

TASMANIAN EUCALYPTS.

By L. Rodway, C.M.G., Government Botanist.

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There are about twenty-two, more or less unstable, forms of Eucalypts native of Tasmania which may be regarded as distinct species. The variations of some of these are very puzzling to the student, and have been responsible for much confusion. Some of the species respond profoundly to change of conditions, especially soil. Hybridisation is fairly common with many species, and is responsible for some temporary confusion, and perhaps permanent change. There is a further evolution progressing in response to internal and unknown causes, not in the small fluctuating variation present in the offspring of every organism, but in sudden mutation. With some of our species, especially Blue Peppermint, from seed carefully gathered off the one tree, it is common to find conspicuous distinction of form amongst the offspring. There is a large field of research in all three forms of variability open to the student; very little has been done, and we shall not properly understand the limitation of species until it is.

Students must recognise that no two eucalypts or any other organism are exactly alike. We seize upon a convenient form and call it the type of a species, and all beings that conform within a restricted but arbitrary degree to this we group together and call it a species. There is no such thing as a species in nature.

The Eucalypts of Tasmania may be grouped as follows:--

- Black Peppermint = *Euc. amygdalina*, Lab.
- White Peppermint = *Euc. linearis*, Denh.
- Blue Peppermint = *Euc. risdoni*, Hook.
- False Blue Gum = *Euc. hypericifolia*.
- Broad-leaved Peppermint = *Euc. nitida*, Hook.
- Mountain Peppermint = *Euc. coccifera*, Hook.
- Messmate = *Euc. obliqua*, L'Her.
- Gum-topped Stringy = *Euc. gigantea*, Hook.
- Swamp Gum = *Euc. regnans*, F.v.M.
- Mountain Ash = *Euc. sieberiana*, F.v.M.
- White-topped Stringy = *Euc. sieberiana* variety.

- Weeping Gum = *Euc. pauciflora*, Sieb.
 Blue Gum = *Euc. globulus*, Lab.
 White Gum = *Euc. viminalis*, Lab.
 Candlebark = *Euc. rubida*, Deane and Maiden.
 Cider Gum = *Euc. gunnii*, Hook.
 Perrin's Gum = *Euc. perriniana*, F.v.M.
 Mueller's Gum = *Euc. muelleri*, T. B. Moore.
 Dwarf Gum = *Euc. vernicosa*, Hook.
 Urn Gum = *Euc. urnigera*, Hook.
 Heart-leaved Gum = *Euc. cordata*, Lab.
 Ovate Gum = *Euc. ovata*, Lab.
 Apple-scented Gum = *Euc. stuartiana*.

All these fall into two natural sections, which for brevity we will call Sections A and B. Trees belonging to these are very distinct to the expert, but it is not always apparent to the student. There is one clear distinction between the two sections which, though small, indicates a radical divergence, and that is in the shape of the anthers. In A the two halves of the anthers diverge so as to cause it to assume the shape of a kidney. In B the two halves are straight and parallel.

The first eleven in the list belong to A. Besides the shape of the anthers there is a general resemblance. The flowers, except in one form of *Mountain Peppermint*, are numerous in the umbel. The veins of the leaf are few, and tend more to a longitudinal than a divergent course.

To B belong the rest. Except in *Ovate* and *Apple-scented Gum*, the flowers are in three or one, only abnormally in more. The veins are numerous, diverging, and netted.

In Section A there are two sub-sections, the *Peppermints* and the *Messmates*, or *Stringies*. The *Peppermints* mostly have narrow, equal-sided leaves, and the capsules are not at all constricted at the mouth. The *Stringies* have leaves with one half larger than the other, and the capsule constricted at the mouth. *Mountain Ash* and *Weeping Gum* may be recognised from the other *Stringies* by the very longitudinal veins.

Section B is not capable of being split up into natural groups. *Blue Gum*, and sometimes *Dwarf Gum*, bears single flowers. *Ovate* and *Apple-scented* have more than three flowers in the umbel. *White* and *Candlebark* have very protruding valves to the fruit, and usually oblique leaves. All the rest, together with *Dwarf Gum*, are a group closely related to *Cider Gum*.

The following descriptions will aid in recognition.

Black Peppermint (*Euc. amygdalina*, Lab.).—Usually a small tree, but often remaining only of the dimensions of a shrub. Slow growing, and on good land readily smothered by more robust competitors. The leaves are long, narrow, straight, or slightly unequal-sided, usually under one centimetre in diameter; substance thick, surface often shining, veins few and not widely diverging. Flowers about seven to nine in the umbel, clavate in bud with a very short, nearly flat, operculum. The fruit is almost hemispheric, tapering at the base into a short stalk; the orifice is usually flat or convex, not at all or but slightly constricted, valves not protruding, rim broad, four to six millimetres diameter. The bark is fibrous and persistent in the typical trees, but is very variable, leaving no clear line of demarkation between *Black* and *White Peppermints*.

The juvenile leaves of *Black Peppermint* are opposite, sessile, linear, and more or less rough, with glands. The timber of all the *Peppermints* is very durable.

In the neighbourhood of St. Mary's Pass Mr. Irby observed in the forest of mixed *Mountain Ash* and *Black Peppermint* a few trees which differed from either, but were called *Black Peppermint* by local inhabitants. The trees were medium-sized, with a rough, persistent, semi-fibrous bark. The juvenile leaves were narrow, opposite, and sessile, very like those of *Black Peppermint*. The mature leaves also resembled the leaves of that species, only tended to grow much longer. Flowers and fruit smaller than, but much like those of, *Mountain Ash*. Fruit is pear-shaped, much restricted at the orifice, rim narrow, valves deeply sunk; stalks slightly flattened. R. T. Baker described it as a new species under the name of *Euc. taniola*, but it seems probable it is a hybrid between *Black Peppermint* and *Mountain Ash*.

White Peppermint (*Euc. linearis*, Denh.).—Always a small tree, whose natural habitat is on basaltic hills, where the more robust species cannot freely establish themselves. In the typical tree the bark is not at all fibrous, and scales off to the base, leaving the trunk white and smooth. The leaves are very narrow, but those of the seedlings are smooth, broader, and more oblong or ovate than those of *Black Peppermint*. The flowers and fruit are also as in that species, but smaller. Intermediate specimens between the two species are common.

Blue Peppermint, also known as *Risdon Gum*, sometimes *Cabbage Gum* or *Bastard Blue Gum* (*Euc. risdoni*, H.)

—A small tree, growing often in the driest and most unpromising places. It varies greatly in response to the conditions in which it finds itself, but also the seeds gathered from a tree will often show great difference on germination.

The type form of *Blue Peppermint* has foliage of an ashy-blue colour, leaves nearly as broad as long, shortly pointed or blunt, opposite, the leaves broadly combined with one another across the stem. This is the form found on very dry mudstone hills. When the soil is still poor, but moisture available in greater quantity, the tree grows out of the juvenile foliated condition. The leaves become alternate, stalked, lanceolate, acute, nearly or quite equal-sided, but still much broader than those of *Black Peppermint*. This form is often referred to as *variety elata*, but it is only the normal development of the type form. In better country *Blue Peppermint* cannot live, because it is smothered out by more rapidly growing species. But where artificial or some accident may permit it to grow on good land, the leaves become smaller and narrower, approximating those of *Black Peppermint*, from which they can only be distinguished by more copious venation, and at least some pale bloom covering the surface. The bark is always scaly at the base, and smooth pale above. The buds are many in the umbel, club-shaped, with small, nearly flat, opercula, averaging one centimetre in length. The fruit is somewhat variable in size and shape, a half to one centimetre long and broad, hemispheric, with a flat top to almost pear-shaped, and the top slightly depressed. In a bed of typical *Blue Peppermint*, as, for instance, along the Huon-road, about two miles from Hobart, all variations of fruit are found. Some of the trees, both in foliage and fruit, are indistinguishable from *Mountain Peppermint*.

Amongst the forms of *Blue Peppermint* which may be picked from amongst the numerous varieties is that once named by R. Brown *Enc. hypericifolia*, and commonly known as *Cabbage Gum*. The juvenile leaves differ from those of the type in being more lanceolate and long, and the mature leaves are usually very broad, with numerous diverging veins, but at other times the leaves are lanceolate: but whatever shape the veins are always more numerous than in the type, and the surface is always more or less clothed with glaucous bloom. To instance the variability, both automatically and in response to conditions, an instance may be cited. A few small trees grow on the sand-dunes at Adventure Bay, with large broadly oblong opposite leaves, with typical flowers and fruit.

Seeds taken from one tree gave seedlings of two forms, one with opposite, sessile, lanceolate leaves, some free, others joined across the stem, as in recognised forms of *Cabbage Gum*; the other with short, ovate, opposite, sessile leaves, little or not at all joined across the base, identical with the juvenile leaves of *Mountain Peppermint*. In five years' time both forms had assumed narrow lanceolate alternate foliage, differing very little from that of *Black Peppermint*.

Broad-leaved Peppermint (*Euc. nitida*, H.).—With the habit and white bark of *White Peppermint*, it has long, slightly unequal-sided leaves, one and a half to two centimetres diameter. Often narrow-leaved trees are met with with a few interspersed broad leaves, which might be referred with equal justice to one or the other *Peppermints*. A specimen gathered by Mr. Irby at Guildford Junction had broad, oblong, opposite juvenile leaves, mature leaves as in this species, but the bark was scaly or semi-fibrous.

This form requires further observation before its specific dependance can be maintained. The record probably includes many varieties. A broad-leaved form of this Hooker mistook for *Euc. radiata*, Sieb., which was erroneous. The type was described from material gathered on Tasman's Peninsula. The broader-leaved form is common in the North-West.

Mountain Peppermint (*Euc. coccifera*, H.).—The type of this tree was taken from the form growing on the summit of Mt. Wellington, and is the extreme form of the group of variations included in this species. It is a small tree, with smooth white bark. The leaves are broadly oblong, alternate, stalked, equal-sided, or nearly so, the veinlets are very numerous and netted. The buds are club-shaped, with small, nearly flat, opercula, as in *Blue Peppermint*, but normally only three in the umbel. The fruit is about one centimetre long and broad, very flat, and not at all constricted at the top, the rim broad, flat, or convex. The juvenile leaves are broadly oblong, opposite, sessile, not usually united across the stem. On Mt. Faulkner, Cradle Mt., Western Tiers, and Great Lake the fruits are much smaller and more numerous in the umbel, sometimes being typically flat above, with a broad rim, at others more constricted, with a depressed rim. The leaves have always numerous diverging veinlets, and the juvenile foliage appears constant. At Powderham and Abbotsbury, England, it has grown into a tall tree, and shows much variation, chiefly in the foliage.

Messmate, also *Stringybark*, or *Brown Stringybark* (*Euc. obliqua*, L. Her.).—A medium-sized tree, much disposed to lateral branching. Bark persistent, thick, brown, fibrous. Juvenile leaves green, alternate stalked, but very broad, unequal-sided. Mature leaves from broadly ovate oblique to barely 5 cm. long, lanceolate, acute. Leaves always alternate, stalked, and unequal-sided. Buds numerous in the umbel, club-shaped, with short conical opercula, stalks and common stalk round. Fruit pear-shaped, mouth constricted, rim broad or narrow, valves deeply sunk.

Gum-topped Stringy (*Euc. gigantea*, Hooker).—An erect tree, often assuming the largest dimensions. The branches usually short and ascending, the main trunk predominating. Bark thin-fibrous, continuous to the branches. Juvenile leaves large, oblique, stalked, more glaucous than in *Messmate*, but otherwise, together with mature foliage, buds, and fruit, similar to those borne by that species.

R. T. Baker does not recognise Hooker's name, and has re-named it *Euc. delegatensis*. Mueller often confounded this with *Euc. harmastoma*, Smith.

Swamp Gum, also called *Mountain Ash* (*Euc. regnans*, F.v.M.).—Erect and attaining enormous proportions, with the bark stripping off in long ribands, it has exactly the appearance of *Blue Gum*. Bark smooth from the base. Juvenile leaves red and glaucous, often dentate on the margin, otherwise all structure as in *Gum-topped*.

Typical trees of *Messmate*, *Gum-top*, and *Swamp* are quite distinct, but intermediate forms are common.

Mountain Ash, *Tasmanian Ironbark*, also some forms known as *White-topped Stringy* (*Euc. sieberiana*, F.v.M. *Euc. virgata*, Sieb.).—A variable tree. At Scamander flowering when only a few feet high. In gullies, in the same neighbourhood, often exceeding 100ft. The bark is stringy, persistent, and deeply furrowed. The leaves are unequal-sided, and vary from broadly ovate to narrowly lanceolate, the veins are few and almost longitudinal. The flowers and fruits resemble those of *Messmate*, only the stalk of the umbel is rather long and very flat; the stalks of the individual buds are also rather long and flat, but this is not apparent when in fruit.

At Falmouth a tall growing form, with white upper limbs, is known as *White-topped Stringy*.

Weeping Gum (*Euc. pauciflora*, Sieb. *Euc. coriacea*, Cunn.).—This tree is widely dispersed through the Mid-

lands. It has a white, smooth bark from near base, and is usually of a spreading, drooping habit. On the Alma Tiers this is very pronounced; the branches are slender, long, and pendulous. About Chudleigh and elsewhere, when met with in forests, the tree is erect. The mature leaves are long, lanceolate, slightly unequal, stalked, and alternate, but the venation is distinct from that of any other Tasmanian tree, except *Mountain Ash*: the veins are few, and run almost parallel with the midrib. From *Mountain Ash*, where there may be doubt in the venation, a distinction may always be made by *Weeping Gum* having the flower stalks round instead of flat, the fruit nearly hemispheric instead of pyriform, and the bark being deciduous and smooth. The juvenile leaves are very like those of *Gum-topped*.

Blue Gum (*Enc. globulus*, Lab.).—In the typical form the main stem is erect and strongly pronounced. Bark shed in long ribands. Leaves alternate, stalked distinctly unequal. Juvenile leaves opposite, sessile, very broad, shoots square. Flowers large, single in the leaf-axils, rarely three; fruit large, two to three centimetres diameter. As a rule the tree varies but little. There is a form growing near the sea at the foot of the hills at the entrance to Port Arthur, with pale, more equal-sided leaves, the flowers in threes, and only half the size of the type, the valves of the fruit more sunk than in hybrids with *White Gum*. This seems to approach *Enc. globulus* as it grows in Gippsland.

White Gum, also *Manna Gum* (*Enc. viminalis*, Lab.).—Usually a small tree, but in favourable localities exceeding 100ft. Bark scaly, from deciduous, except at the extreme base, to persistent to the branches. Leaves very variable in size, running from under three inches to about one foot, sometimes narrow, almost linear, equal-sided to broad falcate, almost indistinguishable from those of *Blue Gum*. Juvenile leaves usually oblong, with a constricting base, opposite, sessile, sometimes broadly heart-shaped. In rare instances flowers may appear in the axils of the juvenile leaves. The flowers are always in threes. The operculum is dome-shaped to conic, about as long as the tube. Fruit nearly globose, with very protruding valves, usually about 6 mm. diameter.

Though the foliage is so variable the species can always be clearly made out amongst Tasmanian plants by the large operculum and characteristic globose fruit always in threes. The only other gum with such a fruit is *Candlebark*.

White Gum hybridises with its immediate relatives. In forests of mixed *Blue* and *White Gums* occasionally an odd tree may be met with bearing median characteristics between the two. The bark and leaves are intermediate, the flowers are in threes, the operculum is smooth, the fruit is about one centimetre diameter, and smooth, but has often one to three slight ribs. This has been described by R. T. Baker as a distinct species under the name of *Euc. unialata*.

Where *White Gum* and *Ovate Gum* are intermixed it is very common to find specimens quite intermediate between the two.

White Gum and *Urn Gum* will also produce a hybrid with very white smooth bark, very long narrow leaves, and flowers and fruit intermediate between the two.

Candlebark (*Euc. rubida*, Deane et Maiden).—On dry hills and poor alluvial flats, extending from Bridgewater to Russell, a tree with the character of *White Gum*, but with smaller fruits, and the juvenile, opposite foliage, glaucous, small and nearly rotund, is very common. Mr. Maiden refers it to this species. Hitherto it has been considered to be a form of *White Gum*. This and closely allied forms occur in many localities with a poor mudstone soil. The allied forms have often broadly ovate, pointed, green, juvenile leaves and larger fruits, and it is merely a matter of opinion amongst the forms growing in Tasmania which shall be referred to *White Gum* and which to *Candlebark*.

Cuder Gum (*Euc. gunnii*, Hooker).—Hooker described and figured the species from material gathered in Tasmania. This tree is therefore the type with which all forms must be compared. It is variable, and a matter of individual opinion where we shall fix the division line between this and adjacent species. The tree is widely dispersed throughout Tasmania, but in only rare instances is it found at a lower altitude than a thousand feet. A small tree in exposed situations, it assumes very lofty dimensions under more suitable conditions. In the typical form the leaves are stalked, alternate, oblong, equal-sided, and crenate on the margin; the juvenile leaves are opposite, sessile, rotund. The flowers are three together, shortly stalked to nearly sessile on a short common stalk. The operculum much shorter than the tube, domed or pyramidal; fruit oblong to nearly hemispheric, valves deeply sunk. Bark smooth, pale from the base. Plants growing on the Alma Tiers often have different juvenile

leaves; they are broadly ovate and acute, otherwise similar to the type.

A form growing on the Western Tiers, opposite Mole Creek, has the juvenile leaves and fruit of the type, only the leaves are about two inches long, lanceolate, acute, often falcate.

Another specimen from the same locality has narrow leaves, and the operculum almost as large as in *White Gum*, for which it would readily pass, only that the capsules are cylindrical, with sunk valves.

A form growing at Uxbridge attains very lofty stature. It differs from the type only in the capsules being rather larger and often angled. It is locally known as *Yellow Gum*, and is a link with *Mueller's Gum* of Mt. Wellington.

Some trees growing in England have assumed a form between *Cider* and *Urn Gum*.

Perrin's Gum (*Euc. perriniana*, *F.v.M.*).—This departs little from *Cider*. The juvenile leaves are orbicular, and join broadly across the stem, they are pale glaucous; this condition is generally maintained for some time, when the tree gradually assumes the foliage of *Cider*. The flowers are smaller and shorter stalked than in that species, the fruit hemispheric and nearly sessile.

Perrin's Gum is rare; hitherto only recorded from Ouse district in Tasmania, and Mt. Kosciusko in New South Wales.

Mueller's Gum (*Euc. muelleri*, *T. B. Moore*).—This is an extreme variety of *Cider Gum*, found on the edge of its southern and western distribution. Its only distinction is the fruit being large, up to one centimetre diameter, strongly obconic or turbinate, the mouth being very broad, apex flat, and the valves in the dry fruit sharply protruding.

On some of the mountains of the west there are small trees, which are intermediate in character between this and *Dwarf Gum*.

Settlers on Mt. Wellington often call this *Red Gum*. People at Bellerive call *Ovate Gum* by the same name. As each State has from one to many *Red Gums* not at all related to these, it appears well to reject the appellation.

Dwarf Gum (*Euc. vernicosa*, *Hooker*).—In the typical form this is a small shrub, with small, oblong, varnished, thick leaves, seldom exceeding two centimetres in length, opposite or alternate. The flowers are close in the leaf-

axils, and one or three together; the fruit is cylindrical to turbinate, generally ribbed, about seven millimetres in diameter.

The peculiar Box-like foliage comes true to seed when grown at a low elevation. At Mt. La Perouse some trees grew to twenty feet, still retaining the characteristic foliage.

Urn Gum (*Euc. urnigera*, *Hooker*).—A tree varying greatly in stature, according to edaphic conditions, and, like *Mueller's Gum*, mostly confined in Tasmania to an altitude between two and three thousand feet, though in England it does well at sea level. The bark, like that of *Mueller's Gum*, is smooth, and usually blotched with red or brown; the foliage, both juvenile and mature, is similar to the foliage of that species, but the flowers are very different. They are three in the umbel on a long common stalk, and each flower is cylindrical and fairly long stalked; the operculum is very short, nearly flat, with a central protuberance. The fruit is shaped like an urn, being constricted just below the orifice, ranging about rather more than a centimetre in length, the valves are very deeply sunk. A form of this tree grown at Whittinghame, Scotland, said to have been raised from seed gathered on Mt. Wellington, has the characteristic capsules, but very much smaller, and the leaves are long and narrow. Other trees growing in England exactly conform to the type.

One specimen from Alma Tiers has the flowers upon a shoot while still in juvenile foliage.

The juvenile foliage of *Urn Gum* is more glaucous than that of *Mueller's Gum*, but otherwise similar.

Heart-leaved Gum (*Euc. cordata*, *Hooker*).—Usually a small tree, but at Uxbridge, in forests, it attains a height of two hundred feet. The foliage is ashy-blue. Leaves opposite, sessile, very broadly ovate to orbicular, not joining across the stem; this juvenile condition, which is very like the foliage of *Urn* and *Mueller's Gums*, is maintained throughout the life of the tree. The flowers are three together on short stalks, close in the angles of the leaves; tube is broad, operculum almost flat. The fruit is nearly spherical, and about one centimetre diameter to rather more; the rim is rather broad, and the valves deeply sunk.

Ovate Gum (*Euc. ovata*, *Lab.*).—Generally a small tree. Bark scaly at the base, smooth above. Leaves equal-sided, oblong or ovate, polished and often undulate, sometimes narrower; juvenile foliage opposite, sessile,

ovate, or oblong. Flowers usually six or seven in the umbel, tube oblong, operculum rather shorter than the tube, with a central protuberance, which in some specimens may be elongated to five millimetres. Fruit typically obconic, mouth wide, rim broad, valves from sunk to protruding, four to six millimetres broad.

The type of the species was gathered by Labillardiere in Tasmania, and the figure in his work on New Holland Flora exactly corresponds with the tree which is very common here. Hooker, who evidently was unacquainted with Labillardiere's figure, mistook the tree for the *Enc. acervula* of Sieber. Mueller, recognising Hooker's error, fell into worse confusion by sometimes recognising our tree as a form of *Enc. gunnii*, and at others combining it with his own *Enc. stuartiana*. R. T. Baker described a similar form as *Enc. paludosa*.

Black Gum, also known as *Swamp Gum* and *Apple-scented Gum* (*Enc. stuartiana*, *F.v.M.*).—A medium-sized, widely-spreading tree. Bark sub-fibrous, dark, persistent to the branches. Leaves narrow, lanceolate, often slightly unequal-sided, thick, and often shining; juvenile foliage opposite, sessile, orbicular, to oblong. Flowers small, many in the umbel; operculum conic. Fruit obconic, usually under three millimetres diameter, valves protruding.

The form described above corresponds with specimens sent out by Mueller as typical of the tree described as *Enc. stuartiana* in his "Eucalyptographia." Unfortunately Mueller tried to bring in many other forms under the same name, which led to some obscurity. Deane and Maiden consider the tree, common in Northern Tasmania, and described above, to be distinct from Mueller's tree, and named it *Enc. aggregata*. R. T. Baker considers it to differ further, and calls it *Enc. rodwayi*.

It may be readily distinguished from *Ovate Gum* by the fibrous bark, narrower leaves, and smaller fruits.