thin, apex buff yellow.

♀ like male, larger, black distal areas of both wings and cell-band of forewing, as well as the greenish white discal costal band of spots on forewing, reduced.

Neuration : SC^1 of forewing confluent with C ; SC^2 free.

Genitalia : ♂. Clasper without ventral process, or the process vestigial ; proximal ventral angle of harpe somewhat produced basad ; central ridge regularly dentate, the teeth conical, especially those along the proximal edge, a short transverse row near ventral angle.——♀ not dissected.

Early stages not known.

Hab. Colombia to Paraguay and Brazil.

a. P. dolicaon hebrus subsp. nov.

Papilio dolicaon, Staudinger, *Exot. Tagf.* i. p. 18 (1884) (*partim* ; Antioquia, Colombia).

♂. Black ventral mesial line of abdomen broad.——Wings, *above* : forewing more obtuse at apex than in the other forms ; white subapical cell-band narrow, narrowing costad, sometimes reduced to a point at costal margin or abbreviated ; discal spots long, spot R^2—R^3 always present, rarely a dot behind R^3 ; veins M^1 and M^2 more extended black than in the following forms.——Hindwing more rounded, resembling the wing of *P. iphitas* ; white spot SC^2—R^1 within the black distal border always distinct, the black spot or line separating it from the basi-discal area usually smaller than the white spot.

Underside.—Pale distal area of forewing and the hindwing more purple than in the other subspecies.——Forewing : pale distal area more restricted, the veins R^1 to M^1 traversing it very heavily black, separating the band into patches, the patches M^1—M^2 being small or vestigial.——Hindwing more or less obviously washed with ochreous, especially in anal region ; black discal band broad, especially the costal portion and the cell-band ; pale blue admarginal dots large, buffish patches C—R^1 outside black discal band rather sharply defined.

Hab. Colombia ; known to us from the Magdalena valley, and the Llanos of the Rio Meta, east side of the Cordillera of Bogota.

The form found in "Bogota" collections, usually confounded in collections with *P. d. deileon*.

In the Tring Museum 16 ♂♂ from "Bogota."

In coll. F. D. Godman from the Llanos of R. Meta.

b. P. dolicaon deileon Feld. (1865).

Papilio deileon Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 163 (1864) (Bogota; *nom. nud.*); id., *Reise Novara, Lep.* p. 48. n. 37 (1865) (Bogota); Staud., *Exot. Tagf.* i. p. 18 (1884) (S.E. Peru).

Papilio dolicaon, Wallace, *Trans. Ent. Soc. Lond.* (2). ii. p. 255 (1854) (Amazons); Bates, *ibid.* (2). v. p. 348 (1861) (Pará to Peru); id., *Journ. Entom.* i. p. 228. n. 31 (1862) (sparingly throughout the Amazons); Druce, *Proc. Zool. Soc. Lond.* p. 245. n. 11 (1876) (Ucayali); Butl., *Trans. Ent. Soc. Lond.* p. 146. n. 229 (1877) (R. Jutahi, February); Staud., *Exot. Tagf.* i. p. 18. t. 12 (1884) (*partim*; Amazons); Hahnel, *Iris* iii. p. 250 (1890) (Maués); id., *l.c.* p. 183 (1890) (Pebas).

Papilio dolicaon var. a. *P. deileon*, Kirby, *Cat. Diurn. Lep.* p. 555. sub n. 237 (1871) (Colombia).

♂. Black distal border of hindwing, *underside*, thin from R^1 backwards, 1 to 2 mm. broad at R^2; black discal band of hindwing crossing cell at base of M^2, the point of origin of this vein situated within the band, the patch of ground-colour in apex of cell much larger than the patch situated at base of cellule SC^2—R^1.

The subapical greenish white cell-band of the forewing, *upperside*, usually strongly shaded with black in the specimens from East Central Peru, and the discal spots SC^3—R^3 reduced in size; these spots largest in Bolivian examples, which have nearly always a distinct spot in the subcostal fork. The black distal area of the hindwing produced to cell at veins R^2 and R^3, widest in Peruvian examples, in which the white spots R^1—R^3 situated at cell are often very small; patch SC^2—R^1 of ground-colour situated within black distal border small, often vestigial, always smaller than the black spot standing at its proximal side; pale postdiscal patch SC^2—R^1 of *underside* of hindwing larger and less sharply defined in Amazonian, Peruvian and Bolivian specimens than in individuals from more northern localities. Width of cell of forewing and length of hindwing somewhat variable.

Hab. Colombia: probably "terra caliente" on eastern side of Cordillera of Bogota; from East Ecuador eastwards to Pará and southwards to South-East Bolivia and Matto Grosso.

Felder's specimens are said to be from "Bogota." As the "Bogota" collections, which nowadays come on the market, contain apparently only the preceding subspecies, it is possible that Felder's specimens are wrongly labelled, being perhaps obtained in Eastern Ecuador.

In the Tring Museum 65 ♂♂ from: "Bogota"; Coca, Rio Napo (W. Goodfellow); R. Cachyaco, affl. of R. Huallaga (Stuart); Chanchamayo (Schunke); Palcazu (Sedlmayr); Pozuzo (W. Hoffmanns); R. Chuchuras, affl. of R. Palcazu (W. Hoffmanns); Peréné R. (Watkins); Montanas, R. Madre de Dios (Ockenden); La Union, R. Huacamayo, 2000 ft. (Ockenden); Mapiri; Mushay, Beni R. August 1895 (Stuart); mouth of La Paz R. (Stuart); Yungas de la Paz (Garlepp); Prov. Sara, Santa Cruz de la Sierra, February—April 1904 (J. Steinbach); Villa Maria to Diamantino, Matto Grosso, January 1897 (Andeer).

c. P. dolicaon tromes subsp. nov.

Papilio dolicaon, Staudinger, *Exot. Tagf.* i. p. 18 (1884) (*partim*; Venezuela); Hahnel, *Iris* iii p. 203 (1890) (Valera).

♂. Similar to the preceding subspecies. Subapical greenish white cell-band of forewing, *above*, very slightly shaded with black; distal border of hindwing

broad, spots R^1—R^3 of ground-colour situated around apex of cell small. Black distal border of forewing, *below*, narrow, about 1 mm. wide from R^1 backwards; the pale distal area continued beyond M^2; black discal band of hindwing crossing cell a little distally of point of origin of M^2, there being a small spot of the ground-colour at the base of cellule M^1—M^2: spot SC^2—R^1 of ground-colour longer than, or as long as, the spot situated in apex of cell.

Hab. Northern Venezuela.

In the Tring Museum 2 ♂♂ from Palma Sola.

d. P. dolicaon dolicaon Cram. (1775).

Papilio Eques Achivus dolicaon Cramer, *l.c.*; Goeze, *Ent. Beytr.* iii. 1. p. 79. n. 34 (1779); Fabr., *Spec. Ins.* ii. p. 13. n. 51 (1781) (Amer. merid.); id., *Mant. Ins.* ii. p. 7. n. 57 (1787); Jabl. & Herbst, *Naturs. Schm.* iii. p. 142. n. 95. t. 42. fig. 3. 4. (1788); Fabr., *Ent. Syst.* iii. 1. p. 23. n. 66 (1793) (Amer. merid.); Gmelin, *Syst. Nat.* i. 5. p. 2237. n. 312 (1790) (Amer. merid.).

Papilio dolicaon, Godart, *Enc. Méth.* ix. p. 40. n. 46 (1819) (*partim*); Feld., *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 162 (1864) (*partim*; Surinam); Kirby, *Cat. Diurn. Lep.* p. 555. n. 237 (1871); Möschl., *Verh. Zool. Bot. Ges. Wien* xxxii. p. 304 (1883) (Surinam); Haase, *Untersuch. Mimicry* i. p. 84 (1893).

Cramer's figure represents this form.

♂ ♀. Greenish white subapical cell-band of forewing, *above*, not, or very little, shaded with black; distal marginal border of underside broader than in the other forms, 3 to 5 mm. wide at R^2, narrower in female. Distal border of upperside of hindwing distant from cell; on underside the discal band crossing cell beyond point of origin of M^2, spot of ground-colour at base of cellule SC^2—R^1 as long as, or longer than, the spot situated in apex of cell; buffish postdiscal spot SC^2—R^1 transverse; marginal tooth R^2 often prominent, sometimes with yellow dot on upperside at tip (corresponding to yellow apex of tail).

Hab. Orinoco; the Guianas.

In the Tring Museum 10 ♂♂, 1 ♀, from: Suapure, June 1901, and La Vuelta, May 1904, Caura R. (S. M. Klages); R. Demerara, July 1897; Surinam.

e. P. dolicaon deicoon Feld. (1864).

Iphiclides dolicaon, Hübner, *Verz. bek. Schm.* p. 82. n. 831 (1818?).

Eurytides dolicaon id., *Samml. Exot. Schm.* ii. t. 91 (1820?); Kirby, in Allen, *Nat. Libr., Lep.* i. 2. p. 272 (1896).

Papilio dolicaon, Boisduval, *Spec. Gén. Lép.* i. p. 347. n. 188 (1836) (Rio de Janeiro); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845) (Brazil); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 154 (1846) (Brazil); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 36. n. 176 (1852) (Brazil); Lucas, in Chenu, *Enc. Hist. Nat., Pap.* p. 38. t. 9. fig. 2. ♂ (1851–53) (Brazil); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 49. n. 184 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petr., Lép.* i. p. 4. n. 55 (1857) (Brazil); Butl., *Cat. Diurn. Lep. deser. Fabr.* p. 239. n. 19 (1869) (Brazil); Burm., *Descr. Rép. Argent.* v. *Lép., Atlas* p. 3. n. 2 (1879) (Corcovado; Tijuca); Oberth., *Et. d'Ent.* iv. p. 74. n. 227 (1880) (Brazil); Staud., *Exot. Tagf.* i. p. 18 (1884) (*partim*; Sta. Catharina); Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1895) (Corcovado).

Papilio deicoon Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 164 (1864) (Bras. austral.); Staud., *l.c.* p. 18 (1884) (var. of *dolicaon*).

Papilio dolicaon var. *P. deicoon*, Kirby, *Cat. Diurn. Lep.* p. 555. sub n. 237 (1871) (Brazil).

Eurytides deicaon (!), id., in Hübn., *Samml. Exot. Schmett.* ed. ii. p. 92. t. 304. fig. 3. 4 (190–?).

♂ ♀. White spots in black distal area of forewing large; subapical cell-patch seldom a little washed with black; black border to hindwing narrower than in

the preceding forms; white spot SC^2—R^1 within the black border sharply defined, the black spot separating it from the basi-discal area not always complete.——Discal band of hindwing, on *underside*, crossing cell at M^2, the point of origin of this vein being within the band, the costal portion of the band a little more oblique than in the other forms, the greenish white basal area therefore more oblong; the yellowish white patches distally of the curved outer discal band sharply defined as a rule; veins in proximal half of wing more extended black than in the other subspecies.

Hab. Brazil: Rio Grande do Sul northwards; Paraguay.

In the Tring Museum 40 ♂♂, 1 ♀, from: Minas Geraës, February 1899 (Kennedy); Espiritu Santo; Petropolis and Rio de Janeiro; Bahnru, Sao Paulo (Dr. Hempel); Castro, Parana (E. D. Jones); Sapucay, Paraguay, August and October 1901 and December 1903 (W. Foster); Jatahy, Goyaz.

169. **Papilio iphitas** Hübn. (1820?).

Papilio dolicaon, Godart (*non* Cramer, 1775, err. det.). *Enc. Méth.* ix. p. 40. n. 46 (1819); Donov., *Nat. Repos.* ii. t. 65 (1824); Prillw., *Stett. Ent. Zeit.* xxvi. p. 129 (1865) (Corcovado; "light yellow," perhaps *iphitas*?).

Eurytides iphitas Hübner, *Samml. Exot. Schm.* ii. t. 92 (1820?); Kirby, *ibid.* ed. ii. p. 92. t. 305. fig. 3. 4 (190-?).

Papilio iphitas, Boisduval, *Spec. Gén. Lép.* i. p. 348. n. 189 (1836) (Rio de Janeiro; var. of *dolicaon*?); Lucas, *Lép. Exot.* p. 14. t. 8. fig. 1 (1835); Doubl., *List Lep. Ins. Brit. Mus.* i. p. 16 (1845) (Brazil?); id., Westw. & Hew., *Gen. Diurn. Lep.* i. p. 16. n. 155 (1846); Gray, *Cat. Lep. Ins. Brit. Mus.* i. *Pap.* p. 36. n. 177 (1852) (Brazil); Lucas, in Chenu, *Enc. Hist. Nat., Pap.* i. t. 11. fig. 2. ♂ (1851-53); Gray, *List Lep. Ins. Brit. Mus.* i. *Pap.* p. 49. n. 185 (1856) (Brazil); Ménétr., *Enum. Corp. Anim. Mus. Petrop., Lép.* i. *Suppl.* p. 68. n. 1122 (1857) (Brazil); Felder, *Verh. Zool. Bot. Ges. Wien* xiv. p. 300. n. 165 (1864) (Bras. austral.); Kirby, *Cat. Diurn. Lep.* p. 554. n. 237a (1871) (Brazil); Burm., *Descr. Rép. Argent.* v. *Lép.* p. 3. sub n. 2 (1879) (var. of *dolicaon*); Oberth., *Et. d'Ent.* iv. p. 74. n. 228 (1880) (Brazil); Staud., *Exot. Tagf.* i. p. 18 (1884) (var. of *dolicaon*?; Pernambuco); Haase, *Untersuch. Mimicry* i. p. 84 (1893); Bönningh., *Verh. Ver. Nat. Unterh. Hamburg* ix. p. 27 (1895) (Organ Mts.; not near Rio).

♂. Similar to *P. dolicaon*; ground-colour creamy buff; distal border of forewing narrower behind, both above and below, than in *P. dolicaon*, veins M^1—SM^2 heavier black distally; yellow discal spot R^1—R^2 longer than the others. ——Hindwing more rounded than in *dolicaon*; black discal band marked on *upperside* between SC^2 and R^1, usually entering cell; extreme tip of tail yellow.

Black discal band of forewing below shifted to margin between M^1 and SM^2. Nearly all the veins of hindwing black; discal band crossing cell distally of M^2, spot of ground-colour in apex of cell smaller than the spot situated at base of cellule SC^2—R^1; one row of pale blue spots.

Neuration; SC^1 of forewing confluent with C; SC^2 free.

Genitalia: No ventral process on valve; proximal ventral angle of harpe not produced; central ridge without teeth at proximal edge, a long tooth near ventral angle corresponding to the transverse row of teeth of *P. dolicaon*, tip of ridge pointed, no teeth near it.

♀ and early stages not known.

Hab. Brazil.

In the Tring Museum 8 ♂♂ from: Fazenda Jerusalem, Espiritu Santo; Rio de Janeiro (E. May; doubtless from the Organ Mts.).

EXPLANATION OF NEURATION.

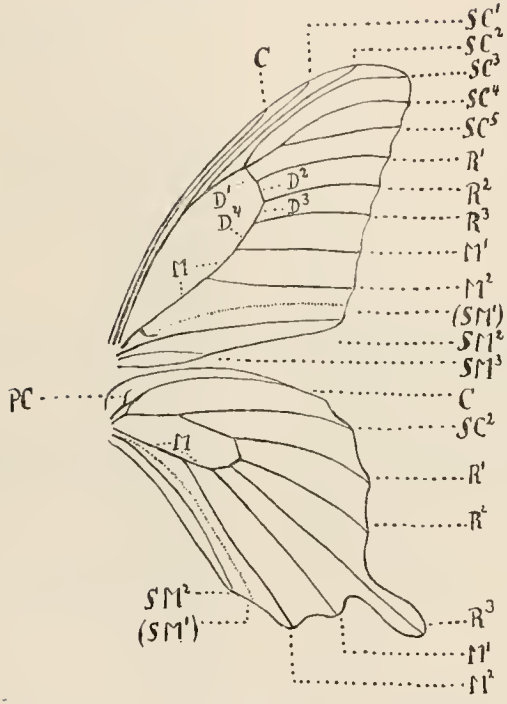


Fig. 4.

INDEX.

Printed by Hazell, Watson & Viney, Ld., London and Aylesbury.

A NEW SPECIES OF GIANT TORTOISE.

By the Hon. WALTER ROTHSCHILD, Ph.D.

Testudo goufféi.

THIS tortoise is at once distinguishable from *gigantea* and its subspecies, *daudini* and *soumeirei*, which form this group of the genus *Testudo*, by its much more elevated carapace, which is also more declivous in front, much larger scutes, and squarer front edge to the carapace.

But the most prominent and easily perceived distinctive character is the development of the scutes on the forelegs and hind part of head. On the legs the scutes are raised and protrude separately, almost as prominently as in *T. calcarata* of Abyssinia. On the head the scutes, instead of being sunk in the skin, stand out like flattened knobs. These characters were even more apparent when the animal was alive. There is a double nuchal plate. Caudal and marginal plates behind somewhat recurved, thus approaching those of *T. daudini*.

Skull considerably smaller than in an individual of *T. gigantea* of similar size. Central alveola on ridges of upper jaw much closer at the front of jaw, 12 mm. apart, as opposed to 15 mm. The front margin of intermaxillaries does not project as far as in *T. gigantea*, so that the nasal opening does not slope so obliquely. Palatal region less concave than in *gigantea*, and the central ridge more pronounced. Edges of pterygoid much contracted posteriorly, while in *T. gigantea* they run almost parallel. The inner edges of the alveolar surface do not meet at the anterior extremity of the vomer, and form a short broad isosceles triangle between that and the foramina palatina, while in *T. gigantea* these edges meet and form a long narrow triangle. In this new species the basi-occipital is much raised above the ex-occipital owing to the deep concavity of the latter, while in *T. gigantea* it is almost in the same plane. The posterior lateral portions of the pterygoid which join the quadrate are strongly concave, and sunk much below the posterior portion of the sharp edge of the pterygoid, while in *T. gigantea* these portions are almost flat, and are level with the sharp edge of the pterygoid.

Skull:

Greatest width, *T. goufféi*: $4\frac{1}{2}$ inches = 114 mm.
„ „ *T. gigantea*: $4\frac{1}{2}$ inches = 114 mm.
Length to end of basi-occipital, *T. goufféi*: $5\frac{1}{2}$ inches = 140 mm.
„ „ „ *T. gigantea*: $6\frac{1}{4}$ inches = 158 mm.
Lower jaw length, *T. goufféi*: $3\frac{3}{4}$ inches = 96 mm.
$4\frac{1}{16}$ inches = 103 mm.
„ *T. gigantea*: $4\frac{1}{8}$ inches = 104 mm.
4 inches = 102 mm.

Scutes:

1st vertebral	10 × $12\frac{1}{2}$ inches	= 253 × 318 mm.
2nd „	$9\frac{1}{2}$ × $15\frac{1}{2}$ „	= 240 × 394 „
1st costal	14 × $13\frac{1}{2}$ „	= 351 × 343 „
Supra-caudal	11 × 13 „	= 279 × 330 „
Caudal	5 × 10 „	= 127 × 253 „

Carapace :

Length over curve, 62 inches = 1550 mm.

„ in straight line, 49½ inches = 1238 mm.

Breadth over curve, 60 inches = 1500 mm.

Hab. Therese Island, St. Anne's Channel, Seychelles Islands.

The carapace of the *T. gigantea* used for comparison measured 49 inches in a straight line,=1225 mm. It is true *T. gigantea* of Schweiger, of which *T. hololissa* Günther is a synonym. This form inhabited the smallest of the three Aldabra islands, while *T. gigantea elephantina* inhabited the northern large island, and *T. daudini* is still found on the southern large island. *T. soumeirei* inhabited one of the smaller islands either of the Seychelles or neighbouring groups.

ADDITIONAL NOTES ON BIRDS FROM N.W. AUSTRALIA.

By ERNST HARTERT, Ph.D.

(Plate I.)

Amytornis woodwardi Hart.

(Plate I. fig. 1, ♂ ad.)

In *Nov. Zool.* 1905, p. 225, I mentioned a series of a bird under the name *Amytornis housei*. Mr. Bernard Woodward, curator of the Perth Museum, has now kindly sent me a specimen of the true *A. housei*, and I find it quite distinct from our series. I therefore described the birds from the Alligator River, Arnhem Land, under the name of *Amytornis woodwardi*, in honour of Mr. Woodward (*Bull. B. O. Club* xvi. p. 30, November 1905). In *Amyt. housei*, originally described as *Amytis housei* (Rep. Kimberley Exped., App. B, 1902) the tail is much shorter (in the specimen before me 91 mm., against 106 to 114 in *A. woodwardi*), the throat is striated with black and white, each feather being white with black margins, the malar region similarly marked, the chest, breast and abdomen are light chestnut, the former only being slightly marked with buff shaft-lines, the vent and under tail-coverts blackish with rufous shafts, and the upper wing-coverts chestnut with whitish shaft-lines. In other respects *A. housei* is much like *A. woodwardi* (cf. *Bull. B. O. Club* xvi. pp. 30, 31).

Amytis housei is well figured on Pl. XIII, *Emu* iv.

The generic name of these peculiar little birds has been rather unlucky. They were named *Amytis* by Lesson in 1831, but as this name had been preoccupied by Savigny in 1826 for a genus of worms, Stejneger in 1885 created the name *Amytornis*, which fact being overlooked by Oberholser, this author made another substitute for *Amytis*, namely *Diaphorillas*, in 1899.

In 1901 Mr. Milligan described a new species under the name *gigantura*. This name was changed first for *megalura* and then for *megalurus* by Sharpe (*Zoological Record* for 1901, p. 68, and *Hand-list* iv. p. 246) under the belief that *gigantura* was a "vox hybrida." Fortunately, however, the original name is composed of two genuine pure Greek words, and "*megalura*" as well as "*megalurus*" are therefore under any circumstances useless synonyms. The fear of Mr. Milligan (cf. *Victorian Naturalist* xx. p. 138) that Dr. Sharpe "forestalled" him with his name *megalurus* is of course unfounded!

Colluricincla woodwardi Hart.

(Plate I. fig. 2.)

This interesting new species has been described in *Nov. Zool.* 1905, p. 228, and the male is figured on Pl. I.

Gymnorhina tibicen longirostris Milligan.

In *Nov. Zool.* 1905, p. 230, I described as a new subspecies from the South Alligator River a *G. t. longirostris*. Shortly afterwards I found that Mr. Milligan had already named a *Gymnorhina longirostris* (*Emu* iii. p. 96) as a new species from North-western Australia. From his description it is clear that he described the same bird, which must therefore be called *G. t. longirostris* Milligan. It is fortunate that I chose the same name, and thus avoided making a new synonym in spite of my overlooking the prior publication.

Mirafra javanica pallida Hall.

(Cf. *Nov. Zool.* 1905, p. 237.)

In the text occurs unfortunately a slip. I have said : "We have also a male from Swan Hill, Victoria, which is paler and greyer than typical *horsfieldi*, very near to *griescens*, but not quite like it." Instead of *griescens* I meant to say *pallida*, as there is no such name as *griescens*.

NOTES ON BIRDS FROM THE PHILIPPINE ISLANDS.

By ERNST HARTERT, Ph.D.

(Plate II.)

PART I.

WE have in the Tring Museum considerable numbers of birdskins from the Philippine Islands, which are not yet worked out. The late William Doherty collected industriously on Basilan and Palawaa ; the first collection made by Mr. Goodfellow on Mount Apo in South Mindanao is preserved in Tring, and also the first set of those collected in the same districts by Mr. John Waterstradt. We also have some skins collected at Ayala (Mindanao) by an orchid hunter.

I should have written an account of these birds—especially those from Mt. Apo—if I had not been waiting for a second and larger collection from there. Mr. Goodfellow has made such a collection, but it has been sold to the British Museum, and Mr. Ogilvie-Grant has published a full account in the *Ibis* for 1906. I can therefore content myself with short notes on most of these forms, and herewith publish the first of them. The rest will follow in *Nov. Zool.* 1907.

(PSITTACI.)

Trichoglossus johnstoniae Hart.

Trichoglossus johnstoniae Hartert, *Bull. B. O. Club*, xiv. p. 10 (1903—Mt. Apo) ; *Aricultural Magazine* 1906, plate.

This wonderful new parrot was discovered at an elevation of 8000 ft., and it was at similar altitudes that Mr. John Waterstradt and Mr. Goodfellow on his second visit to Mt. Apo collected specimens.

Mrs. Johnstone's parrakeet is of special interest, because it seems to connect the so-called genera *Psitteuteles* and *Ptilosclera*, while *Trichoglossus* is in my opinion not separable from *Psitteuteles*. Therefore I call Johnstone's parrakeet simply *Trichoglossus*, though I have little doubt that some ornithologist afflicted with "furor genericus" will one day create a new generic term for it.

Cacatua haematuropygia (P. L. S. Müll.).

Not a mountain bird, being found at Davao, Daliaon, and other places of the plains. This species is widely distributed, being known from twenty-five islands and islets of the Philippine Archipelago. Local forms have not been distinguished, and it seems to me that there are no differences between birds from the various islands.

Doherty obtained it on Basilan, and described the iris as scarlet, feet dirty purplish, bill whitish.

Prioniturus waterstradti Rothsch.

We have the three specimens collected by Mr. Waterstradt on Mt. Apo, it is said at an elevation of 3000 ft., while Mr. Goodfellow sent several examples from a height of 8000 ft.

There can be no doubt that this is the form of the mountains, where it seems to take the place of *P. discurus*. Three thousand feet, however, is not far from the lowlands, and we should await further investigations before deciding if *P. waterstradti* everywhere replaces *discurus*, or whether the two occur together and may be of different stock.

Prioniturus discurus Vieill.

William Doherty obtained four specimens on Basilan, Mr. Goodfellow shot a number at Davao, Piso, and Martina, in South Mindanao, and we have also received one from Ayala. Doherty described the iris as dull chestnut, the bill dull whitish, feet dull slaty blue.

I have before me the type of "*Prioniturus discurus* (Vieill.) var. nov. *suluënsis*" (sic), described in *Journ. f. Orn.* 1890, p. 140. I am sorry to say that I must agree with Mr. Worcester (*Hand-list B. Philippine Is.*, p. 49, footnote) that the Sulu form cannot be separated.

Tanygnathus lucionensis (L.).

Psittacus lucionensis Linnaeus, *Syst. Nat.* Ed. xii. 1. p. 146 (1766—ex Brisson).

Doherty obtained a series of skins on Basilan, and Mr. Goodfellow others on Mindanao, at Daliaon, Davao, and Piso. Mr. Waterstradt sent it from Santa Cruz in S. Mindanao.

We have in the Tring Museum a considerable series from most of the islands of the Philippine Archipelago. Mr. Ogilvie-Grant (*Ibis* 1896, p. 561) gave some very interesting notes on *Tanygnathus lucionensis*, distinguishing between certain groups, but fortunately without naming them. I have before me thirty-six specimens from Luzon, Mindoro, Marinduque, Negros, Panay, Cebu, Basilan, Mindanao, Bongao, Sibutu, Samar, Leyte, Sulu Islands, Palawan, and the small group of islets called Mantanani, near Borneo. I cannot see any constancy in the differences mentioned by Mr. Grant for specimens from various islands. It is true

that our examples from Luzon have very pale blue heads, but specimens from the southern islands are sometimes quite similar. The shade of blue on the crown varies, apparently according to age, and it seems to be lighter in freshly moulted birds, darker in worn birds. The length of wing is also variable and not constant on any island. We have, however, a very remarkable specimen from Negros, in which the blue on the crown is entirely blue from the nape, leaving only a narrow frontal line green, and in which the cheeks too are blue.

Mr. Ogilvie-Grant (*Ibis* 1896, p. 562) separated two birds from the Mantanani islets, near Borneo, under the name of *Tanygnathus salvadorii*. Count Salvadori had correctly mentioned these birds (*Cat. B.* xx. p. 426) as young birds. Mr. Grant "thinks this is a mistake," because the two birds have about as much blue on the crown as old birds; but we very often find that in birds certain portions of the plumage moult irregularly before others, and evidently Mr. Grant is mistaken rather than Count Salvadori, as two adult birds from the Mantanani islets in the Tring Museum show, which have the lesser upper wing-coverts black and the rest exactly as in specimens from other islands.

With regard to Mantanani it is very interesting to read Everett's letter in the *Ibis*, 1888, p. 282.

The amount of blue on the rump also varies considerably, but I have not been able to localise these variations.

The occurrence of *T. lucionensis* on the Sangi Islands is in my opinion most unlikely, and evidently due to an error in labelling in the Darmstadt Museum. I do not hesitate to regard *talautensis* as a subspecies of *lucionensis* and to name it trinomially (cf. Meyer & Wiglesworth, *B. Celebes*, i. p. 145).

Bolbopsittacus lunulatus mindanensis (Steere).

This form is evidently a bird of the lowland regions, for it was found at Davao, Daliaon, Piso, Surigao, Butuan, Zamboanga, Ayala, and on the small island of Panaon, but not on Mt. Apo.

The three *Bolbopsittacus* from Luzon (*B. lunulatus lunalatus*), Leyte and Samar (*B. lunulatus intermedius*), and Mindanao (*B. lunulatus mindanensis*) are as typical subspecies as can be, representing each other on three different islands, and being so much alike that they can only be distinguished if they are closely examined.

B. l. mindanensis was separated as long ago as 1890, and duly described in the *Catalogue of Birds*, xx. pp. 504 and 506. In 1905 (*Bull. B. O. Club* xvi. p. 17), Mr. Ogilvie-Grant redescribed this subspecies as a "new species," fortunately choosing the same name as Mr. Steere. He thus had similar luck as I had with my *Gymnorhina tibicen longirostris* (anteà, p. 755).

Loriculus philippensis dohertyi subsp. nov.

The late William Doherty sent 3 ♂♂ and 3 ♀♀ from Basilan, and I have also examined some specimens collected there by Professor Steere.

This series shows at a glance a much stronger and more reddish golden-yellow wash on the back than in the specimens from Mindanao. In the old males the whole back appears to be golden orange, about the apical half of the feathers being golden orange. In the females it is as strong, or nearly so, as in the males, or in some specimens less developed, though always evident.

Type of *L. philippensis dohertyi*: No. 11898, Basilan, January 1898, William Doherty coll.

It is somewhat difficult to decide how many of the Loriculi should be considered as subspecifically related. There can be little doubt that the smaller forms—i.e. *exilis*, *amabilis*, *aurantiifrons*, *tener*, and others—are not subspecies of the larger ones, because they stand apart by coloration and size, and one form, *L. exilis*, occurs together with a large one, *L. stigmatus*, on Celebes. *L. indicus*, of Ceylon, with its high beak, stands by itself, and so does *galgulus*, with its deep blue patch on the crown, *vernalis* with a blue throat-patch, and *pusillus* from Java. On the other hand, there is good reason to link the Philippine forms together into one group of representative forms, at least those that I am acquainted with, and to call them *L. philippensis philippensis*, *L. philippensis mindorensis*, *L. philippensis apicalis*, *L. philippensis worcesteri*, *L. philippensis regulus*, *L. philippensis dohertyi*, etc.

I cannot see that the black bill of *bonapartei* and *stigmatus* is anything more than a subspecific character, according to my treatment, and I should even link *sclateri* and *ruber* to this series of forms. Meyer & Wiglesworth's considerations in their *Birds of Celebes*, i. p, 160, ff., are most interesting, though I cannot agree to their wide separation of a "northern" and "southern" group.

Loriculus philippensis apicalis Souancé.

Loriculus apicalis Souancé, *Rev. and Mag. Zool.* 1856. pp. 220, 221 (Mindanao).

I have before me in the Tring Museum 9 adult specimens from Mindanao. Mr. Goodfellow obtained it at Daliaon, Dovao, Piso, and Tandaya, and on Mt. Apo at 8000 feet. Mr. Waterstradt sent specimens from Santa Cruz, from 2000 feet on Mt. Apo. Steere obtained a series near Ayala. All these specimens show some golden-yellow tinge on the back, very faint in most females, but distinct in the males.

Rhipidura nigrocinnamomea Hart.

(Plate II. fig. 1.)

Bull. B. O. Club xiv. p. 12 (1903).

This fine and perfectly new *Rhipidura* was obtained by Mr. Goodfellow at an elevation of 8000 feet, and Mr. Waterstradt sent a specimen from a similar height. Its wing measures only 73·5 mm., while the type had a wing of 80 mm.

Goodfellowia miranda Hart.

(Plate II., fig. 2.)

Bull. B. O. Club xiv. p. 11 (1903).

Mr. Goodfellow obtained several fine specimens during his first expedition, and a large series on his second trip; while Mr. Waterstradt did not procure it, probably because he depended mostly on native hunters and did not ascend to such elevations as Mr. Goodfellow.

(*To be continued in* Nov. Zool. 1907.)

NOTES TO PLATES III. AND X.

By KARL JORDAN.

NYMPHALIDAE.

1. **Morphopsis meeki** R. & J., *Nov. Zool.* xii. p. 456. n. 2 (1905) (Angabunga, Brit. N. Guinea).

(Pl. III. fig. 2. ♂, 3. ♀)

Mr. A. S. Meek discovered this species in the Owen Stanley Range at the head-waters of the St. Joseph River. He has recently met with it again on the north-east side of the range at the Upper Mambare River.

2. **Morphopsis ula** *iid.*, *l.c.* p. 454. n. 1 (1905) (Angabunga).

(Pl. III. fig. 13. ♂, 14. ♀)

This fine species has also been found by the same explorer at both places where *meeki* was obtained.

PAPILIONIDAE.

3. **Troides chimaera** Rothsch., *l.c.* xi. p. 311. n. 1. t. 3. fig. 25. ♀ (1904) (Owgarra); *id.* & Jord., *l.c.* xii. p. 460. n. 9 (1905) (Angabunga, ♂ ♀).

(Pl. III. fig. 1. ♂)

This species does not appear to be rare at higher altitudes, though it is difficult to obtain in good condition on account of its high flight. It visits flowering trees, like the allied species. The female varies considerably in the amount of black on the abdomen and in the size of the white markings of the wings. In some females the spots of the discal row on the forewing are all of nearly the same size, while in the majority of specimens some of the anterior spots have disappeared. This species occurs also at the Upper Mambare River, north-east side of the Owen Stanley Range.

LYCAENIDAE.

4. **Deudorix grandis** R. & J., *l.c.* xii. p. 465. n. 18 (1905) (Angabunga).

(Pl. III. fig. 9. 10. ♂)

Nearest to *D. dohertyi* Oberth., *Et. d'Ent.* xix. p. 13. t. 3. fig. 10. ♂ (1894) (Andai), but easily distinguished by the reduced metallic area of the upperside and the deep green band of the underside.

5. **Hypochrysops meeki** R. & J., *l.c.* p. 464. n. 17 (1905) (Angabunga).

(Pl. III. fig. 16. ♂)

Mr. Meek met neither with this nor the previous insect at the Upper Mambare River.

CASTNIIDAE.

6. **Castnia icarus** Cram., *Pap. Exot.* i. p. 26. t. 18. fig. A, B (1775) (Surinam).
(Pl. X. fig. 1—4)

These four forms, which occur together, at least in Paraguay, belong doubtless to one variable species. There appears to be nothing that distinguishes them from one another but the amount of white on the hindwing. The short subapical band of fig. 1 is also no constant difference. The white form is *endelechia* Druce.

URANIIDAE.

7. **Cyphura pardata** Warr., *Nov. Zool.* xii. p. 66. n. 14 (1906) (Angabunga).
(Pl. X. fig. 15. ♂)

GEOMETRIDAE.

8. **Milionia pericallis** R. & J., *l.c.* p. 467. n. 21 (1905) (Angabunga).
(Pl. III. fig. 5. ♂)

Mr. Meek found a long series of this pretty insect at Angabunga, but did not meet with it at the Mambare River.

9. **Craspedosis desmiata** *id.*, *l.c.* p. 468. n. 25 (1905) (Angabunga).
(Pl. III. p. 6. ♂)

10. **Dicyclodes hieroglyphica** Warr., *l.c.* xiii. p. 76. n. 34 (1906) (Angabunga).
(Pl. X. fig. 13. ♂)

11. **Hypochroma purpurissa** *id.*, *l.c.* p. 77. n. 36 (1906) (Angabunga).
(Pl. X. fig. 14. ♂)

This and the other Geometrides of Pl. X. are reproduced by way of experiment: we wanted to know if the three-colour process is sufficiently accurate for the reproduction of insects of that size.

12. **Anisogamia commaculata** *id.*, *l.c.* p. 78. n. 40 (1906) (Angabunga).
(Pl. X. fig. 11. ♂)

13. **Chlorochroma latistriga** *id.*, *l.c.* p. 84. n. 53 (1906) (Angabunga).
(Pl. X. fig. 6. ♂)

14. **Xanthorhoë cerasina** *id.*, *l.c.* p. 104. n. 107 (1906) (Angabunga).
(Pl. X. fig. 5. ♂)

15. **Xanthorhoë interrufata** *id.*, *l.c.* p. 105. n. 110 (1906) (Angabunga).
(Pl. X. fig. 10. ♂)

16. **Arycanda fulviradiata** *id.*, *l.c.* p. 138. n. 179 (1906) (Angabunga).
(Pl. X. fig. 9. ♂)

17. **Moneta plenicolor** *id.*, *l.c.* p. 159. n. 222 (1906) (Angabunga).
(Pl. X. fig. 8. ♂)

ARCTIIDAE.

18. **Asura rhodina** R. & J., *l.c.* p. 469. n. 27 (1905) (Angabunga).

(Pl. III. fig. 12. ♂)

A series of specimens similar to the type were found by A. S. Meek at the Upper Mambare River in March and April 1906.

19. **Caprimima metallica** *iid.*, *l.c.* p. 470. n. 28 (1905) (Angabunga).

(Pl. III. fig. 17. ♀)

20. **Caprimima aenea** *iid.*, *l.c.* n. 29 (1905) (Angabunga).

(Pl. III. fig. 11. ♀)

21. **Neoscaptia albata** *iid.*, *l.c.* n. 30 (1905) (Angabunga).

(Pl. III. fig. 8. ♀)

22. **Neoscaptia aequalis** *iid.*, *l.c.* p. 471. n. 31 (1905) (Angabunga).

(Pl. III. fig. 7. ♀)

The figures of the last two species and of *C. aenea* are much too pale blue. Plate III. is reproduced by another process than Plate X.; the result is not satisfactory.

AGARISTIDAE.

23. **Argyrolepidia palaea** *iid.*, *l.c.* p. 473. n. 35 (1905) (Angabunga).

(Pl. III. fig. 15. ♀)

24. **Xanthospilopteryx zeodita** Niepelt (ubi?).

(Pl. X. fig. 7. ♂)

We have both sexes from Lulnabourg, Kassai River, Congo Free State. A German dealer lately submitted the species to us under the above name, which we adopt to avoid confusion. The insect is nearest to *X. nigridorsa* Mab. (1890).

25. **Andrhippuris caudaequina** Karsch, *Ent. Nachr.* xxi. p. 353. t. 1. fig. 1. ♂ (1895) (Lower Guinea).

(Pl. X. fig. 12. ♂)

We have several specimens from the Kassai River, Congo Free State.

NOCTUIDAE.

26. **Buzara calodesma** R. & J., *l.c.* p. 474. n. 38 (1905) (Angabunga).

ERKLÄRUNG.

In seiner Arbeit "On the African Forms of the Genus *Pycnonotus*" (*Nov. Zool.* xiii. p. 389) schreibt Dr. Hartert: "*P. b. gabonensis* is so much like young *tricolor* that even Professor Reichenow mistook the latter for *gabonensis*. He states that *gabonensis* extends to the Congo, on the strength of a bird collected at Manyanga by Bohndorff; but the specimens collected by Bohndorff at Manyanga are now before me, and they are *tricolor*, but by no means *gabonensis*, though a young specimen has the under tail-coverts very pale sulphur-yellow."

Alle drei in dem vorstehenden Satze von Dr. Hartert aufgestellten Behauptungen sind unzutreffend. Weder ist der von Bohndorff in Manyanga gesammelte Vogel, worauf meine Angabe sich bezieht, *Pycnonotus tricolor*, noch hat Dr. Hartert den Vogel vor sich gehabt, wie der Leser aus dem Inhalt des Satzes annehmen muss, und ferner ist es für den erfahrenen Ornithologen unmöglich, den jungen Vogel von *Pycnonotus tricolor* mit *P. gabonensis* zu verwechseln.*

Ich wiederhole daher meine im *Journal für Ornithologie* 1887, s. 301, und in meinem Buche *Die Vögel Afrikas*, iii. S. 419, gemachte Angabe, dass *Pycnonotus gabonensis* am Kongo vorkommt, wo er von Bohndorff in Manyanga gesammelt ist. Das Belegstück befindet sich im Berliner Museum. Übrigens gibt Prof. Barboza de Bocage das Vorkommen von *P. gabonensis* am Quillu und sogar in Kakonda in Benguella an.

Dr. Reichenow.

* Mir liegen im Museum zu Tring ein ganz alter und ein junger von Bohndorff zu Manyanga gesammelter Vogel vor. Dass der alte Vogel nicht *gabonensis* sondern *tricolor* ist, liegt auf der Hand. Dass der junge dazu gehört unterliegt meiner Ansicht nach keinem Zweifel, obwol er *gabonensis* so ähnlich sieht, dass auch ein erfahrener Ornithologe—selbst Prof. Reichenow vor 29 Jahren—ihn leicht damit verwechseln könnte. Dr. Walter Rothschild kaufte vor langer Zeit, ehe ich mich in Tring befand, von dem verstorbenen Naturalienhändler Schneider in Basel eine Sammlung, von der er damals glaubte, es wäre die von Bohndorff gesammelte Vogelsammlung. Nun wusste ich allerdings sehr wohl, dass sich im Berliner Museum viele von diesen Vögeln befinden, der Zahl nach aber augenscheinlich weniger, als in Tring, natürlich aber glaubte ich, dass Prof. Reichenow damals die ganze Sammlung vorgelegen habe. Wie mir Prof. Reichenow freundlichst mitteilt hat er nicht alle Exemplare gesehen, was er aber damals auch nicht wusste. Es ist leicht erklärlich, dass ich die von Bohndorff zu Manyanga gesammelten und als *Pycnonotus gabonensis* bestimmten Stücke für die von Reichenow erwähnten hielt. Ich bedauere, dass ich versäumte, Herrn Prof. Reichenow zu fragen, ob sich dieselben noch in Berlin befänden.

Auf der anderen Seite bin ich auch heute noch nicht davon überzeugt, dass *P. gabonensis* und *tricolor* regelmässig nebeneinander wohnen. Eine Nachprüfung der von Barboza de Bocage erwähnten Stücke erscheint mir nothwendig. Nach der l c. p. 242 gemachten Bemerkung bin ich geneigt, anzunehmen, dass dem Autor von Caconda eben auch ein alter und ein junger *tricolor* (das letzterer gibt er selbst zu) vorlagen, und dass auch das Exemplar von Quillu ein junger *tricolor* ist. Ich hoffe später auf die Formen der Gattung *Pycnonotus* und ihre Verbreitung zurückzukommen und die verschiedenen Ansichten darüber wenigstens teilweise zu klären.

E. Hartert.

INDEX.

[For Index to "A Revision of the American Papilios," pp. 411 to 745, see pp. 746 to 752.]

J.G Keulemans del et lith

West, Newman

1. AMYTORNIS WOODWARDI. ♂
2. COLLURICINCLA WOODWARDI ♂

J C. Keulemans del et lith

West, Newman imp

1 RHIPIDURA NIGROCINNAMOMEA ♀
2 GOODFELLOWIA MIRANDA ♂.

EXPLANATION OF PLATE III.

Fig.	1.	*Troides chimaera* ♂	p. 759
„	2.	*Morphopsis meeki* ♂	„
„	3.	„ „ ♀	„
„	4.	*Buzara calodesma* ♂	p. 761
„	5.	*Milionia pericallis* ♂	p. 760
„	6.	*Craspedosis desmiata* ♂	„
„	7.	*Neoscaptia aequalis* ♀	p. 761
„	8.	*Neoscaptia albata* ♀	„
„	9.	*Deudorix grandis* ♂	p. 759
„	10.	„ „	„
„	11.	*Caprimima aenea* ♀	p. 761
„	12.	*Asura rhodina* ♂	„
„	13.	*Morphopsis ula* ♂	p. 759
„	14.	„ „ ♀	„
„	15.	*Argyrolepidia palaca* ♀	p. 761
„	16.	*Hypochrysops meeki* ♂	p. 759
„	17.	*Caprimima metallica* ♀	p. 761

Martin Rommel & Co., Hofkunstanstalt, Stuttgart.

EXPLANATION OF PLATE IV.

Fig. 1. *Papilio burchellanus* ♂ . . . . . p. 466
„ 2. „ *coelus* ♀, type . . . . . p. 451
„ 3. „ *vertumnus autumnus* ♀ . . . . . p. 470
„ 4. „ *laodamas rhipidius* ♀, type . . . . . p. 533
„ 5. „ *steinbachi* ♂, type . . . . . p. 453
„ 6. „ „ ♀ . . . . . „
„ 7. „ *iphidamas calogyna* ♀ . . . . . p. 481
„ 8. „ *anchises anchises* ♂ . . . . . p. 485
„ 9. „ *phosphorus phosphorus* ♂, type . . . . . p. 468
„ 10. „ „ „ ♀ . . . . . „
„ 11. „ „ *gratianus* ♂ . . . . . „
„ 12. „ *anchises anchises* ♀ . . . . . p. 485

These Reproductions are four-fifths Natural Size.

1. BURCHELLANUS ♂
2. COELUS ♀
3. AUTUMNUS ♀
4. RHIPIDIUS ♀
5. STEINBACHI ♂
6. STEINBACHI ♀
7. CALOGYNA ♀
8. ANCHISES ♂
9. PHOSPHORUS ♂
10. PHOSPHORUS ♀
11. GRATIANUS ♂
12. ANCHISES ♀

A. C. Fowler, Imp., Moorfields, E.C.

EXPLANATION OF PLATE V.

Fig. 13. *Papilio homothoas* ♂, type . . . . . p. 561
„ 14. „ *aristeus coelebs* ♂, type . . . . . p. 643
„ 15. „ *trapeza* ♂, type . . . . . p. 669
„ 16. „ *harmodius imaus* ♂, type . . . . . p. 668
„ 17. „ *ariarathes leuctra* ♂, type . . . . . p. 674
„ 18. „ *torquatus leptalea* ♂, type . . . . . p. 620
„ 19. „ *harm. xeniades* ♀–f. *androna*, type . . . . . p. 668
„ 20. „ *klagesi* ♀ . . . . . p. 453
„ 21. „ *aristor* ♂ . . . . . p. 568
„ 22. „ *scamander scamander* ♂ . . . . . p. 631
„ 23. „ *euryleon euryleon* ♀ . . . . . p. 665
„ 24. „ *erlaces xanthias* ♀, type . . . . . p. 464

These Reproductions are four-fifths Natural Size.

13. HOMOTHOAS ♂
14. COELEBS ♂
15. TRAPEZA ♂
16. IMAUS ♀
17. LEUCTRA ♂
18. LEPTIS ♂
19. ♀-f. ANDRONA
20. KLAGESI ♀
21. ARISTOR ♂
22. SCAMANDER ♂
23. EURYLEON ♀
24. XANTHIAS ♀

EXPLANATION OF PLATE VI.

Fig. 25. *Papilio oberthueri* ♂, type . . . . . p. 696
„ 26. „ *aeneas locris* ♀ . . . . . p. 457
„ 27. „ „ *damis* ♀–f. *pyromelas*, type . . . . p. 456
„ 28. „ „ *linus* ♀ . . . . . „
„ 29. „ *orthosilaus* ♂ . . . . . p. 721
„ 30. „ *helios* ♂, type . . . . . p. 720
„ 31. „ *lycimenes paralius* ♀ . . . . . p. 474
„ 32. „ *earis* ♂, type . . . . . p. 723
„ 33. „ *lycimenes erythrus* ♂, type . . . . . p. 474
„ 34. „ „ „ ♀ . . . . . „
„ 35. „ *aeneas damis* ♀–f. *eucharia*, type . . . . . p. 456

These Reproductions are four-fifths Natural Size

25. OBERTHUERI ♂
26. LOCRIS ♀
27. ♀-f. PYROMELAS.
28. LINUS ♀
29. ORTHOSILAUS ♂
30. HELIOS ♂
31. PARALIUS ♀
32. EARIS ♂
33. ERYTHRUS ♂
34. ERYTHRUS ♀
35. ♀-f. EUCHARIA.

A. C. Fowler, Imp., Moorfields, E.C.

EXPLANATION OF PLATE VII.

Fig. 36. *Papilio polydamas vincentius* ♂, type. . . . . p. 517
„ 37. „ „ *lucianus* ♂, type . . . . . p. 518
„ 38. „ „ *xenodamas* ♂ . . . . . „
„ 39. „ *madyes chlorodamas* ♂ . . . . . p. 525
„ 40. „ *polydamas jamaicensis* ♂, type . . . . . p. 522
„ 41. „ „ *dominicus* ♂, type . . . . . p. 519
„ 42. „ „ *neodamas* ♂ . . . . . „
„ 43. „ *madyes crispus* ♂, type . . . . . p. 525
„ 44. „ *anchises foettertei* ♂, type . . . . . p. 487
„ 45. „ „ „ ♀ . . . . . „
„ 46. „ „ *etias* ♀ . . . . . p. 486
„ 47. „ „ „ ♂, type . . . . . „


36
44
40
37
45
41
38
46
42
39
47
43

EXPLANATION OF PLATE VIII.

Fig. 48. *Papilio rhodostictus nymphius* ♂, type . . . . . p. 612
„ 49. „ „ *pacificus* ♂, type . . . . . „
„ 50. „ *ilus* ♂ . . . . . p. 675
„ 51. „ *andraemon tailori* ♂, type . . . . . p. 571
„ 52. „ *harmodius halex* ♂, type . . . . . p. 667
„ 53. „ *curyleon anatmus* ♂, type . . . . . p. 666
„ 54. „ „ *haenschi* ♂, type . . . . . p. 665
„ 55. „ „ *pithonius* ♂, type . . . . . „
„ 56. „ *isidorus isidorus* ♂, type . . . . . p. 611
„ 57. „ *ariarathes menes* ♀, type . . . . . p. 672
„ 58. „ *curyleon pithonius* ♀ . . . . . p. 665
„ 59. „ *thoas melonius* ♂, type . . . . . p. 556


48
52
56
49
53
57
50
54
58
51
55
59

EXPLANATION OF PLATE IX.

Fig. 60. *Papilio molops megalurus* ♂, type . . . . . p. 712
„ 61. „ „ *hetaerius* ♂, type . . . . . p. 711
„ 62. „ „ *molops* ♂, type . . . . . p. 710
„ 63. „ *glaucolaus melaenus* ♂, type . . . . . p. 709
„ 64. „ „ *glaucolaus* ♂ . . . . . p. 708
„ 65. „ „ *leucas* ♂, type . . . . . p. 709
„ 66. „ *protesilaus archesilaus* ♂, type . . . . . p. 717
„ 67. „ „ *protesilaus* ♂ . . . . . „
„ 68. „ *stenodesmus* ♂, type . . . . . p. 722


60
63
66
61
64
67
62
65
68

EXPLANATION OF PLATE X.

Fig. 1. *Castnia icarus* . . . . . p. 760
„ 2. „ „ . . . . . „
„ 3. „ „ . . . . . „
„ 4. „ „ . . . . . „
„ 5. *Xanthorhoë cerasina* ♂ . . . . . „
„ 6. *Chlorochroma latistriga* ♂ . . . . . „
„ 7. *Xanthospilopteryx zeodita* ♂ . . . . . p. 761
„ 8. *Moncta plenicolor* ♂ . . . . . p. 760
„ 9. *Arycanda fulviradiata* ♂ . . . . . „
„ 10. *Xanthorhoë interrufata* ♂ . . . . . „
„ 11. *Anisogamia commaculata* ♂ . . . . . „
„ 12. *Andrhippuris caudaequina* ♂ . . . . . p. 761
„ 13. *Dicyclodes hieroglyphica* ♂ . . . . . p. 760
„ 14. *Hypochroma purpurissa* ♂ . . . . . „
„ 15. *Cyphura pardata* ♂ . . . . . „


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15


BRITISH MUSEUM
Z
D
NATURAL HISTORY

NOVITATES ZOOLOGICAE.

A Journal of Zoology.

EDITED BY

THE HON. WALTER ROTHSCHILD, PH.D.,
DR. ERNST HARTERT, AND DR. K. JORDAN.

VOL. XIII.

No. 1.

PAGES 1—190.

ISSUED, FEBRUARY 24TH, AT THE ZOOLOGICAL MUSEUM, TRING.

PRINTED BY HAZELL, WATSON & VINEY, LD., LONDON AND AYLESBURY.

1906.

VOL. XIII.

NOVITATES ZOOLOGICAE.

EDITED BY
WALTER ROTHSCHILD, ERNST HARTERT, and KARL JORDAN.

CONTENTS OF NO. I.

Annual Subscription to "Novitates Zoologicae," £1 1s.

Price of Yearly Volume, when completed, £1 10s. (Commission for Booksellers on completed volumes only.)

Communications, etc., may be addressed to
THE EDITORS OF "NOVITATES ZOOLOGICAE,"
ZOOLOGICAL MUSEUM,
TRING.

PRINTED BY HAZELL, WATSON AND VINEY, LD., LONDON AND AYLESBURY.

NOVITATES ZOOLOGICAE.

A Journal of Zoology.

EDITED BY

THE HON. WALTER ROTHSCHILD, PH.D.,

DR. ERNST HARTERT, AND DR. K. JORDAN.

VOL. XIII.

No. 2.

PAGES 191—410.

ISSUED, JULY 10th, AT THE ZOOLOGICAL MUSEUM, TRING.

PRINTED BY HAZELL, WATSON & VINEY, LD., LONDON AND AYLESBURY.

1906.

VOL. XIII.

NOVITATES ZOOLOGICAE.

EDITED BY
WALTER ROTHSCHILD, ERNST HARTERT, and KARL JORDAN.

CONTENTS OF NO. II.

Annual Subscription to "Novitates Zoologicae," £1 1s.

Price of Yearly Volume, when completed, £1 10s. (Commission for Booksellers on completed volumes only.)

Communications, etc., may be addressed to

THE EDITORS OF "NOVITATES ZOOLOGICAE,"

ZOOLOGICAL MUSEUM,

TRING.

PRINTED BY HAZELL, WATSON AND VINEY, LD., LONDON AND AYLESBURY.

NOVITATES ZOOLOGICAE.

A Journal of Zoology.

EDITED BY

THE HON. WALTER ROTHSCHILD, PH.D.,

DR. ERNST HARTERT, AND DR. K. JORDAN.

VOL. XIII.

No. 3.

PAGES 411—752. PLATES IV.—IX.

ISSUED, AUGUST 30th, AT THE ZOOLOGICAL MUSEUM, TRING.

PRINTED BY HAZELL, WATSON & VINEY, LD., LONDON AND AYLESBURY.

1906.

Annual Subscription to "Novitates Zoologicae," £1 1s.

Price of Yearly Volume, when completed, £1 10s. (Commission for Booksellers on completed volumes only.)

Communications, etc., may be addressed to

THE EDITORS OF "NOVITATES ZOOLOGICAE,"

ZOOLOGICAL MUSEUM,

TRING.

PRINTED BY HAZELL, WATSON AND VINEY, LD., LONDON AND AYLESBURY.

NOVITATES ZOOLOGICAE.

A Journal of Zoology.

EDITED BY

THE HON. WALTER ROTHSCHILD, PH.D.,

DR. ERNST HARTERT, AND DR. K. JORDAN.

VOL. XIII.

No. 4.

PAGES 753—789. PLATES I., II., III., X.

ISSUED, DECEMBER 22nd, AT THE ZOOLOGICAL MUSEUM, TRING.

PRINTED BY HAZELL, WATSON & VINEY, LD., LONDON AND AYLESBURY.

1906.

VOL. XIII.

NOVITATES ZOOLOGICAE.

EDITED BY
WALTER ROTHSCHILD, ERNST HARTERT, and KARL JORDAN.

CONTENTS OF NO. IV.

Annual Subscription to "Novitates Zoologicae," £1 1s.

Price of Yearly Volume, when completed, £1 10s. (Commission for Booksellers on completed volumes only.)

Communications, etc., may be addressed to
THE EDITORS OF "NOVITATES ZOOLOGICAE,"
ZOOLOGICAL MUSEUM,
TRING.

PRINTED BY HAZELL, WATSON AND VINEY, LD., LONDON AND AYLESBURY.

6