Forests Department, Bulletin No. 34.

Western Australia.

Key to the Eucalypts of Western Australia.

With Descriptive and Botanical Notes concerning all Arborescent Species of Eucalyptus known to be Indigenous to Western Australia (June, 1924).

BY

S. L. KESSELL, B.Sc., Conservator of Forests,
and C. A. GARDNER

Issued under the authority of Hon. P. Collier, M.L.A., Minister for Forests.

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INTRODUCTORY NOTE.

The work of botanists has resulted in all known plants being systematically grouped, named, and described. Such classification of plants is necessarily based on reliable and constant characters of universal application. To trace the identity of a plant, however, through an ordinary botanical key is a lengthy task to the trained botanist. In dealing with flowering plants he usually requires very complete botanical material, including flowers in various stages of development and fruit.

There is a need, in connection with many genera of economic importance, for a key which may be used by the layman, and which incorporates, as far as possible, the following advantages:—

(1) The use for identification purposes of reasonably constant macroscopic vegetative features, in addition to the usual floral distinctions.

(2) The possibility of identification when complete information or material is not available.

(3) The possibility of studying independently all features used for identification purposes in the key, with a reasonable chance of correct identification, although mistakes may be made in connection with the defining of one or more characteristics.

It occurred to the writer that the decimal filing system used in business practice offered possibilities of being adapted to serve the purpose of a key having such advantages. The need of a key for use by officers of the Forests Department in Western Australia, which would enable them to identify the numerous species of Eucalyptus indigenous to the State, provided opportunity for applying the idea to this genus.

The knowledge of local flora and the enthusiastic co-operation of Mr. C. A. Gardner have rendered the project possible. The success which has attended our efforts may be judged from the attached Key to the Eucalypts of Western Australia.

It is hoped that the idea contained in this publication, if it be new to some botanists, will not be dismissed without consideration of the possibilities of its wider application in an improved form.

There appears no reason why any number of genera should not be separated on similar lines, using more or less constant vegetative features as well as the usual floral characteristics. Separate keys might then be prepared for each genus, or group of allied genera. No general rules can be laid down for the application of this system, as considerable ingenuity may be exercised in each particular case.

The value of this publication is enhanced by the fact that it includes a complete description of all known species of Eucalypts indigenous to Western Australia. A great deal of this information is based on the writings of Mr. J. H. Maiden, F.R.S., F.L.S., I.S.O., who has done more than any other man to clear up the ambiguities which have surrounded so many species of this genus. Certain particulars are new, including a detailed description of *Eucalyptus diptera* (Cecil Andrews) and *Eucalyptus Dundasi* (Maiden).

The State has been so thoroughly examined botanically that it is unlikely that more than a few species of minor importance still await description. Practically the whole of the Eucalypts dealt with are represented in the Herbarium of the Forests Department, where the botanical material is available for reference by persons interested.

S. L. KESSELL,
Conservator of Forests.

Forests Department,
Perth, W.A.,
24th June, 1924.

Part I.

KEY TO THE EUCALYPTUS TREES, MALLEES AND MARLOCKS, CONTAINING EVERY SPECIES OF THE GENUS KNOWN TO OCCUR IN WESTERN AUSTRALIA. [JUNE, 1924].

This key is intended for the use of foresters and others who may wish to determine species of this difficult genus without resorting to finer botanical distinctions. While a general knowledge of the macroscopic features of a plant will, in most cases, serve to identify the more common species, certain finer differences of floral structure have been used—as necessary distinctions in certain cases—but more often as check features.

After a species has been determined by the use of the key, fuller botanical information may be obtained from the alphabetically arranged descriptive notes forming Part II. of this publication.

CHARACTERISTICS OF THE GENUS EUCALYPTUS.

The Eucalyptus derives its name from two Greek words which may be translated as "well-covered"—a name applied to the little cap which protects the unopened flower, and one which aptly describes what is perhaps the leading feature of the genus. The most noticeable feature about a Eucalyptus flower is the absence of both sepals and petals, and the presence of the operculum or bud-cap which protects the stamens in the bud stage. The operculum usually falls off entirely as the flower expands, but sometimes remains hinged on to the calyx after the flower opens. These characteristics, together with the presence of the inferior ovary and the conspicuous stamens of indefinite number, serve to distinguish the genus *Eucalyptus* from all other flowering plants. The Eucalypts are closely allied to the genus Angophora, which is found only in the Eastern States, and in which there are petals which soon fall after expansion, and small but distinct calyx-teeth. The calyx of Eucalyptus, although generally without lobes or teeth at all, has, in a few instances, small teeth, four in number, which are situated at or near the top of the calyx, and which appear to be the rudiments of sepals. The operculum of Eucalyptus takes the place of petals as regards their protective functions, but the filaments are the most conspicuous part of the flower, and, being attractive, serve as petals in this respect. If, as is generally supposed, the *Angophoras* are the ancestors of the Eucalypts, the operculum may have, at one time, consisted of free petals. In some species of Eucalyptus the operculum is double—the outer one falling off before the inner.

The Eucalypts are all evergreen trees or shrubs, with the exception of one tropical tree which is deciduous, and another from the same latitude which is partially deciduous. Eucalypts have simple leaves which usually have leaf *stalks*. The leaves are generally of a lance or egg *shape*. The *venation* consists of a midrib connected by fine secondary veins with a vein which runs close to the margin of the leaf (intramarginal). With few exceptions, the bracts and bracteoles so characteristic of other flowering shrubs and trees are absent from Eucalyptus, and, when present, are either rudimentary or fall before the flowering period.

Eucalypts are divided, as regards their habit, into Trees, Shrubs, Mallees and Marlocks. Trees are distinctive in habit, in that they possess a well defined trunk. Shrubs branch from the base, or close to the base. Mallees have a bulbous root-stock, either subterranean or half above the soil, from which arise stems (usually 4 to 8 in number), which are all of about the same height. Typical Mallees have a large woody stock. Marlocks, which may be called "sand-plain Mallees," have a smaller reduced stock, or become true shrubs. It is often difficult to differentiate between a Marlock and a shrub, as intermediate forms occur, which may be one or the other. Trees and Mallees, on the other hand, are quite distinctive forms of vegetation. For the sake of convenience, the Mallees, Marlocks and true shrubs, have been placed in the same general key.

INSTRUCTIONS FOR USING THE KEY.

It is first necessary that field notes be taken concerning:—

Whether species is a tree, or Mallee, etc.

(a) Texture of the bark.

(b) Character and colour of the bark.

(c) Colour of the timber (heartwood).

(d) Habitat.

Specimens of such leaves, fruits, and buds as may be available should then be secured and studied in conjunction with the notes and diagrams contained in the key, in the following order:—

(e) Fruit (shape of the mature fruit).

(f) Valves of the mature fruit.

(g) Operculum, or bud-cap of the unopened bud.

(h) Leaves, their colour, and whether stalked, or without a leaf-stalk.

As each characteristic is located in the key, a number is built up, but care must be taken to keep numbers in the correct order, and place an 0 in any position when information is not available concerning any characteristic.

The number built up by the use of the whole, or part of the key is then referred to the numbered list of species on pages 14 to 17 and the name read off.

The first four decimal places may serve to determine a species, in which case the other characteristics may be read off the key and used to check the correctness of the diagnosis.

For example, let us take the Karri:—

Our note book gives the following information—

·1 Texture of bark—Smooth throughout.

·01 Character and colour of bark—Thick, and smooth.

·002 Colour of the heartwood—Red.

·0001 Habitat—South-West.

Thus, up to the present, we have number ·1121.

If we now consult the list we find there are three species having this number; and reference to the descriptive notes of each species will show that height, shape of tree, and habitat preclude the possibility of it being any species other than Karri (*Eucalyptus diversicolor*).

The other alternative is to continue the use of the key by referring the other features in the order given, or selecting one feature which from the number quoted in the key is different in each of the three species, as, for instance, the shape of the fruit.

A.—KEY TO THE ARBORESCENT SPECIES (page 11).

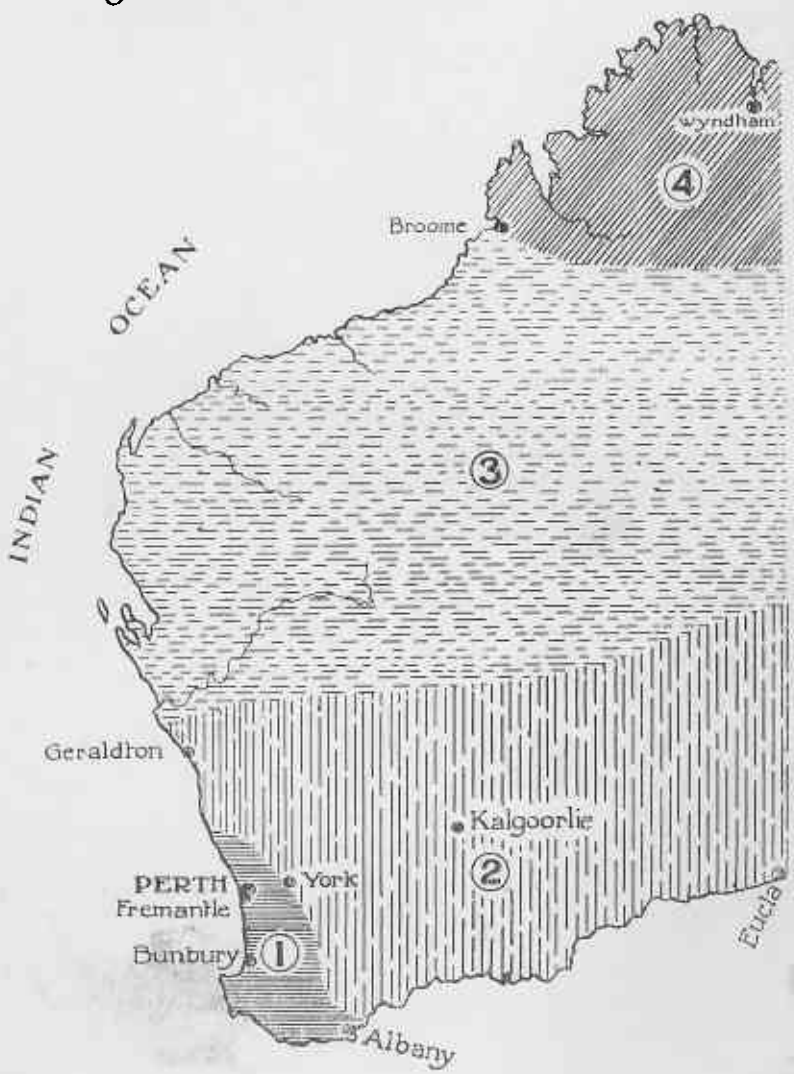
B.—KEY TO THE MALLEES AND MARLOCKS (page 19).

— MAP OF —

WESTERN AUSTRALIA.

HABITATS

Showing the approximate ranges of various species



THE KEY.

A.—TREES.

Eucalypts from 10 feet in height upwards, with a simple or single stem or trunk of 6 feet or more below the first branch.

A.—TEXTURE OF THE BARK.

·1000 0000 *Smooth barks* throughout.

*·2000 0000 *Base of the trunk with rough persistent bark,* otherwise smooth, "Blackbutts." All Goldfields or Eastern districts species.

·3000 0000 *Trunk with rough persistent bark,* the branches smooth, or slightly ribbony only. "Half-barks," *e.g., Yate.*

·4000 0000 *All except the branchlets* (or twigs), *with rough bark,* or with totally rough bark, *e.g., Jarrah and Marri.*

·5000 0000 *Lamellar barks, i.e.,* bark in thin layers on the trunk, of a papery texture. A group which is confined in Western Australia to the Kimberley district.

B.—CHARACTER AND COLOUR OF THE BARK.

Thick barks (never under ⅜in. thick at breast height).

·0100 0000 *Smooth,* white, grey, or pinkish, clean and shedding annually.

·0200 0000 *Persistent rough,* (a) light grey in colour, *e.g. Tuart.*

·0300 0000 *Persistent rough,* (b) dark grey to almost black.

Thin barks (never more than ¼in. thick at breast height).

·0400 0000 *Smooth,* (a) white, or light grey, or yellow-white.

·0500 0000 *Smooth,* (b) reddish or brown or orange-red.

N.B.—In the case of trees classed under ·2 and ·5 (either "base of the trunk with rough persistent bark" or "lamellar barks"), the *character and colour of* the bark has reference to the bark of the upper portions and not the roughened or flaky base.

C.—TIMBER (colour of the heartwood).

·0010 0000 *Pale, i.e.,* white, yellow, light brown, or pinkish (*e.g.,* Tuart).

·0020 0000 *Red or reddish* (*e.g.,* Jarrah and Karri).

·0030 0000 *Brown* to almost black (deeper than red, *e.g.,* Coolibah).

D.—HABITAT (see sketch map).

·0001 0000 South-West.

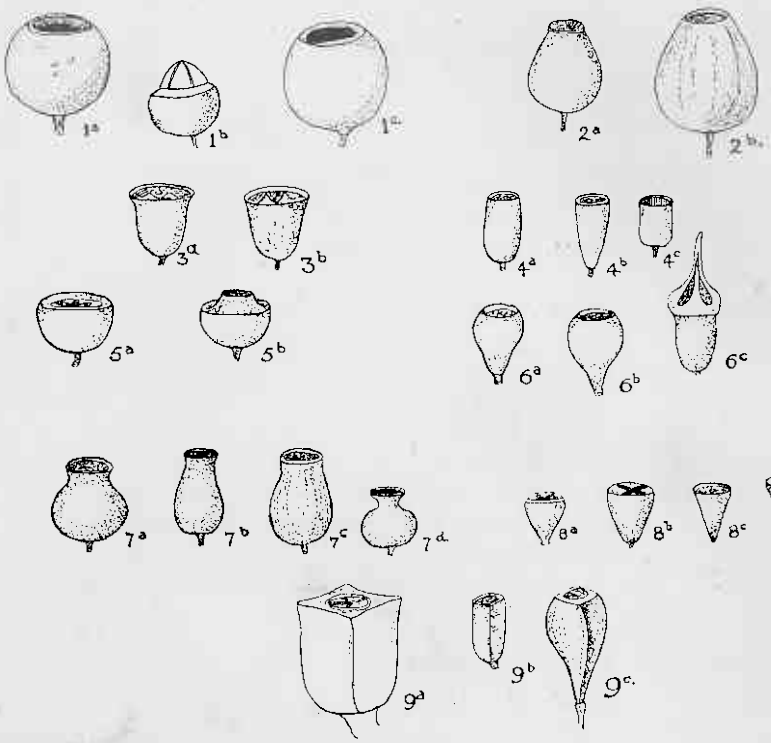
·0002 0000 Savannah forest of Southern interior (Eastern districts and Goldfields).

·0003 0000 North-West.

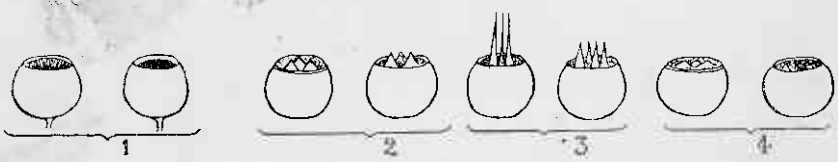
·0004 0000 Kimberley, or Northern district.

The above are all field characters. The four places following the space refer to botanical distinctions.

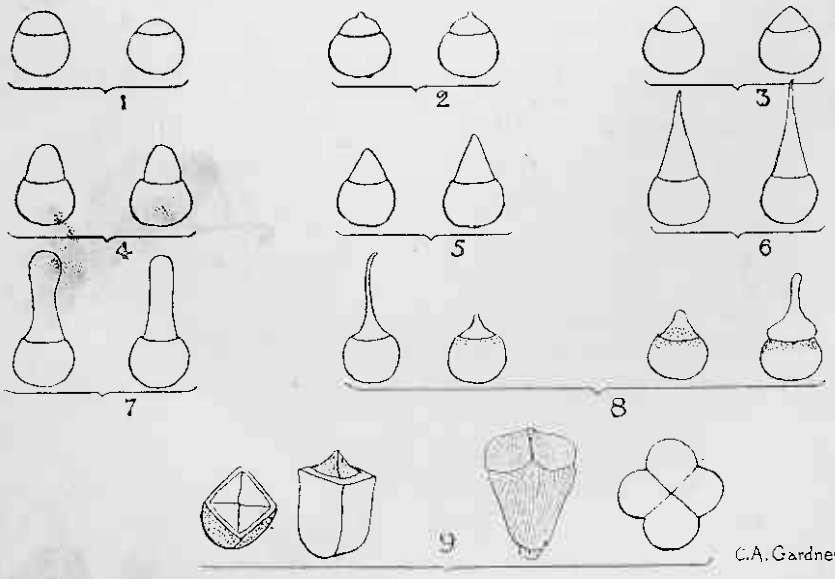
* The well known Blackbutt of the South-West (*E. patens*) does not belong to the group of Eastern District trees known as Blackbutts.



FRUIT VALVES.



OPERCULA.



C.A. Gardner, Delt.

E.—FRUIT: Shape.

·0000 1000 Globular or spherical, or roughly so.

·0000 2000 Egg-shaped, tapering away from the stalk (ovoid).

·0000 3000 Bell-shaped (campanulate).

·0000 4000 Long and narrow, or more or less cylindrical.

·0000 5000 Cup-shaped (hemispherical).

·0000 6000 Pear-shaped, but flattened at the end (obovoid-pyriform).

·0000 7000 Vase-shaped, *i.e.* globular, egg-shaped or narrow, with a distinct neck.

·0000 8000 Inverted-cone-shaped, top, or funnel-shaped.

·0000 9000 Four-sided (quadrangular).

F.—FRUIT: Valves (which open in the mature fruit to emit the seeds).

·0000 0100 Valves enclosed (included within the fruit).

·0000 0200 Valves protruding from the opening, but more or less triangular and short (deltoid).

·0000 0300 Valves protruding, narrow and awl-shaped.

·0000 0400 Valves slightly protruding, or slightly sunk, more or less flush with the top of the fruit.

G.—OPERCULUM: The cap which protects the unopened flower.

·0000 0010 *Hemispherical.*

·0000 0020 *Hemispherical* with a *short tip or beak.*

·0000 0030 *Hemispherical-conical,* scarcely one or the other.

·0000 0040 *Egg-shaped, i.e.,* obtusely conical (blunt).

·0000 0050 *Conical,* very close to 3, but more acute.

·0000 0060 Narrow-conical, or *long and tapering.*

·0000 0070 *Long* and narrow, *with a blunt apex,* or oblong.

·0000 0080 Much flattened or drawn out (spreading) at the base, sometimes long and tapering, but expanded at the base.

·0000 0090 Square, quadrangular or cross-shaped (cruciform).

H.—FOLIAGE: Lustre of the leaves.

Leaves petiolate (i.e. with a leaf stalk).

·0000 0001 Shining on both sides.

·0000 0002 Dull (not shining), often bluish, on both sides.

·0000 0003 Dark green and shining above, paler underneath.

Leaves sessile (i.e. without a stalk to the leaf-blade):

·0000 0004 Shining, on both sides.

·0000 0005 Dull, or whitish, or bluish-green.

Key Number, Species, and Common Name. (Trees.)

*·1111	1231	*E. megacarpa,* F.v.M. Bullich.
*·1111	1361	*E. falcata,* Turez. White Mallet.
·1111	4152	*E. redunca,* var. *elata,* Benth. Wandoo.
·1111	6142	*E. accedens,* W. V. Fitzg. Powder-bark Wandoo.
*·1112	1361	*E. falcata,* Turez. White Mallet.
·1113	3491	*E. erythrocorys,* F.v.M.
·1113	5191	„
·1121	2123	*E. diversicolor,* F.v.M. Karri.
·1121	5211	*E. Lane-Poolei,* Maiden. Powder Salmon Gum.
·1121	5241	„
·1121	5242	*E. Drummondii,* Bentham.
·1121	6143	*E. diversicolor,* F.v.M. Karri.
·1122	5311	*E. salmonophloia,* F.v.M. Salmon Gum.
*·1122	7481	*E. Flocktoniae,* Maiden. Merrit.
·1123	1251	*E. rostrata,* Schlecht. River Gum (Red Gum of S.A.).
·1123	5432	*E. pallidifolia,* F.v.M. Micum.
·1124	1251	*E. rostrata,* Schlecht. River Gum.
·1124	2132	*E. latifolia,* F.v.M.
·1124	2152	„
·1124	4255	*E. Mooreana* (W.V.F.) Maiden. Mountain Gum (Kimberley).
·1124	5211	*E. alba,* Reinwardt. Ridge Gum.
·1124	5221	„
·1124	5241	„
·1124	5255	*E. Mooreana,* (W.V.F.) Maiden.
·1124	5432	*E. pallidifolia,* F.v.M. Micum.
·1124	7111	*E. Foelscheana,* F.v.M. Smooth-barked Bloodwood.
·1124	7121	„
·1124	7131	„
·1124	8412	*E. Houseana,* (W.V.F.) Maiden. Kimberley White Gum.
·1131	4152	*E. redunca,* var. *elata,* Benth. Wandoo.
·1133	5252	*E. microtheca,* F.v.M. Blackheart (N.W. form).
·1133	5432	*E. pallidifolia,* F.v.M. Micum.
·1134	4131	*E. collina,* W. V. Fitzg.
·1134	4132	„
·1134	5432	*E. pallidifolia,* F.v.M. Micum.
†·1411	1161	*E. doratoxylon,* F.v.M.
†·1412	1361	*E. eremophila,* Maiden.
†·1412	4361	*E. eremophila,* Maiden.
·1412	5211	*E. corrugata,* Luehm.
†·1412	5271	*E. annulata,* Benth.

†·1412 5451 *E. conglobata,* (R.Br.), Maiden.
†·1412 6141 *E. leptophylla,* F.v.M.
·1424 4111 *E. papuana,* F.v.M. Cabbage, or Desert Gum.
·1424 4131 „
·1424 4132 „
·1424 8251 *E. confluens,* (W.V.F.) Maiden.
†·14x1 x361 *E. Lehmanni,* Rein.
·14x2 7131 *E. sepulcralis,* F.v.M. Weeping Gum.
†·14x3 9112 *E. eudesmioides,* F.v.M.
·1511 6461 *E. platypus,* Hook Moort.
*x·1512 3371 *E. astringens,* Maiden. Brown Mallet.
*x·1512 3371 *E. spathulata,* Hooker. Swamp Mallet.
*·1512 3372 „
*·1512 4462 *E. Gardneri,* Maiden. Blue Mallet.
*1512 6371 *E. astringens,* Maiden. Brown Mallet.
·1512 7122 *E. caesia,* Bentham. Red-flowered tree.
*·1532 2241 *E. salubris,* F.v.M. Gimlet.
*·1532 5241 „
·1532 5412 *E. campaspe,* Spencer Moore. Silver-topped Gimlet.
*·1532 5451 *E. diptera,* Cecil Andrews. Bastard Gimlet.
·1x12 xx21 *E. Cooperiana,* F.v.M.
·2112 3422 *E. Woodwardi,* Maiden.
*·2112 4131 *E. celastroides,* Turcz.
·2122 2362 *E. transcontinentalis,* Maiden. Redwood.
·2122 7362 „
*·2122 7481 *E. Flocktoniae,* Maiden. Merrit (Blackbutt).
·2412 3382 *E. Clelandi,* Maiden. Blackbutt.
·2412 3422 *E. Woodwardi,* Maiden. Blackbutt.
·2412 4382 *E. Clelandi,* Maiden. Blackbutt.
·2412 5211 *E. corrugata,* Luehm.
·2412 5281 *E. Le Souefii,* Maiden. Blackbutt.
·2422 2152 *E. intertexta,* R. T. Baker.
·2422 6152 „
·2512 3361 *E. Sargenti,* Maiden.
·2512 5361 „
·2532 3472 *E. Stricklandi,* Maiden. Goldfields Yellow-flowering Gum.
·2532 4121 *E. Dundasi,* Maiden. Dundas Blackbutt.
·2532 4131 „
·2532 4472 *E. Stricklandi,* Maiden. Goldfields Yellow-flowering Gum.
·3211 5241 *E. rudis,* Endl. Flooded Gum.
·3211 5251 „
*·3212 4131 *E. celastroides,* Turcz.
·3212 8211 *E. Griffithsii,* Maiden. Grey Gum.
·3212 8281 „
·3213 6422 *E. striaticalyx,* W. V. Fitzg. Cue "York Gum."
·3213 8422 „
·3224 2232 *E. pruinosa,* Schauer. Apple Gum.

*·3232	4131	*E. celastroides,* Turcz.	
·3232	8211	*E. Griffithsii,* Maiden.	Grey Gum.
·3232	8281	„	
·3311	3361	*E. occidentalis,* Endl.	Swamp Yate.
·3311	3371	„	„
·3311	4131	*E. foecunda,* var. *loxophleba,* Benth.	York Gum.
*‡·3311	6361	*E. cornuta,* Labill.	
·3312	4141	*E. foecunda,* var. *loxophleba,* Benth.	
·3322	1351	*E. longicornis,* F.v.M.	Red Morrel.
·3322	1361	„	
*·3322	2341	*E. oleosa,* F.v.M.	A Morrel.
·3322	2351	*E. longicornis,* F.v.M.	Red Morrel.
·3322	2361	„	
‡·3322	2362	*E. transcontinentalis,* Maiden.	
·3322	7362	„	„
*·3332	4111	*E. gracilis,* F.v.M.	Yorrel.
·3332	4182	*E. torquata,* Luehm.	Goldfields Red-flowering Gum.
·3332	5241	*E. melanoxylon,* Maiden.	Black Morrel.
*·3332	6111	*E. gracilis,* F.v.M.	Yorrel.
·4211	1121	*E. Todtiana,* F.v.M.	Prickly-bark.
·4211	3411	*E. gomphocephala,* A.D.C.	Tuart.
·4211	4141	*E. Mundijongensis,* Maiden.	
·4211	5241	*E. rudis,* Endl.	Flooded Gum.
·4211	5251	„	
*·4221	1251	*E. decipiens,* Endl.	Coastal White Gum.
*·4221	1351	„	
*·4221	6251	„	
*·4221	6351	„	
·4224	2235	*E. pruinosa,* Schau.	Apple Gum.
·4234	2112	*E. Spenceriana,* Maiden.	Grey Box.
·4234	2132	„	
·4311	1121	*E. Todtiana,* F.v.M.	Prickly-bark.
·4311	1132	*E. patens,* Benth.	Blackbutt (S.W.).
·4311	1151	*E. Staeri,* Maiden.	Blackbutt of Albany.
·4311	2113	*E. ficifolia,* F.v.M.	Red-flowering Gum.
·4311	2133	„	
·4311	6111	*E. Guilfoylei,* Maiden.	Yellow Tingle Tingle.
·4311	6411	„	
·4311	7133	*E. calophylla,* R. Brown.	Marri.
·4321	1141	*E. Jacksoni,* Maiden.	Red Tingle Tingle.
*·4321	1153	*E. marginata,* Smith.	Jarrah.
*·4321	1163	„	
·4321	2121	*E. haematoxylon,* Maiden.	Mountain Marri.
·4321	2131	„	
·4321	7121	„	
·4321	7131	„	

·4323 1125 *E. setosa,* Schauer. Bloodwood.
·4323 1135 „
·4323 4131 *E. terminalis,* F.v.M. Ironbark.
·4324 1112 *E. dichromophloia,* F.v.M.
·4324 1121 *E. Cliftoniana,* W. V. Fitzg. Desert Gum.
·4324 1125 *E. setosa,* Schauer. Bloodwood or Cabbage Gum.
·4324 1132 *E. dichromophloia,* F.v.M.
·4324 1135 „
·4324 2133 *E. ptychocarpa,* F.v.M. Swamp Red Gum.
·4324 3112 *E. tetrodonta,* F.v.M. Messmate.
·4324 3132 *E. Brachyandra,* F.v.M. Deciduous Bloodwood.
·4324 3142 „
·4324 4121 *E. pyrophora,* Benth. Bloodwood.
·4324 4131 *E. terminalis,* F.v.M. Ironbark.
·4324 7112 *E. dichromophloia,* F.v.M.
·4324 7115 *E. perfoliata,* R. Br. Bloodwood.
·4324 7135 „
·4334 44x2 *E. lirata,* (W.V.F.) Maiden.
·4334 5252 *E. microtheca,* F.v.M. Coolibah.
·4334 6152 *E. melanophloia,* F.v.M. Silver-leaved Ironbark.
·4334 6252 „
·4334 8432 *E. argillacea,* W. V. Fitzg.
§·5424 4122 *E. miniata,* A. Cunningham. Woollybutt.
§·5424 7122 „
§·5434 2112 *E. clavigera,* A. Cunn. Cabbage Gum.
§·5434 2115 „
§·5434 4112 „
§·5434 4115 „
§·5434 4x31 *E. oligantha,* Schauer.
§·54x4 7121 *E. grandifolia,* R. Brown.
·xxx3 4112 *E. gamophylla,* F.v.M.
·xxx3 4115 „

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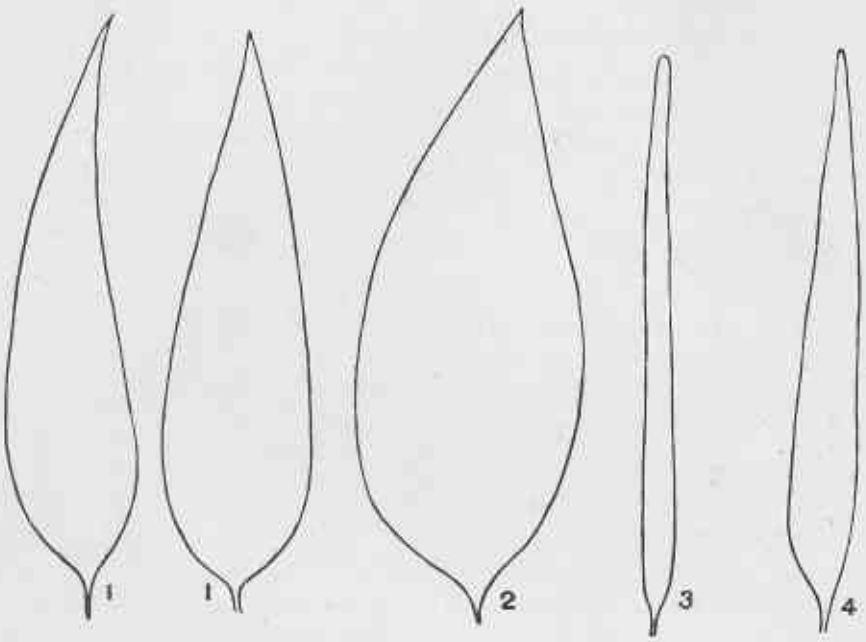
* These trees at times may be found in mallee form.

† Mallees occasionally found as trees (see Mallee Key).

x *Eucalyptus spathulata* may easily be distinguished from E. astringens by its small very narrow greyish shining leaves, and by its thinner smoother bark.

‡ Fruits in dense clusters.

§ The colour of the bark mentioned for the trees indicated is that of the upper portions of the trunk and branches. The lamellar lower portion is often multi-coloured, or light grey to yellow brown showing inner bark of red or white.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1
2
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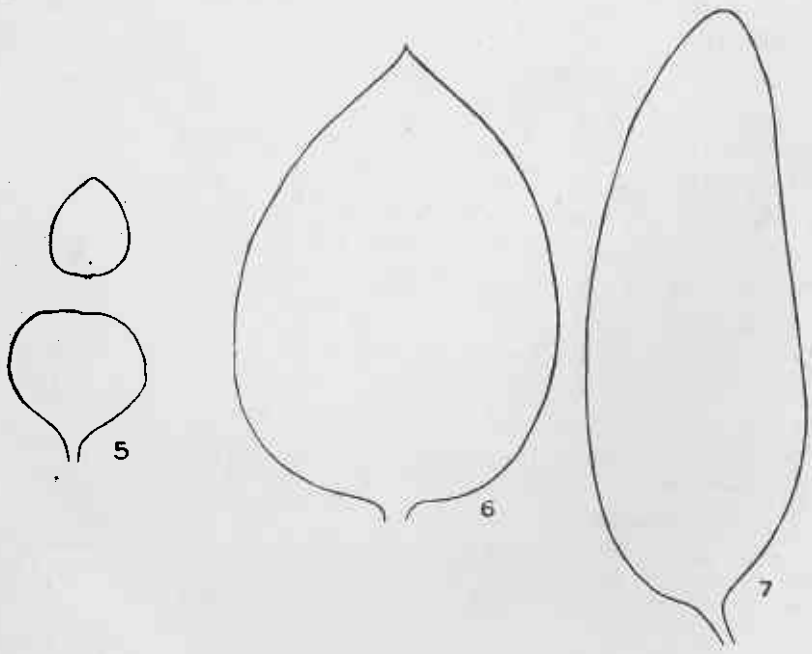
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B.—MALLEES, MARLOCKS, AND SHRUBS.

·10 0000 Mallees associated with trees in forest country, or in Mallee-thickets in reddish or grey clay loam.

·20 0000 Marlocks, or sand-plain Mallees, usually with small stocks (reduced) or without stocks (shrubs).

·30 0000 Shrubby forms (Mallee-like) found around granite rocks, or in elevated situations. All except *E. doratoxylon* and *E. megacarpa* (Stirling Range mountain forms) with reddish-green streaked thin barks.

·40 0000 Tropical species, occurring North of the Tropic of Capricorn.

LEAVES (see diagrams on opposite page).

·01 0000 Leaves lance-shaped, straight, or curved.

·02 0000 Leaves pointed egg-shaped—ovate-lanceolate.

·03 0000 Leaves very narrow and long—linear.

·04 0000 Narrow-lance-shaped—broader than linear, but narrower than lance-shaped.

·05 0000 Heart-shaped or circular, small.

·06 0000 Ovate, or egg-shaped, much larger than ·05

·07 0000 Oblong, of the shape and size illustrated.

FRUIT: Shape. (See diagrams, page 12.)

·00 1000 Globular or spherical, or roughly so.

·00 2000 Egg-shaped, tapering away from the stalk, *i.e.*, with the broad side next to the stalk (ovoid-truncate).

·00 3000 Bell-shaped (campanulate).

·00 4000 Long and narrow, or more or less cylindroid.

·00 5000 Cup-shaped (hemispherical).

·00 6000 Pear-shaped, but flattened at the end (obovoid-truncate).

·00 7000 Vase-shaped (globular, egg-shaped, etc., with a distinct neck).

·00 8000 Inverted cone-shaped, top or funnel-shaped (turbinate).

·00 9000 Four-angled (quadrangular).

FRUIT: Valves. (See diagrams, page 12.)

·00 0100 Valves *enclosed* within the fruit.

·00 0200 Valves *protruding* beyond the opening, more or less short and *triangular* (deltoid).

·00 0300 Valves *protruding, awl-shaped.*

·00 0400 Valves slightly protruding, or slightly sunk, more or less level with the top of the fruit.

OPERCULUM, or bud-cap: Shape. (See diagrams, page 12.)

·00 0010 *Hemispherical.*

·00 0020 Hemispherical with a *short tip or beak.*

·00 0030. *Hemispherical-conical.*

·00 0040 *Egg-shaped, i.e.,* obtusely conical.

·00 0050 *Conical.* Near hemispherical-conical, but more acute.

·00 0060 *Tapering* to a point (narrow conical).

·00 0070 *Long with a blunt apex,* or more or less *oblong.*

·00 0080 With a drawn-out, or *dilated base,* conical, tapering or flat.

·00 0090 Square, quadrangular, or cross-shaped.

Colour (LUSTRE) of the leaves.

·00 0001 Shining.

·00 0002 Dull.

KEY NUMBER AND SPECIES (MALLEES, MARLOCKS, AND SHRUBS).

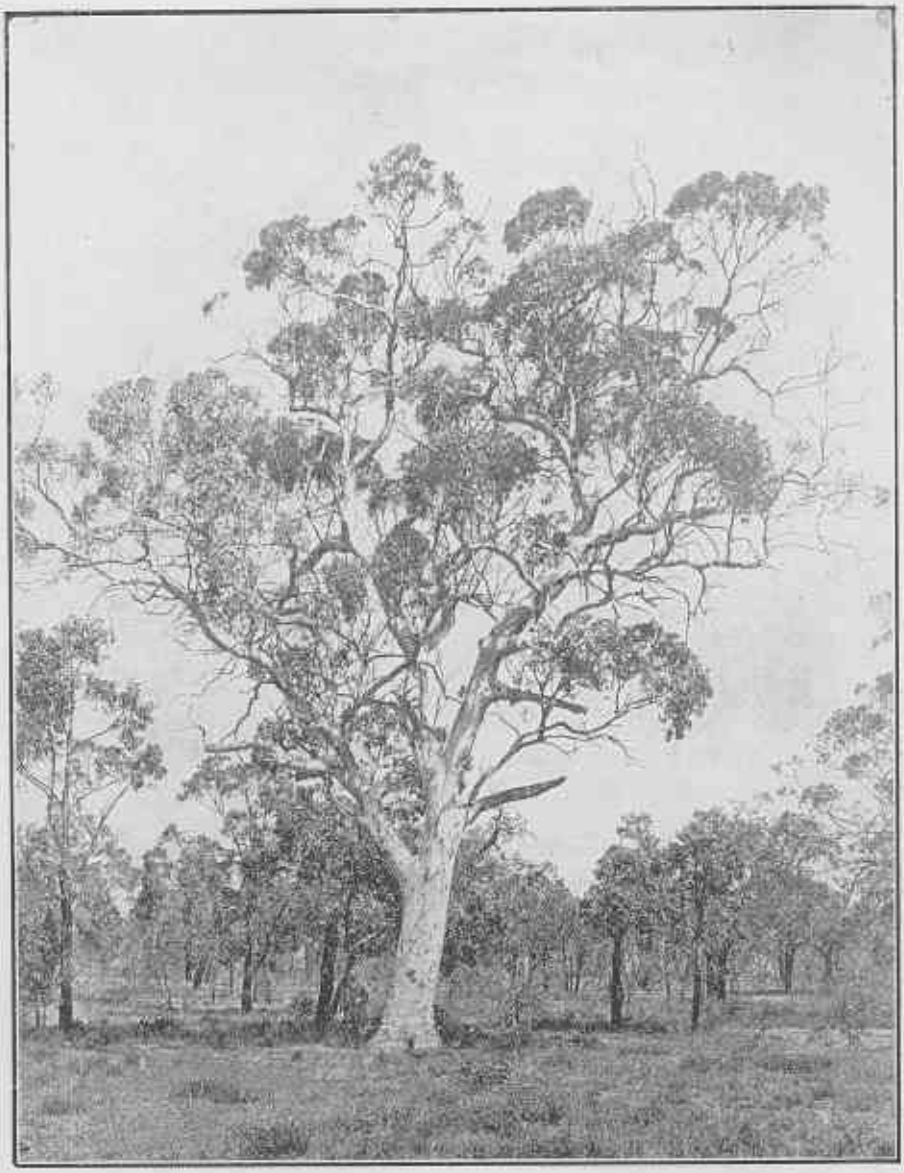
·11	1222	*E. Ewartiana,* Maiden.
*·11	1341	*E. oleosa,* F.v.M.
*·11	1361	*E. oleosa,* F.v.M.
*·11	1362	*E. eremophila,* Maiden.
*·11	2341	*E. oleosa,* F.v.M.
*·11	2361	*E. oleosa,* F.v.M.
·11	4131	*E. foecunda,* Schau.
·11	4141	*E. foecunda,* Schau.
·11	4151	*E. calycogona,* Turcz.
·11	4152	*E. redunca,* Schau.
·11	4171	*E. grossa,* F.v.M.
·11	4422	*E. Sheathiana,* Maiden.
·11	4462	*E. redunca,* Schau.
*·11	5271	*E. annulata,* Benth.
*·11	5451	*E. conglobata,* (R. Br.) Maiden.
·11	6152	*E. redunca,* Schau.
·11	6231	*E. dumosa,* A. Cunn.
·11	6371	*E. Stowardi,* Maiden.
·11	6441	*E. platypus,* var. *nutans,* Benth.
*·11	6461	*E. platypus,* Hooker.
·11	6452	*E. redunca,* Schau.
·11	6462	*E. redunca,* Schauer.
*·11	7481	*E. Flocktoniae,* Maiden.
·11	8422	*E. Sheathiana,* Maiden.
·11	8461	*E. erythronema,* Turcz.
·11	8481	*E. erythronema,* Turcz.
·11	9151	*E. Forrestiana,* Diels.
†·14	2241	*E. salubris,* F.v.M.
†·14	5241	„
*·14	4111	*E. gracilis,* F.v.M.
·14	4132	*E. celastroides,* Turcz.
*·14	4362	*E. eremophila,* Maiden.
*·14	5431	*E. diptera,* Andrews.
*·14	6111	*E. gracilis,* F.v.M.
·15	4152	*E. Kruseana,* F.v.M.
*·15	6461	*E. platypus,* Hooker.
·16	4171	*E. grossa,* F.v.M.
·21	1111	*E. buprestium,* F.v.M.
·21	1212	*E. Ebbanoensis,* Maiden.
†·21	1251	*E. decipiens,* Endl.

·21 1282 *E. Ebbanoensis,* Maiden.
†·21 1351 *E. decipiens,* Endl.
*·21 1361 *E. falcata,* Turcz.
·21 2111 *E. angulosa,* Schau.
·21 2131 *E. decurva,* F.v.M.
·21 2151 *E. angulosa,* Schau.
·21 246x *E. macrandra,* F.v.M.
·21 3261 *E. occidentalis,* Endl.
·21 3271 *E. occidentalis,* Endl.
·21 4121 *E. Comitae-Vallis,* Maiden.
·21 4131 *E. foecunda,* Schau.
·21 4141 *E. foecunda,* Schau.
·21 4422 *E. Sheathiana,* Maiden.
·21 4451 *E. incrassata,* Labill.
·21 4461 *E. incrassata,* Labill.
·21 4462 *E. Gardneri,* Maiden.
·21 5262 *E. pyriformis,* Turcz. var. *Kingsmilli,* Maiden.
·21 5422 *E. pyriformis,* Turcz.
·21 543x *E. micranthera,* F.v.M.
·21 5452 *E. pyriformis,* Turcz.
·21 6212 *E. Ebbanoensis,* Maiden.
†·21 6251 *E. decipiens,* Endl.
·21 6282 *E. Ebbanoensis,* Maiden.
†·21 6351 *E. decipiens,* Endl.
·21 635x *E. angusta,* Maiden.
·21 6371 *E. astringens,* Maiden.
·21 6462 *E. Gardneri,* Maiden.
·21 7111 *E. angulosa,* Schau.
·21 7151 *E. angulosa,* Schau.
·21 7371 *E. astringens,* Maiden.
·21 8422 *E. Sheathiana,* Maiden.
·21 848x *E. goniantha,* Turcz.
*·21 9112 *E. eudesmioides,* F.v.M.
·21 9191 *E. tetraptera,* Turcz.
*·21 x361 *E. Lehmanni,* Preiss.
·22 1222 *E. Oldfieldii,* F.v.M.
·23 1441 *E. angustissima,* F.v.M
*·23 3372 *E. spathulata,* Hook.
·23 xx5x *E. Jutsonj,* Maiden.
*·24 1161 *E. doratoxylon,* F.v.M.
·24 1252 *E. leptopoda,* Benth.
·24 1411 *E. pachyloma,* Bentham.

·24	1451	*E. uncinata,* Turcz.
·24	1452	„
·24	3191	*E. erythrocorys,* F.v.M
·24	5191	„
*·24	6141	*E. leptophylla,* F.v.M.
·24	635x	*E. angusta,* Maiden.
·24	6451	*E. uncinata,* Turcz.
·24	6452	„
·24	6462	*E. xanthonema,* Turcz.
·24	7131	*E. sepulcralis,* F.v.M.
·26	2112	*E. tetragona,* F.v.M.
·26	5222	*E. macrocarpa,* Hooker.
·27	3412	*E. Preissiana,* Schauer.
·27	5451	*E. Kalganensis,* Maiden.
†·31	1151	*E. marginata,* Sm.
†·31	1161	„ „
·31	1221	*E. megacarpa,* F.v.M.
·31	1222	*E. Ewartiana,* Maiden.
·31	2122	*E. caesia,* Bentham.
·34	1161	*E. doratoxylon,* F.v.M.
·35	5212	*E. crucis,* Maiden.
·35	5442	*E. Websteriana,* Maiden
·35	xx5x	*E. orbifolia,* F.v.M.
·44	3241	*E. Herbertiana,* Maiden.
·44	4111	*E. odontocarpa,* F.v.M.
·44	7241	*E. Herbertiana,* Maiden

* Mallees which sometimes have a tree form.

† Trees which sometimes have a Mallee form (*see* Arborescent Key).



Eucalyptus accedens, W. V. Fitzg.
"POWDER BARK WANDOO."

Part II.

WESTERN AUSTRALIAN EUCALYPTUS TREES.

Notes on Species.

E. accedens, W. V. Fitzgerald—"Powder-bark Wandoo." (1111 6142).

A tree of 70 to 90 feet, with the habit of the common Wandoo; 3 to 4 feet diameter. It may be easily distinguished from the Wandoo by its outer bark, which is covered with a pinkish or terra-cotta coloured powder, which rubs off on the hand if pressure or friction is applied. The colour of the bark, too, is rather different to that of the Wandoo, being a warmer (*i.e.*, more inclined to be pink) colour, while the many small flakes of a rich brown bark, which adhere to the notches or depressions in the bark, has earned for it the local name of "Spotted Gum."

Economic uses.—Used for wheelwright purposes, and said to be even stronger than Wandoo.

Habitat.—Steeply rising ground or summits of hills in the Darling Range between Midland Junction, York, and Pingelly, always in rocky lateritic soil. Flowers m. December-April.

Botanical characteristics.—Differs from *E. redunca* (its closest affinity) in the outer powdery bark, darker-coloured (pale reddish-brown) timber, larger and wider fruit, and short blunt lid (operculum).

E. alba, Reinw.

"RIDGE GUM."

E. alba, Reinwardt—"Ridge Gum." (1124, *5211) (*5221) (*5241).

A tree of 25 to 40 feet, with a short stout trunk and widely spreading branches. Trunk to 25 feet and 2 feet diameter, the bark thick, smooth, white or pinkish or even yellowish, timber pink or light red, fairly soft, not strong. Other characteristics of the tree are:—the leaves do not hang quite vertically, but are more or less spreading, a pale green, and many fall from the tree in the dry season (partially deciduous), and when its branches cross, as they frequently do, they fuse or grow together, which is a peculiarity not observed in any other Western Australian tree. The flowers are white, and the tree flowers during August and September.

Economic uses.—Not of much value as a timber. The bark is valuable in tanning, yielding 31 to 32 per cent. tannins.

Habitat.—In the East Kimberleys the tree inhabits stony ridges, hence the name of "Ridge Gum," but in the Central Kimberleys where it occurs in almost pure formation, it inhabits flat grasslands in a moist soil, or more frequently is found along the grassy banks of creeks in the vicinity of the Upper Drysdale River. In Western Australia it is confined to the Kimberley district, chiefly the eastern portions, but it extends into Queensland and Java. The bark is valuable for the tannin it contains.

Botanical characteristics.—Leaves broadly ovate, pale green, 2 to 3 inches long, with rather prominent venation. Peduncles axillary, but slightly flattened, short, bearing a close umbel of sessile flowers. Calyx small and almost hemispherical, opercula almost hemispherical.

Not unlike *E. oligantha* and *E. Mooreana*, it can be distinguished from the former by its smaller almost hemispherical fruits, perfectly smooth bark and anthers, and from the latter by its leaves which have quite long petioles. *E. alba* is usually found on moist flats, while *E. Mooreana* is a crooked tree of the mountain summits.

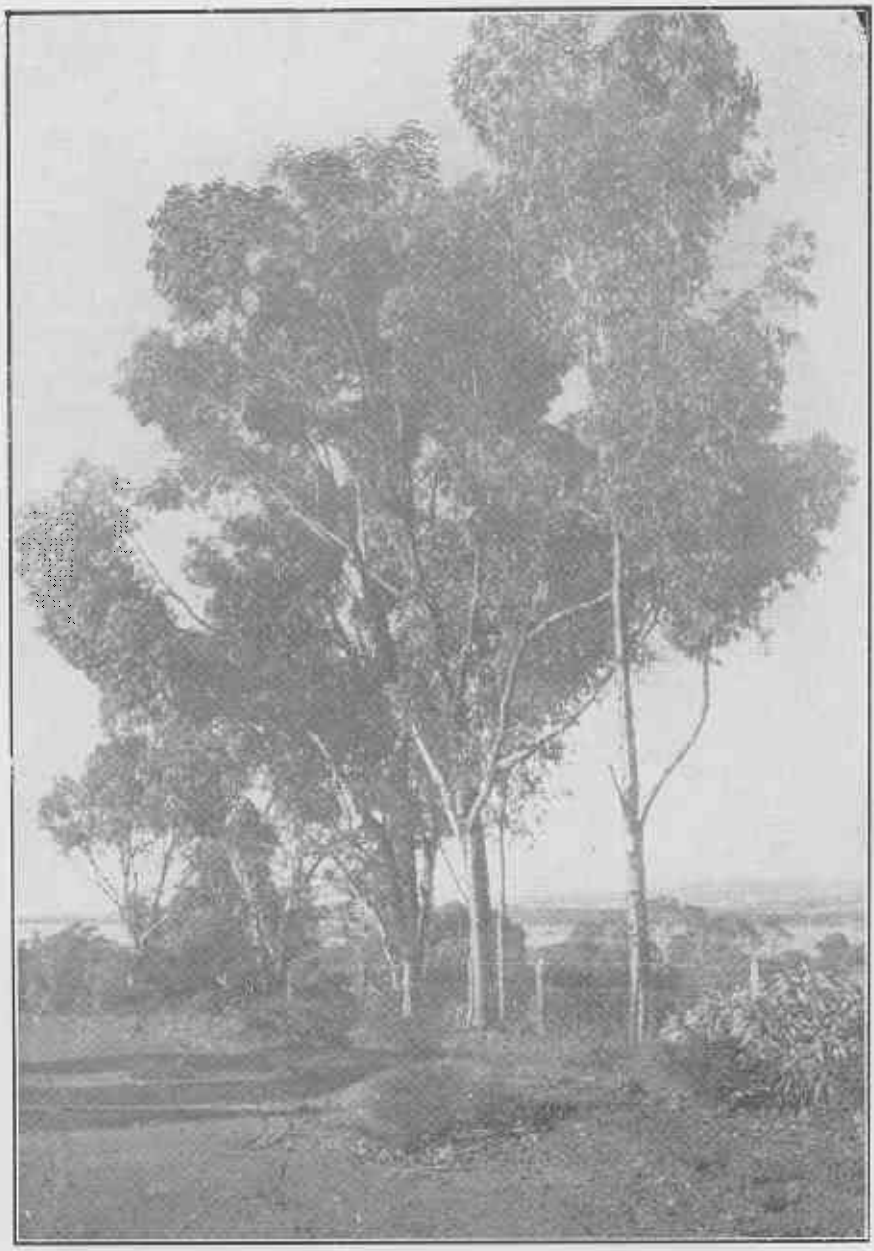
E. argillacea, W. V. Fitzg. (4334 8432).

A tree of 25 to 40 feet, trunk of 15 feet and 9 to 12 inches diameter. Bark dark grey, persistent on trunk and branches, semi-fibrous, almost like that of a Box. Timber red to brown, hard and tough. Leaves 2½ to 3½ inches long, on petioles of ½ inch. The branchlets, leaves, and inflorescence are whitish.

Economic uses.—Of no known commercial value.

Habitat.—This rare species has only been seen on the shales of Mt. House and Mt. Clifton in West Kimberley. It is not widely distributed.

Botanical characteristics.—Leaves obtuse, stalked; flowers in umbels of 4 to 6; calyx not ½ inch long, turbinate; fruit obvoid, the valves not exserted. It might be confused with *E. gamophylla*, *E. melanophloia*, and *microtheca*, but differs from the first in the pointed operculum, and in being a tall tree: from the second by its larger almost campanulate fruits, and from *E. microtheca* by its much larger and differently shaped fruits.



Eucalyptus astringens, Maiden.

"BROWN MALLET."

E. astringens, Maiden—"Brown, or Red Mallet." (1512 *3371) (6371).

A tree of 30 to 50 feet with a smooth brownish or greyish bark, and slightly angular trunk. The bole is straight, 1 to 2½ feet diameter, and up to 30 feet long, the timber pale brown and very dense. The bark is fairly thick and "gummy," easily stripped throughout the greater part of the year, and very astringent to the taste. The leaves are a dark shining green lanceolate, and irregularly veined.

Economic uses.—Young trees make very strong poles, the timber being hard, strong, and durable. Its chief value lies in its bark, which yields 40 to 57 per cent. tannins.

Habitat.—Pingelly to Tambellup on the Great Southern Railway, westwards to Wandering and Arthur, and eastwards to beyond Ravensthorpe, on rises or hills, usually lateritic.

Botanical characteristics.—Flowers white, the operculum cylindroid-conical, longer than the calyx-tube. Fruits small, campanulate less than ½ inch long. Its closest affinity is *E. occidentalis*, but it is a smaller tree, the bark is not rough on the trunk, and it is an inhabitant of rising, not swampy, ground. The fruits are smaller, and the valves not so prominent.

E. brachyandra, F. v. M. (4324 3132) (4324 3142).

A small tree of 10 to 12 feet, with a short stout trunk of 6 to 8 feet, rarely 10 feet, and widely spreading branches. Bark dark grey, rough, and persistent, fibrous and fissured. Timber red, poor. Flowers white, very small. The tree is deciduous, being almost or entirely leafless in the dry months. The leaves are small, broadly ovate and obtuse, mostly opposite, but occasionally alternate.

Economic uses.—Of no known commercial value.

Habitat.—Northern Kimberley—Artesian and Edkins Ranges, and hills near the Prince Regent, Mitchell, King Edward Rivers, and Admiralty Gulf. It occurs on sandstone hills, usually in scanty soil among rocks.

Botanical characteristics.—Its closest affinity is with the Grey Box and Silver-leaved Box, but can be easily distinguished from both by its exceedingly small fruits, which are not more than one-tenth of an inch long.

E. caesia, Bentham. (1512 7122).

A small crooked tree of 10 to 20 feet, with a diameter of 10 inches, and a smooth reddish streaky bark. Timber white. The leaves are either ovate or lanceolate, calyx-tube campanulate, marked with lines, filaments either light yellow or a bright pinkish-red. Operculum hemispherical at the base, with a conical beak. Fruits urceolate or ovoid-truncate, greyish, with the capsule deeply sunk.

Economic uses.—A particularly beautiful ornamental tree, of no commercial value.

Habitat.—Known from near Dowerin, the southern parts of the eastern goldfields, and Mt. Stirling (south of Kellerberrin). It occurs around granite rocks.

Botanical characteristics.—Among the trees its affinity lies with one of the Goldfields Blackbutts (*E. Woodwardi*), from which it differs in the smaller leaves 2 to 4 inches long, and urceolate fruit, which is larger than that of *E. Woodwardi*. *E. Woodwardi* has longer leaves, 4 to 6 inches, and a campanulate fruit. It is also a much larger tree, with orange-yellow flowers.

E. calophylla, R. Br.
"MARRI."

E. calophylla, R. Br.—"Marri," the so-called "Red Gum." (4311 7133).

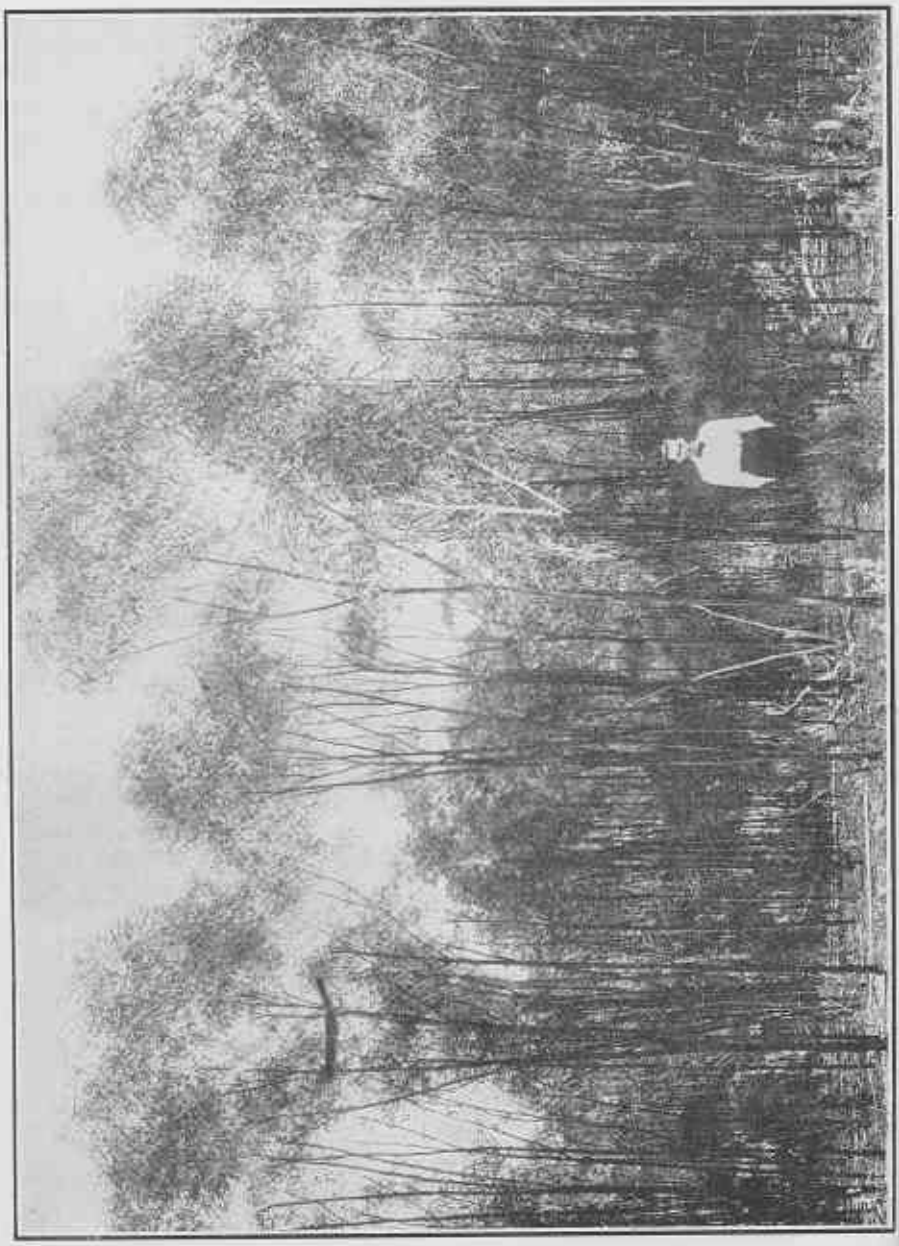
This is a tree of 70 to 100 feet in height, with a bole of 50 feet, and trunk diameter of 6 feet or more. The bark is rough, persistent and flaky (not fibrous). Light grey in colour in the younger trees and friable in small threads, it becomes more flaky in the adult tree, and a brownish-dark grey. Quantities of a deep red kino "gum" are exuded from the bark, and contained in large cavities in the wood. The timber is pale, almost light yellow, and strong. The large and beautiful leaves are ovate-lanceolate in outline, dark green above, but paler underneath, with a prominent midrib, and fine closely parallel secondary nerves. The flowers are large and white, borne in dense corymbs at the ends of the branches, and the fruits are large and urceolate, 1 to 1¾ inches in length with a distinct neck at the top; the capsule is deeply sunk.

A form with pink flowers occurs in the Bridgetown district. It has, otherwise, the characters of the ordinary form.

Economic uses.—This tree possesses a light yellow strong timber. It is easily worked, and but for the presence of kino-reservoirs would be amongst the most valuable of our timbers. The kino veins are found throughout the timber, but some trees are better in this respect than others. Marri is used for purposes where strength and elasticity are needed. It makes excellent cart shafts, axe handles, etc., and is of value in waggon work generally when sound.

Habitat.—Entire Jarrah and Karri forests, extending northwards to Dandaragan, and eastwards to near Harrismith in the Wandoo forest. To the east it exceeds the Jarrah forest for some miles.

Botanical characteristics.—Its affinities lie with the Red-flowering Gum (*E. ficifolia*) and Mountain Marri (*E. haematoxylon*), but it can be distinguished from the former in being a large tree and having black seeds which are not winged, and white flowers, while its affinity with *E. haematoxylon*, which is equally close, is scarcely less well defined. *E. haematoxylon*, however, has a red timber, white flowers, and a seed wing. It occurs on hills only.



E. campaspe, Spencer le M. Moore—"Silver-topped Gimlet." (1532 5412).

A slender tree of 25 to 35 feet, with a spirally twisted or fluted trunk of up to 10 inches in diameter; bark thin, light-brown or reddish-green, easily stripping, with a few flakes of thin bark decorticating from the trunk in small pieces. The branchlets and even the tops of the main branches are powdery-white, hence the name "Silver-topped Gimlet," and the leaves are rather large, of a bluish-green. Buds with hemispherical operculum, flattened peduncle, and hemispherical whitish fruits. Flowers white or yellowish-white. Timber pale-brown.

Economic uses.—A small tree with a strong timber, but too small to be of any commercial use apart from poles and firewood.

Habitat.—Eastern Goldfields, from Coolgardie southwards to Higginsville, and eastwards to Fraser's Range and Hampton Plains. The trees often occur in fairly dense thickets, when they are smaller and more shrubby, but they are never true shrubs or mallees. An inhabitant of a rich red loam, usually on flats, but occasionally ascending the hills.

Botanical characteristics.—This species can only be confused in the field with the true Gimlet (*E. salubris*), which occurs along with it, but the Gimlet has deep-green shining leaves, obtusely conical opercula, perfectly green or brown fruits, and none of the white powder which characterises the Silver-topped Gimlet. See *E. diptera*.

E. celastroides, Turcz—"Mirret." (2112 4131) (3212 4131) (3232 4131).

A tree up to 65 feet, with an ash-coloured bark, rough, when young smooth, whitish-coloured or shining red. A Blackbutt, with the upper portions of the trunk smooth. Timber pale brown. Leaves pale green.

Economic uses.—Not used for any commercial purpose. At the present time it is used for firewood on the gold mines.

Habitat.—Eastern Goldfields and eastwards along the transcontinental railway, westwards to Lake Yealering.

Botanical characteristics.—Leaves 2 to 3 inches long and a little over ⅓ of an inch wide. Flowers white. Buds long, the operculum short and obtuse, the calyx angular. Fruits obovoid, or shortly cylindrical, obscurely angular.

Its affinities lie in *E. gracilis* and *E. Dundasi*. It differs from the former in its bark which, although sometimes persistent over the whole trunk, is never a dark grey or almost black as in *E. gracilis*, the leaves are dull, not shining, and the fruits are larger.

In *E. Dundasi* the fruits are cylindrical, not at all obovoid, and the buds have a conical operculum, not obtuse.

E. clavigera, A. Cunn. (5434 * 2112) (*2115) (*4112) (*4115).

A tree without a common name, 20 to 35 feet high, but usually under 30 feet. Trunk to 18 feet and 20 inches diameter, the bark (at least on the greater part of the trunk) dark grey, rather persistent, papery-flaky. The upper trunk and branches smooth, greyish-pink. Leaves large, almost round, light green, rather thin, horizontally spreading, hairy at least on the midrib. Flowers probably white. Fruits in large umbels on slender stalks, of a papery texture.

Economic uses.—Not used for any commercial purpose. It is an excellent shade tree.

Habitat.—Northern Kimberleys northwards from Derby. Occurs on sandstone ranges and basaltic plains. On the latter it is associated with the Grey Box. The tree has not the characteristic appearance of the majority of Eucalypts.

Botanical characteristics.—Leaves oval or broadly ovate, undulate, soft, 4 to 6 inches long. Flowers in lateral umbels or short panicles; calyx-tube turbinate, operculum almost flat; fruits ovoid-oblong, the capsule deeply sunk, papery. It is closely allied to *E. grandifolia*, but the operculum is much more obtuse, and the calyces and fruits are smaller.

E. Clelandi, Maiden—"Goldfields Blackbutt," "Cleland's Blackbutt." (2412 * 3382) (*4382).

A tree of 30 to 45 feet, the bark rough and flaky on the butt for a short distance, otherwise quite smooth, and a yellowish-white or almost white. The branchlets are glaucous or powdery-white; leaves dull green. Timber pale brown, straight in the grain, but very hard.

Economic uses.—Not used for any commercial purpose. This timber is used in the gold mines as firewood. It has the appearance and qualities of a fine timber.

Habitat.—From 70 miles north of Kalgoorlie to Coolgardie and some distance southwards.

Botanical characteristics. Flowers usually in lateral umbels, the calyx-tube almost campanulate, scarcely corrugated, the operculum almost hemispherical, but shortly beaked (rostrate); filaments white. Fruit cylindrical-campanulate but shortly so, glaucous, obscurely ribbed, the valves not, or but slightly exserted.

It has *E. Le Souefii* as its closest relative, but can be distinguished from this species by its glaucous branchlets, smaller buds and fruits, indistinctly ribbed fruits and buds, and in the operculum being shorter than the calyx, or at least, not longer. In *E. Le Souefii* the operculum is very prominently ribbed, and has quite a wide overhanging base, and the buds and fruits are much broader than those of *E. Clelandi*.

E. Cliftoniana, W. V. Fitzg.—"Desert Gum." (4324 1121).

A tree of 30 to 40 feet; trunk up to 15 feet high and 12 inches in diameter. The bark is rough and dark-grey in colour on the trunk and branches, and furrowed longitudinally. Timber dark red, tough and hard. Leaves thick, narrow, on long petioles. The flowers are white. Fruit light brown, woody and hard, under 1 inch in diameter, globular.

Economic uses.—A very rare tree, of no known commercial use, and very restricted habitat.

Habitat.—The above are Mr. Fitzgerald's notes, and he, the sole collector of the species, found it on Mt. Anderson, which is south-east of Derby, near the Fitzroy River. He states that it is found on sandy soil overlying sandstone, and that it extends to the desert country south of the Fitzroy River. The desert country referred to is probably what is locally known as "Pindan"—a type of low scrubby bush.

Botanical characteristics.—Leaves 4 to 5 inches long, petioles about ½ inch long. Pedicels ½ inch or less. Calyx-tube 3 to 4 lines diameter. Fruit ¾ inch diameter. Fertile seeds 2 lines long, the wings 3 lines in length. It is allied to the so-called cabbage Gum or Bloodwood (*E. setosa*), from which it differs considerably in the narrow leaves. It also has affinity to *E. pyrophora*, but the fruits are much more globose. *E. Cliftoniana* is one of those species of which we know very little, and its rediscovery would be welcome. It is a member of the *Corymbosae*.

E. collina, W. V. Fitzg. (1134 4131) (1134 4132).

A tree of 40 to 60 feet (probably less), with a trunk of up to 30 feet and 12 to 18 inches diameter, and therefore a slender tree. The bark is persistent, smooth, greyish-white or white, mottled with dark grey. Timber dark brown, hard, tough. The leaves are quite thick, and together with the twigs, glaucous, as if frosted, silvery-white in colour. Flowers white or yellowish-white.

Economic uses.—Of no known commercial use, occupying uninhabitated country.

Habitat.—Only known from the Kimberleys in the King Leopold Ranges and vicinity. The following are the only stations recorded:—Summit of Bold Bluff, Packhorse Range, Mount Rason, and Synnott Range.

Botanical characteristics.—Leaves scattered or alternate, lanceolate, falcate, acuminate, tapering at the base into a long petiole, the veins not prominent. Flowers large, pedicellate, in umbels of 4 to 6, several together in pedunculate panicles, pedicels terete, stout, calyx-tube turbinate, the operculum depressed-conical, or almost hemispherical, opening by an irregular line. Stamens inflected in the bud. Fruit broadly cylindrical, smooth, with a deeply sunk capsule.

Affinities *E. pyrophora, E. terminalis,* and *E. perfoliata.* The fruits are wider than in *E. terminalis,* and the inflorescence larger, the leaves too are very different. From *E. pyrophora* it is quite distinct in not having a corymbose inflorescence, the thicker leaves are not prominently veined, neither are the opercula so acute. The fruits are not unlike those of *E. perfoliata,* but the leaves are very different.

E. confluens (W. V. F.) Maiden. (1424 8251).

A tree of 20 to 30 feet high, with a trunk of up to 15 feet, and 10 inches diameter. Bark pinkish-white, smooth and blotchy. Timber red to brownish-red, hard and tough. It is a straggling tree with but few branches. Flowers white.

Economic uses.—Is found in unoccupied country, and is therefore of no known commercial use.

Habitat.—Kimberley district, in the vicinity of the King Leopold Range; not seen to the north.

Botanical characteristics.—Leaves pale green but shiny, narrow lanceolate 4 to 6 inches long, without prominent veins. Flowers white, in axillary or lateral umbels. Stamens inflected in the bud, which is almost elliptical in outline, the operculum and calyx being of about the same size. Fruits broadly obconical with domed valves.

It is quite a distinctive species, with no close affinities in the trees of its habitat.

E. Cooperiana, F. v. M. (1x12 xx21).

Very little is known of this species, which was collected by Maxwell, without notes or locality. It is probably a tree, but even this is not certain.

Economic uses.—A species practically unknown.

Habitat.—"South-West Australia" (Maxwell). Probably east of King George's Sound in the direction of Esperance, as the country around Albany and westwards is now fairly well known, and the species has not been collected since Maxwell's time.

Botanical characteristics.—Branchlets (twigs) acutely winged, leaves scattered, ovate-lanceolate and shining. Umbels of up to 17 flowers, the peduncles and pedicels flattened. Calyx-tube shortly cylindrical abruptly narrowed at the base, the operculum depressed-hemispherical, but flattened on the top, somewhat umbonate or rostrate. Fruit unknown, but the capsule is sunk.

Its nearest relative is the Merrit (*E. Flocktoniae*), but the operculum is very different, the leaves broader, and more flowers in the umbel.

E. cornuta, Labill—"Yate." (3311 6361).

A tree of 50 to 70 feet, rarely taller, with a trunk of up to 35 feet, and a diameter of up to 3 feet. Bark dark-grey or almost black, rough and longitudinally fissured on the trunk, the fissures narrow and deep. Bark of the branches ribbony, smooth, and brownish-grey when decorticated, but with long ribbons of a greyish bark hanging from them. Branchlets smooth. Timber pale-coloured, almost yellow, exceedingly dense, supple and strong. Leaves dark-green and shining, the oblique veins rather conspicuous. Flowers yellowish-white, united in small dense heads, with long filaments.

Economic uses.—This tree yields a pale-yellow timber of great strength and density. It is probably one of the hardest and strongest timbers in the world, having a tensile strength not much below that of wrought iron. It is used generally in wheelwright work, especially for those parts which require the greatest strength and toughness, as for instance shafts for vehicles, frames, and wheel parts.

Habitat.—The Yate has two forms: one is the tree described above, the other is a Mallee-like shrub of 10 to 15 feet. The tree form, which is the true Yate, occurs near the western coast at Busselton and southwards to the Lecuwin, thence eastwards to the Mount Barker district. The Mallee-like form occurs on the Stirling Range, and to near Israelite Bay.

Botanical characteristics.—Leaves lanceolate, or ovate-lanceolate, usually under 4 inches long, the intramarginal vein some distance from the margin. Peduncles axillary, terete, or nearly so, bearing few to 12 closely sessile flowers, calyx almost obovoid. Operculum 1 to 1½ inches long, narrow-conical expanded at the base, the stamens erect. Fruit obovoid-truncate with very prominent valves formed by the persistent base of the style. Seeds small and reddish-brown.

Its affinities lie with a shrub (*E. Lehmanni*) and the Swamp Yate (*E. occidentalis*). The Yate tree is of course sharply separated from the former in being a tree; botanically it is separated by its fruits. These are concrescent in *E. Lehmanni*, or fused together. In *E. cornuta* they are in a dense head, but free from one another. The Yate has the external appearance of *E. occidentalis*, but the latter has flattened peduncles, pedicellate free and campanulate fruits.

E. corrugata, Luehmann—One of the Blackbutts. (2412 5211) (1412 5211).

A tree of about 30 feet with a smooth white, fairly thin bark. It may, or may not, have a low butt or persistent bark on the trunk. Diameter 8 to 12 inches. Timber pale brown. The leaves are fairly thick, heavy, and rather broad, but acute, dark green, and shining. The flowers are yellowish-white.

Economic uses.—This small tree has no commercial use beyond that of firewood, but the timber is very tough and strong.

Habitat.—Southern Cross district, westwards to Carrabin and Westonia.

Botanical characteristics.—Leaves on fairly long petioles, lanceolate, rather **falcate,** narrowed at the base, 3 to 4 inches long, usually ½ inch wide, the veins rather **indistinct, the intramarginal one close to the edge. Peduncles axillary or** lateral, almost terete, ½ inch long, bearing an umbel of 3 to 5 flowers on short pedicels. Calyx-tube hemispherical, with 6 to 8 very prominent ridges, ½ inch diameter. Operculum hemispherical, with the same ridges or corrugations as the calyx-tube. Fruit hemispherical, shining brown, tapering slightly at the base, with about 8 very prominent ridges rounded at the top above the disc, flat-topped.

The species might be confused with *E. Le Souefii*, but the fruits are larger, and the opercula not at all conical.

E. decipiens, Endl. (4221 * 1251) (*1351) (*6251) (*6351).

A tree of 30 to 60 feet, with a trunk of up to 30 feet, and a diameter of 3 feet. The bark is thick, persistent and rough of an ashy-grey colour, and that of the branches is somewhat smooth. Timber reddish, fairly hard. Flowers yellowish-white.

Economic uses.—Of no known commercial value.

Habitat.—Coastal limestone in the Fremantle-Rockingham area, extending southerly in small patches or isolated trees in the lower-lying parts of the Jarrah forest (particularly in the Blackwood River district) to Cranbrook, the Kalgan River, and Porongorup Range.

The Southern specimens have a darker, looser, and more flaky bark than the Fremantle specimens.

Botanical characteristics.—Leaves leathery and shining, but more or less pale-green, about 3 to 4 inches long, the midrib alone prominent, the intramarginal vein removed from the edge. Peduncles axillary or lateral, terete or nearly so, bearing a dense head of closely sessile flowers (6 to 10). Operculum conical, often bent, from as long as, to almost twice as long as the calyx-tube. Filaments inflected in the bud, anthers globular, or nearly so. Fruit broadly turbinate or pear-shaped, ¼ inch diameter, the capsule sunk, the valves slightly protruding.

Affinities to *E. oleosa* and *E. uncinata*. The former has a more obtuse operculum, and more pointed valves, the fruit is pear-shaped, not truncate as in *E. decipiens*. *E. uncinata* has smaller flowers, and is a small Mallee. *E. decipiens* might be mistaken for the Tuart (*E. gomphocephala*), which it resembles outwardly, but the timber is reddish—not pale, and the fruits are much smaller; the buds also are acute and narrow.

E. dichromophloia, F. v. M. (4324 * 1112) (*1132) (*7112).

A tree of 20 to 30 feet, with gracefully drooping, almost pendulous branches. Trunk to 20 feet, and about 20 inches diameter, the bark persistent throughout, rough and flaky on the trunk, but in numerous layers which, when fallen off, leave reddish layers, more or less longitudinally fissured. Leaves a pale green, long and tapering.

Economic uses.—Inhabits little-known country. The tree is too small to be of value as a commercial timber, but should prove valuable for fencing purposes in its habitat.

Habitat.—Northwards from the Gascoyne River to the Northern Kimberleys, occurring in poor sandy soil, either on hills or stony rises.

Botanical characteristics.—Leaves alternate, narrow-lanceolate, very tapering, pale green, straight. Flowers in umbels, the umbels forming terminal panicles. Young buds obovoid. Fruit urceolate-globose, or almost globular, with a short cylindrical neck, green or reddish-green and woody, about ½ inch across.

The species is most likely to be confused with *E. latifolia*, but has a grey rough bark, not smooth and yellowish, as in *E. latifolia*. It is also close to *E. terminalis*, but the fruits are shorter and more globular, not cylindrical. The same applies to *E. pyrophora*.

E. diptera, C. Andrews—"Bastard Gimlet." (1532 5451).

A small tree of 20 to 27 feet, with a slender trunk of 6 to 10 feet, fluted or angular, and thin erect branches and reddish branchlets, trunk to 8 inches diameter. Bark thin, brownish-green, or greenish-red, exactly similar to that of the true Gimlet, smooth throughout. Timber brown, rather pale, hard and dense, tough. Leaves dark shining green, flowers greenish-yellow.

Economic uses.—Of no commercial use.

Habitat.—Vicinity of Salmon Gums on the Esperance Railway, northwards to Gilmores and Lake-View, in clay loam, on flats, in the Salmon Gum and Merrit or Blackbutt forest. Flowering months, June-July.

Botanical characteristics.—The juvenile leaves are unknown at the time of writing. Mature leaves alternate, erect, on twisted slightly flattened petioles, narrow-lanceolate, thick and shining, 2½ to 3½ inches long and ¼ to ½ inch wide, the same colour on both sides, the midrib prominent with the thickened reddish margins, the secondary veins inconspicuous, roughly parallel, with the intramarginal vein fairly close to the edge. Flowers axillary or lateral in sessile clusters of 2 to 3, usually rather compressed laterally. Calyx-tube almost hemispherical but compressed, much flattened in the lower portion, into a wing which continues longitudinally up the sides to form two conspicuous wings. Operculum conical, compressed with two vertical acute angles corresponding to the continuation of the vertical wings of the calyx-tube, about ¼ inch long and acute, scarcely as broad as the calyx-tube, but more or less continuous with it, and reddish-green, contrasting with the green calyx-tube. Filaments lemon-yellow sharply inflected in the bud, nearly ½ inch long, with oblong anthers opening in longitudinal back-to-back cells. Ovary with a conical summit and thick clavate green style. Fruit hemispherical, with the broad compressed base and vertical wings of the calyx-tube continuing to the top, ½ inch diameter without the wings, or sometimes smaller—rather variable in size—and not quite the same length. Rim thick and broad, the capsule slightly sunk with 3 to 6 valves, deltoid, and more or less flush with the orifice, or but slightly exserted.

The affinities are with *E. conglobata* and *E. salubris*. *E. conglobata* is a shrubby species, or a Mallee with a silvery-yellow or grey bark, and much larger leaves and smaller flowers of a different shape. It has a closer affinity to *E. salubris* and *E. campaspe*, differing from the former in its wider fruits and buds, and from the latter in its total absence of glaucousness, and from both in the very remarkable broad wings of the buds and fruit.

Locally it is looked upon as a "Gimlet."

E. diversicolor, F. v. M.

"KARRI."

E. diversicolor, F. v. M. (1121 6143) (1121 2123).

A tree of upwards of 250 feet in height, and the second most important tree in the State. The trunk reaches a height of over 100 feet before giving rise to the first branch, and may have a diameter of 8 to 10 feet. The bark is smooth, of a yellowish-white colour with purple-grey patches of decorticating outer bark, and is yellow in fracture, and fairly thick. The timber is red, very similar to that of Jarrah, but has a longer and stronger grain, and is usually paler in colour. A test as to whether a timber is Jarrah or Karri, employed by bushmen, and which rarely fails, is to take a small splinter of the timber about the size of a match and burn it. Karri leaves a white ash, Jarrah a greyish-black ash.

Economic uses.—This is the second most important timber in Western Australia. It is excellent for superstructures where strength is required, being stronger than Jarrah. It is used for wheelwright purposes, flooring, beams, and building work generally. It does not stand in the ground and does not resist termites, unless treated. *"Powellising"* is the only form of treatment applied commercially on a large scale.

Habitat.—Confined to South-Western Australia, forming the well-known Karri forest between Cape Leeuwin, Manjimup, and the South coast, extending eastwards to Torbay. Isolated patches occur on the Porongorup Range and around Mount Manypeak.

Botanical characteristics.—Leaves ovate-lanceolate or lanceolate, acute, 3 to 6 inches long, the intramarginal vein removed from the edge, dark green above, paler underneath, hence the specific name. Pedicels axillary or lateral, each with 3 to 6 flowers. Operculum hemispherical or obtusely conical, shorter than the calyx-tube. Fruit ovoid-truncate or almost pear-shaped. Flowers white, the stamens inflected in the bud.

Its affinity lies (botanically) with *E. Guilfoylei*, the Yellow Tingle Tingle, but it may be readily distinguished by its smooth bark. From external appearances it is not unlike the Bullich (*E. megacarpa*), sometimes called the swamp Karri, but the latter has a whiter bark and a pale timber; it is also a smaller tree with dark green leaves and large fruits.

E. Drummondii, Bentham. (1121 5242).

A small tree of 20 to 25 feet with a short deformed trunk, or rarely taller (30 to 45 feet and 2 feet 6 inches diameter), the bark smooth, yellowish-white, with small flakes of brownish bark on the trunk. Timber reddish. Not a common tree.

Economic uses.—Of no known commercial value.

Habitat.—Perth-York Road, near St. Ronan's Well, and around York, occurring in gravelly soil overlying granite.

Botanical characteristics.—Leaves dull green, from oblong-ovate to lanceolate, under 4 inches long, with closely parallel veins, the intramarginal one close to the edge. Peduncles ½ to 1½ inches long, terete, each with an umbel of 3 to 6 flowers (white). Calyx-tube broadly hemispherical, nearly ½ inch diameter, operculum broadly conical, longer than the calyx. Stamens inflected in the bud; anthers small, ovate. Fruit hemispherical with a prominent flat rim around the capsule, and short scarcely protruding valves.

It has a close affinity with *E. Oldfieldii* which is a Mallee, and also with *E. Lane-Poolei*, a tree of the Armadale-Pinjarra districts. *E. Lane-Poolei* has a powdery bark like that of *E. accedens*, and bright green lanceolate leaves, also a distinctly hemispherical (not conical) operculum.

Eucalyptus Dundasi, Maiden.

"DUNDAS BLACKBUTT."

E. Dundasi, Maiden—"Dundas Blackbutt." (2532 4121) (2532 4131).

An erect tree of 30 to 60 feet, with erect or scarcely spreading branches, and the usual obconical, or umbrella-like appearance of the common Goldfields trees. Trunk to 20 or 25 feet, and up to 30 inches diameter. Bark of the base of the trunk forming a dark-coloured butt, of 6 to 11 feet in height, rarely extending to the branches, and often ending abruptly, with a sharp distinction between the upper and lower barks. Butt bark thick, black, tessellated, or shortly, narrowly, and deeply fissured, brown in outer section, yellowish-white in inner section. Upper bark thin, rich reddish-brown, with grey crisped flakes of shedding bark, white in fracture. Timber dark brown, exceedingly hard and dense, with a white sapwood of about 1 inch thick in mature trees. Leaves small and bright dark shining green, flowers white, about ½ inch diameter.

Economic uses.—An uncommon tree, except in its restricted habitat. Has been used to some extent in the past for mining timber in the Norseman district. All the trees examined sound and free from termites.

Habitat.—From about 4 miles south of Lake View (Gilmore's), northwards to near Higginsville, in red gravelly loam, forming pure stands in the alluvial soil around Lake View and Dundas, but more scattered to the north of Norseman, where it is rare. It flowers in April.

Botanical characteristics.—Juvenile leaves at present unknown. Mature leaves alternate, on slightly angular or terete branchlets, narrow-lanceolate, acuminate with a hooked apex, on petioles of ½ to ¾ inch, the whole leaf 2½ to 3½ inches long, and under ½ inch wide, bright shining green on both sides, rather leathery and thick with a prominent midrib and slightly thickened margins, and inconspicuous roughly parallel veins, the intramarginal one close to the edge. Flowers in axillary, or rarely lateral umbels, on a slender slightly flattened peduncle thickened at the top, and supporting 4 to 6 flowers on short pedicels. Calyx-tube dark shining greeen (drying almost black), slightly over ¼ inch long, cylindrical-urceolate or constricted about the middle, striate or obscurely ribbed, dilated at the orifice. Operculum hemispherical with a prominent beak, or hemispherical-conical, about half the length of the calyx-tube. Filaments white, a little over ¼ inch long, inflected in the bud, with oblong anthers attached near the base and opening in parallel cells. Fruit cylindrical, about 4 lines long, with short distinct pedicels, dark green, angular, or finely but obscurely ribbed, straight or slightly constricted above the middle, the orifice not constricted, with a prominent narrow rim and deeply sunk capsule with short well included deltoid valves. Seeds very small, brown, and minutely striated.

The species is related to *E. oleosa* and the other members of that series, having almost the operculum of some of the Mallee forms of that species. The perfectly cylindrical fruits and different anthers, together with the venation of the leaves make it distinct. The habit is that of a Morrel, with a bark closely similar to that of *E. Stricklandi*, but darker in the butt.

E. erythrocorys, F. v. M. (1113 3491) (1113 5191).

This species is either a "shrub" or a tree of up to 30 feet, with a dull whitish bark and pale whitish timber. The leaves are opposite, narrow, long-lanceolate, very tapering, and of a bright green. The flowers are quite different to those of any other known Eucalypt, having a turbinate bright green rather fleshy ribbed calyx; cruciform or almost biretta-shaped scarlet operculum with four prominent ridges which is much broader than, and rather overhanging the calyx; and golden-yellow stamens. The fruit is large (nearly 2 inches across), broadly campanulate, with four depressions or pits in the disc. It is also ribbed.

Economic uses.—A rare species, and of small stature. It is perhaps the most ornamental of all the Eucalypts, and is deserving of cultivation throughout the world.

Habitat.—Lower Murchison River towards Shark's Bay, and southwards to below Dongarra, on the coastal limestone. This, the most handsome of all the Eucalypts, does not possess a distinctive common name.

Botanical characteristics.—This distinctive species cannot be confused with any other. It is one of those in which the stamens are arranged in four tufts, and its closest relation in habit, bud and fruit appears to be the Bullich (*E. megacarpa*).

E. falcata, Turcz.—"White Mallet." (1112 1361).

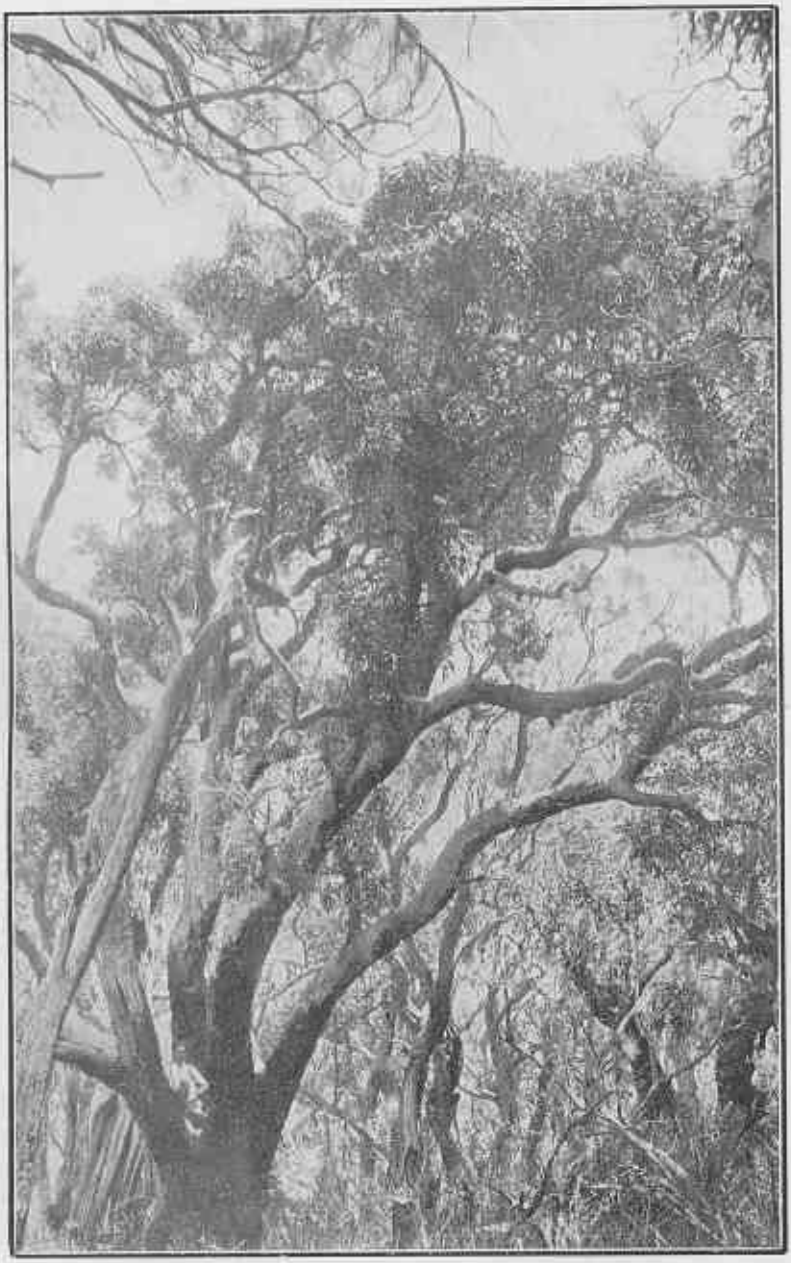
A tree of 20-30 feet, rarely 35 feet, with erect branches and a flat top; trunk to 15 feet and 12 inches diameter; bark about ¼in. thick, silvery white, or yellowish-white, shedding in thin purple-grey plates, pink in fracture. Timber light brown, dense and very hard. Leaves dull shining green, flowers yellowish-white.

Economic uses.—The tree is too small to be of much value as a timber, although it is strong and durable. The bark yields 32 per cent. tannins, and has been extensively exploited.

Habitat.—Ironstone (lateritic) hills and ridges in the Narrogin-Wagin districts, eastwards to Harrismith, occurring on the poorest of soils with Blue Mallet, Sheoaks and Cypress Pine (*Callitris Roei*).

Botanical characteristics.—Leaves lanceolate, acuminate, about 4 inches long, dull or pale green, but not lustrous. Flowers in umbels on almost terete peduncles, 6-12 flowers in the umbel. Pedicels short and slender. Operculum conical, acute, much longer and narrower than the almost globular calyx-tube, which is furrowed. Fruit depressed-globular, a little over ¼in. in diameter, with a narrow flat rim and very long needle-like points to the valves, which often cohere towards the top.

Its affinities lie chiefly in *E. oleosa* and *E. decipiens*. It can readily be separated from both by its bark, which is smooth and white. The buds are not unlike those of *E. decipiens*, but are much more acuminate, and the long valves and short globular fruit are distinctive.



E. ficifolia, F. v. M.
"RED FLOWERING GUM."

E. ficifolia, F. v. M.—"Red, or Scarlet-flowering Gum." (4311 2113) (4311 2133).

A more or less straggling, rarely erect, tree of 20-35 feet, and upwards of 2ft. to 2ft. 6in. in diameter. Bark persistent throughout, thick, yellowish in fracture, light grey externally, easily friable, and not stringy, much like that of the Marri, but lighter in colour, and without the kino of that species. Timber pale.

Economic uses.—Of little timber value. This species is extensively cultivated as an ornamental tree for its scarlet, pink and crimson flowers.

Habitat.—From Brook's Inlet near the Shannon River westwards to the Bow River between Denmark and Nornalup, occurring in small patches on sandy rises, at a little distance from the coast. None of the patches are of any great extent; the largest, near the 31-mile hill (Denmark-Nornalup road), has been secured as a Reserve.

It has been recorded as a tree of 35 feet in height and 6 feet diameter (E. J. T. Brockman). Flowers December-February.

Botanical characteristics.—Leaves often opposite, ovate-lanceolate to ovate, acute, rather thick and rigid, bright green and shining above, paler underneath, with closely parallel secondary veins, the intramarginal vein close to the edge. Flowers in terminal corymbose panicles on reddish pedicels, which are long and slender, terete or slightly flattened. Calyx-tube reddish, more or less pear-shaped when in the bud, the operculum hemispherical to hemispherical-conical, much shorter than the calyx-tube, and hinging on to the calyx after the flower has expanded. Filaments intense vermilion with oblong anthers opening in parallel cells. Fruit urceolate, or ovate-urceolate, usually without a neck, but sometimes with a short neck like that of the Marri. Seeds winged.

The affinity is with *E. calophylla,* the Marri, but it is a smaller tree with smaller leaves; the flowers are red with a reddish calyx, and scarlet filaments. The juvenile leaves too, are different, being without bristly hairs, and are not peltately attached to the petiole.

E. Flocktoniae, Maiden.

"MERRIT."

E. Flocktoniae, Maiden—"Merrit." (1122 7481) (2122 7481).

A tree of 40-50 feet, erect, not much branched, trunk to 12in. diameter. Bark smooth, almost white or pinkish, about ¼in. thick, decorticating tardily in thick plates, some of which adhere to the trunk at the base for a considerable period. In other trees the bark decorticates entirely. Timber pink or red, fairly dense. The bark is sometimes stripped (for tanning purposes) under the erroneous name of "Silver Mallet," a name more properly applied to *E. falcata*, but it can scarcely be regarded as a true Mallet, for the bark is almost identical with that of the Salmon Gum. Whereas Salmon Gum suckers freely when cut down the Merrit usually dies out, and regenerates from seed.

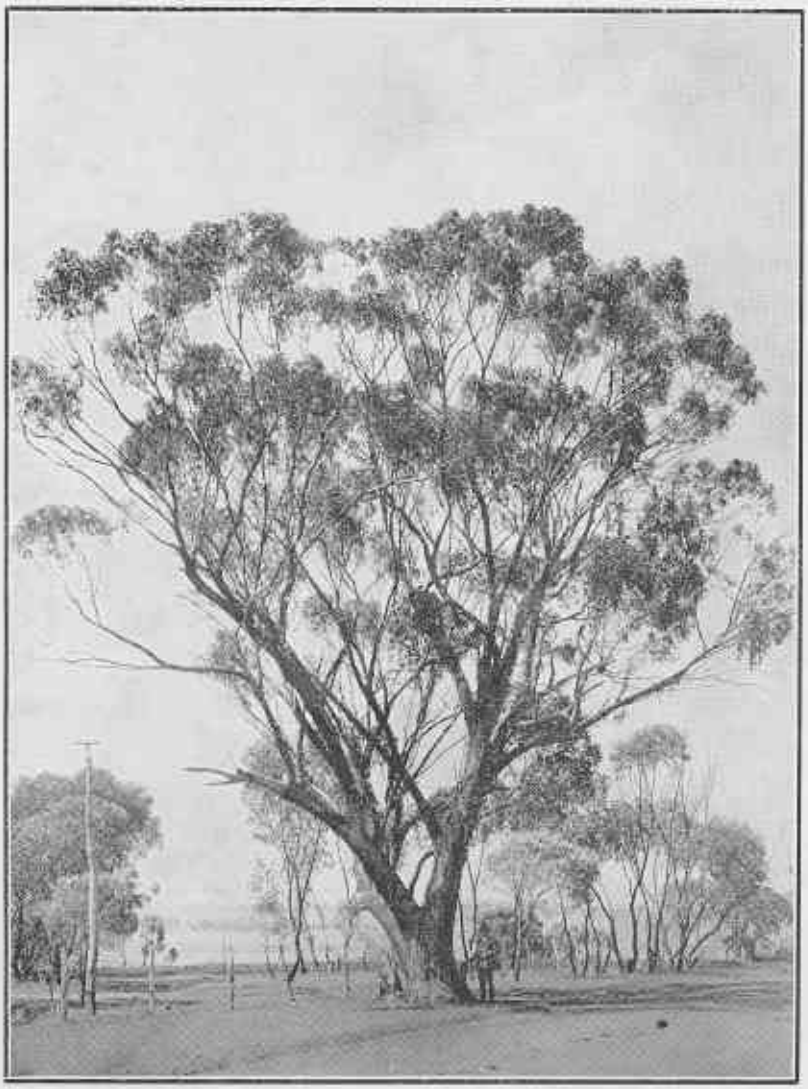
Economic uses.—Has the qualities of Salmon Gum, and is used in building locally, and as mining timber on the goldfields. The bark yields 18.5 per cent. tannins, and is used commercially for tanning, but chiefly as an adulterant with White Mallet.

Habitat.—Eastern Goldfields, southwards from Coolgardie to beyond Norseman almost as far as Esperance, westwards to Ravensthorpe and Kondinin, and indefinitely eastwards to the South Australian border.

Botanical characteristics.—The juvenile leaves are large and bluish-green, ovate lanceolate in shape, opposite, with the margins continued down the stem forming wings (decurrent).

Mature leaves thick, dark green and shining, lanceolate, larger than those of the Salmon Gum, and darker in colour. Flowers yellowish-white, in pendulous umbels of 5-8 on stout terete peduncles. Pedicels shorter than the calyx-tube. Calyx-tube urceolate, or inverted-pear-shaped, in the goldfields specimens narrowed at the orifice, in the Kondinin specimens constricted below the orifice, then expanded. Operculum narrow-conical, tapering to a long point. Style long. Anthers broadly ovate. Fruit urceolate, slightly wrinkled or furrowed, small and inverted pear-shaped in the goldfields trees, urceolate in the Kondinin trees and narrowed or constricted above the middle with a prominent expanded summit, the valves scarcely protruding.

In the field, this tree can only be confused with the Salmon Gum, and the Redwood (*E. transcontinentalis*). It has the habit of the former but may be distinguished by its darker green foliage, striking seedlings, and constructed or urceolate fruits, and from the latter by its perfectly smooth (or usually so) bark, bright green leaves, green *not glaucous* buds and fruits.



E. foecunda, Schau., var. loxophleba.

"YORK GUM."

E. foecunda, Schauer, var. loxophleba, Bentham. (3311 4131) (3312 4141).

Eucalyptus foecunda is a Mallee, the variety *loxophleba* is the common York Gum. It is a tree of from 15 to 35 feet, with a rough grey flaky-fibrous twisted bark on the trunk and smooth greenish-brown branches. The trunk attains a height of 20 feet, is seldom straight, but usually twisted or contorted, with swellings or "knobs" near the base. The bark is closely adherent, and does not strip easily, even in winter. The timber is a pale brown in colour with streaks of white, and is exceedingly hard and dense, the grain closely interlocked.

Economic uses.—This useful timber is used extensively in wheelwright work, particularly in the manufacture of naves and felloes of waggon wheels, on account of its toughness and durability. It does not split.

Habitat.—In the Wandoo forest to the east of the Darling Range from Port Gregory (in the Murchison district), southwards to the Stirling Range, and eastwards through the "Jam" country to Merredin. It is particularly common between Toodyay, York, and Kellerberrin.

Botanical characteristics.—Leaves lanceolate, tapering, slightly undulate, 3-5 inches long, pale green, with prominent irregular oblique veins, a prominent midrib, and the intramarginal vein distant from the edge of the leaf. Peduncles axillary or lateral, terete or nearly so, with a dense umbel of 6-12 flowers. Calyx-tube obconical or almost cylindrical, nearly ¼in. long, bright green. Operculum hemispherical or nearly so, much shorter than the calyx. Stamens inflected in the bud. Fruit narrow-obovoid, slightly contracted at the summit, the capsule deeply sunk.

Its affinities lie with the species, which is known as Red Mallee, with a smooth, or nearly smooth reddish bark, and with *E. incrassata.* It differs from the former in being a rough barked *tree,* and from the latter by the very narrow fruits and short operculum.

E. Foelscheana, F. v. M.—A "Bloodwood." (1124 * 7111) (*7121) (*7131).

A tree of 10-35 feet, with few widely spreading branches. Trunk to 15 feet and 15 inches diameter; bark a light buff colour, or whiter, with purple patches of decorticating bark which are thin, the bark otherwise quite smooth. Timber red, hard and dense. The leaves are a deep shining green, rather rigid.

Economic uses.—A small tree which may be of local use when its unsettled habitat is populated. The bark appears to have the qualities of a good tannin product.

Habitat.—North-West Kimberley, to the immediate south of Admiralty Gulf, from thence to the King Edward River, occurring on hills, usually in basaltic soil.

Botanical characteristics.—Leaves ovate to lanceolate-falcate, attaining seven inches in length, pale green, rigid but drooping, with a prominent midrib, and closely parallel secondary veins. Flowers white, large, in terminal panicles. Calyx-tube turbinate, with a depressed operculum. Fruit urceolate, narrow, smooth, contracted into a short neck, the capsule deeply sunk.

The species has affinity with *E. terminalis, E. latifolia,* and *E. setosa.* It may be distinguished from the first by its smooth bark, wider and more rigid leaves, and has longer fruits. From *E. latifolia* it may be distinguished by its longer narrower leaves, larger flowers and fruits, but it is very closely allied to *E. latifolia.* It differs from *E. setosa* in its total absence of bristly hairs, long petioles, and narrow fruits, and also in many other characteristics.

E. gamophylla, F. v. M. (xxx3 4112) (xxx3 4115).

This species is very little known. It is probably a dwarf tree, and has been described as a shrub, but notes on its habit are missing.

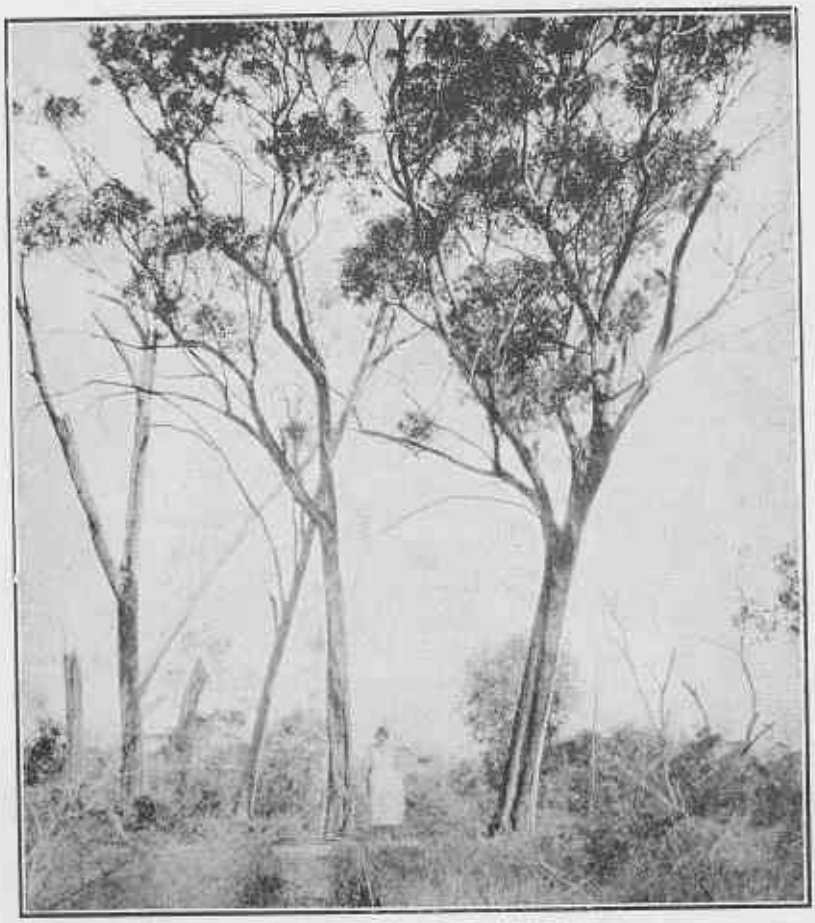
Economic uses.—An imperfectly known, apparently rare species.

Habitat.—It appears to be confined in Western Australia, to the interior North-West. Following are some of the recorded localities:—Hammersley Range, Mt. Pyrton, Harding River, Fortescue River, and the Cavanagh Range.

Botanical characteristics.—Leaves opposite, sessile or connate (connate in the West Australian specimens known), broadly lanceolate, reticulately veined, hoary-white. Peduncles short, terete, bearing umbels of few flowers. Flowers unknown. Fruit cylindrical-campanulate, about ½in. long, with obtuse valves and a concave rim.

It has affinity with *E. perfoliata*, *E. pruinosa*, and *E. melanophloia*. It differs from *E. perfoliata* in its smaller leaves, and smaller, differently-shaped fruits. From *E. pruinosa* to which it is closely allied, it differs in its rather smaller perfectly smooth fruits, but scarcely so, the chief difference being in the anthers. *E. pruinosa* is a tree of the Eastern Kimberleys, known as Apple Gum; *E. gamophylla* has not been recorded from the Kimberley district.

From *E. melanophloia*, which is the Silver-leaved Ironbark of Kimberley, it differs in having larger fruits, and in much wider leaves, and in the more acute operecula. At the same time, it is difficult to distinguish this tree from *E. pruinosa* and *E. melanophloia* in the absence of information concerning its size, habit, and timber.



E. Gardneri, Maiden.
"BLUE MALLET."

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E. Gardneri, Maiden. (1512 4462).

A tree of 30 to 35 feet known as "Blue-leaved, or Blue-topped Mallet." Trunk to 25 feet, and 2 feet diameter, more or less angular, straight and erect; bark fairly thick, but not quite as thick as that of the brown Mallet, decorticating in small thin crisped flakes, silver-grey to silver-brown, very astringent and "gummy." Timber light brown, dense. Leaves about 3½ inches long, bluish-grey, scarcely green, hence the name of "Blue Mallet."

Economic uses.—A small tree with a strong dense timber used for poles and rails, the trunks being remarkably straight in the young trees. The species is valuable as a tannin producer, the bark yielding 22 to 30.1 per cent. tannins.

Habitat.—On gravelly or lateritic rises along the Great Southern Railway between Narrogin and Katanning, eastwards to Lake Yealering and Kondinin, forming thicket-like patches when young, intermixed with the Brown Mallet (*E. astringens*).

Botanical characteristics.—Juvenile leaves ovate, petiolate, glaucous, with fairly distinct veins, the intramarginal one removed from the edge. Mature leaves bluish-green, or almost slate-blue, lanceolate, about 3½ inches long and ¾ inches wide, acute, without conspicuous veins. Peduncles flattened, with an umbel of 6 to 10 flowers, on short almost terete pedicels. Operculum narrow-conical, very acuminate, usually with a slightly hooked point. Anthers versatile. Fruit elongated pear-shaped or cylindrical, nearly ½ inch long, slightly contracted at the orifice, the valves not protruding.

The species may be at once distinguished by its blue-coloured leaves. It has affinity with the Wandoo (*E. redunca*, v. *elata*) and the Brown Mallet (*E. astringens*) differing from the former chiefly in the bluish foliage, thinner astringent bark, and more slender habit, also in the dark-coloured bark. From the latter it may be separated by its blue-coloured leaves, thinner and more grey bark, narrow buds, acute opercula, and different fruits.

E. gomphocephala, D.C.

"TUART."

E. gomphocephala, A. D. C.—"Tuart." (4211 3411).

A tree attaining a height of 130 feet, with a trunk of up to 45 feet in height and 6 to 8 feet diameter. Bark light, of an ashy-grey, fibrous, close and dense, persistent throughout, even to the branchlets. Timber pale-coloured, almost yellow, very hard, dense, and strong, with an interlocked grain.

Economic uses.—The timber is commercially valuable and stronger than that of the Wandoo. It is used for wheelwright purposes, especially in large waggons and whims, and in railway waggon and truck construction. It turns well in the lathe, and the smaller pieces are extensively used in articles which require special strength and toughness, such as pins for telegraph insulators. Tuart is one of our most valuable timbers.

Habitat.—Confined (as far as we know) to the narrow coastal limestone strip which extends from the Arrowsmith River in the north to the Sabina River near Busselton, in sandy loam overlying limestone, and forming the Tuart forest of a narrow, but varying width.

Botanical characteristics.—Leaves ovate-lanceolate to lanceolate, 5 to 7 inches long, acuminate, rarely straight, the venation scarcely conspicuous. Peduncles thick and rigid, flattened, almost wedge-shaped, with 4 to 6 flowers sessile, or almost so. Calyx-tube obovoid, nearly half an inch long. Operculum almost globular, or ovoid, about half an inch in diameter and overhanging the calyx at the base. Anthers oblong, flowers white. Fruit campanulate, or bell-shaped, nearly ¾ inch long, with a prominent rim and flat top, but rather variable in shape.

The species has several affinities, but no very close ones with which it is likely to be confused, excepting *E. Mundijongensis,* a species of which only one tree has been seen (*see E. Mundijongensis*).

Around the Vasse district a hybrid is seen (*Euc. gomphocornuta*), which has both the characteristics of Tuart and Yate, but more of those of the Tuart. The branchlets are inclined to be smooth, and the fruit is shortly conical at the summit instead of flat, and the operculum is more acute.

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E. gracilis, F. v. M. (3332 6111) (3332 4111).

Variously known under the names of Yorrell, Black Morrel, Black Yate, and Blackbutt. A tree of up to 30 feet, with a short stout trunk and widely spreading branches. Leaves small, dark green. Trunk to 18 inches diameter. Bark on the lower and greater part of the trunk dark grey, or almost black, thick and flaky, readily separating in large flakes, that of the upper trunk smooth, brownish-grey, thin, with long streaks of darker grey bark, and often ribbony about the forks of the branches. Flowers small, white. Timber deep brown, hard and dense, strong, but the species usually eaten by termites.

Economic uses.—The timber is strong, dense and very hard. Unfortunately it is attacked by termites, and therefore of little use when mature. The young trees are used extensively for poles, shafts of vehicles, and swingle-trees in agricultural implements, being much stronger than Salmon Gum or Red Morrel.

Habitat.—Over the Goldfields districts and Eastern Avon district as far west as Tammin and Korrelocking, southwards to Harrismith near Narrogin. Occurs intermixed with the Red Morrel and Salmon Gum.

Botanical characteristics.—Leaves small narrow-lanceolate, shining, acuminate, more or less hooked at the apex, veins inconspicuous, copiously oil-dotted. Umbels axillary and terminal, slender. Calyx-tube narrow-cylindrical, the operculum much shorter, depressed-hemispherical. Fruit small and narrow.

Its affinity lies with *E. calycogona* and with *E. celastroides*. From the former it differs in being a tree with a more or less stout trunk, whereas *E. calycogona* is a Mallee with angular fruits; those of *E. gracilis* are smooth. From *E. celastroides* it differs in its shiny leaves (those of *E. celastroides* are glaucous). The fruits, too, are smaller, and not angular. *E. celastroides* is also a tree.

E. grandifolia, R. Br. (54x4 7121).

A small tree with the outer bark brown and flaky, deciduous, the inner bark whitish and very smooth. The butt covered with flaky bark, the upper parts smooth. The layers of bark are of a papery consistence, more or less wrinkled. Leaves (juvenile) up to 16 inches long. Mature leaves 4 to 8 inches long, smooth, (*8281).
from ovate to ovate-lanceolate, distinctly veined.

Economic uses.—A little known tree useful as a shade-bearer, but too small to possess any value as a timber tree.

Habitat.—Sparsely found in the West Kimberleys, between the Lennard River and Synnott Ranges.

Botanical characteristics.—This is one of the tropical species with large spreading pale green leaves, so unlike the usual type of Eucalyptus leaf that one has to look into the flowers to be sure that it belongs to the genus Eucalyptus. It is closely allied to *E. clavigera*, having the same spreading habit and shady crown, but whereas *E. clavigera* has to a certain extent hairs upon the leaves, this species is glabrous. The fruits too are larger, and so are the flowers.

E. Griffithsii, Maiden.

"GREY GUM."

E. **Griffithsii**, Maiden—"Grey Gum." (3212 8211) (3212 8281) (3232 * 8211)

A tree of 30 to 40 feet, seldom with a straight trunk of 10 to 20 feet, and a diameter of 20 inches. Bark ashy-grey, but loosely fibrous, scarcely flaky on the trunk, the branches smooth or nearly so, with a brownish bark. Timber reddish-brown.

Economic uses.—This timber is only used for firewood.

Habitat.—From Kurrawang, near Coolgardie, southwards to Norseman, usually on red loamy flats, particularly common around salt lakes. It is used for firewood on the mines.

Botanical characteristics.—Leaves narrow-lanceolate to lanceolate, pale yellowish-green, with a distinct midrib, but scarcely obvious lateral veins. Flowers axillary or lateral in umbels of a few (usually 2 to 3) flowers. Buds flat-topped with a depressed-hemispherical somewhat ribbed operculum. Calyx-tube obovoid, smooth but rather acutely 2-angled, yellowish-brown. Flowers yellowish-white. Fruit obconical or almost campanulate, but not expanded at the top, with a flat summit and two prominent angles down the sides.

Its affinities lie botanically with *E. corrugata, E. incrassata,* and *E. campaspe,* but it is hardly likely that it will be confused with these species in the field. *E. corrugata* is smooth-barked, erect, with only a short butt of flaky bark, *E. incrassata* is a Mallee and *E. campaspe* is a Gimlet. It might be mistaken for the Morrel form of *E. oleosa,* but has larger buds and fruits, and smooth 2-angled calyx and obtusely ribbed opercula are quite sufficient to distinguish this tree from all others on the Goldfields.

Eucalyptus Guilfoylei, Maiden.
"YELLOW TINGLE TINGLE."

E. Guilfoylei, Maiden—"Yellow Tingle Tingle." (4311 6111) (4311 6411).

A tree of 80 to 120 feet in height and up to four feet diameter. The bark is much the same as that of the Jarrah (*E. marginata*) closely fibrous and stringy, dark brownish-grey, persistent throughout, except the branchlets. Leaves dark green, straight or nearly so, flowers white.

Economic uses.—Timber yellow, exceedingly hard and dense and very durable, but splits well. It has the qualities of Tuart but is straight-grained.

Habitat.—Denmark, and westwards to the Shannon River, plentiful around the lower Frankland River, mixed with Red Tingle Tingle and Karri, but is more characteristic of hills than of valleys.

Botanical characteristics.—Juvenile leaves paler below than above, ovate-acuminate, twice as long as broad, the midrib channelled above, petiolate, with parallel veins. Mature leaves rather thin, broadly lanceolate, up to 6 inches in length, with a prominent midrib, but scarcely obvious secondary veins, the intramarginal vein very close to the margin or marginal. Flowers in terminal panicles, with very angular or flattened branches. Flowers in umbels of 4 to 7, on a flattened peduncle, nearly sessile, the calyx-tube cylindrical, with two or three prominent angles. Operculum short, hemispherical. Anthers reniform, the filament at the base with the gland on top, opening horizontally along the base of each cell. The anther is not versatile. Fruit obovoid-truncate, with one or two angles, sometimes quite smooth, not ½' inch long, the points of the valves not protruding.

Botanically it is allied to the Karri and Blackbutt. The fruits are much like those of the Karri, but shorter, but the anthers are very different, and it is a rough-barked tree. The juvenile foliage of the Blackbutt is sessile or stem-clasping; the buds are not angular, and there are distinct pedicels. The bark of the Blackbutt is thicker and more spongy, and much more deeply furrowed. The anthers of the Yellow Tingle are quite distinct from either.

In the field the Yellow Tingle Tingle might easily be confused with either the Red Tingle Tingle or the Jarrah, but can be distinguished at once by its yellow timber.

E. haematoxylon, Maiden—"Mountain Marri." (4321 * 2121) (*2131) (*7121) (*7131).

A tree of 30 to 40 feet and up to 18 inches diameter, of a rather stunted nature. The bark is similar to that of the Marri, *i.e.*, persistent, with flakes of a deep reddish external bark and slightly furrowed. The timber is red with kino cavities, but soft. The flowers are white, and the fruits roughly globular.

Economic uses.—Not a common species, of scattered distribution, and not used commercially at the present time.

Habitat.—Jarrahwood, Yallingup, and the Nannup district, in lateritic soil on hills.

Botanical characteristics.—Juvenile leaves lanceolate to broadly-lanceolate, purplish, petiolate with thickened margins, containing caoutchouc. Mature leaves smaller than those of the Marri, but much of the same shape, rigid, and the same colour on both sides, 3 to 4 inches long. Flowers in a corymb as in the Marri, but with flattened peduncles and pedicels. Operculum shortly pointed. Fruits ovoid to nearly spherical, much contracted at the apex with a small orifice, a little over an inch long, the capsule deeply sunk.

The species is found mixed with Marri which it closely resembles. It may be distinguished from it, however, by the red timber (Marri has a pale yellow timber), smaller leaves, smaller fruits usually without any "neck." It also has affinity to *E. ficifolia*, but does not occur in the same district; the timber is of a different colour, and the flowers are white, not scarlet.

E. Houseana (W. V. F.), Maiden—"Kimberley White Gum." (1124 8412).

A tropical species; a robust tree of 30 to 60 feet with numerous erect or spreading, occasionally almost pendulous, branches. Bark quite white and smooth, decorticating in large thin flakes. Trunk to 30 feet and 30 inches diameter, usually swollen at the base into a pedestal-like butt. Timber pink to red in colour, fairly hard and dense, with kino-ducts. Leaves whitish, flowers yellowish-white.

Economic Uses.—This tree inhabits country at present inhabited by savage natives. It must be regarded as one of the principal timbers of the Kimberleys, being tough and strong, and appears to be free from termite attacks. The trunks are among the largest of the Kimberley trees.

Habitat.—Northern Kimberley district, Northwards from the Charnley River to near Napier Broome Bay, along the banks of streams and rivers, and in swampy places in the sandstone formations.

Botanical characteristics.—Leaves from ovate to lanceolate, alternate, on fairly long stalks, glaucous on both sides, the venation prominent, 3 to 6 inches long. Peduncles axillary or lateral, rather flattened, bearing closely sessile umbels of 4 to 8 flowers. Calyx-tube obconical or turbinate, rather angular; operculum hemispherical, shorter than the calyx-tube, anthers oblong, with parallel cells. Fruit broadly turbinate, slightly 2- or 3-angled, the rim rather narrow but prominent, the capsule slightly sunk, the points of the valves not protruding. The fruit is not more than ¼in. long.

The species has affinity with *E. alba*, with which it might be confused, but the foliage is glaucous, almost white, and not the beautiful pale green of *E. alba*. The young leaves on the branchlets are sessile and cordate, while those of *alba* are not so at any stage of their development. The two species occur together on the Drysdale River.

E. intertexta, R. T. Baker—A "Blackbutt." (·2422 2152) (2422 6152).

A tree of upwards of 80 feet in height, and about 3 feet in diameter. The bark is smooth nearly to the ground, the butt has a hard persistent bark extending for a few feet up the trunk, the smooth bark has patches or spots, and varies in colour from a brown to a light grey, or sometimes it is a dead white. Leaves of a pale yellowish-green or bluish-green.

Economic uses.—This species is too rare in Western Australia to be of any commercial value.

Habitat.—It is only known, in Western Australia, from the Cavanagh Range, where it is a dwarf tree at an elevation of 2,500 feet. The above notes on habit are taken from trees in other States. It may not attain the same proportions in Western Australia. **The timber is reddish.**

Botanical characteristics.—Juvenile leaves similar to the mature ones but inclined to be broader. Mature leaves lanceolate, acuminate, usually under 6 inches long, not shining, the lateral veins divergent, not prominent, the intramarginal veins near the edge. Flowers mostly in small terminal panicles; pedicels and peduncles slender. Calyx small, narrow-obconical; operculum shortly conical, much shorter than the calyx-tube. Anthers oblong. Fruits ovoid to obovoid, with a thin rim, narrowed at the top, about quarter of an inch long and nearly as broad.

The affinity of this species lies in *E. accedens*, but it is a tree of the arid interior and has a red timber.

Euc. Jacksoni, Maiden.
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E. Jacksoni, Maiden.—"Red Tingle Tingle." (·4321 1141).

A tree of upwards to 230 feet, erect, with a long trunk which attains a diameter of 15 feet at a height of 5 feet from the ground, and one tree measured 66 feet in circumference at the base. The base of this tree is often bottle-shaped to a slight extent, but assumes a normal diameter at a height of about five or six feet. The bark is a reddish-grey, very fibrous, rather stringy, narrowly fissured, and much like that of the Jarrah, but not quite so close. It is persistent throughout. The flowers are white (or said to be so). Timber red, much like Jarrah, but lighter.

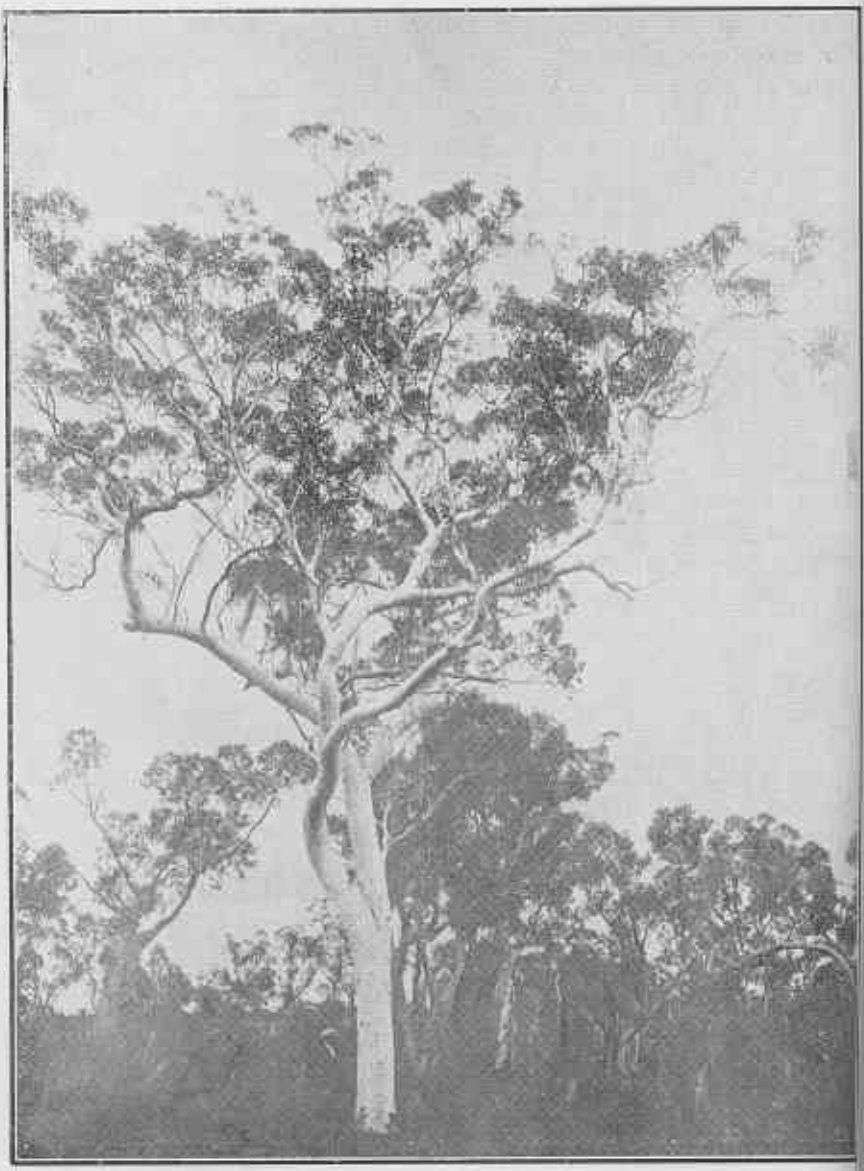
Economic uses.—A timber closely resembling Jarrah but lighter in weight. Up to the present it has not been put to any extensive use, but appears to be eminently suitable for furniture and other purposes where lightness, strength and appearance are required.

Habitat.—Forms high and dense forest in the 50 inch rainfall zone around Nornalup Inlet, in a red rich loam, somewhat gravelly, or a sandy surface soil. Other localities are:—Deep River, Bow River, Irwin Inlet, and to 10 miles up the Frankland River. The timber has qualities which highly recommend it for use where Jarrah is rather heavy, such as furniture and fittings. It is also a good structural timber.

Botanical characteristics.—Juvenile leaves nearly orbicular to broadly lanceolate, rather oblique or uneven, paler below than above, with abundant oil-dots and the intramarginal vein well removed from the margin. Mature leaves the same colour on both sides, petiolate, broadly lanceolate, with parallel lateral veins, and fairly well oil-dotted, about 3½in. long. The mature buds have not been seen, but are rather like those of the Jarrah, although the operculum is blunt, and shorter than the calyx-tube. Fruits rather like those of the Jarrah, but much smaller, almost spherical, a little over ¼in. across.

The species closely resembles the Jarrah, Blackbutt and Yellow Tingle Tingle. It may be distinguished from the Jarrah, which it most closely resembles, by its much larger size, smaller leaves and fruits. From the Yellow Tingle it can be readily distinguished by the red timber, the fruits are more spherical, not narrow, with a short but distinct pedicel, and it is a larger tree with a closer bark.

It may be distinguished from the Blackbutt (*E. patens*), which it also closely resembles, by the colour of its timber, much larger proportions, darker green leaves, and by the fruits.



Eucalyptus Lane-Poolei, Maiden.

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E. Lane-Poolei, Maiden—"Powder-bark, or Salmon-White Gum." (1121 5211) (1121 5241).

A tree of 30 to 40 feet, and up to 12 inches in diameter or more, with a short trunk, usually twisted or contorted, and a smooth pinkish-yellow bark covered with a pinkish powder, and small crisped flakes of a reddish-brown decorticating bark. Timber reddish-brown, more red than brown, with an interlocked grain. Leaves rather small, dark green, in a fairly dense crown; flowers yellowish-white.

Economic uses.—A small tree not commercially used. The timber is strong and hard.

Habitat.—Armadale to North Dandalup, extending along the base of the Darling Range in yellow sandy gravelly soil. It is fairly common in a narrow strip between the Jarrah-Wandoo, and Tuart forests, on both sides of the railway line.

Botanical characteristics.—Juvenile leaves petiolate, of a lanceolate shape, one-coloured, more or less having a 3-veined appearance. Mature leaves lanceolate, acuminate, rather falcate or sickle-shaped, about 4 inches long and narrow, almost parallel-veined, the intramarginal vein almost marginal. Peduncles axillary or lateral, round, about ½in. long, bearing an umbel of 4 to 6 rather large flowers on round stalks. Calyx-tube nearly hemispherical, with two obtuse ridges about ½in. diameter. Operculum hemispherical, obtuse, without a terminal point. Stamens inflected in the bud, with large anthers opening in parallel slits. Fruit hemispherical, nearly ½in. diameter, with a broad slightly domed top and conspicuously exserted valves.

From its situation, it can only be confused with the Wandoo and Powder-bark Wandoo, from both of which it differs in its red timber, obtuse, nearly globular buds, and hemispherical fruits. Otherwise it has botanical affinities with *E. oleosa, E. Oldfieldii, E. Drummondii,* and *E. campaspe.*

E. latifolia, F. v. M. (·1124 2132) (·1124 2152).

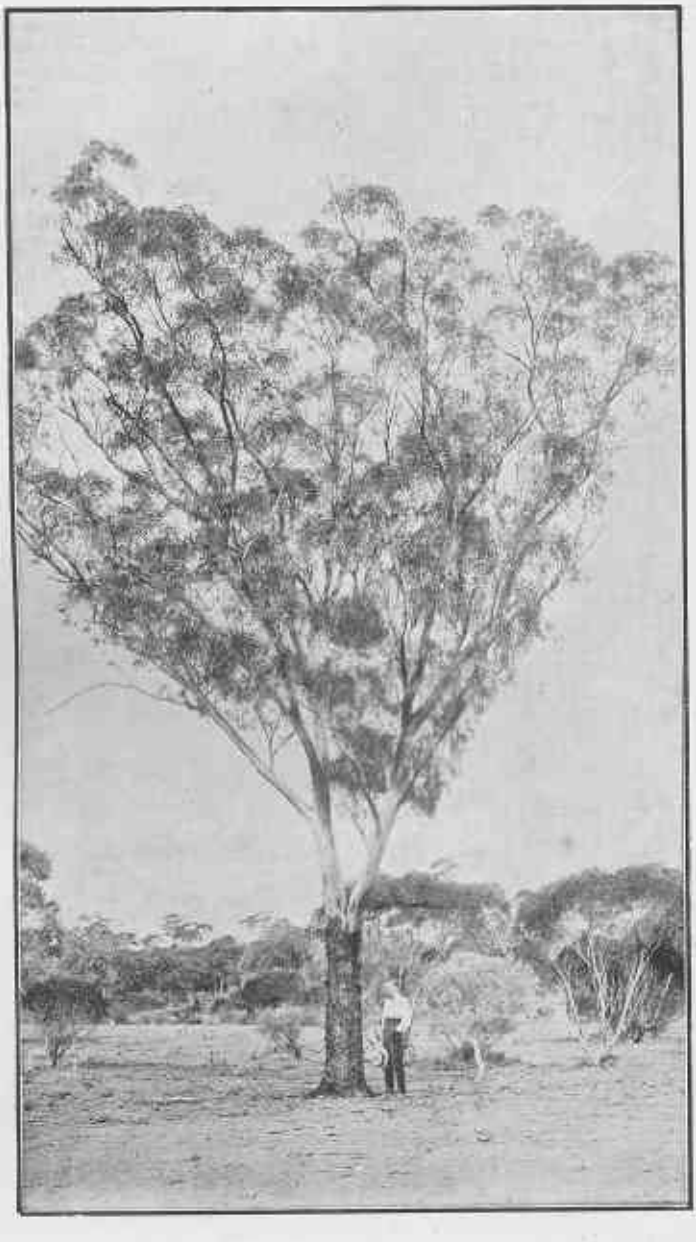
Locally called a Bloodwood, but with a smooth bark. A robust tree of 30 to 50 feet, with an erect trunk, and widely spreading branches. Trunk to 25 feet, and up to 20 inches diameter, the bark yellowish-pink in colour, or almost pure white, speckled with flakes of a purple-grey colour. Timber dense, pinkish-red, hard and tough. Leaves greyish-green, wide. Flowers white.

Economic uses.—Inhabits unsettled country, and has not been used up to the present.

Habitat.—Confined to the Kimberley district in Western Australia, and to the central regions about Mount Hann.

Botanical characteristics.—Leaves alternate (usually), petiolate, ovate, obtuse. with widely spreading parallel secondary veins, pale green, 3 to 4 inches long. Peduncles terete, the flowers arranged in a broad terminal panicle. Pedicels terete also, shorter than the calyx-tube. Calyx-tube broadly turbinate, not ½in. in diameter; operculum very short, almost hemispherical, but with an obtuse point. Fruit urceolate-ovoid, abruptly narrowed at the base, tapering towards the apex, with a slight neck, smooth, the rim narrow and prominent, the capsule deeply sunk, the valves totally included. Seeds winged.

This species is closely related to *E. Foelscheana* and *E. dichromophloia,* differing from the former in its wider obtuse leaves, the fruits smaller and not tapering at the base into the foot-stalk. From *E. dichromophloia* it differs in its perfectly smooth whitish bark, much wider obtuse leaves (they are narrow and tapering in *E. dichromophloia*), but the fruits are very similar.



E. Le Souefii, Maiden.

"GOLDFIELDS BLACKBUTT."

E. Le Souefii, Maiden. (·2412 5281).

A Goldfields "Blackbutt." Attains a height of from 30 to 50 feet, with a comparatively short trunk and erect or scarcely spreading branches and an obconical outline, or flat top. Trunk to 2 feet diameter. Bark flaky at the butt, the upper portions smooth, of a deep yellowish colour, or rarely a silvery yellow. The bark of the butt is dark brown, thick and hard, composed of persistent flakes of thick bark, which envelop the trunk from anything up to 7 feet from the ground. Timber light brown, dense and very hard. Leaves dull green, flowers yellowish-white.

Economic uses.—A tree which suffers considerably from the ravages of termites, seldom being found sound when mature. It is consequently only used for firewood.

Habitat.—Goldfields districts, from west of Broad Arrow southwards to Higginsville, near Norseman, and westwards to near Karalee. The trees occur in a red loamy soil, forming open forests with Salmon Gum and Morrell.

Botanical characteristics.—Juvenile leaves on angular branchlets, ovate-lanceolate to ovate, glaucous, thick and coarse, with spreading venation, the intramarginal vein removed from the edge. Mature leaves lanceolate, petiolate, about 4 inches long, coriaceous, thick, the same colour on both sides, the midrib prominent, and the intramarginal vein distinct from the edge. Peduncles axillary, flattened, but only slightly so, bearing a dense umbel of up to 7 flowers on very short pedicels. Calyx-tube widely campanulate, obtusely ribbed, the operculum broadly conical, longer than the calyx-tube and broader than it at the base.

The species has affinity to *E. corrugata, E. goniantha,* and *E. Griffithsii,* differing from the first in the pointed operculum, in being a larger tree with a yellowish bark, and in the operculum being greater in diameter than the calyx. *E. goniantha* is not a large tree, but a Mallee or shrub. *E. Griffithsii* has a rough grey bark, a smooth calyx, and very flat obtuse operculum. The closest affinity of *E. Le Souefii* is that of *E. Clelandi,* another Blackbutt, which it closely resembles, although the latter has a whiter bark, very little butt, and the twigs are powdery-white; *E. Le Souefii* is not. The buds and fruits of *E. Clelandi* are narrower than those of *E. Le Souefii,* and the fruit is scarcely ribbed, while that of *E. Le Souefii* is deeply ribbed.

E. lirata (W. V. Fitzg.), Maiden. (·4334 44x2).

A tree of 30 to 40 feet with a trunk of up to 15 feet, and 12 to 18 inches diameter. The bark is rough and greyish, but soft and rather loose, easily broken, persistent on the trunk and branches. Timber brown, rather hard, and free in the grain.

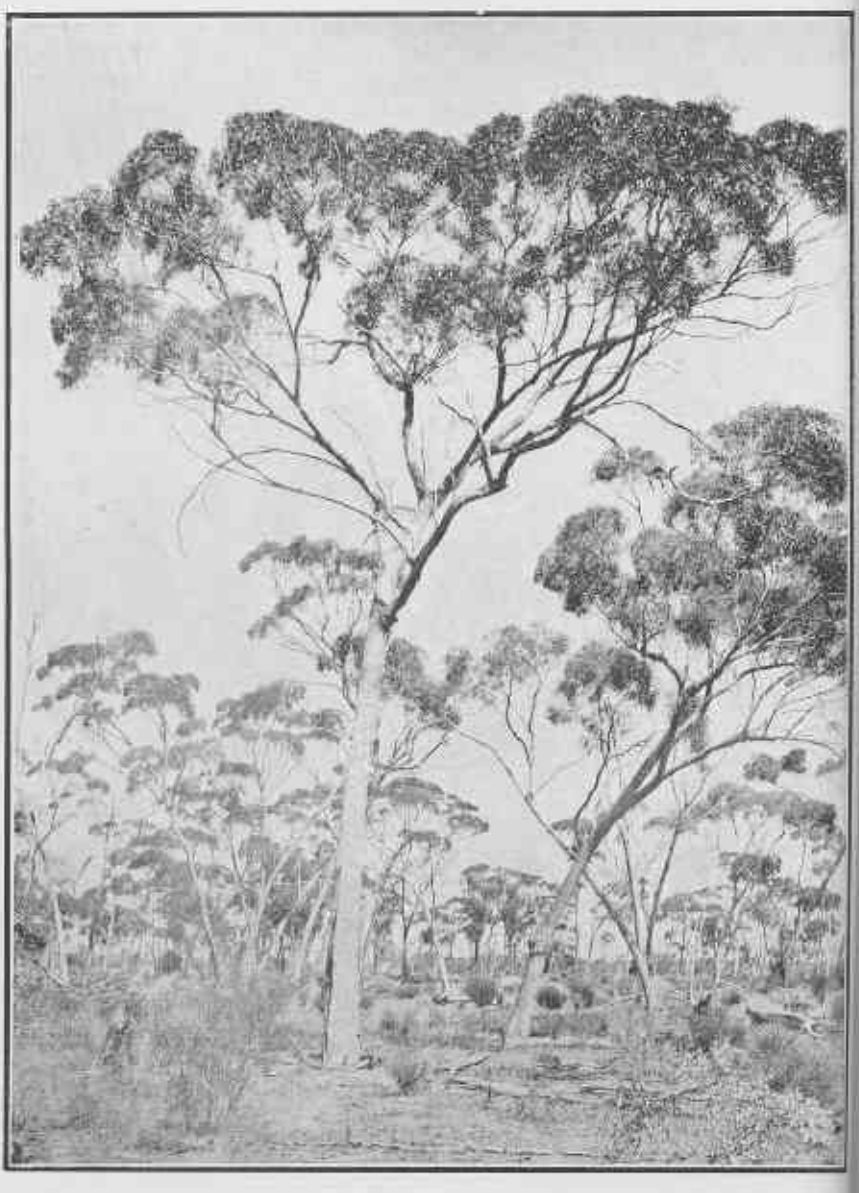
Economic uses.—A rare and imperfectly known species.

Habitat.—This is a Kimberley tree, and is only known from the locality where Mr. Fitzgerald collected it, viz., summit of Bold Bluff, a mountain in the King Leopold Range not far from the Isdell River.

Botanical characteristics.—Leaves opposite or alternate, straight or curved, acuminate, petiolate, dull greyish-green on both sides, with crowded oil-dots and inconspicuous veins, the intramarginal one not far removed from the edge. Fruits 3 to 5 together, on short pedicels, on terete axillary or lateral peduncles, ovoid-oblong, the rim thin, the capsule sunk, with 3 triangular partially exserted valves.

The flowers and buds are unknown.

It has no close affinities in Western Australia, and the information we have concerning this tree is very scanty. The leaves are 3-4 inches long, on petioles of nearly ½in., peduncles ½ to ⅝in. long, fruits nearly half an inch long, and over ¼in. across at the base.



E. longicornis, F. v. M.
"RED MORRELL."

E. longicornis, F. v. M.—"Red Morrell." (·3322*1351) (*1361) (*2351) (*2361).

A tree of 60 to 80 feet with an erect long trunk and widely spreading umbrella-like branches. Bark persistent upon the trunk, dark grey, furrowed, closely fibrous and tough; that of the branches reddish-grey, thin and smooth. Timber red. The leaves are rather small, bright green and copiously oil-dotted. The flowers are small and white.

Economic uses.—Used for wheelwright work, and for building and general work in the agricultural areas, also as a mining timber on the goldfields. A fine timber quite worthy of more extensive use.

Habitat.—From Mullewa southwards through Goomalling and Narrogin to near Cranbrook, thence eastwards to the Eastern Goldfields over a very wide tract of country embracing all the wheat lands of the eastern districts. In the Gnowangerup district it is known as Poot, in the Avon and Northam districts as Morrel, and on the goldfields as Red Morrel—a name which appears to be most satisfactory, as there are other trees of the same habit which have not got a red timber, among which it grows, always on a rich clayey loam, on flat or gently undulating country.

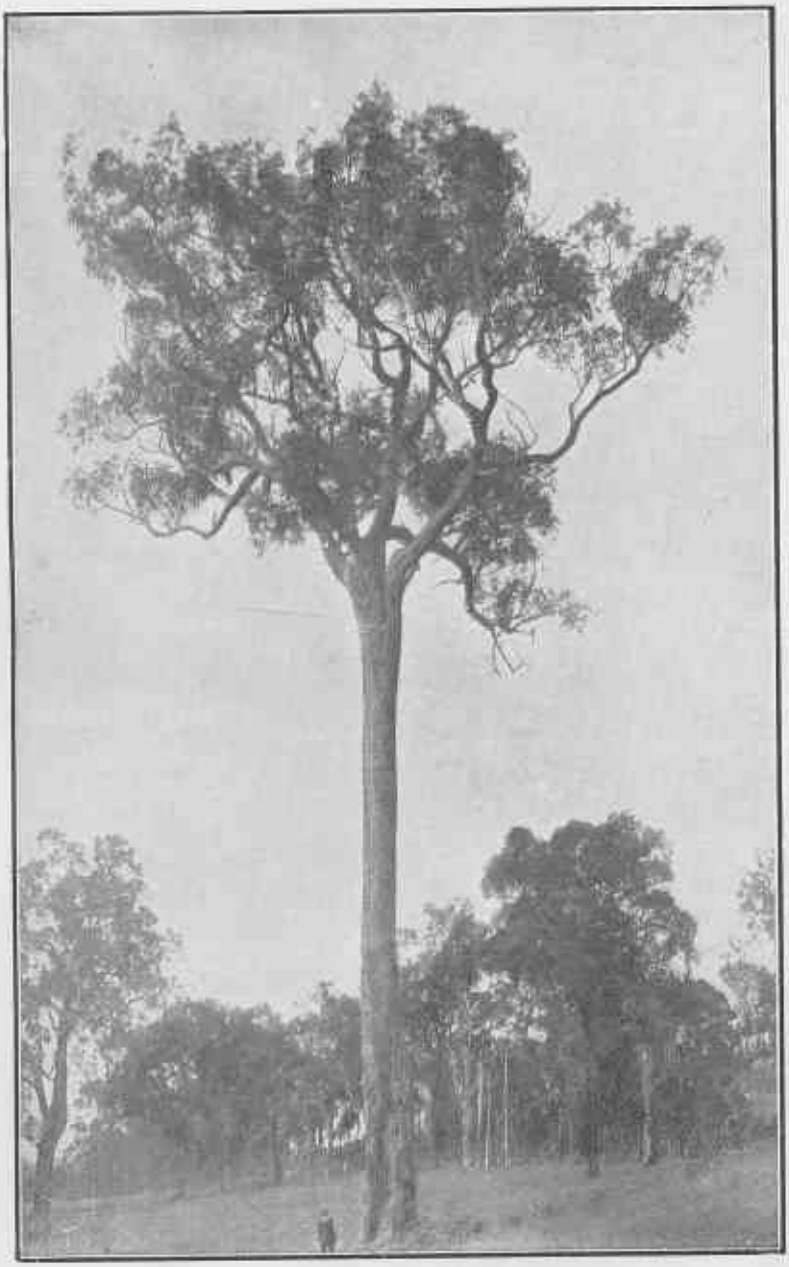
Botanical characteristics.—Juvenile leaves opposite, very glaucous, on quadrangular stems, almost sessile crowded and decussate, terminating in a small curved point, copiously oil-dotted, 1 to 1½ inches long, the venation not very distinct. Mature leaves narrow-lanceolate, acuminate, petiolate and shining, 4 to 5 inches long, the midrib alone conspicuous. Peduncles slender, slightly angular, about ½ inch long with usually 4 to 8 flowers on slender pedicels of about ¼ inch. Calyx-tube ovoid-truncate or almost hemispherical, tapering into the pedicel. Operculum much longer, narrow-conical, usually more than twice as long as the calyx-tube, and brown. Flowers yellowish-white, the stamens inflected in the bud, the anthers broad, thick and white, opening in slightly oblique slits. Fruits ovoid-truncate or almost globose, the rim flat or concave, narrow, the capsule deeply sunk with long slender needle-like points to the valves, much protruding, and formed of the split base of the style.

It has affinity to the Salmon Gum, Black Morrel, *Eucalyptus oleosa* and *E. leptophylla*. From the Salmon Gum it may be distinguished by its rough bark on the trunk, the longer operculum and larger fruits.

The tree is very similar to the Black Morrel (*E. melanoxylon*), but the bark is lighter in colour, not so deeply furrowed, and the timber is red, not dark brown. The bark is red or pinkish in fracture.

From *E. oleosa*, which is sometimes also a tree, it may be distinguished by the long and pointed operculum, and larger fruits. The operculum of *E. oleosa* is not acute and of about the same length as the calyx-tube.

The Red Morrel has a certain affinity to *E. leptophylla* which, although a shrub in most cases, may be seen as a small smooth-barked tree around Southern Cross. The bark of *E. leptophylla* is thin, smooth and white, and the timber light brown. The operculum of *E. longicornis* is longer, and the valves more exserted. We have not included *E. leptophylla* among the list of trees, as it is almost always a Mallee or shrub. It is only on the goldfields that it attains the proportions of a small tree, and then only in a few places, *e.g.* Southern Cross and Parker's Road.



E. marginata, Sm.

"JARRAH."

E. marginata, Smith—"Jarrah." (·4321 1153) (4321 1163).

This is the principal timber tree of Western Australia. It is a large tree of 100-130 feet, with a straight trunk of 50 to 60 feet and a diameter of 6 feet. The bark is rough, persistent, reddish-grey, close, stringy and flat with small fissures. The stringy-fibrous character of the bark renders it distinct from all South-Western trees except the Albany Blackbutt and the Red Tingle Tingle, which have also fairly stringy barks, although not as tough as the Jarrah.

Economic uses.—Jarrah is the principal timber tree of the State. In the early days of the colony it was known as Mahogany, owing to its resemblance to that timber. It has a hard, dense, easily worked timber, very durable even when exposed to the worst conditions, and is therefore useful for almost every purpose. Jarrah is used extensively in building, sometimes whole houses are built solely of this timber, and it is also used for harbour work, sleepers on the railways, flooring, beams, cabinet work, and wood block paving. It is particularly suitable for interior decorations, such as panelling and office fittings. It will be seen, therefore, that its uses include the whole gamut from paving to wood-carving. It has a world-wide reputation.

Habitat.—Its typical habitat is the South-West, extending from Gingin southwards to Albany, principally on the lateritic hills of the Darling Range, as far east as the 20-inch isohyet which sweeps eastwards to the south of the Stirling Range. The largest trees occur between the Collie and Warren Rivers, and become smaller to the east of the Kent River, being reduced to typical Mallees on the mountains of the Stirling Range, and small crooked trees on the plains to the south. The best trees thrive in lateritic gravelly soil. A small isolated patch of this timber occurs in the Kondinin district, about 60 miles east of the eastern margin of the forest.

Botanical characteristics.—The species is too well known to need any description here. The juvenile leaves, however, may be described as follows: Cotyledon leaves orbicular-reniform, about 1½ inches across, on petioles of seven-eighths of an inch. The next leaves are opposite, ovate-lanceolate, a little over 1 inch long, thin and slightly oblique, glabrous, sessile, with a conspicuous midrib, and widely spreading irregular veins. Sometimes the cotyledon leaves are obcordate, or indented at the top, and the petioles may be over an inch in length.

The mature leaves are ovate-lanceolate, or lanceolate, 3-5 inches long, pale green but not glaucous, slightly darker green above than below.

The flowers are in small slender umbels on slender pedicels, and the operculum is conical. The stamens are not inflected in the bud. Fruit almost globose, ½ inch diameter or more, pale brown, smooth, the rim flat and rather broad, overhanging the somewhat depressed capsule, the valves short and obtuse. Seeds black and shining, somewhat 3-angled, and about ¼ inch long.

Its affinities lie with the Blackbutt (*E. patens*), the Albany Blackbutt, and the Red Tingle Tingle. The Blackbutt has a thicker, more friable bark, which is paler in fracture and more deeply furrowed, smaller more glaucous leaves, smaller fruits which are more ovoid and have a much narrower, more prominent rim. The Blackbutt grows in a sandy soil, usually on flats, and the timber is yellowish.

The Red Tingle Tingle is a much larger tree with an almost identical timber and bark, but the bark is looser, and the fruits are smaller. The opercula are more obtuse and shorter, and the fruits are only about half the size. This tree is perhaps the closest relative of the Jarrah, but its habitat is more restricted (see *E. Jacksoni*).

The so-called Albany Blackbutt is very similar to the Jarrah, but may be distinguished by its larger, thicker leaves, much larger buds and fruits, and paler yellow timber.

Eucalyptus megacarpa, F. v. M.
"BULLICH."

E. megacarpa, F. v. M.—"Bullich." (·1111 1231).

An erect tree of 40-80 feet with a tall trunk of up to 35 feet and erect branches. Trunk to 3 feet in diameter. Bark perfectly smooth, pure white or yellowish-white, not very thick, with a few streaky patches of grey decorticating bark. Timber yellowish, dense, strong and hard. Leaves bright green, flowers large, yellowish-white.

Economic uses.—A strong, free-grained pale timber. Has not been put to any commercial use apart from the manufacture of a small amount of furniture locally.

Habitat.—Swampy lands, in moist sandy loam with Blackbutt and Swamp Banksia (*B. littoralis*) southwards from the Mount Dale district to Albany, and eastwards to the Porongorup Range. In the last-named place it occurs on the crests of the mountains, and it occurs as a Mallee with a larger fruit on the summits of the Stirling Range.

Botanical characteristics.—Leaves lanceolate (broadly or narrowly), falcate, acuminate, 4-6 inches long, thick, with irregular veins which are not conspicuous. Pedunces axillary, lateral or terminal, thick and flat or angular, each bearing a few sessile flowers. Calyx-tube broadly turbinate under ½in. long, with the margin prominent in the bud. Operculum widely conical. Stamens about ½in. long, with anthers inflected in the bud, ovate-oblong, with parallel cells. Fruit broadly campanulate or depressed-globular, with a domed summit, with thick incurved horn-like valves which almost meet in the centre.

The species has no close affinities. The large fruits (nearly 1 inch across) and horn-like valves are unique among the timber trees of the South-West. It has affinity to the Blue Gum of the Eastern States.

E. melanophloia, F.v.M.—"Silver-leaved Ironbark." (·4334 6152) (·4334 6252).

A small tree of 10-25 feet of spreading habit, with a short stout trunk of about 10 feet and widely spreading rigid branches. Bark grey, rough and persistent throughout, fibrous, more or less fissured on the trunk, almost identical with that of the common Kimberley Grey Box (*E. Spenceriana*). Trunk to 12 inches diameter, the colour usually a light grey. Timber dense, reddish-brown, very hard and durable. Leaves silvery-grey.

Economic uses.—The Silver-leaved Ironbark is not common in Western Australia, and is only found in country at present unsettled.

Habitat.—In Western Australia it is only known from the West Kimberleys, near the Isdell River. It has not been observed to the north.

Botanical characteristics.—The leaves may be sessile and opposite or petiolate. The Kimberley tree has the latter form, and they are oblong-lanceolate in shape. Peduncles short, arranged in a terminal panicle. Calyx-tube about ¼in. long, or less, obovoid-truncate; operculum obtusely conical. Fruit pear-shaped or urceolate, and very small. They are given in the Forests Department Bulletin (No. 32) as 3-4 centimetres in diameter. This should read "3-4 mm.," *i.e.* less than ¼in.

The species is closely related to *E. pruinosa, microtheca* and *Spenceriana*. It may be distinguished from the first by its much smaller fruits and differently shaped leaves, as far as the Kimberley specimens are concerned; from *E. microtheca* by its closer bark, smaller obtuse leaves and larger fruits, pointed operculum, etc., and from *E. Spenceriana* by its small silvery obtuse leaves, differently shaped fruits and buds, and larger flowers.

E. melanoxylon, Maiden—"Black Morrel." (·3332 5241).

A tree of 60-80 feet with a straight trunk and more or less erect branches. Trunk to 30 inches diameter; bark rough on the trunk or the greater part of it, dark grey in colour, rather evenly and deeply furrowed, like that of an Ironbark, with two well-defined layers in fracture—an outer thick brown layer of about 1 inch in thickness, and a thin inner very distinct layer of a rich deep yellow colour which is very pronounced in the freshly cut specimen. The bark of the upper portions is a silvery grey but with a suggestion of pink, and smooth except for ribbon-like streaks of a darker grey bark which sheds in the late summer. Timber dark brown, very deep in colour, but not black, deepening with age when cut, exceedingly hard and dense. The flowers are small and yellowish-white. Fl. m. February.

Economic uses.—This tree has not been used commercially beyond a local use as a mining timber. The wood is exceptionally hard and dense, and very strong. The tree attains large proportions, and should prove of commercial value.

Habitat.—Only known from Southern Cross, Bullabulling and Westonia, growing with Salmon Gum and Red Morrel with *E. gracilis*, on flats, forming fairly dense forest in a clayey soil.

Botanical characteristics.—Juvenile, or sucker-leaves glaucous, rather thick, petiolate, ovate-acuminate, the venation moderately conspicuous, the intramarginal vein distant from the edge, the secondary veins widely spreading. Mature leaves dark green, shining, of the same colour on both sides, rather thick, petiolate, narrow-lanceolate, about 3 inches long, the veins distinct, the intramarginal one not far removed from the edge, the lateral veins spreading.

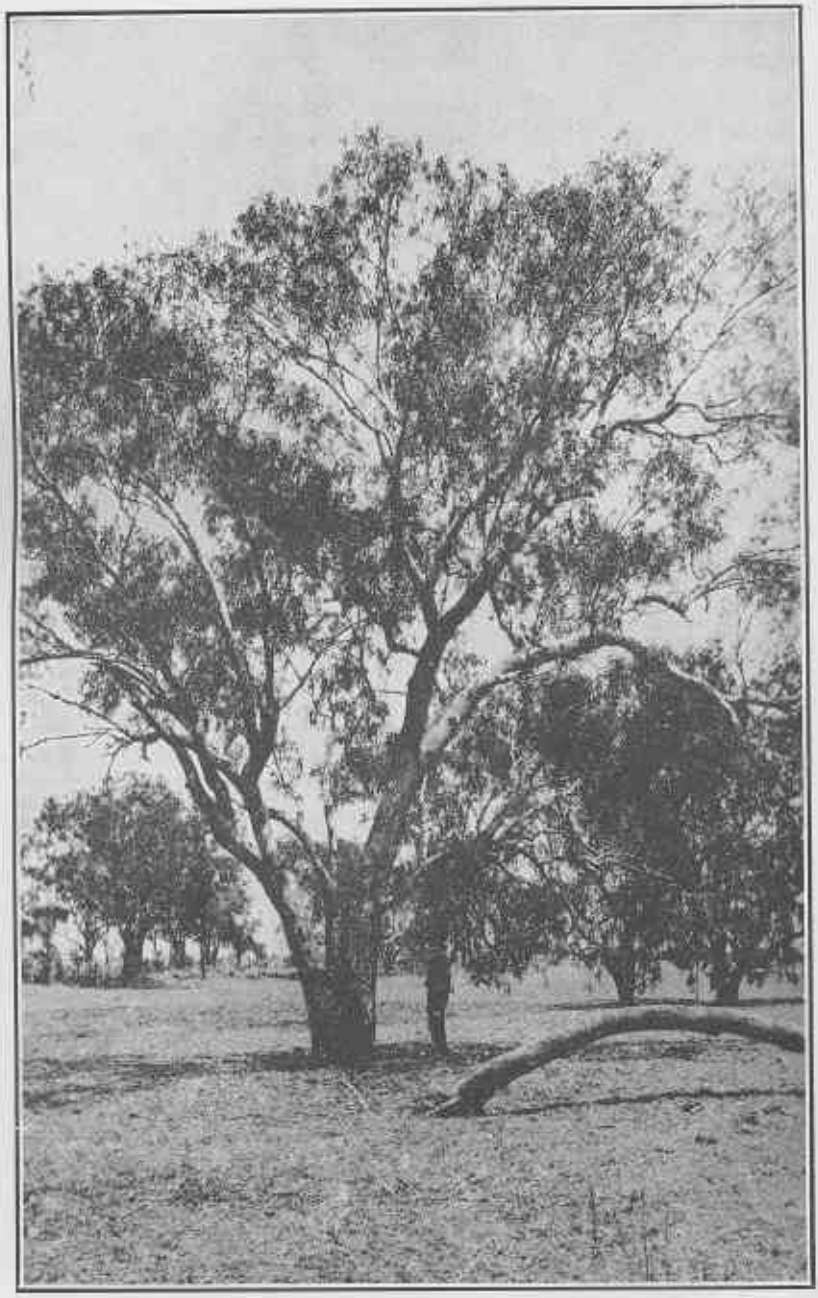
Peduncles axillary, the umbels on long flattened peduncles with as many as 11 flowers on long slender pedicels. Calyx-tube obovoid, operculum ovoid or shortly conical, blunt. Anthers white, very distinct to the naked eye, opening in parallel cells. Fruit small, not ¼in. long, obconical-hemispherical, the valves prominent and exserted, but not long like those of *E. longicornis*.

This tree rather resembles the Red Morrel (*E. longicornis*) in appearance, but the bark is much thicker with the two coloured layers in fracture, and the timber is a deep sepia brown. The buds are obtuse, and the fruit has not the awl-like valves. The bark is also more deeply furrowed.

It bears also some resemblance to the Morrel form of *E. oleosa*, and the buds are somewhat similar, but the fruit is different, and the timber is dark brown, not red as in *E. oleosa*. It also differs from *E. oleosa* in the bark, which is darker, thicker, and more deeply furrowed.

The buds and flowers are not unlike those of the Gimlet, but of course the tree has a different appearance, and bark.

E. melanoxylon is quite distinct, therefore any doubts in the field may be settled by cutting into the trunk, the dark hard timber, together with the yellow inner bark, are distinctive.



E. microtheca, F. v. M.

"COOLIBAH."

E. microtheca, F. v. M.—"Coolibah" of Kimberley and "Blackheart" of the lower North-West. (4334 5252) (·1133 5252).

Since this species varies so much outwardly, that is as far as the bark is concerned, it may be described separately under its two well-defined forms:—

(a) "Blackheart" of the North-West (not Kimberley district). A tree of 20-35 feet with a clean white bark, drooping branches and a straggling trunk. Timber very hard, dark brown, resisting decay and termites, with an interlocked grain. The trunk is said to be as white as though whitewashed, the whiteness rubbing off readily if touched with the hand. Occurs along the rivers and creeks of the North-West.

(b) "Coolibah." A tree of 20-40 feet with a short stout trunk and widely spreading branches. Trunk to 16 feet, often crooked, attaining a diameter of over 2 feet. Bark persistent throughout, thick, hard, fibrous-flaky, more or less irregularly tessellated or furrowed, of a dirty grey-brown colour, that of the small twigs smooth, light grey and shedding in strips. Timber exceedingly dense, dark reddish-sepia, with what appear to be fine white wavy threads running through it, in reality pores, the sapwood white. A Kimberley tree. As will be seen by the above, it has a totally different bark to that of the North-West Blackheart. There are probably intermediate forms.

Economic uses.—Coolibah is probably the hardest wood in the world. Locally it is highly valued for its strength and durability, also its termite-resisting qualities. This timber is too hard to be used for ordinary timber purposes, but is specially suitable for all the purposes for which Lignum-Vitae is used, such as bearings in certain machinery, the final bearing of steamship propellors, bushes in pumps, etc. Another use for this remarkable timber would be its manufacture into bowling-green balls. Coolibah has an advantage over Lignum-Vitae in that it is heavier and stronger.

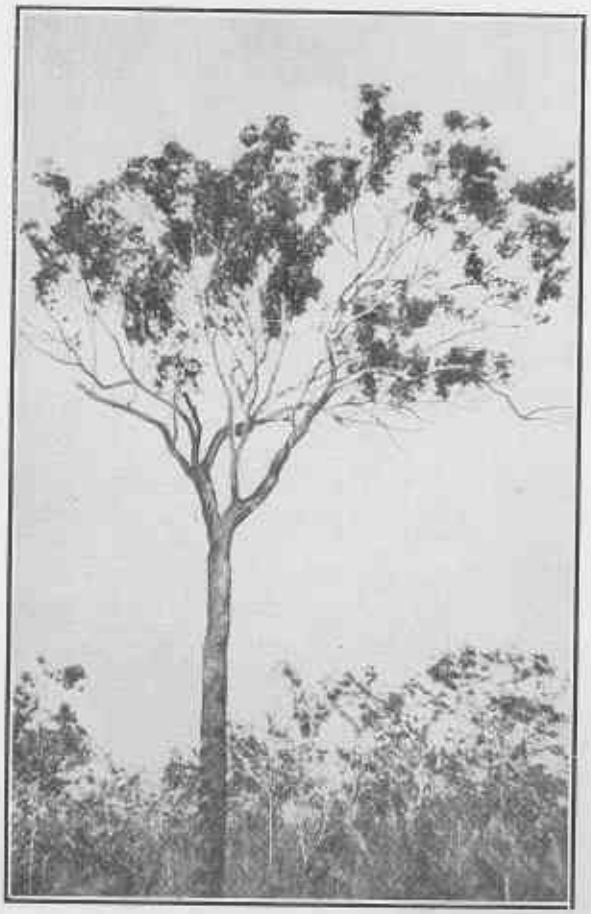
Habitat.—Low clay depressions around billabongs, or in proximity to creeks and rivers, in places periodically inundated by flood waters.

Blackheart: Murchison River, Cue, Gascoyne, Lyons and Strelly Rivers, and near Roebourne.

Coolibah: Lennard, Fitzroy, Barker and Ord Rivers in East and West Kimberley.

Botanical characteristics.—Leaves very variable in shape and size, narrow-lanceolate and acuminate 4-7 inches long, on long slender petioles. Flowers very small, in lateral or axillary panicles, on slender flattened peduncles and pedicels. Buds small. Calyx-tube obovoid, angular, operculum almost hemispherical, or obtusely conical; the whole but little more than one-eighth of an inch long. Flowers white, anthers ovate, opening in short slits. Fruit very small, hemispherical-ovate, thin and papery.

Its affinities lie with *E. Spenceriana, E. melanophloia* and *E. rostrata.* From *E. Spenceriana* it differs in the smooth twigs (or branchlets), much smaller buds and fruits, and in the darker, harder timber. It differs from *E. melanophloia* (the Kimberley form) in its long, narrow leaves, smaller fruits, obtuse buds, etc., and the North-West Blackheart may be distinguished from *E. rostrata* in its much smaller fruits and obtuse buds, timber, etc.



E. miniata, A. Cunn.
"WOOLLYBUTT."

E. miniata, A. Cunn.—"Woollybutt." (·5424 4122) (5424 7122).

A tree of 30-40 feet with a stout erect trunk and widely spreading branches. Bark of the trunk, or the base of it, thick, in several greyish paper-like layers, rather reminiscent of a Paperbark, thick and loose. Bark of the upper parts thin, smooth, light yellow or buff-coloured. Leaves dull green. Timber red, tough, not very dense or strong. Flowers with a pale whitish calyx, green style, orange-yellow filaments and pale yellow anthers; very large and beautiful.

Economic uses.—The Woollybutt is used to some extent in building in the Kimberleys, but is inferior to its associate trees, being more brittle, and an easy prey to termites. It is, however, a very ornamental species with its vivid orange-scarlet flowers, and might prove a rival to the Red Flowering Gum if planted extensively, for it is a more graceful and widely spreading tree.

Habitat.—Confined in Western Australia to the Kimberley district north of the King Leopold Range over the sandstone tracts to the northern limits of the State. It is common on the mountains of the King Leopold Range, and a small stunted forest of it occurs, isolated from the main area, in the Pindan outside Derby. Flrs. m. May-July.

Botanical characteristics.—Juvenile leaves petiolate, cordate to broadly lanceolate, obtuse or sometimes emarginate. Intramarginal vein quite distant from the edge, the secondary veins pinnate, the petiole and leaf-surfaces, when young sprinkled with stellate hairs. Mature leaves lanceolate to ovate-lanceolate, acuminate, 4-6 inches long, the secondary veins roughly parallel, the intramarginal one close to the edge. Peduncles axillary or lateral, thick and broad, somewhat flattened, ½-1 inch long with 5-8 closely sessile flowers. Calyx-tube almost turbinate, about ½in. long, with about 8 obscure angles. Operculum obtusely hemispherical-conical, shorter than the calyx-tube. Stamens rich orange about ½in. long, with prominent light yellow anthers. Style short, bright green. Fruit urceolate, 1-2 inches long, light brown, with more or less conspicuous obtuse ribs, the capsule deeply sunk.

Among Western Australian trees this is quite distinctive, and it has no close affinities. The fruit is like that of *E. ptychocarpa*, but the latter is a totally rough barked tree.

E. Mooreana (W. V. Fitzg.), Maiden—"Kimberley Mountain Gum." (·1124*4255) (*5255).

A small crooked tree of 15-20 feet with a smooth white bark, which is rather thick. Timber reddish. Leaves mealy-white, large. Flowers yellowish-white, seen flowering in April.

Economic uses.—Of no known commercial value.

Habitat.—Occurs on the mountains of the King Leopold Range, but not seen elsewhere. Not a common species.

Botanical characteristics.—Juvenile leaves sessile, opposite, ovate-cordate, stem-clasping or perfoliate, of the same colour on both sides, with spreading veins, the intramarginal one distant from the edge. Mature leaves about 6 inches long, and about 3 inches wide, more pointed than the juvenile leaves, otherwise much the same.

Peduncles axillary, opposite, thick and angular. Calyx-tube more or less turbinate, about ¼in. long, obtusely 2- or 3-angled, the operculum conical, of equal length, with an outer membranous covering when in the bud. Anthers oblong, opening in parallel slits. Fruit cylindrical-hemispherical, with a domed summit, and prominent acutely deltoid valves.

The affinities lie with *E. alba* and *E. perfoliata.* From the former it differs in its sessile leaves, larger fruits and pointed operculum, and in the mealy-whiteness of the branchlets and leaves. *E. Mooreana* is a mountain species. *E. alba* is a tree of the plains.

From *E. perfoliata* it differs essentially in the buds and fruits, and also in the bark. *E. perfoliata* has an almost discoid operculum which hinges on the calyx and only falls when the flowers have died. The fruit is very large and urceolate-cylindrical, and the bark is rough and persistent throughout.

E. Mundijongensis, Maiden. (4211 4141).

A tall tree of 80-100 feet with a diameter of 5 feet at B.H. Bark persistent on the trunk, and perhaps the bases of the branches, the top "clean." The bark of the trunk is probably something like that of a Tuart, as at Mundijong the tree bore that name. Timber pale. Flowers not known.

Only two trees (or perhaps three) of this species were known, and all have been destroyed. The last specimen to fall, and from which the type material was obtained, grew at the intersection of the Mundijong-Jarrahdale, and Perth-Bunbury roads, where a clay pit now exists. The tree was destroyed when this pit was established.

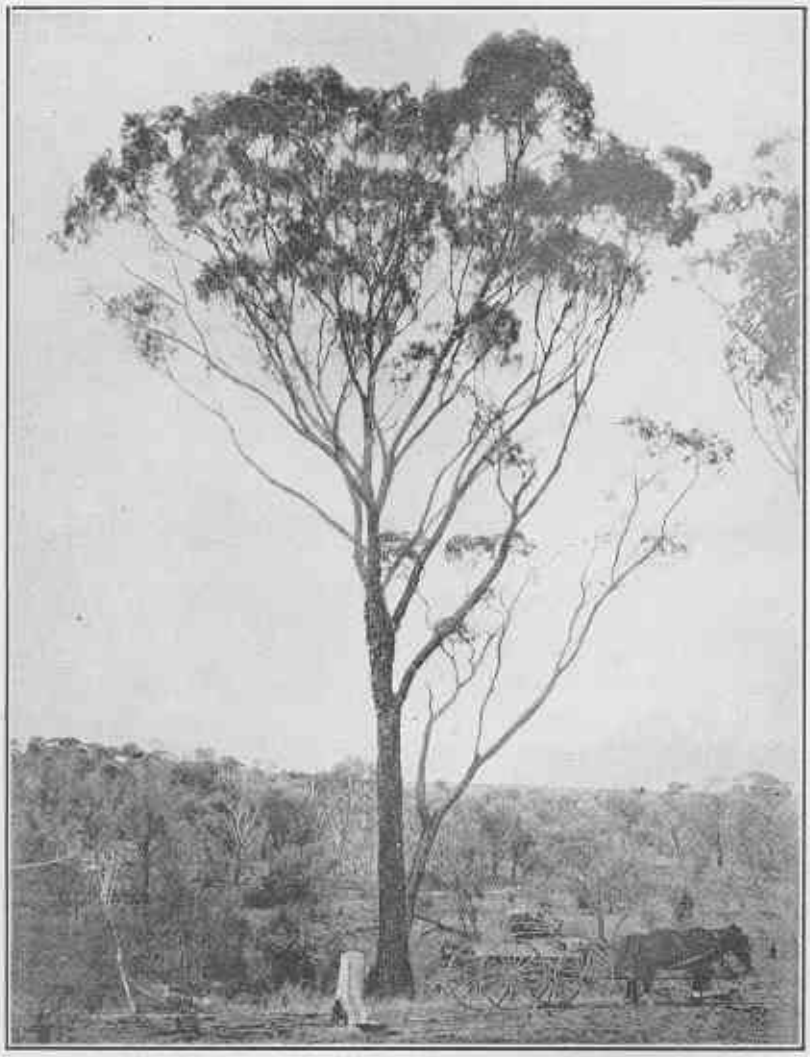
Perhaps this tree will be seen again in the future. It must be exceedingly rare, if it exists at all, and people should be on the look-out for Tuart-like large trees with long cylindrical fruits.

Economic uses.—The quality and uses of this species are not known, and do not concern us, for this tree is either very scarce, or perhaps now altogether extinct.

Habitat.—No trees known at present. Originally occurred near Mundijong. See previous remarks.

Botanical characteristics.—Juvenile leaves 4½ inches long, by 2 inches broad, fairly shiny, without prominent veins, coarse and thick. Intramarginal nerve not conspicuous, and removed from the edge. Mature leaves narrow-lanceolate, falcate, shining, of the same colour on both sides, thick and leathery, the veins inconspicuous, 6 inches long and ¾ inch wide. Buds on terete rather thick peduncles, the calyx-tube cylindrical, the operculum much shorter, obtusely conical, and rather wider than the calyx at the base. Flowers unknown. Fruits cylindrical, slightly over ½in. long, and half as much in diameter, nearly sessile, with a thin prominent rim, the capsule sunk below the surface.

Its affinity lies with the Tuart (*E. gomphocephala*), from which it differs in the fruit which is much narrower with included valves, and in the longer operculum which is also narrower.



E. occidentalis, Endl.
"SWAMP YATE."

E. occidentalis, Endl.—"Swamp, or Flat-topped Yate." (3311 3361) (3311 3371).

A tree of 60-80 feet and 2½ feet in diameter, with a stout erect trunk and erect branches which arise at an acute angle with the trunk, all of about even length, giving to the tree an umbrella-topped appearance. Bark of the trunk thick, hard and persistent, rough and fissured, dark grey or almost black, fibrous and very tough. Bark of the branches smooth, light grey or yellowish-grey and clean, except for ribbons of a dark grey flaky bark which persists in the forks, and around the bases of the branches, hanging down for some distance. The rough bark does not end abruptly, but gradually becomes smooth with an interval of the loose ribbony bark. Leaves dark green and shining, rather thick; flowers yellowish-white. Flowers in April and May.

Economic uses.—Used for the same purposes as the Yate, which it closely resembles, being slightly inferior to that timber.

Habitat.—Wagin and Dumbleyung, thence to the south coast east of the Jarrah belt, and extending eastwards to Ravensthorpe and near Esperance, thence northwards to Salmon Gums (60 miles north of Esperance), where it is very rare. An inhabitant of clay flats, usually with a low undergrowth of rushes or tea trees.

Botanical characteristics.—Juvenile leaves ovate-orbicular, slightly petiolate, thin and glaucous, often irregular at the base, with spreading inconspicuous veins, the intramarginal vein distant from the edge. Mature leaves lanceolate-falcate, usually about 6 inches long, but often smaller, thick and shining, of the same colour on both sides, rather prominently veined with oblique nerves, the intramarginal vein some distance from the edge. Peduncles axillary or lateral, much flattened, especially near the top, usually recurved, with pendulous flowers. Calyx-tube urceolate-campanulate, on flattened peduncles, 4-6 in the umbel. Operculum oblong conical, rather obtuse, with a dilated base, twice as long as the calyx. Stamens yellowish-white, erect in the bud, anthers with parallel cells, opening in parallel slits. Fruit distinctly campanulate or bell-shaped, ½in. long, obscurely and finely ribbed, with prominent acute exserted valves.

Its affinities lie with *E. cornuta, E. platypus, E. astringens,* and *E. spathulata.* Its closest affinity, botanically, is with *E. astringens,* from which it differs in the larger leaves and fruits, and more rigid exserted valves. In the field it is sharply separated from *E. platypus, E. astringens,* and *E. spathulata,* all of which have smooth thin barks. The tree closely resembles *E. cornuta* in appearance, having the same bark and leaves, but the fruits are free and have distinct stalks, and the shape is distinctly campanulate, with free valves.

E. oleosa, F. v. M.—A "Morrel." (·3322 2341).

For the description of this tree see *E. longicornis*, which it closely resembles. Besides the strictly botanical differences of herbarium material, this tree is difficult to distinguish from *E. longicornis*. It is usually a smaller (30-50 ft.) tree, with a more crooked trunk. The bark is similar, only perhaps more thin and less fissured, and the timber is the same in colour and texture.

Economic uses.—Only used as firewood, on account of its low stature and crooked trunk.

Habitat.—Eastern Goldfields, on loamy flats on rising ground with *E. longicornis*. Seen at Coolgardie, Widgiemooltha, and Southern Cross. Fl. m. October.

Botanical characteristics.—Its affinity lies chiefly in *E. longicornis*, from which it may be distinguished by its short conical-hemispherical operculum (that of *E. longicornis* is twice as long as the calyx-tube, and acutely conical) of about the same length as the calyx-tube.

E. oligantha, Schauer. (·5434 4x31).

A small tree of 10-20 feet with a stout trunk and widely spreading leafy branches. Trunk to 12in. diameter. Bark moderately smooth, but inclined to be papery-rough on the butt, grey with grey-purple flaky paper-like plates which easily come off. Bark of the upper portions whitish-grey and smooth. There is some resemblance to a Blackbutt, only the butt though thick is not rough, but more like that of a woollybutt, and smoother in appearance. The inner layers of bark are almost white. Some difficulty was experienced in placing this species in the key, along with *E. clavigera* and *E. grandifolia*, but the papery texture of the bark seemed to warrant their being included in the section with lamellar barks. Leaves large and shining.

Economic uses.—Of no known commercial value. A rare species.

Habitat.—Kimberley district, on the Artesian and Synnott Ranges, a low tree found in scanty soil among rocks. Fl. m. September (?).

Botanical characteristics.—Leaves on long petioles, widely ovate or almost orbicular, obtuse or shortly acuminate, 3-4in. long, and about as broad. Flowers arranged in short terminal panicles, the umbels 3-6-flowered shortly pedicellate, on terete peduncles. Calyx-tube campanulate or rounded-turbinate, about ¼in. long. Operculum hemispherical-conical, rather shorter than the calyx. Flowers white, the stamens inflected in the bud with small globular anthers opening in short parallel slits. Fruit urceolate-cylindrical, not seen quite ripe, with a domed top to the capsule and included (?) valves.

Its affinities with Western Australian trees are found in *E. pruinosa* and *E. alba*. The former has sessile leaves, those of *E. oligantha* have long petioles. It is clearly related to the smooth-barked *alba*, with a different bark, and larger, not hemispherical fruits. The timber is reddish.

E. pallidifolia, F. v. M.—"Mieum." (1123 5432) (1124 5432) (1133 5432) (1134 5432).

Sometimes called "Ridge Gum," which is a name first applied, perhaps unsuitably, to *E. alba*. A crooked tree of 20-30 feet, the trunk to 15in. diameter. Bark pinkish or yellowish-white, smooth and thick, very brittle, breaking away from the dry specimen in small squares. Timber dark red, hard and dense, and termite resistant, used locally for fencing purposes. The timber is not very strong. Branches erect or spreading. Leaves bluish-white, flowers yellow-white.

Economic value.—Locally used for fences. The bark yields 25 per cent. tannins, and is therefore of commercial value.

Habitat.—This species occurs on the Hammersley Range and around Millstream Station, also on Sturt's Creek, and in the Western Kimberley, but has not been traced continuously between these localities through the dry country.

Botanical characteristics.—Leaves ovate-oblong or lanceolate-oblong, obtuse, not more than 3in. long, pale green, or bluish-white, with red branchlets and petioles. Peduncles axillary or lateral, almost terete or quite so, short, bearing 4-6 nearly sessile flowers. Calyx-tube almost hemispherical, small, less than ¼in. in diameter. Operculum hemispherical, or obtusely hemispherical-conical, shorter than the calyx. Stamens inflected in the bud, with ovate anthers opening in parallel cells. Fruit hemispherical, small, with a prominent rim, and domed summit, the valves almost flush with the orifice.

Its affinity lies with *E. alba*, a tree of similar habit and bark but with a paler heartwood, but in *E. pallidifolia* the leaves are smaller and narrower, also the buds and fruits. *E. alba* has a very wide acute leaf.

E. papuana, F. v. M.—"Desert Gum." (·1424 4111) (·1424 4131) (·1424 4132).

A polymorphic species as regards habit. The large coastal form is known as "White Gum," and the inland form as "Desert Gum."

Desert Gum.—A tree of 20-30 feet with spreading, almost pendulous branches, and scanty foliage. Trunk to 15 feet and 12 inches diameter, the bark varying from almost white to a pinkish-buff colour, mottled with small numerous flakes or spots of a reddish-brown colour. Leaves a deep shining green, narrow.

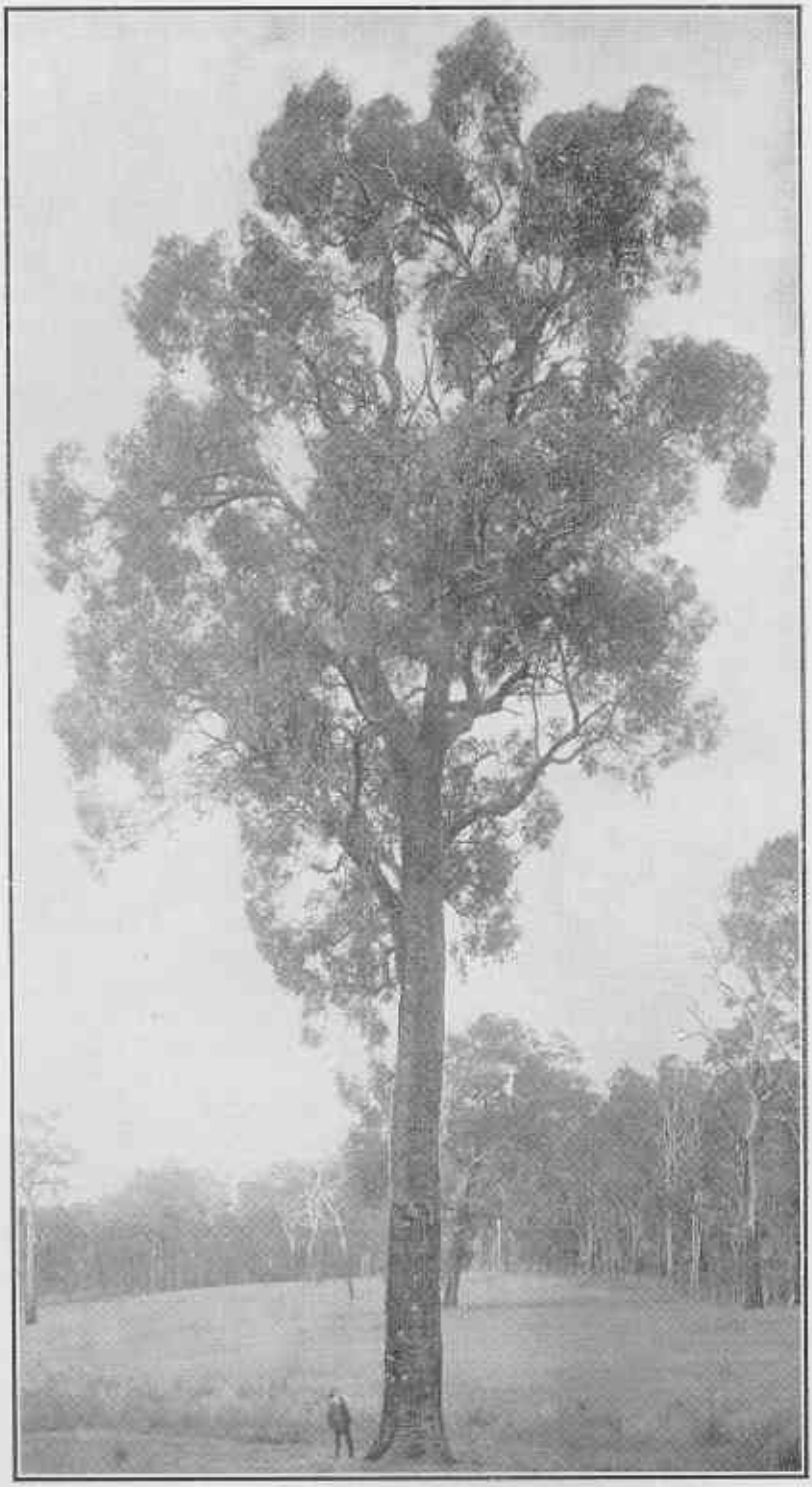
"White Gum."—An erect tree of 35-45 feet or more. Trunk to 25 feet and 2 feet diameter, the branches gracefully drooping, or almost pendulous. Bark dead white, rather thin, usually smooth to the ground, but occasionally with a small rough butt, shedding in thin grey papery-flakes. Timber pink, rather dense.

Habitat.—Confined in Western Australia to the Kimberleys, as far North as the Northern limits of the State, and Southwards to Broome.

"White Gum" around the coast, extending for a few miles inland. "Desert Gum" found on the sandstone areas of the plateau.

Botanical characteristics.—Juvenile leaves broadly lanceolate, and slightly petiolate. Mature leaves long-lanceolate, not very thick, deep shining green, the same colour on both sides. Flowers arranged in small panicles of rather small flowers, the slender peduncles and pedicels terete. Calyx-tube pear-shaped, small, without angles. Operculum hemispherical, or hemispherical-conical, shorter than the calyx. Anthers narrow-oblong, with parallel cells. Fruit more or less cylindrical, of papery consistence, easily crushed between the fingers, the capsule sunk with included valves.

The affinities are with *E. clavigera* and *E. grandifolia*, especially in the fruits. *E. papuana* has narrower leaves than both, and the smooth white or pinkish bark is also sufficient to distinguish it from either.



E. patens, Benth.
"BLACKBUTT."

E. patens, Bentham—The common "Blackbutt." (·4311 1132).

A tree of up to 100 feet in height, with an erect trunk and spreading or more or less erect branches, but without the umbrella-like top of the Jarrah. Bark persistent throughout, light grey (frequently blackened by fire), thick, deeply furrowed, light and friable, yellowish in fracture, of an almost corky appearance. Timber pale yellow, hard and dense. Trunk to 5 feet or even 6 feet in diameter. Leaves of a bluish-green, flowers white. The species flowers February-April.

Economic uses.—This excellent timber has not up to the present been put to any extensive use. It is a harder timber than Jarrah, and suitable for structural work.

Habitat.—Confined to South-Western Australia. Occurs throughout the Jarrah and Karri forests and nearly as far East as York, as a tree. To the North of the Blackwood River it is characteristic of swamps or flats in a sandy soil; to the South, however, it occurs on the hills with Jarrah. A shrubby form is found as far East as Esperance, but is rare.

Botanical characteristics.—Juvenile leaves opposite or in threes, from broadly ovate to narrowly ovate, large and quite sessile, more or less heart-shaped, greyish. Mature leaves petiolate, lanceolate-falcate, up to 6 inches in length, of a glaucous hue, with fine secondary veins, the intramarginal vein close to the edge, but very distinct. Peduncles axillary or lateral, usually forming simple umbels, but sometimes small panicles, terete, or slightly flattened and broadened at the apex, with 4-8 flowers on terete pedicels. Calyx-tube turbinate or obconical, about ¼in. diameter. Operculum hemispherical with a short obtuse point, shorter than the calyx-tube. Stamens creamy-white with ovate anthers and parallel cells. Fruit globular, flattened at the top, about ½in. in diameter, with a prominent narrow rim and a slightly sunk flat capsule with valves that do not protrude.

Its affinities are with the Jarrah, Karri, and *E. Todtiana*. It can readily be separated from the Karri by reason of its rough bark. From *E. Todtiana* it differs in the thinner leaves, shorter pedicels, and smaller fruits with a narrower rim, and in being a taller tree.

It resembles the Jarrah rather closely, but has quite different juvenile foliage, a pale, not red timber, a more friable, not springy bark, narrower and paler leaves, obtuse bud-cap, smaller fruits with a narrow prominent rim, and sunk capsule.

E. perfoliata, R. Brown—A "Bloodwood." (·4324 7115) (·4324 7135).

A small crooked tree of 10-20 feet, with a stout trunk of 6-10 feet and widely spreading rigid branches. Bark persistent throughout, fibrous, brownish-grey, rather thick and longitudinally fissured. Timber red, fairly dense and hard. Trunk to 10 inches diameter. Flowers white, leaves blue-green.

Economic uses.—This small tree is not put to any use in its somewhat restricted habitat.

Habitat.—Confined to the Western Kimberleys extending southwards from the Prince Regent River and Roe River to the Artesian Range, Lennard River and Grant Range near the Fitzroy River. It is not found more than 70 miles from the coast. Fl. m. May.

Botanical characteristics.—Juvenile leaves unknown, but probably very large, wide and sessile. Mature leaves opposite, connate, 6-9 inches long and up to 4 inches wide, widely spreading or almost erect, thick and rigid, pale green with numerous roughly parallel secondary nerves, the intramarginal vein very close to the edge. Flowers large, arranged in terminal panicles, the peduncles rusty-red, stout, short and terete, the flowers sessile. Calyx-tube broadly turbinate and fleshy, reddish, fig-like in the bud and quite soft, the operculum at this stage not evident. As the flower opens the operculum comes off irregularly like the bursting of a fig, and is almost disc-like. Flowers whitish, the anthers ovate-oblong, with distinct parallel cells. Fruit urceolate-cylindrical, 1½-2 inches long, woody, slightly contracted at the summit with or without an obscure neck, the rim deeply concave and the capsule sunk with short, broad, almost invisible valves some distance down in the fruit.

This species has no close affinities. Its large rigid leaves, connate so as to appear as one long perfoliate leaf, fig-like buds and large smooth fruits are quite characteristic. It is related in some ways with *E. gamophylla*, but no possible confusion could arise. *E. gamophylla* is a little-known species of the North-West; *E. perfoliata* is confined to Western Kimberley.

E. platypus, Hooker—"Moort" or "Round-leaved Moort." (·1511 6441).

A small bushy tree of 20-30 feet with an erect trunk and dense short spreading branches. Trunk short, 6-8 feet or even as little as 4 feet, up to 12 inches in diameter. Bark silvery-grey, thin and smooth, easily stripped. Timber pale brown, hard and dense. Leaves wide and obtuse, dark, dull, but shining green, and very thick. Flowers greenish-yellow.

Economic uses.—Of no value as a timber tree, except as fence posts. The bark of the species is valued for tanning, yielding 25-30 per cent tannins. It tans leather a beautiful rich yellow.

Habitat.—Southern portions of the State, forming dense almost impenetrable thickets. Its western and northern limit is Broomehill on the Great Southern Railway. From there it extends through Gnowangerup and Borden to the Stirling Range and Cape Riche to Hopetoun and Ravensthorpe. Fl. m. June-October.

Botanical characteristics.—Juvenile leaves broadly lanceolate to almost orbicular, slightly petiolate, rather fleshy. Mature leaves broadly ovate to almost orbicular in the typical form, with slightly indented margins, thick, about 1½ inches long. In the more eastern forms where the species occur in sandy soil (clay is its typical soil) the leaves are widely lanceolate to ovate and acute, but these are only seen around Hopetoun and Ravensthorpe. Peduncles axillary, thick and much flattened, 1-1½ inches long, and nearly ½in. broad, erect or recurved (especially when in fruit), bearing an umbel of 3-7 flowers. Calyx turbinate-obovoid, with usually 2 or 3 angles and a very short pedicel. Operculum elongated-conical, broadened at the base, but not very acute, about twice as long as the calyx-tube in the typical form, to about the same length in the eastern specimens. Stamens erect in the bud, with ovate-oblong anthers opening in parallel cells. Fruit obovoid-truncate to almost pyriform, nearly ¾in. long in the common form, with a broad rim, sunk (usually) capsule, with protruding acute valves.

Its affinities lie with the Yate and the Swamp Yate, and to a less extent with the Swamp Mallet. It differs from the first two in its distinctive habit and thin smooth bark, from the Yate in its broader peduncles and large free fruits, from the Swamp Yate in the leaf, pear-shaped fruits, thicker and broader peduncle and almost sessile flowers. From the typical Swamp Mallet (*E. spathulata*) it differs in the broader leaves, large flowers and fruits, but there are certain forms which appear to almost connect the two species.

E. pruinosa, Schauer—"Apple Gum." (·3224 2231) (4224 2235).

A tree of up to 40 feet in height with a diameter of about 12 inches. Bark persistent, grey, fibrous, thin; timber reddish and tough. Leaves pale whitish-grey, flowers white.

Economic uses.—This little-known species has no known uses.

Habitat.—The only known Western Australian localities are those given by Mr. W. V. Fitzgerald: "Nine-mile Ridge, near Wyndham; to the sources of Sturt's Creek, and the Ord River."

Botanical characteristics.—The bark is given as "whitish-grey" in Bentham's description. Leaves mealy-white, sessile, opposite or nearly so, rigid and spreading, orbicular-cordate to oblong or ovate, 2-4 inches long. Umbels 3-6-flowered, peduncles short and arranged in a terminal panicle or in the upper axils almost

hidden by crowded leaves. Pedicels terete, about the same length as the calyx-tube. Calyx-tube about ¼in. across, ovoid-cylindrical; operculum hemispherical-conical, not as long as the calyx. Stamens inflected in the bud, white, anthers small and globular with distinct parallel cells opening in very short slits or terminal pores. Ovary slightly raised in the centre. Fruit more or less ovoid or slightly cylindrical, with a narrow rim and exserted valves from a slightly sunk capsule.

Its affinity lies with *E. melanophloia,* the Silver-leaved Box or Ironbark, but according to description, this is not an ironbark. *E. melanophloia* has usually smaller narrower leaves, and smaller differently shaped fruits, *i.e.* more pear-shaped.

E. ptychocarpa, F. v. M.—"Red-," or "Swamp-Gum" of Kimberley. (4324 2133).

An erect tree of 30-50 feet with widely spreading, almost drooping branches. Trunk to 30 feet and over 30 inches in diameter; bark persistent throughout, thick and longitudinally fissured, dark reddish-grey, frequently blackened with fire. Timber red, soft but fibrous, usually sound. Leaves of a vivid green, flowers white, or tinged with pink (in the Western Australian specimens).

Economic uses.—Not a common tree, occurring in wild uninhabited country. Has been put to no use, but will doubtless prove a good timber when this country is settled.

Habitat.—Western and Northern Kimberleys. The following are the only localities established in Western Australia up to the present: Welcome Creek, Roe and Drysdale Rivers (Bradshaw & Allen), Isdell and Charnley Rivers, Woollybutt and Synott Creeks (W. V. Fitzgerald), King Leopold Range, Edkins Range, Upper Charnley River, Mount Agnes, Prince Regent, Carson and Mitchell Rivers (C. A. Gardner). Fl. early in the year, probably about March.

Botanical characteristics.—Leaves broadly lanceolate, straight, not falcate, about one foot long, dark green, usually opposite, with a prominent midrib, closely parallel secondary veins and a conspicuously wide thickened margin; intramarginal vein close to the edge. In diameter they attain 3 inches. Flowers white, or white tinged with pink, in umbels arranged in a large woody terminal panicle; peduncles thick and terete, ½-2 inches long; pedicels short. Calyx-tube broadly turbinate, ½-¾in. long, with usually 8 very prominent ribs or angles which continue along the operculum, and down the pedicel when young. Operculum shortly hemispherical-conical, shorter than the calyx-tube. Stamens above ½in. long, the rigid filaments inflected in the bud; anthers small, ovate, with distinct parallel cells. Fruit ovoid or ovoid-truncate inclined to be urceolate, very woody, about 2 inches long or more than 1 inch, with usually 8 prominent ribs, the rim thick and prominent, deeply concave, the capsule very deeply sunk with short flat valves. Seeds winged.

The affinity of this species lies with *E. miniata,* which it somewhat resembles in the fruit, but this is narrower in *miniata,* and not nearly so prominently ribbed. The Western Australian examples of *E. miniata* have merely *angled* fruits, while *E. ptychocarpa* has well-defined wing-like ribs. *E. ptychocarpa* can also be separated by the colour of its flowers which are not orange-red, its much larger long straight leaves, and particularly by its bark. *E. miniata* has a papery-flaky bark on the trunk and yellow smooth branches, while *E. ptychocarpa* has a bark very similar to that of the Marri—a Bloodwood type.

E. pyrophora, Benth.—"Bloodwood." (4324 4121).

A tree of 20 to 35 feet, with widely spreading leafy branches. Trunk to 15 or 20 feet and 12in. in diameter, the bark persistent, grey and rough, and longitudinally fissured. Flowers whitish.

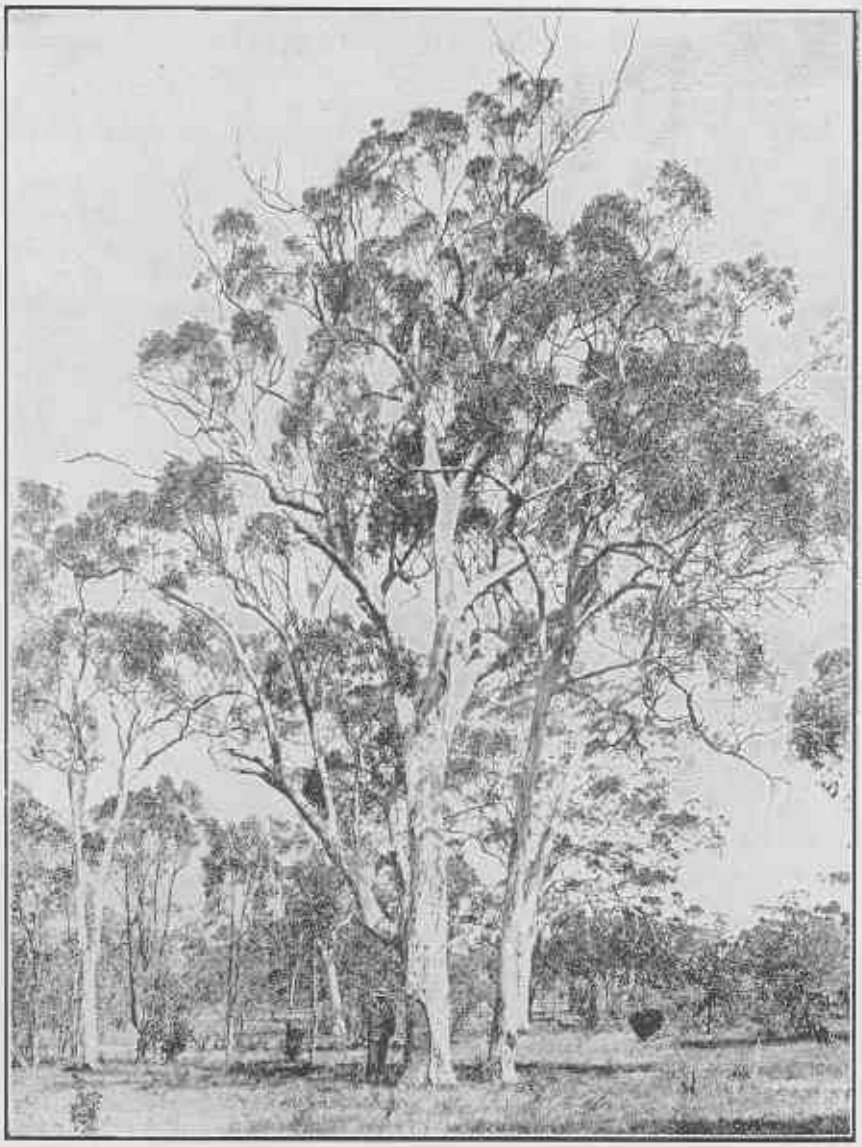
Economic uses.—This tree inhabits sparsely settled country, and as far as is known has no commercial uses.

Habitat.—Definite localities for this species are badly needed. It is not easy to distinguish from *E. terminalis* in the field, and authentic localities established by botanists may add to its range. The authors only know of it definitely on the plains of the Lennard River, to the South-West of the King Leopold Range in the Kimberleys, and in the Pindan around Derby where it is fairly common. Travellers have reported it as being common on the basaltic hills, but this is open to question. It flowers about May or June. Flowers white, leaves thick, and dark green.

Botanical characteristics.—Juvenile leaves orbicular with a cordate base, sessile, stem-clasping, or only slightly petiolate. Mature leaves rigid, spreading, long-lanceolate, with a prominent midrib, and closely parallel secondary veins, the intramarginal vein close to the thickened nerve-like margin. Flowers in umbels arranged in a large terminal corymb. Peduncles terete, about ½in. long, pedicels short and terete. Buds silvery-scaly. Calyx-tube pear-shaped, the small operculum scarcely distinguishable, and hinging off as the flower opens, almost disc-like or hemispherical, but with a small central umbo or point. Stamens white, with small ovate anthers opening in parallel cells, or oblong, opening in parallel cells. Fruit more or less ovoid-cylindrical, narrowed at the summit, the rim thin, and the capsule sunk with included valves.

The affinities of this species are found in *E. terminalis* and *E. dichromophloia.* The latter may be easily distinguished by its thinner paler leaves and green globular necked fruits, *i.e.,* globose with a neck, or urceolate-globose, not cylindrical. It is more closely related to *E. terminalis,* the so-called Ironbark, but the fruit is larger, and the flowers also. *E. pyrophora* has a larger, more massive inflorescence than *E. terminalis.* The differences between the two are very slight, and cannot be separated by field characters. We do not know of two other trees so closely related, and the material of *E. pyrophora* in the Herbarium is far from complete. No doubt there are, to a resident in the West Kimberleys, differences in the field characters which are not so evident to the traveller in these little-known localities.

It may be remarked, however, that although *E. terminalis* is known as an Ironbark (not an appropriate name), *E. pyrophora* is a Bloodwood. This name of Bloodwood is applied to the species in the other States, it goes without a common name in Western Australia. The Kimberley residents give the name of Bloodwood to several smooth-barked trees, such as *E. latifolia* and *E. Foelscheana.*



Eucalyptus redunca, Schau., var. elata, Benth.
"WANDOO."

E. redunca, var. **elata**, Benth.—The "Wandoo." (·1111 4152) (·1131 4152).

A tree of up to 100 feet in height, with rather spreading branches. Trunk to 40 feet and 4 feet in diameter. Bark thick, yellowish-white, rather blotchy with purple-grey patches of more persistent bark, yellow in fracture. (The bark is not in the least powdery, like that of *E. accedens* or *E. Lane-Poolei.*) Timber yellowish, to light brown, hard, dense, and strong. Flowers yellowish-white,

Economic uses.—A valuable timber useful in wheelwright work, in railway-waggon construction, and in building generally. A feature of the timber is its lasting quality, even under the roughest use, and no chemical action is apparent between metal inserted in the wood and the timber itself. Bolts which have been taken from this timber after 20 years' service have been found as clean as when they were inserted. It stands fairly well in the ground, but is not so good for this purpose as Jarrah.

Habitat.—South Western Australia. The main Wandoo belt extends eastwards from the summits of the Darling Range to Wongan Hills, Kellerberrin, Wickepin, Gnowangerup, and the Stirling Range, the best timber being found around Clackline, Baker's Hill, and Wandering. The variety extends as far east as Merredin, Kondinin, Dumbleyung, and Ongerup. Areas of the timber extend down the western slopes of the Darling Range into Midland Junction and other places near the South-Western Railway. It is found usually where granites are near the surface, with a clay subsoil. Flowers, October to December.

Botanical characteristics.—Juvenile leaves ovate, petiolate, with conspicuous veins pinnately arranged, the intramarginal one removed from the edge some distance. Mature leaves alternate, glaucous or dull, lanceolate-falcate, acuminate, the same colour on both sides, the veins not conspicuous. Peduncles axillary or lateral, slender, slightly flattened, bearing each an umbel of 6 to 12 flowers, about ½in. long. Pedicels very short, tapering into the narrow calyx-tube which is narrow-obconical or almost cylindroid. Operculum narrow conical, acute, paler in colour than the calyx-tube, usually yellowish. Fruit almost cylindroid, or narrow pear-shaped, nearly ½in. long, with a prominent rim, and slightly sunk capsule and short included valves.

The Wandoo is a variety of *E. redunca,* one of the Mallees. It usually has a trunk swollen at the base into a kind of pedestal, but although this is common it is not a rule. Its affinities lie with *E. foecunda* and *E. accedens.* It may be distinguished from the former by its smooth bark. *E. foecunda* var. *loxophleba,* which is the tree form of *E. foecunda,* has a rough grey trunk. *E. accedens* closely resembles the Wandoo, but has a powdery outer bark even in winter, the powder rubbing off if touched with the hand; this and the egg-shaped obtuse operculum readily separate the Powder-bark from the Wandoo.

E. rostrata, Schlecht—"River Gum." (Red Gum of S.A., Vict., and N.S.W.) (·1123 1251) (·1124 1251).

The following description refers to Western Australian trees:—An erect tree of 35 to 70 feet with a trunk attaining 35 feet or even 40 feet in height and 20 inches diameter, straight and smooth. Branches widely spreading, slender, and drooping towards the ends. Bark not very thick, smooth, white, or suffused with pink, yellow in fracture; timber pinkish-red, rather hard and dense, straight-grained and easily splitting. Leaves a bright green, flowers yellowish white.

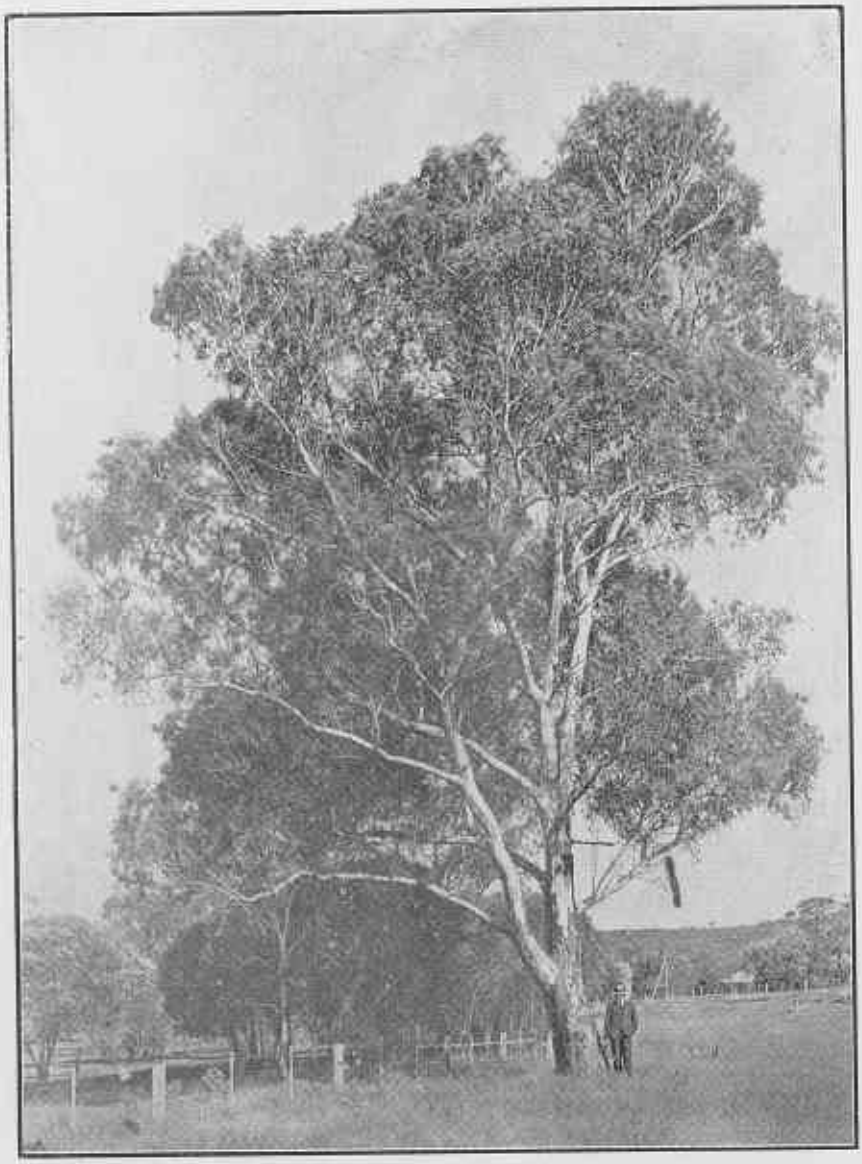
Economic uses.—Used for buildings and poles, but not of extensive occurrence, and therefore not much used.

Habitat.—From the Murchison River northwards, along the banks of creeks and rivers to the Isdell, Barker, Lennard, and May Rivers in the West Kimberley, confined to the vicinity of watercourses, in a sandy loam. It has not been seen to the North, where the watercourses have a richer muddy soil, or rocky cliff-like banks. Flowers in September and October.

Botanical characteristics.—Juvenile leaves ovate-lanceolate, petiolate, thin and glaucous. Mature leaves alternate, long lanceolate, falcate, acuminate, 4 to 7 inches long and usually ¾in. wide, with a prominent yellowish midrib and conspicuous pinnate veins, the intramarginal vein close to the nerve-like margin. Peduncles axillary or lateral, about ½in. long, slender and terete or nearly so, bearing an umbel of 4 to 8 flowers on slender pedicels. Calyx-tube hemispherical, under ¼in. diameter. Operculum ovoid-hemispherical, with a short beak which gives it its specific name, longer than the calyx, and wider. Stamens about quarter of an inch long, inflected in the bud, anthers small and ovate opening in parallel distinct cells. Ovary prominently domed or convex in the centre with a short thick style. Fruit almost globular, the rim prominent and almost conical, domed in the centre with protruding deltoid valves.

The affinity of this species is with the Flooded Gum which it occasionally strongly resembles. For the differences between the two see *E. rudis*, concluding paragraph.

Eucalyptus Spenceriana, Maiden.
"GREY BOX."
(See page 109.)



Eucalyptus rudis, Endl.

"FLOODED GUM."

E. rudis, Endl.—"Flooded Gum," "Swamp Gum," "Moitch" or "Wormwood." (·3211 * 5241) (*5251) (·4211 * 5241) (*5251).

A tree of 30 to 50 feet with a stout trunk and widely spreading branches. Bark rough and persistent, flaky, dirty grey in colour, that of the branches cleaner and almost smooth, occasionally, in such forms as those found on the Irwin River and the hills around Mt. Dale and Northam, yellowish-white and perfectly smooth or with a short butt of flaky bark. It is seldom as straight and clean as that of *E. rostrata*. Timber brown to pale brown or reddish, of short grain, and not of much use. Leaves dark green, flowers yellowish-white.

Economic uses.—This timber is not put to any use, except as firewood. Occasionally good strong pieces are found, but they are exceptional rather than the rule.

Botanical distinctions.—The juvenile leaves are ovate to nearly orbicular, and nearly sessile, pale, glaucous and thin, the petioles angular. Mature leaves alternate from ovate-lanceolate to narrow-lanceolate, falcate, the same colour on both sides, prominently nerved with fine diverging veins, the intramarginal vein distinctly removed from the edge. Peduncles axillary or lateral, terete or almost so, slender, under half an inch long, supporting an umbel of 4 to 8 flowers on usually slender pedicels. Calyx-tube broadly turbinate, about a quarter of an inch diameter; operculum conical, usually longer than the calyx-tube, sometimes of equal length, commonly straight and not rostrate, but occasionally so. Stamens about quarter of an inch long, inflected in the bud, anthers ovate or oblong, with parallel distinct cells, ovary conical in the centre, usually not so prominent as in *E. rostrata*. Fruit hemispherical, broadly turbinate, or almost campanulate—but shortly so, over quarter of an inch in diameter, with a narrow rim and usually slightly sunk capsule with shortly protruding valves. Sometimes the fruit has a convex rim and the domed capsule of *E. rostrata*.

The affinity of this species rests with *E. rostrata*, a smooth-barked Eucalypt. In their typical forms they cannot be confused, for *E. rudis* has, normally, a rough bark. In a few cases smooth-barked forms of *E. rudis* occur, which resemble *E. rostrata* very closely, as for instance, the hills forms of the Dale, Northam and Mingenew districts. The sucker leaves are different, those of *E. rudis* being very broad, while *E. rostrata* has lanceolate foliage. The only other constant differences are the following:—*E. rostrata* has an operculum wider and larger than the calyx-tube, and the junction of each is not very evident, whereas *E. rudis*, which has a calyx-tube about as wide as the operculum, has a distinct line—the commissural line—separating the operculum from the calyx-tube.

E. salmonophloia, F. v. M.
"SALMON GUM."

E. salmonophloia, F. v. M.—"Salmon Gum." (·1122 5311).

An erect tree of 60 to 80 feet, or rarely 100 feet in height, with a diameter of up to 3 feet and a bole of 50 feet. Trunk smooth, with a salmon-pink bark lightly patched with dull silver-grey, or, in the late summer months, purely salmon-pink, the bark thick, and reddish in fracture. Timber red when fresh, deepening with age to a reddish-brown, straight in the grain and very strong, the sapwood thick and white. Branches erect, arising from the trunk at usually an acute angle, and all of about the same length, imparting to the tree a flat or umbrella-like topped appearance which is also characteristic of the other trees of its habitat. Leaves drooping, a bright shining green, copiously oil-dotted. Flowers yellowish-white. Flowering months, August to December.

Economic uses.—This beautiful timber has not been put to any commercial use except as mining timber in the Eastern Goldfields mines, and for the erection of buildings in the farming areas.

Habitat.—Great Southern and Midland Railways southwards from Mullewa and northwards from Gnowangerup as far east as Kalgoorlie and Salmon Gums Siding, on the Esperance Railway. It inhabits a rich red clay loam, usually on flats, forming open forests of some extent.

Botanical characteristics.—Juvenile leaves ovate to ovate-lanceolate, linear when quite young, glaucous or dull blue-green, petiolate, with fine roughly parallel secondary nerves, the intramarginal vein removed from the edge. Mature leaves narrow-lanceolate, alternate, hanging vertically on rather long petioles, thick, shining, a glossy green on both sides, the midrib conspicuous, the secondary veins not so, the intramarginal vein removed from the margin. In the western portions of its habitat, where the rainfall is the greatest, the leaves are larger and may attain five inches in length. The typical form, however, rarely has larger leaves than three inches, by between a quarter and half inch wide. Peduncles axillary or lateral, terete or almost so, about a quarter of an inch long, supporting an umbel of usually 4 to 7 flowers. Pedicels slender, about as long as or slightly longer than the calyx-tube. Calyx-tube hemispherical to ovate-truncate, very small. Operculum hemispherical, or shortly hemispherical-conical, about as long as the calyx-tube. Stamens inflected in the bud; anthers white, broadly ovate or almost orbicular, with distinct parallel cells. Fruit hemispherical or obovoid-truncate, little more than one-eighth of an inch across, the top of the capsule flush with the calyx-tube, and the small subulate valves well protruded.

The species has affinity with *E. leptopoda*, a Mallee, *E. oleosa*, and *E. Flocktoniae*. The first is a Mallee of the sandplains, not exceeding 15 feet in height, *E. oleosa* is either a Mallee or a Morrel with a rough trunk, and *E. Flocktoniae* is the Merrit. In the field, therefore, it is only necessary to differentiate between these two. *E. Flocktoniae* has larger dark green leaves, a whiter bark (when not a Blackbutt), larger buds with an elongated operculum, and distinctly urceolate fruits.

E. salubris, F. v. M.
"GIMLET."

E. salubris, F. v. M.—"The "Gimlet." (1532 2241) (·1532 5241).

A tree of 60 to 80 feet, with a diameter attaining 30 inches and a bole of 50 feet, but usually much smaller—a tree of about 50 feet and 20 inches diameter. Branches erect, usually slender. The trunk of a young tree is usually spirally fluted or at least very angular, hence the name of "Gimlet." Bark thin, smooth, greenish-red, shining. Timber pale brown, dense and very hard, remarkably tough and strong, with a narrow white sapwood. Leaves shining green, flowers whitish.

Economic uses.—Used on the gold mines as firewood, and in other districts as building and fencing timber, the trunks, especially those of the young trees, remarkably straight and tough, are easily flattened, being angular, and make good poles. It is also used to a less extent in fencing, particularly in districts where Jam (*Acacia acuminata*) is not obtainable. Bark contains 16 to 19 per cent. tans.

Habitat.—Cunderdin and Mullewa, eastwards to the limits of the Salmon Gum, northwards to Goongarrie, and southwards to Kondinin and Lake Cowan, Gilmores, etc.

Botanical characteristics.—Leaves narrow-lanceolate, alternate, thick and shining on both sides, the midrib alone prominent, the secondary veins roughly parallel, the intramarginal one close to the edge. Peduncles axillary or lateral, about ½in. long, flattened, but not broadly so, bearing an umbel of usually 4 to 7 flowers. Calyx-tube ovate-truncate tapering gradually into an angular pedicel. Operculum egg-shaped, longer than the calyx-tube, and of a different colour, usually reddish. Anthers yellowish-white, oblong, opening in parallel slits. Fruit ovoid to hemispherical, small, usually slightly 2-angled, with a narrow convex rim and prominently exserted deltoid valves.

The species has several affinities, such as *E. angustissima, E. leptopoda,* and *E. redunca* among the Mallees. Among the trees it is related to *E. campaspe, E. diptera, E. spathulata,* and *E. oleosa. E. campaspe* has more obtuse buds, larger rounder fruits and conspicuously mealy-white branchlets, not to mention its whitish leaves. *E. diptera* has a precisely similar habit, but prominently 2-winged buds and fruits, and greenish-yellow flowers. *E. spathulata* has much narrower (linear) silvery-green leaves, longer opercula, and smaller obvoid fruits with subulate valves. *E. oleosa* is a rough-stemmed tree.

E. Sargenti, Maiden.

A small tree of 15 to 25 feet with a short stout trunk of up to 18 inches diameter, giving rise to stout erect or widely spreading branches at a height of 6 to 8 feet. The tree has a more or less globular outline, not the usual obconical profile of Eastern trees. The lateral branches spread widely. Bark of the trunk (from 2 to 6 feet above the ground) loosely-flaky in persistent plates of a dark reddish-grey, the upper edges of the plates often reflexed back upon the plates, giving the butt a thicker diameter than would be the case were it smooth. Bark of the upper portion of the tree smooth, or ribbony in patches, particularly in the axils of the branches, the ribbony pieces long and greyish-brown. The smooth bark is thin, and a warm burnt-sienna brown, inclining to green in young trees. Leaves comparatively dense, dull, but a shining green. Flowers not seen.

Economic uses.—Sometimes used as an adulterant for Brown Mallet, but too scarce to be of much commercial value. The timber is light brown, dense and hard, straight-grained and tough, with white sapwood.

Habitat.—Margins of, and "islands" in, the salt rivers of Hine's Hill, Wyola, and Lake Meares, east of Beverley, in sandy saline soil forming thicket-like patches of low forest of small extent.

Botanical characteristics.—Juvenile leaves thin, narrow-lanceolate with fine veins. Mature leaves alternate, petiolate, narrow-lanceolate, of the same colour on both sides—a shining rather dark green—with fine roughly parallel secondary veins. Intramarginal vein distinct from the margin. Peduncles axillary or lateral, long and slender, almost terete, supporting an umbel of 5 to 7 flowers on short, terete pedicels tapering abruptly into the calyx-tube. Calyx-tube more or less ovoid or shortly cylindrical; operculum narrow, long and tapering, about twice as long as the calyx-tube. Stamens erect in the bud. Anthers opening in parallel slits. Fruit nearly hemispherical or narrow-campanulate, on slender pedicels, the rim prominent and narrow, the valves subulate and exserted.

This species is close to *E. astringens, E. redunca,* and *E. Gardneri,* differing from all of them in its rough York Gum-like bark at the base. The fruits of *E. Sargenti* are very much like those of *E. astringens,* but smaller and narrower. *E. Gardneri* has bluish leaves, and *E. astringens* broader deeper green leaves. All have wider leaves than *E. Sargenti.*

E. sepulcralis, F. v. M.—"Weeping Gum." (14x2 7131).

A small tree of remarkable habit, with a thin stem covered with a whitish bark, and long supple branches which hang down almost to the ground like those of a Willow. The leaves are small, of a shining green, and the flowers are yellow. The buds and fruits are bluish-coloured when fresh.

Economic uses.—Beyond its expected adoption as an ornamental tree this species is too small and too rare for any commercial value.

Habitat.—Ravensthorpe, Eyre's Range, and eastwards to Thomas River. Flowering month, January.

Botanical characteristics.—Branchlets angular, bluish. Leaves a vivid green, 2-3½ inches long, narrow-lanceolate, thick and shining, hanging vertically. Peduncles lateral 1-1½ inches long, thin and slightly flattened, bearing two small bracts under the umbel, early deciduous. Pedicels long and slender, gradually

tapering into the calyx-tube, about ½in. long. Buds pear-shaped, the calyx-tube more or less pear-shaped or obconical, wrinkled. Operculum hemispherical-conical with a broad beak. Stamens inflected in the bud; filaments pale yellow; anthers whitish, ovate, opening in upwardly confluent short slits. Fruit ovoid-urceolate, about 1½ inches long, greyish-green, streaked or dotted, contracted at the summit, the capsule very deeply sunk beneath a prominent rim, the small deltoid valves well included.

This species has affinities with *E. buprestium, E. setosa,* and *E. caesia.* It has glaucous branchlets, which are long and pendulous, and longer fruits than *E. buprestium* which is a Mallee, and it is quite different in many respects from *E. caesia,* which has a ribbony red bark, broader leaves and small more distinctly urceolate fruits. *E. setosa* has broad, usually sessile leaves, hairy buds and shorter fruits, and is a tropical species.

E. setosa, Schauer—A "Bloodwood" or "Cabbage Gum." (·4323 * 1125) (*1135) (4324 * 1125) (*1135).

A tree of up to 40 feet; trunk up to 15 feet; diameter 12 inches; bark persistent on the trunk and branches, dark grey and rough; timber reddish, moderately hard and tough; flowers white (W. V. Fitzgerald). We know very little concerning this tropical species. It appears to have a smooth white bark in the other States, but the different specimens from Western Australia have a rough grey bark.

Economic uses.—No known uses for this comparatively rare plant.

Habitat.—The following are the only Western Australian localities known: Broome, Lennard River (W. V. Fitzgerald); South of Fitzroy River (Mayo Logue); Strelley River (Dr. J. B. Cleland); between Wogalla and Minilya (S. L. Kessell); near Mt. Marion (V. Edwards).

Botanical characteristics.—Juvenile leaves orbicular or ovate, glaucous, more or less hairy, sessile, with spreading fine veins, the intramarginal one distant from the edge. Leaves (mature) opposite, sessile, cordate to lanceolate, sometimes in threes, obtuse or acute, 2-4 inches long, often sprinkled with reddish brittle hairs, the veins roughly parallel, spreading, with the intramarginal vein distinctly removed from the edge. Flowers in short terminal loose corymbose panicles, on pedicels often longer than the calyx. Calyx-tube obovoid, about ¼in. long, more or less covered with short reddish bristly hairs. Operculum hemispherical-conical, hemispherical-umbonate, or hemispherical-rostrate, shorter than the calyx-tube. Anthers ovate, with parallel cells. Fruit urceolate-globular, woody, contracted at the summit into a short but more or less distinct neck, hard, woody, slightly over 1 inch long, the rim prominent and deeply concave, the capsule deeply sunk. Perfect seeds, broadly winged.

The species is allied to the *Corymbosae* group of Eucalypts, but differs from *E. terminalis, E. dichromophloia,* and *E. pyrophora* in the sessile leaves. It shows a resemblance also to *E. Foelscheana* and the Marri, Mountain Gum, Red Flowering Gum, etc., but differs from these also in its sessile broad glaucous leaves, and in the hairiness of the younger parts.

E. spathulata, Hooker—"Swamp Mallet," or "Swamp Gimlet." (·1512 3371) (·1512 3372).

Trunk to 15 feet and 10 inches diameter, branches erect, arising from the trunk at an acute angle. Bark thin, silvery-brown to reddish-green, much like that of the Gimlet (*E. salubris*). Timber brown, rather pale, hard and dense, straight-grained, with a narrow sapwood. Leaves silvery-green, flowers white.

Economic uses.—The species yields 25-30 per cent. tannins. It is of little value as a timber.

Habitat.—The tree form of this species is found in the sandy swamps, or low-lying sandy spots which form lakes in the winter months, to the east of Wagin and Katanning. It occurs in low forest formation with Paperbarks and tea trees. Fl. m. July.

Botanical characteristics.—Juvenile leaves linear to narrow-lanceolate, sessile. Mature leaves linear, rather thick, shining silvery-green, copiously oil-dotted with inconspicuous veins, even the midrib scarcely evident, scarcely petiolate. Peduncles short, axillary, slightly flattened, bearing each an umbel of 4-7 flowers. Calyx-tube ovoid or obovoid, with a short slender pedicel; operculum oblong-cylindrical, of a chestnut brown which contrasts with the green of the calyx-tube. Stamens erect, little more than ¼in. long, with oblong anthers opening in parallel cells. Fruit obovoid-hemispherical, or almost campanulate, small, often slightly 2-angled, slightly contracted at the orifice, with a slightly convex rim and sunk capsule with exserted subulate valves.

The affinities are with *E. platypus, E. occidentalis* and *E. redunca,* but it can be distinguished from each by its narrow leaves. It also has affinity to *E. angustissima*, which is a Mallee to the east of Esperance.

In the field it is only likely to be confused with the Gimlet (*E. salubris*), but may be distinguished from Gimlet by its narrow silvery-green leaves, and oblong operculum.

E. Spenceriana, Maiden—"Grey Box" of Kimberley. (·4234 2112) (4234 2132).

(See illustration, page 99.)

A tree of 10-35 feet, but occasionally attaining a height of 50 feet. Trunk usually short and stout, about 15 feet high, and up to 18 inches diameter. Bark persistent throughout, even to the small twigs, light, or dark grey, rough and fibrous-flaky, closely resembling that of the Tuart (*E. gomphocephala*), close and thick. Branches spreading or more or less erect, few, and sparsely foliaged. Timber dark reddish-brown, hard and dense, with an interlocked grain, with white fibre-like pores. Sapwood thin, light yellow. Leaves pale glaucous green, flowers white.

Economic uses.—Occupying more or less uninhabited country, this timber has not been put to any extensive use. It appears to be quite a suitable substitute for Coolibah which it closely resembles. It has been used to some extent in building sheds and stockyards, and is highly prized on account of its termite-resisting qualities. It stands well in the ground.

Habitat.—The Grey Box is commonly found on the basaltic areas of Kimberley to the north of the Lennard River in West Kimberley. It flowers about December.

Botanical characteristics.—Juvenile leaves broadly lanceolate, obtuse, gradually tapering into a petiole of about ¾in., pale-coloured on both sides, the secondary veins fine and numerous, roughly parallel, the intramarginal vein not far distant from the edge. Mature leaves long-lanceolate, pale dull green, 4-6 inches long, with rather prominent veins, the intramarginal one rather close to the edge. Flowers arranged in slender panicles, shorter than the leaves. Umbels with slender peduncles and pedicels both terete. Buds small. Calyx-tube oblong-clavate, gradually tapering into the pedicel. Operculum hemispherical-conical, or shortly conical, much shorter than the calyx-tube. Anthers ovate or reniform, opening in terminal pores. Fruit papery, ovoid and thin, with a sunk capsule and short included valves.

Its affinities lie with *E. microtheca*, *E. papuana*, and *E. brachyandra*.

It closely resembles *E. microtheca*, but the timber is slightly more red, and the bark lighter in colour. The chief difference is in the fruit. That of *E. microtheca* is hemispherical with short protruding valves. *E. Spenceriana* has a fruit twice as large and rather more papery, with included valves, and can be furthermore distinguished by the bark which is persistent throughout, *E. microtheca* having smooth branchlets.

E. papuana has a brighter green foliage, and clean bark. The fruits are rather similar, but the flower has an obtuse operculum, and anthers with parallel cells. The anthers are also versatile, while those of *E. Spenceriana* are erect.

E. brachyandra has much shorter, obtuse ovate deciduous leaves, and much smaller flowers in denser panicles. It is also a much smaller tree.

E. staeri, Maiden Ms.—"Albany Blackbutt." (·4311 1151).

An erect tree of 40-50 feet with a stout trunk and rather spreading branches. Trunk to 30 feet and 24 inches diameter. Bark dark greyish-brown, thick and longitudinally fissured, the fissures more or less whitened or yellowish-grey, the outer bark shedding in broad flakes not as stringy as that of the Jarrah, but not friable as the Blackbutt bark. It is intermediate between the two in character and appearance. Timber pale, yellowish. Branches crooked. The inner flakes of bark reddish.

Economic uses.—Not used at present, except as firewood.

Habitat.—Sandy, usually sub-swampy flats near Albany, extending over the sandy places to Denmark and near the Kent River; flowers yellowish-white, flowering in November.

Botanical characteristics.—Juvenile leaves not seen in quite the youngest state, ovate, thin, sessile, pale green with conspicuous midrib and purple-red nerves, the secondary veins spreading and irregular, the intramarginal vein distant from the edge. The leaves are obtuse, and roughly 2 inches long by 1¼ inches wide. Mature leaves ovate-lanceolate to lanceolate, thick and rigid, on very angular branchlets and flattened twisted petioles, acuminate, pale green with a thick yellowish midrib and fine roughly parallel spreading veins; the intramarginal one at a distance from the thickened margin. Peduncles axillary, about 1 inch long, stout and flattened, widened near the top, supporting an umbel of 4-8 rather large flowers on fairly long angular pedicels. Calyx-tube obconical, or narrowly turbinate, tapering into the pedicel and, together with the pedicel, over ½in. long. Operculum conical, reddish-yellow, slightly spreading at the base and forming a prominent angle with the calyx-tube. Filaments whitish; anthers kidney-shaped, opening in upwardly confluent slits. Fruit globose, about 1 inch in diameter, pale yellow-brown with a prominent rim and slightly sunk capsule with obtuse included valves.

The affinity of this species is with *E. marginata*, from which it differs in the yellow timber, wider thicker leaves, larger flowers and fruits.

E. striaticalyx, W. V. Fitzg. (·3213 6422) (·3213 8422).

A tree of 30 to 40 feet, with a trunk of up to 18 inches in diameter. Bark dark grey, moderately thick, rough, persistent and flaky, thin, yellow inside, covering the lower portion of the trunk, or the whole of the trunk and part of the branches; bark of the upper portions thin, whitish and smooth, decorticating in small sheets. Timber pale brown, very hard.

Tree rather erect in habit, leaves greyish-green, flowers pale.

Economic uses.—Extensively cut for firewood in the Cue district, where it is known under the name of "York Gum."

Habitat.—Milly's Soak, near Cue, and about four miles east of Nannine, both on the Meekatharra Railway.

Botanical characteristics.—Juvenile leaves ovate-orbicular, obtuse, dull, with rather short petioles, spreading veins, and the intramarginal vein distinctly removed from the edge. Leaves (mature) alternate, conspicuously petiolate, ovate-lanceolate to lanceolate, slightly falcate, thick, rather leathery, 3 to 6 inches long, with numerous, very fine divergent veins, the intramarginal one close to the edge, dull greyish-green on both sides. Peduncles axillary or lateral, solitary, or forming short terminal panicles, terete or scarcely angular, ½ to ¾ inch long, each bearing an umbel of 6 to 8 flowers. Calyx-tube turbinate, in the bud over ¼ inch long, smooth or nearly so, tapering into the short pedicel. Operculum hemispherical with a short beak, about the same length as the calyx-tube but broader, with 10 to 15 longitudinal raised lines. Stamens inflected in the bud; anthers broadly oblong with parallel distinct cells. Ovary shortly conical in the centre. Fruit obovoid or truncate-pyriform, nearly ½in. long and about ¼in. across, faintly and irregularly streaked with fine lines, scarcely contracted at the summit, the rim rather broad and slightly concave; valves awl-like, slightly exserted, or more or less flush with the top of the fruit.

The affinities of this species lie with *E. incrassata*, *E. foecunda*, and *E. dumosa*. *E. incrassata* and *E. dumosa* are Mallees, while *E. striaticalyx* is a tree. At the same time the specimens of each are very much alike. The broad operculum and striated buds should distinguish *E. striaticalyx* from the others, together with its habitat and habit. The habit of the tree is closer to that of the "York Gum" (*E. foecunda*, var. *loxophleba*), but the venation of the leaf, hemispherical-umbonate opercula, and broad fruits should serve to distinguish it from the latter.

E. Stricklandi, Maiden.

"GOLDFIELDS YELLOW FLOWERING GUM."

E. Stricklandi, Maiden—"Goldfields Yellow-flowering Gum." (·2532 * 4472) (*3472).

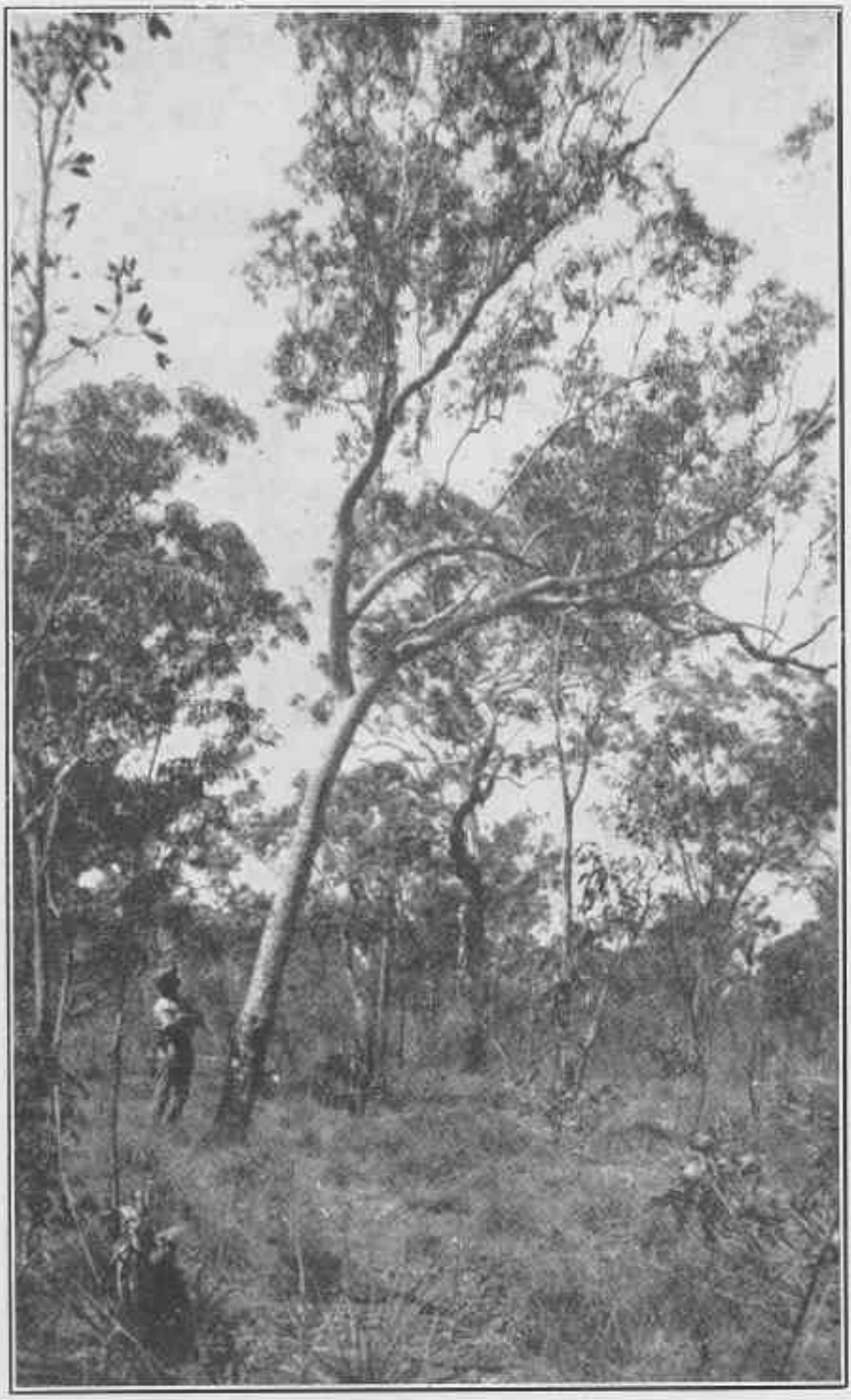
A tree of 30 to 45 feet with a stout trunk and widely spreading, poorly foliaged branches. Trunk to 15 feet and 2 feet in diameter. It is a Blackbutt. Bark for the first 2 to 8 feet of the trunk almost black, thick, persistent and flaky. Bark of the upper portions smooth, or slightly ribbony (at times), reddish-brown, thin, with light grey flakes or patches which later decorticate as dark grey ribbony flakes of bark. Timber deep brown or reddish-brown, hard and dense with an interlocked grain. Leaves glaucous, very thick, flowers yellow, large, with mealy-white branchlets.

Economic uses.—This timber is used for firewood on the gold mines of the Coolgardie Goldfield.

Habitat.—Widgiemooltha to south of Higginsville and eastwards towards the Fraser Range. It is a fairly rare tree with a very restricted habitat and occurs on stony hills in small patches.

Botanical characteristics.—Juvenile leaves broadly lanceolate to nearly orbicular, pale-coloured and petiolate. Mature leaves glaucous on both sides, very thick, lanceolate, 4 to 8 inches long, and petiolate, drooping, the secondary veins fine and inconspicuous, roughly parallel, with the intramarginal vein removed from the edge. Peduncles mostly lateral, broad, thick and spreading, ¾in. long and over ¼in. wide, mealy-white broadened and thickened at the top, supporting an umbel of 4 to 6 sessile flowers. Calyx-tube urceolate-cylindrical, with two very prominent and one or two less prominent ribs; operculum oblong, or oblong-ovoid, about the same length as the calyx-tube with a prominent junction at the base, obtuse, and widened towards the base. Stamens lemon-yellow, with long narrow anthers opening in parallel cells. Fruit shortly cylindrical or almost campanulate, slightly narrowed in the middle, with a narrow rim, slightly sunk capsule and slightly exserted or almost flush valves.

A very distinctive species with a possible affinity to *Euc. grossa,* a shrub with yellow flowers, more pointed opercula, and different fruits.



E. terminalis, F. v. M.

"IRONBARK."

E. terminalis, F. v. M.—"Ironbark." (·4323 4131) (·4324 4131).

An erect tree of 40 to 60 feet, with erect or slightly spreading branches. Trunk to 35 feet and 2 feet in diameter. Bark persistent throughout, rough, longitudinally fissured, light to dark grey in colour, soft and fibrous. Timber dense, of a deep red colour. Leaves thick and shining. Flowers white.

Economic uses.—Occupying uninhabited country, this species has not been used up to the present. It possesses a straight-grained, strong timber which should be useful for many purposes when the country which it inhabits is developed.

Habitat.—A common tree of the sandstone areas of Kimberley to the north of Broome, forming open savannah forest with a ground covering of grass, in sandy loam.

Botanical characteristics.—Juvenile leaves broadly ovate, obtuse, slightly hairy, petiolate, with hairy petioles and stems and fine venation, the intramarginal vein quite removed from the edge. Mature leaves alternate, lanceolate-falcate, petiolate, thick and shining, the same colour on both sides, rather rigid, with closely parallel fine veins, the intramarginal vein close to the thickened margin. Flowers in terminal corymbs on rigid peduncles, terete and thickened at the summit. Pedicels short and thick. Calyx-tube obconical or almost pyriform, glaucous, about ½in. long. Operculum hemispherical-conical, or hemispherical, obtuse. Stamens inflected in the bud, anthers oblong, opening in parallel cells. Fruit urceolate-cylindrical, or quite cylindrical, about 1¼ inches long, and slightly over ½ inch in diameter, glaucous and woody, with a narrow rim, and very deeply sunk capsule with included valves.

The affinities, as far as Western Australian species are concerned, lie with *E. pyrophora* and *E. dichromophloia*. From the latter it differs in the thicker leaves and longer fruits. For its affinities to *E. pyrophora*, see the note under that species.

E. tetrodonta, F. v. M.—"Messmate," or "Stringybark." (·4324 3112).

An erect tree of 35 to 50 feet, with more or less erect branches. Trunk to 35 feet and 20 inches to 2 feet diameter. Bark persistent throughout, rough and fibrous with dense interlocked fibres and quite stringy, rather similar to that of the Jarrah. Timber pale red when fresh, dense and fairly hard, with a thin white sapwood. Leaves drooping, glaucous, flowers yellowish-white.

Economic uses.—Occupies unsettled country, and has therefore been put to no use. It appears quite suitable for building construction and ground work.

Habitat.—Sandstone or ironstone areas of East Kimberley, extending westwards to the Phillips Range and Prince Regent River. It does not occur to the south of the King Leopold Range. Forms open forests, more dense than any other Eucalyptus forest in Kimberley, with a shrubby or coarse grass undergrowth. Flowering month—July.

Botanical characteristics.—Juvenile leaves opposite or alternate, ovate to ovate-lanceolate, large, with short petioles, spreading veins, the intramarginal vein close to the edge. Mature leaves opposite, lanceolate-falcate, acuminate, distinctly petiolate, pale green on both sides, more or less pendulous, with fine irregular spreading veins, the intramarginal vein distinct from the margin. Peduncles axillary, slightly angular and rather thick, nearly ½in. long, supporting an umbel of 3 to 5 flowers on very short flattened pedicels. Calyx-tube obconical, 2-angled, with 4-rounded obtuse teeth at the summit, somewhat resembling large thick cloves. Operculum hemispherical, smooth. Stamens yellowish-white, rather long, with oblong anthers opening in parallel cells. Fruit more or less shortly cylindrical or campanulate, more or less 2-angled, the 4 calyx-tube teeth prominent, the rim prominent and forming a raised yellow ring, the capsule slightly sunk and flat-topped, opening in three or four valves which are deltoid and enclosed.

This species has affinity with the shrubby *E. odontocarpa,* which occurs to the south of the Fitzroy River, and has smaller narrower leaves, and more prominent calyx teeth. The Messmate has no close affinities among the trees.

E. Todtiana, F. v. M.—"Prickly-bark," or "Coastal Blackbutt." (·4211 1121) (·4311 1121).

A tree of 30 to 50 feet with widely spreading branches, some of the lower branches pendulous. Bark persistent throughout. Trunk to 25 feet and 3 feet in diameter. Timber pale, but brittle. Bark dark grey, rough and fibrous, the fibres short and prickly. Leaves shining green. Flowers yellowish-white.

Economic uses.—This tree does not possess a valuable timber, being too short in the grain and brittle.

Habitat.—From the Arrowsmith River below Geraldton, to the Swan River around Perth, the largest trees being seen in the latter locality. The Northern ones are smaller. It inhabits a poor sandy soil. Fl. m. February.

Botanical characteristics.—Mature leaves 3-4 inches long, narrow-lanceolate, straight, with very prominent midribs and spreading veins, the intramarginal vein removed from the edge, or close to it, the leaf thick and rigid. Peduncles axillary, about ½in. long, slightly flattened, or almost terete, supporting 4-7 flowers in an umbel, or short compressed pedicels. Calyx-tube turbinate. Operculum hemispherical-umbonate, much shorter than the calyx. Stamens yellowish-white, rather long; anthers ovate, opening in longitudinal upwardly confluent slits. Fruit globular, pale grey-glaucous, about ¾in. diameter, with a broad convex rim, and sunk capsule with short broad included valves.

The affinities lie in *E. patens, E. marginata,* and *E. buprestium. E. buprestium* is a small Mallee. *E. patens* has thinner falcate leaves not shining as in *E. Todtiana,* much smaller fruits and narrow anthers. *E. marginata* has a red timber, long conical opercula, and much smaller fruits. It is also a larger tree.

E. torquata, Luehm.

"GOLDFIELDS RED FLOWERING GUM."

E. torquata, Luehmann—"Christmas Tree" (of Goldfields), or "Red-" or "Coral-flowered Gum." (·3332 4182).

A tree of 20-35 feet with a short trunk and widely spreading branches. Bark of the trunk persistent, dark grey and flaky, extending to the lower branches. Bark of the branches smooth or inclined to be ribbony, greenish-grey, dark-coloured. Timber dark brown, hard and dense, very tough. Trunk to 12 feet, and 18 inches diameter. Leaves glaucous, flowers coral-pink, or yellowish-white, with handsome reddish calyces and opercula. Branchlets reddish.

Economic uses.—Only used as firewood. It is an uncommon small tree with a restricted habitat. The species is one of the most ornamental of the Eucalypts, and flowers when very young. The bark yields 17.6 per cent. tannins.

Habitat.—Coolgardie, and southwards to below Higginsville and Norseman, and westwards to Bullabulling. An inhabitant of red stony loam, on hills or rising ground. Fl. m. November-December.

Botanical characteristics.—Leaves alternate, lanceolate to narrow-lanceolate, rather thick, glaucous, of the same colour on both sides, with long petioles, and fine diverging inconspicuous nerves, the intramarginal vein removed from the edge. Peduncles axillary or lateral, slender and recurved, terete, thickened towards the summit, supporting an umbel of 6-8 flowers. Pedicels long and slender, about as long as the peduncle, ¾in. long, slightly flattened or quadrangular. Calyx-tube ½in. long, urceolate-cylindrical, dilated at the base into a rim composed of about 7-10 prominent short vertical ridges which are inconspicuous further up the calyx-tube. Operculum narrowly conical, broadly dilated at the base with a ring of short ridges or ribs similar to those of the base of the calyx, the upper portion long and narrow, acute, the whole operculum about ¾in. long. Stamens 4-7 lines long, anthers oblong, wider at the top than the base, opening in parallel cells. Fruit ovoid-oblong, or ovoid-cylindrical, with the basal corrugations of the calyx, about ½in. long, slightly contracted at the summit, with a narrow rim and included subulate valves.

The species has affinities in *E. incrassata, E. Clelandi,* and *E. corrugata,* but the habit of the tree, shape of the operculum, colour of the flowers and shape of the fruit makes it quite distinct.

E. transcontinentalis, Maiden.
"GOLDFIELDS REDWOOD."

E. transcontinentalis, Maiden—"Redwood." (·2122*2362) (*7362) (3322*2362).

A tree of 50-70 feet with a long clean slender trunk of 30-40 feet and up to 20 inches in diameter, or a *Morrel* with a rough trunk, and greyish glaucous branchlets. The Morrel form is rare, and only occurs in the Westonia district. The Goldfields (Kalgoorlie) form has either a perfectly smooth trunk, or a small flaky butt of 1-2 feet high. Bark smooth, greyish-white, or pinkish, fairly thick, yellow in fracture, and not unlike that of the Salmon Gum. Branches erect, slender, sparsely foliaged with glaucous or pale leaves hanging vertically, and yellowish-white, or yellow flowers. Timber reddish-brown, very tough and hard, durable.

Economic uses.—Used on the gold mines for firewood.

Habitat.—The Eastern Goldfields generally, extending westwards to Westonia and northwards to Comet Vale. Fl. m. November. It inhabits a red clay loam, usually on flats with Salmon Gum.

Botanical characteristics.—Juvenile leaves glaucous, sessile or almost so, broadly lanceolate or ovate, about 2½ inches long by ¾in. wide, the secondary veins irregularly pinnate, the intramarginal one distinctly removed from the edge. Mature leaves glaucous on both sides, petiolate, alternate, lanceolate-acuminate, about 4 inches long, covered with fine oil-dots, the veins not very distinct, the intramarginal one removed from the edge. Peduncles mostly lateral, terete or slightly compressed, supporting an umbel of 4-9 flowers, on slender terete pedicels. Calyx-tube cylindrical-urceolate, yellowish; operculum long and tapering with a more or less dilated base, wider than the calyx-tube, about ½in. long. Stamens inflected in the bud; anthers broad, thick and white, with the longitudinal slits slightly oblique. Fruits ovoid-urceolate, glaucous, not ½in. long, with a narrow concave rim, the capsule deeply sunk, with the subulate valve-points protruding.

The affinities are with *E. oleosa, E. longicornis,* and *E. falcata.* The tree form of *E. oleosa* differs in the obtuse operculum chiefly, *E. longicornis* has an operculum continuous with the calyx-tube, and often narrower and more hemispherical fruits. *E. falcata* has a ribbed calyx-tube which is wider than the operculum, and almost globular. *E. transcontinentalis,* in addition to the other distinctions, may be recognised among the above by its glaucous leaves, branchlets and fruits, and decidedly yellow operculum.

E. Woodwardi, Maiden—A "Blackbutt." (·2112 3422).

A tree of 40-50 feet, with a smooth bark, except for a dark scaly butt, glaucous in all its parts, with almost mealy-white foliage.

Economic uses.—Not known in this very scarce species.

Habitat.—To the immediate west of Zanthus Siding on the Great Western Railway, and 60 miles south of Victoria Spring.

The above are the only localities known.

Botanical characteristics.—Juvenile leaves probably ovate to ovate-acuminate, with distinct but not prominent venation, the midrib channelled (in the intermediate stage), and the lateral veins rather spreading and roughly parallel, the intramarginal one at a considerable distance from the edge. Mature leaves very thick, rigid and glaucous, of the same colour on both sides, nearly straight, petiolate, broadly lanceolate or ovate-acuminate, usually about 4-6 inches long and 1½-2 inches wide, the midrib distinct, with fine inconspicuous veins and a thickened margin. Peduncles short and terete, supporting an umbel of usually 3 or 4 flowers, on terete fairly short pedicels. Calyx-tube urceolate-campanulate, the operculum hemispherical with a blunt short beak. Flowers orange-coloured; anthers not seen mature, but apparently oblong, opening in parallel cells. Fruit sharply separated from the short pedicel, urceolate-campanulate, a little over ½in. long, with a prominent rim and included or almost flush valves.

Its affinities are with *E. caesia, E. miniata, E. pruinosa,* and *E. campaspe. E. caesia* has pink flowers, larger urceolate-globular fruits and smaller leaves, and is a small tree. *E. campaspe* is a "Gimlet" with small almost hemispherical fruits and longer narrower leaves, and *E. miniata* and *E. pruinosa* are Kimberley trees.

Index of Vernacular Names.

INDEX OF VERNACULAR NAMES—*continued.*

Alphabetical List of Western Australian Eucalyptus Trees.

Trees which occasionally take on a Mallee form—

E. astringens, Maiden
E. celastroides, Turcz.
E. cornuta, Labill
E. decipiens, Endl.
E. diptera, C. Andrews
E. falcata, Turcz.
E. Flocktoniae, Maiden
E. Gardneri, Maiden
E. gracilis, F. v. M.
E. marginata, Smith
E. megacarpa, F. v. M.
E. oleosa, F. v. M.
E. salubris, F. v. M.
E. spathulata, Hooker
See also Mallees occurring as trees

Alphabetical List of Mallees and Marlocks.

E. angulosa, Schauer
E. angusta, Maiden
E. angustissima, F. v. M.
E. annulata, Benth
E. buprestium, F. v. M.
E. calycogona, Turcz.
E. Comitae-Vallis, Maiden
E. conglobata (*R. Br*), Maiden
E. crucis, Maiden
E. decurva, F. v. M.
E. diptera, Cecil Andrews
E. doratoxylon, F. v. M.
E. dumosa, A. Cunn
E. Ebbanoensis, Maiden
E. eremophila, Maiden
E. eremophila var. grandiflora, Maiden
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E. erythronema, var. marginata, Benth.
E. eudesmioides, F. v. M.
E. Ewartiana, Maiden
E. falcata, Turcz.
E. foecunda, Schauer
E. Forrestiana, Diels
E. goniantha, Turcz.
E. grossa, F. v. M.
E. Herbertiana, Maiden
E. incrassata, Labill
E. Jutsoni, Maiden
E. Kalganensis, Maiden
E. Kruseana, F. v. M.
E. Lehmanni, Preiss
E. leptophylla, F. v. M.
E. leptopoda, Benth.
E. macrandra, F. v. M.
E. macrocarpa, Hooker
E. micranthera, F. v. M.
E. occidentalis, *Endl. var. stenantha*, Diels
E. odontocarpa, F. v. M.
E. Oldfieldii, F. v. M.
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E. pachyloma, Benth
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E. pyriformis, var. elongata, Maiden
E. pyriformis, var. Rameliana, Maiden
E. pyriformis, var. Kingsmilli, Maiden
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E. redunca, var. melanophloia, Benth.
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E. Sheathiana, Maiden
E. tetragona, F. v. M.
E. tetraptera, Turcz.
E. uncinata, Turcz.
E. Websteriana, Maiden
E. xanthonema, Turcz.

Mallees, which sometimes have a tree form—

E. annulata, Bentham
E. conglobata (*R. Br.*), Maiden
E. diptera, Cecil Andrews
E. doratoxylon, F. v. M. (?)
E. eremophila, Maiden
E. eudesmioides, F. v. M. (?)
E. falcata, Turcz.
E. Lehmanni, Preiss.
E. leptophylla, F. v. M.
E. oleosa, F. v. M.
E. platypus, Hooker
E. spathulata, Hooker
See also list of trees sometimes occurring as Mallees

GLOSSARY.

Acuminate : Having a tapering point.

Arborescent : Having the form of a tree.

Anther : That portion of the stamen which contains the pollen. Situated in Eucalyptus species at the top of the stamen and made up of two lobes joined together by the connective.

Axil : The angle formed between a branch and another branch or a branchlet, and a leaf stalk.

Axillary : In the axil.

Biretta : A square cap.

Calyx : The outermost of the floral envelopes fused in the Eucalypts to form the calyx tube.

Calyx Tube : A tubular form of the calyx, due to the union of the sepals; the cup which finally forms the outer layer of the eucalyptus fruit.

Campanulate : Bell-shaped.

Capsule : That portion of the fruit which contains the seeds.

Commissural Line : The line formed by the junction of the calyx tube and the operculum.

Concave : Hollowed out.

Conical : Cone-shaped.

Connective : That portion of the stamen, distinct from the filament, which connects the two lobes of the anther.

Convex : Rounded, bulging.

Corymb : A convex flower cluster of an indefinite inflorescence.

Deltoid : Shaped like the Greek Δ ; an equilateral triangle.

Disc : The flat summit of the flower or ripe fruit between the inner edge of the calyx and the base of the valves.

Discoid : Resembling a disc.

Exserted : Protruded beyond.

Falcate : Sickle-shaped or curved to the side.

Filament : Part of the stamen (q.v.); the stalk of the anther.

Fruit : The "Nut" or "Gum nut."

Glaucous : Bluish-green; covered with bloom as a plum or cabbage leaf.

Inflected : Bent sharply inwards.

Intramarginal vein : A vein which follows the margin of the leaf near the edge.

Lanceolate : Narrow, tapering to each end.

Mallee : See page 8.

Marlock : See page 8.

Midrib : The central and principal vein of a leaf.

Obconical : Shaped like a cone, but attached at the narrow end.

Obcordate : Inversely heart-shaped.

Oblique : Slanting.

Obtuse : Blunt; rounded at the end.

Operculum : The lid or cap which covers the stamens in the bud of a Eucalypt.

Orifice : The opening in the top of the fruit within the rim or disc.

Ovoid : Egg-shaped.

Panicle : A cluster of flowers on a stalk irregularly arranged.

Pedicel : A flower stalk bearing a single flower in a cluster of flowers.

Peduncle : The main stalk bearing a cluster of flowers.

Peltate : Applied to a leaf in which the petiole is attached to some point distinctly within the margin.

Petiole : The stalk of a leaf.

Petiolate : Having a petiole.

Reinform : Kidney-shaped.

Rim : The upper edge of the fruit.

Rostrate : Possessing a beak.

Sessile : Without a stalk.

Shrub : See page 8.

Stamen : The pollen-bearing organ. A large number of stamens make up the attractive portion of a Eucalyptus flower and wither off as the fruit opens.

Style : The connection between the stigma and the ovary.

Subulate : Awl-shaped.

Terete : Circular in transverse section.

Tree : See page 8.

Turbinate : Shaped like a top; conical.

Umbel : A cluster of flowers in which a number of stalks, each bearing a flower, radiate from one centre.

Umbonate : Having a rounded knob in the centre.

Urceolate : Urn-shaped.

Valves : The split portions of the top of the ovary, or base of the style, which when open in the ripe fruit allow the seeds to escape through pores.

Versatile (anther) : Turning freely (on the filament).

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