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DEPARTMENT OF FISHERIES AND FAUNA
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THE FAUNA AND FLORA OF THE MONTE BELLO ISLANDS

By

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Fauna Branch

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LIST OF CONTENTS

INTRODUCTION

Two visits were made to the Monte Bello Islands in 1970 and 1971.

The aim of the visits was to examine the islands for the presence of native mammals and other fauna, and to explore the possibility of re-establishing fauna now extinct.

The first survey was carried out in conjunction with a more detailed examination of the Dampier Archipelago. The fisheries patrols vessel "Dampier" was used to reach the islands and as a base. Personnel were R. Johnstone (W.A. Museum), E.J. Little and J.D. Harman (crew of the "Dampier"), R.F. Dear and A.A. Burbidge, all from the Department of Fisheries and Fauna.

The party arrived at the islands on June 30, 1970 and departed on July 3. Only Trimouille and Hermite Islands were examined. Both islands were traversed by day and night and "Elliot" live traps and break-back traps were set using "universal" bait.

The second visit was made in conjunction with a visit to Barrow Island. Personnel were W.H. Butler (Conservation advisor to West Australian Petroleum Pty. Ltd.) and A.A. Burbidge. Cage traps baited with fish were set on Hermite Island, and visits were also made to Campbell, Alpha, North-West, Primrose and Bluebell Islands.

HISTORY

The Monte Bellos are a group of over 100 islands which lie about 15 miles north of Barrow Island and fifty miles north west of Cape Preston, the closest point on the mainland. Most of the islands are very small, only about 15 being of any size. The two largest are Hermite (2,320 acres) and Trimouille (1,215 acres).

The Monte Bello Islands have been previously visited by parties who examined the flora and fauna. The islands were named by the French Baudin expedition in 1801, although the English ship "Tryal" was wrecked off the group in 1622. This wreck has recently been located and is now being explored by the W.A. Museum. A further survey was made in 1818 by the navigator King (1826). Natural history records date from Stokes (1846) who surveyed the islands from H.M.S. "Beagle" in 1840.

The first detailed biological survey was carried out in 1912 by Montague (1914). The next visit was by Sheard (1950). In 1952, the islands were used by the British Atomic Weapons Research Establishment as a site for testing nuclear weapons. Natural history observations made at that time were purblished by Hill (1955). Further tests were carried out in 1956.

In 1958, Serventy and Marshall (1964) visited the group to resurvey the natural history following the nuclear explosions. In 1966, W.H. Butler made a brief visit to the group while conducting a fauna survey of Barrow Island (Butler, 1967). His visit coincided with West Australian Petroleum Pty. Ltd. drilling an exploratory well on Trimouille Island.

CLIMATE

No extensive weather data have been collected from the Monte Bellos. However, records are available for Barrow Island since 1965. The nearest climate stations on the mainland are Mardie, Onslow, and Dampier.

The Monte Bello Islands are in an area of low unreliable rainfall. The annual average rainfall is probably in the region of ten to twelve inches, most of this resulting from summer tropical cyclones, with the occasional thunderstorm. Judging from Barrow Island and the adjacent mainland, heavy dews occur during both summer and winter.

Temperatures on Barrow Island are milder than on the adjacent mainland and the Monte Bellos would be similar. Summer maximums are usually in the range of 90^{o} to 105^{o} (32^{o} to 40^{o}C), while winter minimums rarely fall below 55^{o}F (13^{o}C).

GEOLOGY

The islands consist of Pleistocene Coastal Limestone formations which are consolidated sand dune deposits (Smith, 1965). The "Coastal Limestone" is a buff or red coloured highly calcareous, ferruginous, cross bedded sandstone. Inlands, especially on Trimouille and North West Islands, there is extensive cover by loose sand derived from the coastal limestone and the topographic highs are travertinised dunes.

Hill (1955) notes that the sand on Trimouille is 90% soluble in dilute acid, signifying a high lime content: Hermite and nearby islands are much more rocky than Trimouille and North West and have a very different vegetation.

There is no standing fresh water on the islands.

FLORA

The flora of the Monte Bellos has been described by Hill (1955). He recognises five habitats:

1. Crevices in rocks, 2. Sandy Beaches, 3. Sand dunes,
4. Inland areas and 5. Mangrove swamps.

The following description of these types is after Hill.

1. Crevices in Rocks. Typical plants are Frankenia pauciflorum, Seddaria media, Euphorbia spp, Phyllanthus spp, Capparis spinosa var. nummularia, Scaevola spinescens and Melhania incana.

2. Beaches. The principal plants of sandy beaches are Spinifex longifolius and Launea bellidifolia. Others include Frankenia pauciflorum and Salsola kali.

3. Sand Dunes. Spinifex and Launea are also common on dunes, particularly the less consolidated areas such as the northern half of Trimouille Island. Ipomoea pes-caprae is also a common sand-binder, and many smaller plants such as Ptilotus exaltatus.

4. Inland Areas. The flora inland varies with the soil type. On Trimouille, which consists of consolidated sand dunes, the vegetation is dominated by grasses, especially Sorghum plumosum and Sporobolus virginicus, with a few shrubs, e.g. Acacia coriacea, Scaevola spp. and Abutilon exonemum scattered throughout. Some common herbs are Swainsonia beasleyana and Ptilotus spp. Hermite Island is much more rocky and is basically a grassland dominated by Triodia pungens with Triodia wiseana in the very rocky areas. Valleys contain a variety of shrubs, e.g. Clearia axillaris, and Scaevola spinescens; grasses such as Themeda australis and Sporobolus virginicus with a few herbs e.g. Ptilotus spp. and Acanthocarpus preissii.

5. Mangroves. Mangroves are particularly common on rocky shores and sheltered bays on Hermite Island and other similar islands near it. They are scarce on sandy areas, e.g. Trimouille Island. The species include Avicennia marina, Rhizophora mucronata and Ceriops lagal.

List of Flora of Monte Bello Islands, 1970

(see also Hill, 1955)

	TRIMOUILLE	HERMITE
GRAMINEAE		
Aristida browniana Henr.		X
Eulalia fulva (R.Br.) O. Kuntze	X	
Panicum decompositum R.Br.		X
Sorghum plumosum (R.Br.) Beauv.	X	
Spinifex longifolius R.Br.	X	X
Sporobolus virginicus (L.) Kunth.	X	X
Themeda australis (R.Br.) Stapf.		X
Triodia pungens R.Br.		X
Triodia ?wiseana C.A. Gardn.		X
LILIACEAE		
Acanthocarpus preissii Lehm.	X	X
CHENOPODIACEAE		
Bassia uniflora (R.Br.) F. Muell.	X	X
Enchylaena tomentosa R.Br.		X
Rhagodia preissii Moq.		X
Salsola kali L.	X	
AMARANTACEAE		
Amaranthus pallidiflorus F. Muell.	X	X
Ptilotus exaltatus Nees et Esenb.	X	X
Ptilotus murrayi F. Muell.	X	
NYCTAGINACEAE		
Boerhavia repandra Willd.	X	
AIZOACEAE		
Trianthema aff. oxycalyptra F. Muell		X
CAPPARIDACEAE		
Capparis spinosa L. var. nummularia (DC.) Bailey		X
Cleome viscosa L.	X	X

	TRIMOUILLE	HERMITE
MIMOSACEAE		
Acacia bivenosa DC.	X	
Acacia coriacea DC.	X	X
Acacia gregorii F. Muell	X	
CAESALPINIACEAE		
Cassia sophera L.		X
PAPILIONACEAE		
Canavalia maritima (Aubl.) Thou.	X	X
Crotalaria trifoliastrum Willd.		X
Indigofera linifolia Retz.		X
Indigofera triata L.	X	X
Rhynchosia minima DC.	X	
Swainsonia beasleyana F. Muell. spp. eglantoides A. Lee	X	
Tephrosia eriocarpa Benth.		X
Tephrosia ?flammea (F. Muell) Benth		X
EUPHORBIACEAE		
Euphorbia atoto Forst.	X	X
Euphorbia australis Boiss.	X	
Euphrobia eremophila A. Cunn.	X	
Phyllanthus maderaspatanus L.	X	X
TILIACEAE		
Corchorus walcottii F. Muell	X	X
MALVACEAE		
Abutilon exonemum F. Muell.	X	X
Malvastrum spicatum (L.) A. Gray		X
STERCULIACEAE		
Melhania icana Heyne		X
FRANKENIACEAE		
Frankeina pauciflora DC.	X	X
RHIZOPHORACEAE		
Rhizophora mucronata Lam.		X

	TRIMOUILLE	HERMITE
ASCELPIADACEAE		
Cyanchum floribundum R.Br.		X
CONVOLVULACEAE		
Evolvulus alsinoides L. (Sprawling form)	X	
Evolvulus alsinoides L. (Erect form)	X	
Ipomoea pes-caprae (L.) R.Br.	X	
BORAGINACEAE		
Trichodesma zeylanicum (L.) R.Br.	X	X
VERBENACEAE		
Avicennia marina (Forsk) Vierh.		X
SOLANACEAE		
Solanum esuriale Lindl.	X	X
GOODENIACEAE		
Scaevola globulifera Labill.	X	X
Scaevola spinescens R.Br.		X
COMPOSITAE		
Flaveria australasica Hook	X	X
Launea bellidifolia Cass.	X	
Olearia axillaris F. Muell.		X
Pterigeron decurrens (DC.) Benth		X
Vittadinna sp.		X

FAUNA

a) MAMMALS

Two terrestrial marsupials occurred on the islands in historic times. One is known only from skeletal remains, but these probably are derived from Barrow Island. In addition, the water rat and a bat occur in the group.

1. Spectacled Hare Wallaby, Lagorchestes conspicillatus

Stokes (1846) mentions Trimouille as a locality for this species, stating that three guns shot nearly 20 individuals in a couple of hours. However, Montague (1914) found the species only on Hermite Island and suggested that this might also have been Stokes' locality, as old charts showed the Monte Bello group as a single island named Trimouille. From what is known of the Spectacled Hare Wallaby's habitat, on Barrow Island (Burbidge and Main, in press), Trimouille is a most unlikely habitat for this species. By the time of Sheard's visit in 1950, the hare wallaby was extinct, and this has been confirmed by later visits.

2. Boodie, Bettongia lesueur

This is known only from a lower jaw found by Serventy on Hermite Island in 1958. It was not present when Montague surveyed the group in 1912. Serventy and Marshall (1964) suggested that from the condition of the bone, the species may have survived on the island until early this century. I believe that the presence of a single jaw bone is insufficient evidence that this species occurred on Hermite Island in recent times. The species occurs on Barrow Island (this fact was unknown to Serventy and Marshall) and the skeletal remains might easily have been carried from there by sea eagles. We found skeletal remains of rock wallabies (Petrogale sp.) in a sea eagle nest on Hermite Island, and these presumably came from Barrow Island which is only 15 miles away. There is no doubt that sea eagles prey on wallabies of this size and can carry them a considerable distance. Furthermore, from what is known of the distribution of macropod marsupials on islands off the West Australian coast (Main 1961; Main and Yadav, 1971) it is most unlikely that two macropods could survive together on an island as small as Hermite.

3. Golden Bandicoot or Wintarro, Isoodon auratus

Found as recent remains, including shrivelled skins, by Montague on Hermite Island. Must have become extinct shortly before 1912. Montague found that the skulls correspond with the Barrow Island form I. a. barrowensis.

4. Water rat, Hydromys chrysogaster

Tracks identified as being made by this animal were found on Hermite Island. The species occurs on Barrow Island where it lives in mangroves and swims readily in the sea. Butler (1970) recorded tracks on Trimouille Island in 1966.

5. Little Brown Bat, Eptesicus pumilis

Apparently quite common. Collected by Montague, Hill, Butler and during the 1970 trip. Observed in 1971.

6. Domestic Cat, Felis catus

Cats were recorded by Montague on Hermite Island and he attributed the extinction of the bandicoots to their presence. He further predicted that the hare wallabies would suffer the same fate. Sheard (1950) and Hill (1955) only found cats on Hermite Island, but we also observed them on Trimouille. An attempt to live trap cats using fish for bait in 1971 was unsuccessful, although fresh tracks were found near some traps and near fish left on a beach. Spot-light shooting at night was also unsuccessful since no cats were seen.

A food analysis from droppings on Hermite Island showed that the diet was largely insects, e.g. grasshoppers, and lizards with some plant material.

7. Black Rat, Rattus rattus

Montague found this species very common on a number of islands including small outlying islets. He attributed its presence to a pearling schooner wrecked 20 years previously. Hill found that the rats were absent from Hermite, but common on Trimouille and South East Island. However, Butler found a skeleton on Hermite in 1966 and we found old signs of rats there in 1970 and 1971, although in very much lower density than on Trimouille where they are very common. Tracks identified as this species were seen on all other islands visited, i.e. North West, Campbell, Primrose, Bluebell and Alpha.

b) BIRDS

A summary of observations is as follows :

LAND BIRDS

	MONTAGUE	SHEARD	HILL	SERVENTY & MARSHALL	BURBIDGE	
	1912	1950	1952	1958	1970	1971
Kestrel			X			X
Owl (species unknown)					X	X
Whistling Kite					X	
Spotted Harrier						X
Black-breasted Buzzard						X
Sacred Kingfisher	X					X
Mangrove Kingfisher	X		X			
Bar-shouldered Dove	X		X	X		X
Welcome Swallow				X		X
Australian Pipit	X		X	X	X	X
Spinifex Bird	X	X				
Black & White Wren		X				
Yellow Silvereye	X			X	X	X
Brown Honeyeater	X		X	X		X
Zebra Finch	X			X		
White-breasted Wood Swallow	X			X		X
Narrow-billed Bronze Cuckoo	X					
Rufous Whistler	X					
Crimson Chat	X					

SEA BIRDS AND WADERS

Wilson's Storm Petrel			X			
Wedge-tailed Shearwater		X	X	X		X
Australian Pelican	X		X	X	X	
Pied Cormorant				X	X	X
White Egret						X
Reef Heron	X			X	X	X
Wimbrel						X
White-breasted Sea Eagle	X	X	X	X	X	
Red-breasted Sea Eagle	X					X
Osprey	X	X	X	X	X	X
Pied Oystercatcher	X			X	X	X
Sooty Oystercatcher	X	X		X	X	X
Mangrove Heron						X

	MONTAGUE	SHEARD	HILL	SERVENTY & MARSHALL	BURBIDGE	
	1912	1950	1952	1958	1970	1971
Large Sand Dotterel	X			X		X
Mongolian Dotterel	X					
Little Stint	X			X		X
Red-capped Dotterel	X	X			X	X
Grey-tailed Tattler				X		X
Bar-tailed Godwit						X
Turnstone					X	X
Beach Curlew			X	X		
Crested Tern				X	X	X
Caspian Tern	X	X		X	X	X
Fairy Tern				X	X	
Bridled Tern						X
Silver Gull	X			X		X

The bird fauna is similar to that recorded for Barrow Island (Butler, 1970), but a few differences are evident. Mangroves are scarce on Barrow Island, and only one species, Avicennia marina occurs, so birds associated with mangroves are largely absent. These include the Mangrove Kingfisher, the Mangrove Heron and the Brown Honeyeater. The Rufous Whistler and the Crimson Chat, which have not been recorded on the Monte Bellos since Montague's 1912 visit are also unknown from Barrow.

The owl pellets we found on Hermite Island probably belong to the Boobook Owl which has been recorded from Barrow Island.

Two notable birds appear to have disappeared from the Monte Bellos. These are the Black and White Wren (Malurus leucopterus) and the Spinifex Bird (Eremiornis carteri). The former was reported by Sheard on Trimouille Island in 1950, but was not seen by Hill (1955) nor by us in 1970. The latter recorded both by Montague and Sheard, but was not seen by Hill, nor us in 1970 or 1971. Both species occur on Barrow Island.

Some of the sea birds and waders recorded from the Monte Bellos are unknown from Barrow Island, but this is not significant.

The Monte Bellos are not used extensively as a sea bird breeding area. The Wedge-tailed Shearwater breeds on South-East Island (Serventy and Whittell, 1967) and we found evidence of breeding on a small island north-west of Bluebell Island in 1971. This same island had a small colony of Crested Terns, approximately 30 nests, each with a single egg. On April 4, 1971, juvenile Bridled Terns were present on rocky islets south of Hermite.

c) REPTILES

A summary of Reptiles collected is as follows:

	MONTAGUE 1912	HILL 1952	BUTLER 1966	BURBIDGE 1970
GEKKONIDAE				
Heteronotia bynoei	X	X		X
Gehyra variegata	X		X	
Gehyra australis				X
Gehyra punctata			X	
PYGOPODIDAE				
Lialis burtoni		X		
Delma fraseri				X
Aprasia repens rostrata		X		
AGAMIDAE				
Physignathus gilberti	X	X	X	X
SCINCIDAE				
Sphenomorphus isolepis	X			X
Ctenotus lesueurii	X			X
Ctenotus wotjulum			X	
Morethia taeniopleura				X
Morethia lineoocellatus				X
Lerista bipes	X	X	X	X
Lerista meulleri	X			
VARANIDAE				
Varanus gouldi	X	X		X
Varanus acanthurus	X			X

	MONTAGUE 1912	HILL 1952	BUTLER 1966	BURBIDGE 1970
TYPHLOPIDAE				
Rhamphotyphlops diversus	X			
BOIDAE				
Liasis childreni	X	X	X	
ELAPIDAE				
Brachysoma christeanus		X		
Demansia psammophis reticulata		X		

In addition to these, a number of marine reptiles are known from the islands. These are the Green Turtle (Chelonia mydas), the Hawksbill Turtle (Eretmochelys imbricata) and the sea snakes Hydrophis elegans, Hydrophis ornatus, Astrotia stokesi, and Aipysurus laevis laevis.

Of the terrestrial reptiles, most have been recorded, from Barrow Island (Butler, 1970). However, a few have not. Both Varanus gouldi and V. acanthurus are unknown from Barrow which harbours V. giganteus, V. gouldi occurs on Trimouille and some of the smaller islands, but is absent from Hermite where V. acanthurus is found.

The distribution of Varanus in this area is especially interesting. V. gouldi digs and lives in burrows, and this might explain its absence from Hermite which is very rocky, while V. acanthurus is found under rocks. The Monte Bellos are possibly too small for V. giganteus which occurs on the much larger Barrow Island (53,000 acres). Gehyra australis Gehyra punctata and Morethia lineoocellatus are also unknown from Barrow. Further collecting might extend the number of species on the Monte Bellos and the amount of overlap on Barrow Island.

Montague (1914) noted that all reptiles he collected were significantly smaller than mainland representatives of the same species.

d) INVERTEBRATES

Descriptions and lists of invertebrates collected on the island in 1912 and 1952 can be found in Montague (1914) Rathburn (1914), Iredale (1914), Robson (1914), Hill (1955), Britton (1955), Pope (1955), Cameron (1955), Kimmins (1955) and Salmon (1955). No collections were made during our visits.

DISCUSSION

The Monte Bello Islands contain an interesting and varied fauna, even after the introduction of exotic mammals and the disturbance of nuclear weapons testing. It is clear that the marsupials became extinct before the atomic testing and that the atomic tests have had no appreciable affect on the remaining fauna.

The causes of the extinction of the marsupials are not clear. Montague (1914) suggested that the introduction of the feral cat had caused the extinction of Isoodon auratus which had died out just before his visit. He further suggested that the hare wallaby would suffer the same fate, a supposition which has been confirmed. Thus, any re-introduction of the marsupials would probably be unsuccessful unless the feral cat population can be exterminated or considerably and permanently reduced.

Both marsupials which previously occurred on the Monte Bellos still occur on Barrow Island, and it would be relatively easy to capture some there and release them on the Monte Bellos. It is considered that only Hermite Island would be suitable as an area for introducing these mammals as:

1. Evidence indicates this was the only island inhabited by the animals in historic times.

2. The vegetation of Hermite is very similar to that on Barrow Island, being a spinifex (Triodia) grassland while Trimouille has very different soils and no spinifex.

3. Hermite is the largest island in the group (2,320 acres) compared with Trimouille which is only 1,215 acres. From what is known of the distribution of macropod marsupials on offshore islands (Main, 1961: Main and Yadav, 1971) the larger islands are better able to support a population than smaller ones. Work on Barrow Island (Burbidge and Main, in press) suggests

that Lagorchestes conspicillatus needs a large territory, of the order of 20 acres for a female and possibly twice that for a male. These figures indicate that Hermite Island could support about 60 males and 120 females, a figure which is probably below or very near the minimum needed for long term survival. It seems probable that L. conspicillatus actually requires a smaller area than that suggested above or else it would not have survived on Hermite Island until historic times.

Serventy and Marshall (1964) suggest that the extinction of the marsupial fauna on Hermite might have been due to the deterioration of the climate. It is quite possible that this was a factor, but documentation is a major problem. Records indicate that the incidence of drought has increased since about 1890. There were major droughts in the north-west of Western Australia from 1904 to 1906, (Gibbs and Maher, 1967) and this coincides roughly with the extinction of Isoodon. Another long drought occurred in the late 1930's which might have affected Lagorchestes, but its actual date of extinction is not known. If climatic deterioration is a factor, re-establishment of the marsupials may be unsuccessful in the long term.

FUTURE USAGE

The Monte Bello Islands, although somewhat isolated, are in an area which is seeing rapid development, and they will doubtless have tourist appeal in the future. Due to the large number of islands in the group, there seems to be no reason why tourism should not be able to co-exist with the fauna. Trimouille Island would seem to be the best location for any tourist resort since it has good beaches and is unsuitable for the re-establishment of wallabies. The introduced rats which occur there would be a major problem to any land based operation, but this would be the same on any island.

Hermite Island, on the other hand, is less suitable for tourism because of its rocky nature and lack of beaches, but it does provide suitable wallaby habitat. Stephenson channel at Hermite Island does, however, provide an excellent cyclone anchorage for small craft.

A number of other islands also have an interesting fauna and flora, and should be left undisturbed. South-East Island is a breeding area for Wedge-tailed Shearwaters and Hill (1955) reports that this island also has an interesting flora. The Bungarra (Varanus gouldi) occurs on South-East, North-West and Alpha Islands (Hill, op.cit.), as well as Trimouille; we also found it on Campbell Island and signs of it on Bluebell Island.

Any tourist development would have to be carried out in such a way that it did not adversely affect the fauna and flora or cause erosion. Thus, domestic pets would have to be forbidden or else it would only serve to negate efforts to re-establish the native marsupials.

Much of the attraction of the islands is the abundant marine life, and some of the waters surrounding them might well be declared a marine park, and the taking of all forms of marine life prohibited.

RECOMMENDATIONS

1. That Hermite Island be made an 'A' class reserve for the "Conservation of Fauna and Flora", and that it be vested in the Western Australian Wild Life Authority.

2. That the remainder of the Monte Bellos be made an 'A' class reserve for the "Conservation of Fauna and Flora and Tourism" and that it be vested in the Western Australian Wild Life Authority, with the power to lease. Reserve No. 13517 (Campbell Island) for the purpose of "Water for the Pearling Industry", should be cancelled or the purpose amended as above.

3. That some of the waters surrounding the islands be declared a marine reserve - a possible area might be all waters within half a mile of Hermite and Campbell Islands.

4. That action be taken to exterminate or permanently reduce the population of feral cats on the islands.

5. That, assuming recommendation 4 is successful, hare wallabies and bandicoots be introduced on to Hermite Island from Barrow Island.

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BIBLIOGRAPHY

Britton, E.B. 1955. Coleoptera: Scarabidae: Melonothinae and Dyrastinae from the Monte Bello Islands, 1952. Proc. Linn. Soc. London 165(2):124-126.

Burbidge A.A. and A.R. Main, (in press). Report on a visit of inspection to Barrow Island, Nov. 1969. Report No. VIII Department of Fisheries and Fauna, Western Australia

Butler, W.H. 1967. Report on the Flora and Fauna of Barrow Island, W.A. Unpublished Report to the Explorers Club, New York.

Butler, W.H. 1970. A summary of the vertebrate Fauna of Barrow Island, W.A. W.Aust. Nat. 11(7):149-160.

Cameron, Malcom. 1955. Coleoptera: Staphylinidae from the Monte Bello Islands, 1952. Proc. Linn. Soc. Lond. 165(2):128.

Gibbs, W.J. & J.V. Maher. 1967. Rainfall deciles as drought indicators. Commonwealth of Australia, Bureau of Meteorology Bulletion No.48.

Hill, F.L. 1955. Notes on the natural history of the Monte Bello Islands. Proc. Zool. Soc. Lond. 165(2):113-124.

Iredale, Tom. 1914. Report on Mollusca collected at the Monte Bello Islands. Proc. Zool. Soc. Lond. 1914:665-675.

Kimmins, D.E. 1965. Neuroptera from the Monte Bello Islands, 1952. Proc. Linn. Soc. Lond. 165(2):128-131.

King, P.P. 1826. "Narrative of a Survey of the Inter-tropical and Western Coasts of Australia". Vol. 1 P. 141 (John Murray: Lond.)

Main, A.R. 1961. The occurrence of Macropodidae on islands and its climatic and ecological implications. J. Roy. Soc. W. Aust. 44(3):84-89.

Main, A.R. and M. Yadav. 1971. Conservation of Macropods in Reserves in Western Australia. Biological Conservation 3(2):64-74.

Montague, P.D. 1914. A report on the Fauna of the Monte Bello Islands. Proc. Zool. Soc. Lond. 1914:625-652.

Pope, R.D. 1955. Coleoptera: Caccinellidae from the Monte Bello Islands. 1952. Proc. Linn. Soc. Lond. 165(2):127.

Rathburn, Mary J. 1914. Stalk-eyed Crustaceans collected at the Monte Bello Islands. Proc. Zool. Soc. Lond. 1914: 653-664.

Robson, G.C. 1914. Cephalopoda from the Monte Bello Islands. Proc. Zool. Soc. Lond. 1914:667-680.

Salmon, J.T. 1955. Collembola: A new species of Pseudanurida from the Monte Bello Islands. Proc. Linn. Soc. Lond. 165(2):131-132.

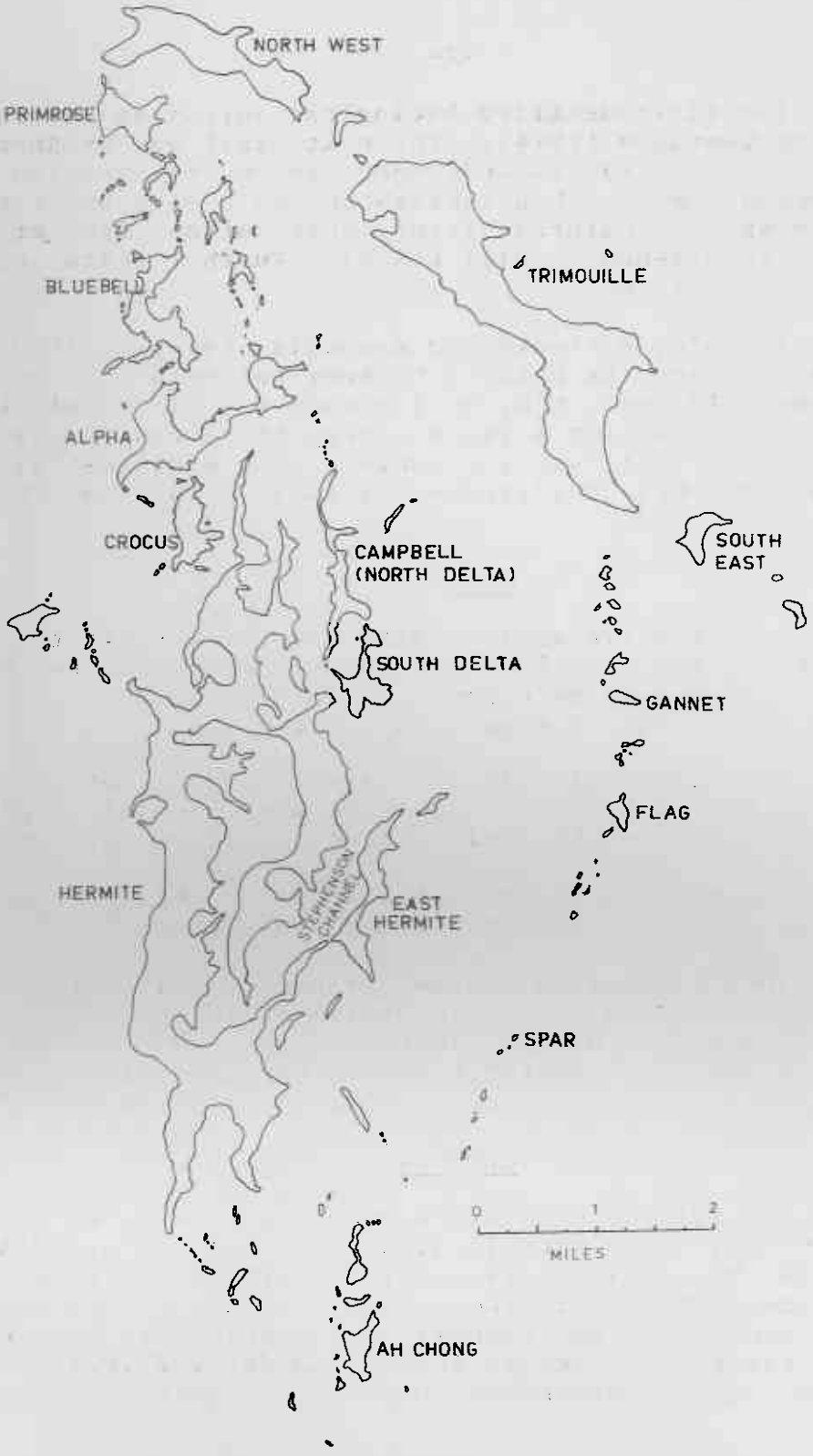
Serventy, D.L. and A.J. Marshall. 1964. A natural history reconnaissance of Barrow Island and Monte Bello Islands, 1958. C.S.I.R.O. Division of Wildlife Research Technical paper No.6.

Serventy D.L. and Whittell, H.M. 1967. Birds of W.A. Fourth Edition (Lamb Publications Pty. Ltd.:Perth)

Sheard, K. 1950. A visit to the Monte Bello Islands. W. Aust. Nat. 2(7):150-151.

Smith, D.N. 1965. Monte Bello Geological Reconnaissance. Unpublished Report, W.A. Petroleum Pty. Ltd.

Stokes, J.L. 1846. Discoveries in Australia (T. and W. Boone: London).



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