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Received
THE FOREST FLORA OF NEW SOUTH WALES.

BY

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GOVERNMENT BOTANIST
AND DIRECTOR OF THE BOTANIC GARDENS,
SYDNEY.

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[The names of Synonyms or Plants incidentally mentioned are in *italics*.]

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<td>Leaf</td>
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<td>or Cabbage Gum</td>
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<tr>
<td>or Common Pine</td>
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<tr>
<td>or Grey Box</td>
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<tr>
<td>or Grey Ironbark</td>
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<td></td>
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<tr>
<td>Pale, or Pink Bloodwood</td>
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<td></td>
<td></td>
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<td>Sally</td>
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<tr>
<td>Top</td>
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<td>Widdringtonia, Endl.</td>
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<tr>
<td>Wild or Native Plum</td>
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<td>Willow</td>
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<td>Weeping</td>
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<td>Woongul</td>
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<td>Worgnal</td>
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<td>Wyeaulie</td>
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<td>Yarran</td>
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<td>Yeh</td>
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<td>67, 116, 200</td>
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<td></td>
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<tr>
<td>Cedar</td>
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<tr>
<td>Yerre</td>
<td>199</td>
<td></td>
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</tbody>
</table>
THE FOREST FLORA
OF
NEW SOUTH WALES.

J. H. MAIDEN,
Government Botanist of New South Wales and Director of the
Botanic Gardens, Sydney.

PART XI.
Published by the Forest Department of New South Wales, under authority of
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No. 39.

**Eucalyptus tereticornis, Sm.**

The Forest Red Gum.

(Natural Order MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*, see p. 33, Part II.

**Botanical description.**—Species, *E. tereticornis*, Sm. A tall tree, with a smooth, whitish or ash-coloured bark, shedding in thin layers.—(F. Mueller and others.)

*Leaves.*—Lanceolate, mostly falcate and acuminate, often exceeding 6 inches long, the veins rather regular and numerous, and oblique as in *E. rostrata*, but often rather coarser, the intramarginal one rather distant from the edge.

*Peduncles.*—Axillary or lateral, not very short, terete or angular, the upper ones sometimes forming a short panicle, each bearing about four to eight flowers on pedicels of 1 to 3 lines.

*Calyx tube.*—Turbinate, 2 to nearly 3 lines diameter.

*Operculum.*—Conical acuminate, usually about ½ inch long, always much longer than the calyx-tube and usually broader, of a rather thin texture and smooth.

*Stamens.*—Often ½ inch long, more or less inflected in the bud, but sometimes only very shortly so at the ends; anthers small, ovate, with parallel distinct cells.

*Ovary.*—Nearly as long as the calyx-tube, and convex or conical in the centre.

*Fruit.*—Obovoid or almost globular, 3 to 4 lines diameter, the rim broad and very prominent, the capsule not sunk, the valves protruding beyond the rim.—(B.Fl., iii, p. 241.)

**Botanical Name.**—*Eucalyptus*, already explained, Part II, p. 34; *tereticornis*, Latin—*teres, teretis*, long and round, taper as a tree or pillar; *cornu*, a horn, referring to the shape of the operculum.

**Vernacular Names.**—"Forest Red Gum." This tree is very closely related to the Murray Red Gum, which is always found near watercourses or on alluvial country. The species is, with important exceptions indicated, usually found in open forest country, hence I recommend the adoption of the prefix "Forest" to Red Gum, the name by which it is very commonly known, with the view to save confusion. It sometimes also goes under the names of Blue and Grey Gum, and even others, but these names are best reserved for other trees.
Aboriginal Names.—By the aborigines of northern New South Wales and southern Queensland it is called "Mungurra," or "Mungara." By those of Central Queensland it was called "Arangnnulla," according to the late M. Thozet. Caley (1800–10) gave the names (Sydney district) as "Yarro" ("Bastard Gum") and "Burringora" to a broader-leaved form, perhaps variety *latifolia*. Cumbora ("July, 1807") is certainly variety *latifolia*, while "Calgargro is certainly variety *squamosa*, while "Caro" probably is.

Synonyms.—*E. subulata*, A. Cunn. See also the names given under the separate varieties.

Leaves, Oil.—Messrs. Schimmel & Co. (Bericht, April, 1893, p. 38) examined the oil of a Red Gum from Queensland, and say:—"A red oil of an odour not easily definable, resembling oil of Zeodary. Contains no cineol. Practically valueless."

Messrs. Baker and Smith (Research on the Eucalypts) say of this species:—

<table>
<thead>
<tr>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation, $[\alpha]_D$</th>
<th>Saponification Number</th>
<th>Solubility in Alcohol</th>
<th>Constituents found</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9218</td>
<td>$-102^\circ$</td>
<td>267</td>
<td>1 vol. 80%</td>
<td>Pinene, eucalyptol, aromadendral</td>
</tr>
</tbody>
</table>

As will be seen later, there are at least three forms of *tereticornis* at Tenterfield, but I cannot assert positively which one is the Red Gum of Tenterfield referred to in the following:—

Oil from a variety of Eucalyptus, which is called Red Gum of Tenterfield. Specific gravity, 0.9144; optical rotation, $[\alpha]_D = -2^\circ 38^\prime$. Insoluble in 70 per cent. alcohol; soluble in equal parts of 80 per cent. alcohol. The oil has an odour like cumic aldehyde, contains cineol, but is free from phellandrene. As these data show, it is on the borders of a class of superior Eucalyptus oils, but it cannot replace a normal globulus oil.—(Schimmel & Co., Semi-annual Report, October, 1900, page 32.)

Timber.—Of a deep red colour, hard and inlocked in the grain, heavy and durable. Apt to warp in seasoning, and, in common with many of its congeners, it is very hard to work up when dry. It has some tendency to shell off, which limits its use for such purposes as flooring and decking. It is much esteemed for fence posts and any underground work, its great durability for this purpose having been long established. Used also for naves and felloes of wheels, and for general building purposes. Its merits and defects are much the same as those of Murray Red Gum, and I draw attention to it as a meritorious timber for wood-blocks. It is a valuable timber for railway sleepers.

Size.—The normal species furnishes the largest trees,—say, up to 100 or 120 feet high, with a diameter of 3 or 4 feet. Notes on the sizes attained by the varieties will be given below.
**Habitat.**—The normal form is chiefly confined to the coastal districts and to the eastern slopes of the table-lands. As for definiteness I have given details of localities of the varieties, I give a few illustrative localities of the normal form.

*Victoria.*—Gippsland.

*New South Wales.*—Eden to Moruya, Shoalhaven River, Crookwell, north to Sydney and Parramatta. Very near the normal on the Mudgee line; common along the North Coast.

*Queensland.*—Common on coast, at least as far north as Rockhampton; the Herbert River; and the Northumberland Islands. Leichhardt called some specimens "Scaly Gum."

*New Guinea.*—It is one of the few Eucalypts that extend to this dependency.

**Varieties of *E. tereticornis***.

*E. tereticornis* is one of the most variable of our Eucalypts; it has an extensive range, and exhibits much variation even in its operculum, which is usually looked upon as its most characteristic organ. For example, the operculum of var. *squamosa* is conical and even hemispherical; a similar tendency is shown in var. *dealbata*, and especially in those forms which extend into the far interior, and which, I think, cannot be differentiated from *E. rostrata* growing in those regions. Var. *squamosa* has a peculiar glaucous appearance unique among the Eucalypts in the districts in which it grows; this appearance is also to be observed in interior forms of *E. tereticornis*. In fact, glaucousness is an accidental character, the same plant being often more glaucous at one period of the year than at another, while the difference in glaucousness, owing to environment, is notorious.

Of this species we have at least four well-defined varieties. I call them varieties, as they run into each other and every one runs into the other and into the typical form. I will give instances of this later on. Mr. Duff, formerly Superintendent of the Botanic Gardens, found what he called no less than four forms in the Sydney Domain. They are all near the species type, but all vary in habit of tree, foliage, fruit, etc.

Certain Kanimbla Valley, N.S.W. (Lowther), specimens are interesting in this connection. They have fruits and buds between *dealbata* and *latifolia*, forming indeed one of the strikingly intermediate forms. The leaves have very marked intramarginal veins, and the fruits remind one of those of *E. punctata* in shape. A few yards away we have a tree whose fruits are nearly normal.

There is an instance of fibrous barked *tereticornis* mentioned by Bentham (B.Fl. iii, 241). "In one specimen from the granite hills between Nine-mile Creek and Broken River, Victoria, F. Mueller has appended the note that the bark is
persistent like that of 'Box.'" Without suggesting for a moment that Mueller is wrong, it is proper to put students on their guard that E. resinifera has a fibrous bark and sometimes has opercula as long as ever seen in E. tereticornis.

1. Var. dealbata, Deane and Maiden. (Proc. Linn. Soc. N.S.W., 1899, p. 466.)

**Synonym.**—E. dealbata, A. Cunn. ex Schauer in Walp. Rept. ii, 924.

It is most commonly called "Red Gum" or "Cabbage Gum."

This is a very widely diffused form chiefly found in the interior, though, when the localities given are studied, it will be found that it has a wider range. It is usually neither a straight nor a large tree; it is more or less glaucous, and the rim is often nearly horizontal or truncate. The type came from Wellington Valley, but it is too unstable to be called a species. Sometimes it has very small fruits and appears to run into var. latifolia.

It undoubtedly resembles a small-fruited form of E. punctata sometimes, added to which the bark is often precisely similar to that of the species named, but the timber is redder. Var. dealbata is an interior species while E. punctata chiefly belongs to the coast districts. The warning is necessary when I mention that both the late Baron von Mueller and Revd. Dr. Woolls sent me specimens of var. dealbata from Grenfell and Condobolin respectively as E. punctata.

**Leaves, Oil.**—In my "Useful Native Plants of Australia" I quote Staiger, of Queensland, who distilled an oil which he said was dealbata. Schimmel (Bericht. Oct. 1893, p. 19) apparently examined the same oil. It is also referred to in "The Volatile Oils" (Gildemeister and Hoffmann) p. 537. This oil is palpably not that of var. dealbata. The name has been applied to more than one tree in Queensland—E. pulverulenta, var. lanceolata (E. nova-anglica), amongst others.

Messrs. Baker and Smith (Research on the Eucalypts) analysed the true leaves of var. dealbata:

<table>
<thead>
<tr>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation, [α]_D</th>
<th>Saponification Number.</th>
<th>Solubility in Alcohol</th>
<th>Constituents found.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9261</td>
<td>+4.3°</td>
<td>2.05</td>
<td>1½ vol. 70%</td>
<td>Eucalyptol, pinene.</td>
</tr>
</tbody>
</table>

Following are some precise localities for this variety:

**Victoria.**—Beechworth (specimens from Gippsland Lakes slightly glaucous, otherwise normal):
New South Wales.—The “Red Gum” of the Tumut flats. Fruits small and the valves more exerted than usual. At Tumut and Adelong Crossing it is sometimes called “White Gum,” and its foliage is drooping and rather coarse; it has glaucous buds and approaches the typical species. Mr. R. H. Cambage has sent a pedicellate form from Carabost, near Tumberumba. From Wagga Wagga I have it with very plump buds and pale valves; it also approaches the normal species; specimens from Burrowa also approach the normal species.

The “White Gum” of Bowning (A. Murphy) has glaucous buds, and connects with variety \textit{latifolia}.

A good test for var. \textit{dealbata} is the horizontal rim. But (e.g. Goulburn and Forbes) trees otherwise var. \textit{dealbata} have a sloping rim.

Albury; Barmedman, very blunt buds, nearly ovoid; Wyalong; Young; Grenfell and Weddin (Red or Cabbage Gum).

This tree is called Cabbage Gum on account of its small size and crooked, stunted shape. It is most difficult to get a straight log (either from trunk or branch) of even 4 feet in length. The bark is smooth and grey, similar to the Red Gum (\textit{E. rostrata}) both on trunk and limbs—in fact the whole tree appears to be the Red Gum in miniature, except that it does not grow straight. It is sometimes used for posts for fencing when no other timber can be obtained, such as on rocky hills, where it is generally found, and where carting other kinds is difficult. It makes good charcoal—(F. R. Postlewaite, Grenfell). Specimens from Grenfell, Wyalong (W. S. Campbell), and other western localities, have buds resembling those of Bentham’s variety \textit{brevifolia} a good deal.

Condobolin, including Mt. Tyriga (commonly called the centre of N.S.W.). This is a tree which, if growing in the Sydney district, would, as regards its bark, be judged to be \textit{E. punctata}. There is no doubt that, in its fruits and in other respects, it shows the affinity of \textit{E. tereticornis} to \textit{E. punctata}.

Then we come to the western districts. It should be borne in mind that the type of this variety comes from near Wellington. I have had a good deal of difficulty with some of the western forms.

“Red Box” or “Red Gum.” Tall straight trees of large dimensions with thick bark of a clean appearance. Timber red; a valuable timber for all purposes. Capertee Valley (J. L. Boorman).—This form is nearest var. \textit{dealbata}, but in this district it shows transit to the normal form and also to var. \textit{latifolia}.

At Mudgee we have var. \textit{dealbata} and at Gulgong the form shows transit to var. \textit{latifolia}. At Cassilis specimens collected by Leichhardt tend to the species type.
At Bathurst and Wiseman’s Creek we have a form with slightly sloping rims to the fruit. At Orange and Cowra the var. *dealbata* is nearer the Wellington type. At Lyndhurst we have very glaucous, small fruits, between var. *dealbata* and var. *latifolia*.

Other specific westerly localities are:—Stuart Town; Minore; Dubbo to Tomingley and Peak Hill; Harvey Range.

It is often stunted and nearly like a mallee in the dry country, e.g., at Mount Boppy (the most north-western locality recorded, R. H. Cambage), Nymagee, Byrock, and Gundong Creek on the Bogan.

Then we have it rather common in the Warrumbungle Range (W. Forsyth), some specimens showing strong affinity in buds and fruits to *E. rostrata* (Murray Red Gum). Other localities in the district for var. *dealbata* are Gilgandra; top of Nandi Hill near Coonabarabran (fruits sessile and rim rather domed); plains near Baradine; and Cobborah to Merrygoen.

Crossing over to the North-western Line we have it abundant near Narrabri, and a very small-fruiting form at Boggabri.

It is the Brown-barked Gum of New England according to Christie’s specimen 4 e.*

On New England, as far west as Barraba, it is common; also near Tingha, where it is very glaucous; at Merriwa it approaches the typical species, while on the Liverpool Range it is common. Near Murrurundi, on the gravelly ridges and sandstone rocks, it grows as large as the normal species. The buds are very glaucous. At Bullock Creek, near Trundle, Mr. R. H. Cambage found it with ovoid, nearly hemispherical, buds. Charles Stuart collected it in New England and wrote—“30-40 feet. Bark corrugated, very hard, but not very rugose, separating in small pieces three-quarters of an inch thick.” The Rev. Robert Collie calls it “Soft Gum” (ranges between Tenterfield and border). Its abundance in New England makes it reasonable to expect it in Queensland, say about Stanthorpe, and it should be found in the drier country of the west of that State.

2. Var. *latifolia*, Benth., B.Fl. iii, 242. “Leaves ovate to lanceolate. Flowers with a strong cimicine smell. Shoalwater Passage—R. Brown.” Brown named this form *E. cimicina*. It has nearly ovoid buds, and the intramarginal veins are sometimes so well marked as to give the leaves a triplinerved appearance, hence Tausch, in the Vienna Herbarium, named it *E. triplinervis*. The common “Swamp Gum” of New South Wales is often markedly triplinerved.

I have provisionally included with *E. cimicina* the common broad-leaved or swamp form of *E. tereticornis*, to which it undoubtedly possesses considerable

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* Proc. Roy. Soc., N.S.W., 1877, p. 32.
affinity. I have not seen the fruits of *E. cimicina*; the flowers are few in the umbel, while those of the common swamp form are usually smaller and more in the umbel. This swamp form is not usually a tall tree; it is rather crooked and its timber is inferior, that of the normal species being good. Its foliage is dense, and its leaves broader and coarser than those of the type. Its opercula are usually slender and even subulate. Naudin thought it should be given specific rank, and hence called it *E. amplifolia*.

So that we have a Stinking Gum (*E. cimicina*, R.Br.) in Northern Queensland, which Bentham named *E. tereticornis*, var. *latifolia*; we have also a Stinking or Swamp Gum (*E. amplifolia*, Naudin) of Eastern Australia—Central Queensland to Southern New South Wales.

I suggested (*Bulletin Herb. Boissier*, 1902) that these two Stinking Gums come under Bentham’s variety, but if not, our Stinking or Swamp Gum may be called variety *amplifolia*; some may think as Naudin did, that it is worthy of specific rank.

I have *E. cimicina* from Shoalwater Bay Passage, Percy Island, and Mackay, all in Northern Queensland.

All the forms which now follow come under *E. amplifolia*, Naudin.

The “Swamp Gum” has often very quadrangular stems, and has sometimes markedly triplinerved leaves (*e.g.*, Wingello specimens). This quadrangular character is especially marked in specimens from Tenterfield to Sandy Flat, but it is frequent in other specimens.

“Of those with the larger and broader leaves, their timber is often next to worthless.”—(A. Rudder, in *Agricultural Gazette*, January 1896, p. 15.) Mr. Rudder brought this matter under my notice thirteen years ago, but I had not then sufficient material to make a general statement. Normal *tereticornis* timber is undoubtedly durable and valuable, but the “Swamp Gum” is not so. A form of variety *brevifolia*, which also grows in low-lying situations, and other forms, are also inferior. As a general rule, it may be stated that Eucalyptus timbers grown in moist situations are deficient in durability and strength. We are now able to understand the conflicting statements in regard to the timber of *E. tereticornis*. At the same time, under Wingello, I give an account of a tree which is undoubtedly the same form, but it grows on hills (rarely on flats), and is reputed a good timber.

I think it is very probable that some of the local prejudice in regard to the timber of vars. *latifolia*, *squamosa*, etc., arises from the stunted, scrambling look of the trees, their growing in damp situations, and their usual faultiness. Nevertheless, I think that the timber will often be found to be durable in damp ground, *e.g.*, for posts, although not useful for many other purposes, because long straight lengths cannot usually be obtained. This form is mainly confined to New South Wales.
Following are some specific localities (I may say it has for many years been cultivated in South Africa, and it comes true from seed): —

**Southern Localities.**—Colombo, near Candeló; Goulburn.

Wingello "Blue Gum," Large trees on the summit of the hills, and in rare cases, on the flats. Ribbony bark, but the smooth blue colour of the bark is most prominent. Has large leaves of a thick texture. Wood red, and stated to be good. —(J. L. Boorman). Twigs markedly quadrangular.

"Shoalhaven River Gum," Wingello (A. Murphy), Bowral.

"Bastard Blue Gum," "Blue Gum," and "Red Gum." Bankstown to Cabramatta. "Fairly plentiful in low-lying lands, reaching to fair proportions. Smooth bark, patched in colour with green and white."—(J. L. Boorman). Called "Bastard Box" or "Grey Gum" by Woolls.

**Western Localities.**—Richmond Common; Kanimbla Valley, in swamps.

"Swamp Gum," Capertee. Tall trees, stem slightly ribbony, of a greyish colour, sap-wood yellow, centre red.—(J. L. Boorman).

Bathurst, "Red Box"; at Sunny Corner, "fair-sized trees, bark smooth; sap-wood white, darkens on exposure; heart-wood red, bark thick, brittle, grain of wood short."—(J. L. Boorman.) Not to be confused with the proper Red Box (E. polyanthemos).

**Northern Localities.**—"Swamp Gum" of the Hawkesbury district, "Bastard Gum," "Stunted Gum," "Flooded Gum," "Bastard Box." "Grows on flats; about 30 feet high. Branches start about 10 feet from ground. Grey bark, with ribbons hanging to trunk up to 10 feet from ground. Used largely for fencing posts. The local opinion is that it is very durable, and one of the best timbers for ground work."—(J. D. Hay, Wyong.) Near Dungog. "Broad leaf, timber no good."—(A. Rudder.)


Chandler River, New England; Sandy Flat to Tenterfield and Jennings; Grafton to Dalmorton; Moonanbah.

Following are some Queensland localities:—"Blue Gum," Gayndah; "Water Gum," grows on banks of creeks, attains a diameter of 3 to 4 feet, and height of 100 feet (Maryborough); "Swamp Gum" of Byerley's timber tests, undertaken in 1881 at Rockhampton.

Speaking of E. tereticornis in Queensland, the late Rev. J. E. Tenison-Woods says:—"It grows near running water, or in the beds of streams. It is found on both sides of the Dividing Range, and even on the very borders of mangrove swamps. In well-watered open forests it may be said to be the prevailing gum-tree. In the tropics, where the soil is rich, the banks of the streams are so
thickly clothed with scrub that one begins to lose sight of it, especially north of Cardwell. I remember seeing it on the Herbert River and on the Barron; but at Herberton and on the table-land it is not uncommon." (Proc. Linn. Soc., vii, 331.) Var. *latifolia* is probably referred to in the above passage.

3.—Var. *squamosa*, Maiden.

**Synonym.**—*E. squamosa*, Deane and Maiden (Proc. Linn. Soc., N.S.W., 1897, p. 561).

A medium-sized tree, with a scrambling and drooping habit, often stunted. Bark smooth or scaly, often blotched; timber soft and faulty. Grows in low-lying and barren places. Timber dark red; evidently a depauperate form.

Foliage glaucous or dull green; fruits small, and with a narrow, rather sharp rim, opercula hemispherical or ovoid. The sunk space between the valves shows undoubted affinity to *E. saligna* (N.S.W. Blue Gum).

Mueller called varieties *brevifolia* and *squamosa*, var. *amblycorys*, testimony to the closeness of their relationships.

Bentham looked upon var. *squamosa* as a variety of *E. viminalis*, and said, "identical with the specimens collected by Caley, with a hemispherical calyx-tube, and broad, almost globular, operculum."—(B.Fl. iii, 240).

These specimens I afterwards found in the Vienna Herbarium. It is interesting that Caley, who was botanical collector in New South Wales for Sir Joseph Banks (1800–10), gave the aboriginal name as “Calgargro.” Bentham has also (under *viminalis*), “near Duck River” (Parramatta); “Drooping Gum,” Woolls. I have also seen these specimens, and they are var. *squamosa*.

The precise range of this variety remains to be defined. The most southerly locality known to me is Hill Top (Southern Line); the most westerly, Agnes Banks, near Richmond; while I do not know any locality north of the Hawkesbury.

Other southern localities are Bargo Brush, Thirlmere, National Park, and Bankstown and Cabramatta. I have also got it at Berowra and Peat’s Road, near the Hawkesbury.

4.—Var. *Banerquist*, Maiden, var. nov.

**Synonyms.**—Var. *brevifolia*, Bentli., partim; *E. Banerquist*, Maiden.


Stuart’s specimens are Nos. 7, 127, and 308. One label reads: “From most exposed parts of mountains. A straggling tree, 20–30 feet; very smooth white bark, separating in thin scabs.” Another reads: “A large tree, but frequently flowering when young.”
The rim of the calyx in this gum is very marked. The valves are well exserted and pale. The operculum and calyx are full of oil-dots. The leaves are dull, the veins are finer and less prominent than the type; the intramarginal vein is usually not so far distant. The peduncles are much broader and flatter than in the normal species; the pedicels likewise are broader and flatter. The operculum is sub-cylindrical, much longer than the calyx, but the calyx is larger and the operculum smaller than in the normal species. The operculum is narrower than the calyx, giving the appearance of "egg in egg-cup" or acorn and cup. This shape is very marked. The pedicels are flat and thick. The whole fruit is coarser in appearance than is that of the normal species.

Mr. Boorman and I found this form at Jennings, on the New South Wales-Queensland border. It is a large scrambling tree, growing amongst masses of granite; branches rather rotten; fruits broad-rimmed. It is in every way similar to Charles Stuart's specimens. It is in the highest degree improbable that it will not be found in Queensland. Mr. J. L. Boorman found trees at Emmaville, which he thus described: "Large trees growing throughout the district with a patchy bark (after the fashion of *E. punctata*), leaves long, glaucous; suckers, ovate to oblong; buds, long cylindrical, but rather pointed; fruits, with prominent valves." The same form has been found by Mr. R. H. Cambage at Tingha. The buds, while the calyx is still of greater diameter than the operculum, have the operculum as long as that of var. *latifolia* (Swamp Gum).

Then we come to the "Orange Gum," growing on ironstone and serpentine soil at Honeysuckle Flat, Port Macquarie. There are a few hundred trees, attaining no great size—say, 18 inches to 2 feet diameter, 12 feet to first fork, and 30 feet high. Timber, very deep red, especially when freshly cut; brittle, usually hollow, and the timber looked upon as inferior. The buds are precisely those of var. *brevifolia*, the fruits nearly so, while the leaves are 6 inches long.

For specimens from Burpengary (Queensland), I am indebted to Dr. T. L. Bancroft. His notes are: "Wood, red; timber, useless; grows in swamps near the coast; trunk and branches always crooked; tree very stunted, under 50 feet; decays in the centre; very short in the grain. A common tree from Redcliffe to Caboolture. I do not know its wider range."

The leaves are all lanceolate. Some of them are precisely of the texture of those of Honeysuckle Flat. Some leaves are more falcate and thicker. The buds show the egg-in-egg-cup arrangement, but the operculum varies from subulate to conical. Sometimes, particularly in the coarse foliaged specimens, the operculum becomes swollen in a ring at a little distance beyond the suture. In drying, such buds exhibit a constricted appearance—viz., just above and just below the swelling. The valves are markedly pale.

To summarise, in var. *brevifolia* the leaves are usually 2–3 inches long. The coastal ones (Port Macquarie) are up to 6 or 7 inches long. The Burpengary
specimens (also on the coast) are of the same length and size; presumably through
being near to the sea, some of them are more coriaceous. The buds are pointed,
like those of the Emmaville specimens. I therefore find the var. brevifolia a very
unstable form, for we have—

1. Blunt opercula and blunt short leaves (var. brevifolia).
2. Blunt opercula and long leaves. (Orange Gum of Port Macquarie.)
3. Long opercula and long leaves. (Burpengary.)
4. Long opercula and leaves intermediate in length. (Emmaville.)

I think it best to include them under one name, which those who hold
different views as to the limitation of species can accept as a variety or a species, as
they see fit, viz.:—E. tereticornis, Sm.; var. Bancrofti, Maiden; or, E. Bancrofti,
Maiden.

Apart from the inappropriateness of the name brevifolia for my wider variety,
the name brevifolia for a species (E. brevifolia, F.v.M.) is pre-occupied. The variety
is a depauperate form, and is nearest to var. squamosa in habit, foliage, and timber,
though not in fruits. Mueller confused the two varieties, as has already been
stated.

On tops of hills, Liverpool Range, we have a small tree of erect habit, and
somewhat like Spotted Gum in appearance. It has markedly triplinerved sap-
green leaves. In the general shape of the leaves, in buds and fruits, it is inter¬
mediate in character between Bentham’s var. brevifolia and var. latifolia. As it is
not far from the region where var. brevifolia is chiefly found, I have placed it with
that variety. At the same time var. latifolia, which has a far wider range, occurs
at no great distance. A specimen like this is very interesting, as showing how
impossible it sometimes is to name a tree without qualification.

In dried specimens a dark line round the suture of the bud is often seen in
this variety and var. latifolia.

In New England, e.g., Tenterfield (H. Deane) there are trees of E. tereti-
cornis, which in their glaucous buds and in their fruits absolutely connect with var.
Bancrofti.

Another connecting link is from Parish of Uffington, also Williams River
(A. Rudder), with leaves broad and glaucous all over, which connects with
Bentham’s var. brevifolia.

Eucalyptus exserta, F.v.M,
Journ. Linn. Soc. iii. 85 (1859).

Synonyms.—E. rostrata, Schlecht.; var. exserta, F.v.M.; E. Foeld-Bay,
Naudin.

I now bring under notice a tree which was suppressed by Mueller himself
and for many years has been erroneously included under both E. rostrata and
E. tereticornis. Mueller in Eucalyptographia, under E. rostrata, says, “In respect to the fruit E. exserta approaches closer to E. tereticornis than to E. rostrata, differing from both in the persistency of its outside wrinkled and rough, inside somewhat fibrous bark; both E. tereticornis and E. exserta have the stalklets often thicker and shorter than E. rostrata. E. exserta, the “Bendo” of the aborigines, is now known to range from the Burnett to the Gilbert River, but does not extend to West Australia.”

It is a small tree with narrow lanceolate leaves and persistent bark on the trunk and branches, of an ashy brown, wrinkled and fissured. Mueller originally described the bark as intermediate in character between that of a Bloodwood and a Stringybark. But a more obvious difference between this species and tereticornis and rostrata lies in the brown (not red) timber of exserta.

It appears to be common in the Rockhampton district, Queensland, and is described to me by A. Murphy as “very plentiful, with narrow sparse leaves; reminds me of E. amygdalina. Timber soft, easily split; rarely more than 2 feet to 2 feet 6 inches in diameter.” It is there known as “Messmate.” It has short pedicels. At Maryborough, Queensland, it is called “Peppermint.”

I have also got it from Rockhampton (A. Thozet), No. 4737, Northumberland Isles (R. Brown, 1802-5), “cf. E. semisuperam in his handwriting”; Comet River (O’Shanesy). Tenison-Woods (Proc. Linn. Soc. N.S.W. vii, 341), says that the basaltic ridge between Port Mackay and Clermont were the most northerly localities known to him. So far as known it is confined to Queensland, but additional localities will readily be found now that I have drawn prominent attention to it.

A very prominent character is the very broad sloping rim of the fruit, and its very exserted valves, like cusps.

The fruits of E. Foeld-Bay, a cultivated species described by Naudin, have large and very broad rims, and filiform pedicels of half an inch.

I have specimens, otherwise similar, from East Gippsland, Victoria, but which have very short pedicels.

EXPLANATION OF PLATE 41.

A. Twig of the normal species.
B. Fruits of the same.
C. Buds and fruits of variety dealbata.
D. Buds and fruits of Bentham’s variety brevifolia.
E. Leaf and fruits of variety latifolia (Eucalyptus amplifolia, Naudin).
   [N.B.—The fruits are generally more numerous in the head.]
F. Buds and fruits of variety squamosa.
FOREST RED GUM.

(Eucalyptus tereticornis, Sm.)
No. 40.

*Sideroxylon australe*, Benth. et Hook. f.

The Black Apple.

*(Natural Order SAPOTACEæ.)*

**Botanical description.**—Genus *Sideroxylon*, Linn.

*Calyx*-lobes, corolla-lobes, stamens, and ovary cells 5, or rarely 6 or more, or the ovary cells in species not Australian twice as many.

*Scales* (or staminodia).—In the throat of the corolla alternating with the lobes.

*Ovules.*—Laterally attached.

*Seeds.*—Solitary or few, rarely all perfect; testa hard, shining; hilum lateral, linear or broad, about half as long as the seed; albumen copious, fleshy; cotyledons broad, flat, usually thin.

Trees or shrubs, glabrous or tomentose.

*Flowers.*—Sessile or pedicellate, clustered.


A tree attaining sometimes a great elevation, quite glabrous except a slight appressed pubescence on the very young shoots.

*Leaves.*—Shortly petiolate, from elliptical-oblong and shortly and obtusely acuminate to broadly oblative-oblong and very obtuse, mostly 3 to 4 inches long, but sometimes larger, usually much reticulate.

*Flowers.*—In axillary clusters or almost solitary on pedicels of 2 to 3 lines, more globular than in *S. xerocarpa*, and *S. Richardi* (*A. laurifolia*).

*Calyx*-segments.—5, broadly orbicular, about 2 lines diameter.

*Corolla.*—Sarcely exceeding the calyx, the lobes short and spreading; scales of the throat slightly dilated upwards.

*Anthers.*—On very short filaments near the base of the corolla-tube.

*Ovary.*—Densely villous, tapering into a short glabrous style, 5-celled; ovules laterally attached near their base.

*Fruit.*—1 inch diameter.

*Seeds.*—Few, large, compressed, the hilum on the inner edge more than half as long as the seed, much broader than in *S. xerocarpa*, narrower than in *S. Richardi*.—(R. Fl. iv, 282, as *Achras*.)

**Botanical Name.**—*Sideroxylon*. From two Greek words, *sideros* iron, and *xylon* wood, owing to the hardness of the wood of the first species described; *australe*, Latin, southern, and hence often Australian.
Vernacular Names.—Variously known as “Black Apple,” “Brush Apple,” “Wild” or “Native Plum,” because of its fruit.

Aboriginal Names.—Following are some aboriginal names:—Jerrawāwa or “Jerra-wa-wah,” Illawarra and Brisbane Water (New South Wales); “Wycaulie,” Richmond and Clarence Rivers (New South Wales); “Tchoonboy,” Northern New South Wales and Southern Queensland; “Panunpin,” of some Queensland aborigines (A. J. Hockings).


Fruit.—Purplish black, glaucous, something like an Orleans plum, 1⅛ inch long and about an inch broad. Of a coarse insipid flavour and somewhat astringent to the taste. The large seeds, and the frequent occurrence of maggots in the fruit are drawbacks, but it yields a fair jelly or preserve, frequently made in the country districts, where it is a prolific bearer.

Some of our sapotaceous seeds will perhaps prove to be good oil-yielders. The seeds of the Black Apple can scarcely be distinguished in appearance from those of *Bassia latifolia* of India which yield Mahwa oil.

Timber.—The wood is close-grained, firm, prettily veined, and good for cabinet-work (Macartthur). Very handsome planks can sometimes be obtained from it. It is occasionally used by turners and wood-carvers; it works splendidly. It is of a pale yellow colour, and the complicated grain affords a pattern of a singularly pretty appearance. It is singular that the figure has a very similar appearance whether cut radially or tangentially. It requires very careful seasoning. It is used for staves and laths, and for general building purposes. It is not much used.

Two slabs of this wood which have been seasoned over twenty-five years have weights which correspond to 55 lb. 13 oz. and 57 lb. 14 oz. respectively per cubic foot.

Exudation.—

The remarkable gum which exudes from this tree is worth investigation. I can answer for its disagreeable tenacity when it gets about the hands.—(Tenison-Woods, Proc. Linn. Soc. N.S.W. iv, 135.)

The juice is milky and the order to which this tree belongs yields the gutta-percha of commerce. It would not be difficult to collect a quantity of this juice for research, and it should certainly be examined. The milky sap resembles cream in taste if eaten in small quantity.

An allied tree, *Achras sapota*, Linn. is of special interest in this connection.

This is said to be the tree which produces most of the “chicle,” a gum extensively imported into the United States, and used in the manufacture of chewing gum, which is almost wholly composed of it. It is said that *Vitellaria mammosa* (L.) Radlk., as well as other species of the genus *Vitellaria* produce chicle, and that the best gum for “masticatory” purposes is that obtained from *V. mammosa*. 
BLACK APPLE.

(Sideroxylon australe, Benth. & Hook., f.)
According to Treasury reports for 1897, 5,315,902 lb. of this gum, valued at 1,091,892 dollars was imported into the United States in the year 1896-97. The crop for 1897-8 is estimated at only 2,600,000 lb. Under the Wilson Bill the gum was admitted free of duty, but now there is a duty of 10 cents per pound.

Size.—It attains a height of at least 100 feet. Trees 3 feet in diameter are not uncommon. “The largest tree seen at Brisbane Water measured 10 feet 6 inches in circumference.”—(Macarthur.)

Habitat.—This is a brush tree, being found in the coastal brushes from the Illawarra northward to Rockhampton, Queensland, “and apparently the same plant, but in leaf only, Lord Howe’s Island, Milne.”—(B.Fl. iv, 282.) This is a mistake; there is, however, a *Sideroxylon* on the island, viz., *S. Howeanum*, F.v.M. (See my paper on the “Vegetation of Lord Howe Island.” *Proc. Linn. Soc. N.S.W.*, 1899, p. 130.)

EXPLANATION OF PLATE 42.

a. Flowering twig.
b. Flower.
c. Flower, opened out.
   (a) Corolla-segment.
   (b) Anther.
   (c) “Scale of the throat,” or rather staminode.
d. Flower.
   (a) Sepal.
   (b) Ovary.
   (c) Stigma.
e. Section through ovary.
f. Fruiting twig.
g. Vertical section of fruit, showing two of the seeds.
h. Seed.
   (a) Hilum.
Angophora lanceolata, Cav.
The Smooth-barked Apple.
(Natural Order MYRTACEÆ.)

Botanical description.—Genus, Angophora, Cav.

Calyx-tube.—Turbinate-campanulate, adnate to the ovary at the base, the free part broad and open, 5-angled, truncate, with five small distinct teeth.

Petals.—5, attached by their broad base, herbaceous and aristate, with coloured margins, much imbricated in the bud, spreading and separately deciduous.

 Stamens.—Numerous, free, in several series; filaments filiform; anthers versatile, the cells parallel, opening longitudinally.

Ovary.—Inferior, the flat summit glabrous, 3- or 4-celled, with many ovules in each cell, ascending on a peltate placenta; style subulate, with a capitate stigma.

Capsule.—Enclosed in and adnate to the hardened truncate persistent calyx-tube, opening loculicidally in 3 or 4 valves.

Seeds.—Perfect (where known), one in each cell, large, broad, very flat, peltately attached on the inner face; testa thin; embryo straight; cotyledons thin, flat, or folded over each other at the edge, deeply cordate, the radicle slightly clavate, scarcely protruding beyond the lobes of the cotyledons.

Trees or shrubs, usually glaucous, pubescent, or hispid with bristly hairs.

Leaves.—Opposite, or here and there alternate, coriaceous, penniveined.

Flowers.—In umbel-like cymes, arranged in terminal corymbs.

Bracts.—Exceedingly deciduous.—(B. Fl. iii, 183.)

Botanical description.—Species, Angophora lanceolata, Cav. Ic. iv, 22, t. 339.

A tree of considerable size, the bark deciduous in large smooth flakes as in A. cordifolia, branches and foliage glabrous and scarcely glaucous, or rarely a few bristles on the inflorescence.

Leaves.—Distinctly petiolate, lanceolate, acuminate, mostly 3 to 5 inches long, coriaceous, with numerous fine parallel pinnate veins.

Flowers.—In rather dense terminal corymbs or short panicles, larger and more dense than in A. intermedia, rather smaller than in A. cordifolia.

Calyx.—Usually about 3 lines long and 4 lines broad at the top, the teeth very minute or at any rate shorter and thicker than in A. intermedia, and the secondary ribs often very short or quite inconspicuous.

Fruiting calyx.—Usually thick and very smooth.—(B. Fl. iii, 184.)

Angophora Woodsiana, Bail. (Syn. Queensland Fl. 172), is A. intermedia, DC., var. Woodsiana, Bail. (Queensland Flora ii, 605). In my opinion it should be A. lanceolata, Cav., var. Woodsiana, for it is a smooth-barked tree, stunted, and apparently a depauperate form of the species.
Botanical Name.—It is from two Greek words signifying “vessel bearing,” in allusion to the fruits; but its meaning does not imply anything particularly characteristic, as it would be equally appropriate if applied to those of the Eucalypts. The specific name *lanceolata* is in allusion to the shape of the leaves; but these vary in width somewhat, being occasionally as narrow as those of the narrow-leaved variety of *Angophora intermedia*.

Vernacular Names.—Sydney workmen know it best by the name of Red Gum; but, as this name has been appropriated, over vast areas, by a different tree (*Eucalyptus rostrata*), it may be well to leave the latter in undisputed possession, reserving for *A. lanceolata* the appropriate designation of the “Smooth-barked Apple-tree,” the only objection to which is its length. The smooth bark is not perfectly white in colour, but of a uniform yellowish-red tint; hence two of its names, “Orange Gum” and “Rusty Gum.” Hardly at any period of the year will you see one of these trees unstained with kino, which frequently exudes in considerable quantity, and every bit shows up on the pale-coloured, smooth bark. These stains being of an orange or rusty colour, have intensified the appropriateness of the designations just alluded to. Because it is common on the Blue Mountains, it sometimes goes by the name of “Mountain Apple-tree,” but as often as not it is simply called “Apple.”

Aboriginal Names.—That cyclopaedia of aboriginal plant names, the late Sir William Macarthur, records that this tree was called “Kajimbourra” by the blacks of the counties of Cumberland and Camden—a word doubtless with a significant meaning,—and the least we can do is to endeavour to rescue these euphonious names from the oblivion which is fast overtaking those who were accustomed to employ them. Mr. F. M. Bailey records that South Queensland blacks used to call the tree “Toolookar.”


Flowers.—Note the delicate petals in these flowers. The closely allied Eucalypts have no petals.

The late Sir William Macarthur judiciously remarked of this tree: “The largest of the genus; the connecting link between *Angophora* and the smooth-barked Eucalypti.”

Timber.—As might have been expected with such a free yielder of kino, the timber of this tree is liable to gum-veins; in fact, it is difficult to get a piece of any size from them. Nevertheless it is a useful timber, strong and heavy, and used for naves of wheels, flooring-boards, slabs, rough buildings, and fuel. A specific
The gravity of '893 is given in a Report, Victorian Exhibition, 1861. It is considered to form good fuel in the Gosford district.

The plant tissue of this tree possesses a wonderful power of accommodating its shape, or rather the direction of its growth, to the rocky ground on which it is usually found. Thus we find the base of the tree often flattened out, and following the course of obstacles, reminding one of a gigantic candle placed on a surface sufficiently warm to soften the wax or fat, which then, by the weight of the candle, moulds itself into shapes determined by the obstacles it encounters. The comparison is a homely one, and it is only intended to refer to the plastic appearance, not, of course, the result of heat in any way in the case of the tree.

**Exudations.**—This tree is a free yielder of kino. It dries readily on exposure, so that the aperture is soon blocked up with the indurated substance. If this be picked off, the wound begins to flow afresh, and thus a considerable quantity may be collected. This kino bears a strong resemblance to that of a few gum-tree kinos. It is of a reddish-brown colour, and when quite dry is very friable, readily powdering between the fingers. It possesses a sourish, unpleasant smell, not easily described, which is strongest when the kino is quite new, and the proximity of an Apple-tree can thus be frequently determined by the smell alone. For reasons which need not be gone into now, Apple-tree kino does not precisely fill the requirements of the British Pharmacopoeia as regards kino; nevertheless it is a valuable astringent remedy, frequently available in the bush when more elegant preparations are not obtainable. It usually contains between 50 and 60 per cent. of tannic acid.

**Size.**—Up to 50 or 60 feet, with a diameter of 2 or 3 feet. On the Narrabri sand-hills its height is 40 to 50 feet, and diameter 1 to 2 feet.

**Habitat.**—This tree is found in the coast districts and mountain ranges, and extends a considerable distance into the interior. The most southerly locality known to me is the ranges around Nerrigundah, near the Victorian border (J. S. Allan), while it extends to the Rockhampton district in Queensland. I have a specimen labelled, in Leichhardt's handwriting, "Mingagabarne, *Angophora lanceolata.*—On the sandy ridges between Archer's and Garral." I have collected it in similar situations near Narrabri, N.S.W., while it has been sent to me from the Lower Lachlan. It is very abundant in the coast districts and in the Blue Mountains, occurring at least as far west as Mt. Tomah. The two Cunninghams found it north of Bathurst, which would connect with the Narrabri locality.

This tree is usually considered a sign of poor soil, and it is marvellous to observe how a giant tree often flourishes upon what appears to be almost bare rock, and one wonders both how such a bulky plant can obtain nourishment and how the roots can spread sufficiently to secure the necessary hold. At the same time the tree does not object to improved surroundings, and I have observed it and Turpentine
SMOOTH-BARKED APPLE

(Angophora lanceolata, Cav.)
(Syncarpia laurifolia, usually a sign of good soil) growing happily together to a fair size, and in some instances the two growing as closely together as if they had sprung from the same stock.

**Propagation.**—Seed is freely produced.

**EXPLANATION OF PLATE 43.**

a. Flower looked at from above.
   (a) Stamens.
   (b) Petal.
   (c) Sepal.
   (d) Stigma.

b. Flower looked at from below.
   (a) Calyx.
   (b) Petal.
   (c) Stamens.

c. Vertical section through the flower.
   (a) Calyx.
   (b) Stamens.
   (c) Stigma.
   (d) Ovary.

d. Cluster of fruits.

e. Vertical section through the fruit.

f. Transverse section through the fruit.
No. 42.

Scolopia Brownii, F. v. M.

(Natural Order BIXACEÆ.)


Flowers.—Hermaphroditic.

Sepals.—4 to 6, slightly imbricate when very young, but open long before flowering.

Petals.—As many and nearly similar.

Stamens.—Indefinite, inserted on the thickened torus, with or without glands.

Anthers.—Short, the connective terminating in a thick process.

Ovary.—With 3 or 4 placentas and few ovules.

Style.—Filiform, with an entire or lobed stigma.

Fruit.—A berry. Seeds 2 to 4, with a hard testa. Cotyledons leafy.

Trees often armed with axillary spines.

Leaves.—Simple, with pinnate veins, entire or toothed.

Flowers.—Small, in axillary racemes.

Synonym.—Phoberos, Loureiro.

Although Loureiro's Preface bears date 1788, the title-page is that of 1790, so that in strict priority Schreber's name (published in 1789) should be preferred; but as Phoberos has been generally adopted, and Scolopia runs some risk of being confounded with Scopolia, it is perhaps better to retain the former. (J. J. Bennett, Plants Javanice Rariores, p. 188). I think, however, that the reasons quoted for the supercession of Scolopia are quite inadequate.

Botanical description.—Species, S. Brownii. F. Muell., Fragm. iii, 11.

Perfectly glabrous in all its parts.

Leaves.—From ovate to oblong—lanceolate, mostly acuminate, obtuse or almost acute, rarely rounded at the top, 1½ to 3 inches long, always narrowed into a petiole of 3 to 4 lines, entire or slightly undulate—toothed, rather thick and smooth, obscurely triplinerved, but all the veins less conspicuous than in most species, either without glands or with two or three marginal glands underneath.

Racemes.—Short and axillary, or forming a terminal panicle of 1 to 2 inches.

Pedicels.—2 to 3 lines.

Calyx.—Four-cleft, smaller than is S. crenata, apparently persistent.

Petal.—Four, rather longer than the calyx, deciduous.

Stamens.—Numerous, with slender filaments surrounded by a ring of glands, either distinct and shortly club-shaped or irregularly connate.

Anthers.—Small, the process of the connective glabrous, and usually as long as the cells.

Placentas.—Three, with about four ovules to each.

Stigma.—Slightly three-lobed.—(B.Fl. i, 107.)

Botanical Name.—Scolopia. I am not certain as to the derivation. Perhaps from the Greek skolops—skolopos, a stake; Brownii after the celebrated Robert Brown.
Vernacular Name.—I know of none.

Leaves and Sooty-mould.—This tree has the drawback that it is liable to the unsightly appearance known as sooty-mould, so-called because the leaves are often dusted with a black powder. Other trees liable to it in New South Wales are certain Eugenias, the Black Apple (described in this Part), whilst amongst exotics, orange, lemon, and cinnamon trees are often attacked.

Attention is invited to a paper, founded on Australian material by D. M'Alpine, entitled “the Sooty-mould of citrus trees; a study in Polymorphism (Capnodium citricolum, n. sp.)”*

Species of fungi included in the group Perisporiace are the cause of these black sooty coatings found on leaves frequented by green-fly (Aphis) and other leaf insects. These are purely epiphytic and saprophytic forms which derive nourishment from the “honey-dew” secreted by these insects. They multiply very rapidly, and soon form dark coatings on the upper side of the leaves and twigs. Little damage need be feared, since the leaves retain their green colour, and the coating is not enough to stop access of light. Amongst them are species of Capnodium, Meliola, and Apiosporium, as well as the conidial forms Fumago, Torula, Antennaria.†

The sooty-mould on our Scolopia is usually Capnodium.

In his account of “Diseases of the Orange in Florida,” Lucien M. Underwood‡ gives an account of the sooty-mould of the orange and olive trees in California and Florida.

The honey-dew is there produced by the bark lice, and the sooty-mould is Capnodium citri, Berk.

Dr. W. G. Farlow recommended treatment with a strong spray of alkali soap. Underwood says: “This disease has not yet made sufficient progress in Florida to demand such treatment, and with the natural enemies of the scale insect to check their development, is not likely to prove a serious difficulty.”

Unfortunately sooty-mould is more prevalent in the Sydney Botanic Gardens than I like to see it, but our difficulty is that we have to grow plants of very different requirements under practically identical conditions. For example, Scolopia Brownii naturally grows in brushes, i.e., with rich, deep soil, conditions available in but small areas in the Botanic Gardens, where the soil is often shallow and poor. Many of our insect and fungus pests would disappear if the trees on which they grow could have more genial conditions. They would thus become full of vigour, and would repel bark lice and Aphis, and sooty-mould is a consequence of the presence of these insects.

These remarks are of general application. If people would attend more to the soil, drainage, and general conditions which promote the health of plants, they would have far less need for spraying operations and such special treatment as the introduction of parasites to cope with animal pests. In the same way people who live in healthy surroundings have but diminished need for the services of the doctor.

**Timber.**—This is not a timber tree, rarely exceeding 10 inches in diameter. When quite fresh the wood is white, becoming pink towards the centre.

**Size.**—Rarely as much as 40 feet in height, with a stem diameter of under 1 foot.

**Habitat.**—The type comes from Ash Island, Hunter River, and from the Clarence River. It is confined to good brush-land of the coastal districts, occurring as far south as the Illawarra, and north as far as Cape York in Queensland—the most northerly point of Australia.

**Propagation.**—The fruits, or rather the seeds, readily germinate. I desire to bring this tree under notice as a most desirable addition to the arboretum or shrubbery. It can be pruned to any shape, while its dense, shining, drooping foliage renders it a pleasing object. Its one drawback is the tendency to sooty-mould to which I have alluded.

EXPLANATION OF PLATE 44.

A. Flowering twig.

B. Flower in vertical section.
   (a) Sepal.
   (b) Petal.
   (c) Torus or disc. Note the glands which are characteristic of the species.
   (d) Stamen.
   (e) Stigma.
   (f) Ovary.

C. Flower, with stamens removed.
   (a) Sepal.
   (b) Petal.
   (c) Torus.
   (d) Stamen.
   (e) Ovary.
   (f) Stigma.

D. Stamen, back and front view.

E. Flower, looked at from above.
   (a) Sepal.
   (b) Petal.
   (c) Torus.

F. Fruit-bearing twig.

G. Fruit.

H. Transverse section of the same.

K. Seeds.
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THE FOREST FLORA
OF
New South Wales.

J. H. MAIDEN.

VOL. II. PART 2.

Published by Authority of the
GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

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J. H. MAIDEN,
Government Botanist of New South Wales and Director of the
Botanic Gardens, Sydney.

PART XII.
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No. 43.

**Eucalyptus corymbosa, Sm.**

The Bloodwood.

(Natural Order MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus*. (See Part II, page 33.)


- Usually a small or middle-sized tree, but sometimes attaining a great height, with a persistent scaly or flaky bark.

- **Leaves.**—Ovate-lanceolate or lanceolate, acuminate, about 3 or 6 inches long, with numerous fine transverse parallel veins, often scarcely visible.

- **Umbels** loose, several-flowered, mostly in a terminal corymbose panicle, the peduncles slightly compressed or angular.

- **Flowers** rather large, on pedicels of 2 to 4 lines.

- **Calyx-tube**, when open, broadly turbinate, 3 or 4 lines diameter, often dilated at the margin.

- **Operculum**, short, hemispherical, umbonate or shortly acuminate.

- **Stamens** attaining 5 or 6 lines; anthers very small, but ovate, with distinct parallel cells opening longitudinally.

- **Ovary** short, flat-topped.

- **Fruit** more or less urceolate, \( \frac{1}{2} \) to \( \frac{3}{4} \) inches long, usually contracted above the capsule and often expanded at the orifice, the rim narrow, the capsule sunk.

- **Seeds** large, ovate, more or less bordered by a wing, usually narrow.—(B.Fl. iii, 256.)

**Botanical Name.**—*Eucalyptus*, already explained, Part II, p. 34. *Corymbosa*, from the Greek *korumbos*, or Latin *corymbus*, a summit. Hence the term *corymb*, in botany, where the stalks of the individual flowers are gradually elongated, so that the flowers are brought approximately to the same level (or top, or summit). The inflorescence of the Bloodwood (see Plate) is not a perfect corymb.

**Vernacular Name.**—This tree is, perhaps, as fortunate in its vernacular name as any of the Eucalypts. It exudes abundance of kino (popularly known as "gum"—hence, "gum-tree"), and, when freshly exuded, this has all the appearance of a stream of blood. So freely does it flow, and so like blood is it, that sometimes the appearance of the ground at the foot of one of the trees is quite startling. It is one of the few eucalypts that enjoys but one vernacular name. At the same time there are some other Bloodwoods in various parts of the Australian States.
Aboriginal Names.—"Mannen" was the aboriginal name of the tribes in the counties of Cumberland and Camden, according to the late Sir William Macarthur. Mr. Forester G. R. Brown states that its name amongst the blacks of the Port Macquarie district was "Bookeybarng," the word "barng" signifying "tree." In a catalogue of timbers, published many years ago, Mr. Charles Moore stated it to be the "Weni Aabie" of the aborigines of the Clarence and Richmond. By those of southern Queensland it used to be called "Boona."

Synonyms.—*Metrosideros gummifera*, Gaertner; *Eucalyptus oppositifolia*, Jardin Noisette.

Leaves.—The fine parallel venation of the leaves should be observed, for it is characteristic. If the very young leaves be pulled asunder it will be noticed that they are drawn into fine glutinous threads, which are largely composed of caoutchouc or india-rubber.

In common with all other Eucalyptus leaves those of the Bloodwood contain some Eucalyptus oil, but not in quantity sufficient to make its extraction commercially profitable. Over thirty years ago Mr. Joseph Bosisto distilled a little for experimental purposes. Recently Messrs. Schimmel & Co., of Leipzig, have prepared a small quantity, and describe it as "a colourless oil, rich in cineol (eucalyptol)."

Messrs. Baker and Smith (*Research on the Eucalypts*) give the following analysis of the oil:

<table>
<thead>
<tr>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation</th>
<th>Saponification Number</th>
<th>Solubility in Alcohol</th>
<th>Constituents found.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0883</td>
<td>-9·5°</td>
<td>3·8</td>
<td>Insoluble</td>
<td>Pinene, eucalyptol, aromadendral, sesquiterpene.</td>
</tr>
</tbody>
</table>

Flowers.—White or creamy in colour. This tree flowers at a very early age, and very profusely. It is in consequence much visited by parrots, and bees and other insects. As far as beetles are concerned, the trees about Sydney flower too late in the season for the flower-haunting beetles, but a number of the fossorial wasps (*Seolias* and *Thynnus*) are very fond of this tree, and so also are a few of the late beetles.—(W. W. Froggatt.)

Fruit.—The urn-shaped fruit is noticeable. The shape of the fruit in this species is referred to at p. 28.

Bark.—The scaly appearance of this bark is characteristic, and should be noticed. It covers the whole of the trunk and extends to the tips of the smallest branches. It is of a reddish-brown colour, and is often blotched with blood-like stains of kino.
The late Dr. Joseph Bancroft stated that charcoal was made from Bloodwood bark by the aborigines of Moreton Bay, and used by them as an antiseptic application to wounds. This particular species was chosen, I imagine, from the scaly nature of the bark, which facilitated charcoal-making.

**Timber.**—It owes its name because of the large quantity of blood-like fluid (gum or kino) which exudes from the tree, and which, when indurated, forms the gum-veins so common in this timber.

It is liable to shell concentrically, the spaces thus formed being often filled with the red astringent substance known as "gum." It is one of the most durable of all Australian timbers. It does not split at the ends when exposed to the sun, as many of our timbers do. It is valuable for such purposes as require a durable timber. For posts in the ground, and for use in culverts, it is all but imperishable. The great drawback to this timber is its liability to gum-veins, but in spite of this I look upon much of the prejudice against Bloodwood as unreasonable. It would be unacceptable for export, as we have abundance of better timbers, but I certainly think it ought to be used more than it is where readily available. Where not too defective, I should look upon it as an ideal timber for wood-paving. By too defective I refer to cases where the timber shells too much; but the presence of gum-veins of moderate width, in timbers such as this and Grey Gum, I would not look upon as an important defect in wood-blocks, as this astringent "gum" tends to preserve the block rather than injure it. I have seen timber rejected for wood-blocks because of gum-scabs and gum-veins, which would, of course, be inadmissible in a furniture wood, for instance, but which would in no way be detrimental to a wood-pavement. The scrupulous care which is insisted upon in some contracts to reject wood-blocks because of gum-veins, sometimes degenerates into mere faddism, and it is only possible to select so severely, because at present we have an enormous timber supply to fall back upon. I would, therefore, recommend the framing of wood-block contracts in such a way as to allow the inspecting officer some latitude in dealing with timber containing gum-veins.

Used for posts, naves, &c., also for small culverts. I would like to see it used increasingly for such work as this; it would economise ironbark. It is very resistant to white ant. The old wharf at Port Macquarie is laid without piles, with Bloodwood stringers and Bloodwood bed, which have been down forty years, and are now perfectly sound.

It is stated to be the most durable timber in the Cape Hawke district. When it shells, it is of course useless, but when it is solid when it is felled the sun never opens it out. In fact, Mr. Breckenridge, a man of very great experience in timber, says that no timber stands the sun better.
Mr. Forester Rudder says of it:—

It is not apt to warp, or rend in seasoning, and is excellent for fence-posts and sleepers, and wherever round timber is required for use in culverts and bridges and for ballast logs, and for ground work generally, is in my opinion, not to be surpassed, as it is as lasting, and not so combustible, or subject to the white ant, as ironbark. For fuel in furnaces it generates more heat than any wood I know.

Mr. District Forester Rotton, of Nowra, reports:—

As it seasons it reduces in weight, probably more than the wood of any other tree of the Eucalypt family. Though soft when green it is not an easy timber to work, and does not present a neat finish owing to the numerous running rings and gum-vessels it contains. It is not an uncommon occurrence for a piece of this wood of the length of a railway sleeper when squared to open out from end to end as soon as the gum in the ring dries up. It is this defect that renders the wood useless for railway sleepers. The rings develop as the tree grows older. Bloodwood of young growth may be used as rafters and corner-posts of rough buildings, and will last for many years.

**Exudations.**—The kino or red “gum,” which exudes from this tree, has already been briefly referred to. When freshly exuded it has a distinct smell, which appears to be characteristic, and is soon recognised. It is something of a vinous odour. Much of the kino exuded becomes entangled in the scaly porous bark, but one frequently comes across quite a store of the substance through tapping the communication with the reservoir which has collected behind the bark, or between the concentric circles of the wood. The passage gets choked up with indurated kino, but picking off the substance often causes the stream to flow afresh.

It is the most brilliant in appearance of all the kinos. It is exceedingly friable, and it is highly astringent. When freshly collected from the outside of the tree it contains over 80 per cent. of catechin and tannic acid. The blacks used to chiefly employ this kino for tanning the skins of animals. Their *modus operandi* was to skin the animal, put in the “gum” and some water, tie up, and shake the skin “bottle” until the tanning was complete.

Fishermen frequently use the bark (with its entangled kino) for tanning their nets.

The late Archdeacon King noticed Mellitose-manna on the leaves of this tree to a small extent when they are pierced by a beetle (*Anoplognathus cereus*).

**Size.**—Usually a tree of medium size, *i.e.*, with a height of say 60 feet and a stem diameter of 2 feet or 2 feet 6 inches. Speaking of the east slope of New England, Mr. A. R. Crawford writes to me: “I saw a *Eucalyptus corymbosa* of 4 feet in diameter, height (approx.) of 80 feet to first limb. Another of 4 feet, and height 70 feet.”

**Distribution.**—It extends all along the coast from the Bega district northwards to Queensland. It is also found on the coast ranges, where it attains a greater magnitude than in the coast country. It is only found on the eastern slopes of the high table-lands. It is very widely diffused in Queensland, extending to the northernmost part of that State, and is abundant withal.
White, Pale, or Pink Bloodwood,

At the London Exhibition of 1862, Mr. Charles Moore, of the Botanic Gardens, Sydney, exhibited two samples of timber (marked lviii and lix, in the Catalogue of N.S.W. timbers), both from "Clarence and Richmond open forests." Both were called by the aborigines "Weni Aabie," and the former by the colonists "Rough-barked Bloodwood," and the latter "Smooth-barked Bloodwood." Thus they are described:—

(lviii.)—Prevailing to a great extent; a tree of considerable size. Timber of great strength, and very durable, both in and out of ground. Used principally for posts and beams. (lix.)—This and the preceding are mere varieties of the species, and only to be distinguished from each other (by the bark!). Both are equally common, and are used for the same purposes.*

The "Smooth-barked Bloodwood" is now more usually known as "White" or "Pale Bloodwood," and I desire to draw further attention to it.

The late Rev. Dr. Woolls, "Flora of Australia," p. 288, quoted Moore, and observed that "Mountain Bloodwood" (*E. eximia*) is different from the Bloodwood of the north, which indeed it is.

There is no doubt, I think, that the "Pale Bloodwood" is a distinct species. The timber is, when fresh, of a pale pink, although in process of time it turns nearly as dark as ordinary Bloodwood. It seems also to have fewer kino-veins, and it is undoubtedly very much more fissile. It seems to be very much more sparingly distributed than ordinary Bloodwood. It seems always to occur with that species, and I would suggest that it may be a hybrid, one of whose parents is the Bloodwood.

I have specimens of the timber from Eight-mile Plain, Brisbane (J. L. Boorman), also, from Glenreagh, 28 miles from Grafton, on the Coff's Harbour road. Mr. District Forester Wilshire says of it:—

The Pale Bloodwood is used in culverts and blocks for buildings, and both extensively for posts, it being recognised as a very durable timber for ground work.

Mr. District Forester Rotton in sending excellent specimens from the parish of Numba, in the Shoalhaven District, makes the following report:—

I am acquainted with the pale-coloured Bloodwood, known as White Bloodwood amongst timber men. This tree occurs but rarely in my district; it grows sparingly in the parishes of Nowra, Tomerong, Currumbene, and Wandawangian, county of St. Vincent. By carefully observing the trees when going through a forest, this tree is revealed (only rarely in my district) in a tall, very straight barrel, with bark of a light brown colour, not so rough as that of the Red Bloodwood, and having shallower and straighter furrows, the cubed face appearance being fairly well maintained. I have never seen a tree of any considerable girth measurement, and timber-getters insist that it seldom grows to large dimensions; average about 5 feet 6 inches girth.

* Maiden's "Useful Native Plants of Australia," p. 441.
The wood differs altogether from that of the Red Bloodwood. It is pale in colour, fine in fibre
texture, very soft, easy to work, and as it is not ringy is capable of presenting a pleasing finish when
carefully treated. The wood is almost absolutely free from rings and gum-vessels, a fact, I should say,
that would leave little reason to believe that the bark is not very rich in tanning properties. The wood
loses considerably more weight than the Red Bloodwood as it seasons. The tree occurs too rarely in my
district to afford any illustration of its merits in general use. In small quantities it has been used in ship
fittings at the yards of Mr. Dent, at Jervis Bay, owing to its durability, combined with lightness. My
acting Forest Guard, Mr. T. C. Kennedy, informs me that about fifteen years ago he found a small grove
of White Bloodwood growing in company with Blackbutt, Red Bloodwood, and Mahogany, on private
property at a place called "Long Nose," at Greenwell Point, in the Shoalhaven District. He was a con¬
tractor at the time, and squared two of the trees for the walls of a culvert. He assures me that the wood
now shows barely a trace of decay, though it has been in use for fifteen years, and was subject to being
wet and dry alternately ever since.

Excellent specimens have also been received from District Forester Hardiman,
from the parish of Bohnoek, county of Gloucester.

In the Agricultural Gazette for September, 1895, p. 604, I wrote as
follows:—

One so-called White Bloodwood was pointed out to me on the banks of the Hastings. It had a
paler-coloured bark than is usual with Eucalyptus corymbosa, and showed no external gum-stains. I was
informed that the timber shows no gum-veins; if so, the only important objection to Bloodwood is removed.
I had no opportunity of seeing the timber, and this tree (3 or 4 feet in diameter), had its lowest branch
at such a height from the ground that I was unable to make any botanical observations.

Earlier I wrote:—

Occasionally Bloodwood is found pretty free from concentric gum veins, or the veins are wide apart.
When this is the case it is sometimes cut up for lining boards in country districts, and for this purpose it
is much liked.

Both these paragraphs refer to the timber now under review.

In Proc. Linn. Soc. N.S.W. xxv, 674 (1900), Mr. R. T. Baker described this
Bloodwood under the name of Eucalyptus intermedia. For a number of years I
looked upon this tree as E. terminalis, F.v.M., and hence took no steps to give it
another name.

The E. terminalis from the dry interior (Eremaean region) necessarily differs
in appearance from the fresher green of the coast; it varies gradually as we proceed
coastward. As we proceed north the fruits of Bloodwood get more habitually egg¬
shaped, i.e., less urceolate, and more or less mottled. Before me, as I write, are no
less than fourteen specimens of such Bloodwoods, from the Macleay River up to
Rockhampton in Queensland, all coastal and all labelled terminalis by Mueller.

varieties of E. corymbosa, E. terminalis, E. dichromophloia, and E. pyrophora:—
as I find it impossible to draw a clear line of demarcation; the specimens from the dry interior and
from the north-west have the leaves frequently of equal colour on both sides, and the fruits are occasionally
rather ovate-truncate than urceolate.
THE BLOODWOOD.
(Eucalyptus corymbosa, Sm.)
I agree with Luehmann as regards _E. dichromophloia_ and _E. pyrophora_, and I have my doubts as to the specific rank of two other Bloodwoods, viz., _E. Watsoniana_, F.v.M., and _E. Foelschiana_, F.v.M. I think there have been too many names applied to the Bloodwoods, which necessarily, in a territory of millions of square miles, must exhibit much variation.

I do not at present follow Luehmann in making _terminalis_ a variety of _corymbosa_, as I fully believe in the individuality of the White Bloodwood, and feel that it is probably something more than a mere variety of ordinary Bloodwood.

If Mueller's view that this Pale Bloodwood is the coastal form of _E. terminalis_ is wrong, then we must adopt Mr. Baker's name of _E. intermedia_. At present there are in the National Herbarium at Sydney some 150 herbarium specimens of _E. corymbosa_ and _E. terminalis_, collected over a very wide area, and I am also indebted to Mr. Baker for a specimen of his _E. intermedia_. Except in those instances in which I have also specimens of the timber, I am simply unable, in the majority of cases, to separate them into _corymbosa_ and _terminalis_. The matter is further complicated by the fact that the White Bloodwood of "poor ridgy country along the coast of southern Queensland" is _E. trachyphloia_, F.v.M. The timber appears to be identical with our Pale Bloodwood. The fruits are smaller, but the leaves, in the coast districts, are very similar. I trust that the many readers of this "Forest Flora" will, in the interests of forest science in New South Wales, furnish me with further particulars of the occurrence of White or Pale Bloodwood, and also favour me with small axe-cuts of the timber, together with corresponding twigs in flower and fruit. Then we shall be able to settle, once for all, the limits and synonymy of _E. corymbosa_, _E. terminalis_, _E. intermedia_ and _E. trachyphloia_. I will figure some of these forms later on.

**EXPLANATION OF PLATE 45.**

**The Bloodwood (Eucalyptus corymbosa, Sm.)**

- **A.** Twig, bearing flowers.
- **B.** Fruits, urn or urceolate in shape. Not quite ripe, but well showing the constricted shape. (A and B from Sydney district.)
- **C.** Fruits from Byron Bay, N.S.W.
- **D.** Fruits collected by Robert Brown ("East coast, 1802–5"). [See the text for observations in regard to variation of the shape of the fruits in this and allied species.]
No. 44.

The Cypress Pines of New South Wales.

Genus Callitris.

(Natural Order CONIFERÆ.)

Botanical Name.—Genus, Callitris, Vent. Decad. (1808).

Flowers.—Monoecious.
Male amenta.—Cylindrical oblong or ovoid; the stamens in whorls of 3 or rarely 4 (Wildeman figures more in C. cupressiformis); imbricate* in twice as many vertical rows; the scale-like apex ovate, orbicular, or slightly peltate (see plate 48, fig. B); anther-cells 2 to 4 (see plate 48, fig. 21).
Female amenta of 6 or rarely 8 scales, more or less distinctly arranged at the time of flowering in 2 whorls, without any enlarged outer empty scales.
Ovules (or carpels).—Several within each scale, in three vertical series, sessile and erect. (This is a slip on Bentham's part. The Conifers are Gymnosperme, i.e., the ovules are naked, not carpels, or enclosed in an ovary, like the Angiosperme. The ovules cannot be called carpels.—J. H. M.)
Fruiting cone.—Globular ovoid or pyramidal, the six, rarely eight, scales enlarged and hardened, shortly united at the base, apparently arranged in a single whorl, and opening in as many valves, either all equal and strictly valvate, or three alternate ones smaller and sometimes overlapping the others on the margin.
Fertile seeds (see plate 48, fig. W.)—Usually few only in each cone, compressed, with a hardened integument, the margins produced into two unequal wings or rarely only one wing developed, or very rarely a third wing also prominent on one face, the abortive seeds mostly enlarged and very flat with winged margins; in some species there is a more or less prominent central columnella; usually a triangular pyramid (see plate 48, figs. E and G), and sometimes apparently formed of abortive ovules (see plate 48, figs. N and N1).
Cotyledons.—Two, rarely three. Trees or shrubs, with slender terete, or three, or rarely four, angled branches.
Leaves.—In whorls of three, rarely four; those of the young plants sometimes acicular though short, but generally reduced to minute acute scales (see plate 48, fig. B), the decurrent midribs forming the angles of internodes as in Casuarina.
Male amenta.—Usually small, solitary or clustered at the ends of the branches, and rarely a few lateral ones.
Female cones.—On short thick peduncles or branchlets, solitary or clustered, ripening usually the second year, and persisting many years after the seeds have fallen.—(based on B.Fl. vi, 234.)

The genus was established by Ventenat on an Australian tree to which no specific name was attached, but which is probably C. cupressiformis. The name Callitris is derived from the Greek kalos, beautiful, of which the comparative and superlative are kallon and kallistos. They are undoubtedly beautiful trees.

* Imbricate in a young state, but as the anthers expand the scales are lifted from the attachment, become peltate and more or less valvate in appearance.
Callitris is synonymous with the Frenela of Mirbel, who, in 1826, substituted the name Frenela on account of the similarity of sound between Callitris and Calythrix!

The well-known North African tree (often known as C. quadrivalvis), which produces the Sandarac of commerce, is recognised by Masters, the great authority on the Coniferae, under Bentham's name Tetraclinis (T. articulata).

Following shows the synonymy of the genus:—


In Australia there are thirteen species of Callitris, and some of them have varieties more or less marked, so that there are a goodly number of Australian Cypress Pines. Four of the species (Roei, Drummondii, Actinostrobus, and acuminata) are confined to Western Australia. C. oblonga is only found in Tasmania. Callitris is exceedingly variable over our territory of millions of square miles, and interpretation of some of the forms must be carried out in a philosophic spirit. It is impossible to take one character and insist too strongly upon it. I agree with Robert Brown that the fruit is the best indication in this genus. But the fruits vary, as I shall abundantly show; so also do the branchlets, and every other part of the plant. Field knowledge is indispensable to a proper understanding of this genus.

Habit.—As a very general rule the trees are of a neat pyramidal shape, e.g., C. robusta. Sometimes they are of a more or less pendent habit at the top, e.g., C. cupressiformis. C. verrucosa is usually without a main stem, forming a congeries of thin stems from a woody stock, somewhat after the fashion of a mallee.

Foliage.—I use this term to include the branchlets. The foliage is dimorphic in some species. This is particularly observable in C. Macleayana. Bentham also observed it in C. calcarea (Frenela Endlicheri), "which has frequently acicular leaves on the lower branches." I have noticed a similar case in C. Muelleri. So far as I know, these are the only three species of which dimorphism has been recorded, but extended observation will doubtless augment the list.

C. robusta is the only species with almost invariably glaucous foliage; the other species vary in the depth of tint of green, though some, e.g., verrucosa, are occasionally glaucous.

I see no advantage in making a drawing of the foliage of each species, as there is a considerable amount of similarity between them.
In the branchlets the vertical lines (including the angles) are much more accentuated when the plant is dry, i.e., these sharp lines are accentuated by shrinking.

There seems to be but little difference between the seedlings of the various species.

**Male amenta.**—The number of male amenta seems to be of no specific value. Where Bentham describes the male amenta he used the expression, “Solitary or three together, or usually three together.” Usually there are more than one, but we have one commonly in the Tasmanian *C. cupressiformis*.

**Staminaliferous flowers.**—In the Conifera the male flowers consist only of stamens, and have mostly the shape of a triangular scale excentrically stalked on the face. On the lower margin of the scale are the anthers or pollen-bags. They are always one-celled, roundish or elongated (linear in *Araucaria*), and amongst themselves mostly little or not at all connected.

The scale is structurally the filament; we see a small scar, which is the point of attachment to the plant, and the oval bodies at the base are the one-celled anthers, the “anther-cells” of Bentham. These anthers lie in shallow depressions in the scale. Hook. f., in his *Flora Tasmania*, calls the scale and its anthers a stamen, which indeed it is. According to Bentham, the Australian species have two to four anther-cells. He, however, never gives the number of anther-cells on the scale as a distinguishing character between the several species.

Attention is drawn to the terminal scale in *C. cupressiformis*, which is drawn out to a point like an operculum. I have not seen attention drawn to it, although it can scarcely have escaped notice.

**Pistilliferous flowers.**—See the drawings of the pistilliferous flowers of *C. cupressiformis* and of *C. calcarata*.

**Fruits.**

*Callitris* of Ventenat *is peculiar to Terra Australis, where it exists very generally, but most abundantly in the principal parallel; it consists of several species, differing from each other chiefly in the form of their fruit. R.Br., *Botany of Terra Australis* (Flinder’s Voy.), p. 574 (1814).

This is important as showing what Robert Brown (who described several species) chiefly relied upon.

These fruits vary much in size; those of *C. cupressiformis* are the smallest, while those of *C. verrucosa* and *C. propinquua* are the largest. They usually persist on the branches for many years. *C. robusta* and *C. cupressiformis*, for example, appear to be an exception in this respect. In these species one can always find large numbers under the trees and on the young wood, but in some other species, *e.g.*, *verrucosa* and *propinquua*, they are always on old wood.

* Annales du Mus., 16, p. 299.
The fruits can be provisionally classified according to the columella, viz.:

Columella, a single triangular pyramid: verrucosa, robusta, columellaris, propinqua, Muelleri. Columella, more than one, and irregular in shape (perhaps formed of aborted ovules): calcarea, cupressiformis, Macleayana.

The colour of the cones is greyish-brown. C. robusta, C. columellaris, and C. Macleayana are rather dull as regards lustre; C. propinqua, C. calcarea, C. Muelleri, and C. cupressiformis are usually of the degree of lustre known as "egg-shell"; C. verrucosa is often dull, but sometimes the fruits are of a greasy lustre.

Some of the fruits have points on the scales or valves. For example, C. calcarea was specifically named because of these points. They are marked in C. cupressiformis, particularly in the variety mucronata. The fruits of C. verrucosa are covered with rounded wart-like swellings, as has already been stated.

Seeds.—The seeds vary in shape somewhat, as may be seen from the drawings. They vary somewhat in the number and shape of the wings. The seeds of C. Macleayana are different from those of the other species.

An attempt will be made later on to describe the colour of the seeds of some of the various species; the colours vary somewhat, but we do not yet know the amount of variation in the case of each species.

The seeds are packed in rows conformably to the scales, and the scars or cicatrices, showing where they have been attached to each scale, give the inside of the fruit a tesselated appearance, which is often distinctly ornamental in character.

Timber.—The following notes are of a general character; others will be found under each species:

Characteristics.—Its pleasant odour—camphoraceous, or sometimes reminding one of sandal-wood. Its great power of resistance to insect pests—it is said to be absolutely resistant to white ant, but that is overstating the case. Messrs. Sulman and Power, architects, in 1893 showed me a piece of Cypress Pine that had been undoubtedly attacked by white ants. Nevertheless, Cypress Pine is about the very last timber that white ants will attack. It lasts well in the ground, yet it is not the most durable timber for posts in parts of our western districts, but its great practical advantage is the facility with which it splits. Some of the species, the Red or Black Pine in particular, produce very showy timber; in fact, many of the planks are so gorgeous in appearance that care is required in using it for decorative purposes lest it should have too overpowering an effect. At the same time, much of the timber is of a quiet, handsome character. The prevailing colour of the figure is brown of various shades. Drawbacks to Cypress Pine timber are its brittleness; it has none of the soft yielding characters of Baltic Deal or Californian Redwood. It will therefore stand but little transverse strain, and a nail can hardly be driven
into the wood without previous boring, for fear of splitting the timber. Another drawback is its great inflammability. It may readily be dressed up to a smooth and glossy surface.

Principal uses.—It is extensively used in buildings liable to attack by white ants; and I think if its value were better known in the coast districts it would be employed to a greater extent. It is used to an enormous extent a couple of hundred miles or more back from the coast for house-blocks, linings, and ceilings of houses. Land carriage would effectually stand in the way of our profitably shipping this timber, even if an outside demand were to spring up for it, of which we have no evidence at present. It is one of the most luxurious firewoods I know of; it burns well, and in burning emits a delicious fragrance very generally admired. My idea is that the small pieces produced in saw-mills would sell at a remunerative price, as a superior kind of fuel for drawing-rooms, &c., if people could only readily obtain it. This may appear to be only a trifling matter, but I think that minor uses of our timbers (and above all, utilisation of waste) should be looked to. In developing such enterprises of magnitude as the wood-block trade, or the getting out of railway sleepers and timbers for bridge work, we should not lose sight of the smaller possibilities of some of our timbers. Nevertheless, Mr. Forester J. G. Postlethwaite, of Grenfell, a man of great experience with western timbers, being asked to give a list of the best six fuel woods of his district, adds the caution:—

I do not give Pine as a good fuel wood for general use as it is too dangerous, throwing out sparks and burning too fiercely, but it is the best for heating boilers and bakers' ovens.

The ordinary “Colonial Pine” of the Sydney market is the Richmond River Pine, called also Hoop Pine, White Pine, or Maryborough Pine (Araucaria Cunninghamii). Cypress Pine is often known as Colonial Pine in the districts in which it grows, and confusion has arisen, ere now, in interpreting “Colonial Pine” in contracts.

White Ants and Cypress Pine.—I have already referred to the fact that while this pine is very resistant it is not absolutely so. Following is some evidence in the matter:—

If only fully matured timber be used, that is the dark yellow-coloured wood, ants will not touch it. It is only the light yellow-coloured timber (which is cut from trees not fully grown or matured) that the ants will attack. I find from inquiries that white ants attack this timber either growing or when fallen, so far as the sapwood and bark is concerned. They will also attack the fresh cut timber before the sap dries. There are four varieties recognised in the western districts.—(J. V. de Coque.) These are white, red, and yellow (see C. robusta), and black (C. calcarata), which last timber Mr. de Coque issues a warning against.

Both Black and White Pine are of a very durable quality, and are extensively used in the building trade, for which they are much prized on account of their white ant resisting qualities. I have examined pine timber that has been in use in buildings for forty years, and find it still perfectly sound. I consider it is a great oversight that this timber is not introduced by the building trades into Sydney, where the white ant is so destructive.—(Forester Condell, Narrandera.)

A house in my district is built of hardwood, with the exception of the ceilings and lining-boards. A set of pigeon-holes, 9 feet x 4 feet, made out of imported pine, in one of the rooms, is, together with all the wood in the building, excepting our own colonial pine cut in the district, showing signs of white ants.
The palings round this building are also of imported pine, and although only of seven years’ standing they have now to be pulled down on account of the white ants eating the boards, and replaced by palings made out of the locally-grown pine. Other houses in the same town, with palings of Colonial Pine, standing over fifteen years, show no signs of white ants.—(Forester Harris, Gunnedah.)

Exudation (Australian Sandarac).—It was a specimen of resin from the Oyster Bay Pine of Tasmania (C. cupressiformis, var. tasmanica), sent to the Exhibition of 1851, which first drew the attention of experts to the possibilities of Australian Sandarac. For “the fine pale resin of the Oyster Bay Pine (Callitris australis), from the eastern coast of Van Diemen’s Land,” and other gums and resins, Mr. J. Milligan was awarded honourable mention.—(Jury Reports, 1851 Exhibition, p. 182.)

This is one of the most valuable of Australian* vegetable products; a market is ready for it, and it seems strange that it should have been so much neglected. There are no statistics available in regard to the importation of Sandarac into these colonies, but to bring it here at all is a veritable “carrying coals to Newcastle.”

It is a matter of common observation, that a number of raw vegetable products of more or less importance are going to waste in Australia, simply because our people are ignorant of their properties and value. I can hardly cite a better instance than that of Australian Sandarac. Here we have a product absolutely and entirely identical in chemical and physical properties with a well-known article in regular demand. The price of this article at London auction sales is shown by figures readily accessible, while its cost in Sydney is very much enhanced; and yet we actually import from Algeria, via London, at this high price, what is common enough in parts of New South Wales, and to be had for the gathering.

The collection of Australian Sandarac is one of those minor industries which could be readily undertaken by a family of children. As the resin flows from the Cypress Pines it could be accumulated in clean dust-proof tins until a sufficient quantity was obtained to be sold to the local storekeeper, who would again sell to the wholesale chemist, or wholesale oil and coloourman of Sydney. Sandarac is usually graded. There would be no difficulty in grading locally our local product, while any surplus available for export could be shipped without grading if found expedient.

I have no means of getting at the consumption of Sandarac in this State, but we ought to be able to supply the local demand, and have a good surplus for export.

The mealy appearance on Sandarac resin which has remained too long on the trees is well known, and can be easily removed by a weak solution of potash, as suggested by Mr. R. Ingham Clark. Samples thus treated take on a bright fresh appearance, as if freshly exuded.

* Notes on Sandarac will be found in Spon’s Encyc. of Manuf. and Raw Materials (Lock), p. 1681, also in Julius Wiener’s Die Rohstoffe des Pflanzenreiches, i, 249. Notes on Australian Sandarac will be found in papers by me in the Proc. Roy. Soc., Tasmania, 1889, and in the Agric. Gazette (N.S.W.), for May, 1894, and July, 1895, also in Proc. Roy. Soc., N.S.W., 1901.
It may be pointed out that the solution in weak potash of this external coating would be utilised by soap-makers. Nothing need be wasted.

Another method which may be suggested is to treat the Sandarac with rectified spirit. The resin at once assumes a beautifully fresh appearance, while both the spirit and the dissolved resin may be readily recovered, as every soap or varnish maker knows.

Picking and grading can be done by children with facility into two or three sorts; and Mr. Ingham Clark's advice not to neglect this, should be borne in mind, for it will pay. In a mixed parcel the price tends to that of the most inferior portion of it.

I reiterate the statement made in one of my articles, that the collection of Sandarac from our Cypress Pines will pay. I say there is money in it, and it will not only pay children to collect but grown-up people too. Seventy shillings per hundredweight leaves a handsome sum to the collector when all expenses are paid, and inasmuch as in many districts large quantities are available, particularly where the pines have been ringbarked or felled.

My experiments tend to show this: Given similar circumstances in regard to size and age of tree, season of flow, climatic conditions, &c., the Sandaracs from all the species are precisely similar in chemical and physical properties. Conversely it follows, that if two specimens of Sandarac are of different qualities, the explanation is to be found in the circumstances above enumerated. What is the best season to collect Sandarac or to bleed trees in a particular district is only to be learned by experience, and I think I have said enough to show that it is worth the trouble to try and find out.

Dr. T. A. Henry has recently published a valuable and exhaustive research on the Cypress Pine Resins or Sandaracs.* He examined the North African Callitris (Tetraclinis) quadrivalvis and the Australian C. verrucosa. He finds the resins to be identical in composition, and to consist of a mixture of resin acids and terpenes, separable by steam distillation. From the latter pinene has been isolated and identified. Two resin acids have been isolated and examined: one is named inactive pimaric acid, and for the other the name callitrollic acid has been retained. The research was carried out in the laboratories of the Imperial Institute, London, of which Mr. Wyndham Dunstan is Director.

According to Balzer (Archiv. d. Pharm. 234, p. 311), Sandarac from C. (Tetraclinis) quadrivalvis contains about 1 p.c. of volatile oil, which can be obtained by steam distillation. The oil has a brownish colour, a pleasant strongly aromatic odour, reminding of the odour of pines. In the cold it becomes viscid, and apparently separates a steareoptene-like substance. ("The Volatile Oils," Gilde-meister and Hoffman, Kremers' trans., p. 267.)

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Cypress Pines and our Poets.

Let me briefly touch upon our Australian poets and Cypress Pines, which do not, however, appear to have much stirred the poetic fire. I only give four quotations,—two referring to the hills of the Southern table-land and two to the Western Plains, celebrated for their pines, the home of the pine-scrubs and of those forests of pines which will be more valued as they become scarcer.

Charles Harpur speaks of—

"With leafy breath of piny mountains."

A. B. Patterson, in his "Snowy River," has—

"And down by Kosciusko, where the pine-clad ridges raise
Their torn and rugged battlements on high."

The closeness and regularity of growth of many of the western pines is alluded to by T. H. Ord—

"They chased him thro' timber, to where the tall pines
Rose out of the sandhills, set close as a furze."

The sweet aroma of a Cypress Pine forest reminds one of the perfume of the pine forests of Europe.

T. E. Spencer, in "O'Toole and M'Sharry," sings—

"In the valley of the Lachlan, where the perfume from the pines
Fills the glowing summer air like incense spreading."

There is nothing more delightful in the approach, on a winter evening, to a township where Cypress Pine is used as a fuel. Its delicious perfume is borne on the air for miles, and is often the first intimation that the weary traveller experiences that he is approaching a human habitation, and that his long journey is drawing to a close.

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KEY TO THE SPECIES OF CYPRESS PINE (CALLITRIS).

Fruit-cones large, angular, pointed, the junction of the valves prominent, the leaves (branchlets) markedly dimorphic ... ... ... ... ... ... Maclareana.

Fruit-cones globular, strictly valvate, the junction of the valves usually neither prominent nor furrowed.* Exterior not smooth; columella pyramidal.

Fruit-cone warty all over ... ... ... ... ... ... verrucosa.

Cone valves alternately smaller, foliage glaucous, and with comparatively thin pedicels (interior species) ... ... ... ... ... ... robusta.

Foliage bright green (coast species) ... ... ... ... ... ... columellaris.

Fruit-cones greyish-brown, nearly smooth.

Cone globular.

Columella pyramidal.

Branchlets coarse (coast and mountain species) ... ... ... ... ... ... Muelleri.

Branchlets rather slender, cones sparingly warty... ... ... ... ... ... propinquus.

Columellas several (interior species) ... ... ... ... ... ... colorata.

Cones rhombohedral, rather small, clustered on short branchies ... ... ... ... ... ... cupressiformis.

* Specimens of Murray Pine (robusta) from Mildura, Victoria, are markedly furrowed.
No. 44.

Callitris Macleayana, F.v.M.


A tall pyramidal tree (one of the largest of the genus) with spreading branches.

Leaves.—In whorls of 4 or sometimes 3, developed on the lower or sometimes on nearly all the branches into rigid linear-triquetrous almost pungent-pointed spreading laminae of 2 to 4 lines, reduced in some of the upper branches to the minute scales or teeth of the other species, the angles of the internodes very prominent. In no species are the leaves so markedly dimorphic as in this one.

Male amenta.—2 to 4 lines long.

Fruit-cones.—Sessile, nearly globular or slightly pyramidal, about ¼-inch diameter, the valves 8 or sometimes 6, nearly equal, thick, with a small dorsal point near the end, their junction forming prominent angles before the cone opens.

Fertile seeds.—With one of the wings usually large, the other small or obsolete. Colour of the wings a warm brown (Vandyke brown). Seed darker.—(See B.Fl. vi, 235.)

Botanical Name.—Macleayana, in honour of the late William Sharpe Macleay, of Sydney. It was described by Mueller in February, 1857, during a brief visit to the Sydney Botanic Gardens, and plants in the Gardens were raised from seed collected by Mr. Macleay at Tacking Point, Port Macquarie.

Vernacular Names.—“Stringybark Pine,” “Port Macquarie Pine,” “Mountain Pine,” or “Turpentine Pine,” are names by which it is known on the Dorrigo.

It is known locally simply as pine, and by no other name, without any distinguishing characteristic such as red or white.—(District Forester Hardiman, Taree.)


Leaves.—The dimorphism of the branchlets has already been referred to. The top of the leaf-scale appears to be rounder than in other species.
Bark.—This is friable-fibrous or stringy, different in texture to that of any of the other species, which are hard and more or less furrowed. When young, before it becomes properly fibrous, it is almost silky in appearance and to the touch.

Timber.—It is a pale-coloured fissile, easily worked timber, with little figure or colour, and but slightly aromatic. It is said to be white-ant resisting. It is used for indoor purposes, for weatherboards, deals, battens, and other small scantlings. It is light and useful, and was much used for shingles in the early days.

Size.—Up to a height of 40 or 60 feet, with a trunk diameter of 1 to 2 feet, in the Ellenborough Falls country. Mr. Hardiman says that in the Comboyne it grows to an average height of 30 feet, and a diameter of 2 feet.

Habitat.—Eastern Australia from the Stroud district, New South Wales, to northern Queensland. I have received it from near Cairns from Mr. S. Dixon. It is found quite close to the coast and westerly to the coast range.

Following are some specific localities in New South Wales, near Stroud:—
“Forest Reserve 33,036, parish of Yanatt, near the Comboyne, and was growing in rough, rocky, mountainous country. The timber is very scarce.”—(Forester Hardiman, Taree.)
“Rough country near the Ellenborough Falls.”—(J. H. M. and J. L. Boorman.)
“Near Coopernook.”—(J. C. Langley.)
“Port Macquarie.”
“Dorrigo, fairly plentiful on the Little Murray River.”—(District Forester T. H. Wilshire.)
“Grows only in one spot in my district, and that to a limited extent only. It is found on a clay ridge near Alstonville, Richmond River, immediately on the edge of basaltic country.”—(District Forester Pope, Casino.)
Callitris verrucosa, R.Br.


A small flat-topped tree 10–15 feet high, mallee-like, “of loose, wide-spreading habit, the branches falling to the ground, then taking an upward tendency, forming a basin shape; in height equal to the width.”—(J. L. Boorman).

Male amenta.—There may be as many as 4 male amenta in a cluster.

Fruit-cones.—From 1½ to 1½ inch diameter, nearly globular, almost entirely covered with warts on the backs of the valves. They are borne on the old wood, are persistent for some years after shedding the seeds, and are for the most part sessile or shortly pedicellate. The central columella a triangular pyramid, tesselated inside.

Fertile seeds.—Three-winged, rich warm brown (burnt sienna) in colour.

Botanical Name.—Verrucosa, Latin, “full of warts,” referring to the tubercles or swellings at the back of the fruits.

Vernacular Name.—“Mallee Pine” is a name given to it in western New South Wales.


The type comes from Enfield, S.A. Parlat. op. cit., p. 451, says of the fruits “stroblis haud vel parce tuberculatis sed tantum rugosis.” My specimen has very tuberculate fruits. I have seen specimens in the Melbourne Herbarium from the Murray River. Parlatore referred it, as indeed he did other forms, to F. robusta, A. Cunn. Bailey (Queensland Flora) speaks of C. verrucosa as “a tall, erect, usually glaucous tree,” the habit and branchlets the same as C. robusta,” a description which can only apply to C. robusta.

Fruit.—The tubercles on the backs of the valves are a characteristic which renders this species easy of determination. These tubercles vary in size a good deal, in some fruits they are few; in others, as crowded as it is possible for them to be.
I might mention a peculiarity of this pine is that the cones are borne in thick clusters for the most part directly on the larger limbs instead of towards the end of smaller branches as in the common (White) pine.—(R. O. Moore, Coan Downs.)

The same observation has been made by Mr. Boorman in regard to this species.

**Timber.**—This species is too small for timber. I have a note that a sample of “Rock Pine” from the Daubency Ranges, where the trees are 20–25 feet high, and 6–12 inches in diameter, is a splendid working timber, close-grained, and very showy. I have not seen twigs for many years, and perhaps a reader may forward me cones to see if the “Rock Pine” be identical with the “Mallee Pine” or no.

**Size.**—A shrub 10 to 12 feet high, with spreading horizontal branches resembling a Cypress.—(J. Duff.)

Small stunted pine, similar in growth to mallee, growing among mallee on Bygo Run, 10 feet high, spreading.—(Forester Taylor, Wagga Wagga.)

Its manner of growth appears to be much after the style of Whipstick Mallee, i.e., it has practically no trunk, the branches all springing from a bole or stump close to the ground, and being of a decidedly spreading nature.—(Mr. R. O. Moore, Coan Downs, Mt. Hope.)

Mr. Boorman’s description of the plants at Nymagee (ante p. 40) is much the same. In Western Australia never more than a glaucous bush of 6-10 feet high.—(W. V. Fitzgerald.)

**Range.**—It is a dry country species, found in the interior of New South Wales, Victoria, and South Australia, and also reaching the coast in Western Australia.

The type locality is “intérieur de la Nouvelles Galles du Sud, entre 24° et 38°.” The specimens were collected in the same district (by Allan Cunningham in Oxley’s Expedition) as *C. calcarata* were (see *C. calcarata*, p. 59), and Nymagee and Coan Downs may be fairly looked upon as type localities.

Found amongst mallee scrub on Coan Downs, Roto, and other stations, Lachlan District.—(J Duff.)

Mallee Pine grows in scattered patches in the mallee on this and neighbouring stations. It is usually found just on the fringe of the mallee, or on low sand rises in the mallee.—(R. O. Moore, Coan Downs.)

A correspondent informs me that it occurs about 1 mile west of Lake Cudgellico, on the road to Welsh’s selection, but I have not seen it. The above are New South Wales localities.

Lockhart Morton sent specimens of the species from north-western Victoria to Mueller, who labelled it *verrucosa*.

It also occurs in South Australia; Miquel’s type of *Frenela crociclavata* came from Enfield, near Adelaide. *F. tuberculata* came from the côté méridionale, i.e., the coast of South Australia or the south of Western Australia.
Turning to Western Australia,—

The few trees and shrubs seen on these hills (vicinity of Fremantle and Perth,—J.H.M.) consisted of . . . and a beautiful species of Calytris or Cypress, of the finest green colour, producing large warty cones.—(Charles Fraser’s visit to Swan River, W.A., in H.M.S. “Success,” in 1827, in Hooker’s *Bot. Miscell.* i, 225, 1830.)

Fraser’s original manuscript runs:—

Of the most beautiful green, producing large verrucose cones.

Again, at p. 229—

I observed two species of Calytris.

and at p. 233—

The loftiest parts of the Isle of Buache are thickly covered with Cypress (Calytris).

Buache is the present Garden Island, near Fremantle.

In abundance in close proximity to the sea, slightly north of Cottesloe, and sparingly on Rottnest Island.—(W. V. Fitzgerald.)

EXPLANATION OF PLATE 46.

*Callitris Macleayana.*

No. a and a₁. One form of foliage, natural size, and about three times natural size. b and b₁, the second form of “foliage” (branchlets) common in this species. b enlarged and b₁ greatly enlarged. c is a fruit. c₁ seeds, and c₂ two of the clusters of central columnella or aborted ovules of each fruit.

*Callitris verrucosa,* R.Br. (specimens from near Nymagee, N.S.W.).


n. A very warted fruit of *Callitris propinqua,* R.Br., showing close affinity to *C. verrucosa.* For remainder of *C. propinqua,* see Plate 47.
THE WARTED AND STRINGYBARK PINES.

(Callitris verrucosa, R.Br.)

(, Macleayana, F.v.M.)
Callitris robusta, R.Br.


A tall pyramidal tree.

*Branchlets.*—Slender and glaucous, the internodes terete or with very obtuse angles, the scales or teeth small and acute.

*Male amenta.*—Solitary or in threes, 2 to 4 lines long.

*Fruit-cones.*—Solitary or few together, nearly globular, and usually about 1 in. diameter, rarely either angled or furrowed; the valves 6, alternately about ½ shorter, strictly valvate, lustre dull, smooth, or occasionally one or two of the valves more or less verrucose and wrinkled on the back, without any dorsal point, except when the fruit is quite young. Central columella sometimes nearly as long as that of *C. columnellaris*.

*Fertile seeds.*—Usually 2-winged, the central columella often somewhat prominent; colour light brown.

Botanical Name.—*Robusta*, Latin, in allusion to the sturdy growth of the species.

Vernacular Name.—"White or Common Pine." It is often named after a locality, thus—"Murrumbidgee or Lachlan Pine." Other names will be alluded to later on.

The "Mountain Cypress Pine" of Weddin, near Young, grows on hilly country, and as a rule is not of a very sound nature, having dry rot at the heart; used for saw-milling and fencing purposes. There is very little of this pine in the Grenfell district.—(District Forester A. Osborne.)

There is a variety here (Parkes) known as "Ridge Pine," which may be either figured or plain, but is so called because it grows on the sides of hills. Sawyers will not take it if they detect it, as in many cases, though apparently sound at both ends, is pithy in the middle, and thus cuts up badly. Generally speaking, the best timber has a rather smooth bark. That with rough curly bark generally indicates a rough curly-grained timber.—(Forest Guard P. J. Holdsworth.)

Mr. Osborne’s "Mountain Pine" is *C. robusta*. Mr. Holdsworth does not send specimens of his "Ridge Pine," but it would appear to include *robusta*, and also the Red or Black Pine (*calcarata*), and it is perhaps a name given to inferior timber of both kinds.

Aboriginal Names.—"Backoowarrah" of those of Ivanhoe, via Hay, N.S.W.—(K. H. Bennett). "Carra" is the name in use by the Lachlan blacks in the thirties.—(Mitchell—Three Expeditions). Mr. Forestor Kidston in 1894 gave me "Gurrah" as the name used on the Lachlan (near Condobolin); it is evidently
the same as Mitchell’s name. “Marung” or “Marunng,” of those of Lake Hindmarsh Station, Victoria, and other Murray blacks. “Marro,” of the Rottnest (W.A.) blacks, according to Miquel, in Lehmann’s *Planta Preissiana*.

**Synonyms.** — *C. glauca*, Nouvelle Hollande (intérieur de la Nouvelle-Galles du Sud, entre 24° et 28°); côte méridionale (Golfe Spencer), entre 32° et 35°; ex Mirb. *Mem. Mus. Par.* xiii, 74 (1825); *C. Preissii*, Miq. in *Lehm. Preiss.* i, 643 (1844–5); *F. robusta*, A. Cunn. ex Mirb. loc. cit.; *F. glauca* ex Mirb. loc. cit.; *F. canescens*, Parlat, S.W. Australia (Roe); Swan River (Drummond, Nov., 1843), Parlatore in DC. *Prod.* xvi (2) 448; *F. Gulielmi*, Parlat. “In Nova Hollandia Australi prope Salt Lake ad Tungetta legit Princeps Carolus Gulielmus in Herb. Vindob. sub nomine *Callitris Preissii*.” —Parlat in *DC. Prod.* xvi (2), 449.

I have not seen types of these two species which are referred to *robusta*.


I have seen a specimen doubtfully referred to this species. It is “Murrumbidgee Pine” (*C. robusta*).

*C. robusta* is figured in Mueller’s *Key to Victorian Plants*, Fig. ii, as *verrucosa*. Bentham, while he combined the species, called them *robusta*. I think I have fairly shown that *robusta* and *verrucosa* should be kept apart.

**Leaves (Branchlets).**—Mr. P. J. Holdsworth has made some interesting experiments on the essential oil from the foliage of the White Pine. In one experiment he obtained $\frac{1}{2}$ fluid ounce from 6.5 lb. of fresh leaves, and it seems desirable that his experiments should be followed up with the view to ascertain the composition of this oil, as, so far as I know, he is the first to extract oil from these leaves.

**Timber.**—The name White Pine has been attached to this tree because of its glaucous foliage. Sometimes its timber is nearly destitute of figure. I have “Mountain Pine” from the Acting Forestier at Thackaringa, near Broken Hill, whose timber is of a rich colour, but small.

The white is the one most used for all building and fencing purposes. How it comes to be called “white” I cannot explain, as the sap-wood only is white, while the heart-wood is invariably in lighter or darker shades of red.—(Forester Kidston, Condobolin.)

The durable timber; Black Pine no good.—(A. Murphy, Murrumbidgee, near Dubbo.)

The white, red, or yellow varieties, as far as I can gather, are of one species; the branchlets are light in colour of bark, also the fruit-cones as compared with the Black Pine. These three distinctions are made owing to the respective colours of the lines running through the timber, but no difference exists as to their durability in works. The white, red, and yellow varieties are in great demand throughout the Western district for house-building. It seems to dry quickly, and has some wonderful records for durability. For example, I have a reliable record of a White Pine post, 20 inches in diameter, put into the ground near Wellington, infested with white ants. It was removed after thirty years, and was quite sound except sap-wood, and of the consistency and colour of iron. It is a capital timber for house-building purposes, but is rarely used in Sydney owing to the expense of bringing it so far by rail. I failed to find a single instance recorded in the Western districts where white ants attacked the timber after it
was dry, and the majority of the houses, etc., around the towns of Dubbo and Wellington are built of this timber. It is also forwarded for upwards of 100 miles by rail for building purposes, and invariably gives satisfactory results as long as the black variety is not used. —(J. V. de Coque.)

The pine timber is the most useful timber here for buildings, telegraph-posts, and posts for wire fencing, and is not so liable as other timber to the attack of white ants. It takes a good polish, and I have seen shop-counters made from the same. It is also much used for ceilings, and looks remarkably well, and remains sound under the ground for many years.—(Forester Payten, Corowa.)

The White Pine is a valuable timber, and is used extensively for building, fencing, and telegraphpoles. It stands well in the ground, especially if the bark is left on the part that is put underneath the surface. For building purposes it is indispensable, and nearly all the wooden buildings in town and country are made from this wood. It keeps sound for a long time, but houses made of this timber will not bear moving, as it splits and breaks very easily while being taken to pieces, so they cannot be erected again with any degree of neatness.—(Forester Postlethwaite, Grenfell.)

This is one of the most useful trees, used mainly for saw-milling and fencing purposes, and is of hardy growth.—(District Forester Osborne, Cootamundra.)

This timber is very free from knots, and easily worked, and is considered by builders and carpenters as the best of our pine, and is used for all building purposes. It takes a very fine polish, and is very handsome in the grain. This pine is proof against white ants. I have often seen them moving over it to attack other timber, and would not attempt to touch the pine.—(Forester Smith, Dubbo.)

Size.—Height, 50-60 feet.—(Forester Taylor, Wagga). It sometimes reaches a diameter of 18 or 20 inches.—(Forester Postlethwaite, Grenfell.) Attaining a height of 70 or 80 feet with a diameter of 2 feet, the logs now being brought in to the mills running from 30 to 50 feet.—(Forester Smith, Dubbo.)

Habitat.—In all the States except Tasmania. It is usually gregarious, forming scrub forests on sandy barren lands.

WESTERN AUSTRALIA.

Rocky Bay and Woodman’s Point (Preiss No. 1,312); coast districts of South-west Australia (Bynoe); King George’s Sound (Baxter); near Fremantle (Hägel); Rottnest Island (Allan Cunningham, also Preiss No. 1,310). All the above quoted by Parlatore, but some may be liable to revision. The type locality is “Ile Rottnest sur la côte occidentale, lat. 31°.”

Mr. W. V. Fitzgerald says of this species:—

Abundant on Rottnest Island and sparingly near Claremont. It frequently attains a height of 45 feet.

and the specimens he sends in no way differ from the common White Pine of our western (N.S.W.) country.

Speaking of Western Australia, Diels and Pritzel state:—

It is not at all particular in the choice of its habitat. We have seen it growing on granite on the coast, in the limestone regions of the west coast, on sand in the interior, and on gravelly conglomerates, but always associating with vegetation characteristic of the Eremean Region. Apart from the littoral it seems, therefore, to be wanting entirely in the districts Darling and Warren.—(Englers’ Jhbr. xxxv.)

E. Pritzel’s No. 848, Plantae Australiae occidentalis, Coolgardie, October, 1901, labelled “Frenela robusta, Cunn.,” shows a few warts and inclines to verrucosa. It is an intermediate form of which many other instances could be given.
South Australia.

Very common in this State, from near the coast far into the interior. In sending me specimens from the Mount Brown Forest Reserve, Mr. Walter Gill remarks:

Spencer's Gulf is only a few miles due west. You may consider this a real Spencer's Gulf Pine, as it is typical of thousands of similar trees all along the ranges, which rise immediately from the plain forming the borderland east of the Gulf.

The Horn Expedition only collected robusta, or as Mueller put it, "verrucosa of the smooth-coned variety."

Victoria.

In the Mallee country generally. Some specimens from Mildura (Mr. Borrett) have markedly furrowed valves. I draw attention to this because Bentham, in the key (B.Fl., vi. 235), places robusta in a section in which the "junction of the valves is neither prominent nor furrowed." It is but another instance of the variation which obtains in the genus.

New South Wales.

It is abundantly distributed in the dry country west of the Dividing Range of this State. It is unnecessary to enumerate all the localities in the National Herbarium, but following are some notes, chiefly by foresters, some of them made some years ago, and now published for the first time:

There is no pine growing in any of the reserves in my district, which extends to the edge of the pine country about Wagga and Old Junee. I have searched the country between Old Junee and Wagga for pine, and have only found a few pines, and they chiefly in alienated lands. From Old Junee and Wagga towards Narrandera, you get into the pine-country which is out of my district. I have seen a little pine in the Camping Reserve at Alfred Town, on the banks of the Murrumbidgee, but no quantity, and also a small quantity between Upper and Lower Tarcutta, but very small.—(Forester Mecham, Tumut.)

Native Pine grows in the hills, and the soil is of a rocky and stony nature. On Poolamacca Pastoral Holding, 6 miles south of Torrowangee, they are very scarce, only an odd pine-tree here and there.—(W. N. Baker, Acting Forester, Torrowangee.)

There is a great scarcity of matured pine timber in this district. The whole of the matured trees have been felled before the present reserves were proclaimed, and great waste of valuable timber took place, the greater portion being allowed to rot on the reserves. The following are the principal pine reserves in my district, within the County of Townsend, and are all fairly well-timbered with young pine, in all stages of growth. Nos. 1,901, 1,902, and 3,156, situated on Puckawidgee Run; Nos. 1,879 and 1,880, Steam Plains; No. 7, Conargo; No. 1,104, Deniliquin; and part of No. 1,158, Warwillah Run. All these reserves, with the exception of No. 1,158, have under my supervision been thinned, and all scrub and undergrowth cut and burnt off by the lessees of the runs. The timber has wonderfully improved since the clearing, and will become very valuable in time. The only other pine reserve in my district of importance is No. 3,103, situated on Chah Ling River, County of Wakool. This reserve is timbered with good pine, most of the trees are now suitable for telegraph posts. Bush fires in this district have tended to destroy hundreds of acres of splendid young pine forests, both on freehold and Crown lands; very little fire destroys the young timber. There are several other reserves in my district that contain small patches of pine. The total area of pine timbers including all the reserves in my district, I would estimate at about 10,000 acres.—(Forester Wilshire, Deniliquin.)

There are about 20,000 acres of land upon the reserves in my district, well-timbered with pines.—(Forester Payten, Corowa.)
The number of reserves (pine) in my district is 101, and the area which they cover is 467,625 acres. There is a plentiful supply of pine distributed over these reserves in various stages of growth, from trees of half an inch in circumference up to 4 feet. This pine* is of two varieties, known locally as “Black and White Pine.”—(Forester Condell, Narrandera.)

As near as I can calculate, there are about 92,000 acres of White Pine on the timber reserves in my district, exclusive of a proposed reserve in the County of Gipps, which I believe has not yet been gazetted, containing about 2,000 acres of pine. Though pine timber is found upon the area above-mentioned, it is principally of a small description, the larger trees having been already felled for various purposes, and there are probably at the present time not more than one-third of that number of acres carrying matured trees. The White Pine thrives best on sandy ridges, and is generally found with other timbers, such as Bull Oak and Box. The former is occasionally found in considerable numbers on the Weelkin Forest Reserve, for instance, there are hundreds of acres of this class of timber which grows to a greater size here than upon any other reserve that I know of.—(Forester Postlethwaite, Grenfell.)

To be found on nearly every reserve throughout the Lachlan and Murrumbidgee districts, especially on stony ridges.—(Forester Taylor, Wagga Wagga.)

There is a large quantity of pine timber, the White or Yellow Pine being mostly used; the great bulk of pine now being cut by mills in Dubbo, Narromine, Trangie, and Wellington, being obtained from Crown lands between the railway line and the Bogan River, the belts of timber running from Timber Reserve No. 2,727 to close to Peak Hill, with very little break. The trees being very sound and large, I have already recommended this country be reserved so that the young timber could be protected, which is very necessary, and which if done would give a lasting supply to the mills named. I would estimate the output of pine in this district at nearly 3,000,000 feet per annum, and this could be maintained if more of the young pine were protected, as near towns small trees are cut and brought in to save carriage. There is also a large quantity of pine, on Crown lands within my district, being carted to towns outside, such as Parkes, Mudgee, Coonamble, &c., the quantity of which I could not form an estimate. The White Pine is found in large quantities growing amongst the scrub, and if the scrub were cleared there would very soon be good pine in its place. The White Pine is the most plentiful in this district.—(Forester Smith, Dubbo.)

The White Pine is found growing in the thickest scrubs, and is considered good timber for all purposes; saplings run up straight, with little taper, and are used for rafters, ridging, and bush carpentry in general.—(District Forester Marriott, Dubbo.)

Mr. Marriott’s Red Pine is also C. robusta; his Black Pine is (as is usually the case) C. calcarata. I see no marked difference in the colouration of these three Dubbo timbers. If anything, the Black Pine is the lightest; but the two robustas (White and Red Pine) have a clear band of pale sap-wood, while in the Black Pine the band is far less marked. Commenting on this, Mr. Marriott reports, “The Red Pine is considered to be if anything the best timber for milling purposes. The White and Red Pine found on the level country constitute the pine of the plains. Sometimes the Red Pine is called Yellow Pine. For other notes on the subject see “Timber,” p. 34.

White Pine is more or less plentiful thence to the north-west railway line.

White Pine is found growing on light loams and sandy loams, chiefly bad country. It is one of the most common tree growths in the district.—(District Forester Bishop Lyne, Narrabri.)

The principal reserves in and around Gunnedah comprise 56,613 acres, chiefly composed of pine. Breeza, Doona, Tulcumbah, and Denison may be taken as the largest, but with the exception of the last-named there is no pine left of the required size. Breeza reserve, situated 25 miles from Gunnedah, and comprising 19,070 acres, is completely cut out of pine. Thousands of logs have been taken from this reserve for the past twenty-five years. Doona and Tulcumbah reserves may be classified as the same, and unless proper measures are taken the young pine now maturing will be stunted and knotty. Denison

* This is robusta and calcarata but the former largely preponderates.
reserve is, however, a valuable one as far as pine is concerned, the reserve, comprising 29,500 acres, growing an average of eight matured trees per acre, over an area of 20,000 acres. This reserve could also be improved, as far as the young pine is concerned. If it were attended to, it should be able to produce a constant supply of pine yearly. At a rough estimate, there is in my district 163,000 acres growing, on an average, five matured pine-trees per acre, and the young pine saplings, in a healthy state, might be averaged at the same, with an average of more than double.—(Forester Harris, Gunnedah.)

Mr. Harris' district contained both White Pine and also Black Pine, *C. calcarata.*

**Queensland.**

This species is found over enormous areas in Western Queensland, extending to near the coast in Central Queensland. In that State we often find species which in New South Wales are looked upon as *Eremean* extending to the coast.

**Pine Scrub and Pine-thinning.**

*C. robusta* mainly forms the Pine Scrub of the west; to a less extent *C. calcarata* is a pest; sometimes, in a given area, the two species are commingled. The matter of dealing with these lands is discussed in a valuable pamphlet* I do not, therefore, propose to do more than briefly touch upon the subject.

"Pine Scrub" is a serious pest to pastoralists in the interior, the land not only being rendered useless for grazing purposes by reason of the millions of young trees, as thick as a maize-crop, but this scrub is a safe hiding-place for innumerable vermin—rabbits, dingoes, &c. Efforts have been made, under the supervision of the Forest Department, to thin out the saplings, and thus allow trees to attain maturity.

The following extract from a report by Cadet Swain, of the Forest Department, which was obtained at my instigation, gives so excellent an account of White Pine, the principal component of Pine Scrub, that I reproduce it here. Mr. Swain was in the Grenfell, &c., district:

A symmetrical tree attaining a height of 100 feet, of glaucous foliage, and often crowded branches. It occurs generally as Pine Scrub, with a sprinkling of matured trees; on reddish sandy loam in almost pure forest, with a slight admixture of White and Yellow Box and Kurrajong.

It is a light-demander, and though the scrub is often very thick, the foliage is so thin that the sun obtains apparently unrestricted admission.

Reproduction is effected at long irregular intervals as the result of a good season, when the young pine scrub quickly covers the ground with a glaucous seedling growth. The "thicket" stage succeeds—a dense crop of whipstick pine with dead snaky branches interlacing and forming the dreaded pine scrub. This is followed by the pole stage.

A further report says:

In some places the scrub is so dense that it is impassable, and I have counted twenty-six pine plants, each from 3 to 8 feet in height, upon 1 square yard. Plants growing as close as this can never reach maturity or usefulness. I have lately supervised the thinning out of a small area (120 acres) in the Weddin Forest Reserve and have left all those of 4 inches and upwards intact, and thinned out those

* Notes on Pine-thinning, based on Foresters' and Surveyors' Reports. Compiled and annotated by R. D. Hay (published by the Forest Department, Sydney, 1899.)
under this size to 8 feet apart, which I think is quite close enough to enable them to become useful. The 
pine is occasionally attacked by a grub, which is about \( \frac{5}{8} \)th of an inch long, of a white or cream colour. 
Its head is the largest part and it burrows around the stem of the plant, just under the bark, while young, 
and afterwards penetrates to the interior, sometimes killing the tree, but so far does not seem to have 
destroyed many in this district; but rabbits, if hard pressed for food, will bark the small saplings, as has 
been done in this district, but not to any great extent, as the rabbits are not at present numerous 
enough.—(Forester Postlethwaite, Grenfell.)

In the Annual Report, Forest Branch, Department of Mines, for 1884, p. 35, 
is a “Report by Dr. von Lendenfeld on the life-history of an insect destroying the 
pine scrub in the Nymagee, Condobolin, and Forbes districts.” The insect in 
question is a beetle *Diodoxus erythrurus*, White, which ringbarks the young pine 
scrub. He made the remarkable proposal that these beetles should be systematically 
introduced into the pine scrub in order that they might clear it, saving the cost of 
felling or ringbarking. The larval stage of the beetle is the grub already alluded to 
by Mr. Forester Postlethwaite. While there are, of course, drawbacks to pine 
scrubs, yet the pine is a valuable asset in this country, and the time may come 
when it will be carefully conserved. Already in parts of the country the scarcity 
of this valuable timber is being felt, and it often grows in situations entirely 
unsuited to agriculture, or even pasture.

There is a very limited quantity of matured pine-trees in my district; the young trees vary in size 
from 2 to 10 inches in diameter, and are of healthy condition and straight, but are of such dense growth 
that the trees can make but little headway on account of not having sufficient light and moisture.— 
(Forester Payten, Corowa.)

I consider we have a supply of pine here which, with care, would last a generation if our reserves 
are only attended to—that is, by having the timber judiciously thinned out and the useless scrub destroyed. 
—(Forester Condell, Narrandera.)

Between the Murray and the Darling there must be at least 50,000,000 acres of pine country, less 
what has been destroyed. In all that area there are no other timber of any commercial value but Pine and 
River Gum (*Eucalyptus rostrata*). The pine derives its principal value from its resisting the white ants 
and because there is no other timber, west of Forbes, in any quantity that does so. The notable increase 
and spread of young pine-trees dates back from the country being stocked with sheep; after rain, the seed is 
dibbled into the soil by the sheep’s feet. From 20 miles north of the Murrumbidgee to beyond Cobar, and 
from Dubbo, Forbes, and Wagga, on the east, to Booligal and Mossgiel, on the west, may be considered a 
vast pine forest with a few open plains intervening. In my belief a great misapprehension exists regarding 
the time required for a pine sapling to become a matured tree—say from 1 foot high to 15 inches in 
diameter. Mr. J. Ednie Brown thought it would grow to be 1 foot thick in twelve or fourteen years. I 
think it will take at least sixty years; and this is accounted for by the diminished and intermittent 
rainfall of the Western district. I have counted eight young pines, 3 to 8 feet high, on 14 square inches. 
As they grow up the taller kill the shorter ones, while the density or number of the plants wither the 
lateral branches, ultimately leaving the trees that matured without branches or knots for 20 feet to 25 feet 
from the ground. But for the pine the whole of the Western district would require to import its timber, 
for American or Baltic is ruined by the white ants in a year or two.—(Forester Kirkton, Condobolin.)

In places where young whipstick pine is growing thickly I have seen a few trees, about 4 feet high, 
that have been cleared and pruned, the consequence being that in seven years they have become saplings 
18 feet high, with a circumference of 1 foot; whilst on the other hand, whipstick pine left alone, growing 
some distance from Gunnedah, is, I am credibly informed, almost the same to-day as it was fifteen years 
ago, the only difference being that some are taller than others, perhaps 14 feet high, but with no trunk of 
any size; but if these were cleared and pruned now they should in a very few years mature, and the 
gradual dying out of the matured pine in my district without a corresponding increase, or anything being 
done to push the young pine forward, should show the necessity of fostering an important industry.— 
(Forester Harris, Gunnedah.)
Callitris columellaris, F.v.M.


A tall tree of 50 to 60 feet, with a diameter of 2 feet. Hill says of it: “Its form is pyramidal and of great beauty; the trunk has a brownish, ridgy bark; the branches are numerous and ascending.” Near the coast it is often of a straggling habit. Bark usually rather hard and deeply furrowed.

Branchlets.—Slender and bright green, the internodes with very obtuse angles, the teeth small and rather acute.

Male amenta.—Solitary, or more generally in clusters of 2 or 3, 1 to 2 lines long.

Fruit-cones.—Small, but varying from under ½ inch to nearly ¾ inch, the valves usually more unequal. Thinnest in texture of all the species, almost shell-like; central columella perhaps more developed than in any other species; triangular, and varying from scarcely one line to nearly the length of the valves.

Fertile seeds.—Bright light brown (burnt sienna).

Botanical Name.—Columellaris, Latin, columella (a little column), in allusion to the triangular pyramid in the inside of the fruit emerging from the base. The columella in this species is as long as it is ever found in Callitris.

Aboriginal Names.—“Kurun-Kurun,” “Coorong-Coorong,” or “Coorung-Coorung” (evidently three spellings of the same name) of the aborigines of Northern New South Wales. “Pooragri” of those about Brisbane. “Coolooli” of those about Wide Bay (Queensland).


The affinity of this species to C. robusta is obvious. It was observed both by Parlatore and Bentham. It differs chiefly in habit from C. robusta, and forms an example of the protean forms of Callitris.

Timber.—Highly figured and very aromatic.

While residing here, for over nineteen years, I was always given to understand that the timber of the Cypress Pine is not touched neither by the white ant nor the cobra.—(S. Sohn, Wardell, Richmond River, N.S.W.)
The root of this tree is valued by cabinetmakers for veneering purposes and largely employed in this way some years ago; but for some cause, not explained, it seems to have fallen into disuse.—(C. Moore, in Paris Exh. Cat., 1855.)

A bone-dry specimen, weighed by me, gave a weight of 44 lb. 7 oz. per cubic foot.

The timber is an article of great importance, but as yet has not received the attention that it deserves from the timber merchants. This wood is brittle, durable, fine-grained, fragrant, and is capable of a high polish. It is used for piles of wharves and for sheathing punts and boats; it resists the attack of cobra and white ants; the root also is used for cabinet purposes. (Hill, speaking of Octoclinis backhousei, Hill, in Cat. of Nat. and Indust. Prod. of Q. (Intern. Exhib., 1862.)

Bentham (B.Fl. vi, 238) says the specimens supplied by Hill are "without flower or fruit," and are probably Frenela Endlicheri (Callitris calcarata). The species is C. columellaris, and we have here additional evidence of the difficulty of dealing with Callitris on herbarium specimens alone.

Used for telegraph poles in the Rockhampton district.—(A. Thozet.)

This is the only timber used here (Northern Territory) for buildings, as it resists the white ants perfectly.—(N. Holtze, speaking of F. robusta, var. intratropica.)

**Size.**—"Only a few specimens may be found girding 6 feet at 3 feet from the ground."—(S. Sohn, Richmond River.) It has been recorded at 50 feet high with a diameter of 2 feet near Ballina; height of 30 feet with a diameter of 15 inches at Byron Bay.—(District Forester Pope.) From 50–60 feet at Moreton Island (Queensland).

**Range.**—"To this belong most of the Northern specimens, also Richmond and Clarence Rivers."—(B.Fl. vi, 237.) Near Wardell, it grows in a loose sand formation.—(Sohn.) Near Ballina (Richmond River), I have seen it growing in pure sand—coastal sand-dunes. There are groves of it near the Brunswick Heads, on the Mullumbimby road. Near the Clarence Heads it is common. District Forester Pope says that it occurs near Byron Bay, close to the sea-shore, in small patches, always in sandy country.

It grows in great quantities upon Moreton Island, near the entrance to the Brisbane River.—(Catal. of Northern Woods, Paris Exh., 1855, No. 62, C. Moore.) Forms vast tracts along the coast of Queensland, growing on barren sandy soils.—(W. Hill.)
No. 48.

Callitris Muelleri, Benth. and Hook. f.


A handsome, pyramidal, glabrous tree of 40 feet, with a diameter of trunk of 9 to 12 inches.

Branchlets.—Very angular and coarse, occasionally dimorphic (e.g. Eden).

Male amenta.—From rarely solitary to clusters of 4, short and thick.

Fruit-cones.—Globular, \( \frac{3}{4} \) to 1 inch diameter, sometimes as large as those of any species, neither angled nor furrowed, the valves 6, very thick, strictly valvate, smooth outside, with a minute dorsal point below the summit, the smaller valves about half the breadth of the larger ones, though not very much shorter. The inside of the fruit of a tesselated appearance; central columnella single.

Fertile seeds.—Deep red brown.

Bentham (B.Fl. vi, 237) says: “This species requires further investigation.” There is no doubt that its affinity to C. propinqua is very close, and to C. calcarata nearly as close. Bentham’s remark is a natural one, for the delimitation of some of the forms is very difficult.

Botanical Name.—Muelleri, after the late Baron von Mueller, Government Botanist of Victoria.

Vernacular Names.—This tree is usually known as Cypress Pine. The names “Port Jackson Pine,” and “Illawarra Mountain Pine” should be received with caution, as C. cupressiformis may be included.

Synonym.—Frenela Muelleri, Parlat. in DC. Prod. xvi, 2, 450.

This species name has been mixed up with C. fruticosa, R.Br., and I will try and clear the matter up.

C. fruticosa, R.Br. ex L. C. Rich. Conif. 49 (1826), and therefore Frenela fruticosa, A. Cunn., ex Endl., l.c. “It is probably a Tasmanian specimen of Frenela australis, R.Br., that R. Brown had originally designated under the name of Callitris fruticosa, which does not occur in his herbarium.”—(B.Fl. vi, 239.)

Mueller often labelled Blue Mountain specimens of C. Muelleri “C. australis, R.Br.,” in the early days.

Mueller wrote to me, 8th June, 1891,—

Callitris fruticosa awaits also yet elucidation. I think it is one with very coarse foliage (unusually thick branchlets) and usually of shrubby growth, and originally only about Port Jackson, where it may have become extinct.

Neither Bentham nor Mueller saw Brown’s species. Bentham surmised that it was from Tasmania, Mueller from Port Jackson. If Mueller’s view is correct, then it is the plant we know as C. Muelleri.
Parlatore, in DC. *Prod.* xvi (2) 450, gives *Frenela fruticosa*, var. *arborea*, Mueller; as a synonym of *F. Muelleri*. I agree with this, having seen the specimens.

I have seen L. C. Richard's work. T. 18 consists of an elaborate series of detail drawings of *C. rhomboidea* (*cupressiformis*) under No. 1. No. 2 (on the same plate) consists only of a drawing of one cone, under the name *C. oblonga*. The drawing might have been better, but I see no reason to differ from those who attribute it to the Tasmanian *C. oblonga*, especially as in the brief description we have "squamis oblongis," which those of *C. Muelleri* certainly are not. Richard gives as a synonym of his species "Callitris fruticosa, R. Brown, M.S." After describing his species he adds "Habitat ad portum Jackson. Ex Londino specimena ad me misit, R. Brown." It seems to me that the confusion has entirely been caused by attributing this specimen to Port Jackson instead of Tasmania.

**Leaves.**—The coast form has especially angular branchlets, which are even decurrent. Speaking generally, the length of the internodes is greater in *Muelleri* than in *calcarata*, but the shape of the rudimentary leaves is identical in the two species.

**Fruit.**—The fruit resembles that of *C. propinqua* a good deal, but is, apparently, never tuberculate. That this species runs into *C. propinqua* I have no doubt.

**Timber.**—A figured Cypress Pine timber of no special character. It is not very abundant, and since it comes into competition with excellent hardwoods it is not often used.

**Size.**—Usually a small tree, but I have seen it up to, perhaps, 40 feet in height, with a trunk of 12 inches.

**Habitat.**—Port Jackson, also South Head (Port Jackson), "et austral orientale ad Port Phillip Heads" * (Parlat. in DC. *Prod.* xvi (2) 450). I look upon this species as confined to New South Wales, (Central and South Coast and the Dividing Range). It is usually found in rocky (sandstone) situations.

Mueller's "*Frenela fruticosa*, var. *arborea*" came from Lane Cove River, Port Jackson. It bears the collector's note, "Habit rigid, compact, 20-30 feet." It is at present not rare about Middle Harbour, Port Jackson, and also George's River.

Going north, I have it from Brisbane Water (not to be confused with Brisbane River) at "Woy Woy, on the tops of the high table-land, some of them grow to a fair-sized tree—very handsome."—(A. Murphy.) South, I have collected it near Eden, on the Victorian border. A Berrima specimen (Woolls) is labelled *F. Endlicheri* (synonym of *C. calcarata*) by Parlatore, which name was accepted in B.Fl. vi; 288, is *C. Muelleri*.

On the Blue Mountains it is not rare, and the most westerly locality known to me is Rylstone.

* See *C. propinqua*, p. 55.
No. 49.

Callitris propinqua, R.Br.


*Branchlets.*—Slender, the internodes rounded, and with very obtuse angles.

*Male amenta.*—Solitary, or 2 or 3 together; about 2 to 3 lines long.

*Fruit-cones.*—Clustered on the old wood on thick peduncles; globular or rather oblong; above 1 inch long when opened; the valves wrinkled or sparingly warty, mostly tessellated inside round the short central column.

*Fertile seeds.*—Dark brown, with two large rounded spreading wings, the whole seed at least twice as long as broad.

This is a species which of late years has been confused with *C. Muelleri* on the one hand, and *C. verrucosa* on the other. One must keep to the type, especially as I have prominently drawn attention to the somewhat arbitrary boundaries of most of the species. From *C. Muelleri*, *C. propinqua* may be separated by the perfectly smooth cones and coarse angular branchlets of the former. It has the smooth branchlets often seen in *C. verrucosa*, and it has often a few warts on the valves; its affinity to *C. verrucosa*, a species name which has by Mueller been used somewhat as a drag-net, is evident. The stout peduncles, and the way in which the cones remain on the old wood for years, separate this species and *verrucosa* from *robusta*.

*Range.*—The type came from "Ile des Kangourous, sur la côté méridionale, lat. 36°." This is, of course, off South Australia. I have specimens from Kangaroo Island through the kindness of Constable Thorpe, and also of Miss E. J. Benham and Mr. Walter Gill. I have also seen Waterhouse's specimens from Kangaroo Island, which were labelled *Frenela robusta* by Parlatore. The species extends to the mainland, being found in South Australia. Going west we find it in Western Australia, and eastward it occurs in Victoria and New South Wales.

South Australia.

Sandy Creek, near Gawler, (W. Gill). This tree certainly has affinity to *C. Muelleri* in angularity of branchlets, fruits (lustre, columella, seeds, and seed cones). Some of these specimens have branchlets as slender as those of Mr. Baker's *C. gracilis*. It has also affinity both to *C. robusta* and *verrucosa*, as any observer may see. The fact is that in *Callitris* one must closely adhere to the type, and this is specially the case with such species as *columellaris*, *Muelleri*, and *propinqua*. 
I have a specimen from the Mt. Brown Forest Reserve, S.A. (W. Gill), which has bright green foliage, and is hence sharply differentiated from the glaucous White Pine (C. robusta) growing with it. But while the cones appear to resemble those of C. robusta a good deal, one cone has two of the valves more or less warted, as shown in the drawing. While the old cones are nearly sessile (like verrucosa and calcicola), the younger ones have thinnish and rather long pedicels, as often seen in C. robusta. The column is that of C. verrucosa and C. robusta.

An unusually large-fruited specimen from Franklin Harbour, Spencer's Gulf (Peter McKechnie, through Bishop Hale), is in the Melbourne Herbarium.

I have referred to the South Australian specimens at some length partly because they are obtained from localities not far from that of the type, and partly to put observers on their guard. If one were inclined to "lump," the Australian Callitris might go under three or four species, so much do they resemble each other.

Western Australia.

Bald Island (Oldfield), tree of 15 or 20 feet. "The Bald Island Pine of the Colonists."—(Oldfield.) Some of the cones being sparingly tuberculate, like those of the Kangaroo Island tree, show some resemblance to C. verrucosa. Coast at Bremer Bay (J. Wellstead, comm. A. Morrison) has much the facies of C. Muelleri as regards the fruits (egg-shell lustre, column, and dark seeds).

Victoria.

Under F. Muelleri, Parlatore (in DC. Prod., xvi (2), 450) gives the loc. "... ad Port Phillip Heads." I have seen the specimens, which are from the Quarantine Station, collected by Mrs. Barker and others. I am of opinion that they belong to C. propinqua, though I readily admit their similarity to C. Muelleri; but their smooth branchlets remove them from that species.

New South Wales.

I am of opinion that the Cypress Pine of Quiedong, Bombala, belongs to this species. This is limestone country, and the trees, which have been carefully examined by me, have branchlets very close to those of C. verrucosa (as, indeed, other specimens of propinqua have).

Specimens from Acting Forester J. Bear, of Wentworth, "growing on sandy ridges, and the only Pine in the district," connect with the South Australian specimens, and appear to be also referable to propinqua. The Quiedong and Wentworth specimens have cones larger than those of propinqua usually are.

Mr. R. T. Baker describes and figures (Proc. Linn. Soc., N.S.W., xxviii, 839) a new species, confined to the Rylstone district, under the name of C. gracilis.
All the known species of *Callitris* have a rather extensive range, and it is not likely that the present form is an exception. I have not seen the specimens, but the drawing is very good. The cones are large, like those of the Quiedong *propinqua*, which they precisely resemble. The branchlets are slender, like those of *propinqua* often are. The number of male amenta is one, or only occasionally two, but I have shown that this character is not exclusive to this form, occurring in the Quiedong specimens, also in *verrucosa* and *cupressiformis*.

Mr. Baker figures his *gracilis* with the stamens imbricate in 6 vertical rows. All the specimens of *C. propinqua* to which I have access possess a similar character. It is not rare in other species. Male flowers of *Callitris* have been but rarely figured, but Wildeman figures *C. cupressiformis* (*C. rhomboidea*) with the stamens in 6 vertical rows. I cannot find any character to separate *gracilis* from *propinqua*.

**EXPLANATION OF PLATE 47.**

*C. robusta*, R.Br.

A. Twig bearing male flowers and cones.
   A₁. Portion of branchlets enlarged.
B. A cone opening.
C. A cone further advanced, showing the prominent central columella. (Letters A–C from Dubbo, N.S.W.)
D. Cone of "Murray Pine" from Mildura, Vic., furrowed at the valves.
E. Young cone of Red Pine from Dubbo, showing long stalk, and cone somewhat pointed.
F. Branchlet (enlarged) bearing male flowers.
G. Scale with anthers.
H. Fruit, bearing a few small warts or tubercles.
J. Seeds. (J–J from Mount Lofty, near Adelaide.)

*C. propinqua*, R.Br.

K. Branchlet (enlarged) bearing male flowers, Bremer Bay, W.A.
L. Portion of branchlet bearing male flowers, much enlarged.
M. Stamen with anthers.
N. Cone, showing columella.
O. Seeds. (O–O from Quiedong, near Bombala, N.S.W.)
P. Portion of branchlet (enlarged) from Sandy Creek, near Gawler, S.A. (The fruit, being identical with that of Quiedong, has not been also drawn.)
Q. Cone a little pointed and sparingly tuberculate, from Wentworth, N.S.W.
R. Cone from type locality (Kangaroo Island, S.A.). For another fruit of *C. propinqua*, see letter n of Plate 46.

*C. columellaris* F.v.M.

S. Branchlet (enlarged) bearing male flowers.
T. Cones, opening and shedding seeds.
U. Cone showing the prominent columella, from which the species was named.
V. A single columella.
W. Seeds. (All from type locality, Richmond River, N.S.W.).
THE WHITE AND OTHER CYRESS PINES.

(Callitris robusta, R.Br.)

( Callitris propinqua, R.Br.)

( Callitris columellaris, F.v.M.)
No. 50.

Callitris calcarata, R.Br.


A tree of medium size, rarely exceeding 50 feet.

*Branchlets.*—Coarse and very angular, with short internodes. "Frequently acicular leaves on the lower branches."—(Benth.)

*Male amenta.*—Usually solitary, short, and compact.

*Fruit-cones.*—Almost globular in shape when closed, but with a broader base, about \( \frac{1}{2} \) inch in diameter; the three larger valves but little or not dilated upwards, the dorsal point very near the end, smooth or scarcely rugose, the three smaller ones often slightly overlapping and the cone furrowed at junctions. Central columellas, three to five or six.

*Fertile seeds.*—Dark red brown (brown madder).

*C. calcarata* and *C. Muelleri* are often confused. In the latter there is but one columella, in the former several, of irregular form. In *calcarata* the space between the leaf-scales is smaller than in *Muelleri* and the branchlets are much less coarse.

*C. calcarata*, the Black Pine, and *C. robusta*, the White Pine, are often confused in general descriptions, and the following notes bring out their chief points of difference. The Black Pine has usually bright green foliage, while that of the White Pine is silvery. The cones of the Black Pine have usually stiff points on them; this is only exceptionally the case with White Pine; the stalk of the fruit is usually slender in the case of White Pine. In the case of Black Pine the cones persist on the old wood for many years; White Pines have usually many fallen cones under each tree. Usually the seeds of the Black Pine are reddish-brown in colour, while those of the White Pine are of a pale brown.

Botanical Name.—*Calcarata*, Latin, *calcar*, *calcaris*, a spur, in allusion to the points on the back of the valves. Allan Cunningham was the first to give the specific name (as *Frenela*) in his MS. Journal, under date 25th May, 1817. He was then in the Lachlan district with Oxley’s expedition.

Squamae of the strobile calcarated near the apex which is longer than *C. glauca*. Arbuscula, 25 feet.

Vernacular Names.—Most commonly known as “Black Pine,” but also as “Red Pine.”

The Red Pine occurs on the ridges, where it is also called Mountain Pine. It is generally stunted and does not produce timber of any commercial value. It is also subject to dry-rot and doziness.—(Forest Cadet H. Swain, Cootamundra-Grenfell District.)

The darker is called indiscriminately Red or Black Pine.—(District Forester Osborne, Cootamundra.)
The following is an instance of the puzzling use of the names White, Red, and Black Pine. The matter has already been touched upon under C. robusta.

Mr. District Forester Marriott, Dubbo, sent three specimens of timber (accompanied by twigs) of the Red, White, and Black Pine. His Red and White are C. robusta and the Black Pine C. calcarata. I see no difference between the Red and White, except that the Red Pine has the fruits a little more squat and the valves a little drawn up to a blunt point, and possibly a little more glaucous. As regards all three timbers I see no marked difference in the coloration. If anything, the Black Pine is the lightest. The White and Red have a clear band of paler sapwood, while in the Back Pine the band is far less marked.


Var. mucronata, Benth.  F. Gunnii, Endl., var. mucronata, Parlat.

Leaves.—Mr. Bauerlen informed me that the twigs of this tree are used in northern Victoria and southern New South Wales for mixing with fodder, to expel worms in horses. There is no reason to suppose that any merit there may be in this remedy is not shared by all the other species. Boronia rhomboidea is also put to a similar use.

Fruit.—The points or spurs on the fruits, while commonest in this species, are also occasionally found on some other species, e.g., robusta.

Timber.—This species yields, perhaps, the handsomest timber of this class, although not the most durable. It is beautifully mottled and striped with black, white, and yellow; it is much used and valued for the interior lining and roofing of houses, mantelpieces, skirting-boards, etc. Slabs of wood of this tree were used by Sir Thomas Mitchell for sleepers when crossing the Yarran Swamp.

The timber is soft, easily worked, and durable. I was shown a stable at Cooma, built of this pine, which had been erected for 30 years, and the timber still appeared perfectly sound. It is also largely used as a top rail for stone and wire fencing. The value of this timber in a country like the Monaro, where timber suitable for any purpose but rough fencing and firewood is so scarce, cannot be over-estimated.—(Forester Benson, Bega.)

Black Cypress Pine grows on sandy and hilly country, and is used for saw-milling and fencing purposes.—(District Forester A Osborne, Forbes.)

Red or Black Cypress Pine, called Black Pine, when growing on the lowlands in conjunction with White Pine (robusta) where it produces timber of good quality, but heavier and penetrating odour than the latter. It is also much darker, and the grain is of a more streaky, parallel, or concentric design of eddish and other brown colouring, gorgeous in effect. The annual rings are very fine. Its uses are the same as the White Pine, except that its more streaky grain renders it a fit wood for ornamental fittings or cabinetmaking.—(Forest Cadet H. Swain, Cootamundra-Grenfell.)
As the timber is very little used in this neighbourhood, not much value is placed upon it. It does not stand in the ground as well as the white variety, and there are too many knots in it to make it useful for sawing or building.—(Forester Postlethwaite, Grenfell.)

This tree does not grow nearly as large as the White Pine, is of a darker colour, and is not much used, being more brittle and liable to split. The knots are more numerous than in White Pine and have a great tendency to fall out when the timber is seasoned. Builders will not use this pine at any time when the white is available.—(District Forester Smith, Dubbo.)

A distinguishing feature of this pine is the large quantity of resin which gathers in the interstices of the bark; it shows a decided increase of girth at the butt. Less durable than the other pines, being spongy, subject to dry-rot, and is in consequence little used.—(District Forester Marriott, Dubbo.)

The Black Pine, a decidedly inferior timber, spongy, and of no durability. The timber is dark, also the branchlets and fruit-pods, which are quite black. It decays in the ground in two years. It can be distinguished from the other varieties for weeks after it is cut, as it glistens along the face of the timber like thousands of minute diamonds. The knots of the Black Pine are not so large, but are much more plentiful throughout the tree; again, the Black Pine invariably grows on the southern and western slopes of the mountains. It is also much more highly scented than the other pines when being cut.—(J. V. de Coque, speaking chiefly of the Western Pine.)

It seems to stand fairly well in the ground when used for verandah posts in out-buildings, the rule being to erect them with the bark on, which, I am informed, gives them greater durability. When required for building purposes here, it is brought from the Tamworth and Gunnedah districts, but it is not used to any great extent, although highly useful and ornamental for inside purposes in buildings.—(The late Forester Siddins, Armidale.)

Some Black or Mountain Pine from the Inverell district (District Forester Stopford) belonging to this species has but little figure. As it approaches the table-land it appears to lose much of that richness of colour that this species possesses on the western plains. Locality has, of course, much to do with the physical properties of timber.

Size.—It is a small tree, seldom exceeding 30 feet in height and 18 inches in diameter.—(Forester Benson, Bega, speaking of Monaro.) 50-60 feet.—(Forester Taylor, Wagga Wagga.)

It is of a stunted habit, and though it attains a height of 50 feet, a tree can seldom be found of more than 8 inches in diameter, 3 feet from the ground; thus it is practically useless for milling purposes.—(Forester Siddins, Armidale.)

Habitat.—The type came from—

Intérieur de la Nouvelles Galles du Sud entre 24 et 38° avec le précédent (C. verrucosa).—(R.Br. ex Mirbel, Mem. Mus. Par. xiii, 74, 1825.)

These specimens were collected by Allan Cunningham in Oxley's expedition, and I have already shown, by an extract from his unpublished journal, that he collected his calcarata specimens in the Lachlan River district.

On the 26th May, 1817, Oxley's expedition was at Mount Aiton, lat. 33° 55', long. 146° 30'. The course had been south-west. On the 25th May the expedition was near Mount Aiton (Oxley's Journal, p. 44.) The expedition was, therefore, in the Cocopara Ranges, to the west of Wyalong West.

Mirbel's names and brief notes were supplied by Robert Brown, in whose hands Cunningham's specimens were placed at the time.
This species has an extensive range in New South Wales. It is found over enormous areas west of the Dividing Range, and also in rocky declivities and canions in the southern and northern table-lands. It also occurs in Victoria and Queensland.

Abundant on the reserves and alienated lands bordering on the Snowy River, county of Wellesley.
—(Forester Benson, Bega.)

Red or Mountain Pine, Wagra, Upper Murray. Small stunted Black Pine, from a hill near Wagra, Murray River. (These specimens belong to *C. calcarata.* Soil stiff, red, and sandy.—(Forester Taylor, Wagga Wagga.)

Pine is also to be found in the Killimicat Ranges, between Tumut and Gundagai. A large quantity of it, but no trees of any size, and growing on very rough barren country.—(Forester Mecham, Tumut.)

There are probably between 8,000 and 10,000 acres of Black Pine found upon the timber reserves in this district. It is found principally in rough, rocky country, on gravelly soil.—(Forester Postlethwaite, Grenfell.)

On shallow soils; on stony or rocky ridges.—(District Forester Marriott, Dubbo.)

Mitchell (*Tropical Australia,* p. 93) made sleepers of *C. pyramidalis,* 14 feet long and 2 feet wide, to carry his drays over the Yarran Swamp.

It is not plentiful; the most common is the Western Pine, but it does not thrive well, owing, I believe, to the cold preventing its proper development. It rarely reaches 2 feet in girth, the average size of the largest being about 18 inches in circumference. On the eastern side of the Main Range, I have not seen any; if there is, it is in small quantities, and in remote places.—(Late Forester Siddins, Armidale.)

No Cypress Pine is found on the New England table-land, though it comes well upon the western slope. Black or Mountain Pine is obtained near Inverell, in which locality there is a large quantity of this kind of pine. It grows almost exclusively in the roughest country, in granite or poor white sandy soil, and very often forms a scrub of small saplings of from 1 to 5 inches in diameter.—(District Forester Stopford, Armidale.)

It is not easy to define what New England really is. I have attempted to define it in my Presidential Address before the Linnean Society of New South Wales vol. xxvi, 766 (1901), and the following note from Mr. Stopford is interesting. The canions of eastern New England are full of this pine, but it hardly comes on to the comparatively flat table-land.

With reference to the growth of pine on the falls of New England, I always consider that New England commences on the south, about Walcha, and extends to Deepwater on the north, at both of which places ravines come up; from Tamworth and Apsley Falls on the south, and from Bolivia on the north, the same country and conditions prevailing all along the western falls. It is in these places that pine is found, but I do not think it is found, or at least can generally be considered to be on the true table-land, at any rate, I do not know of it, upon what I would call this class of country.
Callitris cupressiformis, Vent.


A medium tree usually 30 or 40 feet high, pyramidal in shape, with the top and longer branches usually more or less pendulous.

Branchlets.—Most like those of *C. calcarata*.

Male amenta.—Solitary (chiefly in Tasmanian specimens) or 3 together, small or loose. The terminal scale is pointed and operculum-like in the Victorian and Tasmanian specimens.

Fruit-cones often clustered on short branches, globular, not exceeding half-inch diameter in the typical forms; valves 6, alternately smaller, the larger one dilated into a broadly rhomboidal apex, with a short conical protuberance about the centre, and usually rugose, the alternate ones much shorter, with a broad base and slightly overlapping the others on the margin, at least when young, the unopened cone furrowed at the junctions. The central columnellas (or aborted ovules) are numerous.

Mature seeds.—Two-winged, the breadth of the wings exceedingly variable. The colour of the seeds is of a warm oak-brown.

Ventenat did not say whence he obtained his specimen. Probably the Port Jackson (N.S.W.) tree may be taken as the type; the type of *C. Ventenatii* certainly came from Port Jackson.

Parlatore gave an inappropriate varietal name, as the top of this tree is usually pendulous. Var. *pendula*, "ramulis pendulis," New South Wales (Vernon?) "Weeping Frenela."—(Parlatore in *DC. Prod.*, xvi (2), 447.)

The Victorian (Grampians) form is var. *mucronata* and the Tasmanian form is var. *tasmanica*.

Botanical Name.—*Cupressiformis*, Latin, cypress-like.

Vernacular Name.—"Port Jackson Pine" (with *Muelleri*); "Oyster Bay Pine" of Tasmania.

Aboriginal Names.—"Brorogery" of some Queensland aborigines. "Brorogorce" is a spelling given for the name in use by those of Stradbroke Island by Mr. G. Watkins. "Murragun" of those of the Sydney district, according to the late Sir William Macarthur.

Synonyms.—*C. Ventenatii*, R.Br., ex. Mirb. in *Mem. Mus. Par.*, xiii (1825), 74 (the type of this came from Port Jackson); *C. rhomboidea*, R.Br., in Rich. *Comment. bot. de Coniferis et Cycadeis*, 47 t. 18 (1826); (figured also under this name).

**Timber.**—Not a highly figured Cypress pine timber; none of the coastal-grown pines appear to have much figure. "Wood soft, not supposed to be durable" (Sir William Macarthur, speaking of the Sydney district). Timber from the Dorrigo is of very little figure, nearly as plain as that of *C. Macleayana*, and but slightly aromatic. Backhouse (*Narrative*, p. 142) speaks of it as affording narrow-plank and small timber, which is useful in building, but not easy to work, being liable to splinter; it has an aromatic smell.

The Tasmanian timber (Oyster Bay Pine) is used for telegraph poles. The bark must always be stripped as soon as cut, otherwise insects get in and destroy the timber. The above notes I obtained at Oyster Bay.

Wood of little use, said to be obnoxious to bugs, from its resinous odour.—(*Fl. Tas.*)

Timber strong and durable, used for furniture, planks, weatherboards, battens, etc.—(*Cat. Col. and Ind. Exh., 1886.*)

**Size.**—Usually a tree of 30 or 40 feet in height, with a stem diameter of about a foot. The largest tree measured by District Forester Rotton at Tomerong, N.S.W., was 15 inches in diameter.

Backhouse describes this as 50–70 feet high and 6–9 in. in girth, of a pyramidal shape, and giving a peculiar feature to the landscape. Gunn gives it as 25–30 feet. The above refers to Tasmanian (East Coast) trees. I have seen it 50 or 60 feet high. It forms dense thickets 10 to 12 feet high at Flinders Island. In New South Wales I have not seen it so large, but still a good tree, of (say) 40 feet.

**Habitat.**—Found in New South Wales, Victoria, South Australia, and Tasmania. Usually it is found in rocky situations not far from the coast. It would appear that its most inland localities are in Victoria.

Specific localities in New South Wales are the Dorrigo district (head of the Bellinger River)—here it is somewhat scattered and limited in quantity, according to District Forester F. H. Wilshire; Kinchela, Port Macquarie, Port Jackson (including the site of the present Government House), George's River, Port Hacking, and the National Park. The most southerly locality known to me is that recorded by District Forester Rotton, at Parma Creek, near Tomerong, Shoalhaven district.
THE BLACK AND OTHER CYRESS PINES.

(Callitris Muelleri, Benth. & Hook., f.)

( . . calcarata, R.Br.)

( . . cupressiformis, Vent.)
In Victoria, var. *mucronata* is known as "Mountain Cypress Pine." Mueller says it occurs "on rocky not densely-timbered ranges, thus on the Grampians, Ovens Ranges, and Genoa Ranges."—(Cat. Intercol. Exh., 1866–7, p. 224.)

In South Australia we have Cape Willoughby, Pink Bay, Kangaroo Island. —(Seely in Parlat. in DC. Prod., xvi (2), 447.) It is also found near Onkaparinga.

I travelled over much of the Oyster Bay Pine country in Tasmania, and was informed that it starts at Paradise (most southerly locality). It is abundant between Swanport and Swansea, near the sea. Northerly, it extends for 50 or 60 miles to St. Paul’s Tier.

In Hooker’s Fl. Tas. it is stated to form dense thickets at Flinders Island on granite hills near the sea coast.

**EXPLANATION OF PLATE 48.**

*Callitris Muelleri.*

α and α 1. Dimorphic foliage, Eden, N.S.W. β. Branchlet (enlarged) bearing male flowers.

c. Fresh cones (α and c from Port Jackson). d. Cone, Wentworth Falls, Blue Mountains, N.S.W. e and f. Cones in different stages. g and g 1. central columnella in plan and elevation. h and h 1. Showing method of attachment of seeds around the central columnella.

j. Seeds (k–j from Mount Wilson, N.S.W.)

*Callitris calcarata,* R.Br.

k. Seedling. l. Fragment of branchlet. m. Young cone. n. Cone opened, showing the multiple columnellas or aborted ovules. x 1. A few specimens showing the great variation in the columnellas. o. Branchlet (enlarged) showing female flowers. (k–o from Dubbo, N.S.W.). p. Branchlet (enlarged) bearing male flowers, from Jennings (N.S.W.-Queensland border).

q. cone, and q 1. seeds from Cooma, southern N.S.W.

*Callitris cupressiformis,* Vent.

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No. 40.—The Black Apple (*Sideroxylon australe*, Benth. et Hook. f.).

No. 41.—The Smooth-barked Apple (*Angophora lanceolata*, Cav.).

No. 42.—*Scolopia Brownii*, F.v.M.
THE FOREST FLORA

OF

New South Wales.

J. H. MAIDEN.

VOL. II. PART 3.

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(Two Plates.)
No. 10.—The Red Mahogany (Eucalyptus resinifera, Sm.).
No. 11.—A She-Beech (Cryptocarya obovata, R.Br.).

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No. 13.—The Brown or She Pine (Podocarpus elata, R.Br.).
No. 14.—The Broad-leaved Tea-tree (Melaleuca leucadendron, Linn.).
No. 15.—The Quandong (Eusamia acuminata, R.Br.).

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No. 18.—The Mountain Gum (Eucalyptus goniocalyx, F.v.M.).
No. 19.—A Cupania (Cupania anacardioideae, A.Rich.).

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No. 22.—The Red Silky Oak (Stenocarpus salignus, R.Br.).
No. 23.—The Black Pencil Cedar (Paxus acuminatus, R.Br.).

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(Plate.)
No. 25.—The Spotted Gum (Eucalyptus maculata, Hook.).
No. 26.—The Brush Bloodwood (Baloghia lucida, Endl.).

PART VIII (ISSUED MAY, 1904).
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No. 28.—White or Grey Ironbark (Eucalyptus paniculata, Sm.).
No. 29.—Barkly syringifolia, F.v.M.
No. 30.—A Yellow Wood (Rhodosperma rhodanthema, Engler).

PART IX (ISSUED MAY, 1904).
No. 31.—The White Beech (Gmelina Leichhardtii, F.v.M.).
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No. 33.—The Yellow Box (Eucalyptus melliodora, A. Cunn.).
No. 34.—Ecdysis occidentalis, Blume.

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No. 36.—A Stinkwood (Albizzia pruinosa, F.v.M.).
No. 37.—The Leopard Wood (Flindersia maculosa, F.v.M.).
No. 38.—The Queensland Nut (Macadamia ternifolia, F.v.M.).
THE FOREST FLORA
OF
NEW SOUTH WALES

J. H. MAIDEN,
Government Botanist of New South Wales and Director of the
Botanic Gardens, Sydney

PART XIII.

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PRICE, 1/- per Part, or 10/- per dozen Parts, payable in advance
MAR 26 1912
Gray Herbarium
Harvard University
Eucalyptus sideroxylon, A. Cunn.

The Mugga; a Red Ironbark.

(Natural Order MYRTACEÆ.)

Botanical description.—Genus Eucalyptus. (See p. 33, Part II.).

Botanical description.—Species E. sideroxylon, A. Cunn.

Following is the earliest record I can find of this species:—

At the base of the range of hills at Mount Maude some tolerable fair specimens of the Western Ironbark, Eucalyptus sideroxylon, were noticed, being easily distinguished from its congeners by its extreme rugged, furrowed bark, containing, like others of the Eucalypti, a strong astringent gum.—(A. Cunningham’s MS. Journal, under date 19th May, 1817.)

Oxley’s Expedition was then in latitude 33° 25' and longitude 147° 10', i.e., about midway between Condobolin and Wyalong West. Some of these specimens were distributed with Cunningham’s name.

The next reference I can find is:—

6th October, 1846 (near Mount Pluto), . . . and among the larger forest trees was a Eucalyptus, allied to, but probably distinct from, the E. sideroxylon, A. Cunn., p. 339.—(Mitchell’s Trop. Journ. Austral., 339.)

In the list of plants collected by Mitchell’s Expedition, at p. 437 of his work, this plant, referred to at p. 339, is given as E. sideroxylon without any qualification. I have seen the specimens in question, and they are what we know as E. sideroxylon, A. Cunn.

Then Mueller described a species, under the name of E. leucoxylon, in the following words:—“Arborescent:

Leaves.—Alternate, somewhat shining, narrow lanceolate, subfalcate, tapering into a long uncinate acumen, veined and furnished with pellucid dots; umbels axillary, generally three-flowered, with a thin peduncle.

Lid.—Conico-hemispherical, acuminate.

Tube of the calyx.—Semiovate, somewhat longer than the lid.

Fruits.—Semiovate, hardly contracted at the orifice; the valves of the capsule inclosed.

Seeds.—Blackish clathrate.

In grassy plains from the Avoca to St. Vincent’s and Spencer’s Gulf.

This is the “White Gum Tree” of the South Australian Colonists.”—(Trans. Victorian Inst., i, 33 [1855].)
Thereafter, for many years, this “White Gum” was confused with the New South Wales “Ironbark.” For example, Bentham, in the *Flora Australiensis* (iii, 210), who is followed by Bailey, in the *Queensland Flora*. Then Mueller, in *Eucalyptographia*, continues to confuse the two trees. But in the field they could not be considered identical for an instant. Bentham’s description of *E. leucoxylon* applies very well to that of *E. sideroxylon*, but requires to be supplemented in the following points:

<table>
<thead>
<tr>
<th></th>
<th><em>E. sideroxylon</em></th>
<th><em>E. leucoxylon</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Juvenile leaves</td>
<td>Linear-lanceolate or linear.</td>
<td>Cordate or ovate-lanceolate, sessile.</td>
</tr>
<tr>
<td>Bark</td>
<td>Black, furrowed and rugged (Ironbark).</td>
<td>Whitish or bluish, smooth (White or Blue Gum).</td>
</tr>
<tr>
<td>Timber</td>
<td>Deep red.</td>
<td>Pale brown or white (hence the name <em>leucoxylon</em>).</td>
</tr>
</tbody>
</table>

**Varieties.**—In B.Fl. iii, 210, Bentham has a variety minor (of *E. leucoxylon*). Flowers rather smaller and often more numerous at the ends of the branches. This variety seems almost to pass into *melliodora*—Parramatta (W. Woolls).

I have seen the original and it is *E. sideroxylon*, with rather smaller flowers than the type. But inasmuch as the species varies much in the size of the flowers, some being even smaller than those of the so-called variety minor, it seems a pity to perpetuate it. The specimen is also called “variety rubriflora” on the label, but since the colour of the flowers of many individual trees of this species varies from year to year, this name is unfortunate also.

Variety *pallens*, Benth., of *leucoxylon* (B.Fl., iii. 210).
Leaves not so coriaceous and whitish.

This form is really an Ironbark, and therefore a variety of *sideroxylon*. For example, “Mountain Ironbark,” Upper Hunter (H. Deane); also head of Gwydir (Leichhardt). Sometimes this variety *pallens* has been labelled “*E. paniculata* variety.”

The following may be classed with the same variety, but they are too coriaceous to be typical—“Silver-leaved Ironbark,” New England (W. Woolls); “leaves very broadly lanceolate, whitish,” Murrumbo (R. T. Baker). The collection of fruits of these may, however, show that these specimens really belong to *E. siderophloia*, Benth., var: *glauca*, Deane and Maiden.

**Botanical Name.**—Eucalyptus already explained (Part ii, p. 34); *sideroxylon*, from two Greek words—*sideros* (iron), *xylon* (wood)—in allusion to the hardiness of the timber. It is an Ironbark, and the timber of the one now under review is one of the softest of the Ironbarks.
Vernacular Names.—Its aboriginal name is in very common use, and it is also known as “Red Ironbark” because of its timber, but the timbers of other Ironbarks (*e.g.,* *siderophloia* and *crebra*) are also red. For obvious reasons it is also called “Red-flowering Ironbark.” Sometimes it is called “Black Ironbark,” because of the darkness of its bark. A very common name is “Fat Cake,” or “Fat-cake Ironbark,” because of the pulverulent look of the bark, interspersed as it is with blackish kino grains, the general appearance reminding one of a burnt greasy cake.

The name “Mountain Ash,” as applied to *E. sideroxylon*, has doubtless crept into the *Flora Australiensis* and other works on Oldfield’s authority. Following is one of his labels, in his own handwriting:—Oldfield confused, as regards bark at least, *E. sideroxylon* with the Mountain Ash (*E. Sieberiana*), which in the south-east of New South Wales has bark like an Ironbark.

Ironbark, or Black Mountain Ash of colonists; tree, 180 feet; bark persistent, brittle with dots of gum; dark, iron-grey, rough, with prominent ridges; wood very hard. Mountain Hut Range, near Eden, Twofold Bay.—(Herb. Barbey-Boissier.)

Oldfield added later, “*Eucalyptus sideroxylon* A.C.,” with which determination I agree.

Synonym.—*E. formosa*, J. Backhouse, “No. 18, near Liverpool, New South Wales,” in Herb. Calcutta, is *E. sideroxylon*, A. Cunn. The confusion with *E. leucoxylon* has already been referred to.

Juvenile Leaves.—I desire to invite especial attention to the young foliage of this species, which is very different in shape from that of *E. leucoxylon*, the species with which *E. sideroxylon* is most commonly confused.

Flowers.—This is the New South Wales species of *Eucalyptus* which most frequently has red or rather pink or crimson flowers. Often, however, it has creamy white flowers.

Fruit.—The shape will be noted from the figure. A point worthy of remark is that it has a round rim or ring round the mouth, as is often seen in the smaller fruit of the Yellow Box (*melliodora*). It also has warty excrescences such as are seen in *E. leucoxylon* (from Victoria and South Australia), in *E. maculata* (Spotted Gum), and a few others.

Bark.—The bark of this species has been referred to under “Vernacular Names.” The ultimate branchlets are smooth, while those of *E. crebra* (another Red Ironbark often associated with it) are rough.

Timber.—The wood of this is the deepest in colour, and also the softest and least valuable of the ironbarks. The tree is often pipy and gnarled, but in many places it is a fine timber tree. Where one of the other ironbarks is available, this ironbark suffers by comparison; nevertheless, it is a useful timber, and is employed
in public works for such purposes as railway sleepers and posts, where long lengths are unnecessary. Frequently good lengths cannot be obtained, and if they could the tensile strength of this timber is not equal to that of the best ironbark.

This tree has a straight even bole; the timber is of the highest reputation for strength and durability, and is very much used for large beams in stores for heavy goods, poles for bullock drays, railway sleepers, girders and piles for bridges, and other purposes where great strength is required. It is one of the best fuel woods in New South Wales for domestic uses and steam-engines. Its average weight is from 75 to 78 lb. per cubic foot when green, and it loses 3 to 5 lb. in drying within the first two years. (General Report, Sydney International Exhibition, 1879.)

Colour of timber dark red. A most valuable and durable timber for all kinds of outdoor and strong work. It is extensively used for fencing and building, railway sleepers, girders, beams, joists, shafts of drays, and all descriptions of work where strength and durability are required. (Forest Ranger Postlethwaite, of Grenfell.)

Red Ironbark very plentiful all over the Mudgee district. Used for naves, spokes, shafts, and nearly every description of rough carpentry. The timber of this species growing in this district seems to be easier worked than similar trees growing elsewhere. (Forest Ranger Marriott, Mudgee.)

Found about Harvey's Range, Dubbo, and a small patch on Hermitage Plains. Timber red and soft: soon wears. Not considered a good timber. Will not be taken for public works. Used for fencing. (Forest Ranger Martin.) With reference to the statement about public works, it is inferior to E. crebra, but Mr. Deane (Engineer-in-Chief for Railway Construction) told me he would use it for sleepers, as its durability is good. He informed me that he would judge each sleeper on its merits, no matter from what species of Ironbark it may have come.

The timber is used freely for railway sleepers, and although it is considered one of the finest woods of the west, it is not to be compared for general use with E. paniculata, Sm, the Grey or White Ironbark of the east. The wood of the latter tree is tough, while that of the Western one is comparatively dry and brittle. (R. H. Cambage.)

A railway engineer informed Mr. J. V. de Coque that his experience of Mugga only gave the timber a six or seven years' life.

Mr. J. V. de Coque gives the following interesting notes of Mugga and Ironbark (E. crebra) in the Dubbo district, where both are abundant and associated:

On entering a forest where the two timbers grow the Mugga shows itself—seems to grow at its best on outskirts of timber belt. The two timbers, Mugga (sideroxylon) and Ironbark (crebra), are easily distinguished growing owing to the deep red colour of the Mugga bark and the gum crystals which are embedded throughout the bark. The Mugga seems to be the happy home of the big grub Endopteryx, and from what I can learn from the saw-millers, they state that they rarely find any hole to denote the entrance of the insect. In sawing Mugga timber it rapidly clogs the teeth of the saw with a resinous substance. It is therefore objectionable to the sawyer. I cut two logs myself over the circular-saw bench. The ironbark piece cut clear, the Mugga even in so short a piece clogged the teeth.

The only timber I know which puts so much resinous matter on the saw is the E. globulus of Victoria and Tasmania, which can only be cut to satisfaction with a spray of water constantly flowing between the teeth.

E. sideroxylon is not a common tree in Victoria, hence the following unpublished notes by the late Mr. G. Perrin, Inspector of Forests, in 1898, are interesting:—

E. sideroxylon* is not a common tree in Victoria, hence the following unpublished notes by the late Mr. G. Perrin, Inspector of Forests, in 1898, are interesting:—

The Red Ironbark (E. sideroxylon)* is next to Red Gum (E. rostrata) in commercial importance, and, like the Red Gum, this tree has been shamefully misused in the past, and for this misuse the miner

* Also known as E. leucoxylon; I prefer the specific name as given above, because the South Australian Blue Gum is also named E. leucoxylon, and is similar to our White Ironbark, the former being a red wood. The specific name as above is, in my opinion, preferable.—G. Perrin.
is responsible. It is a most valuable timber tree, and for manufacturing purposes is far more so than Red Gum; the texture or grain of the wood is not unlike that of Jarrah, but it is not interlocked, being more fissile or straight in the grain; the wood is clean, without knots, and singularly free from faults common to most eucalypts—gum-wells, veins, or dry rot.

A marked peculiarity of this tree is its preference for auriferous localities, as it is invariably found growing on the quartz ironstone ridges along the main leads of the more important gold-fields. The tree is a fast grower, and has a clean straight stem, with an average height of 40 feet.

Matured timber is now very scarce, and on the most of the gold-fields it has been cut out. Millions of young trees are taking the place of the old matured ones, and in a few years, with care and attention, large quantities of this valuable wood will be again available. The timber is suitable for wood blocks and carriage or coach building. It is a tree which should be specially protected by proclamation from cutting in its sapling state. Ten of thousands of young trees have been cut on all the mining centres for firewood for engine fires as well as household use.

Exudations.—Its bark contains large quantities of kino, which also permeates the wood.

Mr. Forester Allan, writing to me, says:—

I obtained the gum from the ironbark by boiling the bark and straining the liquor, after which I reduced it to a thick consistency. Large quantities can be obtained by this process at little cost.

It will probably be found useful for tanning purposes.

Size.—It attains a height of 100 feet and a diameter of 4 feet, though usually it is much smaller. Foresters Postlethwaite, of Grenfell, and Marriott, of Dubbo, both quote the height as 100 feet, and the diameter as 2 feet. Forester Martin, formerly of Dubbo, gave the height as 40 to 60 feet, and the diameter as 18 inches to 3 feet.

Habitat.—In New South Wales it occurs in the bush between Parramatta and Liverpool, in paddocks at South Creek, and in the neighbourhood of Richmond, and again beyond the Blue Mountains, near Mudgee and Wellington, and elsewhere, being widely diffused over the auriferous districts of the western and southwestern interior. It is rare in the southern part of the State, becoming more plentiful on the ranges near Moruya; getting more plentiful further north. It is usually found on poor, sterile, ranges, and is usually unaccompanied (except in the Dubbo district) by any other species of ironbark.

The following more detailed notes are by Mr. R. H. Cambage:—

It is rarely found growing at an altitude exceeding 2,000 feet above sea-level. In going west it is first met with on the western line beyond Kerr's Creek, and on the Orange to Forbes line beyond Molong, so that it covers much the same country as E. tereticornis, var. dealbata, and also prefers ridges. In the west this species bears a profusion of blossoms in the months of April and May. It is fairly plentiful between the Macquarie and Murrumbidgee Rivers, occurring in patches, and shows a decided preference for sedimentary formations.—(Proc. Linn. Soc., N.S.W., 1900, 715.)

This ironbark is commonest in the Central Division of New South Wales and its “curving boundary” to the west (as far as I know it) is a line roughly drawn through Germantown (near the Murray), Wagga Wagga, Hillston, Nyngan, Cobar, Dubbo, Narrabri, Warralda, Inverell, and thence to the Darling Downs, in Queensland. I shall be glad if correspondents will favour me with any localities west of this boundary.
In spite of the reckless extravagance with which this timber has been cut, it is by no means scarce, especially in some localities, a few miles from the coast. While it is a very slow-growing tree, there is some consolation in the fact that it usually grows in barren, rocky country unsuitable for agriculture, and therefore wholesale clearings are not made as in the case with many other timbers. At the same time it does not readily reafforest.

**VICTORIA.**

Mr. A. W. Howitt says this is the only ironbark in Victoria although *E. leucoxylon* (with its white bark and hard timber), is often known as White Ironbark.

The chief localities for its growth are Bendigo, Maryborough, Dunolly, Moliagul, Inglewood, Bealiba, Heathcote, Mt Ivor, and Chiltern, and several other places in small quantities; also in certain places in mining centres in Gippsland, Walhalla, and other places.—(G. Perrin.)

**QUEENSLAND.**

Darling Downs and the mountainous country adjoining New England (New South Wales).

---

**EXPLANATION OF PLATE 49.**

A. An original specimen in flower collected by Allan Cunningham.

b. Seedling raised from seed collected at Stuart Town, N.S.W.

c. Natural seedling from Condobolin, N.S.W.

d. Fruits from Condobolin Hill (whence the preceding seedling was obtained). Observe the warts frequently seen on the fruits of this species.

e. Fruits from Cootamundra to Grenfell.

f. Fruits from Cabramatta, near Sydney. All the above are *E. sideroxylon*, A. Gunn.

The following are *E. leucoxylon*, F.v.M., for comparison.

g. Seedling from seed obtained at Mount Lofty, S.A.

h. Pair of juvenile leaves from Kapunda, S.A.

k. Pair of juvenile leaves, a stage further advanced, from the same place.
THE MUGGA: A RED IRONBARK.
(Eucalyptus sideroxylen, A. Cunn.)
(G.H.K. are E. leucoxylon, F.v. M.)

*Flowers.*—Monoecious, the males in axillary cymes, the females solitary or two together.

*Perianth.*—In both sexes of 4 or 5 segments, imbricate in the bud.

*Stamens.*—In the males 4 or 5, the filaments short, slightly incurved in the bud.

*Pistil.*—Rudimentary.

*Styles.*—In the females deeply divided into linear acute entire branches papillose-hirsute inside.

*Ovule.*—Pendulous, or laterally attached near the top.

*Drupe.*—Ovoid, slightly compressed, the endocarp crustaceous.

*Seed.*—Nearly globular; testa membranous; albumen little or none.

*Embryo.*—Curved or involute, the outer larger cotyledon enclosing the smaller one.

Tree or shrub.

*Leaves.*—Alternate, penniveined.

*Stipules.*—Very small or none.

*Male cymes.*—In the axils of the old leaves.

*Female Flowers.*—Sessile or shortly pedicellate in the lower axils of the young shoots.


A tree or small shrub, glabrous or scabrous pubescent.

*Leaves.*—Shortly petiolate, broadly ovate to elliptical, acute or almost obtuse, rigidly membranous or coriaceous, scabrous, the primary veins very prominent underneath, and although anastomosing near the margin, generally produced into small rigid mucronate teeth, the whole leaf usually 1 to 2 inches long, but on some barren specimens the leaves larger, ovate-lanceolate, truncate or almost cordate at the base, the marginal teeth more prominent: on other specimens the leaves smaller, broader, and deeply divided into pungent-pointed lobes.

*Male cymes.*—Almost sessile but loose.

*Perianth segments.*—Broad, concave, ciliolate.

*Anthers.*—Half exserted when fully out.

*Female perianth.*—Segments narrower.

*Fruit.*—Ovoid, acuminate, about 3 lines long.
The original description by Planchon is not readily available, and is given here for convenience of reference. The introductory matter on p. 265 is necessary for an understanding of Planchon's remarks.


Gen. iii. Aphananthe, Planch. . . . . . . vide supra, p. 265.

Sp. unica. A. philippinensis.


Botanical Name.—Aphananthe, Greek aphanes, unseen or invisible, anthos, a flower, in reference to the inconspicuous flowers; philippinensis—this plant was first described from the island of Luzon, in the Philippines.

Vernacular Names.—Most usually called Elm—it certainly resembles that tree in foliage, and to some extent in habit—but also "Rough-leaved Hickory."

Aboriginal Names.—"Mail" and "Monduar Gourabie" are aboriginal names quoted by Mr. Charles Moore as formerly current in the Clarence and Richmond River Districts. Mr. Bailey quotes Mr. E. Cowley for the name "Mallban" in use on the Barron River, Queensland.

Dr. Elmer D. Merrill gives the name "Cha" (Tagalog dialect) for an Aphananthe in the Philippine Islands, presumably the present species.

Synonyms.—Taxotrophis rectinervis, F. Muell. Fragn. vi, 192; Sponia ilicifolia, S. Kurz, in Flora, 1872, 148.

Epicarpurus orientalis is the name given in the catalogue to specimen No. 33 of C. Moore's Northern Woods (London Exhibition, 1862), which (B.Fl. vi, 160) is attributed by Bentham to Aphananthe philippinensis. The names are not really synonyms, and the explanation of the use of the Epicarpurus is doubtless explained by the third paragraph of p. 193 of Vol. vi of Mueller's Fragmenta.
NATIVE ELM.

(Aphananthe philippinensis, Planch.)
Leaves—Note their very rough sand-papery texture.

Timber.—It is used at Taree, on the Manning River, for axe-handles, etc. Timber said to be durable, very hard, not used.—(C. Moore, *Cat. N.S.W. Timbers, Lond. Exh.*, 1862.)

Little is known about this timber, hence the somewhat conflicting statements concerning it.

In the *Cat. Queensland Timbers, London Exh.* of 1862, this wood (referred to as *Celtis sp.*) was stated by Mr. Hill to be "in bad repute for durability."

It is used for linings, ceilings, etc. It may be found a useful wood for turners. It is close-grained, light in colour, and Mr. Bailey suggests that it might do for stamps.

Size.—Varying in size from 50 to 70 feet (C. Moore). We have a tree in the Botanic Gardens, Sydney, about 45 feet high with a stem diameter of 4 feet at 1 foot from the ground. At 2 feet from the ground it branches, one stem being 1 foot and the other 2 feet in diameter.

Habitat.—The following localities are given in the *Flora Australiensis*:

**New South Wales.**

Clarence River (Wilcox, Beckler); Clarence and Richmond brushes, Northern Woods, London Exhibition, 1862, C. Moore, No. 33.

**Queensland.**

Brisbane River, Moreton Bay (F. Mueller); Queensland Woods, London Exhibition, 1862, W. Hill, No. 86; Rockhampton, (O'Shanesy); Rockhampton Bay (Dallachy).

It is a tree of the coastal brushes of New South Wales and Queensland. I have it from as far south as the Manning River; its extreme northern limit (in Queensland) requires to be ascertained.

EXPLANATION OF PLATE 50.

A. Branches, with staminate flowers.
B. Fruiting branch.
C. Staminate flower, front view.
D. Staminate flower, back view.
E. Pistillate flower.
F. Fruit showing (a) persistent stigmatic branches.
G. Vertical section of fruit showing (a) pendulous ovule.
H. Seed.

(Specimens from Ash Island, Hunter River.)
No. 54.

*Casuarina lepidophloia*, F.v.M.

The Belah.

*(Natural Order CASUARINACEÆ.)*

**Botanical description.**—Natural Order *Casuarinaceae*, Mirbel.

**Flowers.**—Dioecious or monoecious, diclinous (unisexual), both sexes sessile and solitary in the axils of shorted bracts, the bracts of each whorl united into a toothed sheath enclosing the base of the whorl of flowers.

**Staminate Flowers.** In cylindrical terminal spikes; each stamen solitary, surrounded by two perianth leaves consisting of concave or hood-shaped segments, breaking off at their narrow base as they are forced off by the development of the stamen, below which are two persistent bracteoles placed right and left. The anther with 2 large distinct cells, placed back to back; they open laterally, the stamen is exserted, and the filament folded in the bud.

**Pistillate Flowers.**—In globular or ovoid tufts, or dense spikes terminating short lateral branches, naked, each having two persistent bracteoles as in the staminate ones. Styles with two branches, thread-like, usually red, the stigmas pointed. The ovary 1- (rarely 2-) celled, with 1-2 ascending ovules.

**Fruit.**—A seed-like compressed nut, smooth and shining, and produced at the apex into a membranous wing; the enlarged and thickened woody bracts and bracteoles forming a compact cone, closing over the unripe nuts and opening (as valves) when ripe. The opaque nerve, often seen running through the wing, is the remains of the style.

**Seeds.**—Solitary, erect; exalbuminous; with spiral vessels in their outward walls. (“Full of matted spiral vessels.”—Hooker.) Leafless trees or shrubs with verticillate deciduous branchlets.

**Leaves.**—Replaced by small verticillate teeth united by the margin into sheathing joints.

The most complete set of drawings of Casuarina known to me form Plate xcvi, *C. suberosa*, of Hooker's "Flora of Tasmania."

The characters and range of the genus are the same as in the Order.

In *Casuarina*, *Juglans* (the Walnut), and the Order Corylaceae (or Cupuliferae, the British Oak Order) the pollen tube does not enter by means of the micropyle, but passing down the ovary wall, and through the placenta, enters at the chalazal end of the ovule. Such a mode of entrance is distinguished as *chalazogamic* from the ordinary or *porogamic* method.—(A. B. Rendle.)

When Treub discovered the chalazogamic fertilisation of this Order, he proposed to remove it from its place near the Betulaceae (a sub-order of the Corylaceae) where it was formerly placed. It was a later discovery that Juglans and the Corylaceae are also chalazogamic.

Engler, in his "Syllabus der Pflanzen-familien" (1898), gives the place of Casuarina as follows:—

Embryophyta Siphonogama.
  ii. Angiosperme.
  2. Class Dicotyledoneae.
     1. Sub-class Archichlamydeae.
     1. Series Verticillatae.

The Verticillatae includes Casuarinaeae solely. Series 7 is Juglandales, which includes the Juglandaceae, and consequently Juglans, while Series 8 is Fagales, which includes the family Betulaceae and the Corylaceae and Betuleae as sub-families.

The fact is that the precise relationships of some of the primitive Dicotyledons is still not finally settled.

Vernacular Names.—Origin of the term She Oak. Casuarinas are known as "Oaks" or "She Oaks." Various species go under the name of "Forest Oak," "River Oak," "Swamp Oak," "Bull Oak," "Black Oak," "Belah," or "Belar," "Beefwood." These are the principal names, but there are a number of others which will be given as the various species come under review.

The origin of the name "She Oak" has from time to time given rise to discussion, but I think it is quite clear.

The aborigines name the Casuarina She-look, which has probably been corrupted by the early settlers into She Oak.—(George Bennett, Ind. Progress of N.S.W. (1870). Art. Oranges, p. 675.)

I cannot accept this without very strong evidence.

In his "Flora of Tasmania," i, 340, Dr. (now Sir) Joseph Hooker says:—

She Oak, a name I believe adapted from North American "Sheack"; though more nearly allied botanically to the Northern Oaks than any Tasmanian genus except Fagus; they have nothing to do with that genus in habit or appearance, nor with the Canadian "Sheack."

Following are extracts from letters to me concerning the origin of the name "She Oak" from the late Prof. E. E. Morris, of Melbourne, whose too-early death many of us deplore. Unfortunately his notes were not printed:—

I have just received a second letter from Sir Joseph Hooker, in which he abandons any defence of his well-known explanation. . . . . . . I have, as far as one can prove a negative, disproved the existence of the American tree. I am now putting together my notes on the subject, and should they be printed, I will send you a copy.

Personally, I do not think we need look for any far-fetched derivation of the term "She Oak." There is evidence that it reminded the early settlers of oak.

The best kind is a tree with a pine top, but it is very hard, and in grain not unlike the English Oak.—(Letter of Major Ross from Sydney, 10th July, 1788. Hist. Records, N.S.W., Vol. I, Part 2, p. 172).

See also an even earlier comparison of the wood to English Oak by Governor Phillip, infra, p. 78.
The similarity of the timber of the Sydney species (e.g., C. glauca, suberosa, torulosa) to that of Quercus (Northern Oak) is, of course, obvious. As regards the use of the prefix "she," to denote paleness of colour or inferiority, this is an Australian practice which has long been established, and which is open to no doubt. Bushmen continue to use the term daily, thus we have "She Beech," "She Pine," "She Ironbark."

Brancllets.—The "foliage" consists of long fine apparently leafless verticillate branches. Leaves are really present in Casuarinas, but are reduced to minute whorled teeth or bristles forming the top of a cylindrical joint. These branchlet-joints are formed by the concrescence of leaves, each tooth being merely the apex of a leaf. The transit of such diminutive or rudimentary leaves to those of more developed form can be traced in the allied Order Coniferae from Cypresses to Pines.

The branchlet-joints are sometimes more or less furrowed, but, as a rule, the furrows are not evident in living specimens, but become visible on drying.

The stomata lie at the bottom of narrow furrows, which run along the green leafless branches, and peculiar hair structures are present in the furrows to which the hair adheres, forming a barrier against water, exactly as those of Cytisus. The Casuarine, which must finish their work for the year during the very short rainy period of their native country, require during this time arrangements providing for unhindered transpiration no less than does the Cytisus in the Southern Alps.—(Kerner and Oliver, i, 298.)

Casuarinas, of course, grow in the well-watered coastal areas as well as in the coastal tracts; at the same time their structure is essentially xerophilous.

Attention may here be invited to a paper by L. A. Boodle and W. C. Worsdell, "On the comparative anatomy of Casuarinæ, with special reference to the Gnetaceae and Cupuliferae."

The weirdness of these apparently leafless switch-like trees has not escaped the notice of our Australian poets, but since they are so common I fully expected they would oftener inspire the burden of their song. They suggest the minor key. They appear to have impressed Harpur more than any of our poets, and one of his poems is entitled "The Voice of the Swamp Oak":—

"Up in its dusk boughs out-tressing,
Like the hair of a giant's head,
Mournful things beyond our guessing
Day and night are uttered.

Even when the waveless air
May only stir the slightest leaf,
A lowly voice keeps moaning there
Wordless oracles of grief.

But when nightly blasts are roaming,
Lowly is that voice no more;
From the streaming branches coming
Elfin shrieks are heard to pour."

He thus compares the branchlets to the human hair, and the sighing of the wind through them to moans and shrieks.
In his "Creek of the Four Graves" he still has this simile of hair in view, but daintily refers to the "sylvan eyelash" in alluding to what most of us know as the "River Oak" (*C. Cunninghamiana*):—

> "From either bank, or duskily befringed
> With upward tapering feathery swamp oaks,
> The sylvan eyelash always of remote
> Australian waters, whether gleaming still
> In lake or pool, or bickering along
> Between the marges of some eager stream."

To Lawson the She Oaks of the Mudgee district sigh, while the bracelets are grassy:—

> "Now still down Reedy River
> The grassy she oaks sigh."—(Reedy River.)

and—

> "Till I sighed in my heart to the sigh of the Oaks."—(Eurunderee.)

The Belar is the Oak of which I am specially treating in this Part, and Ogilvie in his "The Graves out West," prettily alludes to—

> "God's choristers invisible—the winds in the Belars."

So that our oaks form aeolian harps. And the soughing or sighing of the wind through them suggests sadness, weirdness, and the moans and shrieks of elves.

**Timber.**—Casuarina timbers vary so much in depth of tint, in the extent and distribution of the blotchy grain (medullary rays) to which the wood owes so much of its beauty, that it is difficult to describe it by any brief general description. Some of the deep-red kinds imported into England at one time very largely, Mr. Holtzapffel, the well-known authority on turnery, describes as—

In general colour resembling a full red mahogany, with darker red veins; the grain is more like the Ever-green Oak (*Quercus Ilx*, a Mediterranean species), than the other European varieties, as the veins are small, slightly curled, and closely distributed throughout the whole surface. Some specimens are very pretty.

Most of our She Oaks are very fissile, and show a handsome blotchy oak-like grain, often different, however, in colour. The timber is hard and heavy, and that of some kinds very tough.

The principal use of She Oak timber is for fuel, for which purpose it is excellent. It is also used for shingles, and at one time largely for staves, though far less at the present time. It is excellent for ornamental turnery work generally, and for cabinet work, for which it is generally used in veneers. Then we have such uses as veneer for the backs of brushes, and for what is known as Tunbridge ware. For all the above uses (except shingles and staves), I am of opinion that there might be created for various She Oak timbers a very large demand in Great Britain and the continent of Europe. Some of them, e.g., River Oak and Swamp Oak, are much prized for bullock-yokes, as their timber is comparatively light and tough, and the bolts do not work loose. The She Oak timber makes excellent mauls, tool-handles, and very ornamental walking-sticks, good screws of hand-screws; in fact, one species or another may be put to very many useful purposes.
This timber was called into requisition early in the history of Australian colonisation, and was beginning to get scarce immediately round the settlement in Sydney Cove only four months after the landing. Governor Phillip (quoted by G. B. Barton) at that date says:

The timber which in its growth resembles the fir-tree warps less (than gum timber), but we are already obliged to fetch it from some distance, and it will not float.

Two months later Phillip wrote:

The barracks and all buildings in future will be covered with shingles, which we now make from a tree like the pine-tree in appearance, the wood resembling the English Oak.—(Barton's History of N.S.W., i, 301.)

This is the earliest record of "She Oak" for shingles, a use to which it is extensively put up to the present day.

An officer of marines writing to Sir Joseph Banks a few months after the foundation of New South Wales, did not hesitate thus to dogmatise on its timber trees:

The only tree fit for building or any other use is the fir-tree, and even that is bad.—(See Barton's History of N.S.W., i, 504.)

By "fir-tree," Casuarina was intended. Under the name of Beefwood it was exported to England at least as early as 1806.—(Hist. Records of N.S.W., vi, 101.)

Mueller, speaking of the anatomical structure of the timber, says that it contains many spiral vessels, and that the cells are filled with starch.

We now proceed to consider the species *lepidophloia* in detail.


Arborescent.

**Internodes of the Branchlets.**—Finely striate, terminating in 9 or 10 very short teeth.

**Fruit-cones.**—Rather short, brownish silky-tomentose, the bracts obtuse, shortly acuminate; the fruit-bearing bracteoles conspicuously protruding, minutely apiculate, without appendages.

**Seeds.**—Pale.

In deserts between the Bogan, Darling, and Lachlan Rivers, together with *C. glareus* (L Morton). Near the Murray River, in low sandy places.

Small or middle-sized tree.

**Branchlets.**—Nearly always thinner than a line.

**Teeth-like foliage.**—(Sheath teeth) at first deltoid-lanceolate, delicately ciliate.

**Male and Female flowers.**—Not seen.

**Cones.**—Shorter than an inch, depressed globular, the valve-like bracteoles somewhat turgid, slightly carinate towards the apex.

**Seeds.**—Not seen quite ripe.
The species has been till now confounded with \textit{C. glauca}, but the bark is, according to Morton, scaly and not deeply furrowed, the wood is rather soft, not hard; several trunks often spring up from the same horizontal rhizome, besides the branchlets are often thinner, the teeth in the whorl fewer and shorter, the valves in the fruit less high exserted, thicker, with larger seeds.

"Our new species comes very near \textit{C. equisetifolia} in the fruits, but differs in foliage, and, perhaps, in bark and wood."—(Mueller, \textit{Fragmenta}, x. 115.)

**Botanical Name.**—\textit{Casuarina}, owing to the resemblance of the branchlets to the feathers of the Cassowary (\textit{Casaurinus}); \textit{lepidophloia}, Greek \textit{lepis}, \textit{lepidos} (\textit{=} Latin \textit{squama}) a scale; \textit{phloios}, the inner bark or smooth bark of a tree, hence scaly-bark.

**Vernacular Names.**—This tree is rarely called by any name other than its aboriginal one (Belah). In some districts \textit{e.g} (Grenfell) it is known as "Bull Oak," but this should be reserved for \textit{C. Luehmanni}.

In \textit{Cat. Intercol. Exh. Melb.}, 1860-7, p. 222, Mueller (under \textit{C. glauca}) calls it—

The Desert She Oak of Victoria, in the mallee scrub, a middle-sized tree.

The name "Black Oak" is in use at Mount Lyndhurst, S.A. (M. Koch).

**Aboriginal Names.**—"Belah," or "Belar," is the name almost universally in use. At the same time, I am unable to say what tribe in Belah country used it. Mr. Bailey quotes Mr. Watkins as giving "Billa" in use for \textit{C. glauca} by the Stradbrooke Island (Brisbane) aborigines. It is therefore possible that "Billa" or "Belah" is an aboriginal name for \textit{Casuarina} in general. Sir Thomas Mitchell gave "Ngeu" as the aboriginal name, in use at "Regent Lake," Lachlan River, for a \textit{Casuarina} (probably the Belah). "Gooree" was an aboriginal name at Terrylhibie, New England, New South Wales; "Alkoo," of Mount Lyndhurst, South Australian blacks (M. Koch).


I have examined Mueller's type specimens of \textit{C. lepidophloia}, on the occasions of visits to the National Herbarium, Melbourne, and have also received specimens of the type from Mr. J. G. Luehmann, Curator of that Herbarium, in 1897. These specimens are now in the National Herbarium, Sydney. I have also had the advantage of study of Belah in the field over a large area of its range. On Mr. Baker's description of the Belah as \textit{C. Cambagei}, in 1900, I accepted the name, and distributed the plant under that name for over two years, when circumstances led me to re-examine the plant, and I found that my earlier determination of \textit{C lepidophloia} was correct.
Mr. Baker writes:

I have been enabled to examine the specimens on which Mueller founded his species (*C. lepidophloia*), and except in the diameter of the leaflets [slip of the pen for "branchlets," J.H.M.] (in some cases), there is nothing to connect it with this new species (*C. Cambagei*).

The differences are according to Mr. Baker:

* * * lepidophloia. * * *

Cortex squamosus. Arbor minor v. mediocris.

Strobilis breviscalis fulvide sericeo-tomentellis.

Lignum mollissimum haud durissimum.

* * * Cambagei. * * *

Bark certainly not flaky. The tree attaining the height of 70–100 feet.

The valves are rarely "fulvous pubescent, but nearly always whitish."

Perhaps the hardest timber in the western area.

These are all the differences which are pointed out specially. I will deal with them under different headings; and it seems to me there is nothing essential in these differences to justify the setting aside of Mueller’s name.

Confusion of the Belah with *C. glauca*. — The confusion of this species with *glauca* is one for which Mueller himself is to some extent responsible, he having from time to time named the Belah *glauca*; and Mr Baker does well to insist that the timbers of the two species (viz., Belah and *glauca*) are quite different, and that the two species differ in other respects.

Mr. Baker draws attention to Mueller’s statement that *C. lepidophloia* occurs amongst *C. glauca*, Mueller’s words being "una cum *C. glauca*." Mr Baker says that "*C. glauca* is not found in the interior." This is true as far as our knowledge goes at present; at the same time, *C. glauca* is found in the interior of Western Australia, and there is nothing inherently improbable in it occurring in South Australia and the extreme west of New South Wales. Mueller’s sentence is, however, nothing more or less than an indication that he has mixed up the Belah and *glauca*, which is evident on other grounds.

There is no question that herbarium specimens of *lepidophloia*, especially when cones are wanting, very strongly resemble *C. glauca*.

Leaves (branchlets). —

It has been remarked that this "oak" is of all trees most liable to be struck by lightning, doubtless from its peculiarly formed foliage, which consists of short, wiry leaves standing out like a brush, and presenting so many conductors to attract the electric fluid.—(R. Bennett.)

Mr. F. B. Guthrie, in *Agricultural Gazette*, October, 1899, has analysed it under Nos. 8 and 15 with respect to its fodder value:

<table>
<thead>
<tr>
<th>Water</th>
<th>Ash</th>
<th>Fibre</th>
<th>Ether extract, oil, &amp;c.</th>
<th>Albumenoids</th>
<th>Carbohydrates</th>
<th>Nutrient value</th>
<th>Albumenoid ratio</th>
<th>Tannin (Oak bark)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.70</td>
<td>5.66</td>
<td>46.86</td>
<td>2.80</td>
<td>9.06</td>
<td>23.92</td>
<td>39.1</td>
<td>1:3.4</td>
<td>2.5</td>
</tr>
<tr>
<td>19.44</td>
<td>4.01</td>
<td>27.15</td>
<td>3.40</td>
<td>9.75</td>
<td>36.25</td>
<td>53.1</td>
<td>1:4.5</td>
<td>2.4</td>
</tr>
</tbody>
</table>
The Belah is sometimes eaten by stock, is very woody and astringent, which is claimed for all the Casuarinas in this (Coolabah) district. If fed to stock for any length of time the results are disastrous.—(R. W. Peacock.)

Stock will eat Belah in times of drought if hard pushed, but the settler does not fell Belah for fodder when he has Mulga, Leopardwood, Rosewood, Kurrajong, Supple Jack, etc., of a more nutritious character.—(H. V. Jackson.)

Valuable fodder in S.A.—(M. Koch.)

Flowers.—Mueller had not seen the male flowers at the time of describing the species, but those drawn were taken from a type locality “between the Upper Bogan and Lachlan,” and, it is presumed, were received at the Melbourne Herbarium from L. Morton after the species was described and in response to Mueller’s request.

Fruits.—I have figured a cone of *C. lepidophloia* so labelled by Mueller. As a matter of fact it is one of the smallest cones produced by the species, but the identity of it with the Belah is not open to question. So far as our very complete herbarium material goes, Mr. Baker is quite right in saying “the valves are rarely fulvous pubescent, but nearly always whitish”; but cones and nuts agree otherwise well with Mueller’s description, and therefore the objection raised is unessential. All other differences are in bark and timber, also size of tree—characters seldom indicated in herbarium material. They are simply collector’s notes, and so long as non-botanists collect material, every herbarium will contain specimens and notes less complete than they might have been made.

Bark.—The adjective “squamosus” is not specially appropriate to apply to much of the Belah in N.S.W.; but the word might easily have been less appropriate, and does not affect the validity of the description. Mr. Baker says the bark of the Belah is “certainly not flaky.” He quotes Mr. R. H. Cambage, who writes (*Proc. Linn. Soc. N.S.W.* xxiv, p. 609) in comparing the two Casuarinas “Belah” and Bull Oak” (*C. Luehmanni*):—

The bark of the Belah is the smoother, while that of the Bull Oak is considerably furrowed and thicker.

This agrees fairly well with what Mueller, perhaps from Morton’s notes, writes:—

Bark, according to Morton, scaly, not deeply furrowed.

Morton compares the bark of *C. lepidophloia* with *C. glauca*, but as *C. glauca* has not been found in the western plains, he means in all probability the “Bull Oak,” *C. Luehmanni*, which has a furrowed bark.

Timber.—A first-class fuel wood.

It is very easily killed by ringbarking, never suckers, and burns very readily. Timber is rather straight and tough, but most liable to split with the weather.—(R. W. Peacock.)

Timber very hard, and if split it makes good rails, but it decays rapidly in contact with the ground.—(R. Kidston, Condobolin.)
Split Belah makes good posts, and stands fairly well in the ground, but cannot be compared to Mulga and Gidgee. Round sappy postssoon rot in the ground.—(H. V. Jackson.)

The timber is excessively hard but brittle; it is much used for fencing posts.—(K. H. Bennett, Ivanhoe, via Hay.)

The tree is a quick-growing, fast-decaying one, and it begins to die frequently before it has ceased growing. It is a rare thing to cut down a tree thoroughly sound throughout. The decay begins at the tap-root in the form of a white mould; this works up into the heart, which becomes dry and hollow, and in course of time the whole tree becomes a pipe. The inside of this is excessively hard, and under the axe flies to pieces like glass. It is useless as a building timber, but the trees being straight, they are much used for log fencing and building rough stockyards.—(Richard Bennett.)

Mr. Baker says :-

The timber of this tree (Belah) is so characteristic that had Baron von Mueller intended his description to apply to this species he would have described or referred to so peculiar a wood.

A priori argument is proverbially full of pitfalls, but as a matter of fact one specimen in the Melbourne Herbarium is labelled by Mueller:—


This specimen is a piece of Lockhart Morton’s type material of C. lepidophloia. Mueller, like other busy men, did not always label up his material in the herbarium, that is to say, when he described lepidophloia he did not cancel all the glauca labels he had written for it. But such omission, while regrettable, in no way invalidates a species. Mueller’s statement that the wood is rather soft, not hard, is not correct in a general way, but the authorities I have quoted show that the timber is sometimes rather soft.

As a very general rule Mueller omitted notes of timbers from descriptions of species, and the writer of the present article, who first gathered together a really comprehensive collection of logs of Australian timbers, accompanied by complete herbarium material, is the first Australian botanist who has insisted on the importance of timbers, kinos, and other natural products, as aids in the diagnosis of species—a modern innovation now generally accepted, at least to the extent that such material may usefully supplement twigs.

Habitat.—The Belah is the commonest Casuarina of the interior, and it and Pine (Callitris) are almost the only timber trees found there—in depressions of the land or actually moist localities. These big trees require more moisture than shrubby species, because the roots must go down deep to water. In this connection the following reply (based on Schimper) to a correspondent, who wrote to me asking why the great plains of New South Wales are apparently devoid of timber, may be of some interest:—

The great grass-land plains of Australia are, when xerophilous, technically steppes, and xerophilous grass-land containing isolated trees is savannah. I take it that you are referring both to steppe and savannah country, for there is no hard-and-fast line between them.

Now, in a tree, the transpiring surface (the leaves) is at a greater distance from the water supply in the soil than it is in the shrub or herb; besides this, the strata of air surrounding that transpiring...
surface have properties different to a certain extent from those nearer the soil; finally, at least in many cases, the transpiring surface of the tree is larger when compared with the corresponding surface of the ground than it is in the shrub or herb.

What is essential to the existence of trees is the continuous presence of a supply of water within reach of the extremities of the roots, and therefore at a considerable depth in the soil. It is immaterial during what season this supply is renewed. In our treeless plains it is (usually) the case that the supply of water several feet below the surface is wanting, or at all events is too intermittent to permit the continued existence of tree-life. The winds are also an important factor, insomuch as they agitate the air and greatly increase the transpiration of the leaves. The water transpired can only be drawn up from below, and finally a balance is reached between the efforts of the wind to dissipate the moisture of the leaves and those of the tree roots to keep up the supply. Thus the winds may result in the death of trees and of the tendency of the country to form plains or savannahs or steppes.

The Belah prefers fairly good, slightly undulating, or rather flat land, liable to inundations. Following are notes by various observers, given in their own words:

The Belar chooses a red clayey loam, usually a flat covered with depressions known as crab-holes.—
(Mr. Richard Bennett.)

Mr. Baker, in contrasting “Belah and Bull Oak,” quotes Mr. Cambage:

Belah is usually considered as an indication of dampness, probably low land subject to water in wet weather, and known as “gilgai country,” from the numerous natural water basins which bear that name.

Mueller writes about the habitat of C. lepidophloia:

Prope flumen, Murray River, in depressis locis aridioribus.

These “depressis locis” are “gilgais.”

Mr. R. W. Peacock, writing in the Agricultural Gazette for 1899, p. 267, says:

It grows principally in wet country, surrounding gilgais, &c.,

which, indeed, has been a matter of common knowledge for many years.

You will find Belah not only on the edges of plains but on flat, slightly undulating, country, covered with west country forest flora, such as Dogwood, Whitewood, Wilga, Quandong, Mulga, Beefwood, Sandal-wood, &c.—(H. V. Jackson.)

Following are some localities for Belah, represented in the National Herbarium, Sydney:

New South Wales.

Deniliquin (District Forester O. Wilshire); Balranald; Gunbar, 50 miles from Hay, “Belah or Scrub Oak”; none within 20 or 30 miles from Hay (D. A. Wilson, Acting Forester); common near Moama (District Forester O. Wilshire); Wagga Wagga; Cootamundra; West of Goomalling (District Forester Osborn; J.H.M.); Cowra; Forbes district (J. B. Donkin, R. H. Cambage); Condobolin (J.H.M.); on rich, dark, loamy soil, in the immediate neighbourhood of Myall and Salt-bush plains (R. Kidston, Condobolin); “between the Upper Bogan and Lachlan” (Mr. L. Morton); Dandaloo, Bogan River (R. H. Cambage). This
is near the place where Richard Cunningham, the Botanist and Superintendent of the Botanic Gardens, lost his life in 1835. The Belah is—

“The gloomy Casuarina trees that witnessed the bloody deed”

of Richard Cunningham’s murder (Mitchell, Trop. Aust., 24); Coolabah and the Bogan generally (J.H.M.); East Nymagee (R. H. Cambage); Bourke (J.H.M.); also on the Hungerford Road (see photo.); Nyngan (J.H.M.); Dubbo (District Forester Marriott); Coonamble; Curlew; Moree (W. S. Campbell); Narrabri (J.H.M.); Porcupine Ridge, Gunnedah (W. W. Froggatt); Warrah, on sandy ridges (Jesse Gregson).

VICTORIA.

Mildura, Murray River.

SOUTH AUSTRALIA.

“Scrub Oak,” 230 miles north of Adelaide, a tree of 15–20 feet (W. Gill); Mount Lyndhurst, a tree of 20 feet (M. Koch).

Size.—One of the largest of all western trees; attains a height of 40 or 50 feet (K. H. Bennett).

Two feet in diameter, Condobolin district (Kidston); 70 feet high, 18 inches diameter, in Grenfell district (F. R. Postlethwaite).

EXPLANATION OF PLATE 51.

A. Type specimen (fruit). 1, Young cone; 2, Ripe cone; 3, Winged nut, containing seed. “Between the Bogan and Lachlan Rivers.”

B. Type specimens (staminiferous flowers). “Between the Upper Bogan and Lachlan.”

C. Branch with ripe and unripe fruit.

D. Part of branch showing portions of two joints.

E. Whorled bracts representing leaves, opened out.

F. Portion of joint of branchlet showing point of insertion into whorl.

G. Staminiferous flowers.

H. Part of the same opened out.

J. A single staminiferous flower, consisting of a single stamen between two floral bracts.

J1. A single staminiferous flower showing floral bracts.

K. Ripe cone.

L. Winged nut, containing seed, much enlarged.

(The photo, of the Belah tree, facing p. 83, is from the Bourke-Hungerford road.)
THE BELAH.
(Casuarina lepidophloia, F.v.M)
No. 55.

*Heterodendron olefolium*, Desf.

The Western Rosewood.

*(Natural Order SAPINDACEÆ.)*

**Botanical description.**—Genus *Heterodendron*, Desf.

*Flowers.*—Regular, usually hermaphrodite.

*Calyx.*—Broadly cup-shaped, very shortly and irregularly toothed.

*Petal.*—None.

*Disk.*—Small.

*Stamens.*—6 to 15, inserted within or upon the disc; anthers nearly sessile, longer than the calyx.

*Ovary.*—2- to 4-lobed, 2- to 4-celled, with 1 ovule in each cell; style short, with an obtuse lobed stigma.

*Fruit.*—Of 1 or 2, rarely 3 or 4, coriaceous or hard lobes, indehiscent.

*Seed.*—Half-immersed in an arillus; testa crustaceous; cotyledons thick, flexuose.

Shrubs or small trees.

*Leaves.*—Simple, entire or lobed.

*Flowers.*—Small, in short terminal, slightly-branched panicles, often reduced to simple racemes.


A tall shrub or small tree, the young shoots hoary or glaucous with a minute silky pubescence.

*Leaves.*—Linear, lanceolate or narrow oblong, rarely almost obovate, acute or obtuse, 2 to 4 inches long, quite entire, narrowed into a very short petiole, coriaceous, and sometimes very rigid.

*Panicles.*—Usually few flowered and much shorter than the leaves.

*Calyx.*—Broadly cup-shaped, varying from 1½ to nearly 3 lines diameter.

*Ovary.*—Usually 3- or 4-celled, densely tomentose.

*Fruit.*—Of 1, 2, or very rarely 3 or 4, nearly globular lobes, 3 or 4 lines diameter.—(DC. Prod. ii, 92; F. Muell. Pl. Vict. i, 90). The Queensland specimens have smaller and more glabrous flowers than the more southern ones, with the ovary 2-carpellary. The northwestern and some of the western ones have much broader leaves and more abundant flowers than the eastern.—(B.Fl. i, 169.)

**Botanical Name.**—*Heterodendron*. Greek, *heteros*, variable, and *dendron*, tree, probably in allusion to the foliage; *olefolium*, Latin *olea*, an olive-tree, *folium*, a leaf; some leaves reminding one somewhat of an olive leaf.
Vernacular Names.—Perhaps most commonly called "Rosewood" in the west, but it should have the prefix "Western," to avoid confusion with the well-known Rosewood of the coast. It is sometimes called "Emu Bush," owing to emus feeding upon the seeds; Dogwood.—(P. Corbett.)

Aboriginal Names.—"Jiggo" of those of the Murrumbidgee, and "Berrigan" (of which "Behreging" is an old spelling).—(Kidston.) "Mindra" of some South Australian aborigines.—(Max Koch.)

Leaves.—It is one of our fodder trees. "It yields a fair quantity of moderately good forage, eaten both by cattle and sheep."—(R. W. Peacock.)

Both sheep and cattle feed greedily upon it. It is difficult to kill, springing from the roots when cut down, and one of the best for sheep feed.—(S. Dixon, S.A.)

Good cattle-feed; horses will not eat it.—(P. Corbett, Palдумatta Bore, vid Wilcannia, N.S.W.)

Mr. F. B. Guthrie in *Agric. Gazette*, October, 1899, has published analyses of the leaves with respect to their fodder value.

<table>
<thead>
<tr>
<th>Water</th>
<th>Ash</th>
<th>Fibre</th>
<th>Ether extract (oil, etc.)</th>
<th>Albumenoids</th>
<th>Carbohydrates</th>
<th>Nutrient value</th>
<th>Albumenoid ratio</th>
<th>Tannin (Oak bark)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosewood ...</td>
<td>34-27</td>
<td>2-29</td>
<td>13-74</td>
<td>4-28</td>
<td>10-31</td>
<td>35-11</td>
<td>55</td>
<td>1 : 4 1/4</td>
</tr>
<tr>
<td></td>
<td>12-27</td>
<td>4-84</td>
<td>16-36</td>
<td>2-20</td>
<td>15-75</td>
<td>48-58</td>
<td>69</td>
<td>1 : 3 3/4</td>
</tr>
</tbody>
</table>

Fruit.—The seeds, which are covered with a red fleshy arillus, are eaten by emus and also by the aborigines.

Timber.—Hardly a timber-tree, its principal use being that of a fodder.

Timber very hard and heavy; used for rollers and rolling-pins. It is of a yellowish colour, with a black or dark-brown heart. It might be suitable for wood-engraving. Specific gravity of wood, 858.—(Mueller.)

Size.—A small tree. It grows to a girth of 15 inches and more and up to a height of 20 feet (S. Dixon). Attains a height of 20 to 30 feet (R. W. Peacock).

Habitat.—The localities given in the *Flora Australiensis* are as follows:

**North Australia.**

Hammersley Range, near Nichol Bay (F. Gregory’s Expedition).

**Queensland.**

Burdekin River (F. Mueller); Bowen River and Connor’s Creek (Leichhardt).
THE WESTERN ROSEWOOD.

(Heterodendron oleafolium, Desf.)
New South Wales.

N.-W. interior (Strutt); Mount Brogden (A. Cunningham); plains of the Gwydir (Mitchell); Macquarie River and desert of the Darling and Murray, Herb. (F. Mueller).

It is one of our common western or dry-country species, not reaching the Dividing Range.

Victoria.

Mallee scrub, on the Rivers Murray, Wimmera, and Avoca (F. Mueller).

South Australia.

Lake Torrens, Flinders’ Range, and Cooper’s Creek (F. Mueller).

West Australia.

Dirk Hartog’s Island (A. Cunningham); Murchison River (Oldfield).

ExPLANATION OF PLATE 52.

A. Flowering branch.
B. Fruiting branch.
C. Young flower.
D. Flower more advanced.
E. Part of flower, showing (a) calyx, (b) disc, (c) stamen, (d) style.
F. Vertical section of flower, stamens removed.
G. Stamens.
H. Fruit magnified.
J. Seed.

(Flowers from Brewarrina; fruits from Coolabah, N.S.W.)

Volume II.

PART XI (ISSUED SEPTEMBER, 1904).

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No. 40.—The Black Apple (*Sideroxylon australe*, Benth. et Hook. f.).
No. 41.—The Smooth-barked Apple (*Angophora lanceolata*, Cav.).
No. 42.—*Scolopia Brownii*, F.v.M.

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The Cypress Pines of New South Wales (*Genus Callitris*):

No. 44.—*Callitris Macleayana*, F.v.M.
No. 45.—*Callitris verrucosa*, R.Br.
No. 46.—*Callitris robusta*, R.Br.
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THE FOREST FLORA
OF
New South Wales.

J. H. MAIDEN.

VOL. II. PART 4.
Published by Authority of the
GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

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No. 33.—The Yellow Box (*Eucalyptus melliodora*, A. Cunn.).
No. 34.—Eucodia accedens, Blume.

PART X (ISSUED JULY, 1904).
No. 35.—A Grey Gum (*Eucalyptus punctata*, DC.).
THE FOREST FLORA
OF
NEW SOUTH WALES

J. H. MAIDEN,
Government Botanist of New South Wales and Director of the Botanic Gardens, Sydney.

PART XIV.

Published by the Forest Department of New South Wales, under authority of The Honourable the Secretary for Lands.

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1904

PRICE, 1/- per Part, or 10/- per dozen Parts, payable in advance.
No. 55.

Owenia acidula, F.v.M.  
The Gruie or Colane.  
(Natural Order MELIACEÆ.)

Botanical description.—Genus, Owenia, F. Muell.

*Sepals* 5, short, orbicular, much imbricate.
*Petals* 5, imbricate in the bud.
*Staminal tube* short or long, with 10 entire or 2-lobed teeth; anthers protruding between the teeth.
*Disc* small, annular or not distinct from the ovary.
*Ovary* 3- or 4-celled (or, in one species, 12-celled), with 1 ovule in each cell; style rather thick; stigma globular or conical, entire or lobed, on a disc-like expansion of the summit of the style.
*Drupe* globular, the epicarp more or less succulent, putamen thick, woody or bony, rugose outside, 2- to 4-celled (or, in one species, 12-celled).
*Seeds* solitary in each cell, the outer coating spongy, the hilum broad lateral; cotyledons oblong, thick.
*Trees*, with the juice often (perhaps always) milky; the young shoots often viscid or gummy.
*Leaves* pinnate.
*Flowers* small, in axillary panicles.
*Fruits* rather acid; eaten by the aborigines.

Botanical description.—Species, Owenia acidula, F. Muell., in Hooker's Kew Journ. ix, 304, and Fragm. iii, 14.

A small or moderate-sized tree; glabrous, with the young shoots glutinous.
*Leaves* crowded at the ends of the often pendulous branches; leaflets from 9 to nearly 30, linear-lanceolate, acute, or mucronate, 1 to 1½ inches long, oblique, the midrib prominent underneath, but otherwise almost nerveless; the common petiole 3 to 6 inches long.
*Panicles* narrow, shorter than the leaves.
*Flowers* nearly sessile, in clusters, or on short branches of the panicle.
*Sepals* about 1 line long.
*Petals* about 2 lines.
*Teeth* of the staminal tube subulate, but more or less connected by an undulate crenate or almost fringed membrane.
*Disc* small, annular.
*Ovary* 3-celled.
*Drupe* ¼ to 1 inch, or rather more, in diameter, said to resemble a russet apple;* the epicarp pulpy, of a rich crimson; putamen very hard.—(B.Fl. i, 385.)

* Taken from Mitchell, but not a very good description; it is like a plum, but more spherical, or a nectarine.
Botanical Name.—_Owenia_, in honour of the late Professor Owen, the great comparative anatomist of the British Museum; _acidula_, in allusion to the sour taste of the fruit.

Vernacular Names.—It is called “Sour Plum,” “Native Peach or Nectarine,” and “Emu Apple.” “Fruetis liujus et congenerum struthionibus Novae-Hollandiae gratus” (footnote to original description). “Mooley Apple.”

Aboriginal Names.—“Gruie,” or “Gruyee,” or “Gruie-apple” are common names. The spelling is sometimes given as “Cruie.” Other names are “Colane,” “Ranceoran,” and “Warrongan.” Mr. J. F. Bailey gives a Queensland name as “Bulloo,” and Mr. F. M. Bailey quotes Mr. Wedd as giving its name as “Dilly Boolen” at St. George.

Leaves.—It has been claimed that this is the handsomest tree in the interior; certainly it is a very beautiful, small tree. It has pendulous branches and pinnate foliage, reminding one somewhat of a pepper-tree (_Schinus molle_). It is one of the best of our fodder trees. “Is eaten by most stock with varying degrees of partiality. Sheep are certainly not very fond of it.”—(B. W. Peacock.)

Mr. F. B. Guthrie, in the _Agricultural Gazette_, October, 1899, gives the following analysis under the name of Colane:

<table>
<thead>
<tr>
<th>Water</th>
<th>Ash</th>
<th>Fibre</th>
<th>Ether Extract, Oil &amp;c.</th>
<th>Albumenoids</th>
<th>Carbohydrates</th>
<th>Nutrient value</th>
<th>Albumenoid ratio</th>
<th>Tannin (Oak bark)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49-01</td>
<td>6-86</td>
<td>12-47</td>
<td>1-12</td>
<td>9-19</td>
<td>21-35</td>
<td>33</td>
<td>1:21</td>
<td>1-5</td>
</tr>
</tbody>
</table>

Fruits.—The sub-acid fruit of this tree relieves thirst, enabling travellers to endure the inconvenience of want of water for many hours. It is eaten both by colonists and aborigines, is of the size of a small nectarine, and of a crimson colour. The stones are used for bracelets, &c., like quandongs.

. . . one which bore clusters of a fruit resembling a small russet apple, and about an inch in diameter. The skin was rough, the pulp of a rich crimson colour, not unlike that of the prickly-pear, and it had an agreeable acid flavour. This pulp covered a large rough stone containing several seeds, and it was evidently eaten by the natives, as great numbers of the bare stones lay about.—Mitchell (“Three Expeditions,” p. 82), with fig.

Timber.—The wood is close-grained and handsome. It is reddish, and although hard, it is easy to work. It is not much used, and, owing to its small size, can only be used for small articles.

Size.—Perhaps 20 or 30 feet high, with a stem diameter of, say, a foot.
THE GRIEU OR COLANE
(Quercus glabra, F.v.M.)
Habitat and Propagation.—Originally described “In planiciebus montibusque a flumine Burdekin usque ad partes superiores fluvii Brisbane.” It is a native of the western plains of both New South Wales and Queensland. It was never abundant and it is getting scarce.

Being neatly trimmed at the bottom by stock, and having a naturally-rounded appearance at the top, this handsome tree takes a foremost place amongst the graceful rather than useful trees of the interior.—(R. W. Peacock.)

Mr. Stock-Inspector Dulhunty, of Dubbo, writes to me concerning it:—

The Colane is a very handsome tree. It grows on the most arid plains on the Lower Macquarie, and is the handsomest indigenous tree we have, and one of the best fodder trees. I have tried for years to grow it from seed; but you will see if you cut the stone in two that it is almost solid, and the germ so small that it seems almost impossible that it can grow from seed, but it does, as where there is one tree there is usually a bunch of them.

There is no specimen of this beautiful tree in the Sydney Botanic Gardens, and I should be very grateful to any reader of the Gazette who would assist me in introducing it to cultivation.

I am not prepared to say what the inherent difficulty of propagating this tree is, although I have failed on more than one occasion with it. I wish to try again, and to study the problem of its propagation.

EXPLANATION OF PLATE 53.

a. Twig bearing flower-buds and fruits.
b. Young flower.
c. Staminal tube.
d. Outside of staminal tube, opened out.
e. Portion of the inside of staminal tube, opened out.
f. Disc.
   Ovary.
   Style.
   Stigma.
g. Fruit, showing seed.
h. Seed

The photo facing p. 89 is of a tree growing on the Warrego River, N.S.W. (Kerry & Co., Sydney).
No. 56.

Eucalyptus stellulata, Sieb.

The Black Sally.

(Natural Order MYRTACEÆ.)

Botanical Description.—Genus, Eucalyptus. (See p. 33, Part II.)

Botanical Description.—Species, E. stellulata, Sieb. in DC. Prod., iii, 217.

A small tree, the furrowed bark coming off at length in layers (F. Mueller), rugose below, very smooth above; the smooth portion often of a lead or green colour.

Leaves elliptical, lanceolate, or the lower ones ovate, rarely much above 3 in. long, usually straight or nearly so, acuminate and much narrowed towards the base, the veins very oblique and anastomosing, a few of the principal ones prominent, starting from near the base, and almost parallel to the midrib as in E. coriacea.

Flowers very small and numerous, nearly sessile, on very short lateral or axillary peduncles, the buds very narrow.

Calyx-tube narrow-turbinate, about 1½ lines long.

Operculum conical, about as long as the calyx-tube.

Stamens not above 2 lines long, all perfect, inflected in the bud; anthers small, reniform, the cells divergent and confluent at the apex.

Ovary flat-topped.

Fruit globular-truncate or pear-shaped, rarely exceeding 2 lines in diameter, often contracted at the orifice, the rim flat or slightly concave, the capsule slightly or scarcely sunk.—(B.Fl., iii, 200.)

Variety.—

There is one with small narrow leaves, named angustifolia by Bentham. It occurs in the highest parts of the Blue Mountains, and is a tall shrub or quite small tree as far as known.

Botanical Name.—Eucalyptus, already explained, Part II, p. 34; stellulata, from the Latin stellula, a little star (diminutive of stello). The name is rather happy, and refers to the disposition of the buds, which remind one of a little star or rosette.

Vernacular Names.—It is often called "Sally," alone or with some qualifying adjective, the word being a corruption of Sallow or Willow, a species of
which it is supposed to resemble; but the name is not a happy one. "Black Sally" is undoubtedly its commonest name, this and "Black Gum" being given owing to the rough, hard, dark bark on the butt. Leichhardt called it "Olive-green Gum"; Macarthur "Green Gum" and "Lead Gum." The last three names are attempts to describe the appearance of the smooth portion of the bark, which varies from white with a bluish or lead-coloured cast to even an olive-green. It is called "Muzzlewood" in Gippsland and southern New South Wales, because it is sometimes used to make muzzles for sucking calves.

**Aboriginal Names.—** I know of none.

**Leaves.**—Messrs. Baker and Smith (*Research on the Eucalypts*), give the following particulars in regard to the oil of this species:

<table>
<thead>
<tr>
<th>Whence obtained</th>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation [α] D</th>
<th>Saponification Number</th>
<th>Solubility in Alcohol</th>
<th>Constituents found</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rylstone</td>
<td>0.871</td>
<td>-26.1°</td>
<td>2.1</td>
<td>Insoluble.</td>
<td>Phellandrene, sesquiterpene.</td>
</tr>
</tbody>
</table>

**Bark.—** This is a gum or smooth-barked Eucalypt. It has more or less rough bark towards the butt, which in mature trees is hard, rough, and black; in smaller and younger trees more or less ribbony. The upper or smooth portion of the trunk has been alluded to under "Vernacular Names."

**Timber.**—Pale-coloured, rarely free from gum-veins; warps seriously; a sound log of any size very rare; of little value for purposes other than fuel. Timber that shrinks much in drying may do so regularly or irregularly. Those of the first class have, when dry, practically the same shape as the original piece; but those of the second class take on an irregular shape. The timbers of *E. stellulata* and *E. coriacea* belong to the latter class.

**Exudation.**—The kino is ruby-red, and, when fresh, readily soluble in either water or alcohol. It is, in consequence, a member of my ruby group of kinos, and may be used medicinally as a simple astringent.

**Size.**—It is a forest tree of medium size in the Monaro, e.g., in the Snowy River Valley, forming a shapely tree 50 feet in height and more, with a stem-diameter of 2 to 3 feet, and with a dense foliage. In New England it attains a scarcely less size. As a rule, it is a straggling tree of half the size, while the narrow-leaved variety is frequently only a tall bush.
**Habitat.**—It is widely diffused in the colder and moister parts of the State, loving good soil or the vicinity of watercourses in the most elevated situations, or depressions in shallow, rounded, grassy valleys. It would appear to attain its greatest luxuriance in the Snowy River district, and it also occurs in Victoria. From the southern mountain ranges it skirts round to the west, and then to New England, rarely coming below 3,000 feet.

**EXPLANATION OF PLATE 54.**

a. Juvenile foliage, Jindabyne, Monaro.
b. Twig in bud and fruit, from the Kiandra district.
c. Fruits from Wingello.
d. Twig of variety *angustifolia*, in flower, from Mount Victoria.
e. Form with capsules in dense globular umbels from Blackheath.
THE BLACK SALLY.

(Eucalyptus stellulata, Sieb.)
No. 57.

*Casuarina glauca*, Sieb.

The Swamp Oak.

*(Natural Order CASUARINACEÆ,)*

**Botanical description.**—Genus, *Casuarina.* (See p. 74, Part XIII.)

**Botanical description.**—Species, *C. glauca*, Sieber, in Sprengel's *Syst.* iii, 803 (1826). Following is the original description:

C. ramulis teretibus strictis glaucis scabro-pubescentibus, denticulis vaginarum minutissimis arete appressis, spicis dense imbricatis, vaginis floriferis multifidis setaceis, Nov. Holl.

Following are the numbers of Sieber's type specimens:

- No. 425 (B.Fl. vi, 196); No. 325 (Miq. in *DC. Prod.*).

Bentham's description of the species in *B.Fl.* vi, 196 is erroneous, through confusion with *C. lepidophloia*, F.v.M., and perhaps with another species. The following freshly drawn out description may serve:

A tree attaining a considerable size, with more or less glaucous, rather thick, erect branchlets, striate, with as many shallow grooves as there are rudimentary leaves, but otherwise smooth and terete. The branches rather erect, but somewhat pendulous at the top.

**Rudimentary leaves** generally 15 in the whorl, varying from 12-16.

**Flowers** monoecious, the males in dense terminal spikes, generally from about $\frac{1}{2}$ to above 1 inch in diameter, the rudimentary leaves in the floral whorls with long, fine, slightly ciliate points; the females terminal on short lateral branches.

**Cones** usually subglobose, but truncate at the top, generally rather above $\frac{1}{2}$ inch in diameter, rarely attaining $\frac{3}{4}$ of an inch, the valves very prominent, more or less pubescent when young with a dorsal keel very prominent, especially in the young cones.

**Winged nuts** small, grey.

**Botanical Name.**—*Casuarina*, explained in Part XIII, p. 79; *glauca* (see the original description), in reference to the glaucousness of the branchlets.

**Vernacular Names.**—The commonest and most expressive name is “Salt-water Swamp Oak,” to distinguish it from the “Fresh-water Swamp Oak” (*C. Cunninghamiana*). Sometimes it is simply called “Swamp Oak,” or merely “River Oak,” but “River Oak” is a far better name for *C. Cunninghamiana*, as the rivers on the banks of which *C. glauca* is found are only tidal. I recommend the name “Swamp Oak” for this tree, and shall recommend the name “River Oak” to be reserved for *C. Cunninghamiana*.
Aboriginal Names.—The late Sir William Macarthur gives, in the Exhibition Catalogue, Paris, 1855, the name “Oomburra,” and in the Exhibition Catalogue, London, 1862, the name “Comburra,” for the “Salt-water Swamp Oak,” a “tall-growing species, found only near the margin of salt water; its wood not much valued.” He gives the name “Coomban” for the “Forest Swamp Oak” “usually found in groups or small detached dense thickets in moist places, or open forest ground.” Wood much used for purposes in which lightness and toughness are required.”

I am inclined to think that the names are really identical, his own, or printer’s errors having contributed to the confusion. Perhaps even now the correct name or names may be obtained and recorded. “Ngaree,” of the aborigines of Lake Hindmarsh Station (Victoria). Mr. F. M. Bailey (“Queensland Flora,” p. 1490) quotes Mr. Watkins, who gives “Billa” as the aboriginal name of this tree at Stradbroke Island, and Mr. Wedd, who gives the name “Woongul” as in use at St. George. The latter is an interior locality, and in view of my remarks at page 80, Part XIII, it might be ascertained if this “Woongul” is not C. lepidophloia.

Synonyms.—C. obesa, Miq., C. torulosa, Miq., non Ait.

In New South Wales (whence the type of C. glauca was obtained) the species is confined to the coastal districts. In Western Australia it is found far in the interior, and it became my duty to compare the New South Wales and Western Australian forms, to see if I could detect any difference between them. The Western Australian form was named C. obesa, Miq., and it appears to be identical with C. glauca, Sieb., in every particular.

A recent botanist has the following:

Casuarina glauca, Miq. (? Sieb.—J. H. M.), (cum. C. obesa, Miq., B.Fl., vi, 196). A dioecious tree, with erect branches, the internodes terete, glabrous, and glaucous, easily separable in a dried state, below the teeth slightly thickened, yellowish. Teeth 12–15, adpressed, brown at the base, white ciliate at the margin. Male amenta, with numerous imbricate internodes, hardly constricted at the base, the teeth adpressed. Cone shortly and thickly pedunculate, short and broad cylindrical, 12- to 15-stichous. Bracts short, rather long acuminate, shorter than the bracteoles and inconspicuous; bracteoles exerted, concave-trigonom, outside thickened on the back, white or brownish villous, pale and slightly hairy inside. Achaenium (nut) always pale, with an oblique wing.

Hab. in the districts of Coolgardie, Avon, and Irwin, chiefly in depressions, loamy-sandy or argillaceous. Found also near the Swan River (all in W. A.).

... p. 122. The nearly pan-Australian Casuarina glauca has a wide range in the interior of W. Australia...

P. 123. After Eucalyptus, Casuarina furnishes the highest trees in Western Australia. The arborescent representatives of the genus require more moisture (than the shrubby ones), and are therefore, in the drier districts, confined to the depressions, and are characteristic of the presence of water. C. Humeliana and C. glauca are the most important of these "Creek-species."

Casuarina obesa, Miq., the type of which we have examined, is the true C. glauca, and not C. Humeliana, as Bentham suggests in Fl. Austr. vi, 197.—(L. Diels, in Engler’s Jahrbuch, vol. xxxv.)
CASUARINA GLAUCA, Sieb.
PARRAMATTA RIVER, SYDNEY
Bentham's remark, however, is:

Some specimens with shorter cones, from Murchison River, are referred by Miquel to *C. obesa*, Miq., in *Pl. Preiss.* i, 640, which he afterwards, in *DC. Prod.* XVI, ii, 34, reduces to *C. glauca*, and they certainly appear, in some measure, intermediate between that species and *C. Huegeliana*. The eastern specimens named by Miquel in Herb. Hook., *C. obesa*, are certainly a common form of *C. glauca*.—(B.Fl. vi, 197.)

I have examined the following specimens:

   In depressis turfos humidos ad fluvium Cygnorum supra oppidulum Perth, (27, 6, 39); et in solo calcaveo ad asturiam portus Leschenault (30, 12, 39).—(Pl. Preiss 1, 640.)


The identity of this species with *C. obesa*, Miq. is therefore proved, and the fact is consequently established that *C. glauca* may be found in the dry interior, as well as in coastal situations. Its occurrence in western New South Wales is not improbable.

B. *C. glauca*, Sieb., and *C. pauper*, F.v.M.

*Casuarina glauca*, Sieb.—Miq. l. c. 76, n. 30, Tab. xi, fig. c.

In Peninsula Lefebre ad Portum Lincoln (F. Muller). Hujus loci esse videtur *Casuarina pauper*, F. Mull. adnot. mss., sub quo nomine non nisi strobili maturi extant et quae sequitur adnotatio "in clinivis lapidosis et in deserto versus Morinde et Flinders Range. Non difficulta a C. quadrivalvi discernitur; ramulis crassioribus canis, dentibus vaginarum brevioribus, antheris minoribus, strobilis longioribus, demum habitu humiliore et ramis erectis nec adsurgentibus. She Oak colonorum; fl. vere.—Strobili 5 cent. longi, 3 crassi, cylindrico-oblongi, utrinque truncati, 22-stichi; bracteola elliptica acutiuscula prominula. Ab immaturis conis C. glaucae a me olim delineatis, non nisi majori magnitudine differre videntur.—(Miq. in *Ned. Kruidk. Arch.* iv, 98 [1856].)

In the specimens from the interior, mentioned by Miquel in *Ned. Kruidk. Arch.* iv, 100 as *C. pauper*, F.v.M., and in those from Q., the cones are more like those of *C. equisetifolia* than those of Sieber's typical specimens.—(B.Fl. vi, 196, under *glauca*.)

In *DC. Prod.* XVI, ii, 334, Miquel refers *C. pauper*, F. Muell. Herb., to *glauca*.

I have been unable to see this South Australian Casuarina from the desert towards Morinde and Flinders Range. I strongly suspect it may be the Belah, or Black Oak (*C. lepidophloia*, see p. 79, of Part XIII), which is sometimes extraordinarily like *C. glauca*. This is a point for South Australian botanists to clear up. If *C. pauper*, F.v.M., proves to be identical with *C. lepidophloia*, F.v.M., the latter will, of course, have to give way.

Leaves (Branchlets).—I have seen cattle leaving fair grass for branchlets of this plant, and probably they will feed more or less on the "leaves" of all *Casuarinas.*
**Timber.**—It is of a pale, brown colour, redder when fresh, drying to an oak-brown. A specimen of "Salt-water Swamp Oak," collected by the late Sir William Macarthur, is so light, and has so little figure, that a second glance is necessary to be quite sure that it is Casuarina wood at all. Sir William says of it: "Tall-growing; found only near the margin of salt water. Wood not much valued."

The timber is strong and tough, and is used for staves, shingles, &c., also for rails, but not for posts. It is beautifully marked, close in the grain, and rather tough; brittle. It might be useful for cabinet work.

A specimen from Gosford (Swamp Oak) is tough and difficult to dress. The heart-wood is of a purple colour.

It is used at Cooranbong for bullock-yokes, and at Taree for chisel-handles and walking-sticks.

Mr. District Forester Rotton, of Nowra, reports:—

The heart (red wood) of this tree makes the very best caulking mallets for shipbuilding purposes. It is also used for bullock-yokes, and handles of every description. The saplings are suitable, and have been proved to be excellent and very durable for rafters to buildings.

On part of the Berry Estate they have been used, and after over fifty years' use are as sound as the day when they were cut. This timber must be kept dry, and not exposed to the influence of the weather.

**Size.**—This is a rather erect tree, usually not much above 50 feet high, and with a trunk diameter of 2 feet. It has not a deeply furrowed, but a more or less cracked or flaky bark.

**Habitat.**—In view of the confusion that I have pointed out as regards other species, and particularly *C. lepidophloia*, it is very desirable that reputed localities for this species should be revised.

In coastal New South Wales and Queensland, where, indeed, it is sometimes known as "Coast Swamp Oak," it is usually found in sandy and in low, black-mould, swampy places, and tidal creeks, sometimes growing in salt water.

In Eastern Australia I have seen it from the Shoalhaven River, New South Wales, (in the south) to Rockhampton, Queensland (in the north), and I should be very glad if observers would look out for it beyond those limits.

It does not always grow on flats near the water's edge. For example, the clump of She Oaks, in a dry situation, near Governor Bourke's Statue, in the Outer Domain, at Sydney, was not planted by the hand of man, and it is in a high and dry situation, many feet above high-water mark. The Sydney Botanic Gardens contains natural clumps of this species, which is still abundant in Port Jackson, and must have been very plentiful there at one time.

As regards Victoria, Mueller ("Key to the System of Victorian Plants," ii, 12) records it from the north-west of that State only. All the specimens I have seen from the north-west are *C. lepidophloia*, but I think collectors will probably find it near the sea in Eastern Victoria.
THE SWAMP OAK.
(Casuarina glauca, Sieb.)
Coming to South Australia, Tate ("Flora of S. Australia," p. 220) shows *C. glauca* from "South of central district, extending from Lake Torrens to the Barrier Range, and the plain of the lower Murray River," also *C. lepidophloia* from the plain of the Lower Murray. I have not hitherto seen *C. glauca* from South Australia, and am, indeed, by no means certain of the identification.

In Western Australia, its occurrence in both coastal and interior localities has been proved, as I have already shown at some length, and I expect that collectors will find it, not only in South Australia, but also in western New South Wales and Queensland.

EXPLANATION OF PLATE 55.

A. Twig, with young pistilliferous flowers and cones.
B. Pistilliferous flower.
C. Young fruit (cone).
D. Twig, with cones.
E. Ripe cone.
F. Winged nut containing seed (enlarged).
G. Branchlets, with staminiferous flowers.
H. Staminiferous flowers.
I. Portion of the same, opened out (inside view).
J. A single staminiferous flower, consisting of a single stamen between two floral bracts.
K. Portion of branchlet in transverse section, showing portions of two joints.
L. Portion of branchlet, opened out, i.e., whorled bracts representing leaves.
Botanical description.—Genus, *Ficus.* (See Part I, p. 8.)

*Ficus Henneana, Miquel.*

A Deciduous Fig.

(Natural Order URTICACEÆ.)


A large shrub or slender tree, quite glabrous.

*Leaves* on petioles of 1 to 1½ in., oval or oblong elliptical, obtuse or very shortly and obtusely acuminate, entire, rounded or cordate at the base, 3 to 5 in. long, 1½ to 2½ broad, rather thinly coriaceous, the primary veins distant and prominent, the basal pair very oblique, the others spreading, the veinlets conspicuous but scarcely prominent.

*Stipules* lanceolate, acuminate, glabrous.

*Receptacles* (in pairs?) on peduncles of about 2 lines, globular, ½ to ¾ in. diameter, smooth, but mottled with white, the subtending bracts very deciduous, leaving a truncate margin under the ripe fig.

*Male flowers* few, shortly stipitate, the perianth trimerous, with one large anther on a very short filament, and the subulate stigma of the females entirely those of the section (B.Fl., vi, 165).

Amongst the New South Wales species of *Ficus* it is most nearly allied to *F. Cunninghamii,* Miq., with which it has also the deciduous leaves in common, but from which it is easily distinguished by the larger and pedunculate receptacles, and by the shape of the leaves.—(Maiden and Betche, loc. cit. infra.)

Botanical Name.—*Ficus,* already explained, Part I, p. 9; *Henneana,* in honour of a collector of North Queensland plants, named Henne.

Vernacular Name.—I cannot trace a name given to it, either by white or black men. It is called by botanists and others “Deciduous Fig.”

Leaves.—The leaves are deciduous, but the trees remain bare only a few weeks in the year before the appearance of the new leaves.

Fruit.—The ripe receptacles are reddish and purplish, and spotted with white.

Timber.—Timber of very little value, and similar in properties to that of most of the Fig timbers.
A DECIDUOUS FIG.

(Ficus Henneana, Miq.)
Exudations.—There exudes a substance from the bark very similar in outward appearance to that which occurs in the Port Jackson Fig (*F. rubiginosa*), see Part I, p. 11.

Size.—Bentham describes it (B.Fl., vi, 165), as a “shrub or small tree.” The largest of the few trees growing near “Wentworth’s Hut,” in the National Park, Sydney, attains a trunk diameter of about 5 feet, with gnarled spreading branches, and is probably considerably over 100 years old. This large tree can readily be seen from a boat; it is on a rocky point on the right bank of the Port Hacking River, about a mile from Audley.

Habitat.—

National Park, Port Hacking (M. Bell, February, 1900; J. L. Boorman, January, 1902). New for New South Wales. It seems very strange that a Ficus described from specimens collected on the barren Booby Island, in Torres’ Strait (about 10° S. lat.), and not recorded further south than Rockingham Bay, Queensland, should recur again in Port Hacking, near Sydney; but we have no doubt about the correctness of the identification. The Port Hacking specimens differ only from the small specimen of Henne’s type from Booby Island in the somewhat smaller size of the leaves.—(Maiden and Betche, *Proc. Linnean Soc. N.S.W.*, 1902, p. 64.)

The Hon. J. H. Carruthers, M.P., the Premier, has informed me that this tree has been seen about Shellharbour and other places in the district, *e.g.*, the Foxground, near Gerringong; but as I have not received specimens I wish to see these records confirmed, and to place twigs in the National Herbarium. It is found as such a large handsome specimen at the National Park that one cannot believe that it has died out in New South Wales except at that spot. It should be looked for both north and south.

Propagation.—From seed. This is one of the handsomest of the Figs for cultivation in New South Wales. We have specimens growing in the Botanic Gardens, where it is entirely at home. The origin of these trees has always been a puzzle. It may be that one of them is indigenous in its present situation; it may, however, have been raised from seed obtained from the South Coast.

EXPLANATION OF PLATE 56.

a. Fruiting branch.
b. Staminate flower.
c. Anther.
d. Pistillate flower.
e. Gall flower.
f. Fruit (Receptacle).
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THE FOREST FLORA
OF
New South Wales.

J. H. MAIDEN.

VOL. II. PART 5.
Published by Authority of the
GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

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THE FOREST FLORA
OF
NEW SOUTH WALES.

J. H. MAIDEN,
Government Botanist of New South Wales and Director of the
Botanic Gardens, Sydney

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No. 60.

Acacia melanoxylon, R.Br.

The Blackwood.

(Natural Order LEGUMINOSÆ: MIMOSEÆ.)

Botanical description.—Genus Acacia, Willd.

Sepals.—5, 4, or 3, free or united (wanting in A. Huegelii and A. squamata).

Petals.—As many free or united (wanting in A. squamata).

Stamens.—Indefinite, usually very numerous, free or slightly connected at the base.

Pod.—Linear or oblong, flat or nearly cylindrical, straight, falcate or variously twisted, opening in 2 valves or indehiscent.

Seeds.—More or less flattened, usually marked in the centre of each face with an oval or horseshoe-shaped depression or opaque spot or ring, sometimes very obscure.

Funicle.—Usually thickened into a fleshy aril under or round the seed.

Leaves.—Trees, shrubs or undershrubs, with or without prickles or stipular spines.

Flowers.—Twice pinnate or reduced to a simple phylloidium or dilated petiole.


A hard-wooded tree, attaining a very large size, but sometimes flowering when under 20 feet, glabrous or young shoots minutely pubescent; branchlets angular.

Phylloidium.—Falcate-oblong or almost lanceolate, 3 to 4 inches long in common varieties, ½ to 1 inch broad, obtuse or rarely almost acute, much narrowed towards the base, coriaceous, with several longitudinal nerves and numerous anastomosing veins.

Peduncles.—3 to 4 lines long, few together in a short raceme or sometimes solitary, bearing each a very dense globular head of 30 to 50 or more flowers, mostly 5-merous, and often so closely packed in the head that the calyces cohere.

Calyx.—More than half as long as the corolla, thin, and shortly toothed.

Petals.—Connate above the middle.

Pod.—Elongated, flat, often curved in a circle, 3 to 4 lines broad, with thickened nerve-like margins.

Seeds.—Nearly orbicular; funicle very long, dilated and coloured from the base, very flexuose, more or less encircling the seed in double folds.
A Chat about Wattles.

An Object-lesson written for New South Wales Children.

The word "Wattle" is one which we, in Australia, have peculiarly adopted as our own, and this is how it came about. It dates from Anglo-Saxon times, and signifies twigs or saplings or flexible rods plaited or interwoven together. The word has survived (chiefly in provincial dialects) to modern days, and when the early settlers of this State found it convenient to construct the framework of the walls of their dwellings and other buildings of twigs and split saplings, the operation was called "wattling," and the material used "wattle." Near Sydney Cove there grew in abundance, overhanging the watercourses, a small tree with thin flexible stems, which was frequently used for the purpose, and hence was called "Wattle" or "Black Wattle." It is known to botanists as *Callicoma*, and has cream-coloured flowers, in globular heads. Subsequently other plants, which we now call *Acacias*, were used for the purpose, and these are recognised as "Wattles" in most parts of this continent, whether their stems and twigs are used for wattling or not, while the name, as applied to *Callicoma*, has almost fallen into disuse, except amongst a few old-fashioned people.

The term "Wattle" is, however, by no means universally applied to plants of the genus *Acacia*, particularly in the far-western parts of the State. Myall, Boree, Mulga, Brigalow, Cooba, Dead-finish, Gidgee, Hickory, Miljee, Umbrella-bush, Wait-a-While, and Yarran, amongst others, are all members of the great Wattle family.

The origin of the name *Acacia* is not absolutely free from doubt, but the most reasonable derivation indicates that it comes from the Greek *akazo*, I sharpen, in allusion to the sharp spines of many of the African and Asiatic species, which are, however, not characteristic of most of the Australian ones.

*Acacias* are found in the warmer regions of the earth, particularly in Australia and Africa. They aggregate nearly 500 species for the whole world, of which considerably over 300 are found in Australia alone. It will, therefore, be seen that *Acacia* is mainly Australian. The number of species can only be stated approximately, as botanists continue to discover additional ones.

Having spoken thus generally, let us consider details. First, let us examine the blossoms. It will be found that Wattles fall into two great groups; those which have their flowers in small round heads or fluffy balls, and those in which the shape of the flowers may be described as short blunt rods, or technically speaking, "spikes." Now, if we look at the blossom with a pocket-lens, we shall observe that it consists of a very large number of tiny flowers, forming, in fact, a colony of little flowerets whose structure, though minute, is as perfect as that of the large showy *Hibiscus*, so common in gardens. The minute flowers will be found each to contain

* *Callicoma*, from the Greek *kalos*, beautiful, and *kome*, hair, in allusion to the appearance of the heads of flowers.
perfect sepals (and, therefore, calyx), petals (and, therefore, corolla), a large number of stamens, together with a pistil. The tiny sepals and petals differ amongst themselves in shape, texture, markings, in the presence or absence of hairs; and as these characters often determine the species, it follows that it may be necessary for the botanist to examine minutely a plant submitted for his opinion.

The colour of Wattle blossoms varies from a pure white to a deep yellow, different species showing flowers of varying shades of cream colour and pale yellow. As a rule, they do not show to advantage as cut flowers, their exquisite fluffiness departing as soon as they are removed from the plant.

Most of us are aware that the fruit of the Wattle is a pod or legume, which although varying a good deal in shape in different species, bears a strong family likeness to the homely pea or bean. Hence it is that the Wattle belongs to the Natural Order **Leguminosae**.* In some seasons the conditions for forming pods are unfavourable over large areas, and hence we may look for them in vain; but those of the ornamental Wattles are well worthy of collection, as these plants are best propagated from seed. And here it may be mentioned that the outer coat of the Wattle seed is very tough and impervious to moisture, so that it does not germinate very readily. Accordingly, before sowing, we soak the seeds in hot, nearly boiling water, or partly bake them, an operation which Nature herself often performs by means of bush-fires. Wattle-seed may, in dry grass-land, remain in the ground for many years; but if a fire passes over the country a crop of young Wattles is frequently the result.

If I were to say that most Wattles have no leaves, my readers would think I was not speaking seriously. The feathery foliage of the Black and Silver Wattle, finely divided so as to be almost fern-like, consists of true leaves; but most of our Wattles have "leaves" which, structurally, are only leaf-stalks or petioles flattened out, forming what are known as "phyllodia."‡

Many of these phyllodia look like the leaves of other trees, Gum-trees for instance, others are long and narrow like a tape, while a number are thin and pungent-pointed, like needles. Most are quite green, but others look as if they had been dusted over with flour. In a word, it may be said that the shape, texture, markings, and other characteristics of these phyllodia, present almost endless diversity of appearance.

---

*Calyx.—The outer or lower whorl of a flower. Greek, κάλυξ, a cup, in allusion to the usual shape.

Sepal.—Latin, sepal, I enclose; an individual leaf of the calyx.

Corolla.—The whorl within or above the calyx. Usually bright-coloured. Latin, corolla, a little crown (dim. of *corona*).

Petal.—Greek, petalon, a leaf. An individual leaf of a corolla.

Stamen.—An inner whorl of a flower. In some cases the stamens are present in one flower, while the pistil occurs in another. Stamens consist of filaments terminated by anthers.

Pistil.—The innermost whorl of many plants. When mature it is converted into fruit, and contains the seed. Latin, *pistillum*, a pestle, in allusion to its usual shape.

† Leguminosae (Latin, legum, *a*), all manner of pulse, as peas, beans, &c.

‡ Phyllodia, Greek, φύ (γ) λοίδα, a leaf; oidos, like.
Wattles vary much in size when full grown. Some tiny species hardly exceed 3 or 4 inches in height, and may be crushed like the grass of the field. Most of them are shrubs, or trees of moderate size, while at least two species attain the stature of large forest trees, both of them being found to measure up to nearly 4 feet in diameter, while one has been found to attain a height of over 100 feet, and the other the extraordinary height of 150 feet.

As has been already hinted, the Wattle may reasonably be looked upon as a national Australian plant, and hence it would behove boys and girls to set about the very pleasant task of studying it. The structure of the flowers, pods, and phyllodia should be made out from actual examination of a twig; this will impress the subject on one's memory better than endless reading of descriptions.

The Wattle is essentially a flower of winter or early spring, and its cultivation is easy. It brightens up our gardens and roadsides at a season when there are few other flowers, and no flowers are more effective than yellow ones. When these facts are realised we shall see more Wattles adorning the homes of this bright sunny land than we do at present, for they are themselves an emblem of sunshine.

**Botanical Name.**—*Acacia* (already dealt with); *melanoxylon*; this is from two Greek words signifying “black wood,” and Robert Brown, the botanist, who adopted this designation, simply translated the commonly accepted Australian name.

**Vernacular Names.**—It is called “Blackwood” on account of the very dark colour of the mature wood. In Captain P. P. King’s work, Allan Cunningham refers to it as the “Black-hearted Wattle” or “Native Ash.” It is also called “Lightwood” in Tasmania, Victoria, and southern New South Wales; but the origin of the term, even amongst many people who use it, is not always clear. An explanation often given is that since the great majority of the useful timbers of Australia and Tasmania are heavy, the name is simply to draw attention to its comparative weight. This explanation is, however, untenable. The Blackwood has rather a wide sapwood, up to 4 inches, and this is very light in colour,—almost white; so that, on removing the bark from a Blackwood, a man would at once come across this very light-coloured wood, hence the name “Lightwood;” and this is how a good many people explain it. I think, however, the explanation simply is that pale-coloured Blackwood is called Lightwood. A Blackwood which has grown rapidly has often timber paler in colour, and more porous than the standard Blackwood, and would be called Lightwood. Anyhow, the fact remains that Blackwood and Lightwood are absolutely identical from a botanical standpoint, and differ only on account of differences in soil and climate. While on the subject of the pale sapwood, Mr. Baeuerlen informed me that, years ago, an old man, in the Braidwood district, displayed great skill in cutting it into very thin strips, which he used to fashion into baskets of various kinds, and these had a ready sale. The old
man’s knife was made of hoop-iron, and no one seemed able to imitate him in making such excellent basket material.* The species has also been sent as “Bastard Myall” from Port Stephens and Glen Innes, and as Hickory from the southern parts of this State. It probably bears other local names. North of the Clyde River people are ignorant of the identity of the tree with the Blackwood of Tasmania and Victoria, and hence do not employ that term to designate it.

Aboriginal Names.—“Mootchong” of the Ja-jow-er-ong tribe, Victoria, and “Mooeyang” or “Moeyang” of the Yarra blacks. “Mudgerabah” is an old aboriginal name in northern New South Wales, and is the name by which the tree is generally known, at the present day, in New England.


Bark.—The bark has usually gone to waste after the wood has been obtained from the logs. Baron von Mueller says:—“The bark is, however, rich in tannic acid, and ought not to be left unutilised, though no trees of this species should be sacrificed for their bark alone.” This may be true as regards Victorian trees; but I have not seen any New South Wales Blackwood barks of much value. One from an oldish tree from Monga, near Braidwood, yielded 11.12 per cent. of tannic acid, and 20.63 per cent. of extract. This is the only specimen I have subjected to chemical analysis; but I have roughly tested other barks of the same species, and am inclined to think that Blackwood bark is very inferior for the purposes of the tanner. The bark contains some saponin.

Timber.—This is considered by some people to be the most valuable of Australian timbers. Perhaps this is a bold claim to make, bearing in mind the high merits of such timbers as Ironbark and Red Cedar; but it is undoubtedly a timber of the highest class, happily combining an ornamental character with great strength. It is hard and close-grained, and is much valued for furniture, billiard-tables, cabinet-work, picture-frames, gun-stocks, walking-sticks, crutches, tool-handles, railway and other carriages, boat-building (stem and stern-posts, ribs, rudder), naves of wheels, parts of organs, pianofortes (sound-boards and actions), and many other purposes too numerous to individualise. It is a most useful timber for coach-builders, in the bent timber branch. It bends well, and with proper treatment from the felling and sawing of the lumber, it substitutes perfectly for the bent timber in, say, an Austrian chair, and would look as well, and feel as light. For narrow boards it is used in the coach-building trade in Sydney in place of American

* The fishing lines of the Kurnai (Gippsland) blacks were made of the inner bark of this tree.—A. W. Howitt. “Native Tribes of S.E. Australia,” p. 761.
Walnut, and it is taken for that timber when polished. It would last indefinitely in dry situations. It is really valuable for panelling, and perhaps framing. Blackwood is strikingly like American Walnut in most respects, in fact the former is probably often substituted for the latter without the purchaser being any the wiser, the incentive being that Walnut brings about four times the price in the Sydney market. If Blackwood be treated with lime-water or potash, the deception will be complete. Blackwood is pushing itself forward on its own merits, but it has to fight against a good deal of the prejudice which is shown to Australian timbers, largely caused by unseasoned timber having so often been supplied. It requires fair play in the matter of seasoning, and will well repay any reasonable care expended on it. The similarities of Walnut and Blackwood are not confined to outward appearance, for their properties appear much the same, hence a knowledge of the many uses to which the former timber is put is useful as a guide to the capabilities of our Blackwood. A good deal of it possesses a “broken grain” and satiny lustre which are exceedingly ornamental. Nothing, in my opinion, resembles the figure of picked samples so strongly as the South African mineral crocidolite, which, as is well known, has a characteristic and beautiful appearance. The figured wood is cut into veneers. It takes a fine polish. A drawback to this valuable timber is that it does not take the glue as well as many others. Rosewood behaves similarly to glue; if I do not know the reason of this, it may be from the presence of oil cells. It was largely used for oil casks, chiefly for the Hobart whaling trade. The Lightwood was chiefly used for this purpose. As regards its use for wine casks, Mr. Thomas Hardy, of Adelaide, has pointed out that this timber is open to the objection that it leaks through the pores when sawn; but it is tight when split on the quarter. Mr. Hubert de Castella, the well-known Victorian vigneron, in giving evidence before the Vegetable Products Commission of that State says:—

I do not think that Lightwood is a very good wood for casks; it gives a slight taste; I tried Lightwood; I had thirteen large casks made from Lightwood, and we exchanged them for Oak. Even after a year or two, and wine had been in it, we thought it gave a slight taste to the wine—an oily taste.

Subsequently, Mr. de Castella said:—

On a former occasion I made a few remarks on casks, a subject which is of the greatest importance to the wine industry in this country. I was in hope that this might have provoked some discussion; but in this I have been disappointed; and now again I venture to urge the importance of the matter. . . . . . . . I have used Blackwood since 1863, and found it in every respect equal to Oak. By Blackwood I do not mean what is often supposed to be the same, namely, Lightwood, which is utterly unsuitable for wine, though good enough for tallow.

As a charcoal wood, its charcoal burns with intense heat; but almost as fast without blowing as it does with, which is of course objected to by blacksmiths. Blackwood is not proof against white ants. Its specific gravity, according to Baron von Mueller, is from ’664 to ’777, i.e., the weight of a cubic foot of the dry timber varies between 41 lb. and 48 lb. Mr. Gamble gives the weight per cubic foot of an Indian-grown specimen at 36 lb., and states that it was cut from a tree 20 years old,
and 90 feet high, which gave a plank 2 feet broad; but in India it appears to lack density, and deteriorates in value. It is a wood much appreciated by the Victorian blacks. For instance, the Yarra blacks used to make their mulgas or club-shields of it, their throwing-sticks (for propelling spears), and their "il-lil," a curved fighting weapon with a knob. Following is a report by Mr. Allen Ransome on some samples of this timber sent from Victoria to the Colonial and Indian Exhibition, 1886:

Samples of both old and young trees were sent for trial. The former were made into joiners' specimens, the latter into casks. The figure of the old-growth wood is very fine, and the surface left by the cutters was all that could be desired. The casks proved a complete success. The wood has already been imported into England in small quantities, and sold at prices from 2s. to 3s. per cubic foot.

I quote descriptions of Tasmanian wood by the same authority, as, since we look forward to an increasing trade in colonial timbers with the United Kingdom and the continent of Europe, a report by a well-known English expert has peculiar value:

*Blackwood.*—A sound, mild-working timber of a brownish colour, closely striped with streaks of various shades of reddish-brown, and frequently crossed by diagonal marks of a light golden colour. The more ornamental logs of this wood are exceedingly beautiful, and should fetch a high price in this (London) market, where they could be used to advantage in place of the best Honduras Mahogany, while the less ornamental logs would serve for a higher class of joinery work, such as counter and shop fittings. The younger growth is well suited for cooperage work, and a barrel made from one of the pieces submitted for trial, before being artificially seasoned, is still quite tight, and shows no sign of shrinkage.

*Lightwood.*—This is an inferior description of Blackwood, from which it differs mainly in being of a lighter colour, and having a somewhat more open grain. Although it will not compete with the Blackwood for highly ornamental cabinet work, it can be used in the place of cheap Mahogany for wardrobe backs and other similar work.

It will be observed that most of the reports on the utility of this timber refer to Tasmanian and Victorian wood. This is because the occurrence of Blackwood in New South Wales is known to very few people, whereas, as is stated in the proper place, it is very widely distributed in this State, although usually looked upon as some other timber. In sending a New South Wales specimen for identification, Mr. van Weenen, of Gunnedah, wrote in 1893:

It is only lately that it has been brought to the saw-mills at Boggabri, and the sawyers do not know it. It grows in this district, and is being used by coachmakers and cabinet-makers, who speak very highly of it.

Neither do the saw-millers in the Richmond River district know anything about it. There it is chiefly Cedar, Pine, Hardwood—the changes being rung on these three indefinitely. Beyond these, little is locally known of colonial timbers. Strange to say, that while the timber is highly spoken of in the southern localities of New South Wales I have mentioned below, it is comparatively little used. Now this does not indicate that it is of little value, as some cynics who delight to sneer at native timbers infer, but simply that the public in the district are not yet alive to
its value, and shippers are ignorant of its occurrence in the particular locality. In a sparsely-populated district the local demand for even a popular timber will be readily satisfied; but when we consider the ease of a little-known timber, users are timid about giving an order for something of whose value they are at present ignorant. Still, even in the southern districts, it is worked up to some extent, and it only requires that our people shall be informed that they have growing near them the true Blackwood for them to use it a good deal more. Years ago Mr. Bäuerlen told me of a Braidwood tradesman who made, for many years, articles of local Blackwood. His work had a deservedly good reputation, and a skilled workman does not make chests of drawers, secretaires, plate-chests, &c., out of a timber of whose value he has any doubt. I know of another tradesman at Delegate who used to make beautiful gun-stocks of it. The price he got for his gun-stocks is so high that I am afraid to mention it, as everybody may turn to gun-stock making. Another tradesman uses it for buggy naves. He, from time to time, used to go out and cut down a fair-sized tree, let it season outside in the log, and cut length by length off as he wanted it.

The manufacture of gun-stocks from this timber is a very old industry, particularly in Tasmania. I find that, in the season 1844-5, 430 gun-stocks were exported from Launceston to Great Britain.

A number of tests have been made in regard to the strength of Blackwood; but as it is unsatisfactory to make an abstract of experiments of this kind, I give a list of the most important of them, in order that architects, engineers, and others interested may readily refer to the originals:

1. Tests of the timber experimented upon by the Victoria Timber Board, Railway Workshops, Newport, Melbourne, 1884.

**Exudations.**—Many of our *Acacias* yield gums, but I have never seen gum on a Blackwood, although I have carefully looked for it in different parts of New South Wales and Victoria, and upon trees growing under widely different circumstances. It is therefore rare.

**Size.**—In the southern mountain districts there are many trees 70 or 80 feet in height, with a stem diameter of 2 or 3 feet. The Mudgerabah, which may be
taken as a type of the northern New South Wales form, is usually 40 to 50 feet high, and also has a diameter of 2 or 3 feet. In Tasmania and Victoria it is as large and larger than those of the southern mountain districts of New South Wales.

Distribution.—The Blackwood is best known as a Tasmanian and Victorian tree. It also occurs in South Australia. It is extensively distributed in the southern maintainous districts of New South Wales. It then seems to skip over the immediate neighbourhood of Sydney, but reappears in the rising country at the back of Port Stephens, and is extensively distributed in the table-land of New England, extending into Queensland. From Port Stephens to Queensland it is frequently found wherever the elevation is not less than 2,500 feet. What its precise western boundary is, we do not know at present; but I have seen it from Tenterfield, Glen Innes, Boggabri, and near Armidale. It is by no means rare on the western slopes of the Blue Mountains, not on the sandstone; but on the granite, following up the granite gullies where there is a little seepage. It occurs abundantly in the Mudgee district. It is plentiful in the Richmond River district, occurring in places of no great elevation, and at no distance from the sea. As far as southern New South Wales and Gippsland are concerned, the Blackwood must be considered as a mountain species, though it occurs occasionally in the low coast land; but there it never attains any size. It varies a good deal in mode of growth, according to situation and geological formation. In the rich humus of the jungle of the mountain slopes, it attains a height of from 60 to 80 feet, and in Gippsland, along the boundary of New South Wales and Victoria, localities may be found where it attains a height of 120 feet, and a diameter of nearly 3 feet. There straight trunks may be seen without a limb, from 60 to 80 feet, the timber quite sound, and possessing that beautiful dark colour whence the species has derived its popular as well as its scientific name. When it grows on high mountains, as on the Delegate and Tingiringi Mountains, amongst rocks and precipices, it grows very gnarled and spreading, from 20 to 40 feet high, and from 1 to 2 feet in diameter, sending out thick, long, gnarled, and crooked limbs quite close to the ground. Mr. W. Bauerlen tells me that on the Delegate Mountain he has seen them as low as 1 foot from the ground, with the limbs of great length, and eventually touching the ground. Those trees furnish most beautiful timber, as far as grain and figure are concerned; but generally not quite so dark as the timber growing in the rich soil; but the situations are mostly inaccessible to vehicles of any kind. As regards the southern part of the State, the Clyde Mountains, Braidwood, and the Bateman’s Bay District, may be considered the most northern localities in New South Wales for Blackwood of commercial sizes. From thence it can be obtained all along the coast range right down to the southern boundary, where, as has been already stated, it attains its greatest luxuriance in the brush country, in common with Sassafras, Musk, and other well-known plants. On the mountains east of Bombala, Nimitybelle, and Cooma, but yet on the high table-land, there is a belt of forest fringing the Monaro Plains. This forest, where it is intersected by its numerous
creeks, valleys, and gullies, should furnish a plentiful supply of Blackwood. It has been but imperfectly prospected for that valuable timber, yet plenty of trees 2 feet or more in diameter have been seen with trunks furnishing logs from 20 to 40 feet in length. This is a favourable locality, since carriers go from thence to the Cooma railway station on the west side, and to the seaports of Merimbula and Twofold Bay on the other. The eastern mountain slopes near Candelo, Colombo, Bega, Cobargo, Tilba Tilba (Dromedary), and Moruya, contain also a large supply of this timber.

The Mudgerabah as a shelter tree.—The traveller in New England cannot fail to notice a symmetrical, umbrageous tree, usually some 10 or 50 feet in height, with a trunk diameter of 2 or 3 feet, and with a great spread of leafy branches. It has a rough bark, and its leaves remind some country people of “some sort of gum-tree.” When in flower or seed it will be noticed to be a wattle. It is found a few miles from the coast, at an elevation of about 2,500 feet above sea-level, and I noticed it all over the New England country, even at Guy Fawkes, the summit of the Snowy Range, and the highest point of New England. The climate here is very severe, yet the trees of this Acacia are magnificent specimens, showing how hardy it is. It is everywhere called Mudgerabah, and it is about the only tree that pastoralists do not ringbark, as it gives a grateful shelter to the stock during the summer, while, in those districts where frosts occur, the cattle are found under it during the coldest nights, as the frost cannot penetrate the dense foliage. From the aesthetic point of view, it is desirable that these trees should be conserved, for they are charming objects in the landscape, many of them being nearly as symmetrical as it is possible for a tree to be. This tree is none other than the Blackwood. From the point of view of the timber-getter, the trunks of the Mudgerabah are usually too short; but if it be necessary to fell one, the timber deserves a better fate than to be utilised as fuel.

Propagation.—From seed, which is readily purchasable. I recommend this valuable tree to be conserved and planted in the cooler, moister districts of the State, i.e., in the coastal and dividing ranges and table-lands. It is also a shady, ornamental tree, and hence is often cultivated in Sydney gardens. With me, it has grown 20 feet high in three years—healthy, thick-foliaged trees. This tree has been extensively cultivated in Madras for revenue purposes; but the wood has been found to possess there few qualities prized by the cabinet-maker and builder. It warps after many months of seasoning, is not easily worked, and is not as durable as other timber accessible to the residents of the hill stations. The slowness of growth is much against the tree, and where it has been tried, in two instances as an avenue tree, it has proved a failure. It is liable to attacks from a mistletoe. As a fuel tree it is not prized so highly as A. dealbata (Silver Wattle). The Blackwood was introduced on the Nilgiris in 1840, and is now completely naturalised. It is also grown on the hills of the Punjab, Kumaun, and Sikkim in India. I am not surprised at the want of success with this tree in tropical countries,
The Blackwood.

(Acacia melanoxylon, R.Br.)
EXPLANATION OF PLATE 57

A. Flowering branch.
B. An individual bud removed from a head of flowers.
C. Individual expanded flower, showing—
   (a) Sepal.
   (b) Petal.
   (c) Stamens.
D. Portion of flower, opened out—
   (a) Sepal.
   (b) Petal.
   (c) Stamens.
   (d) Pistil.
E. Sepal.
F. Petal.
G. Stamens.
H. Pistil.
K. Ripe pod.
L. Seed, with funicle partly encircling it in double folds.
M. Phyllode with pinnate true leaves.
No. 61.

**Eucalyptus coriacea, A. Cunn.**

A White or Cabbage Gum.

(Natural Order MYRTACEÆ.)

Botanical description.—Genus *Eucalyptus.* (See p. 33, Part ii.)


A smooth-barked tree attaining sometimes a considerable height, the exterior bark sparingly deciduous, the inner smooth and whitish.

*Leaves.*—Mostly ovate-lanceolate or lanceolate, acuminate and falcate, from 3 to 4 in. to twice that length, very thick, smooth and shining, the veins not numerous, very oblique, a few starting from below the middle and almost parallel to the midrib, giving the leaf a several-nerved appearance.

*Peduncles.*—Axillary or lateral, rather thick, terete or slightly compressed, each with about 5 to 10 flowers, the buds clavate and tapering into a short thick pedicel.

*Calyx-tube.*—Very open, nearly 3 lines in diameter.

*Operculum.*—Hemispherical, obtuse, or with a small point, or nearly conical, shorter than the calyx-tube.

*Stamens* 2 to 3 lines long, all perfect, or perhaps a few of the outer ones with abortive anthers; anthers small, reniform, with short divergent cells confluent at the apex.

*Ovary* flat-topped.

*Fruits* often nearly sessile, smooth, pear-shaped, truncate, 3, or rarely nearly 4, lines in diameter, more or less contracted at the orifice, as long as broad or rather longer, and slightly tapering at the base, the rim flat or conic, the capsule somewhat sunk or nearly on a level with the border, the valves horizontal or scarcely protruding.—(B.Fl. iii, 201.)

**Variety.**—There is a variety which has short and nearly straight leaves, known as *alpina*, from the high mountain localities which it frequents. It is but a tall shrub or small tree, and is more or less glaucous. Photographs of this, known as Snow Gum, will be found facing pages 114 and 115.

The trees of this species at the highest elevations are remarkable for their bare stems, surmounted with a dome or flattish top of leaves. The bare stems are, doubtless, the consequence of winds, the leaves being concentrated on the top as a thin "layer," and offering minimum resistance to the wind. These dwarf trees are in masses of a fairly uniform height; a different arrangement would result in the crown of leaves of the smaller plants being beaten against the bare stems of their taller brethren, and denuded of their foliage. The grotesque leaning forms of the
SNOW GUM, E. coriacea, A. Cunn. GREAT BOGONG, IN WINTER.
SNOW GUM, *E. coriacea*, A. Cunn.: MOUNT KOSCIUSKO.
SNOW GUM, *E. coriacea*, A. Cunn.: MOUNT KOCSIUSKO.
stems, like guys or supports to resist wind-pressure, are shown in some of the illustrations. In many cases the butt of the tree forms a huge protuberance at the ground level, taking on a peculiar plastic appearance often seen in the coast districts in *E. maculata* (Spotted Gum) and *Angophora lanceolata* (Smooth-barked Apple). In *E. coriacea*, from this protuberance there spring out as many as four (and even more) stems of equal diameter, such stems being equidistant from each other, or nearly so.*

**Botanical Name.**—*Eucalyptus*, already explained, p. 34, Part ii. *Coriacea*, a Latin adjective, signifying made of leather or of hide, from the noun *corium*, hide or leather. We have the English word coriaceous, which refers, in the present case, to the texture of the leaves.

**Vernacular Names.**—One of the “White or Cabbage Gums,” but not to be confused with *E. haemastoma*, which goes by the same names. The species goes under the name of “Weeping Gum” in Tasmania, owing to its scrambling habit; the name is also in use in this State, as is also the name “Tumble-down Gum,” by reason of its aspect; “Glassy Gum” is a name given to it in reference to the vitreous appearance of its bark; “White Sally” is a name not infrequently used; it distinguishes it from *E. stellulata*. On the Monaro I have known it to be called “Big Leaf,” for obvious reasons. Sometimes it is called “Cattle Gum.”

**Aboriginal Names.**—I know of none which I can apply with absolute certainty to this tree. At the same time I believe the blacks had a distinctive name for it, although it would be guess-work to say which of the various aboriginal names for White Gum should be applied to *E. coriacea*.

**Synonym.**—*E. paniculata*, Sieb.

**Leaves.**—Coriaceous, yet often succulent, and hence eaten by stock. It is in New South Wales most largely utilised for this purpose, hence the name “Cattle Gum,” which is sometimes applied to it. Besides cattle, opossums have a predilection for the young foliage of this tree, so that they often kill trees of this species.

Mr. F. B. Guthrie (*Agricultural Gazette*, Oct., 1899) has analysed the leaves, with the view to ascertain their value for feeding stock, and following is his analysis:

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Ash</th>
<th>Fibre</th>
<th>Ether Extract (Oil, &amp;c.)</th>
<th>Albumenoids</th>
<th>Carbohydrates</th>
<th>Nutrient value</th>
<th>Albumenoid ratio</th>
<th>Tannin (Oak bark)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cattle Gum</em></td>
<td>36·76</td>
<td>2·90</td>
<td>8·57</td>
<td>6·02</td>
<td>8·75</td>
<td>37·00</td>
<td>59</td>
<td>1 : 5·9</td>
<td>1·5</td>
</tr>
</tbody>
</table>

*J. H. Maiden “A Second Contribution to the Flora of Mount Kosciusko,” Agricultural Gazette, N.S.W., Oct. 1899*
As regards the oil obtained from the leaves, I have three authenticated analyses before me. No 1 is from Messrs. Baker and Smith's "Research on the Eucalypts," and Nos. 2 and 3 are by W. P. Wilkinson:

<table>
<thead>
<tr>
<th></th>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation [A] d</th>
<th>Saponification Number</th>
<th>Solubility in Alcohol</th>
<th>Constituents found</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.8,947</td>
<td>-32.8</td>
<td>4.62</td>
<td>1 vol. 80%</td>
<td>Phellandrene</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Peppermint ketone.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Eucalyptol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sesquiterpene.</td>
</tr>
<tr>
<td>2</td>
<td>0.8,913</td>
<td>+16.7</td>
<td>...</td>
<td>...</td>
<td>No phellandrene.</td>
</tr>
<tr>
<td>3</td>
<td>0.9,200</td>
<td>+6.0</td>
<td>...</td>
<td>...</td>
<td>do</td>
</tr>
</tbody>
</table>

It is remarkable how these analyses vary. My view is that we require hundreds of analyses of the oil of each species taken under circumstances as variable as possible before we shall be able to make accurate generalisations in regard to them. These should be made in all the States, just as the material for botanical diagnosis is obtained over areas as wide as possible.

**Flowers.**—No Eucalypt produces a greater profusion of flowers than this one, although some (i.e. the Yellow Box, *E. melliodora*) are also very free flowerers. It is, in consequence, very much sought after by insects, though whether the variety of species is in good proportion to the profusion of individuals only an entomologist can say.

**Bark.**—This is *par excellence* a White Gum, its smooth bark extending right down to the ground. Its bark is thick, brittle, and succulent.

**Timber.**—Pale-coloured, full of gum-veins, warps a good deal. Good logs cannot be obtained, as the barrels are usually short and crooked. The limbs bend and twist like wire without breaking.—(Nowland). Its chief local uses are for fuel and fencing (posts), as it is very durable.

**Exudation.**—The remarks on the kino of *E. stellulata* apply here.

**Size.**—Usually a medium-sized tree, it exceptionally attains the height of 100 feet, and a diameter of trunk of 5 or 6 feet.

**Habitat.**—This tree is confined to Tasmania, South Australia, Victoria, and New South Wales—

**Tasmania.**

In Tasmania it is common, except the extreme south and south-west.—(Rodway.)

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A WHITE or CABBAGE GUM.
(Eucalyptus coriacea. A. Cunn.)
Victoria.

As regards Victoria, Mueller gives the south, north-east, and east. Speaking of Gippsland, Howitt says:

This eucalypt is extremely constant in character, whether found in small isolated colonies in the littoral tracts, as at Providence Ponds and Morwell, or forming forests over large areas in the Gippsland Alps up to an elevation of 5,000 feet, as on the Wonnongatta Plains, at Omeo, Woolgulmerang, and Delegate. It appears to be essentially an alpine species, yet able to maintain itself, to some extent, in localities but little elevated above sea-level.

South Australia.

J. E. Brown figures it in his *Forest Flora* under the name “The South-eastern White Gum.” In this State the species is, as yet, only known to exist in the south-eastern district, and there merely in patches a short distance of the sea-coast. The localities are—Dismal Swamp (Rev. J. E. Tenison-Woods) and Benara Estate (Beale). The late Professor Tate records it from the volcanic area of the south-east corner of the province, or the Mount Gambier district. Both in Victoria and South Australia it is recorded from the coast, a habitat I believe to be quite unknown in New South Wales.

New South Wales.

It occurs usually at fairly high elevations, preferring undulating grassy country in the ranges and high table-lands from south to north of the State. As already indicated, it ascends to the greatest elevation of any tree in the State. It consequently forms the limit of arboreal vegetation, the “tree-line” which, on Mount Kosciusko, is about 6,500 feet.

Propagation.—Trees raised from seed gathered in our coldest localities are hardy in many parts of England.

EXPLANATION OF PLATE 58.

A. Juvenile leaf.
B. Twig bearing buds and flowers.
C. Fruits.
D. Fruiting twig of the “Snow Gum” of Mount Kosciusko. This is variety *alpina*.

The two photographs of “Snow Gum” forming portion of the “tree-line” at Mount Kosciusko are by Mr. W. Forsyth. The third photograph is by Kerry & Co., of Sydney.
Casuarina Cunninghamiana, Miq.

The River Oak.

(Natural Order CASUARINACEÆ.)

Botanical description.—Genus Casuarina. (See p. 74, Part XIII.)

Botanical description.—Species, Casuarina Cunninghamiana, Miq. Rev. Cas. 56, t. 6 (1848).

A tall glaucous tree (the largest of all Casuarinas) with slender erect branches faintly ribbed between the whorls, but smooth and glabrous.

Rudimentary leaves.—8 to 10 in the whorl, generally 9.

Flowers.—Monoecious, the males in terminal spikes about ¾ of an inch long, rarely attaining 1 inch, the rudimentary leaves in the spike without elongated points in all specimens seen, the females terminal on short lateral branches, the rudimentary leaves with elongated ciliate points.

Cones.—Subglobose or cylindrical, truncate at both ends, attaining in the fully matured cones about ½ inch in length and rarely above 4 lines in diameter, the valves very prominent, pubescent or occasionally glabrous in age, with a very obscure dorsal keel.

Winged nuts.—Small, grey.

The above description has been drawn up from specimens collected by Mr. Boorman and myself between Grafton and Dalmorton. I have no doubt this is the true Casuarina Cunninghamiana, Miq. as figured in Miq. Rev. Cas. t. 6, and by Poisson, Récherches sur les Casuarina (Nouv. Arch. du Muséum, x. t. 4). In the Handbook of the Flora of N.S.W. Messrs. Moore and Betche placed the species in the group of Casuarina with 6 to 8 teeth in the whorl, misled by Bentham, who writes about C. Cunninghamiana “closely resembling C. equisetifolia in . . . and number of parts of the whorls.” C. equisetifolia has 6 to 8 teeth in the whorl.

Both Miquel and Poisson figure C. Cunninghamiana with 9 teeth in the whorl, and Miquel writes in his original description of the species: “vaginarum dentibus 8–10.”
Because of Bentham's misleading, or rather wrong statement, it is a fact that some botanists have excluded all small-fruited specimens of *Casuarina* with more than 8 teeth in the whorl from *C. Cunninghamiana*, whereas they are the true *C. Cunninghamiana*.

It is one of the best marked species, being very uniform in appearance and habitat over enormous areas, and therefore Bentham's statement that it is possibly a variety of *C. equisetifolia* or *C. suberosa* (the latter being a very different tree) is unfortunate.

**Botanical Name.**—*Casuarina*, see p. 79, Part XIII. *Cunninghamiana*, in honour of Allan Cunningham, King's Botanist, and formerly Superintendent of the Botanic Gardens, Sydney.

**Vernacular Names.**—"River or White Oak." This is the commonest tree on the banks of most of our fresh-water rivers, and therefore the name "River Oak" is specially appropriate. *C. glauca*, dealt with in the last Part, is the River Oak found on the margins of tidal rivers.

**Aboriginal Names.**—"Billagin" of the aborigines of the Camden district, according to the late Sir William Macarthur.

**Leaves (Branchlets).**—This is a tree whose branches were felled in enormous quantities for stock-feeding during the late drought. In many districts the mortality amongst sheep and cattle would have been far greater than it was had it not been for this valuable tree.

Mr. F. B. Guthrie, in the *Agricultural Gazette* for October, 1899, gives an analysis illustrating its fodder value.

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Ash</th>
<th>Fibre</th>
<th>Ether Extract (oil, &amp;c.)</th>
<th>Albumenoids</th>
<th>Carbohydrates</th>
<th>Nutrient value</th>
<th>Albumenoid ratio</th>
<th>Tannin (Oak bark)</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Oak</td>
<td>42.27</td>
<td>2.96</td>
<td>20.90</td>
<td>1.66</td>
<td>6.81</td>
<td>25.40</td>
<td>36</td>
<td>1:4.1</td>
<td>1.7</td>
</tr>
</tbody>
</table>

**Fruits.**—This species is the smallest fruited of all the New South Wales She-Oaks.

**Timber.**—Sap-wood white. Wood red (not deep), with a purplish cast. It dries to a brownish-purple. Some of it has a handsome figure. It is used for bullock-yokes (District Forester Stopford, Armidale), shingles, and staves. This and other *Casuarinas* burn well, and their ashes retain the heat for a long while. I look upon it as a valuable timber, and it can be obtained of large size. Wood strong,
light, very tough when dry; excellent for many purposes requiring lightness and
strength; stated by some to be not durable if exposed to the weather.

One of the most endurable oaks, is suitable for bullock-yokes, handles, &c.—(District Forester
Rotton, Nowra.)

I should like to obtain additional evidence as to the durability of River Oak
when exposed to the weather.

The River Oak, it will be noticed, is of a much paler colour than the Bull Oak or Belah, and
although it has many uses, yet, owing to the limited supply it is not much used. In fact, landowners who
have it growing on their property fronting the river or creeks object to it being cut down, as it assists to
keep the banks together as well as providing a shade. It is, in my opinion, a much better timber than
any of the oaks I have mentioned.—(District Forester Osborne, Cootamundra.)

Size.—The largest of all Casuarinas. I have seen it probably nearly a
hundred feet high, and with a trunk diameter of six feet, and perhaps more.

Habitat.—Widely distributed over New South Wales along river banks, and
in shingle beds. It is found in the warm coastal districts, in the cold mountain
districts, e.g., Blue Mountains, Orange, and New England, and in the western
country beyond Dubbo. It can be readily recognised from the figure, and I ask
correspondents to give me specific localities south of the Shoalhaven River, and west
of Dubbo, Narrandera, and Grenfell. It extends to Queensland, Bentham having
received it from the Gilbert River, but its range in that State requires to be defined.

The River Oak as a bank protector.—It is a tree which is readily propagated,
and which should be faithfully conserved, for besides its value as a stock food in
time of drought it is one of the best trees we have for protecting the friable banks of
rivers. The banks had in the course of ages acquired an equilibrium which has
been largely destroyed by the white man. He has ruthlessly cut down the River
Oaks to obtain more ready access to the river frontage, and to enlarge the area of
cultivated land, but the latter aim has often been defeated through the consequent
falling in of the banks. Perhaps I may at this place be permitted to make
quotations from a recent paper written by me *:

The paddock is the unit in considering the effects of erosion. Much of the mischief has already
been done, but intelligent conservation of existing and future trees has vast possibilities for good. It
ought to be made penal to ringbark up to a certain distance from a watercourse, or to cut down a River
Oak on any of the rivers (watercourses), except under a special license only to be obtained after due
enquiry. The reason of the suggestions is because improper ringing or felling affects the riparian owner
lower down, and he has quite enough difficulties to contend with which are beyond human control, to be
victimised by the ignorant act of his fellow-man higher up the stream. I could give an instance where a
man cut down River Oaks to make culverts; the River Oak timber is now perished, and if he had gone but
a few yards away he could have got almost imperishable ironbark. He has now to repair his culvert, but his
River Oaks are gone, his banks are falling away where he removed them, and a larger culvert is now required.
In the case of a casual labourer this would have been termed living from hand to mouth. In the present
instance it is miserable expediency and opportunism unworthy of thinking men. If the results of acts like
this would alone affect the doer, we could view the matter with complacency.

Natural Bank Protectors †—Let us observe the interlacing and ramification of the roots of trees in
good soil (such as these flats and river banks). It is very extensive, and their mechanical action in

---

RIVER OAK, 16 FEET IN CIRCUMFERENCE, GUY FAWKES RIVER, N.S.W.
RIVER OAK, *Casuarina Cunninghamiana*. MIQ.: WOLLONDILLY RIVER.
THE RIVER OAK.
(Casuarina Cunninghamiana, Miq.)
arresting washaways is obvious. One can see evidence that the banks of the Upper Hunter streams were much more lined with trees than at present. In many parts of the Hunter and its tributaries one sees large River Oaks (many of them past their prime) leaving no descendants to continue their work of bank preservation. The young seedlings are palatable to stock, and hence they are eaten out if they have free access to them. This points to the necessary precaution that stock should not have unfettered access to the bed of a stream, as if it were a public highway. The seedling oaks should be carefully conserved until they are out of reach of stock. Great numbers of River Oaks have been cut down this year for fodder alone.

One lays special stress on the value of the River Oak for purposes of bank protection, for the reason that it has been for ages the natural bank protector of these streams, and has become largely adapted to its environment. At the same time the acquisition of these lands by the white man, and his method of dealing with the banks and adjacent country, constitutes a marked change in the conditions, and it may be that other trees are even better than the River Oak for purposes of bank conservation. River Oaks have not a large tap-root; they have rather flat, spreading roots, which penetrate the rich soil and silt on the bed of gravel already alluded to. When this gravel becomes bared, as it does in so many places, the River oak heels over and falls into the stream just as a boulder does.

EXPLANATION OF PLATE 59.

N.B.—What has been figured is the most widely-diffused form of the species. A note on the type form is given at p. 118.

a. Branch bearing pistilliferous flowers.
b. Pistilliferous flower, enlarged.
c. Branch bearing fruits (cones).
d. Young cone.
e. Ripe cones.
f. Winged nut, containing seed.
g. Branch bearing staminiferous flowers.
h. Staminiferous flowers.
i. Part of the same, opened out.
j. A single staminiferous flower, consisting of a single stamen between two floral bracts.
k. Part of branch showing portions of two joints.
l. Whorled bracts, representing leaves, opened out.

There are two photographs of River Oaks, one by Mr. R. H. Cambage, showing them fringing the Wollondilly River at Barragorang, with Triassic and Permocarboniferous cliffs (Blue Mountains) in background. The other, by Kerry & Co., Sydney, was taken on the Guy Fawkes River, New England, N.S.W.
No. 63.

*Atalaya hemiglauc+a*, F.v.M.

The Western Whitewood.

(Natural Order **Sapindaceae**.)

**Botanical description.**—Genus *Atalaya*, Blume.

*Flowers.*—Regular, polygamous.

*Sepals.*—5, much imbricate in the bud.

*Petals.*—5, exceeding the sepals, with an inner scale or tuft of hairs.

*Disk.*—Annular.

*Stamens.*—8, inserted inside the disc.

*Ovary.*—3-celled, with 1 ovule in each cell.

*Style.*—Short, undivided.

*Fruit.*—Separating into 3 distinct carpels or samara, 1-celled, 1-seeded, and indehiscent at the base, terminating in a long wing.

*Seeds.*—Without any arillus, testa coriaceous; cotyledons thick, unequal.

Trees or shrubs.

*Leaves.*—Pinnate, or rarely simple.

*Flowers.*—Usually larger than in *Cupania* and *Ratonia*, in axillary or terminal panicles.


A tall shrub or small tree, quite glabrous except the flowers, and more or less glaucous.

*Leaves.*—Usually pinnate; leaflets few, from narrow oblong to linear, obtuse or scarcely acute, from 2 to 3 or 7 or 8 in. long, often somewhat falcate, narrowed at the base but rarely petiolute, rigidly coriaceous, with numerous pinnate and reticulate veins and a somewhat thickened margin, the common petiole terete or nearly so; sometimes, however, the petiole becomes winged, or the leaves are quite simple, oblong, or linear, or the leaflets are decurrent on the petiole, forming a large 2- or 3-lobed leaf, or rarely the simple leaf is ovate lanceolate, and 8 to 10 inches long.

*Panicles.*—Rather dense, the rhachis and branches glabrous, or nearly so; pedicels 1 to 2 lines long.

*Sepals.*—Orbicular, nearly glabrous, 1½ or the inner ones nearly 2 lines long.

*Petals.*—Pubescent, oblong, 3 to 4 lines long, with a hirsute scale at the base.

*Filaments.*—Pubescent.

*Ovary.*—Densely silky-pubescent.

*Samara.*—Pubescent, with minute appressed hairs, 1 to 1½ inches long, including the wing, which is nearly as broad as long, the cavity hairy or nearly glabrous inside.—(B Fl. i, 463.)
WHITEWOOD, *Atalaya hemiglauca* F.v.M.
Vernacular Names.—"Whitewood" and "Cattle-bush" are names of obvious meaning. As we have more than one "Whitewood" in this State, I propose to attempt to define it in some way by adding the prefix "Western."

Aboriginal Name.—Mr. F. M. Bailey quotes Mr. Wedd as giving the name "Boorbal," current in the neighbourhood of St. George, Queensland.

Synonym.—Thouinia hemiglauca, F. Muell., Fragm. i, 98, the name under which this tree was first described.

Leaves.—The leaves of this tree are eaten by both cattle and sheep, the tree frequently being felled for their use during seasons of drought.

Mr. F. B. Guthrie in *Agricultural Gazette*, October, 1899, has furnished the following analyses to illustrate their food value:

<table>
<thead>
<tr>
<th></th>
<th>Water</th>
<th>Ash</th>
<th>Fibre</th>
<th>Ether Extract (oil, &amp;c.)</th>
<th>Albumenoids</th>
<th>Carbohydrates</th>
<th>Nutrient value</th>
<th>Albumenoid ratio</th>
<th>Tannin (Oak bark)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>Whitewood</td>
<td>35·87</td>
<td>19·50</td>
<td>1·19</td>
<td>14·62</td>
<td>22·55</td>
<td>39·4</td>
<td>1 : 2</td>
<td>1·3</td>
</tr>
<tr>
<td>21.</td>
<td>Whitewood</td>
<td>37·55</td>
<td>6·46</td>
<td>22·05</td>
<td>1·73</td>
<td>11·63</td>
<td>20·58</td>
<td>36</td>
<td>1 : 2</td>
</tr>
</tbody>
</table>

Bark.—It is scaly and friable.

Timber.—A white or pale yellow, fairly close-grained, somewhat fissile timber. It is soft, and decays easily. It is but of little economic importance.

Exudation.—It exudes a useful pale-coloured gum.

I reported* as follows on a specimen:

Most of this gum is quite colourless, and adherent to pieces of the wood of the tree, which belongs to the natural order Sapindacese. A very small quantity only was received. It is readily soluble in cold water, from which solution alcohol throws down a white precipitate readily soluble in water but insoluble in alcohol, and resembling arabin in its properties. It is pure gum, and appears to differ little from the purest gum arabic. A portion of the gum is also attached to a covering of the exterior of the bore of a wood moth (probably a species of Cryptophasa) made of silken web, with castings and débris attached. This gum would be a valuable article of commerce if obtainable in quantity.

I have seen gum exuded from *Nephelium sp.* (Northern Rivers), also from *Cupania semiglauca*, F.v.M., and *Cupania pseudorrhus*, A. Rich., the product being a hard, clear, yellowish, soluble gum in each case.

A twig in the National Herbarium, in Leichhardt's handwriting, bears the words, "Head of the Gulf (of Carpentaria—J.H.M.) Eatable gum."

Size.—This is a small or medium-sized tree, of perhaps up to 30 or 40 feet in height, and with a trunk diameter of 8–12 inches.

* "Report Horn Expedition to Central Australia," p. 196
Habitat.—The following localities are given in the *Flora Australiensis*:

**North Australia.**

N.W. Coast (Bynoe); Hammersley Range, Nichol Bay (F. Gregory); Albert River (Henne).

**Queensland.**

E. Coast (R. Brown); Oxley's Station (Leichhardt); Rockhampton (Thozet); Brisbane River (A. Cunningham, Fraser); Mooni River (Mitchell).

**New South Wales.**

Liverpool Plains (A. Cunningham); Bowen and Castlereagh Rivers (F. Mueller); desert of the Darling, and thence to Stokes Range and Cooper's Creek (Victorian Expedition and others).

It is a western New South Wales species belonging to the far West. In the National Herbarium I have no specimens from the Western line nearer than Coolabah, 80 miles on the Sydney side of Bourke. It is not uncommon about Narrabri, on the North-western line. About Bourke and Brewarrina, and further West, it is by no means rare.

Some of the localities in the *Flora Australiensis*, under “N. Australia,” really come within the political boundaries of W. Australia. In *Fragm.* i., 98, Mueller first described it as “A monte Murchison usque ad regiones orientales tropicas.” I have it from Wyndham, in North-west Australia, and, generally speaking, it is a denizen of the arid portions of all the States except Victoria (and, of course, Tasmania).

**Propagation.**—From seed; this is a useful tree, and is one thoroughly acclimatised to the droughty conditions of the West. It is one, therefore, that should be conserved wherever possible, and should be resown wherever the expenditure will admit of it. I feel strongly that in any measure of “reafforestation” (and our efforts in the West must be on a modest scale) preference should be given to such of our native shrubs and trees as are both useful and drought-resisting.

**EXPLANATION OF PLATE 60.**

a. Flowering branch.

b. Bud.

c. Expanded flower.

d. Part of flower, showing (a) disc, (b) stamen, (c) ovary, (d) stigma.

e. Transverse section of ovary.

f. Stamen.

g. Petal, front view, with (a) scales or tufts of hair at base of petal.

h. Petal, back view.

i. Irregular calyx.

j. Winged seeds (Samaras).

k. Leaves showing variation in this species.

The photo facing page 122 was taken at Barringun, North-western N.S.W. (Kerry & Co., Sydney.)
THE WESTERN WHITWOOD.

(Atalaya hemiglauc, F.v.M.)
Volume II.

PART XI (ISSUED SEPTEMBER, 1904).

No. 39.—The Forest Red Gum (*Eucalyptus tereticornis*, Sm.).
No. 40.—The Black Apple (*Sideroxylon australe*, Benth. et Hook. f.).
No. 41.—The Smooth-barked Apple (*Angophora lanceolata*, Cav.).
No. 42.—*Scolopia Brownii*, F.v.M.

PART XII (ISSUED NOVEMBER, 1904).

No. 43.—The Bloodwood (*Eucalyptus corymbosa*, Sm.).

The Cypress Pines of New South Wales (*Genus Callitris*):

No. 44.—*Callitris Macleayana*, F.v.M.
No. 45.—*Callitris verrucosa*, R.Br.
No. 46.—*Callitris robusta*, R.Br.
No. 47.—*Callitris columellaris*, F.v.M.
No. 48.—*Callitris Muelleri*, Benth. et Hook. f.
No. 49.—*Callitris propinqua*, R. Br.
No. 50.—*Callitris calcarata*, R.Br.
No. 51.—*Callitris cupressiformis*, Vent.

PART XIII (ISSUED NOVEMBER, 1904).

No. 52.—The Mugga; a Red Ironbark (*Eucalyptus sideroxylon*, A. Cunn.).
No. 53.—The Native Elm (*Aphananthe philippinensis*, Planch.).
No. 54.—The Belah (*Casuarina lepidophloia*, F.v.M.).
No. 55.—The Western Rosewood (*Heterodendron oleofolium*, Desf.).

PART XIV (ISSUED FEBRUARY, 1905).

No. 56.—The Gruie or Colaine (*Owenia acidula*, F.v.M.).
No. 57.—The Black Sally (*Eucalyptus stellulata*, Sieb.).
No. 58.—The Swamp Oak (*Casuarina glanca*, Sieb.).
No. 59.—A Deciduous Fig (*Ficus Henneana*, Miquel.).

(N.B.—The numbers of Part XIV are given erroneously in the text).
THE FOREST FLORA

OF

New South Wales.

J. H. MAIDEN.

VOL. II. PART 6.

Published by Authority of the

GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

PART XVI OF THE COMPLETE WORK.
INDEX OF TREES DESCRIBED.

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No. 2.—The Rusty Fig (Ficus rubiginosa, Desf.).
No. 3.—The Turpentine Tree (Syncarpia laurifolia, Ten.).
No. 4.—The Narrow-leaved Pittosporum (Pittosporum phillyraeoides, DC.).

PART II (ISSUED MARCH, 1903).
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No. 6.—The Red Ash (Alphitonia excelsa, Reissek.).
No. 7.—The New South Wales Sassafras (Doryphora sassafras, Endl.).
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No. 38.—The Queensland Nut (Macadamia ternifolia, F.v.M.).
The FOREST FLORA
OF
NEW SOUTH WALES.

J. H. MAIDEN,

Government Botanist of New South Wales and Director of the Botanic Gardens, Sydney.

PART XVI.

Published by the Forest Department of New South Wales, under authority of The Honourable the Secretary for Lands.

Published by Authority of
THE GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

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WILLIAM APPLEGATE GULICK, GOVERNMENT PRINTER.

1905.

PRICE, 1/- per Part, or 10/- per dozen Parts, payable in advance.
MAR 26 1912
Gray Herbarium
Harvard University
No. 64.

**Acacia pendula**, A. Cunn.

The Weeping Myall.

(Natural Order LEGUMINOSÆ : MIMOSEÆ.)

Botanical description.—Genus, *Acacia*.  (See Part XV, p. 103.)


A handsome tree, the foliage pale or ash-coloured, with a minute pubescence; branchlets usually pendulous, slightly angular, soon terete.

*Phyllodia.*—Linear-lanceolate, falcate, acuminate, narrowed towards the base, 2 to 3 in. long, rigidly coriaceous, very finely striate, with numerous parallel nerves, only to be seen under a lens.

*Peduncles.*—Usually clustered on a very short common peduncle, rarely above 2 lines long, bearing each a small globular head of about 12 to 20 flowers, mostly 5-merous, much smaller than in *A. homalophylla*.

*Calyx.*—Turbinated and lobed, but readily separating into distinct sepals.

*Petals.*—Smooth.

*Pod.*—Linear, but very flat, and fully 5 lines broad, thinly coriaceous, transversely reticulate, the sutures bordered by a very narrow wing.

*Seeds.*—Nearly orbicular; funicle thickened into a narrow clavate aril, and scarcely folded below it.*

Bentham adds, "Without the fruit the specimens are very difficult to distinguish from those of *A. homalophylla*. In both species, but especially in this one, 3 of the nerves of the phyllodia are sometimes slightly prominent." (B.Fl. ii, 383.)

It will be interesting to quote the original description from G. Don:—

*A. pendula* (Cunningh. MSS. Loud. Hort. Brit., 490) aspect greyish; phyllodia linear-lanceolate, rather arcuate, attenuated at both ends, ending in a somewhat hooked mucrone, having one gland in front at the base, and 2-3 longitudinal nerves; heads of flowers racemose; branches slender, pendulous. Native of New South Wales. Phyllodia—3 inches long, and 3 lines broad. Habit. of *Salix Babylonica* or *Weeping-willow*.

_Drooping-branched Acacia._  Fl. April, Clt. 1824.  Shrub 6 to 10 feet.

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*Bentham adds the words "but not seen perfect." I have seen perfect seeds and these four words may be eliminated.*
I find an even earlier reference (unpublished, however) in Allan Cunningham’s MS. Journal made when he was on Oxley’s Expedition. His words are as follows:

4/5/17.—*Acacia pendula*, nova sp. A tree 25 feet high, much the habit of growth of *Salix Babylonica*, leaves simple lanceolate; the whole tree has a gray hue, common on the low flats (W. of Bathurst).

25/5/17. It may be worthy of observation that among other signs of humidity this Acacia is one, hence, whenever we observed this gray tree, we might on all occasions rest assured that water was, or had been, in existence near it.

At these dates Cunningham would be in the Forbes, Condobolin, Wyalong country. In Oxley’s Journal* at p. 19, under date May 5, this “new species of Acacia” is referred to “which received the specific name of *pendula*, from its resembling in habit the Weeping Willow.” Mr. R. H. Cambage suggests that the Weeping Myall was first seen on the plains near Jemalong, between Forbes and Condobolin.

Baron von Mueller named for me an Acacia growing in the Hay district, and known as “Yarran.” He pronounced this particular “Yarran” to be *A. pendula*, var. *glabrata*. The timber possesses many of the qualities attributed to the typical *A. pendula*. Further twigs with pods (accompanied by flowers) would be very acceptable in order that the possibility of confusion of this tree with ordinary Yarran (*A. homalophylla*, A. Cunn.) may be removed. Diameter, 6 to 12 in.; height, 20 to 30 feet.

**Botanical Name.**—*Acacia*, already explained, see p. 104, part XV; *pendula*, Latin, owing to its drooping branches, after the manner of the Weeping Willow, as explained by Cunningham himself.

**Vernacular Name.**—The most common name is “Myall” or “Weeping Myall.” In the Riverina it is often called “Boree” (a name it shares with at least one other Acacia). From Grenfell I have received twigs labelled “Myall” and “Boree” respectively. My correspondent wrote, “The more slender twig is Myall, and the more clustered one is Boree.” At the same time I could not make out any differences between the Myall and Boree sent. I hope correspondents who live in districts where the names are both in use will clear the matter up. The name Myall seems to be commonest employed nearly due west and Boree in the Riverina.

**Aboriginal Name.**—The name “Balaar” has been given to me as an aboriginal one for this tree, in use in the north-west. I would like to know more about this name, which too much resembles Belah (*Casuarina lepidophloia*) to be convenient.

* *Journal of two Expeditions into the Interior of New South Wales, undertaken by order of the British Government in the years 1817-18,* by John Oxley. (1820.)
"Boree" is a native name in the Hay District according to the late K. H. Bennett. It bears this name also in the Balranald, Wagga Wagga, Barmedman, and Grenfell districts.

**Leaves** (Phyllodia).—That this is a useful fodder tree is unquestionable, but there are differences of opinion as to its precise value.

Stock, especially sheep, are very fond of the leaves of this tree, especially in seasons of drought, and for this reason, and because they eat down the seedlings, it has almost become exterminated in many parts. Horses do not like it.

Mr. R. W. Peacock writes of it:—"Myall is rapidly becoming exterminated through overstocking. Although of the same genus as the 'Mulga' is not nearly such a good fodder plant, sheep not being particularly fond of it. Its silvery foliage and pendulous habit give it rather an attractive appearance."

Mr. F. B. Guthrie in *Agricultural Gazette*, October, 1899, gives the following analysis of the leaves:

| Water | Ash | Fibre | Ether Extract (oil, &c.) | Albu- | Carbo- | Nutrient | Albu- | Tannin |
|-------|-----|-------|--------------------------|menoids|hydrates|value|menoid| (Oak bark) |
| No. 33 | 48-45 | 4-45 | 19-64 | 1-21 | 9-62 | 16 63 | 29 | 1 : 2 | 0-5 |

**Fruit.**—The legumes or pods are unusually flat, and the seeds are flattish.

**Timber.**—Wood hard, close-grained, of a rich dark colour, and beautifully marked. It was used by the aborigines for boomerangs. It is heavy, and rarely exceeds a foot in diameter, and yet has been used for veneers. So long as it remains unpolished it preserves its peculiar fragrance of violets, which does not occur in greater perfection in any other tree. As soon as this remarkable property became known to European manufacturers the wood came into request for making glove, handkerchief, and other fancy boxes, and especially for tobacco-pipes. Other Acacia woods are often artificially scented to imitate the true Myall, but the perfume of the wood thus prepared is fugacious.

In the *Sydney Morning Herald* of the 16th March, 1894, appeared an announcement that the Aberdeen line steamer "Damascus" took "a lot of Myall for the British Admiralty, that wood having been selected as best suited to the requirements of the Ordnance Department as material for the manufacture of spokes for gun carriages." I never heard whether the timber was considered suitable for that purpose. It is one of the best fuel woods in the districts in which it occurs.
We have a number of intensely hard, heavy, dark-coloured woods, which smell more or less of violets. They are used chiefly for turnery work. The trees attain no great size (say 30 feet), with a trunk-diameter of 12 to 18 inches. They are mostly found in the drier parts of the State, and are plentiful. Considerable railway freights add to their cost, but not to a prohibitive extent, as these timbers are usually used for small articles, such as mallets (presentation and otherwise), turned cups and boxes, rulers, draughtsmen, chessmen, and the better class of turned work generally.

The Myall is the most important, as has already been stated, but the Brigalow (*Acacia harpophylla*), Yarran (*Acacia homalophylla*), are also valuable timbers of the above class. There are others, and the quantity available will satisfy any demand ever likely to be made upon them.
THE WEEPING MYALL.

*(Acacia pendula, A. Cunn.)*
Exudations.—The exudation of gum in this species is rare.

Size.—Up to 20 or 30 feet, with a diameter of, say, a foot.

Habitat.—This tree appears to be confined to the drier parts of New South Wales and Queensland. It has been found across the Darling, and I should not be surprised to hear of its occurrence in South Australia. In our own State some of its most eastern localities are Willow Tree, near Mudgee, and Narrabri. Records of its occurrence as far east as possible would be valuable.

As a rule it is a sign of good land. It grows on the heavier soils of the west, as Oxley long ago pointed out. In the following passage he is referring to our tree:

The Acacia brushes grow generally on a hard and clayey soil evidently frequently covered with water, and I consider that these plains or brushes are swamps or morasses in wet weather, since they must receive all the water from the low ranges with which they are generally circumscribed.*

Propagation.—In some seasons it produces large quantities of pods, and the germination of the seed is attended with no particular difficulty. In view of the value of this tree for stock-fodder, and of the fact that it is gradually becoming scarce, it would appear to be a public duty for pastoralists and others to fence in at least a few trees, so as to enable them to mature their pods and propagate their kind. If this be not done the tree may eventually be in danger of becoming extinct, as the seedlings are readily eaten out by stock, and no young trees are, therefore, in many districts, coming forward to replace the old ones. The Mistletoe pest is also destroying it.

EXPLANATION OF PLATE 61.

A. Flowering branch.
B. Bud.
C. Flower.
D. Portion of expanded flower showing—
   (a) Calyx.
   (b) Petal.
   (c) Stamens.
   (d) Pistil.
   (e) Stigma.
E. Sepal.
F. Petal.
G. Stamens.
H. Pistil.
K. Pods.
L. Seed (enlarged).

The flowers from Coolabah, N.S.W. The fruits from Miss Officer, Zara, via Hay.

The photo. of the tree is from Gilgandra (R. H. Cambage). The dark masses of foliage are those of a mistletoe (Loranthus pendulus, Sieb.) which infests it, and is destroying it. The tree is rather an old one, and it is often more densely foliaged. See page 128.

* Oxley, op. cit. p. 44.
The “Nealie,” “Nelia,” or “Nilyah.” What is it?

In September, 1886, I received from the late K. H. Bennett, of Ivanhoe, via Hay, some bark, with the following label:—“No. 5, Nealie, Acacia sp.” He gave the following information:—

Small tree, 12 to 15 feet in height, timber exceedingly hard and tough, and possessed of a very agreeable perfume, used by natives in manufacture of weapons, &c. Stock will not eat the leaves, even when in a starving condition. Very plentiful in some localities.

In 1887 the late Baron von Mueller received from Mrs. Holding, of “the Upper Darling River,” specimens, with the following particulars:—“Nelia of the aborigines. Wood of Myall odour; boughs erect; dry ground.”

In 1902, Acting Forester T. Miller, of Wilcannia, in official correspondence (117/02) referred to a wattle as Nelia.

In April, 1904, I received (through Mr. It. H. Cambage) from Mr. J. E. Carne, Assistant Government Geologist, some twigs labelled “Nilyah. Obtained from 14 miles south-west of White Cliffs. Said to be bushy, and inclined to follow damp courses.”

Usually only bare leaves (phyllodes) have been sent, and, on one occasion, I received a few dead flowers. I have not failed to importune my correspondents, but, from various circumstances, they have been unable to send me twigs in flower and also pods of the Nelia. Will anyone help?

The leaves are, as a rule, silvery white, like those of the Myall, but they are usually more erect and more rigid than those of the latter. Different botanists have labelled the plant Acacia pendula (which is of course the Weeping Myall) and Acacia homalophylla (the Yarran). But it is mere guess-work to name the Nelia in the absence of good flowers, and perhaps of pods also.

A few twigs with flowers or pods, or both, wrapped in a piece of newspaper will come safely to me for a penny or two, and, if correspondents would give an idea of the districts in which the tree is found, they would increase my indebtedness to them.
No. 65.

_Eucalyptus amygdalina_, Labill.

A Peppermint.

(Natural Order MYRTOIDEA.)

Botanical description.—Genus, _Eucalyptus_. (See Part II, p. 33.)


The following description is based upon Bentham (B.Fl. iii, 202), but by no means literally follows the classical work referred to:

A tree, usually small or moderate-sized, but sometimes attaining a considerable height, the bark fibrous and persistent, not so fibrous as that of a “Stringybark,” and of a looser texture than that of a “Box”; of the character usually known in Australia as “Peppermint,” since it was originally observed on trees at Port Jackson whose foliage emitted a peppermint odour when crushed. The fibrous bark occurs only on the trunk, or at most on the largest branches; the branches are usually quite smooth.

**Juvenile foliage.**—Opposite, narrow-lanceolate. Probably all forms have the twigs more or less rusty glandular. Sometimes they are in threes. The under-side is often purple.

**Mature foliage.**—From linear to broadly lanceolate, straight or falcate, mostly acuminate, and 2 to 4 inches long; when narrow, often rather thin; when broad, thicker; the veins few and oblique, but often inconspicuous, the intramarginal one at a distance from the edge, or rarely near to it. This species varies in the size, shape, and texture of the leaves. The usual shape in New South Wales is lanceolate, or even broadly lanceolate, but the typical form is linear-lanceolate or even nearly linear, comparatively thick, and the veins very oblique at the base, not prominent. Sometimes the foliage is quite dense; in other cases it is sparse.

**Buds.**—Clavate, often glandular and rough.

**Calyx-tube.**—Turbinate, about 2 lines in diameter, tapering into a pedicel often as long as itself.

**Operculum.**—Hemispherical, shorter than the calyx-tube, very obtuse or slightly umbonate.

**Peduncles.**—Axillary or lateral, terete or nearly so, with 4 to 8 and even more flowers.

**Flowers.**—Stamens under 2 lines long, inflected in the bud, all perfect; anthers small, with diverging more or less confluent cells. Ovary, flat-topped.

**Fruit.**—Subglobose-truncate, usually under 3 lines in diameter, but larger in some varieties, slightly contracted at the orifice, the rim flat or slightly concave and rather broad, the capsule not at all or only slightly sunk, the valves flat or slightly protruding.

Following is a general description of them as far as New South Wales is concerned:

They are of a pilular shape, though with some tendency to pear-shape. They are wide at the mouth and almost hemispherical; the rim thin and also thickish and well defined. As compared with New South Wales forms, the Tasmanian specimens have often more domed fruits, and the rim thicker and more conspicuous.

Bentham’s “sub-globose truncate” applies to some of the forms.

The tips of the valves are sometimes slightly exerted.
Botanical Name.—*Eucalyptus*, already explained; see Part II, p. 34; *amygdalina*, Latin, almond-like, in reference to the appearance of the foliage. The name, however, is not specially appropriate in regard to most trees belonging to the species.

Vernacular Names.—Its commonest name is “Peppermint,” owing to the delicious and very obvious odour of its leaves. Sometimes it goes under the name of “Messmate.” Originally the name “Messmate” was given to a tree (*E. obliqua*), which “messmated” or was akin to the true Stringybarks, but the term is in Australia now usually applied to trees such as *E. amygdalina*, which have a softish sub-fibrous bark, easily recognised by observers in the field, and much less stringy than that of the Stringybarks. At Wilson’s Downfall it is known as “Willow,” because of its pendulous habit.

Aboriginal Names.—I know no aboriginal name which can be applied with certainty to the true *E. amygdalina*.

Synonyms.—For a list of synonyms and a mass of botanical information concerning this species, see my “Critical Revision of the genus Eucalyptus,” Part VI, 1905. (Government Printer, Sydney, price 2s. 6d., 4to., with 4 plates.)

Leaves.—The following particulars in regard to the oil of this species and of an allied form are quoted from Messrs. Baker and Smith’s “Research on the Eucalypts”:

<table>
<thead>
<tr>
<th>Species</th>
<th>Whence collected for Oil</th>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation [α] D.</th>
<th>Saponification Numbers</th>
<th>Solubility in Alcohol</th>
<th>Constituents found</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>amygdalina</em></td>
<td>Moss Vale and Monga, N.S.W.</td>
<td>0.9012 to 0.905</td>
<td>-11.37° to -13.53°</td>
<td>3.76</td>
<td>1 1/2 vols. 70% to 2 vols. 70%</td>
<td>Eucalyptol, pinene, phellandrene, peppermint ketone, eudesmol, methyl, ethyl, isobutyl, and amyl alcohols.</td>
</tr>
<tr>
<td><em>vitrea</em></td>
<td>Crookwell, N.S.W.</td>
<td>0.886</td>
<td>-33.92°</td>
<td>5.4</td>
<td>1 vol. 80%...</td>
<td>Phellandrene, eucalyptol, peppermint ketone.</td>
</tr>
</tbody>
</table>

* The notes in this column are mine.

*E. vitrea* is a “White Top” or “Messmate” described by R. T. Baker, and in my “Critical Revision of the genus Eucalyptus,” Part VI, I have proved that it and *E. vitellina*, Naudin, are both hybrids of *E. amygdalina* and of *E. coriacea*, which was figured and described in Part XV of the Forest Flora.

A beautiful and health-promoting tree.—It is this tree more than any other which, on the higher parts of the Blue Mountains and on the high table-lands south
and north, makes the air at times redolent of Eucalyptus oil. It is one of the oils with pleasing odour, of a peppermint character, and appears to be emitted most during the prevalence of light rains or mist. During hot weather or spells of drought this delicious aroma is far less exhaled, or, if emitted, it at once ascends, and is not evident to the olfactory organs of man.

A commonly-held opinion is that the function of the emission of Eucalyptus oil vapour from the leaves of trees is to envelop the tree with a medium which checks the transpiration of water from them. But this explanation, based on an observation of Tyndall, may not be true, or not of general application, in view of the fact above stated, the result of observations extending over many years, that a moist state of the atmosphere induces the emission of Eucalyptus oil in *E. amygdalina*.

To me this aroma is delicious, and directly one observes it one is tempted to expand one’s lungs and drink it in. I can only compare it to the delicious odour of the Pine forests of Europe. Residence in the vicinity of Pine forests, it is well known, alleviates certain distressing symptoms in throat and lung diseases, and in the early stages of consumption may assist to bring about a permanent cure. Let Pine-trees be planted in Australia for health and other reasons, by all means, but I think the tree I am now describing will be found even more useful to Australian conditions. It is very readily propagated, and although it is naturally only indigenous in the colder parts of New South Wales, I do not doubt that it can be readily acclimatised in many other parts.

If I were to be asked my favourite Eucalyptus tree, I think I should probably name *E. amygdalina*. When allowed fair-play it is a beautiful species, with dense masses of pendulous foliage, and shapely withal. So many of our Eucalypts rapidly grow into forest trees, that it is a pleasure to know a tree of medium size which affords excellent shade. It can be readily controlled by judicious pruning, and the delicious and exhilarating odour its leaves naturally emit, and which is much intensified if they be crushed in the hand, has been dilated upon.

**Timber.**—Pale-coloured (nearly white) when newly cut, but drying to a pale brown. Often liable to gum-veins, which tend to form thin concentric rings. Of inferior durability and strength as a very general rule, but some apparently well authenticated instances of the comparative durability of this timber for posts and shingles, and other purposes, have come under my notice.

While New South Wales timber of this species is looked upon as very inferior, as regards durability and general quality, in Tasmania it is looked upon as much more valuable, as the following reports show; this is not the first occasion on which I have pointed out that New South Wales and Tasmanian reports vary as regards the same species.

Dr. Crowther, of Tasmania, showed at the New Zealand Exhibition of 1865 portions of stumps which had been felled thirty-two years (the stumps remaining
in the ground), and except on the surface, they were as sound as if they had been freshly felled. A charred fence-post of the same wood, which had stood in Burnt Island for thirty-eight years, was in the same condition.

*Peppermint.*—This is a very durable wood when placed in the ground, and is of great value for piles in bridges, &c., but it neither grows tall, large, nor plentifully. It makes splendid house-shingles.—(John Bradley.)

**Exudation.**—It exudes a ruby-coloured kino, soluble in water and alcohol, which is a useful astringent often employed by bushmen.

**Size.**—It is not one of our largest trees. It is usually a tree of medium size, say, up to 50 or 60 feet, with a stem-diameter of 2 feet. Exceptional trees attain far larger dimensions.

**Habitat.**—Tasmania is the home of the type, but the species is very abundant in Victoria and New South Wales, occurring in the colder districts of the last-named States. It is also sparingly found in south-eastern South Australia.

**NEW SOUTH WALES.**

In this State it extends from the Victorian to the Queensland border (Tenterfield and Wilson's Downfall), and I have no doubt that it will be found in Queensland, probably in the Stanthorpe district. Westerly it extends to near Orange. As a rule it is found in the colder and more mountainous parts of the State.

**Southern Localities.**—It occurs from the Victorian border to as far north as Hill Top, near Mittagong.

**Western Localities.**—Lawson to Mount Victoria, and the higher parts of the Blue Mountains generally. The most westerly locality known to me is Mullion Creek, Orange (R. H. Cambage).

**Northern Localities.**—Messmate.—Very abundant. Coming from the Bellinger River, first seen about Tyringham, and then at least as far as Woolloomombi. Found on the very summit of the Round Mountain. At Bald Hills Station, Mr. Walter Beauchamp showed me posts of this timber which had been down from ten to fifteen years, and which were still sound. This timber lasts even longer in damp ground. This is worthy of note, as *E. amygdalina* is not usually considered durable for the purpose stated.—(J.H.M., *Agricultural Gazette, N.S.W.*, 1894, p. 611.)

Yarrowitch to Tia, New England (J.H.M.). Moona Plains, Walcha; valves slightly exsert (A. R. Crawford). The northern specimens, as a rule, are closer to Sieber’s *E. radiata* than to typical *E. amygdalina*.

**Propagation.**—From seed. No species produces it more abundantly and none grows on poorer ground.

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**EXPLANATION OF PLATE 62.**

A. Juvenile foliage, showing glandular character.
B. Flowering branch, showing pendulous habit.
C. Fruits.

(All from Wentworth Falls, New South Wales.)
A PEPPERMINT.
(Eucalyptus amygdalina, Labill.)
Casuarina torulosa, Ait.

The Forest Oak.

(Natural Order CASUARINACEÆ.)

Botanical description.—Genus, Casuarina. (See p. 74, Part XIII.)


A small tree, dioecious or sometimes monocious, with more slender branchlets than any other species, except some forms of C. suberosa; the ribs scarcely prominent.

Whorls.—4-merous or very rarely (only in cultivated specimens?) the parts increasing to 5, the sheath-teeth very short.

Male spikes.—Very slender, ½ to 1 in. long, terminating deciduous branchlets, compact, although the short sheaths scarcely overlap.

Cones.—Nearly globular but flat-topped, about ½ in. diameter, the valves very woody, broad, slightly protruding, villous on the back, the dorsal protuberance divided into numerous small nearly equal tubercles.—Miq. in DC. Prod. xvi, ii, 341, but not of his Rev. Cas. (B.Fl., vi, 260).

Botanical Name.—Casuarina, already explained, Part XIII, p. 79; torulosa, Latin, torulus (diminutive of torus), a little rope or cord; in Botany = moniliform (Greek-monile, a necklace), applied to a cylindrical body when it is swollen at regular intervals. In reference to the branchlets, which have a more or less torulose appearance, particularly on drying.

Vernacular Names.—Called “Cork bark’d Casuarina” in the original description. Its usual name is “Forest Oak,” though this is not specially appropriate, since C. suberosa equally deserves such a name. Nevertheless it will be a convenience to adhere to “Forest Oak” for C. torulosa. Mr. District Forester Stopford states that it is known as “Forest or Bull Oak” in New England. We have another Casuarina to which the name “Bull Oak” is commonly applied. I have heard it called “Mountain Oak,” but this is not entirely appropriate. It is sometimes called “Beef-wood,” because of the rich dark colour of the timber. In Queensland it is sometimes known as “Red Oak.”
Aboriginal Names.—The “Noo-loi” of the aborigines of Northern New South Wales according to Mr. C. Moore, and the “Koondeeba” of those of Southern Queensland. “Bureutha” of some Central Queensland aborigines.

Mr. F. M. Bailey quotes Mr. Petrie, who gives “Boorooada” of the Brisbane aborigines; perhaps the same word as the preceding; Mr. Keys, as “Porotha” at Bundaberg, still perhaps the same word. Mr. Shirley quotes the name “Gournah” in use at Taromeo.

All the above, except the first, are Queensland names.

Synonym.—*C. tenuissima*, Sieb., in allusion to its very slender branchlets.

Bark.—The bark of this tree is very deeply furrowed.

Timber.—Much used for fuel. The wood is close, and prettily marked, yielding handsome venceers. It has a rich red colour, and the medullary rays are very large. This handsome wood has a marking peculiarly its own. The line of demarcation of the heart-wood is well-defined. It is used for cabinet-work, and produces very superior shingles. It is used for gun-stocks at Taree. It is one of the best woods for oven fuel. A slab in the Technological Museum, which had been seasoned over twenty-five years (having been exhibited at the London International Exhibition of 1862 as *C. tenuissima*), had a weight which corresponds to 64 lb. per cubic foot.

Mr. District Forester Rotton speaks of it:

Timber excellent for shingles; also used for bullock yokes and ladder rings. It is not suitable for handles, unless kept from the influence of the weather, as it is very liable to split when exposed to the influence of the sun. It has been found suitable for chair-legs, and is an excellent firewood. It generally grows on high good land.

Mr. District Forester Stopford, of Armidale, reports:

Known locally as Forest or Bull Oak, and is, I believe, *torulosa*. The timber, though not used in this district, should from its quality be classed as a commercial timber. It grows in this district to a height of about 30 feet, and a girth measurement of from 3 to 4 feet.

Fruits.—The fruits are unique. (See figure.)

Size.—Of medium size, say, 40 feet, with a diameter of 1–2 feet.

Habitat.—This species appears to be confined to New South Wales and Queensland. Bentham gives Port Lincoln, South Australia, on the authority of a specimen collected by Robert Brown, but I think the reference wants verifying. I doubt that it occurs in South Australia at all. In New South Wales it extends from south of Sydney (I do not know the precise southern boundary, but I have received it from Mr. District Forester Rotton from Appin and Picton) to Central Queensland (I do not know the most northerly locality).

Westerly it is found near the Jenolan Caves; in the Liverpool Ranges, New England, &c. It grows in the most sterile, stony land.
FOREST OAK.

(Casuarina torulosa, Ait.)
Propagation.—From seed, which is abundantly produced.

One of the most beautiful species of the genus, remarkable for its fine, graceful, pendulous branchlets. It was introduced to cultivation in England by Sir Joseph Banks in 1772.

EXPLANATION OF PLATE 63.

a. Branch with pistilliferous flowers.
b. Pistilliferous flowers.
c. Branch with young cones.
d. Ripe cones.
e. Ripe cone, shedding the seed (winged nuts).
f. Winged nut, containing seed.
g. Branch with staminiferous flowers.
h. Staminiferous flowers.
i. Part of the same opened out (inside view).
j. A single staminiferous flower, consisting of a single stamen between two floral bracts.
k. Portion of branchlet, showing portions of two joints.
l. Whorled bracts, representing leaves, opened out.
No. 67.

*Siphonodon australe,* Benth.

The Ivory Wood.

(Natural Order CELASTRACEÆ.)


*Calyx.*—5-cleft.

*Petals.*—5, spreading.

*Disc.*—Not distinct from the base of the calyx.*

*Stamens.*—5, connivent round the pistil, the filaments flattened.

*Ovary.*—Half immersed in the disc or base of the calyx, conical,† the summit hollowed and stigmatic in the cavity round a central style-like column; cells numerous, in 2 to 4 series; ovules solitary in each cell, alternately ascending and pendulous.

*Drupe.*—Globular,‡ hard-fleshy, with numerous 1-seeded bony pyrenes superposed in rings of about 10 round the central axis.

*Testa.*—Of seed membranous; albumen almost horny; cotyledons large, flat; radicle short.

Glabrous trees.

*Leaves.*—Alternate, entire or crenate.

*Stipules.*—Minute, deciduous.

*Peduncles.*—Short, axillary, few flowered.

**Botanical description.**—Species, *S. australe,* Benth., B.Fl. i, 403 (1863).

A tree of 40 feet or more.

*Leaves.*—Obovate or broadly oblong, obtuse, 2 to 3 inches long, entire or slightly sinuate, coriaceous, drying of a pale colour so frequent in Celastraceae.

*Flowers.*—Few on axillary peduncles, usually short.

*Petals.*—Cuneate-orbicular, about 2½ lines long.

*Stamens.*—Short.

*Disc.*—Thin, the sides free from the calyx, with 5 prominent teeth between the stamens.

*Peduncles.*—Very short, bearing 1 or 2 fruits on pedicels of ¼ to ½ inch, as in *S. celastrinum,* Griff.

*Drupe.*—Globular to pear-shaped or oval,§ ½ to 1 inch diameter, the flesh hard and dry, with a stigmatic scar at the top, and the scar of the calyx at the base, as in *S. celastrinum.*

*Nuts.*—Numerous, appearing to have been arranged in 2 rows in each of 5 cells, irregularly ovoid, somewhat compressed, 3 to 4 lines long.||

*Testa.*—Of the seed brown; albumen not very thick; cotyledons broadly ovate. (B.Fl. i, 403, except as to flowers, where the description has been taken from Moore and Betcher's *Handbook of the Flora of New South Wales,* confirmed with fresh specimens).

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* Distinct in Australian species. † Flattened in Australian species, though sub-conical. ‡ Or pear-shaped.
§ Globular in *Flora Australis.*
|| Bentham has a note: "The ovary must probably be considered as 5-celled with many ovules in each cell, separated by spurious transverse dissepiments." The word "probably" may be eliminated.
The flowers are sparingly produced and very deciduous, and the same remarks apply to the fruits. For excellent specimens, supplied in a fresh state, without which the description could not have been completed, I am indebted to Mr. Forest Guard William Dunn, of Acacia Creek, Macpherson Range.

"It flowers right down on the wood, and it is extremely difficult to discover more than one flower on a twig, and as fast as one flower comes out it drops off—it falls to the ground."—(W. Dunn.)

**Botanical Name.**—*Siphonodon*, Greek, *siphon*, a tube, *odon*, a tooth, probably in reference to the prominent teeth of the very short tubular disc; *australe*, Latin, southern (Australian).

**Vernacular Names.**—"Ivory Wood" is a name given to the timber and tree. It is a white wood, but to compare it to ivory might create a wrong impression. (See "Timber.") It is also called "Native Guava," because of the size and appearance of its fruit.

**Aboriginal Names.**—"Currayelbum," of those of Northern New South Wales; "Umpurr," of those of Queensland.

**Leaves.**—Shining, and reminding one of the well-known shrub *Coprosma Baueri*. The underside of the leaf paler and duller than that of the upper.

**Flowers.**—Lemon-yellow and fleshy; the perfume sweet, not strong, and of a lemon character.

**Fruit.**—The fruit, when dead ripe, is of a bright yellow colour.

**Bark.**—Bright yellow, the same colour as the fruit; flaky in texture.

**Timber.**—Fissile, with a neat grain, and as white as deal. Thozet (speaking of Rockhampton, Q.) describes it as "of a uniform yellowish colour." It is undoubtedly a useful wood, though whether valuable for common purposes, such as box-making or for articles of superior workmanship, such as "Tunbridge ware," we require more data than we at present possess. It is certainly worthy of further examination.

**Size.**—Of medium size. Perhaps 50 feet, with a stem-diameter of a foot, is a fair size.

It is confined, as far as we know, to the rich brushes of northern New South Wales and southern Queensland. In New South Wales it occurs as far south as the Clarence River.

"The native guava does not appear to grow in the large or main scrubs (brushes). It is generally found in the small or outlying scrubs, and appears to have a liking or attachment to the tulip-wood, *Harpullia pendula*, as both timbers are often together."—(W. Dunn.)
EXPLANATION OF PLATE 64.

A. Flowering branch, from Acacia Creek, Macpherson Range.
A'. Flowers from Mullumbimby.
B. Bud, natural size.
C. Flower, natural size.
D. Flower magnified, petals removed, showing—
   (a) Calyx.
   (b) Part of disc.
   (c) Stamens.
E. Ovarium, another view showing—
   (a) Stamens.
   (b) Disc.
   (c) Ovarium.
   (d) Stigma.
F. Five-sided ovarium with—
   (a) Disc.
   (b) Ovarium.
   (c) Stigma.
G. Petal, "cuneate-orbicular" (magnified).
H. Irregular calyx.
K. Fruits (pear-shaped) from Acacia Creek, Macpherson Range.
M. Fruit (globular) from Tweed River.
N. Transverse section of fruit showing seeds.
THE IVORY WOOD.

(Siphonodon australis, Benth.)
Volume II.

PART XI (ISSUED SEPTEMBER, 1904).

No. 39.—The Forest Red Gum (Eucalyptus tereticornis, Sm.).
No. 40.—The Black Apple (Sideroxylon australc, Benth. et Hook. f.).
No. 41.—The Smooth-barked Apple (Angophora lanceolata, Cav.).
No. 42.—Scolopia Brownii, F.v.M.

PART XII (ISSUED NOVEMBER, 1904).

No. 43.—The Bloodwood (Eucalyptus corymbosa, Sm.).

The Cypress Pines of New South Wales (Genus Callitris):

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THE FOREST FLORA
OF
New South Wales.

J. H. MAIDEN.

VOL. II. PART 7.
Published by Authority of the
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The Forest Flora
Of
New South Wales.

J. H. Maiden,
Government Botanist of New South Wales and Director of the Botanic Gardens, Sydney

Part XVII.
Published by the Forest Department of New South Wales, under authority of The Honourable the Secretary for Lands.

Published by Authority of
The Government of the State of New South Wales.

Sydney:
1905.

Price, 1/- per Part, or 10/- per dozen Parts, payable in advance.
Casuarina stricta, Ait.
The Drooping She-Oak.
(Natural Order CASUARINACEAE.)

Botanical description.—Genus, Casuarina. (See p. 74, Part XIII.)

Botanical description.—Species, C. stricta, Ait., Hort. Kew iii, 320 (1789), not of Miquel.

A small tree with the branchlets usually, if not always, pendulous, notwithstanding the name, sometimes reduced to a tall dense shrub; the whorls of 9 to 12 parts, the internodes often \( \frac{1}{2} \) inch long or more; the ribs rather prominent; the sheath-teeth acute or shortly acuminate.

Flowers.—Dioecious.
Male spikes.—Some of them terminating deciduous branchlets of several inches, others almost sessile on the permanent branch, often more than 2 inches long, dense when young, the sheaths scarcely overlapping when full-grown.
Fruit-cones.—Globular or ovoid, often 1 inch diameter or even more, the valves much protruded, ovate-triangular or almost ovate-oblong, thickened into a smooth dorsal prominent angle or keel. (B.Fl. vi, 195.)

Botanical Name.—Casuarina, already explained, p. 79, Part XIII; stricta, Latin, drawn out, i.e., into a narrow bundle; hence, speaking of the branches of a plant, rigid or erect. Aiton, in his original description of this species, speaks of it as the “Upright Casuarina.” As Bentham has already pointed out, its branches are only exceptionally rigid. But the “Mountain Oak” of the Dubbo district, for example, is very erect in habit, and a similar habit has been noted from other localities. The female trees are more strict (erect) than the males, and often quite the reverse of drooping.

Vernacular Names.—The commonest name of this tree is simply “She-Oak.” It is often called “Mountain Oak” in the western districts, for obvious reasons. It is not easy to submit a suitable vernacular name, especially as few people give it any particular designation, and it bears the somewhat unfortunate botanical name, “stricta.” I submit the name “Drooping She-Oak,” which is not a new one, and which is fairly descriptive, for general acceptance. I have known it called “Black Oak” at Deniliquin, “Bull Oak” at Wybong, and “Sour Oak” (because of the taste of the branchlets) at Denman close by.

Aboriginal Names.—“Borenne” is the aboriginal name on the Lachlan, according to the late Mr. Forester T. Kidston, who communicated it to me. “Boreen” is another spelling I have seen.

C. quadrivalvis, Labill., was described in 1806. It is necessary to note this date, because C. stricta, Ait., has been suppressed in its favour by some botanists. It is not a sufficient reason to suppress C. stricta because of its inappropriateness.

C. macrocarpa, A. Cunn.—


The above is an unpublished extract from Allan Cunningham's Journal, under date 4th May, 1817.

Miquel defines his variety macrocarpa (a name he obviously borrowed from Cunningham) in these words*:

Strobileis femineis robustioribus globoso-ellipsoideis, ramulis contra haud crassioribus.—Notas vere differentiales haud inveni (ad Lachlean (Lachlan) flumen, A. Cunningh.).

Miquel figures it at B, tab. x, op. cit.

C. cristata, Miq. (op. cit. p. 336 and table x, A). I am doubtful about C. cristata, the description being so vague in many respects that it applies as well to a small-fruited form of C. stricta as to C. lepidophloia (the Belah).

Bentham gives C. cristata, Miq., as synonymous with C. stricta, and I would hardly dare to say he is wrong.

Bentham remarks:

The Lachlan River specimens distinguished by Miquel as two varieties under the names of macrocarpa and cristata were probably all gathered from one tree; the cones do not appear to me to be larger than are many of the Tasmanian specimens. (B.Fl. vi, 195.)

F. A. G. Miquel, in his monograph of the Casuarinæ in De Candolle's Prodromus, xvi (2) 332 (1868), proposes three varieties of C. quadrivalvis (he keeps quadrivalvis, Labill., and stricta, Ait., distinct), viz.:

1. macrocarpa.
2. cristata.
3. spectabilis.

Miquel founded a variety, spectabilis, of this species on a Tasmanian plant, and following are Hooker's observations:

Var. spectabilis, Miq., humilis, ramulis robustis, sulcis latiusculis tomentellis, amentis masculis crassioribus. C. Gunnii, Nob. MSS.; Miq. in Ned. Kruidk. Archief. iv, 100 (Gunn, 1247) . . . . forming dense small thickets near Georgetown and on Flinders' Island, Gunn. . . . . Gunn is doubtful whether the var. spectabilis is not a distinct species; Miquel first placed it under quadrivalvis, but he since published it as different; I find no character but its robust habit to distinguish it, and Victoria specimens are quite intermediate in this respect. (Hooker's Flora of Tasmania, Vol. i, p. 348, under C. quadrivalvis.)

I have seen Gunn's 1247, and I cannot see the grounds for the establishment of this plant even as a variety.

*Casuarina Gunnii*, J. D. Hook. MSS. *Cas. quadralvis, var. spectabilis*. Miq. l.c., p. 73, Tab. x, fig. C. Van Diemensland (C. Stuart). (Miq. in *Ned. Kruidk. Arch.* iv, 98 (1856).)

Bentham remarks:—

The *C. Gunnii*, formerly published by Miquel and reduced by Hooker to a var. *spectabilis* of *C. quadralvis*, differs in nothing but a more robust habit. (B.Fl. vi, 195.)

**Leaves (Branchlets).**—In cases of severe thirst, relief may be obtained from chewing the foliage of this and other species, which, being of an acid nature, produces a flow of saliva—a fact well-known to bushmen who have traversed waterless portions of the country. This acid is closely allied to citric acid, and may prove identical with it. The branchlets of this species appear to be more sour than those of any other. Children chew the young cones, which they call "oak apples."

This is a useful fodder tree in South Australia, Victoria, and southern New South Wales. Mr. S. Dixon states that in Port Lincoln (S.A.) the fallen catkins (male inflorescence) form the chief sustenance in winter on much of the overstocked country. He adds that this tree is too sour to be very useful to ewes rearing lambs; but if sheep had only enough of it, the "break" or tenderness of fibre would often be prevented in our fine-wool districts, and much money saved by the increased value a sound staple always commands.

The foliage is eagerly browsed upon by stock, and in cases of drought these trees are pollarded for the cattle. Old bullock-drivers say that cattle prefer the foliage of the female plant.—(J. E. Brown.) *Casuarina* foliage has a pleasant acidulous taste, but it contains a very large proportion of ligneous matter.

Used for stock feeding in dry time and considered fair feed.—(Dist. Forester Marriott.)

When these trees are lopped for stock feed, the following year they send out a profusion of young foliage, and are very pretty in appearance.—(Forest Ranger Taylor, Wagga Wagga.)


This species yields the largest fruits of any *Casuarina* in New South Wales. Mr. Cambage has measured them $2\frac{1}{2}$ inches long.

**Timber.**—The wood is hard, rather pale when fresh, and with prominent red medullary rays. It dries to a reddish colour, and has dark bands running through it, chiefly in a longitudinal direction, which gives to the polished wood a fine mottled appearance, rendering it very suitable for the manufacture of furniture. It is also used in turnery and for such articles as bullock-yokes, wheel-spokes, axe-handles, staves, shingles, etc. As fuel, it can hardly be excelled (Mueller and J. E.
Brown). The appearance of this handsome wood is very difficult to describe, its heart-wood is darker and less handsome than the other portions. It works up splendidly. It is, however, too small to be used for large articles of furniture. In western New South Wales it is not used except for fuel.

**Size.**—It is a small tree, say, of 20 or 30 feet, and diameter up to 18 inches.

**Habitat.**—It occurs in every State of the Commonwealth except Queensland, and even in that State I should not be surprised to hear of it being found.

It is one of the Casuarinas found both on the coast and in the interior, and therefore it is probable that a certain percentage of salt in the soil is necessary for its healthy existence.

Concerning Tasmania, Hooker says:—“Abundant in good light soil in stony places throughout the island, except towards the north-west.” It was described and figured by Labillardière, “in capite Van Diemen” (the modern Tasmania). In South Australia, Bentham gives the localities St. Vincent’s Gulf (Blandowski), Bugle Range, Port Lincoln, Kangaroo Island (Mueller). Tate records it from practically all over the State, except the Central District (largely desert) and north of that district.

It appears to be more widely diffused in Victoria than in any other State, being found practically in every district. Turning to New South Wales, Miquel gives the classical localities “Fraser et Field’s plains (Macarthur, Backhouse), ad Trofald [Twofold] Sinum (A. Cunningham).”

Of coastal localities we have Twofold Bay (already quoted), Jervis Bay (J.H.M.); tops of hills between Otford and Stanwell Park (E. Bette and J.H.M.); and Newport (R. H. Cambage). The two last localities are very instructive. When Mr. Cambage found this at Newport he remarked to me, “This is on the Narrabeen shale,* and I intend to go to Otford to see if the species is found where the same formation reappears.” I replied that I had personally collected it in that locality. In this particular locality it is confined to the slopes near the top of the ridges, and is never seen on the flat terraces or strands close to the water’s edge. Near Otford its fellow trees are *Banksia integrifolia* and *Eucalyptus botryoides*. This is an instance of the way in which vegetation may be representative of geological formations. We have but few observations on the subject at present, but it affords a most fascinating field for inquiry, to which two well qualified observers, Messrs. R. H. Cambage and E. C. Andrews, are giving attention.

On the coast, and particularly in the southern States, this species grows on sandy land quite close to the sea.

---

* The Narrabeen shale outcrops around Narrabeen and thence to near Kincumber, Broken Bay district. In the south it occurs at Otford. It does not extend, on the surface, far inland.
THE DROOPING SHE-OAK.
(Casuarina stricta, Ait.)
The following interesting note refers to its occurrence in the interior:

They grow in company or close clumps, upon decomposed slate or trap-rock formation, also on granite outcrops, and in some cases on sand ridges, but in every instance the situations are very dry and of a barren appearance, always on high, steep ridges.

The He-Oak, or male tree, always occupies the high side of the ridge, overshadowing the She-Oak, so that the slightest breeze shakes the pollen on the female tree. The male tree is a very compact, round-topped tree, with a good shape, and with a much brighter green than the opposite sex.

The She-Oak is of a more spreading and drooping habit, spare of foliage, and wanting in symmetry or defined outline. (Forest Ranger Taylor, Wagga Wagga, September, 1892.)

Mr. R. H. Cambage* also speaks of its occurrence on igneous hills, although, as he points out, it is not restricted to one formation.

Representative localities in the National Herbarium include Deniliquin (Forester Wilshire), where it is known as "Black Oak," Wanganella, near Hay (E. C. Officer), Weddin, near Young (J.H.M.). Going more west we have Condobolin (J.H.M.) and Dubbo (District Forester Marriott), where it is known as "Mountain Oak." Going north, we find it in various localities in which characteristic western vegetation is found considerably to the east, e.g., "Bull Oak" on stony hills, Wybong (A. Rudder), "Sour Oak" on the southern slopes of the hills around Denman (J.H.M.), and at Mount Dangar (J. L. Boorman).

Propagation.—From seed. It is an excellent tree for sea-side planting, and should be extensively propagated for that purpose. Some of the handsomest trees in the coastal belt of Victoria and South Australia are of this species. One of the most beautiful trees I have seen is in a street at Port Fairy, Victoria, beautifully symmetrical, and affording plenty of shade. The wind, so detrimental to the shape of trees in exposed situations as a rule, does not appear to affect the beauty of this species, and I would therefore recommend that She-Oaks for sea-side planting be added to the scanty list of those trees whose merits for the purpose have been well ascertained.

Aiton says that this species was introduced into England by Messrs. Kennedy and Lee, the nurserymen, evidently from the seed collected by Sir Joseph Banks in 1770.

EXPLANATION OF PLATE 65.

A. Branch with pistilliferous flowers.
B. Ripe cone.
C. Winged nut containing seed.
D. Branch with staminiferous flowers.
E. Staminiferous flowers.
F. Part of the same opened out (inside view).
G. A single staminiferous flower, consisting of a single stamen between two (minute) floral bracts.
H. Portion of joint of branchlet showing point of insertion into whorl.
I. Whorled bracts representing leaves, opened out.

* Proc. Linn. Soc. N.S.W., 1900, 713; 1901, p. 392.
Eucalyptus numerosa, Maiden.

The River White Gum.

(Natural Order MYRTACEÆ.)

Botanical description.—Genus, Eucalyptus, L'Hérit. (See p. 33, Part II.)


It is often seen as a graceful sapling, but may attain the dignity of a large tree. In this State I have seen it up to 3 feet in diameter and more, with a height of 150 feet. It has rather sparse drooping foliage, which gives it at times something of a willow-like aspect.

Bark.—It is nearly a White Gum when very young, but afterwards the bark of the upper part falls off in thin long ribbons (hence the name, Ribbon Gum), and the lower part of the trunk becomes covered to a varying height with fibrous bark of the character known to many as Peppermint-bark. In its most marked form the bark of the butt is more rugged than that of amygdalina usually is. Sir William Macarthur spoke of the fibrous bark, and subsequently Mr. Howitt pointed out that the aborigines of Gippsland similarly used the bark for tying and lashing, hence their name for the tree, “Wang-ngara,” which signifies “bark-string.”

Juvenile leaves. The young stems have a rusty glandular appearance, and the leaves are very narrow.

Mature leaves.—Thin, though usually narrow, up to 11 lines broad, often from 4 to 7 inches long. Although the leaves of this form are very thin, specimens from Bateman’s Bay to Wagonga are especially thin. These specimens also have unusually narrow leaves.

Fruits.—Large in number (commonly twenty or more). Mueller counted as many as forty-three in the umbel (see “Eucalyptographia” under E. amygdalina). I have often counted them with forty in an umbel borne on rather long, often filiform, pedicels. They have a very regular umbellate appearance. Mostly pale-coloured when dry. Very uniform in size, 2 to 2½ lines (barely) in diameter, and pilular or nearly pear-shaped. Sometimes they tend to close at the orifice. The rim varies in width. In some specimens it is comparatively broad, well-defined, and reddish.

Botanical Name.—Eucalyptus, already explained, page 34, Part II. Numerosa, Latin, in allusion to the large number of fruits in the umbel, as already referred to.

Vernacular Names.—“River Gum of Camden,” of the late Sir William Macarthur. “White Gum,” of Bent’s Basin and the Nepean generally. It is very difficult to propose a suitable name for this tree, and I would suggest that
"River White Gum" is as good as any. I have known it also called "Ribbon Gum" and also "Narrow-leaved Peppermint," but both these names are more generally applied to other species.

Aboriginal Names.—"Kayer-ro" of the Camden, N.S.W., aborigines, according to the late Sir William Macarthur. The "Wang-ngara" of the aborigines of Gippsland (Howitt), the meaning of which has already been explained.


Leaves.—Messrs. Baker and Smith, under the name *E. radiata*, have examined the oil of this species, with the following result:

<table>
<thead>
<tr>
<th>Species</th>
<th>Whence collected for Oil</th>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation [α]</th>
<th>Saponification Number</th>
<th>Solubility in Alcohol</th>
<th>Constituents found</th>
</tr>
</thead>
<tbody>
<tr>
<td>radiata</td>
<td>Wingello, N.S.W., and Monga, N.S.W.</td>
<td>0.8695 to 0.8747</td>
<td>-74.1-89°</td>
<td>2.8 to 4.37</td>
<td>Insoluble ...</td>
<td>Phellandrene, pinene, eucalyptol, peppermint ketone</td>
</tr>
</tbody>
</table>

Bark.—"The inner bark used for tying grafts and other similar common purposes" (the late Sir William Macarthur). The comparatively tough nature of the inner bark was known to the aborigines of Gippsland, hence their name for it, as already explained.

Timber.—White, fissile, rather tough when freshly cut, but afterwards of inferior strength. It is easily worked, but is not durable on exposure.

Size.—Up to 3 feet in diameter, with a height of, say, 150 feet, but usually much smaller in size.

Habitat.—Its favourite habitat is on the sides of gullies, or on the steep banks of rivers, often some distance from the bed of the river or creek, but usually on a well-drained slope leading to a watercourse. It sometimes occurs on flats. The late Sir William Macarthur, who first drew attention to it, believed it to be "found only on the immediate sandy banks of rivers."

It extends from Gippsland along the coast range of New South Wales to between the Hawkesbury River and Singleton. As it is a species not very well known at present, I give some localities for it represented in the National Herbarium, Sydney.

Victoria.

Boggy Creek and Tambo River, Gippsland (A. W. Howitt); Darlimurla, S. Gippsland (correspondent of H. Deane). "Flourishes on poor flats; stunted in appearance."
New South Wales.

Tantawanglo Mountain (W. Baueuerlen); Eden (J.H.M.); Wyndham (A. W. Howitt); Deua River, Moruya (J.H.M.); Ryan’s Creek, Monga (W. Baeuerlen); “Blackbutt,” Narrabarba (J. S. Allan). “Easily worked, but worthless. Sometimes substituted for ‘Mountain Gum’ (*E. goniocalyx*) in the Braidwood district” (J. S. Allan); Runnymede, Nelligan (W. Baueuerlen); Currawang Creek (W. Baeuerlen; J.H.M.); Shoalhaven River, Badgery’s Crossing to Nowra (W. Forsyth and A. A. Hamilton); Kangaroo Valley (J. L. Bruce); Marulan, Barber’s Creek, and Wingello (H. J. Rumsey, W. Forsyth, J. L. Boorman, J.H.M.); 3 miles from Marulan, about 4 feet in diameter, called “White Top” or “Ribbon Gum” (A. Murphy); Nattai River, Burragorang (R. H. Cambage); Exeter (F. Jensen); Mittagong (J. L. Boorman and J.H.M.); Hilltop (J.H.M.); County of Camden (Macarthur); Mount Kembla (R. H. Cambage).

The above are all southerly localities. Westerly localities are the Nepean River (Woolls and others), and the most westerly point known to me is Mount Tomah (Jesse Gregson).

Northerly it appears to be rare. Mr. Baker (*Proc. Linn. Soc. N.S.W.*, XXVII, 540, 1902) quotes Mr. Barwick as having found it at Putty, south of Singleton. He calls it *E. radiata*.

**Propagation.**—It produces seed very abundantly. It is a beautiful species, and is worthy of cultivation for ornamental purposes in the colder parts of the State. Many of the remarks made at page 133 of Part XVI, speaking of *E. amygdalina*, are referable to the present species.

**EXPLANATION OF PLATE 66.**

a. Juvenile leaves.
b. Mature leaf.
c. Flowering twig.
d. Portion of branch with umbels of fruits.

(All from Hill Top, near Mittagong.)
THE RIVER WHITE GUM.

(Eucalyptus numerosa, Maiden.)
Flindersia australis, R.Br.

The Native Teak.

(Natural Order MELIACEÆ.)

I give a key to the species of Flindersia, premising that one of the species (F. maculosa) has already been figured and described (Part X).

The characters on which Bentham (B.Fl. i, 388) chiefly bases his key to the species of Flindersia, i.e., the number of leaflets, and opposite or alternate leaves, are very misleading. The number of leaflets is always much less on flowering branches or near the inflorescence than on sterile branches, and F. australis, the only species with alternate leaves according to Bentham’s Key, has opposite leaves near the inflorescence.

Key to the N.S. Wales species of Flindersia.

Seeds winged at the end only. Cone large.

Leaflets very coriaceous. Overlapped part of the cone-valves smooth ... ... F. Bennettiana.

Leaflets comparatively thin. Overlapped part of the cone-valves muricate ... F. australis.

Seeds winged on both ends.

Leaves pinnate, the rachis never winged. Cone large, i.e., above 2 inches long.

Leaflets sessile, or nearly so, with a broad very oblique base ... ... F. Schottiana.

Leaflets narrowed into a short but distinct petiole ... ... F. Oxleyana.

Leaves simple, or if pinnate the rachis winged. Cone small, i.e., 1 to 2 inches long.

Leaves pinnate, with obovate leaflets. Tall tree of the gullies of the Macpherson Range ... ... ... ... ... ... ... ... ... ... F. collina.

Leaves simple, or if pinnate with narrow leaflets. Small tree of the dry western districts. ... ... ... ... ... ... ... ... ... ... F. maculosa.


Following are Brown’s remarks in regard to the systematic position of the genus:

The affinities of the genus are not perhaps very evident. I have referred it to Cedreleae, an order certain genera of which are annexed by Jussieu to Meliaceae, but which I have separated from that family chiefly on account of the structure of the fruit, and of the winged seeds.
Flindersia, however, does not agree with the other genera of Cedrela either in the insertion of its seeds or dehiscence of its capsule; and it appears to differ from them remarkably in its movable dissepiments; but these may be considered as the segments of a common placenta, having a peculiar form, indeed, but not being in other respects essentially different from that of Cedrela. Flindersia is distinct also from the whole of the Order, in having its leaves dotted with pellucid glands, in which respect it seems to connect Cedrela with Hesperideae; and, notwithstanding the absence of albumen, even with Diosmese. (Miscellaneous botanical works of Robert Brown, Vol. i, 72.)

In the same work, he says "Syst. Linn. Pentandria Monogynia, inter Cedrelam et Calodendrum." Cedrela is, of course, the genus which contains our Red Cedar, C. australis (see figure and description in Part III), while Calodendron is that monotypic species C. capense, the "Cape Chestnut," the beautiful tree known to many in New South Wales, and which belongs to the section Diosmese of the Rutaceae.

Bentham (B.Fl. i, 388) observes:—

The genus, although allied to Cedrela, and therefore placed by common consent in Meliaceae, is, nevertheless, as observed by R. Brown, very closely connected with Rutaceae-Zanthoxyleae, and might be very well placed there next to Geijera, with which it is connected, especially through F. macifosa.

Attention has lately been drawn to the matter by Prof. Engler, who removes the genus Flindersia from Meliaceae and places it, together with the Asiatic genus Choroxylon, in the sub-order Flindersiace of Rutaceae (Engler and Prantl. Nat. Planzenfam. iii, Th. iv, Abth. 170).

There is no question that Flindersia is a connecting genus, and therefore different botanists will have different opinions as to its closest affinity. Meliaceae are strongly developed in this State, and I incline to the view that the genus, in a natural classification, comes closer to that Order than to the Rutaceae.

Botanical description.—Species, F. australis, R.Br. in Flind. Voy., ii, 595, t. 1. A tree of moderate size, with a rugged bark.*

Leaves.—Alternate; leaflets generally 11 or 13 in number, or reduced to 3 to 6 leaflets under the inflorescence, usually broad-lanceolate, rather obtuse and scarcely oblique, 2 to 4 inches long, of a thin texture, so that the oil-glands are very conspicuous, paler underneath, especially on the young shoots where the leaflets are almost whitish underneath; foot-stalks of the leaves angular.

Bentham describes the leaves of F. australis as "alternate," in contradiction to all other New South Wales species of Flindersia. In the following specimens of F. australis from Acacia Creek, Maepherson Range, the leaves are all opposite, with three to five leaflets, and very pale, almost glaucous underneath; but in the leaves, cut from the trees of F. australis grown in the Botanic Gardens, Sydney, the leaves are alternate, with eleven to thirteen leaflets and much less paler underneath.

* The original description says "fusco cinereo rugoso." It can be best described, at all events as regards New South Wales trees, as dark brown and rough scaly. It is a large and not "moderate sized" tree in its full development.

†The description of the leaves has been altered from Bentham's description, which is incomplete. The matter has been dealt with in the remarks preceding the Key.
It seems from this that the leaves on the flowering branches of *F. australis* are opposite and with few leaflets, while the full-grown leaves on the tree on non-flowering branches are alternate and have more numerous leaflets, so that Bentham's description in the Flora Australiensis is quite correct after all.

Panicles.—Much branched, terminating short branches without any leaves except a few scale-like bracts, sprinkled with a stellate tomentum.

Flowers.—Numerous.

Calyx.—Open, tomentose, with 5 short broad obtuse lobes.

Petals.—About 2 lines long, tomentose outside, except a narrow border, slightly pubescent inside.

Fruit.—Almost woody, 2 or 3 inches long.

Seeds.—(According to the plate quoted) winged at the upper end only. (B.Fl. i, 388.)

**Botanical Name.**—*Flindersia* in honor of Captain Matthew Flinders. Brown's words are as follows:

The examination of Broad Sound (where the species was collected) was completed at the same time (September, 1802) by Captain Flinders, to commemorate whose merits I have selected this genus from the considerable number discovered in the expedition, of which he was the able and active commander. *Australis*, Latin, Southern (Australian).

**Vernacular Names.**—"Teak" is the common name,—that or "Native Teak." The confusion of this species with *F. Bennettiana* will be dealt with below. It has been sent to me as "Long Jack" (A. Rudder, No. 47); but that name is more frequently applied to *F. Schottiana*. I have also seen it labelled "Flindosa," a name more strictly applied to *F. Schottiana*; also, *Flintamendosa* was a name on the Clarence for *F. Greavesii* (a synonym of the present species).

"Crow's Ash" in Queensland, according to F. M. Bailey. I have not heard such a name applied to *F. australis* in New South Wales. *F. Bennettiana* is sometimes known by that name.

**Teak and Cudgerie.**—The present affords an excellent opportunity of drawing attention to the pioneer work which even yet remains to be done in regard to some of even the most important of our trees. *Flindersia Bennettiana* has been called Teak for many years, and the statement has long been allowed to go unchallenged. On working up the genus, for the purposes of the "Forest Flora," I found, however, that Teak is really the product of *F. australis*. Furthermore, "Cudgerie" has for many years been looked upon as the vernacular for *F. australis*, but inquiry shows that the Cudgerie is properly *F. Schottiana*. The confusion, which is now cleared up, appears to have originated in Exhibition catalogues, and is not surprising. The fruits have been wrongly matched, and anyone who has had experience of the difficulties of botanising in the rich brush forests of this State knows how very easy it is to attribute to a monarch of the forest, with its towering leafy top, the wrong flowers or fruits, which are usually only obtained lying on the ground, blown off by the wind or torn off by a parrot or cockatoo.
As the matter of distinguishing between *F. australis* and *F. Schottiana* is of importance, I would emphasise the following:—They can be readily distinguished by the leaves; the leaflets in *F. Schottiana* are sessile or nearly so, with a broad very oblique base, except the terminal odd one; in *F. australis*, they are narrowed into a conspicuous petiole and scarcely oblique at the base.

The identification of the Teak and Cudgerie will also lead, it is believed, to a modification of the Timber Regulations. The minimum girth, there prescribed, for Cudgerie (*F. Schottiana*) is 6 feet, and the minimum falling girth for Teak (*F. australis*) is 4 ft. 6 in. It would appear to be more generally applicable to reverse these measurements, so that the Teak should be a minimum girth of 6 feet and the Cudgerie 4 ft. 6 in. Some Teak is from 8 to 10 feet in girth, and even more than that.

Cudgerie does not commonly measure more than 6 feet around at the butt, although I have seen it up to 10 feet.

**Aboriginal Names.**—"Wyagerie" is an aboriginal name on the Clarence River, perhaps referable to this species. (See below, under *F. Greavesii*.) But, in dealing with *F. Schottiana*, in the next Part, I will show that the name may belong to that species also, and I trust correspondents will enable me to clear the matter up.

**Synonym.**—*F. Greavesii*, C. Moore. Under No. LXIII (Catalogue of timbers of the Northern Districts of New South Wales at the London International Exhibition of 1862), the late Mr. Charles Moore described a *Flindersia* in the following words:—

*Flindersia Greavesii* (Moore), Flintamendosa (vernacular name); "Wyagerie" (aboriginal name): mountain brushes on the Clarence. A magnificent tree. The monarch of the northern forests, attaining a height of 150 feet, 3 to 6 feet in diameter, distinguishable from every other species of the genus by its dark brown and rough scaly bark, as well as by other characters. Timber used for house-building purposes.

Mr. Moore’s type herbarium specimen in the National Herbarium, Sydney, is labelled:—

This is different from *australis* in the tree attaining a much larger size, in the bark being much more scaly and of a brown colour, in the falcate nearly sessile leaflets and more angular petioles.

The herbarium specimen is *F. Schottiana*, E.v.M. "Angular foot-stalks to the leaves" are seen in *F. australis* only.

For many years there has been a tree in the Sydney Botanic Gardens labelled by Mr. Moore *Flindersia Greavesii*, C. Moore (Lower Garden, 31). It is *F. australis*, R.Br. Mr. Moore’s description of the bark of *F. Greavesii* can only apply to the Teak (*F. australis*).

Mr. W. A. B. Greaves, after whom the tree was named, gave me a fruit which he stated was that of "Greavesii." It is *F. australis*. *F. Greavesii* is really a *nomen nudum*, but Mr. Moore’s name is so well known, at least in New South Wales, that it appears desirable to fully explain it to save further confusion. I have
no doubt that Mr. Moore in some way confused the Teak (*F. australis*) with the tree known as “Cudgerie,” and which was afterwards described by Mueller under the name of *F. Schottiana*.

**Leaves.**—Attention is specially invited to the amended description of the leaves already given. The drawing of *F. australis* leaves in *Flinders’ Voyage* is an admirable one.

**Fruit.**—The natives of the Moluccas use the rough tuberculated fruits* as rasps for preparing roots, &c., for food (*Treasury of Botany*). The species referred to is *F. amboinensis*, Poir. It is very possible the aborigines have put the fruits of *F. australis* (known as Rasp-pod) to a similar purpose. They very probably ate the seeds of this and other *Flindersias*, but I cannot find any record of their having done so.

The overlapping part of the fruit-valves of *F. australis*, is muricate or rough in this species and smooth in all others, and is a useful diagnostic character.

**Bark.**—The bark is an important character, and serves to distinguish it from the other *Flindersias* with which it might be confused. It is dark brown and rough scaly, all the other species with which I am acquainted having a smooth bark.

**Timber.**—Of the first rank, one of the best, indeed, that New South Wales produces. Not only is it extensively used in this State, but it is largely exported to Germany. It is close-grained, heavy, difficult to work, and cracks somewhat unless carefully dried. The colour is yellowish-brown, and it has no figure. It is so hard that it will break the axe in chopping unless great care be exercised. While it is very strong, it has a somewhat short fibre, like beech, hence it cannot be used for wine casks, a use which was proposed.

It is a splendid building timber. At first sight when cut into boards it is scarcely distinguishable from Hoop Pine (*Araucaria Cunninghamii*). It is cut in large quantities, especially for flooring boards, and defies the white ants for a long time. It is excellent for outside walls, where it will last forty or fifty years. It is the best timber for slacking a well, as it does not turn the colour of the water like any of the other timbers. It is durable in or out of the ground. Teak is superior to iron-bark for some purposes. It is used for gearing wheels, and it does not splinter in the pressure of one tooth against another. It is considered to be the best all-round firewood on the Richmond, only excelled by “pine-knots.” As firewood it can be used quite green, and if a freshly-felled log be set fire to it will burn clean away. It is more inflammable when green than when dry.

**Exudations.**—The exudation is a true gum. The greater portion is soluble in cold water, little more on boiling, but the remainder is directly soluble in a very dilute soda solution. It consists of arabin with metarabin.

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*Robert Brown (Collected Works, Ray Soc. i, 72) rightly imagined that the *Arbor Radtldera* of the Herbarium amboinensis (3, p. 201, t. 129) is *Flindersia*. In Rumphius’ Work it is called “Caju Baroedan or De Rasp-Boom.” It is *F. amboinensis*, Poir. See “Boomsoorten van Java,” Koorders and Vaketon, Bijdr. No. 3, p. 5.*
Size.—It attains a height of 100 to 120 feet, and a diameter of 3 to 4 feet.

Habitat.—It is confined to northern New South Wales and to Queensland. The type came from near Upper Head, Broad Sound, a little north of Rockhampton. It is a brush tree, and is not rare in south coastal Queensland. In New South Wales it is "one of the principal, if not the principal, timbers of the district, being unlimited in supply" (Forest Guard W. Dunn, Acacia Creek, Maepherson Range). "It is found on the Tweed" (Forest Guard S. R. Charles). It grows in the Big Scrub near Lismore, and in the scrubs (brushes) all through the Richmond district. Enormous numbers of this valuable tree have been destroyed in the process of clearing land for cultivation, and it is equally certain that much of this timber has been unnecessarily destroyed. In any scheme of forestry this is one of the trees it should be the endeavour of the forester to conserve.

EXPLANATION OF PLATE 67. (FLOWERS.)

A. Flowering branch.
B. Expanded flower.
   a. Petals.
   b. Staminodia.
   c. Stamens.
   d. Disc.
   e. Ovary.
   c. Vertical section of flower showing—
      (a—e as in B).
D. Back of flower.
E. Flower more advanced, showing young cone with stigma.
F. Stamen.
G. Young cone.
H. Vertical section of young cone.
I. Part of outside of young cone showing hairs.
J. Part of stem, showing articulation of petiole.

EXPLANATION OF PLATE 68. (FRUITS.)

A. Leaf.
B. Capsule about to open.
C. Capsule opening septicidally.
D. One valve of the capsule.
E. Deciduous placenta with winged seeds (two on each side of the placenta).

(All drawn from fresh specimens from Acacia Creek, Maepherson Range, W. Dunn.)
THE NATIVE TEAK.
(Flindersia australis, R.Br.)
THE NATIVE TEAK.

(Flindersia australis, R.Br.)
Volume II.

PART XI (ISSUED SEPTEMBER, 1904).
No. 39.—The Forest Red Gum (Eucalyptus tereticornis, Sm.).
No. 40.—The Black Apple (Sideroxylon australe, Benth. et Hook. f.).
No. 41.—The Smooth-barked Apple (Angophora lanceolata, Cav.).
No. 42.—Scolopia Brownii, F.v.M.

PART XII (ISSUED NOVEMBER, 1904).
No. 43.—The Bloodwood (Eucalyptus corymbosa, Sm.).
The Cypress Pines of New South Wales (Genus Callitris):—
No. 44.—Callitris Macleayana, F.v.M.
No. 45.—Callitris verrucosa, R.Br.
No. 46.—Callitris robusta, R.Br.
No. 47.—Callitris columellaris, F.v.M.
No. 48.—Callitris Muelleri, Benth. et Hook. f.
No. 49.—Callitris propinqua, R. Br.
No. 50.—Callitris calcarata, R.Br.
No. 51.—Callitris cupressiformis, Vent.

PART XIII (ISSUED NOVEMBER, 1904).
No. 52.—The Mugga; a Red Ironbark (Eucalyptus sideroxylon, A. Cunn.).
No. 53.—The Native Elm (Aphananthe philippinensis, Planch.).
No. 54.—The Belah (Casuarina lepidophloia, F.v.M.).
No. 55.—The Western Rosewood (Heterodendron oleæfolium, Desf.).

PART XIV (ISSUED FEBRUARY, 1905).
No. 56.—The Grule or Colane (Owenia acidula, F.v.M.).
No. 57.—The Black Sally (Eucalyptus stellulata, Sieb.).
No. 58.—The Swamp Oak (Casuarina glauca, Sieb.).
No. 59.—A Deciduous Fig (Ficus Henneana, Miquel).
(N.B.—The numbers of Part XIV are given erroneously in the text.)

PART XV (ISSUED MARCH, 1905).
No. 60.—The Blackwood (Acacia melanoxylon, R.Br.).
No. 61.—A White or Cabbage Gum (Eucalyptus coriacea, A. Cunn.).
No. 62.—The River Oak (Casuarina Cunninghamiana, Miq.).
No. 63.—The Western Whitewood (Alalaya hemiglanca, F.v.M.).

PART XVI (ISSUED JUNE, 1905).
No. 64.—The Weeping Myall (Acacia pendula, A. Cunn.).
No. 65.—A Peppermint (Eucalyptus amygdalina, Labill.).
No. 66.—The Forest Oak (Casuarina torulosa, Ait.).
No. 67.—The Ivory Wood (Siphonodon australe, Benth.).
THE FOREST FLORA
OF
New South Wales.

J. H. MAIDEN.

VOL. II. PART 8.

Published by Authority of the
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PART XVIII OF THE COMPLETE WORK.
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No. 38.—The Queensland Nut {Macadamia ternifolia, F.v.M.}. 
CASES for binding the 10 parts, which constitute Vol. I of the "Forest Flora," may now be obtained from the Government Printer at 3/- each, 3d. within, and 6d. beyond the Commonwealth to be added for postage. The Index and Title-page of Vol. I are now ready, and will be supplied free of charge to subscribers only.
MAR 26 1912
Gray Herbarium
Harvard University
**Flindersia Schottiana, F.v.M.**

The Cudgerie.

*(Natural Order MELIACEÆ.)*

**Botanical description.**—Genus, *Flindersia*, see p. 209, Part X.


A tree of moderate size, or sometimes tall.*

*Leaves.*—Opposite, crowded under the panicle, leaflets 8 to 12, with or without a terminal odd one, ovate-lanceolate, obtuse or acuminate, 4 to 5 in. long, more or less falcate, sessile, with a broad very oblique base, somewhat coriaceous, glabrous on both sides or softly pubescent underneath when young.

*Panicles.*—Ample and many-flowered, but not exceeding the leaves.

*Petals.*—About 2 lines long, glabrous outside, sprinkled on the inside as well as the anthers with a few hairs (B.Fl. i, 388).

The first fruit of this species seen by me was collected at Tintenbar by W. Bauerlen, February, 1892. Bentham writes in his description of this plant in the *Flora Australiensis*: “Fruit not seen.” Bailey published the first description of the fruit in his *Queensland Flora*, vol. i, page 242 (1899): “Fruit echinate, 4 or 5 inches long, separating into five boat-shaped valves. Seeds nearly 2 inches long, winged at each end.” The fruits of *F. Schottiana* are chiefly distinguished from those of *F. australis* by the smooth sides of the valves of the former, and the valves are longer and narrower; the prickles on the valves are as stout as in *F. australis*, but shorter. Those of *F. Schottiana* are distinguished from those of *F. Bennettiana* and *F. Oxleyana* by the much stouter and less numerous prickles.

Mueller, *Fragm.* v. 113, has described a var. *pubescens* from Rockingham Bay, Queensland, presumably collected by Dallachy. I have also specimens from Pioneer Creek (Dr. Griffiths) and Cairns (E. Betche).

Bailey, *Queensland Flora*, 242, has raised this form to specific rank under the name of *F. pubescens*. “As a shade tree it would be difficult to find its superior.”

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* It is perhaps one of the finest-looking trees of any of the *Flindersia*, having loose pendulous branches and leaves. Stems are of enormous height, say 80 to 120 feet, whilst the girth 3 feet from the ground is from 8 to 10 feet.—(W. Dunn and J. L. Boorman, Acacia Creek, Macpherson Range.)
Botanical Name.—Flindersia, already explained, p. 210, Part X; Schottiana, in honour of Heinrich Schott, Director of the Imperial Zoological and Botanical Garden of Vienna.

Vernacular Names.—The aboriginal name “Cudgerie” has become its common vernacular name. The late Mr. Augustus Rudder sent it under the names of “Ash” and “Stave-wood.” “Mountain Ash” is not an uncommon name. I may say that a great many pale-coloured timbers, more or less fissile, go by the names of “Ash” and “Stave-wood” in Australia.

I believe it to be one of the trees which has passed under the name “Flindosa.” The origin of this name I have been unable to trace, and would suggest that it is a timber-man’s rendering of Flindersia. We have the same word in “Flindosy Beech,” sometimes applied to the tree.


Cudgerie and Teak.—Under F. australis p. 151, Part XVII, I have already drawn attention to the confusion that has existed for so many years between “Cudgerie” (F. Schottiana) and Teak (F. australis). The matter is of considerable importance, as “Cudgerie” was almost invariably referred to as F. australis until the publication of my warning. I believe the following trees, referred to by Moore in the Catal. of N.S.W. Timbers, London Exh., 1862, belong to F. Schottiana:

(xxiv).—Flindersia australis; Ash, Beech, and Flindosa; Wyagerie or Cugerie; Clarence and Richmond.

A large-sized tree of very general occurrence in the northern districts; from 80 to 100 feet in height, and from 2 to 4 feet in diameter. Timber valuable for staves, for which purpose it is extensively used in the Clarence district.

(lxi).—Flindersia australis, var. Flindosa. Wyagerie. Mountain and river brushes, near Grafton, on the Clarence.

A tree similar to xxiv, from which it differs in being smaller in every respect: in the wood being more compact, of a yellowish tinge, and difficult to split; and particularly in the stems being smooth without internode-like swellings as in that species. Timber used for house-building, and occasionally for staves.

Leaves.—Leaflets bright green and shiny in the upper surface; pale green and dead dull on the lower; nearly cordate at base sometimes, except the terminal one.

To look at the leaves on a growing Cudgerie in the distance, the leaves look larger than the Teak leaves, but upon obtaining them we find they are not larger. The leaves are a beautiful dark green, and have a pleasing appearance when on the tree, reminding one of the Silky Oak (Grevillea robusta)—(W. Dunn.)
**Fruit.**—Attention has already been directed to Cudgerie fruits in comparison with Teak fruits. Besides the roughened edges of the valves of the latter, those of the former are flatter and less pungent.

**Bark.**—Smooth, and often glaucous.

**Timber.**—It is a pale-coloured (yellow when fresh, and drying to a white or cream colour), generally useful wood, which shrinks but little in drying. It is rather hard and tough, and is hence sometimes objected to on that score. A recent special use is for railway keys. It is often used as a substitute for Colonial Beech, which it resembles a good deal in outward appearance. It is used for shingles and staves, for flooring, and for general carpentry work. It is softer than Native Teak, and not so durable as that timber. The two timbers are really very different.

I look upon Cudgerie as one of the most valuable of New South Wales timbers, and one whose merits will be more appreciated as it becomes better known.

**Exudation.**—This tree yields a small quantity of gum similar to that of *F. australis*.

**Size.**—It attains a large size, up to over 100 feet in height, and a diameter of over 3 feet. I have alluded to its size, in comparison with Teak, in Part XVII, p. 152.

**Habitat.**—It is confined to northern New South Wales and Queensland. The type was found “In sylvis humidioribus Australiae orientalis a fluvio Hastings ad sinum Repulse Bay.”

I do not know its northern limit in Queensland. Bentham records it from Wide Bay (Bidwill); Cumberland Islands (Herb. F. Mueller); Brisbane River (A. Cunningham). I have it from Cairns (E. Betche); Gympie (Dr. Hamilton-Kenny); and other localities.

In New South Wales it does not appear to have been recorded south of the Hastings River (Tozer, not Thozet as stated in the *Flora Australiensis*). From thence it is not uncommon, in brush forests, to the Queensland border.

At Taylor’s Arm there is a fair supply scattered in the brushes.—(Dist. Forester T. H. Wilshire.)

The same gentleman says:—

In speaking of the Ash from Mt. Yarrahappini, there is a fair supply to be had; the trees attain fair height with rather small barrels. It is not used much locally.

But S. G. F. Smith, Stewart’s Pt., Macleay River, asserts that:—

There are about 1,000,000 feet of this (Mountain Ash) growing in one spot on Mt. Yarrahappini; the barrels of some are 80 feet in length.

It is plentiful in the brush forests of the Maepherson Range (W. Dunn).
EXPLANATION OF PLATE 69. 

Flowers.)

A. Part of stem showing articulation of petiole.
B. Flowering branch.
C. Flower.
D. Flower more expanded, showing —
   (a) Petals.
   (b) Stamens.
   (c) Staminodia.
   (d) Disc.
   (e) Ovary.
   (f) Stigma.
E. Portion of flower.
   (a) Stamens.
   (b) Staminodia.
   (c) Disc.
   (e) Ovary.
   (f) Stigma.
F. Stamens.
G. Transverse section of ovary.
H. Calyx.

EXPLANATION OF PLATE 70. 

(Fruits.)

A. Leaf.
B. Capsule opening septicidally.
C. Capsule more advanced.
D. Capsule reversed, the inside of the valves turned inside out in the process of ripening, to distribute the seeds. It would appear that this process of retroflexion, or turning inside out of the fruits, is unusual in the genus.
E. Seeds (winged all round).
THE CUDGERIE.
(Flindersia Schottiana, F.v.M.)
THE CUDGERIE.

(Flindersia Schottiana, F.v.M.)
No. 72.

Eucalyptus regnans, F. v. M.

The Giant Gum Tree.

(Natural Order MYRTACEÆ.)

Botanical description.—Genus, Eucalyptus, see p. 33, Part II.

Botanical description.—Species, regnans, F. v. Mueller.

Following is the original description, as quoted by Mueller himself in his "Second Census of Australian Plants":—

Eucalyptus amygdalina, Lindl.—In our sheltered springy (containing water-springs, J.H.M.) forest glens attaining not rarely a height of over 400 feet, there forming a smooth stem and broad leaves, producing also seedlings of a foliage different to the ordinary state of Euc. amygdalina as occurs in more open country. This species or variety, which might be called Euc. regnans, represents the loftiest tree in the British territory, and ranks next to the Sequoia Wellingtonia in size anywhere on the globe. The wood is fissile, well adapted for shingles, rails, for house-building, for the keelson and planking of ships, and other purposes. Labillardiere’s name applies ill to any of the forms of this species. Seedlings raised on rather barren ground near Melbourne have shown the same amazing rapidity of growth as those of Euc. globulus; yet like those of Euc. obliqua, they are not so easily satisfied with any soil.—[Report of the Acclimatisation Society of Victoria (now Zoological and Acclimatisation Society), 7th report, 1870, p. 48.]

The species may be more formally defined in the following words:—

A large tree, the largest indeed in Australia, though inferior in size to the Redwood (Sequoia sempervirens and the “Big Tree” (Sequoia Wellingtonia) of Western America (British Columbia and California). Trees about 300 feet high are known in Victoria, and high in girth and straight in trunk they tower into the sky, affording little shade from their foliage because the scanty crown of leaves is so far removed from the earth. Some of the largest trees of New South Wales also belong to this species.

Juvenile Leaves.—The young seedlings of this Eucalypt are at first a good deal like those of the typical amygdalina, but with somewhat broader, lanceolar, opposed leaves. These are soon replaced by broadly lanceolar, scattered, unequal-sided, pointed leaves, very like those of E. obliqua. The saplings so much resemble those of this Eucalypt in other respects that at first sight they might be confused. Their shape is brought out in the figure.

Mature leaves.—Lanceolate to broadly lanceolate, shining on both sides, usually thin in texture (but sometimes quite coriaceous) veins slightly spreading, oil-dots extremely numerous. Indeed, a common method of recognising E. regnans is to hold up a leaf to the light and to notice the fine oil-dots which cover its surface, but this character should be used with caution as leaves of a few other species possess it.

Buds.—The operculum hemispherical to conical, the pointed character being more obvious in dried specimens.

Flowers.—The anthers reniform. While the umbels are mostly solitary, it is not unusual to find them in pairs, a character which is shared with some other species of the Renantheræ, e.g., E. Andrewsii, Maiden.
Fruits.—The shape and size are alike variable. The calyx nearly hemispherical, but more usually gradually continued into the stalk, so as to take on a conoid shape. The pedicels not long, but the common petiole often an inch long. The rim prominent, usually more or less domed, and the valves usually exsert. The valves were originally described as enclosed, but this is not commonly the case in perfectly ripe fruits.

Botanical Name.—*Eucalyptus*, already explained, p. 34 Part II; *regnans*, Latin, reigning or dominating, in allusion to the towering height of the typical trees.

Vernacular Names.—In its smooth-barked (Victorian) form it bears the name of “Mountain Ash,” and even “White Gum,” but it varies as to the amount of rough bark, and indeed its commonest name in Victoria is “Blackbutt.” In New South Wales it is most usually called “Blackbutt” also, though in one district the name “Cut-tail” is in use.

The origin of the term “Cut-tail” is as follows, and refers to the fissile properties, it being considered the best timber for splitting in the districts where it occurs. Amongst the splitters in the south, at least about Delegate and parts of Gippsland, there used to be much ambitious rivalry as to who could split the thinnest and finest shingles of this timber, and some of them went beyond the thinness of shingles and split it even thinner. Then if a splitter showed such very thin pieces to other splitters, naturally some would say that it was mere accident to get those pieces so thin, and there was nothing remarkable about it. The result of that was that some splitters would set to work and cut out pieces the length of a shingle and somewhat longer; these they would split as fine as they possibly could, taking care to leave a short portion of it solid; this solid portion they called the “tail.” If a splitter had such a piece, then of course he had evident proof that it was not mere accident but downright dexterity in splitting which accomplished the feat. This fine splitting was carried so far that (given a good tree) they would split a piece into such thin portions that one could bend them like the leaves of a book, which it roughly resembled, with the solid part at one end resembling the back of the book. Those pieces were called “cut-tail” and the splitters were very proud of them, as it required a delicate touch for a rough working-man to split so thin and yet stop short at the right moment, so as not to run the piece out in its whole length, else of course it would not be a “cut-tail.” From the piece itself the name was transferred to the tree, and a splitter would point out to you that such and such a tree is a “cut-tail.”—(W. Bauerlen, in *Proc. Linnean Society, N.S.W.* 1899, 547.)

Aboriginal Name.—I know of none.


Leaves.—Note the observation above in regard to the thinness and numerous and fine oil-dots of the leaves.

Bark.—It has more or less of a sub-fibrous, dark-coloured bark on the butt and trunk. On the giant trees of Victoria there is often very little of this bark, but on others, in the same State, this bark runs further up the trunk and becomes more
or less ribbony. In the same State, but more commonly in New South Wales, the whole of the trunk and part of the branches becomes covered. The smooth portion is white, and thus it follows that the same species may be either a White Gum or a Blackbutt.

Timber.—A timber can scarcely be more fissile than that of the straightest-growing and largest of these trees. All trees of this species, however, possess this property of fissility in a marked degree. This character has been referred to in Mr. Bäuerlen's note given above. In one particular instance a labourer split 650 5-foot palings in a day. It is pale-coloured and is extensively used for saw-mill purposes.

In its green or sappy state it rends, twists, and warps in the most curious fashion.

When properly seasoned and used for inside or protected work it is a very useful timber, but it is wholly, in my opinion, unsuited for purposes where the timber is required to be in the ground. I have observed this wood cut and sent on as Blue Gum, and also supplied and used for fencing purposes on the railways, probably under the designation of Stringybark.—(A. W. Howitt, Gippsland, in litt.)

Should this tree ever be brought into the export trade, the greatest care must be taken in cutting it. Seasoning is absolutely a sine qua non to its successful introduction to the home or foreign markets. The cutting or sawing of these timbers is also most important: the whole of the Stringybarks and Mountain Ash should never be backed off, but always cut on the quarter. If this rule be properly observed by the benchmen a good deal of the rending, warping, or twisting will be avoided. Should some cheap method of seasoning be discovered, the Mountain Ash would be a good timber for wood-paving.—(Late G. S. Perrin, Victoria.)

The timber of the Victorian "Mountain Ash" is one of four colonial timbers recommended by the Victorian Carriage Board (1884) for the manufacture of railway carriages. The Board reports as follows:—

Lacking the richness of colour of "Blackwood" (Acacia melanoxylon), it is in appearance less attractive for carriage-building (the practice with the Railway Department being not to paint its passenger stock, but to varnish), but in other respects we consider it, if not equal, second only to Blackwood for the purpose named.

It should be felled during the winter months, when it has attained maturity, and is at stump height, say, between 4 and 5 feet diameter. For six months it might so remain before being broken down into plank for seasoning.

The aborigines of Victoria used to make the Mongile, a double-barbed spear made wholly of wood, of "Messmate" (E. fissilis). For a figure of this spear see Brough Smyth's Aboriginals of Victoria, i, 304.

Size.—The Giant Trees of Australia.

The following particulars, written by me, were published in the Sydney Morning Herald some time ago. They are now reprinted by the kind permission of the proprietors of that journal:—

The greatest claims to possess the tallest trees of the world have been made on behalf of Victoria, most of them from Gippsland. In 1862 Mueller wrote to Sessmann's Journal of Botany that Mr. D. Boyle, of Numawading, near Melbourne, has measured a fallen tree in the recesses of the Dandenong, and found it to be 420 feet. About the same time he wrote to the Australasian giving more details about this tree, which was stated to be 392 feet long. He added 30 feet as a fair estimate of the length of the top, which had broken off, and thus we have 420 feet as the height of this tree.
Hemmiker Heaton states that on the Blacks’ Spur were two trees, one, alive, measuring 429 feet in height, and the other (prostrate) 480 feet high. He adds that Baron Mueller is the authority for these measurements. One version, therefore, states that the 120 feet tree is prostrate, and the other that it is alive. If these statements are correct, then two trees of this stupendous height are referred to. Following is another account of the 480 feet tree. A note by Mueller in the *Gardener’s Chronicle* for 1862 says that several trees had been recently measured at the Upper Yarra and on the Dandenong. He adds: “The highest known is ascertained to be 480 feet, and, therefore, as high as the Great Pyramid.” The same writer, in *Seemann’s Journal of Botany*, says it was a Mr. Klein who measured a tree on the Blacks’ Spur, 10 miles from Healesville, and found it to be 480 feet high. Mueller, in his “Select Extra Tropical Plants,” states that a tree was measured in the Cape Otway Ranges 415 feet high, and 15 feet in diameter. Another tree measured at the base of the stem 69 feet in circumference; at 12 feet from the ground, 14 feet in diameter; at 78 feet, 9 feet in diameter; at 144 feet, 8 feet in diameter; and at 210 feet, 5 feet.

All these trees belong to the species described by Mueller as *Eucalyptus regnans*, on account of its crowning height. It is the tree known in Victoria variously as “White Gum, Messmate, and Peppermint” (it varies much in the bark), and Mueller alludes to it as “the tallest tree of the globe, surpassing even the renowned California Sequoia and Wellington pines in height, reaching to 400 feet, and even more.”

On another occasion, he continues to limit the height to about 400 feet. “In our sheltered springy forest glens attaining not rarely a height of over 400 feet.” In 1862, he, in *Seemann’s Journal of Botany*, states that Mr. E. B. Heyne measured a tree at the Dandenong 295 feet to first branch, diameter at first branch, 4 feet. To the point where broken off, 70 feet; total, 365 feet. Diameter at fracture, 3 feet; girth of stem 3 feet from the ground, 41 feet. Although not up to the 400 feet standard, this is a very big tree, and I am sorry that we have not evidence which would warrant our accepting it. In fact, these old records are simply unreliable, in spite of their apparent attention to details.

We will go a step higher. In 1889, the Hon. F. Stanley Dobson, of Melbourne, quoted Mueller as having stated in his “Botanical Teachings,” that our gum trees attain a height of 500 feet. I cannot trace this particular reference, but I have other references of such a height to which Mueller gave currency. For example, in *Seemann’s Journal of Botany*, he states that Mr. George W. Robinson, in the back ranges of Berwick, found a tree 81 feet in girth 4 feet from the ground, and supposes that towards the sources of the Yarra and Latrobe Rivers it attains 500 feet.

Another contemporary account says that Mr. W. G. Robinson, of Berwick, Victoria, in a journey from Gippsland to Mount Baw Baw, saw and measured a tree 500 feet high. Later on, in an edition of the “Select Extra Tropical Plants,” the name of the finder and the height are varied. “Mr. G. W. Robertson, surveyor, measured a tree at the height of Mount Baw Baw 471 feet high.”

But we have not reached high-water mark yet. Mr. David Boyle, who for twenty-seven years had been identified with big trees, in 1889 wrote to the Melbourne *Argus*, giving 325 feet as the height of a tree known to him some years previously. As this was considered to be rather “tall,” and is, I believe, the greatest height in or out of Australia claimed for a tree, Mr. Boyle replied to inquiries: “I determined to have it photographed and measured, ten years having elapsed since I measured it before . . . . I found it. The tree was healthy, the only change in it since I saw it last being that a portion of the top was blown away. The measurement now is 466 feet high, and its circumference 4 feet from the ground, 81 feet; base, 114 feet.”

Visitors to the Melbourne International Exhibition of 1888 will remember the photographs of a large-buttocked Gum-tree by Mr. N. J. Caire, photographer, who stated that he had come across this monster in Gippsland, and that its height was 464 feet. He called it “The Baron,” after von Mueller. Here was something very definite to go upon. The trustees of the Public Library, Melbourne, voted £100, the trustees of the Exhibition Building another £100, the Minister for Lands promised a sum not exceeding £800 to have this leviathan measured and photographed. After some hesitancy on the part of the photographer, the identical tree photographed was found. The Inspector of Forests and a Government surveyor measured it accurately, and found it to be 219 feet 9 inches. Here was a come-down. “No tree in the neighbourhood reached 300 feet.” The tree, of which a specific measurement was given, was found, on actual measurement, to be less than half its reputed height. The Hon. James Munro, Premier of Victoria, thereupon offered a reward of £100 out of his own pocket for any Victorian tree 400 feet in height, and the reward has remained unclaimed to this day.

It turned out that Mr. Boyle’s tree and Mr. Caire’s tree were identical, so that the 525 feet tree shrank over 300 feet. The public interest aroused at the time brought a crop of other guesses and measurements.
Mr. Stanley Dobson, who spent much time trying to get at the truth in regard to these trees, writing to the Royal Society of Tasmania, "believed" that the highest found by a Government surveyor was near Neerim, in Gippsland, and was 325 feet. Even this was excessive, as the Sydney Morning Herald of January 21, 1889, gives the height as "227 feet with the top broken off, and a girth 6 feet from the ground of 55 feet 7 inches." Another tree on the Blacks' Spur, at Fernshaw, had a height of 237 feet 6 inches, the top being broken off, the girth 6 feet from the ground being 50 feet. A still loftier tree was reported,—that on Mount Monda, with a height of 307 feet, and a girth 6 feet from the ground of 22 feet 8 inches. The height given of a tree on Mount Baw Baw is 326 feet 1 inch, with a girth 6 feet from the ground of 25 feet 7 inches.

I am sorry I am unable to quote the authorities for these figures, and therefore my readers may take them for what they are worth. They were given a few months before the "shrinkage" of the height of the Baron, and before the challenge to have all heights verified by a surveyor.

In May, 1889, the Bendigo Evening News gave the height of a tree at Thorpdale, Gippsland, at 320 feet, diameter 7 feet at a height of 12 feet above ground, and 3 feet 6 inches at 165 feet from the ground. One hundred and sixty-five feet of this barrel was split into palings, and produced 6,000 6-feet and 3,600 5-feet palings. Here we have a circumstantial account of a tree reputed to be over 300 feet high, but at the time I could get no confirmatory particulars, although I am far from saying that the measurements were erroneous. At the same time, in cases like these, if records are sought to be established, they must be amply confirmed by independent and competent witnesses. In this case the measurement of a fallen tree was taken. Such measurements are usually more or less approximate, as a high tree always loses its top in falling, and an especially fissile timber such as this would break up and complicate the measurement. It will be best, if possible, to take a standing tree, measured by a surveyor, and we should have at least two independent measurements.

As regards the American trees, I cannot do better than quote the monumental "Silva of North America," by Professor Sargent, which is a work of the highest value. He says:—"The Redwood (Sequoia sempervirens), which is the tallest American tree, probably occasionally attains the height of 400 feet and more. The tallest specimens I have measured was 340 feet high." This is the timber so well known to us in New South Wales, being the best-known tree of Pacific North America. Professor Sargent goes to say:—"Among American trees the Redwood is exceeded in size only by Sequoia Wellingtonia." Here he differentiates between height and bulk.

Turning to Sequoia Wellingtonia, known in California as "Big Tree," Sargent says:—"Its average height is about 275 feet, and its trunk diameter near the ground 20 feet, although individuals from 500 feet to 320 feet tall, with trunks from 25 feet to 35 feet thick, are not rare. Speaking of the celebrated Calaveras trees, he says:—"In the Calaveras Grove there are three trees over 300 feet high, the tallest measuring 325 feet. The largest tree measured by Muir is standing in the King's River Forest, and 4 feet above the ground has a diameter of 35 feet 8 inches inside the bark."

He also states Sequoia Wellingtonia is the largest inhabitant of the American forests, and the most massive-stemmed, although not the tallest tree in the world. In this passage he is not merely indicating that the Redwood is a taller tree, but I believe he is referring also to the Australian trees, which he, from reports, believes to be taller.

Professor Sargent is an eminent authority on the subject of which he treats, and in view of the actual measurement that he presents, viz., 310 feet in height for a Redwood and a girth round the trunk of 107 feet for its congener, the "Big Tree," I am of opinion that, so far as our knowledge goes at present, California is the home both of the tallest and of the broadest trees in the world.

Later on, through the courtesy of Mr. A. W. Crooke, the Acting Conservator of Forests, Victoria, I became aware of the existence of a folio work, of which but a few copies were issued. Following is the whole of the text. It has eight plates, two of which—Nos. 4 and 8—are reproduced.

There is no imprint and no date, nor any author given; but it is, apparently, the joint work of J. Duncan Pierce, C.E., and C. R. Cunningham, surveyor.
THE GIANT TREES OF VICTORIA.

The existence in Victoria of trees, of *Eucalyptus* species, some hundreds of feet in height, had been known for many years prior to the holding of the Centennial International Exhibition in Melbourne during 1888. Rumours were current that trees had been seen towering to a height of over five hundred feet, with circumferences ranging from seventy-five to one hundred feet. Up to that time, however, no systematic endeavour appears to have been made to obtain accurate measurements or photographs of these giants of the forest.

Some time in 1886 Professor O. W. Holmes, who is an enthusiast in the matter, wrote from America to the Honorable Dr. Dobson, of Melbourne, Victoria, asking him to obtain, if possible, some photographs of these trees. Sir John Coode, the celebrated English engineer, also expressed a similar wish during his visit to Victoria.

It would appear that Mr. N. J. Caire, photographer, of Toorak Road, South Yarra, was the only person who had attempted to obtain negatives of some of the well-known specimens. Dr. Dobson therefore communicated with him on the subject, with the result that Mr. Caire, in August, 1887, wrote a letter to the Executive Commissioners for the Centennial Exhibition, making certain suggestions with regard to obtaining such photographs, and offering to supply them under certain conditions duly set forth therein. No active steps were taken, however, until March, 1888, when the matter was brought before a meeting of the Vegetable Products Committee of the Exhibition Commissioners.

In the meantime, Dr. Dobson had laid his views before his colleagues, the trustees of the Public Library, and the Hon. J. L. Dow, Minister of Lands. Contributions were promised in each case towards the necessary expenditure. The Hon. James Munro, Executive Commissioner of the Centennial Exhibition, and Chairman of the Vegetable Products Committee, was requested to complete all requisite arrangements; and, after an interview with the above-named gentleman, it was finally decided that the Lands Department should contribute £400, the trustees of the Public Library £100, and the Exhibition Commissioners £100—in all £600—for the purpose of obtaining a series of photographs of the highest known trees, together with reliable measurements. The Lands Department further undertook to supply, by the photolithographic process, any number of copies that might be required, the negatives to become the property of that department at the close of the work. In June, 1888, advertisements were inserted in the public press, intimating that any person having knowledge of the locale of a tree 400 feet in height would receive £20 upon pointing out the same, and an extra amount of £3 for every additional 5 feet. Following upon this, Mr. Joseph Harris, M.L.A., a member of the Vegetable Products Committee, obtained, through the kindness of Mr. S. Willis, of Prahran, the hollow butt of a tree which had been for convenience of transport sawn into thirteen vertical sections, and which was fitted together and placed in the exhibition grounds. This butt was 15 feet in height, and was described as follows:—*Eucalyptus amygdalina*, var. *regnans* (White Gum). This specimen before being felled measured 72 feet in circumference at the base, was 400 feet in height, and came from Menzies’ Creek, near Fern Tree Gully, Dandenong Ranges.

The Government surveyors also furnished all the information they possessed, and the Hon James Munro personally offered a reward of £100 to anyone who could point out a tree 400 feet in height. The reports of the surveyors tended to show that the largest trees were to be found in the Otway Ranges, Gippsland, and near Healesville.

As time was pressing, it was considered desirable to divide the work of obtaining the desired photographs, and Mr. N. J. Caire and Mr. J. Duncan Peirce, of East St. Kilda, were requested to undertake it. After some delay Mr. Caire declined to co-operate, and the whole work devolved upon Mr. J. Duncan Peirce, who, in addition to being an excellent photographer, was also a civil engineer, and therefore specially fitted to take accurate measurements. He was assisted by Mr. C. R. Cunningham, surveyor, of Queen-street, Melbourne, whose bush experience was found to be extremely valuable. The trees inspected were carefully measured with theodolite, clinometer, and chain, but in so far as regards the height the result was disappointing. In the face of reports, apparently most reliable, of trees reaching 450 and even 500 feet, the highest specimen found measured only 326 feet 1 inch.

Opposite each plate in this album will be found a short description of the tree or trees photographed, giving the species, height, girth, locality, &c.
Plate 1.—Height, 307 feet; girth, 22 feet 8 inches measured 6 feet from the ground; locality, Mount Monda, Fernshaw, 52 miles from Melbourne.

Plate 2.—Height 227 feet (top broken off); girth, 55 feet 7 inches measured 6 feet from ground; locality, Neerim Township Reserve, 79 miles from Melbourne.

Plate 3.—Height, 326 feet 1 inch; girth, 25 feet 7 inches measured 6 feet from ground; locality, spur of Mount Baw-Baw, Gippsland, 91 miles from Melbourne.

Plate 4.—Height, 303 feet 6 inches; girth, 25 feet 7 inches measured 6 feet from ground; locality, Stoney Creek, State Forest, Narbethong, 60 miles from Melbourne.

Plate 5.—Height, 290 feet (top broken off); girth, 32 feet measured 6 feet from ground; locality, forest of the Otway Ranges, 113 miles from Melbourne.

Plate 6.—Height and girth (not stated); locality, head of Sassafras Gully, Dandenong Ranges, 29 miles from Melbourne.

Plate 7.—“The Baron”; height, 219 feet 9 inches; girth, 48 feet 6 inches measured 6 feet from ground; locality, Sassafras Gully, Dandenong Ranges, 31 miles from Melbourne.

Plate 8.—“The Baron”; height, 219 feet 9 inches; girth, 48 feet 6 inches measured 6 feet from ground; locality, Sassafras Gully, Dandenong Ranges, 31 miles from Melbourne.

Habitat.—It is confined to the States of Tasmania, Victoria, and New South Wales, as far as is known at present, but I should not be surprised to find it in the ranges about Stanthorpe, Queensland.

Victoria.

It occurs over a wide area in South and Western Gippsland, chiefly on the Mesozoic Carbonaceous formations, together with *E. obliqua* and *E. globulus*, from the sea-level up to about 1,200 feet. It is also found in the mountains, as at Walhalla, 1,200 feet, and at Tucker Creek, Wentworth River, 2,500 feet (Howitt).

Some of the type specimens of *E. regnans* came from the Dandenong, and were marked by Mueller “D. Boyle, 420 feet.”

New South Wales.

It occurs in most of the high mountainous districts of this State. Following are some localities represented in the National Herbarium, Sydney.

Southern Localities.—Tantawanglo Mountain, near Cathcart, Bombala district (H. Deane and J. H. M., type of *E. fastigata*); “Cut-tail,” Delegate River (W. Bauerlen); Monga, near Braidwood (No. 2,108, W. Bauerlen); Braidwood district (Reidsdale, Irish Corner Mountain), with *E. obliqua* and *E. goniocalyx* (H. Deane); “Blackbutt,” Queanbeyan (J. D. Francis); “Brown Barrel,” “Messmate,” head of Queanbeyan River, Nimbo Station, Cooma district (H. Deane); “Brown Barrel,” Hoskinstown (S. Daniel); “Messmate,” back of Ulladulla (Allan); Macquarie Pass, West Albion Pass, “Messmate,” bark rather stringy, going higher up than usual generally to branches, with specially small fruits (R. H. Cambage); a local indication of trachyte, *e.g.*, at Bowral (R. T. Baker); Mittagong (U. Deane).

* The work contains eight photos, by Mr. Peirce, each 11½ x 16½ inches. The description of each plate bears the names of Mr. Peirce and Mr. Cunningham, and the name “Encalypta amygdaula regnant.”

† Reproduced herewith.
Western Localities.—"Red Blackbutt," timber with straight grain, reddish in colour, stem decidedly rough and black from the ground, Sunny Corner (J. L. Boorman). "Blackbutt," rough, soft bark, clean ribbony tips; a good timber, which is in good demand for palings; leaves thick; Sunny Corner (No. 5, J. L. Boorman). "Blackbutt," Burraga (R. H. Cambage). "Blackbutt," 15 miles southerly from Oberon cross-roads (R. H. Cambage). "Messmate," Tarana (A. Murphy), Jenolan Caves, with rather thick foliage (W. F. Blakely). Mount Wilson, Mount Irvine, &c., all have white tops (Jesse Gregson and J. H. M.) The giant tree at Mount Tomah is of this species. Diameter at ground, 17 feet 6 inches; 3 feet up, 16 feet 3 inches; height (estimated) 150 feet (J. H. M.); Hassan's Walls, Bowenfels (J. H. M.). At the foot of Govett’s Leap, Blackheath (R. H. Cambage).

Northern Locality.—Yarrowitch, New England (J. H. M.). These specimens absolutely match the type *regnans*. Most of the trees I observed are 3 feet in diameter.

EXPLANATION OF PLATE 71.

a. Seedling, almost in the opposite-leaved stage.
b. Flowering twig.
c. Two umbels of buds. [The umbels are often in pairs in the axils, but not invariably so, and other species occasionally show this character.]
d. Portion of leaf (a little diagrammatic) showing the numerous fine oil-dots.
e. Fruits, fully ripe, showing the conoid form, with domed rim and exserted valves.

Photo. 1. Giant Gum trees in Victoria—Plate iv.
Photo. 2. Giant Gum trees in Victoria—Plate viii of the work cited, p. 165.
Photo. 3. Mountain Ash forest, Big Pat’s Creek, Mill Site, No. 2, Warburton, Victoria (Australian Timber Co.)

I am indebted to Mr. A. W. Crookes, Acting Conservator of Forests, Victoria, for these three photographs.
THE GIANT GUM-TREE.

(Eucalyptus regnans, F.v.M.)
GIANT FOREST TREE IN VICTORIA

PLATE IV.—GIANT GUM (E. regnans), NARBETHONG, VIC.
GIANT TREE, VICTORIA.
PLATE VIII.—GIANT GUM (E. regnans), DANDENONG, VIC.
MOUNTAIN ASH FOREST, BIG PAT'S CREEK, MILL SITE No. 2. WARBURTON, VICTORIA (AUSTRALIAN SEASONED TIMBER COMPANY).
No. 73.

Casuarina suberosa, Otto et Dietr.

The Black She-Oak.

(Natural Order CASUARINACEÆ.)

Botanical description.—Genus, Casuarina, see p. 74, Part XIII.


A tree of 30 to 40 feet, the specimens closely resembling those of C. squisitifolia, the whorls similarly 7-merous or the parts varying from 6 to 8, and often monoeious like that species.

Branches.—Seldom if ever corky; the branchlets usually slender and quite glabrous.

Male Spikes.—Much more slender and interrupted, the short sheaths not overlapping those next above.

Fruit Cones.—More frequently tending to become ovoid or oblong, truncate at both ends, the valves more prominent, glabrous or nearly so with usually a short, broad, thick, but almost scale-like, transverse dorsal protuberance at the base rarely extending nearly to the apex of the valve.—(B.Fl. vi, 197.)

This species has been several times figured, e.g., Miq. Rev. Crit. Cas., t. 6 and t. 4 as (C. leptoclada); Hooker, Fl. Tas. i, t. 95; Mueller, Key Victorian Plants, t. 25; Maiden and Campbell, Flowering Plants and Ferns of New South Wales, t. 23.


We draw attention to a pigmy form, 2 feet high and with small cones, of this species. It is erect and yet bushy, reminding one of the habit of C. nana. C. suberosa, of normal size, is in the immediate neighbourhood, and while we note no characters other than that of size in regard to this form, we think that its dwarf habit should be pointed out.—(Maiden and Betche, Proc. Linn. Soc., N.S.W., 1905.)

Botanical Name.—Casuarina, see p. 79, Part XIII; suberosa, Latin, corky, in allusion to the appearance of the bark. The name is not specially appropriate.

Vernacular Names.—On this tree a number of appellations have been bestowed, viz.:—“Erect She-Oak” (a name which refers to the general habit of the tree); “Forest Oak” (a name which had perhaps better be left to C. tunulosu) is in common use for it over large areas of country.

In Tasmania it goes by the name of “Swamp Oak” and “Marsh Oak”; other species pass under these names on the mainland. On the mainland C. suberosa is not a moisture-loving species. In Tasmania it was pointed out to me as “Bull Oak,” but here, again, another species is so-called in Australia. In Tasmania it is also called “He-Oak.” I propose the name “Black She-Oak” for the species. It is fairly appropriate, and has not been adopted for any other species.
Aboriginal Names.—Formerly called “Wayetuck” by the Yarra (Victoria) aborigines. “Dahl-wah” of the aborigines of the county of Camden, New South Wales, according to the late Sir William Macarthur.


C. rigida, Miq. Rev. Cas. 61 t. 7, D and in DC. Prod. xvi, ii, 337, “as to Fraser’s specimens, may be C. suberosa; the more robust Tasmanian specimens belong to C. distyla” (B.Fl. vi, 198). See also Hooker in Fl. Tas. i, 348. A specimen from Kangaroo Island, South Australia, seen by me, is undoubtedly C. distyla.

C. Miquelli, Hook. f. (according to Miquel in DC. Prod. xvi, ii, 337). This is stated to be in the Boissier herbarium, and is “forma tenuior.” Neither Hooker (Fl. Tas.) nor Bentham (B.Fl.) mention it. It is stated to be a tree up to 40 feet in gardens, but in Tasmania a shrub near C. stricta (quadrivalvis) and C. leptoclada (suberosa).

C. Muelleriana, Miq. in Ned. Kruidk. Arch. iv, 98 (quoted as Regensb. Flora 1865, p. 21, by Miquel in DC. Prod. xvi, ii, 338), and C. Baxteriana, Miq. Rev. Cas. 37 t. 3 C. (Regensb. Fl. l. e.) are quoted by Miquel in DC. Prod. as varieties of C. suberosa. Bentham (B.Fl. vi, 199) says they “appear to me both to belong rather to C. distyla.”

The type of C. Muelleriana came from Mount Torrens, Lofty Ranges, South Australia, and as a full description is extant its identity should be ascertained by South Australian botanists.

C. Baxteriana came from Western Australia.

Leaves.—The “leaves” (branchlets) are sometimes used to a small extent for fodder, but this species is one of the least valuable of the She-Oaks for that purpose.

Bark.—The bark of this tree is rugged-looking, with hard corky layers. The inner bark is reddish-brown, and displays on its inner surface the lenticular appearance characteristic of the genus. One analysis (Proc. Roy. Soc., N.S.W., 1888, p. 276) of the bark gave 13.5 per cent. of tannin, but many more experiments require to be made before its value as a tanning material can be assessed with certainty.

Timber.—It is a red timber when fresh, and has the peculiar blotchy markings common to most timbers of the Casuarinaceae. It is very fissile, and hence is used for shingles. It is used to some extent for brush-backs and for Tunbridge
ware generally. It is useful for screws of hand-screws, for making gauges, rails, &c., of chairs, and for clean turnery. Other uses are for bullock-yokes, mauls, and tool-handles. The Yarra (Victoria) blacks are said to have made boomerangs of it. Its chief drawback is its tendency to warp in drying, hence it is often used in veneers. It makes excellent fuel. It is often used, unsawn, for rafters.

Mr. District Forester Rotton, of Nowra, says it is used for shingles and bullock yokes. Settlers sometimes use this timber for rough furniture such as tables and stools. It is also used for pick and hammer handles; is excellent fuel, and is often used by bakers, as it sends out great heat and leaves little ash.

Exudation.—An astringent gum has been met with in this species, but its nature has not been carefully inquired into. It is probably analogous in composition to the dried astringent saps which have been found exuding in small quantities from the barks of many of our native trees.

Size.—It is not a large tree. It rarely attains a larger size than a height of 40 feet, and a stem-diameter of 1$\frac{1}{2}$ to 2 feet.

Habitat.—It occurs in all the States except Western Australia. It is not found in the centre of Australia; but, although its natural habitat is the coast and coast mountain ranges, on poor, rocky soil, it is found in mountainous country many miles west of Sydney.

It is very common in Tasmania. It is found all over Victoria except in the north-west.

In South Australia Prof. Tate gives the range as south of the Murray Desert, embracing the 90-mile Desert and the Tatiara.

It is found from south to the extreme north of Queensland.

In New South Wales it is very widely diffused. In the coast districts it is found from the Victorian to the Queensland border. It is common in the table-lands from end to end of the State. Its westerly range appears to be the Castlereagh River.

A Plea for the Cultivation of She-Oaks.

I would draw attention to the merits of this tree as a substitute for the everlasting *Pinus insignis* of California which seems to be grown immoderately in New South Wales. *C. suberosa* grows in the poorest soil, provided it be stony and well-drained. It has a pine-like habit and is even more graceful than most pines, does not attain a very large size, and forms a copse or an avenue which has a very pleasing appearance.

I go further, and say that if Australians would only take it into their heads to grow their She-Oaks (and we have species for salt-water, fresh-water, for arid situations, and sterile places) they would be charmed at the result. A well-grown She-Oak is one of the most beautiful trees in Australia, and affords a pleasing contrast
to the trees mostly grown, and in most cases suits our climatic conditions far better than the imported pines. The seed is very cheap (anyone can gather a few cones, place them on a sheet of newspaper and let them shed their seeds), the seed readily germinates, the trees are remarkably free from disease, grow rapidly, and their timber, apart from other uses, forms the best fuel we have.

Insect enemies.—On this tree occur remarkable homopterous galls produced by *Frenchia casuarinae*, Mask. This Mallee-scrub insect has hitherto only been recorded for Victoria.

From our own State *Frenchia semiocculta*, Mask., has been described from Thornleigh, near Sydney, by Mr. Froggatt (*Trans. N.Z. Inst.*, 1894, p. 70, pl. vii., fig. 9–19). The allied *Cyclarhrococcus spiniferus*, Mask., was described from Victorian specimens, but it is very common upon this She-Oak in New South Wales. It is figured in Scott’s work on Lepidoptera, evidently under the impression that seed-cones were being figured. See *Trans. N.Z. Inst.*, 1891, p. 41.

In *Proc. Linn. Soc., N.S.W.*, [2], viii, 165, Dr. T. P. Lucas describes a new lepidopterous insect (*Catoryctis nonolinea*) taken on this species at Brisbane.

Host for fungi.—In Victoria a number of fungi have been found on *Casuarina* of various undefined species. They are *Fomes ignarius* and *Hexagonia decipiens* on the trunks, *Trichopeziza sphacelata* on the dead bark, *Dasyscypha eucalypti* on the leaves (? branchlets), and *Pestallozia casuarinae* on the branchlets.

EXPLANATION OF PLATE 72.

A. Branch with pistilliferous flowers.
B. Twig with cones.
C. Ripe cone.
D. Winged nut containing seed.
E. Branch with staminiferous flowers.
F. Staminiferous flowers.
G. Part of same opened out, inside view.
H. Portion of branchlet, showing portions of two joints.
I. Whorled bracts representing leaves, opened out.

THE BLACK SHE-OAK.

(*Casuarina suberosa*, Otto & Dietr.)
Volume II.

Part XI (Issued September, 1904).

No. 39.—The Forest Red Gum (Eucalyptus tereticornis, Sm.).
No. 40.—The Black Apple (Sideroxylon australe, Benth. et Hook. f.).
No. 41.—The Smooth-barked Apple (Angophora lanceolata, C.A.).
No. 42.—Scolopia Brownii, F.v.M.

Part XII (Issued November, 1904).

No. 43.—The Bloodwood (Eucalyptus corymbosa, Sm.).

The Cypress Pines of New South Wales (Genus Callitris):—

No. 44.—Callitris Macleayana, F.v.M.
No. 45.—Callitris verrucosa, R.Br.
No. 46.—Callitris robusta, R.Br.
No. 47.—Callitris columnarisis, F.v.M.
No. 48.—Callitris Muelleri, Benth. et Hook. f.
No. 49.—Callitris propinqua, R. Br.
No. 50.—Callitris calcarata, R.Bi.
No. 51.—Callitris cupressiformis, Vent.

Part XIII (Issued November, 1904).

No. 52.—The Mugga; a Red Ironbark (Eucalyptus sideroxylon, A. Cunn.).
No. 53.—The Native Elm (Aphananthe philippinensis, Planch.).
No. 54.—The Belah (Casuarina lepidophloia, F.v.M.).
No. 55.—The Western Rosewood (Heterodendron oleacefolium, Desf.).

Part XIV (Issued February, 1905).

No. 56.—The Greie or Colane (Owenia acidula, F.v.M.).
No. 57.—The Black Sally (Eucalyptus stellulata, Sieb.).
No. 58.—The Swamp Oak (Casuarina glauca, Sieb.).
No. 59.—A Deciduous Fig (Ficus Henneana, Miquel).

* (N.B.—The numbers of Part XIV are given erroneously in the text.)

Part XV (Issued March, 1905).

No. 60.—The Blackwood (Acacia melanoxylon, R.Br.).
No. 61.—A White or Cabbage Gum (Eucalyptus coriacea, A. Cunn.).
No. 62.—The River Oak (Casuarina Cunninghamiana, Miq.).
No. 63.—The Western Whitewood (Alalaya hemiglaucu, F.v.M.).

Part XVI (Issued June, 1905).

No. 64.—The Weeping Myall (Acacia pendula, A. Cunn.).
No. 65.—A Peppermint (Eucalyptus amygdalina, Labill.).
No. 66.—The Forest Oak (Casuarina torulosa, Ait.).
No. 67.—The Ivory Wood (Siphonodon australis, Benth.).

Part XVII (Issued October, 1905).

No. 68.—The Drooping She-Oak (Casuarina stricta, Ait.).
No. 69.—The River White Gum (Eucalyptus numerosa, Maiden.).
No. 70.—The Native Teak (Flindersia australis, R.Br.).

(Two Plates.)
THE FOREST FLORA

OF

New South Wales.

J. H. MAIDEN.

VOL. II. PART 9.

Published by Authority of the

GOVERNMENT OF THE STATE OF NEW SOUTH WALES.

PART XIX OF THE COMPLETE WORK.
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No. 2.—The Rusty Fig (Ficus rubiginosa, Desf.).
No. 3.—The Turpentine Tree (Syncarpia laurifolia, Ten.).
No. 4.—The Narrow-leaved Pittosporum (Pittosporum phillyreaeoides, DC.).

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THE FOREST FLORA
OF
NEW SOUTH WALES.

J. H. MAIDEN,
Government Botanist of New South Wales and Director of the
Botanic Gardens, Sydney

PART XIX.

Published by the Forest Department of New South Wales, under authority of
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PRICE, 1/- per Part, or 10/- per dozen Parts, payable in advance.
Flindersia Oxleyana, F.v.M.

The Yellow-wood.

(Natural Order MELIACEÆ.)

Botanical description.—Genus, Flindersia (see p. 209, Part X).

Botanical description.—Species, F. Oxleyana, F. Muell., Fragm. i, 65; iii, 25.

A tall, much-branched tree,* attaining often 100 feet.

Leaves.—Opposite, crowded under the panicles; leaflets 4 to 10, with or without a terminal odd one, broadly lanceolate, obtuse, or shortly acuminate; 2 to 4 inches long, oblique, and almost falcate, narrowed into a distinct petiolule, glabrous, or sprinkled underneath with minute stellate hairs, thinly coriaceous, rather sparingly glandular-dotted. (See notes below.)

Panicles.—Loose, and many-flowered, but shorter than the leaves.

Sepals.—Very small.

Petals.—About two lines long, obovate-oblong, glabrous or nearly so.

Fruit.—Woody, 3 to 4 inches long, muricate.

Seeds.—Winged at both ends.—(B.Fl. i, 389).

Botanical Name.—Flindersia, already explained, p 210, Part X. Oxleyana, in honour of John Oxley, Surveyor-General of New South Wales, who, with Messrs. Uniacke and Lieutenant Stirling, discovered the Brisbane River (the locality where this species was first found) in the year 1823.

Vernacular Names.—"Yellow-wood," or perhaps "Light or Pale Yellow-wood," is its commonest name. Originally it was described under the name Oxleya xanthoxyla, and Hooker says (Bot. Miscell., i, 217), "The remarkable yellow colour of the wood has suggested the specific name" (xanthoxyla being compounded of two Greek words signifying yellow wood).

"Long Jack" is a name frequently used in northern New South Wales for this tree, in reference to its great height.

* This applies to a single tree grown in a garden or on the edge of brushes, but is unfortunate as a description of its usual appearance in dense brushes. There it characteristically has a very long barrel, with neither spurs nor buttresses, and with no branches until a few feet of the top of the tree,—usually a conical leafy top.—J.H.M.
Aboriginal Name.—"Yeh" was in use by aborigines of the Richmond River.

Synonym.—*Oxleya xanthoxyla*, A. Cunn., in Hooker's *Botanical Miscellany*, i, 216, t. 54, 1830.

Leaves.—The leaflets are softly tomentose underneath, and more readily wilt than those of any other species. The common rachis is also tomentose. Sometimes the venation on the under side of the leaf is very conspicuous.

The leaflets are not always strictly opposite.

The articulation of the leaves is usually rounded. It has no sharp edges.

Mr. W. Dunn says that the foliage, in mass, reminds him of that of the Teak (*F. australis*), but the leaves are shorter and hairy.

Bark.—Smooth in young or medium trees; patchy in appearance, but not flaky, in older trees. A bushman's description is, "It has a cracked sort of bark, a little resembling that of Teak, but less rough, and not flaky."

Timber.—A fissile, pale yellow timber, with no figure to speak of. It has certainly no dyeing properties.

It was first collected in 1828 by Charles Fraser, Superintendent of the Botanic Gardens at Sydney, and Allan Cunningham, King's Botanist, on the Brisbane River. Hooker, in describing it, says, "Its timber is found to be very useful in various kinds of carpentry, and in the building of boats, &c." (*Botanical Miscellany*, Vol. i, p. 247), so that it had acquired a good reputation at an early date.

Mr. District Forester Pope, Casino, says of it:

It is not much used either locally or for export, but I am convinced it is a most valuable timber. It is very tough, and of a light yellow colour.

Mr. W. Dunn, Forest Guard, Acacia Creek, Macpherson Range, says:

The wood cuts soft like Cudgerie (*F. Schottiana*). The timber is long in the grain and strong, and inclines to be yellow in colour towards the centre of the tree; of course, we have other varieties of timber here much yellower in colour than this timber referred to. It is a really valuable timber.

The official catalogue of the Queensland Forestry Museum, 1904, says:

A large tree, with light-coloured, rough bark. Wood of a pale yellow colour, and a distinctive odour. Chief uses for coach-building, railway-carriage framework, boring rods, and purposes for which strength, combined with lightness, are required; also cabinet-making, joinery, turnery, and picture-frames. It is very elastic, bends well, and is consequently very suitable for casks.

The timber is stated to be very durable and is tough; it is used for making shafts, swingle-trees, and yokes. It is often mistaken for Beech, and is sometimes supplied for that timber. It is an excellent carving wood, as a beautiful specimen of carving in the Technological Museum, Sydney, by the late Mr. W. Ockelford, testifies.
A full account of this timber, chiefly from the point of view of the railway carriage-builder, will be found in MacMahon's "Queensland Merchantable Timbers," p. 53. Here it is stated that:

"It is largely used in the framing of carriages and waggons. It holds paint well and nails may be driven into it without splitting, close up to the end of the scantling. In the works of the Brisbane Tramways Company this timber is a prime favourite; it is used for body-framing, pillars, and finishing; it is found to answer remarkably well for portions of the structure of a tram-car, which it is necessary to bend by steam, and has, in fact, supplanted entirely the more expensive blackwood for this purpose. For an entirely all-round timber it cannot be spoken of too highly, and quite fills the place of English and American ash. A departmental board of the Commonwealth Military Forces has recently decided that this is the most suitable wood in Australia for ammunition boxes."

Size.—
Height often up to 100 feet, with a diameter of, approximately, 2 feet.—(District Forester Pope, Casino.)
Height 80 to 100 feet, with a barrel of 4 to 8 feet in diameter in Macpherson Range.—(J. L. Boorman.)

It is indeed a large tree, variable in diameter.

Habitat.—This tree is confined to the rich brush forests of northern New South Wales and Queensland. What its precise southern and northern limits are I do not know, and inquiries such as these are the legitimate and even necessary duty of a Botanical or Forest Survey.

I have specimens in the National Herbarium from the Richmond and Tweed Rivers, New South Wales, and also one labelled "Stroud district" from the late Mr. Augustus Rudder, but I probably misunderstood him as regards the locality. As regards Queensland, its range appears to be hardly better known than at the time of its discovery seventy-seven years ago.

Concerning New South Wales, Mr. District Forester Pope, of Casino, reports:—
It grows in most of the brush forests in this district, but appears to be favourable to red soil. There is a considerable quantity of it along the Tenterfield Road on Forest Reserves 2,425 and 1,120. It is fairly abundant in all the brushes of the Tweed and Richmond Rivers,—evenly distributed. Does not attain such a size on Forest Reserves 2,425 and 1,120 as in other localities.

Mr. Forest Guard W. Dunn, of Acacia Creek, Macpherson Range, reports:—
This is the scarcest Flindersia here. It is very careful in selecting its habitation. My opinion is, it favours brush mountain regions with plenty of shelter.

Turning to Queensland, Hooker wrote in 1830, on C. Fraser's notes of his trip in 1828:—
The south side of the Brisbane, as far as Canoe Creek, is covered with forests of pine, or Araucaria, to a considerable extent. The north bank, as far as Glenmoriston's Range, is principally open forest, not reaching far, beyond which it is clothed with pine brushes, as on the south. These forests contain immense quantities of Yellow-wood (Osleya xanthoxyla) (Botanical Miscellany, Vol. i, p. 246).

The Official Guide of the Museum of the Forest Department, Queensland, published in 1904, says:—
Trees do not exist in groups, but odd trees are found at frequent intervals in most of the coastal scrubs of Southern Queensland, and especially in the Nanango district.
EXPLANATION OF PLATE 73.

a. Flowering branch.
b. Flower.
c. Expanded flower showing—
   (a) Petals.
   (b) Stamens.
   (c) Staminodia.
   (d) Disc.
   (e) Ovary.
   (f) Stigma.
d. Part of flower—
   (a) Stamens.
   (b) Staminodia.
   (c) Disc.
   (d) Ovary.
   (e) Stigma.
e. Stamens.
f. Transverse section of ovary.
g. Calyx.

EXPLANATION OF PLATE 74.
a. Part of stem, showing articulation of petiole.
b. Leaf.
c. Capsule opening septicidally.
d. Capsule more advanced.
e. Deciduous placenta.
f. Winged seeds.
THE YELLOW WOOD.
(Flindersia Oxleyana, F.v.M.)
THE YELLOW WOOD.
(Flindersia Oxleyana, F.v M.)
No. 75.

Eucalyptus dives, Schauer.

The Broad-leaved Peppermint.

(Natural Order MYRTACEÆ.)

**Botanical description.**—Genus, *Eucalyptus* (see p. 33, Part II).


A tree of medium size, but often flowering as a tall shrub.

**Bark.**—Rough, like a typical Peppermint, with smooth limbs, somewhat ribbony. (Mr. A. Murphy, an experienced collector, says that, practically, in the Bathurst district, he distinguishes this species from *E. piperita* by the yellowish upper limbs, those of *piperita* being white.)

**Juvenile leaves.**—Comparatively broad (sometimes so broad as to be nearly orbicular); stem-clasping, more or less cordate at the base, and in some cases quite acuminate. The shape is brought out in the figure. Both juvenile and mature leaves reek with oil.

**Mature leaves.**—Broadly lanceolate, nearly symmetrical, usually rather thick. Venation, spreading from the base. An important characteristic is the strongly-marked venation. On drying, the principal veins stand out in relief against the vascular tissue. Often shining, a characteristic best brought out in fully mature leaves, but the foliage may be both dull and glaucous. Up to 5 or 6 inches is a common length for the leaves, but they are barely 3 inches in some of the Bombala and Queanbeyan specimens; 4½ inches would appear to be an average length. Specimens up to nearly 2 inches in width are found in Mount Vincent specimens; 1½ inch is a common width; 1½ inch may be given as the average width.

**Buds.**—Operculum usually blunt, though not quite hemispherical. In dried specimens, the operculum more pointed. Buds often glaucous.

**Flowers.**—A profuse flowering species, with dense umbels of eight to twelve, and even more, flower. Anthers reniform, the cells divergent and confluent at the apex.

**Fruits.**—Sometimes nearly hemispherical, with a greater or less tendency to pear-shape. The rim often domed or arched. The tips of the valves occasionally a little exserted. The rims (mouths) usually red, a characteristic often attributed to *E. hemastoma*, and the fruit itself often pale-coloured; may be very shiny or glaucous.

If unaccompanied by sucker leaves, I doubt if *E. dives* can sometimes be distinguished from *E. amygdalina*. Mueller failed to distinguish the species, while admitting a certain amount of difference, amounting to a variety.

Speaking generally, *E. dives* is more aromatic than even *E. amygdalina*. The odour is different, though difficult to describe. The foliage of the former species is usually broader and more glaucous than that of the latter. The fruit of *E. dives* is usually larger; nevertheless, all these characters have sometimes to be cautiously examined when herbarium specimens of mature foliage, buds, and fruits are alone available.
Botanical Name.—Eucalyptus, already explained, p. 34, Part II; dives, Latin, abundant, referring to the great profusion of the flowers.

Vernacular Names.—It is usually known as “Peppermint” throughout its range, and especially so in the western districts. It is called “Blue Peppermint” at Rylstone, “Messmate” in the southern districts generally.


Leaves.—A very obvious character is the cordate, broad, clasping leaves, which remain opposite for a long time, often in the flowering stage. The leaves are very aromatic. Messrs. Baker and Smith, “Research on the Eucalypts,” report:

<table>
<thead>
<tr>
<th>Species</th>
<th>Whence Collected for Oil</th>
<th>Specific Gravity at 15° C.</th>
<th>Specific Rotation [α] D</th>
<th>Saponification Number</th>
<th>Solubility in Alcohol</th>
<th>Constituents found</th>
</tr>
</thead>
<tbody>
<tr>
<td>dives</td>
<td>Fagan’s Creek, Braidwood, Barber’s Creek, Berrima, Rylstone</td>
<td>0.8713 to 0.8887</td>
<td>—62°68’ to —72°45’</td>
<td>2.8</td>
<td>1 vol. 80% to insoluble. The solubility being governed by the amount of the peppermint constituent present.</td>
<td>Phellandrene, pinene, peppermint ketone, aromadendral (traces).</td>
</tr>
</tbody>
</table>

Flowers.—This is, as the name denotes, a very free flowerer.

Timber.—Pale-coloured, full of concentric gum (kino) veins. It would be difficult to get a sound log of any size, and it is an almost worthless timber.

Size.—Usually a tree of medium size, though in the southern ranges it attains a height of, say, 60 feet, with a stem diameter of 2 or 3 feet.

Habitat.—This species is confined to New South Wales and Victoria so far as is known at present. It appears to be confined to the north-eastern portion of the latter State.

New South Wales.

It frequents much of the sterile rocky country of the colder parts of this State, both south and north, but its precise range remains to be determined.

Mr. Ronald Campbell, Cambalong, Bombala, thus speaks of it:

The Peppermint of the district (Monaro). A bad timber from every point of view. It suckers badly, but as it frequents dry, poor, stony ridges, it is but little disturbed.
THE BROAD-LEAVED PEPPERMINT.
(Eucalyptus dives, Schauer.)
Mr. W. U. Nowland, the Staff-Surveyor of the Tumut district, wrote to me as follows, in May, 1903:

A tree growing on the ridgy country round about Tumut. Personally, it is known to me as either a "Messmate," or "Peppermint," according to locality. Some bushmen call it by the former name, others by the latter, owing to it being very hard to distinguish from another tree here in this district, almost a fae simile, excepting in the shape of the leaf. The samples of leaves I send you are not unlike the "Mountain Apple" (Eucalyptus Cambagei). The other tree referred to (E. amygdalina, J.H.M.) has thinner leaves, of a shivery and silver-looking appearance, but both are strongly impregnated with oil, and are pungent to taste. For my own convenience, in reports to the Department, I call the last-named "Messmate," and that which I am sending you, "Peppermint." These two trees are useful for fencing and building purposes.

Mr. R. H. Cambage has some interesting notes on the tree in Proc. Linn. Soc., 1904, p. 691.

Following are some specific localities for E. dives, in the National Herbarium, Sydney.

**Southern Localities.**—Bombala and Cumberland Range (A. W. Howitt); near Delegate (J.H.M.); Jindabyne (J.H.M.); Yarrangobilly (W. Forsyth); "Messmate," Granite Hill, Tumberumba (R. H. Cambage); Head of Tarcutta Creek, 8 miles from Tumberumba (Forest Ranger Mecham); "Messmate or Peppermint," ridgy country about Tumut (W. U. Nowland); Cockatoo, near Germanton (W. Forsyth); Queanbeyan (J. D. Francis); Bungendore (W. S. Campbell, A. W. Howitt); Bell's Creek, near Braidwood (J. S. Allan); Fagan's Creek (W. Baeuerlen); Barber's Creek (J.H.M.); Wingello, Berrima, and Mittagong (J.H.M. and J. L. Boorman), where it is known as "Bastard Stringybark," "Bastard Messmate," or "Messmate."

**Western Localities.**—This tree seems to rarely occur on the sandstone, but as soon as the granite occurs, e.g., near Bowenfels, it makes its appearance plentifully. Mount Victoria (R. H. Cambage; J.H.M., on sandstone); Cox's River (R. H. Cambage and J.H.M.); Jenolan Caves (W. F. Blakeley); Wallerawang (H. Deane and J.H.M.); Tarana (A. Murphy); Capertee (J. L. Boorman and J.H.M.); Sunny Corner (J. L. Boorman); Rockley (R. H. Cambage); Orange (A. W. Howitt, R. H. Cambage). "Blue Peppermint," Mount Vincent, Mudgee district (R. T. Baker).

**Propagation.**—This tree serves a useful purpose on the sterile ridges it has made its home. It has accustomed itself to its environment, and grows where but few trees can obtain a footing. At the same time it is not a tree that I would deliberately propagate except under special circumstances.

**EXPLANATION OF PLATE 75.**

1. Sucker leaves.
2. Flowering branch
4. Fruits.
Botanical description.—Genus, Casuarina (see p. 74, Part XIII).


A fair-sized tree, attaining a height of 70 to 80 feet, or rarely 100 feet, and a diameter of from 1 to 1½ feet, rarely 2 feet.

Bark.—Furrowed, brittle, and easily removed.

Branchlets.—Robust, light coloured or glaucous, under a line (½) in diameter, about the same thickness as in C. ylauca, Sieb., the internodes ribbed, 6 lines long, glaucous, the nodes yellow, sheath-teeth brown or black, short, acute, 9 to 12 in the whorl, mostly 11.

Flowers.—Dioecious. Male spikes about an inch long, of a light golden-brown colour, clustered at the nodes toward the end of the branchlets; internodes straw-coloured; teeth golden-coloured, erect, short, acuminate, constricted at the nodes.

Fruit cones.—Flattened, about ½ inch in diameter, and consisting almost uniformly of three discs or rows of valves, but often irregularly shaped, owing apparently to only a few of the seeds being developed. Valves protruding, prominent, sometimes pubescent at the back and front, with a well-defined dorsal protuberance extending from the base of the valve to half its length and ending in an abrupt angle broadly obtuse or shortly acuminate. Nuts small, dark brown, shining, with a short samara.

Following Bentham’s classification (R.Fl. Vol. vi, p. 194), this species belongs to the section Leiopitys—whorls 7-16—merous, and of the species in this section it has greatest affinities with C. glauca, Sieb., and C. lepidophloia, F.v.M. The branchlets, by their thickness and colour, distinguish it from C. stricta, Ait., and other inland species. The fruits are so characteristic and constant throughout its extensive range that the species cannot easily be confounded with any other.—(R. T. Baker).

This is one of the trees which Mueller included under C. glauca, Sieb.

Rev. B. Scortechini sent it to Mueller from Roma, Queensland, with the note: “I do not know to which Casuarina to refer this specimen. The flat fruits put me out.” Mueller labelled the specimen C. glauca. On another occasion he wrote: “Form of C. glauca with flat-tipped thin fruits.”
I spoke to the Baron about this species, pointing out the flat fruits, but he informed me these probably represented a pathological condition, a view we now know to be quite erroneous; and, as Mr. Baker has pointed out, the shape of the fruits is the readiest character by which the species may be recognised.

I believe, also, that the species has been confused with *C. equisetifolia*, the fruits of which are occasionally, though very rarely, flattened. In Exhibition Catalogues of New South Wales timbers, *C. equisetifolia var. incana* was long styled the “Bull or Forest Oak.” For example, in the Catalogue of the Colonial and Indian Exhibition, we have—“Bull Oak, Forest Oak (*Casuarina equisetifolia*). Timber strong, tough, and prettily veined; used for shingles, staves, veneers, log-fencing, gates, &c. Scrub forests N. Coast district. S., S.W., and W. interior districts, 40-50, 12-18 inches.” I believe the tree referred to is *C. Luehmanni*.

The species has often been confused with the Belah (*C. lepidophloia*) by foresters and others who have not looked at the cones; and in districts where the two species do not grow together, and where the differences between them are not locally recognised, the confusion is pardonable enough. I have had more than once, in outlying localities, to carefully examine a Bull Oak to be certain that it is *C. Luehmanni*.

Botanical Name.—*Casuarina*, already explained, see p. 79, part XIII; *Luehmanni*, in honour of Johann Georg Luehmann, successor of Mueller in the post of Government Botanist of Victoria, and who died 1904.

Aboriginal Name.—“Nyine,” is an aboriginal name on the Lachlan River given me by the late Mr. Forester T. Kidston.

Vernacular Names.—“Bull Oak” is certainly its commonest name, being in use over extensive areas in New South Wales and South Australia.

In South Australia it is often called “Swamp Oak,” according to Mr. Walter Gill, for it often grows in land liable to inundation.

Leaves.—It is an erect species with rather wiry branchlets, which sometimes take on the habit as if they were electrified, and endeavour to stand apart from each other. This habit, it will be understood, is different from that of most species of the genus, whose branchlets are more bunchy and compact.

In times of drought used for feeding stock, but is very binding when used to any extent by itself.—(District Forester Marriott, Dubbo.)

Fruit.—The fruit in this species is so exceptional in shape that it appears desirable to draw special attention to it.

Timber.—Of a red colour, and of rather a coarse grain; one of the species whose medullary rays stand out prominently, rotting last, when a tree is felled.
This timber appears to be of little merit. It is small as a rule, and is used for firewood locally.

District Forester Marriott, of Dubbo, says of it:

This Oak is chiefly used for firewood in this district, and is considered one of the best timbers for this purpose. Used for rails and fencing purposes.

Mr. Walter Gill, Conservator of Forests, Adelaide, says of it:

Timber of rather large figure; durable for fencing-posts.

Size.—It is a tree of small or medium size, say up to 40 feet in height, with a stem diameter of a foot.

Habitat.—This species occurs in New South Wales and Queensland; also in South Australia and Victoria. It is a species I expect to be found in Western Australia near the South Australian border.

South Australia.

Mr. Walter Gill, Conservator of Forests, Adelaide, sent it to me in 1897 from the Wolseley district, later from nearer Bordertown. This is but a stone’s throw from Victorian territory.

Mr. Gill has also found it near the Frances Railway Station, several miles due south of Bordertown, and nearer Narracoorte. Surely search will find it is not confined to the extreme south-east of South Australia.

Victoria.

Mr. Cambage found this species at Serviceton, and Subsequently I found that the species extends about 12 miles into the latter State (South Australia), while it is within sight of the railway for many miles in Victoria, near Horsham, Murtoa, Lubeck, &c. (R. H. Cambage, Proc. Linn. Soc. N.S.W., xxvi, 320.)

Queensland.

In Queensland Scortechini found it about Roma, as already noted, and Mr. Boorman and I have found it at Warialda and Emmaville, New South Wales, localities creeping towards the Queensland border. Other Queensland localities will readily be found now that the identity of the species has been clearly established.

New South Wales.

In this State it belongs to the drier parts, e.g., the western plains and western slopes, while some eastern localities, e.g., Singleton, &c., are interesting because they represent districts in which the western or Eremean flora has descended to comparatively near the coast.
Following are some localities represented in the National Herbarium, Sydney:—Deniliquin (Forester O. Wilshire); Barham, Murray River (Assistant-Forester Chanter); Balranald (Forester G. S. M. Grant); “West of Grenfell” (District Forester Osborne).

This is the Forest Oak of the Wellington country, and is a tree very similar in appearance to the Swamp Oak (C. glauca, J.H.M.) of Port Jackson. It is a tree of about 50 feet in height, and of a stiff and by no means ornamental appearance. November, 1851.—(The late C. Moore.)

Minore, near Dubbo (J. L. Boorman); Dubbo district (District Forester C. Marriott); Castlereagh River (? Collector); between Gilgandra and Gummin Gummin (W. Forsyth); Narrabri (J.H.M.); Gulgong (J.H.M. and J. L. Boorman).

Emmaville.—Trees 20-40 feet high, 8-12 inches in diameter. Fairly plentiful in one particular district only, viz., Kennedy’s Paddock.—(J. L. Boorman.)

Yagobie, Moree-Inverell line (R. H. Cambage); Warialda (J.H.M. and J.L. Boorman), some miles to the east of the preceding locality; Minembah, Whittingham, near Singleton (Roderick Browne), most eastern locality recorded.

I have also notes that I have received it from Tocumwal, Narrandera, Ivanhoe, vid Hay, Wagga Wagga, and Cowra, but as there are no specimens from these localities in the National Herbarium, I ask my many friends to make up the deficiency.

The following notes of some localities of the species, written by Mr. R. H. Cambage in 1901, are very interesting. Of course, the species has been found over a greatly extended area since then.

Near here, Eremeran Homestead, also is C. Luehmanni, Baker (Bull Oak), the first met with in coming from Bourke. This tree has an extensive range, and is very common in the Forbes to Dubbo districts. Although it does not appear to grow in the direct line between Bourke and Euabalong, yet to the east of this line it extends north and south, covering a strip of country at least 100 miles wide, and finally going north-west to Barringan (H. T. Baker) on the Queensland border. Its easterly course is stopped as soon as the cold highlands are approached, it being a distinctly warm-country species. The most eastern points are reached by its creeping up along the valleys of the large rivers. Near the Lachlan there are a few trees on Neila Station, 6 miles south-east of Cowra. Along the elevated parts of the Macquarie it may be found in limited quantities, between Hill End and Bathurst, but its highest point is reached above the latter place, at one mile east of O’Connell; on the south side, and close to the Fish River, there are about a dozen stunted trees growing on a granite bluff. The specimens collected had only fruit in a very young stage, but the whole of the evidence available, including bark and wood, points to the conclusion that they have been properly identified. The land around is occupied, and it is likely that before long the species will be extinct in this locality. In no other place have I found it growing at an altitude exceeding 2,000 feet above sea-level, and seldom above 1,500 feet. The fact of these trees being stunted may be accounted for by the climate too cold for them; but whether they are the remnants of a former luxuriant growth in this locality, or simply a few stragglers outside their regular limit, are questions which cannot be answered without considerable investigation. It is fully 25 miles down the river from O’Connell before any other trees of Bull Oak are found, though possibly others may have existed before the country was cleared.—(Proc. Linn. Soc. N.S.W., 1901, p. 319.)

Other New South Wales localities, by Mr. Cambage, will be found in two papers “On the Botany of the Interior of New South Wales,” in the Proceedings for 1902, Vol. xxvii.
EXPLANATION OF PLATE 76.

A. Branch with pistilliferous flowers.
B. Branch with ripe cones.
C. Winged nut, containing seed.
D. Branch with staminiferous flowers (from type specimen).
E. Staminiferous flowers.
F. Part of same, opened out (inside view).
G. A single staminiferous flower.
H. Part of branch, showing portions of two joints.
K. Whorled bracts representing leaves opened out.

Three photographs of "Bull Oak" growing in swamppy country near Frances and Bordertown Railway Stations, South Australia.—(W. Gill, photo.)
THE BULL OAK.
(Casuarina Luehmanni, R. T. Baker.)
"Bull Oak." Swampy Country, Frances to Bordertown, South Australia.
"BULL OAK," SWAMPY COUNTRY, FRANCES TO BORDERTOWN, SOUTH AUSTRALIA.
PART XI (ISSUED SEPTEMBER, 1904).
No. 39.—The Forest Red Gum (Eucalyptus tereticornis, Sm.).
No. 40.—The Black Apple (Sideroxylon australis, Benth. et Hook. f.).
No. 41.—The Smooth-barked Apple (Angophora lanceolata, Cav.).
No. 42.—Scolopia Brownii, F.v.M.

PART XII (ISSUED NOVEMBER, 1904).
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The Cypress Pines of New South Wales (Genus Callitris):
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No. 45.—Callitris verrucosa, R.Br.
No. 46.—Callitris robusta, R.Br.
No. 47.—Callitris columnaris, F.v.M.
No. 48.—Callitris Muelleri, Benth. et Hook. f.
No. 49.—Callitris propinqua, R. Br.
No. 50.—Callitris calcarata, R.Br.
No. 51.—Callitris cupressiformis, Vent.

PART XIII (ISSUED NOVEMBER, 1904).
No. 52.—The Mugga; a Red Ironbark (Eucalyptus sideroxylon, A. Cunn.).
No. 53.—The Native Elm (Aphananthe philippinensis, Planch.).
No. 54.—The Belah (Casuarina lepidophloia, F.v.M.).
No. 55.—The Western Rosewood (Heterodendron olearfolium, Desf.).

PART XIV (ISSUED FEBRUARY, 1905).
No. 56.—The Gruie or Colane (Owenia acidula, F.v.M.).
No. 57.—The Black Sally (Eucalyptus stellulata, Sieb.).
No. 58.—The Swamp Oak (Casuarina glauca, Sieb.).
No. 59.—A Deciduous Fig (Ficus Henneana, Miquel).
(N.B.—The numbers of Part XIV are given erroneously in the text.)

PART XV (ISSUED MARCH, 1905).
No. 60.—The Blackwood (Acacia melanoxylon, R.Br.).
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No. 62.—The River Oak (Casuarina Cunninghamiana, Miq.).
No. 63.—The Western Whitewood (Aitaiis hemiglauca, F.v.M.).

PART XVI (ISSUED JUNE, 1905).
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No. 65.—A Peppermint (Eucalyptus amygdalina, Labill.).
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No. 67.—The Ivory Wood (Siphonodon australis, Ait.).

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No. 68.—The Drooping She-Oak (Casuarina stricta, Ait.).
No. 69.—The River White Gum (Eucalyptus numerosa, Maiden.).
No. 70.—The Native Teak (Flindersia austalis, R.Br.).
(Two Plates)

PART XVIII. (ISSUED NOVEMBER, 1905).
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(Two Plates)
No. 72.—The Giant Gum Tree (Eucalyptus regnans, F.v.M.).
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THE FOREST FLORA
OF
New South Wales.

J. H. MAIDEN.

VOL. II. PART 10.

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PART XX OF THE COMPLETE WORK.
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MAR 26 1912
Gray Herbarium
Harvard University
PREFATORY NOTE.

THIS Part is of a supplementary character—that is to say, it gives additional information in regard to the trees dealt with in the preceding nineteen Parts, and adds no new species.

It will be seen that I have been indebted to the kindness of many friends (whose names I quote) for much of this supplementary information.

It will also be observed that the trees dealt with are arranged in the order of the parts of the “Forest Flora” published, and references to pages are given, so that readers may readily turn to what has already been stated on the subject.

I propose at the end of each volume in future (e.g. in Part 30, which will be the last part of Volume III), to make a contribution of such supplementary information and illustrations as may be in my possession at that date. Whether this will form a part by itself (as in the present case) will depend on the amount of material available. It is hoped that by following this course the work may always be kept up to date.
No. 1. Part I.

_Grevillea robusta, A. Cunn._

_The Silky Oak._

(Natural Order Proteaceae.)

Timber.—See vol. i, p. 3.

Writing to the _Tropical Agriculturist_ (Colombo) of 1st August, 1902, p. 124, Mr. R. Maclure gives certain particulars as to the value of this Australian tree in Ceylon, where it is largely planted. He says:

I reckon a Grevillea tree at 15 years old is worth 3 rupees 40 cents in ordinary soil, less in poorer soil, and much more in richer soil, such as they have in some parts of Dimbula.

There is then the value of the Grevillea tree—

1. For timber and firewood.
2. To improve the soil it takes from the subsoil, and adds to the surface soil by the deposit of leaves.
3. This deposit not only adds to the soil, but prevents wash and the growth of weeds.
4. As a wind-belt in exposed places.
5. To diversify the cultivation. We were told, when leaf-disease attacked and ruined our coffee, that, in planting it up, as we did, in one unbroken sheet, with no trees or belts of timber interspersed, we transgressed the laws of nature, and suffered in consequence. We were careful to avoid this mistake when planting tea.

Exudations.—See vol. i, p. 5.

Mr. H. G. Smith has shown,* I think conclusively, that the earthy concretion attributed by me to _Grevillea robusta_ really comes from _Orites excelsa_, a second Silky Oak timber which appears to be identical (as stated at vol. i, p. 4) with that of _Grevillea robusta._

Leichhardt mentions that a drooping _Grevillea_ (in the Northern Territory) exudes a glutinous secretion from its seed-vessels, which stains the skin black, and raises most painful blisters. It is not likely that the species is _G. robusta_, but in view of the general innocuousness of _Grevillea_, it is interesting to draw attention to Leichhardt's observation.

Habitat.—See vol. i, p. 7.

The most southerly locality known to me is Little River, near Dalmaorton, Grafton Glen Innes Road.—(J.H.M. and J. L. Boorman.)

It occurs also at Acacia Creek, Macpherson Range, New South Wales.—(Forest Guard W. Dunn.)

As regards Queensland, in the "Catalogue of Timbers in the Forestry Museum" (Brisbane, 1904), we have the note:

Rather a limited quantity near the coast on creek sides in Southern Queensland. Another Silky Oak (_Candollea salicina_), in many respects similar to this as regards characteristics and uses, is plentiful in the scrubs north of Cardwell.

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*A Aluminium, the chief inorganic element in a Proteaceous tree, and the occurrence of Aluminium succinate in trees of this species.—(Proc. Roy. Soc. N.S.W., xxxvii, 107, 1903.)
No. 2. Part I.

Ficus rubiginosa, Desf.

THE RUSTY FIG.
(Natural Order Urticaceæ.)

Roots.—See vol. i, p. 13.

Mr. Robert Kaleski, of Mountain Top, Dorrigio, sends the following note on this tree, from his own experience in the Dorrigio:—

Is at first a parasite, seed being dropped by birds into the tops of other trees, generally Rosewood (Dysoxylon Lessertianum) or Nettle (Laperlea gigas). As the seed grows it sends out feelers, which grow downwards till they reach the ground, where they root. The feelers then attach themselves to the trunk of the tree they grew from and lace themselves on it till they completely cover it, and thus kill it and become a tree themselves. Height and girth same as Rosewood. Timber, soft and practically useless; good burner.

In quoting the passage which follows, the compiler of an English work on plants adds the footnote at the end:—

This statement needs confirmation. We are not aware that the Ficus is a parasite.

As it is, therefore, obvious that some English botanists are not aware of this phenomenon, so common in tropical and sub-tropical countries, it seems desirable to emphasise it.

The same fierce struggle for existence is well exemplified in the Mora trees (Mora excelsa) of Guiana, of which Waterton has left an impressive picture:—

The Wild Fig-tree (Ficus), as large as a common English apple-tree, often rears itself from one of the thick branches of the Mora, and when its fruit is ripe, to it the birds resort for nourishment. It was to an undigested seed passing through the body of this bird, which had perched on the Mora, that the fig-tree owed its elevated station there. The sap of the Mora raised it into full bearing.

ILLUSTRATIONS.

1. Photograph of a fig-tree of this species, Dapto, Illawarra, 56 miles south of Sydney. (Kerry and Co., photo.)

2. Drawing, by Mr. W. Tibbits, of a fig-tree of this species, parasitic on a large Eucalyptus tree, 8-mile post, Casino-Coraki Road. In process of time the fig-tree will entirely cover up the Eucalyptus tree, already dead.
Ficus rubiginosa, Desf. DAPTO, N.S.W.

A FIG (Ficus rubiginosa) SMOTHERING A EUCALYPTUS STUMP. CASINO, N.S.W.
Syncarpia laurifolia, Ten.

THE TURPENTINE TREE.

(Natural Order Myrtaceae.)

Aboriginal names.—See vol. i, p. 16.

Aboriginal name of this tree, as pronounced to me by a very old black gin at Milton, New South Wales, "Bar-am-era" or "Per-am-era," with the accent on the second syllable.—(Lt. H. Cambage.)

Timber.—See vol. i, p. 18.

REPORT ON THE DURABILITY OF UNSHEATHED TURPENTINE PILES FOR WHARF CONSTRUCTION.

During the past three years, while demolishing a number of old wharves in Sydney Harbour, to make room for improvements necessitated by the growth of the trade of the port, we have had ample opportunity of ascertaining the value of turpentine piles for wharf construction. Nearly all the old private wharves in Darling Harbour were built of unsheathed turpentine piles of from 8 inches to 12 inches in diameter. Though the exact dates of erection are not obtainable, it is well known that many of them have been standing from thirty to forty years. They were usually of light construction, having been built to suit a much smaller class of vessels than we find it necessary to provide for now. Had it not been for the great increase in tonnage of ships in recent years, several of these old wharves might have been repaired and made serviceable for a few years more. Naturally some of the piles drawn were found to be entirely crippled, but an examination showed that these were usually not turpentine, but some other timber.

We have, in our sample-room in the office, four sections cut from piles drawn from Smith's wharf, Miller's Point, which, from outside indications, appeared to be amongst the most damaged of the piles, usually about low-water mark. In three instances, while the sapwood has disappeared, having been destroyed by Limnoria terebrans, the timber itself is as sound as the day it went into place. Only one of the three sections has any teredo holes, and that not more than ten small ones, which would not materially weaken the pile. The fourth section, which is completely riddled with holes, is not turpentine, and has been classed as ironbark. It may be added that about 80 per cent. of the old turpentine piles, which we have drawn recently after a service varying up to forty years, have been used over again for various purposes, such as sleepers for cargo-shed floors, repairs to old wharves, &c.

Touching upon more modern experience, we recently demolished a jetty in Woolloomooloo Bay which had been standing twenty years. The piles were of unsheathed turpentine, and proved to be so sound that they have been used again in additions to wharves such as Jones Brothers' coal wharf, Gillespie's wharf, &c. These piles only showed a few teredo holes in the sapwood, and a little erosion above low-water mark, due to Limnoria.

From our experience, which it will be seen is based upon the test of a great many years, it is quite certain that turpentine piles, unsheathed, are incomparably superior, not only to any other Australian timber, but, also, to any other obtainable of the same size.

Our opinion of the value of turpentine as a teredo-resisting timber has received such confirmation that we have built several wharves on unsheathed turpentine piles, amongst which may be mentioned Dalgety's White Star wharf, at Miller's Point, 1,200 feet long by 40 feet wide, and we confidently look forward to a life of from thirty to forty years for these wharves.

H. D. WALSH,
Engineer-in-Chief.

W. E. ADAMS,
Assistant Engineer.

Sydney Harbour Trust,
28th November, 1904.
Habitat.—See vol. i, p. 27.

In walking over the Blue Mountains, New South Wales, the last tree of this species, seen by Mr. R. H. Cambage and myself, is at the top of the big hill, Lawson to Wentworth Falls.

It is indigenous to the Sydney Botanic Gardens and Domain.

No. 5. Part II.

\textit{Eucalyptus longifolia}, Link.

\textbf{THE WOOLLY BUTT.}

(Natural Order \textit{Myrtaceae}.)

Habitat.—See vol. i, p. 36.

As its northerly localities are not numerous, the record of very big trees at Tuggerah Lakes (J. L. Boorman) is worth noting.

Hybrid.—I have drawn attention* to a probable hybrid of this species with \textit{E. robusta}, Sm. It was collected at Erina Creek, near Gosford, and has seven flowers in the head, the normal number being three. The shape of these fruits show a slight resemblance to those of \textit{E. robusta} (Swamp Mahogany), and there are some trees of this species in the vicinity. It may be that this abnormality was the result of hybridisation in which \textit{E. robusta} was concerned. Only one tree was found, which lends colour to the supposition that its parentage is exceptional.

No. 6. Part II.

\textit{Alphitonia excelsa}, Reissek.

\textbf{THE RED ASH.}

(Natural Order \textit{Rhamnaceae}.)

Vernacular Names.—See vol. i, p. 39.

Known as “White leaf” at Lismore.

Leaves, &c.—The following letter shows the tree to be a fodder plant:—

I am sending you a packet containing a sprig of leaves and fruit of a tree known locally as “White leaf.” Will you kindly tell me what its correct name is? It grows 40 to 50 feet high, and sometimes more; but most that I have seen have been about 20 to 30 feet. The wood is very tough, and used for hammer handles, chisel handles, &c., &c.; but what makes me ask about it more particularly is, during the late drought, it was found that horses and cattle ate every leaf within reach, and, at Bungawalbin, where there is a regular scrub of it, during the drought the country was quite clear just as high as animals could reach. Its qualities in this respect was not suspected locally, before this. It grows on the very poorest sandy country, and seems to have some value as a fodder plant.—(A. W. Deane, L.S., Lismore, 30th August, 1904.)

Medicinal properties would appear to be attributed to them by the blacks.
Leaves laid on the eyes when sore. Pennefather and Batavia Rivers. Called “an-na.”—(North Queensland Ethnography, Bulletin No. 5, Dr. Roth.)

Bark.—See vol. i, p. 39.

The Technological Museum,

Dear Mr. Maiden,

23rd May, 1905.

Some time ago a letter from Mr. J. Byrne, of Macksville, Nambucca River, was received through you, asking for particulars as to the tanning qualities of a certain bark. The sample received was that of *Alphitonia excelsa*, and an analysis shows it to be a fair sample, containing about half the amount of tannin usually occurring in the best wattle barks. The tannin is good, quick in its action, and might be used for local tanning.

On the anhydrous bark the following results were obtained:

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total extract</td>
<td>25-1</td>
</tr>
<tr>
<td>Non-tannin</td>
<td>5-1</td>
</tr>
<tr>
<td>Tannin</td>
<td>18-0</td>
</tr>
</tbody>
</table>

If these results are calculated in ordinary air-dried bark containing 13 per cent. of moisture, the statement would be:

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total extract</td>
<td>20-4</td>
</tr>
<tr>
<td>Non-tannin</td>
<td>4-4</td>
</tr>
<tr>
<td>Tannin</td>
<td>15-7</td>
</tr>
</tbody>
</table>

Yours, &c.,

R. T. BAKER, Curator

Habitat.—See vol. i, p. 40.

Grows on igneous formation at Milton, the most southerly locality known to me.—(R. H. Cambage.)

Occurs at Warialda.—(W. Macdonald, C.P. Inspector.)

Tree about 20 feet in length. Wood is of a light colour, and soft. Generally found at the edge of the scrubs.—(Forest Guard W. Dunn, Acacia Creek, Macpherson Range.)

The following note is taken from the *Catalogue, Queensland Forestry Museum*, 1904:

Fairly plentiful in many parts of Southern Queensland; usually on sandy ridges. A rather small tree. Bark of a pale-grey colour, very hard, and rugged on old trees; but much less so on the younger ones. Often found in thick patches or scrubs; in such cases they do not grow to a large size, and the tips of the branches are much appreciated by stock. Leaves green on upper surface, and white underneath. Outer wood pale-pink colour, and the inner wood pink-brown; very tough, curly grain. Used for tool handles and bullock-yokes; otherwise not much used. It might be found suitable for turnery and cabinet work.

No. 7. Part II.

*Doryphora sassafras*, Endl.

THE NEW SOUTH WALES SASSAFRAS.

(*Natural Order Monimiaceae.*)

Timber.—See vol. i, p. 43.

In fairly large trees their heart-wood is dark, clouded, and looks exceedingly well in ceilings, varnished, for which I have seen it used. It works up very easily and well. Near the coast the trees are much smaller, of more irregular growth, and their timber usually of a light straw colour, and usually without the dark heart-wood. Under cover it makes fairly good flooring.—(The late Mr. Augustus Rudder.)
Sassafras grows about 140 to 180 feet high, no spurs, 8 to 9 feet girth, has a sweet scent; colour of timber, light yellow; durable for inside work, but never seasons; always shrinks and swells with weather; rots very quickly outside, stumps very hard to kill; is not milled at present; fair mill timber.—(Robert Kaleski, Mountain Top, Dorrigo.)

**Habitat.**—See vol. i, p. 14.

I have seen it on brush table-land and gullies, somewhat stony, bordering upon New England, often rising to it from the Mann River, a tributary of the Upper Clarence, at an elevation of about between 2,000 and 3,000 feet, where I found it in considerable quantity in places, many of the trees of large size up to and over 4 feet in diameter, and with tall, straight, cylindrical boles, and light branches standing out as so many of the pines.—(Augustus Rudder.)

Grows anywhere in the Dorrigo on second-class land; no use fencing, &c.; burns poorly, good chopper, rivals pine in being highest tree in scrub.—(Robert Kaleski.)

No. 8. Part II.

*Alstonia constricta*, F.v.M.

A "BITTER BARK."

(Natural Order Apocynaceae.)

**Bark.**—See vol. i, p. 46.

*Alstonia constricta* (Fever-bark), of Australia.—This has been woefully abused in the general drug market. *Alstonia scholaris*, which is utterly unlike the *constricta*, has been substituted in quantities, whilst we have seen mixtures of wild cherry bark, goa powder, and cinchona that had been powdered and sold under the name *Alstonia constricta.*—(*Pharmaceutical Review,* U.S.A., October, 1905, p. 298.)

**Exudation.**—It exudes small quantities of a sticky sap. I do not know whether it has been put to any use in this State. The following refers to the closely allied *A. scholaris* and the Queensland aborigines:

The sticky exudation on the bark is employed for smearing over the body with which to affix the feather-down, for purposes of personal decoration. Tully River.—(North Queensland Ethnography, Bulletin No. 7, Dr. Roth.)

**Habitat.**—See vol. i, p. 53.

Have seen it growing in several places on the Clarence River, not far from Grafton.—(Augustus Rudder.)

Acacia Creek, Macpherson Range.—(W. Dunn and J. L. Boorman.)

No. 9. Part III.

*Cedrela australis*, F.v.M.

THE RED CEDAR.

(Natural Order Meliaceae.)

**Size.**—See vol. i, p. 59.

Grows in scrub from 100 to 140 feet high, generally with good straight, round barrel, free from branches about three-fourths of its length. Usually very sound when fallen; must be chopped through spurs in the spring, or is liable to split when touching the ground.—(Robert Kaleski, Dorrigo.)
The following note is taken from the *Sydney Morning Herald* of 25th October, 1861. While a big log, the biggest logs were not transported far in the old days, for the reason that suitable appliances were wanting:—

Yesterday afternoon our attention was called to four logs of cedar—being a portion of one tree—which had just been discharged at Russell's Wharf, Sussex-street, from the iron schooner "Black Diamond," from the Richmond. We understand that these are the largest logs ever brought to this market, and measure 14,359 superficial feet. With one exception, they are irregular shaped, the largest, which is 8 feet in length, measuring 23 feet in circumference; the next, 7 ft. 10 in. in length, and 22 ft. 4 in. in circumference; the third, 7 feet in length, and 21 ft. 9 in. in circumference; the fourth, 9 feet in length, and 1 feet square. Each piece weighs from 5 to 6 tons. It appears that the tree was cut down about two years ago, but owing to its ponderous weight there was no means of getting it removed until very recently, when an extraordinary fresh occurring in the Richmond River it was floated down to the vessel's side, and shipped with great difficulty, owing to the absence of proper mechanical appliances.

**Habitat.**—See vol. i, p. 59. (See also "Propagation.")

Will only grow in certain situations, a very rich-looking, dark, deep soil, free from sour iron, being most suitable; well sheltered from the wind, the top of a ridge or a snug pocket on a hillside being its favourite locality. Generally grows in clumps of twos and threes. As regards the Dorrigo, the cedar belt runs from the Murray River on the west to Paddy's Plain at the northern end, the east side showing practically none.

Was mostly pit-sawn into junk (square timbers) by the old sawyers, who wasted a large quantity in doing so through wantonness, cedar being then very plentiful, quantities in the head which could have been sawn being left to rot. On my selection of 180 acres, which had had more cedar on it than any other selection I know of on the Dorrigo, the suckers on stumps cut sixteen or twenty years ago were only about 5 feet in height and very thin, though the scrub around was dotted with young cedars. The old cedar-getters usually worked about three months in the year, taking a load of cedar to Grafton or Bellingen, and with the proceeds buying enough food and grog to do them three or four months. When this would start running out, they would then go into the scrub for another load, and so on until the timber cut out. Drawing weight is 500 feet to the ton, dry.

It is now practically cut on the Dorrigo.—(Robert Kaleski.)

Very large buttressed trees, but becoming very scarce, the supply being obtained from trees supposed to be cut some thirty or more years ago, in most cases not in any way having deteriorated, although lying in the forest so long.—(Acacia Creek, Macpherson Range, W. Dunn and J. L. Boorman.)

The following notes are taken from the *Catal. Queensland Forestry Museum*, 1904:—

So much of this valuable timber having been cut in former years, particularly in those parts which were most accessible, only occasional trees are now to be met with in the Southern Coastal district, and these are chiefly along Macpherson's and the Blackall Ranges, on the heads of the various creeks flowing therefrom. It is fairly plentiful along the west side of the range from the head of the Condamine River to that of Dalrymple Creek; also on the Eungella Range, in Mackay District, especially on the west side; and there are large quantities in the Cairns, Herberton, and Atherton Districts. A very large tree, with dark-brown scaly bark. In the south, it is usually found on steep mountain sides and deep rocky gorges, but in less rugged country in the north.

So far as I can learn, the most southern cedar tree in New South Wales is at Tillowie, Milton, on the property of my brother William Cambage, growing on igneous formation, and, of course, originally formed part of a brush. This species had most to do with first taking settlers to Milton and Ulladula and, in fact, to many other coastal spots.—(R. H. Cambage.)

At Sackville (just past Tizzana) is a large spreading red cedar of several stems, by the banks of the river. This is one of the few remaining Hawkesbury River cedar trees.
Propagation.—See vol. i, p. 61.

Referring to the growing of our Red Cedar, I have seen it in many places thriving well in the open, where the soil was suitable. There were two on a property in which I had an interest on the Macleay, where they were under my observation for over fifty years. When first seen one of them was about 15 inches in diameter; the other about 18 inches. During the time mentioned, one increased in girth to over 11 feet; the other to over 12 feet. I do not think frosts injured it at all.—(The late Mr. Augustus Rudder.)

Can be grown in the open as an ornamental tree, but if so grown dwarfs and becomes useless for timber. From personal observation and experience, am satisfied that it cannot be successfully grown as a commercial timber unless its natural home be reserved for it to propagate itself in, without interfering with its natural protection of scrub. Average girth would be 9 to 10 feet, one, however, being cut which girthed 27 feet—a sound tree. Stumps sucker very little. Is, like most Dorrigo timbers, of very slow growth.—(Robert Kaleski, Dorrigo.)

No. 10. Part III.

Eucalyptus resinifera, Sm.

THE RED MAHOGANY.

(Natural Order MYRTACEÆ.)

Aboriginal Names.—See vol. i, p. 67.

Note those quoted by Dr. Roth, below.

Leaves.—See vol. i, p. 68.

The first extract refers to their use by the North Queensland blacks for stupefying fish. They are astringent, and they contain a little eucalyptus oil; I know of no toxic principle contained in them.

The leaves are thrown in, and left for from one to three days according to the size of the pool. (Middle) Palmer River. (Middle) Palmer River, “ro-angga.” These same blacks also employ another Eucalyptus (Middle) Palmer River, “bwanal”—an “ironbark”—in similar manner, and acting more rapidly.—(North Queensland Ethnography, Bulletin No. 3, Dr. Roth.)

In Bulletin No. 5 we have: “the Kundara, of the coast-line between the Staaten and Nassau Rivers, boil the leaves and drink the decoction, and also rub the inner bark into the sores, in syphilis.” Coast between mouths of Staaten and Nassau Rivers, “mitar.”

Timber.—See vol. i, p. 68.

In a green state the timber is not specially hard, but when seasoned becomes so. The timber is specially suitable for shingles, as it does not discolour or damage the water and lasts well.—(The late Mr. Augustus Rudder.)

Size.—See vol. i, p. 70.

I have seen it over 5 feet in diameter and of proportionate height, but it is usually about 3 feet in diameter.—(A. Rudder.)

Habitat.—See vol. i, p. 70.

Common at Drake, a few miles east of Tenterfield.—(E. C. Andrews.)

Forms a dense mallee-like growth, say 5 feet high, near the Trig. Station at First Point, Kincumber. Grows out of a stump, say 6 inches in diameter. Red wood, bark fibrous. As we descended the hill the plants became larger and apparently increased gradually and became of normal size.—(R. H. Cambage, and J. H. M.)
On the Blue Mountains it is common near the 38-mile post (road) on Lapstone Hill, near Springwood, Faulconbridge, &c., and was not noticed past Linden by Mr. Cambage and myself. It is not rare, and has a stringy bark with rich dark coarse, umbrageous foliage. It is a handsome species. On the Blue Mountains the buds may have almost hemispherical or longer opercula, but still shorter than the common coast form.

No. 11. Part III.

Cryptocarya obovata, R.Br.

A SHE-BEECH.

(Natural Order Lauraceae.)

Vernacular Name.—See vol. i, p. 73.

Known as “Sycamore” on the Maepherson Range (W. Dunn). Also sent to me as “Roger Gough” from the Dorrigo (Forest Guard Ralph Lowe).

Timber.—See vol. i, p. 74.

A piece of authenticated timber received from Mr. Forest Guard W. Dunn is pale coloured and rather fissile.

Habitat, &c.—See vol. i, p. 74.

The following notes referring to the tree at Acacia Creek, Maepherson Range, are by Messrs. W. Dunn and J. L. Boorman, and refer to authenticated trees of this species:

An exceedingly tall tree of 80–100 feet high, girth 6–8 feet. Timber pale-coloured, long, straight-grained, heavy, a very useful timber for butter-boxes. Grows in moist situations. An aromatic tree.

I believe the following note refers to this tree, but have not confirmed the matter with specimens:

Brown or she-beech. Little is known of its durability. Is a valuable-looking timber about 120 to 130 feet, 8 to 9 feet girth, timber brownish colour, never loses sap or dries, good timber for mill, generally sound. Is not plentiful on Dorrigo, generally grows on fair land, splits badly, and apparently will not stand in ground.—(Robert Kaleski, Mountain Top, Dorrigo.)

No. 12. Part IV.

Eucalyptus saligna, Sm.

THE N.S.W. BLUE OR FLOODED GUM.

(Natural Order Myrtaceae.)

The Bangalay or Bastard Mahogany (E. botryoides, Sm.) is a variety of the Blue Gum, which I have named E. saligna, Sm.; var. botryoides. My paper, giving the evidence, is published in Proc. Linn. Soc. N.S.W., 1905, and I will give the evidence when I submit a drawing of the Bangalay.
Blue and Flooded Gum.—See vol. i, p. 79.

Following is a note by the late Augustus Rudder, but as it was unaccompanied by herbarium specimens or timber, it is not as valuable as it would otherwise be:—

Blue Gum: *E. saligna*.—I have seen this tree up to 7 and 8 feet in diameter, with height of 200 feet. The Cumberland Blue Gum is somewhat different to that. The former is mostly found growing on alluvial ground near and on banks of rivers and creeks in the North Coast country, and though leaves and fruit are very similar, the latter is the larger tree, and its bark near the ground, say from 15 to about 20 feet up, is usually rough and persistent. The timber of this tree, more especially lower logs of old trees, is hard, tough, and lasting; that of young trees is very unreliable. The bark of these trees—Flooded Gum—as we used to call them, above where it is persistent, is thin, quite smooth, and of clear grey in colour. Timber light red. Besides this tree is another, not so large, bark deciduous to the ground, and of a pale blue in colour. Timber somewhat softer than that of the Flooded Gum, and of a darker and brighter red, and is not so strong and tough, nor, generally, so lasting. Sometimes it is found growing in brushes, but more frequently in the open, and extends further back from the coast and on to the hills. Is fairly plentiful in many places in the County of Gloucester.

A note on Flooded Gum is as follows:—

Flooded Gum grows on the creek banks of creeks running into the Richmond River—it also grows on the shelves on sides of hills amongst scrub reaching great height and girth—than on the ridges is less spongy as regards its wood than that on the creek banks. The owner of a large saw-mill at Kyogle staked out some boards 1 inch thick, 8 inches wide for twelve months; they shrunk to a width of 7 inches.—(A. W. Deane, L.S., Lismore.)

Mr. Henry Deane, speaking of Glen Innes to Tenterfield, says:—

Blue Gum (*E. saligna*).—The darker coloured varieties of this timber are in good repute. In the Sydney district the timber is used as well as Blackbutt for fencing.

The last word has not yet been said on Blue and Flooded Gum.

ILLUSTRATION.

Photo, by Kerry & Co., of a tree at Gosford, Hawkesbury River, New South Wales.

No. 12. Part IV.

*Eucalyptus Deanei*, Maiden.

(Natural Order *Myrtaceae*.)

(Synonym *Eucalyptus saligna*, Sm., var. *parviflora*, Deane and Maiden.)

See vol. i, pp. 84 and 85.

Since the issue of the above I have described the above tree, long looked upon as a variety of *E. saligna*, under the name of *E. Deanei*, in the following words*:—

*Eucalyptus Deanei*, sp. nov.


I am of opinion that this form should be removed from *E. saligna* (to which it possesses undoubted affinity), primarily on the ground of its broad sucker leaves. For this reason, in part, *E. dives*, *E. melanolophia*, and *E. Cambagei*, are rightly considered distinct from *E. amygdalina*, *E. crebra*, and *E. goniocalyx* respectively.

* Proc. Linn. Soc. N.S.W., 1904.
In Vol. xxv of these Proceedings (Pl. xlii, figs. 1-4), a mature leaf, half-grown leaf, sucker-leaf, and fruits have been figured, and at pp. 464-5, under the name of *E. saligna*, var. *parciflora*, this tree has been botanically described.

Its foliage is magnificent, especially along the Glen Innes-Grafton road (19-24 mile pegs), appearing like huge camphor laurels. Its habit is spreading, as opposed to the upright habit of Blue Gum, *E. saligna*.

—(E. C. Andrews.)

It may be added that the fruit is uniformly smaller and more urceolate than that of *E. saligna*. Its timber is red, resembling that of *E. saligna*, but the differences have not yet been worked out.

Its butt is much like that of many ordinary Forest Red Gums of New England (*E. tereticornis*) with flaky outer bark.—(E. C. Andrews.)

In addition to the localities quoted in the "Forest Flora," under *E. saligna*, var. *parciflora*, I have collected it at Wallerawang, N.S.W.

As far as New England is concerned, where it is usually known as Brown Gum,* it chooses especially the moist eastern edge of the plateau proper, on granite soil. Specific localities are: Wilson's Downfall, Undercliffe; Great Dividing Range east of Bolivian; Glen Innes and Grafton road.—(E. C. Andrews.)

I have also received it from Stanthorpe, Queensland, where it is a very large tree, soft timber, thick sap, thick bark.—(A. Murphy.)

Its range, therefore, as far as is known at present, is the Dividing Range and spurs, from near Picton Lakes in the south, to Southern Queensland in the north; its most westerly locality, so far recorded, being Wallerawang.

I name it in honour of my old friend Henry Deane, M.A., M. Inst. C.E., Engineer-in-Chief for Railway Construction of this State, my coadjutor in much work on the genus published in these Proceedings, and whose stimulus and counsel in botanical work I have enjoyed for twenty years. He first drew my attention to this tree in March, 1888, at The Valley, Blue Mountains, and I have had it under observation ever since.

In Christie's paper† a New England Brown Gum is referred to, which is probably this species.

In the Blue Mountains this species is usually confined to the valleys, so that it rarely approaches within sight of the Great Western road. It occurs abundantly, however, close to the railway line at Springwood, having followed up the gullies in the vicinity.—(R. H. Cambage and J.H.M.).

**No. 13. Part IV.**

*Podocarpus elata*, R.Br.

THE BROWN OR SHE-PINE.

*(Natural Order Coniferae.)*

**Aboriginal names.**—See vol. i, p. 87.

The name of the fruit at Cape Grafton is "Dalgal" (North Queensland Ethnography, Bulletin No. 3, Dr. W. E. Roth), evidently another spelling of the Barron River name.

**Habitat.**—See vol. i, p. 89.

Leaves attributed to this species in the National Herbarium, Sydney (Transit of Venus Expedition, 1874, Northern Queensland), are over 10 inches long and an inch wide. They are without flower or fruit.

* Sometimes known as "Cabbage Gum," because its wood cuts so soft.—(W. Dunn, Acacia Creek, Macpherson Range.)
No. 14. Part IV.

Melaleuca leucadendron, Linn.

THE BROAD-LEAVED TEA-TREE.

(Natural Order Myrtaceae.)

Varieties.—See vol. i, p. 91.

Local botanists will be interested to know that the following forms are in the National Herbarium, Sydney. Banks and Solander plants (kindly presented by the Trustees of the British Museum)—(a) The form figured at t. 112 of Mr. Britten's work; (b) M. viridiflora, Soland, the plant figured at t. 113 of Mr. Britten’s work; (c) M. sanguinea, Sol. MSS.; (d) M. ruscifolia, Sol. MSS. There is also a specimen of M. viridiflora, Gaertn., collected by Robert Brown; also specimens of Mr. F.M. Bailey’s varieties lancifolia and Cunninghamii, sent by that gentleman.

Aboriginal names.—See vol. i, p. 92.

Following is a note by Mr. J. D. Lord, Public School, Numba, in regard to my suggestion that the township may be named after the tree.

The name Numba is generally spelt with a final double “a”—“Numbaa,” and is most certainly an aboriginal word; I have often discussed this very name with old settlers, who are more or less acquainted with the early naming of this district, but no two agree.

Numba has little or no sandy soil, but out “Warri Warri”—(this word, I always think, is wrongly spelt, more likely a final “a” instead of “i” “Warra Warra” means rain)—there are miles of sand; I have often seen the Broad-leaved Tea-tree growing as I passed along. Again, on “Comarong Island,” between Numba and the sea, I find sand and the Tea-trees.

It may be of course that the township was named Numba after the trees, although Numba trees may not be on the exact site of the township.

Leaves.—See vol. i, p. 92.

The young leaves are bruised in water and drunk for headaches, colds, and general sickness. Mitchell, etc., River.—(North Queensland Ethnography, Bulletin No. 5, Dr. Roth.)

Bark and Timber.—See vol. i, p. 96.

Tea-tree (Melaleuca leucadendron, var. lancifolia).—A fairly large tree, having a white spongy bark, in very thin paper-like layers. There are numerous varieties, most of which may be used for the purposes mentioned below. The leaves of this variety are stiff and sharply-pointed. Wood of a grey colour.

Used for piles and underground work (without removal of bark); and, when thus completely buried in the ground for drainage purposes, they have been known to last a number of years. When barked, the saplings are often used in the round for rafters, etc., in outbuildings, and last a long time.—(Catalogue Queensland Forestry Museum, 1904.)

Melaleuca leucadendron, Linn., and other species—strips of the bark for binding with—a very common material for this.—(North Queensland Ethnography, Bulletin No. 1, Dr. Roth.)

In Bulletin No. 2 the aboriginal name “Bo-du” is given.

The natives of Cape York smoke this bark when they cannot obtain tobacco.—(Veitch.)

The timber splits fairly well, and is largely used for firewood at Ballina, Richmond River, N.S.W.—(J.H.M.)

ILLUSTRATION.

Photo, of a tree taken by Mr. H. King, in 1899, in the Botanic Gardens, Sydney. It was planted by the late H.R.H. the Duke of Clarence, when a midshipman on H.M.S. “Bacchante,” in 1881.
Melaleuca leucadendron, Linn.  SYDNEY BOTANIC GARDENS.
No. 15. Part IV.

**Fusanus acuminatus, R.Br.**

THE QUANDONG.

(Natural Order *Santalaceae*.)

*Santalum.*—See vol. i, p. 103.

*Santalum lanceolatum*, R.Br.—This is a tree with light brown bark and very pale wood, often called "The Blacks' Medicine Tree," from the fact that the bark soaked in water was formerly used by the aborigines for medicinal purposes.—(R. H. Cambage, in *Proc. Linn. Soc. N.S.W.*, 1900, p. 598.)

No. 16. Part V.

**Tristania conferta, R.Br.**

THE BRUSH BOX.

(Natural Order *Myrtaceae*.)

*Timber.*—See vol. i, p. 3.

Following is an extract from a letter to the *Daily Telegraph*, Sydney, of 9th September, 1903:

About 1890, I had a large contract for the Melbourne Harbour Trust. The specifications stated red gum, red ironbark, and box. The only box timber about here is brush box, and I cut some 16,000 feet of this, 12 x 4, for decking, and shipped it with ironbark. My agent in Melbourne sent me a wire that the inspector for the Harbour Trust had rejected all the box. I at once saw Mr. Ednie Brown, got letters from him, went to Melbourne, showed the letters to the chairman of the Harbour Trust, and got their inspector to give the brush box a trial asking him to place it alongside either karri or jarrah. This was done. Two years after I got word that the box was the best to stand the heavy traffic, having beaten all other timber. Surely that was good enough. I have made use of brush box for both flooring and lining boards, and have proved that white ants will not touch it, while other timbers alongside have been destroyed, and there are other scrub woods equally good.—(W. T. Pullen, Woolgoolga.)

A few years ago Scrub Box was described as firewood. It is most valuable for many purposes, and though on account of its having to be dressed green, it warps too much for "tongue and groove" boards, it is very good for weatherboards.—(A. W. Deane, L. S., Lismore.)

The following interesting letter by Mr. D. A. Rogers, timber merchant, contains useful notes in regard to the Brush Box:

When in Glasgow I made strict inquiry, together with inspection, of the various systems adopted by the Corporation, and, no doubt, as an adopted Australian, my tastes went in favour of wood of which some fair examples can be found in that city; still, I was forced to admit that climatic conditions in Glasgow were not so favourable to wood-blocking as here. Two things seemed apparent to me in my inspections: first subsidence, and second decayed blocks, and the reasons I naturally attributed were—subsidence, due to imperfect or insufficient bedding, or heavier traffic than has to be contended with in Sydney; decay of blocks, imperfect knowledge of the hardwoods used; and an admixture of the blocks cut from logs that had passed the stage of maturity, and only required a damp and humid atmosphere to hasten decomposition. The decaying blocks pointed out were said to be jarrah, and knowing our colonial mahogany—which is simply the former with another State name—I had no difficulty in stating that like conditions would apply with either timber under similar conditions, and recommended there, as I also do here, "Brush Box" as the very best of all paving timbers, in so far as it is unrivalled in durability underground, while in moist atmospheres it has little contraction, and maintains a soft-springy surface unequalled with any other timber with which I am acquainted. Baltic is used in many parts, is cheaper than hardwood, but on sanitary grounds is an undesirable element in street formation. An objection to
Australian hardwoods in street-blocking is their density and greasiness in ordinary weather, which is tenfold intensified with the first approach of frost and "rime." The Brush Box previously mentioned has combative properties in this respect. Reporting on wood-paving in the Glasgow Municipal Enterprise, I extract a short paragraph bearing thereon, which reads:—"Wood-paving has been in use to a limited extent for a considerable number of years. Experience has shown that soft woods rapidly wear out under the influence of our moist climate and the wear and tear caused by the shoes of horses, the mode of shoeing adopted for the horses in the city being very detrimental to this class of paving. The only woods that have given any satisfaction are the hardwoods from Burmah (pykadoe) and Australian jarrah." After reading this I came to the conclusion that Glasgow had yet much to learn about timbers suitable for paving purposes, and that an expert from this State was badly wanted to "convince and convert" as to the superiority of New South Wales timbers over all others hitherto experimented upon. I carried back with me a sample of the Burmah article, and while placing it before jarrah, must say that against either I place turpentine and brush box as the timbers best adapted for street-paving throughout the United Kingdom.—(Balmain Observer, 7th October, 1905.)

Habitat.—See vol. i, p. 111.

Correction: "Darling Range" should read "Dividing Range."

No. 18. Part V.

_Eucalyptus goniocalyx_, F.v.M.

THE MOUNTAIN GUM.

(Natural Order Myrtaceae.)

_**Bark.**—At Hassan's Walls, Mt. Victoria, N.S.W., has "box" bark up to the first fork and beyond.

Habitat.—See vol. i, p. 120.

A common tree in many of the valleys of the Blue Mountains, at least from Lawson to Bowenfels; but never continues right up on to the table-land proper. Besides the valleys, it is often found on the taluses of the hills.—(R. H. Cambage and J.H.M.)

No. 20. Part VI.

_Ceratopetalum apetalum_, D. Don.

THE COACH WOOD.

(Natural Order Saxifragaceae.)

Habitat.—See vol. i, p. 129.

Maepherson Range, 6 miles from the Queensland boundary (W. Bäuerlen). This is a considerable extension of range.—(R. T. Baker, Proc. Linn. Soc. N.S.W., 1897, p. 233.)

A connecting locality is the Dorrigo, whence Mr. Forest Guard Ralph Lowe has sent it under the name of "Leather Jacket." I believe the following notes also refer to this tree:

Leather Jacket.—Grows about 60 to 90 feet high, about 6 feet girth. Timber white-pink, too small for milling, and of no practical value. Barrel very crooked, sure sign of poor land. Grows anywhere in the poor clay land in the Dorrigo, where it takes possession of the land altogether. Poor burner; fair chopper.—(Robert Kaleski.)

Have collected this at Milton, which is only 6 or 8 miles south of where you have already recorded it.—(R. H. Cambage.)
No. 21. Part VI.

_Eucalyptus hemiphloia_, F.v.M.

THE WHITE OR GREY BOX.

(Natural Order Myrtaceae.)

Habitat.—See vol. i, p. 134.

For "Roughly, the eastern boundary" read "Roughly, the western boundary."

Acacia Creek, Macpherson Range (W. Dunn) is an additional northern locality.

No. 22. Part VI.

_Stenocarpus salignus_, R.Br.

A BEEF-WOOD.

(Natural Order Proteaceae.)

Timber.—See vol. i, p. 136 (also Habitat, see p. 137).

A Beef-wood formerly grew at Milton, which I believe to be this species. The bar fittings in the "Termeil Hotel" are made from timber of the species procured at Milton.—(R. H. Cambage.)

I saw this work in 1892, shortly after its completion by Mr. Bevan, the proprietor of the hotel, who was also a carpenter and joiner, and it looked handsome. The timber is _Stenocarpus salignus_.

No. 24. Part VII.

_Castanospermum australe_, A. Cunn.

THE BLACK BEAN.

(Natural Order Leguminosae.)

Aboriginal Names.—See vol. i, p. 146.

Following are additional North Queensland aboriginal names, presumably of the seeds:—Cooktown, "ku-par"; Bloomfield, "marchái"; Atherton, "wakki," "mi-ran"; (Lower) Tully River scrubs, "meran"; Cape Grafton, "chonggora."—(Dr. W. E. Roth's _Bulletin_, quoted below.)

Fruits (seeds).—See vol. i, p. 146.

Fruit eaten. On the Bloomfield, this nut is nearly always obtainable, but, like the _Entada scandens_, is not relished. It is one of the worst foods to prepare, a long time being required to wash away the disagreeable flavour. It is first of all baked in a stone oven, then pounded and sifted, put into a bark trough, and treated with like the _Dioscorea sativa_ yam (R. Hislop). At Atherton, the shells being broken, the kernels are commenced to be baked about sunrise, the covering leaves and earth being removed about mid-day. They are then cut up into very fine chips with a sharp shell, &c., and about sunset are put into
a lawyer-cane dillybag, through which the creek (i.e., running) water is made to percolate, and there it
remains until the following morning, when it is ready to eat. On the Lower Tully River, after the beans
have been gathered, the nuts are removed and placed in heaps in the ground-ovens. After covering with
leaves and sand a fire is lit on top, with the result that the nuts are practically steamed, a process
occupying from a few hours up to a whole day. When removed, they are sliced up very fine with a snail-
shell knife and put in dillybags in a running stream for quite a couple of days, when they are ready. If
not sliced up very fine, the bitter taste remains.—(North Queensland Ethnography, Bulletin No. 3,
Dr. W. E. Roth.)

No. 25. Part VII.

_Eucalyptus maculata_, Hook., f.

THE SPOTTED GUM.

(Natural Order _Myrtaceae._)

**Aboriginal Names.**—See vol. i, p. 154.

The aboriginal name at Ulladulla, given me by a very old black gin as “Tarrána” or “Thurrána,” with
the accent on the second syllable. The name is practically that which you quote from Forester Allan.—
(R. H. Cambage.)

**Habitat.**—See vol. i, p. 164.

Following are localities handy to Sydney:—Liverpool to Campbelltown. At
3 miles from the former town there is much Spotted Gum, and thence on to the
Bringelly Road.

On another road leading out of Liverpool there is plenty of Spotted Gum
before Bonnyrigg is reached, i.e., on the Badgery’s Creek Road there is plenty up to
6 or 7 miles.

The following note concerns the Queensland tree:—

Plentiful in coastal ranges and for a considerable distance inland in some parts, especially in the
vicinity of the Western line, between Chinchilla and Miles. A large tree, with smooth deciduous bark,
sometimes of a red colour. Wood of a grey colour and greasy nature; very tough and elastic. Used for
beams, girders, and other bridge-work; frame-work of railway carriages, dray shafts, and for general
building purposes, especially where strength and elasticity are required. An excellent timber, standing
a greater strain than any of our hardwoods; but is not suitable for placing in the ground.—(Catal.
Queensland Forestry Museum, 1904.)

**ILLUSTRATION.**

Photo, by Kerry & Co., of a tree at Little River, near Dalmanor, Grafton district. Height,
alleged to be 300 feet (? J.H.M.); girth, 18 feet.

No. 26. Part VII.

_Baloghia lucida_, Endl.

THE BRUSH BLOODWOOD.

(Natural Order _Euphorbiaceae._)

**Habitat.**—See vol. i, p. 167.

Mr. R. H. Cambage records this species from as far south as Milton.
Eucalyptus maculata, Hook. f. GRAFTON DISTRICT.
No. 28. Part VIII.

*Eucalyptus paniculata*, Sm.

WHITE OR GREY IRONBARK.

(Natural Order *Myrtaceae*.)

**Aboriginal Name.**—See vol. i, p. 175.

An aboriginal woman, born in the district, informed Mr. R. H. Cambage that the name for the tree around Ulladulla was “Yerre.”

No. 30. Part VIII.

*Rhodosphaera rhodanthema*, Engler.

A YELLOW WOOD.

(Natural Order *Anacardiaceae*.)

**Vernacular Names.**—See vol. i, p. 182.

Besides “Yellow Cedar,” also known as “Bill-boy Cedar,” in the Kempsey district, according to District Forester T. H. Wilshire.

**Timber.**—See vol. i, p. 182.

Yellow-wood, deep or dark. A medium-sized tree, with a thin, brown, scaly bark, much resembling that of red cedar (*Cedrela toona*), for which at first sight, it is sometimes mistaken. Wood of a rich, dark-yellow colour, and prettily grained. Highly prized for cabinet-work, railway-carriage fittings, turnery, and picture frames.—(*Catal. Queensland Forestry Museum*, 1904.)

**Habitat.**—See vol. i, p. 184.

It has been sent to me by Mr. Wilshire from the Parish of Kallatina, 14 miles from Kempsey, which remains its most southern recorded locality so far. Evenly distributed throughout this district, and generally found at the edges of the scrub or brush forests.—(District Forester Pope, Casino.) Not plentiful; occasional trees are met with in our coastal scrub.—(*Catal. Queensland Forestry Museum*, 1904.)

No. 31. Part IX.

*Gmelina Leichhardtii*, F.v.M.

THE WHITE BEECH.

(Natural Order *Verbenaceae*.)

**Timber.**—See vol. i, p. 186.

A large tree, with fairly smooth grey bark, rough dark-green leaves; trunk often crooked, irregularly shaped, and sometimes having buttresses at the base. Wood varies in colour, sometimes light-grey, pale-pink, and dark-brown; the first-mentioned being perhaps the most common. It is heavier than soft woods.
generally, close-grained, soft, and very easily worked. Shrinks very little, and is resistant to white ants. Used for verandah flooring, decking of vessels, joinery, cabinet-work, carving, and turnery. It stands exposure to the weather better than any of our soft timbers, excepting cypress pine (Callitris robusta).—(Catal. Queensland Forestry Museum, 1904.)

**Habitat.**—See vol. i, p. 188.

Mr. District Forester T. H. Wilshire, in reporting it from Kangaroo Creek, 30 miles from Grafton, says that a fair amount in log is shipped to Sydney.

As regards Queensland, the following is quoted from the official catalogue just referred to:

This timber, being much prized, was extensively used in former years; the quantity remaining now being limited. Occasional trees are, however, met with in some of our coastal scrubs, north and south, but generally in such places as are difficult of access.

No. 32. Part IX.

*Ventilago viminalis*, Hook.

**THE SUPPLE JACK.**

(Natural Order *Rhamnaceae*.)

**Timber.**—See vol. i, p. 192.

Timber of this species cut by me at Coolabah was very hard.

**Habitat.**—See vol. i, p. 193.

I have never found this species so far south as the Lachlan. It seems to extend from Cobar northwards, but may be in the country south-west of Cobar, towards the Darling.—(R. H. Cambage.)

North of this it is represented in the National Herbarium by such localities as Brewarrina (J. L. Boorman); Bourke (E. Betche); Coolabah (J.H.M.); Plains near Baradine (W. Forsyth).

**ILLUSTRATION.**

The photograph was taken near the Darling River, by Kerry & Co., Sydney.

No. 33. Part IX.

*Eucalyptus melliodora*, A. Cunn.

**THE YELLOW BOX.**

(Natural Order *Myrtaceae*.)

**Timber.**—See vol. i, p. 196.

Following are some additional northern opinions, or, rather, opinions on the timber as it is found in the north.

Wood is very good for fencing material, but for saw-milling and building purposes it is, in my opinion inferior to *E. hemiphloia*, Grey Box.—(W. Dunn, Acacia Creek, Macpherson Range.)

Yellow Box, *E. melliodora*, a very hard and durable timber, but has not been used on account, no doubt, of the difficulty of working it.—(Henry Deane, speaking of Glen Innes to Tenterfield trees.)
Eucalyptus melliodora, A. Cunn. TARCUTTA ROAD, N.S.W.
Mr. Deane says that much of this timber was used for posts and rails near Cudal on the Forbes line.

**Habitat.**—See vol. i, p. 197.

In the Kanimbla Valley; also in a paddock on Jack White’s Creek, half a mile from Hassan’s Walls. It is, of course, common on granite country, and in the localities cited it is either on granite or where the detritus from the sandstone ridges is not thick.—(R. H. Cambage and J.H.M., speaking of the Blue Mountain trees.)

The quantity is very limited, in this district, its habitat is on low lands with light sandy subsoil and about stockyards—(W. Dunn, Acacia Creek, Macpherson Range.)

**ILLUSTRATIONS.**

The photographs of this beautiful tree were both taken by Mr. W. Forsyth, on the Wagga Wagga-Tarcutta Road, New South Wales.

**No. 37. Part X.**

*Flindersia maculosa*, F.v.M.

**THE LEOPARD WOOD.**

(*Natural Order Meliaceae.*)


In *Catal. Queensland Forestry Museum*, 1904, there is quoted a *Flindersia Strzeleckiana*, var. *latifolia,*—I do not know on what authority, and the following notes are given concerning it:—

Not plentiful, but trees are often met with in southern coastal scrubs, usually in steep rugged country.

A rather small tree, having a grey and dark-brown spotted (leopard-like) bark. Wood yellow, close-grained, very tough and durable. It much resembles Crow’s Ash (*Flindersia*).

**Chief Uses.**—Not well known, and, consequently, not much used at present, but is, no doubt, very suitable for general building purposes. It bends well, and would make good staves for casks.

Specimens of the opposite leaved form were collected by Mr. R. Etheridge, at Dunlop Station, Louth, New South Wales.

**Early growth of the tree.**—See vol. i, p. 212.

I have drawn attention to the interesting dimorphism in this species.

In sending me a sketch of *Fraxinus oxyacarpa*, an Ash whose early growth is remarkably like that of *Flindersia maculosa*, Dr. L. Trabut, of Algiers, gives me the following note. This particular form of dimorphism would appear to be peculiar to desert plants.

We have also *Fraxinus dimorpha* of the Mountains of the South, which go to 1,700–2,200 metres (5,525–7,150 feet). It is, I believe, desert-loving, but its growth is very slow. It remains in the state of a *spinus* bush for fifteen or twenty years, then from the centre of the bush there rises a tree with leaves very different (dimorphic). The indigenes utilise it for cattle-feed.
No. 38. Part X.

Macadamia ternifolia, F.v.M.

THE QUEENSLAND NUT.

(Natural Order Proteaceae.)


No. 40. Part XI.

Sideroxylon australe, Benth. et Hook., f.

THE BLACK APPLE.

(Natural Order Sapotaceae.)


I am also sending you a piece of "Black Apple" wood which was in the old "Wilesbro'" house for eighty years. When the house was pulled down it was found that the "white ants" had eaten completely all the hardwoods, and some of the Beech and Cedar, but the "Apple" had been left entirely. I did not notice any piece showing any sign of decay either.—(Mr. Forest Guard George Tingcombe, Beechwood, Hastings River.)

Black Apple (called by some Plum), grows about 100 feet, 6 feet girth, trunk deeply ridged; timber brownish-yellow, useless except for firewood, good burner and chopper.—(Robert Kaleski, Dorrigo.)

No. 41. Part XI.

Angophora lanceolata, Cav.

THE SMOOTH-BARKED APPLE.

(Natural Order Myrtaceae.)

Timber.—See vol. ii, p. 17.

The "plastic" appearance of the trunk has been referred to. I would also like to draw attention to the fact that the branches of this tree display considerable tendency to fuse together when brought into contact, some of the combinations taking on a looping or anastomosing character, sometimes of a grotesque appearance. I am indebted for photographs exhibiting such phenomena to Mr. J. B. Henson, engineer of the Newcastle Water Supply, and the Hon. J. B. Nash, M.D., M.L.C., both of whom obtained their subjects in the Newcastle district, and to Mr. Keith Harris, whose pictures came from Hazelbrook, Blue Mountains.

Exudations.—See vol. ii, p. 18.
Anaphora lanceolata, Cav. NATIONAL PARK, SYDNEY.
Mr. Cambage pointed out to me that there is india-rubber in *Angophora lanceolata* leaves, which I confirmed. It is common enough in the closely-related “Corymbose” section of the genus *Eucalyptus*.

**Size.**—See vol. ii, p. 18.
Mr. Boorman and I measured, on Milson Island, Hawkesbury River, a tree 13 feet 6 inches in circumference at 4 feet from the ground.

**Habitat.**—See vol. ii, p. 18.
The locality, “Lower Lachlan,” has not been confirmed. Does anyone confirm it?
Mr. Forest Guard W. Dunn records it from the highlands between Acacia Creek and Wilson’s Downfall.

**ILLUSTRATION.**
The photo was taken by Mr. W. Forsyth at the National Park, Sydney. The dark stain on the trunk is a flow of kino.

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**No. 43. Part XII.**

*Eucalyptus corymbosa*, Sm.

**THE BLOODWOOD.**

(Natural Order Myrtaceae.)

**Aboriginal Names.**—See vol. ii, p. 21.
The aboriginal name given me by an aboriginal woman for this tree is “Cooloul” or “Coolool,” at Ulladulla.—(R. H. Cambage.)

Seeds of this species from the Port Jackson district are plump, with solid angles, and with little or no wing. As one proceeds northwards the seeds flatten and become more winged. By the time Rockhampton, Queensland, is reached, the seeds are very flat, and resemble Casuarina seeds. The timbers are red, and appear to be like that of the common bloodwood in each case. Eucalyptus seeds are worthy of fuller investigation.

**Timber.**—See vol. ii, p. 25.
Again, there is the bloodwood of this district, in my opinion equal to ironbark for railway-sleepers. I have asked the Commissioners to give it a trial alongside ironbark, and see which had longest life. They refuse, but do not say why. I have had it in the ground over twenty years, and still good ironbark is getting scarce, and the bloodwood of this district is a good substitute. I have taken great interest in the timbers of this and the Clarence district for the last twenty-five years, so am not writing about what I do not understand.
There is no doubt our timber should be a better asset for New South Wales than it is. The waste at the present time is enormous, and, to a very large extent could be remedied if competent men had the looking after our forests.—(W. T. Pullen, Woolgoolga.)

It seems to always grow on sedimentary formation.—(R. H. Cambage.)
Callitris.

THE CYPRESS PINES OF NEW SOUTH WALES.

(Natural Order Coniferae.)

Timber.—See vol. ii, p. 33.

So far as I am aware, no results of oil distillation of any of our native Cypress Pine timbers has yet been published. The following results obtained in regard to the closely-allied C. quadrivalvis of North Algiers (now looked upon as Tetraclinis) will, therefore, be of interest:

Oil from Callitris quadrivalvis.—By distilling the sawdust of Callitris quadrivalvis, Vent. (*Thuja articulata*, Vahl.), of Algeria, which yields the sandarac resin, E. Grimal* obtained 2 per cent. of a red-brown essential oil, possessing a phenol-like odour. It dissolves in every proportion in 80 per cent. alcohol, rotates in alcoholic solution to the left, and has the specific gravity 0·991 at 15°. It boils between 230° and 306°, leaving a resinous residue. It contains about 5 per cent. phenols, consisting of carvacrol and hydrothymoquinone. In addition to these, thymoquinone was detected.—(Semi-annual Report of Schimmel & Co., April-May, 1905, p. 12.)

No. 44. Part XII.

Callitris Macleayana, F.v.M.

Habitat.—See vol. ii, p. 39.

Clarence Town.—(Forest Guard Ikin.)

No. 45. Part XII.

Callitris verrucosa, R.Br.

Aboriginal Name—

Murrumbidgee Pine, near Tumut, called “kara” by the aborigines.—(Dr. G. Bennett, “Wanderings in N.S.W.,” i, 263.)

Size (and Habitat).—See vol. ii, p. 41.

This tree differs somewhat from a Mallee (*Eucalyptus*) in its form of growth, as it usually has a trunk, though at times only a few inches in length, and seldom more than 6 inches. Often it begins to spread level with the surface of the ground, but it always had the appearance of branching rather than sending up separate stems like a Mallee.—(R. H. Cambage.)

Among the Mallee about here (Mount Hope to Parkes) there is often a spreading Pine (*Callitris verrucosa*, R.Br.), which grows with a short stem, and branches out almost from the ground. The fruits are larger than those of *C. robusta*, and are covered with pimples or warts full of a resinous substance South of the Lachlan this tree is sometimes called Turpentine.—(R. H. Cambage, *Proc. Linn. Soc. N.S.W.*, 1901, p. 208.)

Habitat.—See vol. ii, p. 41.

Warialda, N.S.W. (Rev. H. M. R. Rupp). Fruits covered with tubercles, but tubercles smaller than in the type. Specimens like this show the difficulty of classifying Callitris.

* Compt. Rend. 139 (1904), 927.
Calitris robusta, R.Br. TARCUTTA ROAD, N.S.W.

Calitris robusta, R.Br. NEAR WAGGA WAGGA, N.S.W.
Callitris cupressiformis, Vent. PORT JACKSON.

Callitris cupressiformis, Vent. PORT JACKSON.
Callitris calcarata, R.Br.

Habitat.—See vol. ii, p. 59.

Thirty-five miles from Grafton, near Dalmorton, on the Little River. Plenty on the rocky banks. Sent to the mill at South Grafton (J. L. Boorman and J.H.M.); Howell (R. Hart); Warialda (H. M. R. Rupp, J. L. Boorman, J.H.M.); Acacia Creek, Macpherson Range (W. Dunn).

ILLUSTRATIONS.
The four photographs of Cypress Pines were taken by Mr. W. Forsyth. Callitris robusta: single tree from near Wagga Wagga; the row of trees is taken from the side of the Wagga Wagga-Tarcutta Road. Callitris cypressiformis: both the single tree and the clump are taken at Pearl Bay, Port Jackson.

Eucalyptus sideroxylon, A. Cunn.

THE MUGGA; A RED IRONBARK.

(Natural Order Myrtaceae.)

Varieties.—See vol. ii, p. 66.

Under the above name I have discussed Bentham’s variety pallens of E. leucoxylon.

I have raised this to a species under the name E. Caleyi.* It is a Red Ironbark, and much esteemed as a timber tree in the districts in which it grows.

It will be figured and fully described in due course.

Hybridisation.—E. sideroxylon is a species which readily hybridises, with the Boxes, at any rate. Some of the hybrids are so like E. sideroxylon that it is difficult to distinguish them unless the trees be seen or a complete suit of specimens, including juvenile foliage, be available. E. sideroxylon has narrow juvenile foliage, and hence is readily seen to be different from a number of broad-foliaged trees more or less related to it. I have dealt with the matter of hybridisation in Eucalypts, as far as this and other species are concerned, in Proc. Linn. Soc. N.S.W., 1905, p. 492.

Aphananthe philippinensis, Planch.

THE NATIVE ELM.

(Natural Order Urticaceae.)

Habitat.—See vol. ii, p. 73.

Mr. R. H. Cambage informs me that he has collected this species at Stroud, which remains its most southern recorded locality so far.

Casuarina lepidophloia, F.v.M.

THE BELAH.

(Natural Order Casuarinaceae.)

Leaves (Branchlets).—See vol. ii, p. 80.

Chiefly used for feeding stock in dry times, and is considered one of the best Oaks for this purpose.

—(District Forester C. Marriott, Dubbo.)

Timber. — See vol. ii, p. 81.

The timber has been incidentally, though not formally, described by me.

The character of this timber is its absence of figure, most remarkable for a She-oak. The outer portion (not the sap-wood, which is very narrow) is pale-coloured, while the inner portion is of a rich, reddish brown, or even chocolate colour.

Hard to cut or saw, but splits freely with the grain.—(District Forester C. Marriott.)

Habitat. — See vol. ii, p. 82.

Generally found in gilgai country. Plentiful in this district.—(District Forester Marriott, Dubbo.)

Acacia Creek, Macpherson Range.—(Forest Guard W. Dunn.)

Heterodendron oleafolium, Desf.

THE WESTERN ROSEWOOD.

(Natural Order Sapindaceae.)

Vernacular Names. — See vol. ii, p. 86.

Heterodendron oleafolium is known here (Pangee to Nymagee) and to the eastward, towards Dubbo, both as Rosewood and Whitewood, the confusion having probably arisen in the following manner:—North of Nyngan and around Bourke the tree known as Whitewood is Atalaya hemiglauca; and the wood, which is not extremely hard for a western timber, is white right through. It is seldom to be found to the south of Nyngan, but the other tree, Heterodendron oleafolium, is, and in young trees the wood is all white, while the bark somewhat resembles that of Atalaya hemiglauca, which partly accounts for the confusion. In mature trees of Heterodendron oleafolium, which reach a height of 40 feet, with a diameter up to 2 feet, the centre wood turns red, which suggests the name of Rosewood, and it is exceedingly hard, though not tough. Near Nymagee I have known large trees of it called Ironwood, owing to the hardness of the wood. Through having white wood when young and red wood when mature, is another and probably the chief reason why the tree has the two names of Whitewood and Rosewood, for I found that on some holdings they are considered two species. Between Bourke and Cobar it is seldom much more than a shrub, with pale glaucous leaves, and is one of the plants known as Blue Bush, though on Gundabooka Station I have heard it called Rose Bush as well.—(R. H. Cambage, Proc. Linn. Soc. N.S.W., 1901, p. 200.)

"Cabbage Bush" and "Bullock Bush."—(Assistant Forester Andrew C. Loder, Broken Hill.)
Aboriginal Names.—See vol. ii, p. 86.

Its aboriginal name on the Lachlan is “Beernan,” and towards the Bogan it is “Ruba.”—(R. H. Cambage, loc. cit.)

Leaves.—See vol. ii, p. 86.

The leaves are much in request for fodder, and if the branches be lopped, young shoots will grow freely, giving the tree a very pretty appearance, although generally it is by no means an umbrageous species.—(R. H. Cambage, loc. cit.)

The best fodder-tree of the west, superior to the Mulga (Acacia aneura), on account of its fattening capabilities, and also because it will stand heavier lopping, being much harder than the “Mulga.”—(Assistant Forester Andrew C. Loder, Broken Hill.)

Habitat.—See vol. ii, p. 86.

In New South Wales the species extends at least as far south as the Murrumbidgee, generally growing on good soil and avoiding rocky situations. . . . On the Lachlan and about Trangie, on the Western railway line, are places where it seems to attain its greatest size.—(R. H. Cambage, loc. cit.)

Additional localities in the National Herbarium, Sydney, are:—Page River, Scone district, the most easterly locality recorded (J.H.M.); Mt. Dangar, Gungal, leaves rather broader and greener than in the western specimens (J. L. Boorman); Narrabri (J.H.M.).

No. 56 (55). Part XIV.

Owenia acidula, F.v.M.

THE GRUIE or COLANE.

(Natural Order Meliace.e.)

Aboriginal Names.—See vol. ii, p. 90.

In stating that the fruit is eaten raw by the aborigines of Northern Queensland, Dr. W. E. Roth (North Queensland Ethnography, Bulletin No. 3) gives the native names on the Cloncurry as “Eldin” and “Uroka.”

Habitat.—See vol. ii, p. 91.

I have seen this south of Bourke, but not so far south as Colar.—(R. H. Cambage.)

No. 57 (56). Part XIV.

Eucalyptus stellulata, Sieb.

THE BLACK SALLY.

(Natural Order Myrtaec.e.)

For a fuller botanical account of this species, see my “Critical Revision of the Genus Eucalyptus,” Part V.—(Government Printer, Sydney.)
Variety.—See vol. ii, p. 92.

This form is also figured at D. and E. of plate 54. Mr. Cambage and I have described it as a new species under the name of *E. Moorei*. It is sharply separated from *E. stellulata* by its narrow suckers.

Following is the formal description:

**Eucalyptus Moorei**, sp. nov.

_Syn. E. stellulata*, Sieb., var. *angustifolia*, Benth., B.Fl. iii, 291. See also further synonymy in Maiden’s “Critical Revision of the Genus *Eucalyptus*,” V. 129, together with figs. 5a, 5b and 6 of Plate 25.

An erect, rather slender shrub of up to 10 or 12 feet in height, with a stem diameter of 2 to 4 inches. It forms dense masses of small area, reminding one somewhat of a whipstick Mallee, but lacking the root stockiness of that form of *Eucalyptus* growth.

**Juvenile leaves** narrow-lanceolate, glaucous blue, the plant sometimes flowering while still in the opposite-leaved stage. Leaves profusely dotted with oil-glands.

**Mature leaves.**—“Leaves narrow, very thick and smooth, scarcely showing the venation” (Benth.). Shiny on both sides; the tips of the leaves often hooked.

**Buds** arranged in stellate clusters with longish sharply-pointed opercula. Opercula sometimes red in fresh specimens.

**Flowers** in dense heads of four or five to ten and even more; anthers small and reniform. Borne in profusion in the axils of the leaves.

**Fruits** in dense heads, say half an inch in diameter. The common peduncle absent or very short; the pedicels always wanting. The individual fruits of the size of a peppercorn, smooth (often dotted when fresh), rim narrow, and valves always sunk.

**Bark** smooth, with the outer bark peeling off in ribbons.

**Timber** pale, nearly white.

**Habitat.**—On the highest parts of the Blue Mountains.

**Affinities.**—(1) Its affinity with *E. stellulata*, Sieb., is very close, and it has been long looked upon as a variety of that species. The forms are, however, sharply separated by the broad juvenile foliage of *E. stellulata*. The mature foliage of *E. stellulata* is also, as a rule, much broader, while *E. stellulata* attains the dignity of a medium-sized tree.

(2) Its affinity to the narrow-leaved form of *E. stricta*, Sieb., has already been indicated by Bentham (B.Fl. iii, 201), and, when mature leaves are alone available, it is very difficult and perhaps ordinarily impossible to distinguish the two species. The juvenile leaves, buds and fruits, however, sharply separate them.

It is named in honour of the late Charles Moore, for many years Director of the Botanic Gardens, Sydney.—(*Proc. Linn. Soc. N.S.W.*, 1905, p. 191.)

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**Casuarina glauca**, Sieb.

**THE SWAMP OAK.**

*(Natural Order Casuarinaceae.)*

**Habitat.**—See vol. ii, p. 98.

**NEW SOUTH WALES.**

There is a very fine row of this species along the creek (which I am informed is brackish) at Edensor Park (Mr. William Harris), 4½ miles from Liverpool, on the road to Badgery’s Creek.
Ficus Henneana, Miqu. NATIONAL PARK, SYDNEY.
I also found this species on the road from Liverpool to Bringelly, near Cabramatta (the old village of that name, now called Rossmore). The water here is also brackish in a dry time. Here we have localities at a considerable distance from the sea-shore, or tidal water, showing that the species is not exclusively confined to the coast. It has also been proved to be an inland species in New South Wales, and much more inland than in Western Australia. It would appear, therefore, that both in New South Wales and in Western Australia the vicinity of brackish water is necessary for the existence of this species.

Acting District Forester W. F. Crowley has sent this “Swamp Oak” to me from Bodalla and Bermagui, the latter being the most southerly locality known to me.

No. 59 (58). Part XIV.

*Ficus Henneana, Miq.*

_A DECIDUOUS FIG._

(Natural Order _Urticaceae_.)

_ILLUSTRATION._

The photograph of this tree was taken at Wentworth Hut, National Park, by Mr. H. Linsell, and referred to in some detail at vol. ii, p. 101.

No. 60. Part XV.

*Acacia melanoxylon, R.Br.*

_THE BLACKWOOD._

(Natural Order _Leguminosae : Mimoseae_.)

_Habitat._—See vol. ii, p. 111.

For the sake of clearness it may be stated that the Blackwood is abundant on the table-land, and on the edges and slopes of the table-land in such southern localities as far north as Barrengarry Mountain and the Kangaroo Valley generally, Cambewarra Mountain, the Berry Mountain, Robertson, and the Macquarie Pass. What its most northerly locality is south of Sydney, I do not know, but as the species approaches Sydney, it greatly diminishes in size.

Amongst Sydney localities I have it from Carlton (Mr. Clarke), and Lane Cove (Mr. E. A. Smith), probably both from spontaneous trees.

North of Port Jackson I have it from Gentleman’s Halt, Hawkesbury River (A. Murphy).
No. 61. Part XIV.

_Eucalyptus coriacea_, A. Cunn.

A WHITE or CABBAGE GUM.

(Natural Order _Myrtaceae_.)

For a fuller botanical account of this species, see my “Critical Revision of the Genus _Eucalyptus_,” Part V.—(Government Printer, Sydney.)

No. 62. Part XV.

_Casuarina Cunninghamiana_, Miq.

THE RIVER OAK.

(Natural Order _Casuarinaceae_.)

Aboriginal Names.—See vol. ii, p. 119.

No. LXXI of Mr. Charles Moore’s specimens of northern woods sent to the London Exhibition of 1862 has the aboriginal name of “Worgnal,” and is thus described by Mr. Moore:—“Swamp Oak; damp situations in open forest country. A very common tree, attaining a large size on the Richmond. Timber used occasionally for staves and shingles.”

Mr. Moore, however, calls it _C. quadrivalepis_; it is probably, from the description, _C. Cunninghamiana_.

Habitat.—See vol. ii, p. 120.

Under _C. glauca_ (Swamp Oak), I have already discussed its relations to the brackish nature of the soil. In the following interesting observations by Mr. R. H. Cambage, he has discussed the matter also, but more particularly in regard to the localities of growth of _C. Cunninghamiana_. I trust that the matter will lead to further inquiry:—

_C. Cunninghamiana_ is, so far as I have been able to observe, purely a fresh-water tree, and must not be confused with the Swamp Oak, _C. glauca_, often found near salt water along the coast. The former, in addition to growing near fresh water, is generally an indication of good drinking water, while the latter, though usually on salt flats, will sometimes follow up fresh-water creeks; but in such cases it often happens that the stream is sluggish, and the water brackish. A remarkable instance of how trees are sometimes restricted to their proper conditions occurs at the head of Burrill Lake, near Ulladulla. This inlet is chiefly supplied with ocean water, and in many places on the flats around its margin there are trees of _C. glauca_ (Swamp Oak), which extend westward practically as far as the salt water goes, a distance of about 4 or 5 miles. At this point, the lake assumes the form of a salt-water river, which again narrows at a slightly higher level into a fresh-water creek. Oak trees may be seen continuing up the fresh-water stream, known as Woodstock Creek, for a distance of scarcely half a mile; but, curiously, these are not _C. glauca_ at all, but _C. Cunninghamiana_, which, with their finer branchlets and smaller fruits, can easily be distinguished from the former species. Above the point where the oaks cease, the creek soon becomes smaller, and is scarcely what is considered large enough to boast of oak trees, while below the River Oaks the water is salt. The nearest point to this at which _C. Cunninghamiana_ may be found is on the Clyde River, about a dozen miles westerly across mountains exceeding 1,000 feet high. The formation immediately surrounding the fresh-water oaks is Plutonic, but the country drained by the headwaters of the
Casuarina Cunninghamiana, Miq. NEPEAN RIVER, N.S.W.
creek is Permo-Carboniferous. It has been suggested to me that possibly these few oak trees are the surviving descendants of a once numerous assemblage in prehistoric times. It is believed that there has been an alteration in the relative levels of the land and sea on the east coast during recent geological times; and that the coast-line formerly extended as far to the east as the edge of the continental shelf (the present 100-fathom line).* In this case the land around Burrill was formerly higher, and the salt water would have kept back at least some miles to the eastward. Under these conditions, the present bed of Burrill would be occupied as a small fresh-water river, probably lined on both sides with River Oaks. As the alteration of level progressed, the salt water would be likely to encroach and destroy all the fresh-water oaks except the few under discussion; and had the alteration continued longer, even all trace of these might have disappeared. At the same time, too, the altered conditions would be likely to induce the westerly extension of the salt-water Swamp Oak to its present limit.

There appears to be geological evidence to support this view, and I have collected fossils near the mouth of Burrill, at present water-level, and similar ones again on the top of the Pigeon House, 2,360 feet higher, and about a dozen miles to the westward, which prove the formation in both cases to be the same, viz., Permo-Carboniferous.

Altogether the case presents some interesting features, and is one in which the study of the geological changes might be assisted by a knowledge of botany (Plate xxxiii).—(Proc. Linn. Soc. N.S.W., p. 687.)

ILLUSTRATION.

The photo, by Mr. W. Forsyth of a young tree was taken on the banks of the Nepean River near its junction with the Warragamba River.

No. 63. Part XV.

*Atalaya hemiglauca*, F.v.M.

THE WESTERN WHITEWOOD.

*(Natural Order Sapindaceae.)*

**Vernacular Names.**—See vol. ii, p. 123.

According to the *Catal. of Queensland Forestry Museum*, 1904, it would appear to be known in that State under the name of Western Tulip Wood.

**Aboriginal Name.**—See vol. ii, p. 123.

"Bulcan" in western New South Wales.—(R. H. Cambage.)

**Timber.**—See vol. ii, p. 123.

The wood of this tree is attacked by a boring insect almost as soon as cut. I have known miners use it in pegging land. In two months the pegs were riddled, and each stood in a little heap of sawdust.—(R. H. Cambage, *Proc. Linn. Soc. N.S.W.*, 1900, p. 592.)

It would appear to be of darker colour in Queensland than in New South Wales from the following passage:

Sap-wood very light-red; the heart-wood having dark-red or nearly black patches or streaks, close-grained and hard. Used for turnery and cabinet-work.—(*Catal. of Queensland Forestry Museum*, 1904.)

**Habitat.**—See vol. ii, p. 124.

As regards Queensland, the catalogue just referred to says:

Plentiful in St. George, Goondiwindi, and in scattered parts of Inglewood districts.


No. 64. Part XVI.

*Acacia pendula*, A. Cunn.

**THE WEEPING MYALL.**

(Natural Order *Leguminosae*: *Mimoseae*.)

**Timber.**—See vol. ii, p. 127.

Miss Ada Wythes, of Tomingley, informs me that the abundant saline ash of Myall wood is often used by bushmen in the preparation of damper, while housewives, in the districts in which the tree grows, often use it for the purpose of whitening fireplaces.

No. 65. Part XVI.

*Eucalyptus amygdalina*, Labill.

**A PEPPERMINT.**

(Natural Order *Myrtaceae*.)

For a fuller botanical account of this species, see my "Critical Revision of Genus Eucalyptus," Part VI.—(Government Printer, Sydney.)

No. 66. Part XVI.

*Casuarina torulosa*, Ait.

**THE FOREST OAK.**

(Natural Order *Casuarinaceae*.)

**Habitat.**—See vol. ii, p. 136.

Terry’s Paddock, Eastwood, is the nearest locality to Sydney known to me. It is found at Acacia Creek, Macpherson Range, according to specimens received from Mr. Forest Guard W. Dunn, who says it "attains a height of 25 or more feet."

No. 67. Part XVI.

*Siphonodon australis*, Benth.

**THE IVORY WOOD.**

(Natural Order *Celastraceae*.)

**Vernacular Names.**—See vol. ii, p. 139.

Sometimes also called "Bone-wood."

**Bark.**—See vol. ii, p. 139.

Has a rough soft bark, all'ng away by rubbing, and showing a decided yellow cost underneath—a ready means of distinguishing it from all others.—(Forest Guard W. Dunn)
Casuarina stricta, Ait. OTFORD–STANWELL PARK.
Size.—See vol. ii, p. 139.

A very tall, straight-stemmed tree of 80-100 feet high, having a girth 6-8 feet.—(W. Dunn and J. L. Boorman.)

Fruit.—See vol. ii, p. 139.

Mr. W. Dunn has sent (end of January) some dead-ripe fruits of this tree. They are of a bright yellow colour, nearly spherical, rather larger than shown in the plate. The fleshy portion is rather paler than the outside, sweetish and luscious, and must be very acceptable to fruit-eating birds and animals. It has a pleasant odour, resembling that of pears.

When ripe it is so soft that it will not carry well. It must certainly be added to our list of edible native fruits. My experience of it is limited. I ate it and enjoyed it, and no evil consequences have resulted so far.

No. 68. Part XVII.

*Casuarina stricta*, Ait.

**THE DROOPING SHE-OAK.**

(Natural Order *Casuarinaceae*.)

Habitat.—See vol. ii, p. 144.

Following is an abstract of a paper:—

_Notes on the Native Flora of New South Wales._—Part IV. The Occurrence of *Casuarina stricta*, Ait., on the Narrabeen Shales:—

*Casuarina stricta* is one of the She-oaks found chiefly in the southern part of Australia, including Tasmania; and it is also common in the interior of New South Wales. The author recently found it growing on the Narrabeen Shale formation at Newport. The shales dip southerly from Narrabeen, and pass under Port Jackson at a depth of nearly 1,000 feet, but outcrop again at Otford and Stanwell Park, where *C. stricta* also reappears. The theory is advanced that in late or Post-Tertiary time this species flourished on what is now regarded by geologist as the submerged continental shelf, but which formerly was a continuation of the present land surface, extending, perhaps, 20 miles easterly to the 100-fathom line. As the Narrabeen Shales in the vicinity of Port Jackson also rise to the eastward, they will probably have formed the surface in places beyond the present shore-line; and it is suggested that *C. stricta* worked its way up from the south, partly along this old land surface, but, owing to the subsidence, has all been destroyed with the exception of these isolated remnants at Newport, Otford, and Jervis Bay. Evidence is advanced to show that the species is one of great antiquity, ante-dating the time when Tasmania ceased to be connected with the mainland, and having adapted itself both to the conditions of cold in Tasmania and the heat of Central New South Wales.—(R. H. Cambage, _Proc. Linn. Soc. N.S.W._, 1905.)

With reference to the note at p. 144 on its occurrence on the Narrabeen Shales, Mr. A. G. Hamilton states that it occurs 100 feet higher than the pit-mouth at Mount Kembla, on this formation.

**ILLUSTRATION.**

The photograph (by Mr. R. H. Cambage) was taken at the Otford—Stanwell Park locality referred to.
No. 72. Part XVIII.

Eucalyptus regnans, F.v.M.

THE GIANT GUM TREE.

(Natural Order Myrtaceae.)

For a fuller botanical account of this species, see my “Critical Revision of the Genus Eucalyptus,” Part VII.—(Government Printer, Sydney.)

No. 75. Part XIX.

Eucalyptus dives, Schauer.

THE BROAD-LEAVED PEPPERMINT.

(Natural Order Myrtaceae.)

For a fuller botanical account of this species, see my “Critical Revision of the Genus Eucalyptus,” Part VII.—(Government Printer, Sydney.)
PART XI (ISSUED SEPTEMBER, 1904).
No. 39.—The Forest Red Gum (Eucalyptus tereticornis, Sm.).
No. 40.—The Black Apple (Sideroxylon australe, Benth. et Hook. f.).
No. 41.—The Smooth-barked Apple (Angophora lanceolata, Cav.).
No. 42.—Scolopia Brownii, F.V.M.

PART XII (ISSUED NOVEMBER, 1904).
No. 43.—The Bloodwood (Eucalyptus corymbosa, Sm.).
The Cypress Pines of New South Wales (Genus Callitris):
No. 44.—Callitris Macleayana, F.V.M.
No. 45.—Callitris verrucosa, R.Br.
No. 46.—Callitris robusta, R.Br.
No. 47.—Callitris columnaris, F.V.M.
No. 48.—Callitris Muelleri, Benth. et Hook. f.
No. 49.—Callitris propinqua, R. Br.
No. 50.—Callitris calcarata, R.Br.
No. 51.—Callitris cupressiformis, Vent.

PART XIII (ISSUED NOVEMBER, 1904).
No. 52.—The Mugga; a Red Ironbark (Eucalyptus sideroxyylon, A. Cunn.).
No. 53.—The Native Elm (Aphananthe philippinensis, Planch.).
No. 54.—The Belah (Casuarina lepidophloia, F.V.M.).
No. 55.—The Western Rosewood (Heterodendron oleaefolium, Desf.).

PART XIV (ISSUED FEBRUARY, 1905).
No. 56.—The Gruie or Colane (Owenia acidula, F.V.M.).
No. 57.—The Black Sally (Eucalyptus stellulata, Sieb.).
No. 58.—The Swamp Oak (Casuarina glauca, Sieb.).
No. 59.—A Deciduous Fig (Ficus Henneana, Miquel).
(N.B.—The numbers of Part XIV are given erroneously in the text.)

PART XV (ISSUED MARCH, 1905).
No. 60.—The Blackwood (Acacia melanoxylon, R.Br.).
No. 61.—A White or Cabbage Gum (Eucalyptus coriacea, A. Cunn.).
No. 62.—The River Oak (Casuarina Cunninghamiana, Miq.).
No. 63.—The Western Whitewood (Atalaya hemiglaucu, F.V.M.).

PART XVI (ISSUED JUNE, 1905).
No. 64.—The Weeping Myall (Acacia pendula, A. Cunn.).
No. 65.—A Peppermint (Eucalyptus amygdalina, Labill.).
No. 66.—The Forest Oak (Casuarina torulosa, Ait.).
No. 67.—The Ivory Wood (Siphonodon australis, Benth.).

PART XVII (ISSUED OCTOBER, 1905).
No. 68.—The Drooping She-Oak (Casuarina stricta, Ait.).
No. 69.—The River White Gum (Eucalyptus numerosa, Maiden).
No. 70.—The Native Teak (Flindersia australis, R.Br.).
(Two Plates)

PART XVIII (ISSUED NOVEMBER, 1905).
No. 71.—The Cudgerie (Flindersia Schottiana, F.V.M.).
(Two Plates)
No. 72.—The Giant Gum Tree (Eucalyptus regnans, F.V.M.).
No. 73.—The Black She-Oak (Casuarina suberosa, Otto et Dietr.).

PART XIX (ISSUED JANUARY, 1906).
No. 74.—The Yellow-wood (Flindersia Oxleyana, F.V.M.).
No. 75.—The Broad-leaved Peppermint (Eucalyptus diven, Schauer.).
No. 76.—The Bull Oak (Casuarina Luehmanni, R. T. Baker).
(Two Plates)