

8. SMITH, ERWIN—Bacteria in relation to plant diseases, Vol. III, p. 231, 194.
9. DARNELL-SMITH, G. P.—Diseases of Tobacco Plants. Agric. Gaz. of N.S.W., XXVIII, p. 83.

Explanation of Plate.

PLATE XXXVI.

Fig. 1—Pure culture of bacteria re-isolated after two months from a plant that had been inoculated.

Fig. 2—Photograph of a dendritic colony among a number of circular ones.

TWO NEW SPECIES OF EUCALYPTUS.

By R. H. CAMBAGE, F.L.S.

[With Plates XXXVII - XXXIX.]

[Read before the Royal Society of N. S. Wales, November 6, 1918.]

1. EUCALYPTUS PUMILA n. sp.

Arbuscula alta, cum truncis multis separatis, in altum pedes quindecim vigintive extendens, trunci diametrum unciarum duarum triumve habens.

Ramusculi angulares præcipue ad extremitates.

Folia (reversio) tenera ovata ad ovata-lanceolata, 3 - 5 cm. longa, 1 - 1.5 cm. lata.

Folia matura. Linearia-lanceolata ad ovata-lanceolata, modice crassa, sex ad duodecim cm. longa, unum ad tria cm. lata, sæpe leviter falcata, utrobique obtuse viridia, extremitates fuscae et flaccidae, systema venosa modice clara, venae laterales angulis circiter 40 ad 55° e cortâ mediâ dispositae, vena inter margines plerumque juxta marginem, olei glandulae numerosae. Petiolus 1 - 1.5 cm. longus.

Gemmæ. Fuscae cum colore viridi tinctae, prope sessiles vel cum pediculis circiter unum mm. longis, operculum conoide, quinque ad septem mm. longae, calycistubus vix longitudinis dimidius, pedunculus aliquanto complanatus circiter unum mm. longus.

Flores. Circiter septem ad tredecim in umbellâ, antherae modicae, callae parallelae.

Fructus. Prope sessiles, hemisphaericales, diametrus circiter septem mm. plerumque cum quatuor valvis exsertis, ora crassa, convexi.

Cortex. Tenuis et levis ad humum, interdum cum vittis pendulis longis, crassus .5 – 2 mm., color cinereus vel subviridis.

Lignum. Fuscum in centrum, durum.

• A tall shrub of many separate stems reaching 15 – 20 feet high, with stem-diameter of 2 – 3 inches.

Branchlets.—Angular, especially towards the tips.

Juvenile (reversion) foliage.—Ovate to ovate-lanceolate, 3 – 5 cm. long, 1 – 2.5 cm. broad.

Mature leaves.—Linear-lanceolate to ovate-lanceolate, fairly thick, 6 – 12 cm. long, 1 – 3 cm. broad, often slightly falcate, dull green on both sides, tips brown and withered. Venation fairly distinct, lateral veins arranged at angles of from about 40 – 55 degrees with the midrib, intramarginal vein usually close to the edge. Oil glands numerous. Petiole from 1 – 1.5 cm. long.

Buds.—Greenish-brown, almost sessile or with pedicels about 1 mm. long, operculum conoid, 5 to 7 mm. long, the calyx-tube scarcely half that length, peduncle somewhat flattened, about 1 cm. long.

Flowers.—About 7 – 13 in the umbel, anthers of medium size, the cells parallel.

Fruits.—Almost sessile, hemispherical, about 7 mm. in diameter with usually four exserted valves, rim thick, convex.

Bark.—Thin and smooth to the ground, sometimes ribbony, .5 – 2 mm. thick, slaty to greenish in colour.

Timber.—Brown towards centre, tough.

Habitat.—Near Pokolbin, a quarter of a mile west of portion 146, Parish of Rothbury, County of Northumberland, New South Wales.

This species is a Mallee growing on the side of a hill amongst *Eucalyptus siderophloia* Benth., *E. maculata* Hook., *Callitris calcarata* R. Br., *Casuarina Luehmanni* R. T. Baker, and *C. stricta* Ait. The specific name is in allusion to the dwarfed habit of the tree.

Seedlings.—*Hypocotyl* red, erect, glabrous.

Cotyledons slightly emarginate, 1.7 mm. long, 5 mm. broad, lobes oblong-obtuse, upperside green, underside red, glabrous; petiole 2 mm. long.

Seedling foliage opposite for two or three pairs, entire, glabrous, oval-lanceolate to ovate and ovate-lanceolate, obtuse. First pair up to 1.4 cm. long, 7.5 mm. broad, upperside green, underside red to purple, petiole 2 mm. long. Second pair up to 3 cm. long, 1.8 cm. broad, underside red to purple, petiole 5 mm. Third pair up to 4.7 cm. long, 2.4 cm. broad, underside at first reddish-purple, becoming pale green, petiole up to 7 mm.

Stems red.

The seeds germinated $12\frac{1}{2}$ years after being gathered. Plants, when about 6 – 8 inches high, developed nodules or swellings about the axils of the cotyledons, which had fallen.

Affinities.

Its closest affinity appears to be with *E. dealbata* A. Cunn., from which it differs in bark and timber, as well as the texture of the leaves, and the position of the intramarginal vein. The seedling foliage is also different.¹ *E. dealbata*

¹ The evolution of the Eucalypts in relation to the cotyledons and seedlings, by Cuthbert Hall, M.D., *Proc. Linn. Soc. N.S.W.*, Vol. xxxix, pl. xlv.

will sometimes grow in Mallee form, but in such cases the bark remains fairly thick and the timber soft. In bark, timber, oil and habit *E. pumila* much resembles *E. Behriana* F.v.M., but differs in the flowers, fruits and leaves.

Leaves of this *Eucalyptus* were procured and distilled in August 1907 at the Technological Museum. Messrs. Baker and Smith report on the oil as follows:—

“The yield of oil is large, 617 lb. of leaves with terminal branchlets giving 9 lb. 10 oz. of oil—equal to 1·56 per cent.

“The oil is very rich in eucalyptol, and both in yield and eucalyptol content this species is one of the best from which to distil *Eucalyptus* oil for pharmaceutical purposes, and in this respect may be associated with *E. Smithii*, *E. polybractea* and *E. Morrisii*. The oil contains some pinene, but the dextrorotatory form only slightly predominates, and consequently the large fraction of rectified oil does not vary but slightly in optical properties from that of the crude oil. This is contrary to the general experience with oils of the eucalyptol class, as in those the dextrorotatory pinene generally predominates. There are only a few species which give an oil, the rectified portion of which has a less dextrorotatory than the crude oil; *E. dealbata* is one of the species having this peculiarity as well as *E. Behriana*, *E. maculosa*, and a few others. No phellandrene could be detected. A small amount of the lower boiling aldehydes was present; the odour indicated that butaldehyde and valeraldehyde were present, thus following the general rule. The crude oil in appearance and other characteristics resembles those of this group generally, and the rectified oil is slightly tinted yellow.

“The higher boiling portion contains a very small portion of an aldehyde; this is perhaps aromadendral, but it was not separated. The sesquiterpene only occurs in small amount. The crude oil had specific gravity 0·9237 at 15° C. Rotation α_D 2·3°; refractive index 1·4683 at 20° C., was soluble in 1·1 volumes of 70% alcohol by weight, and contained 74 per cent. eucalyptol by the phosphoric acid method. On redistillation 89 per cent. came over

*Addendum slip to be pasted in Journal of the Royal Society of
N. S. Wales, Volume LII., p. 457 (1918).*

Eucalyptus Mitchelli, Cabbage. The undersigned, having ascertained that the name is pre-occupied for a fossil species by Ettingshausen in "Contributions to the Tertiary Flora of Australia," the name *E. Mitchelliana* is proposed in lieu of *E. Mitchelli*.

R. H. CABBAGE.

Attention is directed to the fact that the
present report is preliminary.

Enclosed is a report on the progress of the
work done during the past year. It is
to be understood that the present report is
not a final one, but is intended to give
a general idea of the work done.

R. H. CAMPBELL

between 167 – 183° C. (cor.), this had specific gravity 0.9166 at 15° C.; rotation α_D 2.2°; refractive index 1.4668 at 20° C. Between 183 – 250° C. 8 per cent. distilled; this had specific gravity 0.9359 at 15° C.; rotation α_D + 0.6°; refractive index 1.476 at 20° C. It contained rather a large amount of eucalyptol, and gave the bromine reaction for the sesquiterpene, also the aldehyde reaction. Of the most closely allied oils it more nearly approaches *E. dealbata* than that of any other species which has yet been investigated, although the resemblance between it and the oil of *E. Behriana* is also strongly marked.

“Being a Mallee, it was thought that it might contain a considerable amount of calcium oxalate in the bark. The green bark taken from small sticks, had a thickness of 1 to 2 millimetres; it was found to contain 3.85% of calcium oxalate. The amount of calcium oxalate in the bark of the largest piece having a diameter of 3 inches was 5.39 per cent. The crystals in the bark of this species differ in no respects from those of *Eucalyptus* barks generally (see paper with plate by H. G. Smith.¹ The amount of lime in the bark of *E. dealbata* was 1.19 per cent.”

2. EUCALYPTUS MITCHELLI n. sp.

Arbor umbrosa in altum pedes quinquaginta crescens, trunci diametrum duorum pedum habens.

Folia matura. Linearia lanceolata, a septem ad quatuor decim cm. longa, a septem mm. ad 1.4 cm. lata, cum apice directo vel falcato, utrobique æqualiter viridia, glabrosa et notabile nitida, aliquanto coriacea, costa media modice clara, venæ laterales aliquanto obscuræ et angulis 7 – 15° e costâ mediâ dispositæ, margines quasi nervi sunt, olei glandulæ numerosissimæ petiolum 1 – 1.3 cm. longum.

Gemmæ—Sessiles, operculum acutum, longæ circiter a tria ad quatuor mm. gemmæ vix tam longæ quam calycistubus, racemus stellatus, pedunculum longum circiter unum mm.

¹ This Journal, xxxix, 23, (1905).

Flores—In umbellâ tenus undecim, antheræ parvæ, color ut lactis flos, versatiles, renantherosi.

Fructus—Sessiles, globosi-truncati, fusci, nitidi quasi fuscati, interdum punctis parvis palladis clavati, longi a quinque ad sex mm. diametrum quinque sexve mm. habentes, apud os restricti, labrum interius unum mm. crassus valve depressæ.

Cortex—Levis et alba nisi quod squamas paucas asperes apud basem habet.

Habitat—Summum jugum montis "Buffalo" prope casam ad provinciam "Victoria" pertinentem, in formationem siliceam graniteam quatuor millia et quadringenti pedes super mare nascens.

An umbrageous tree reaching 50 feet high with stem-diameter of 2 feet.

Mature leaves linear-lanceolate, from about 7–14 cm. long, 7 mm. to 1.4 cm. broad, with straight or hooked point, equally green on both sides, glabrous and remarkably shiny, somewhat coriaceous, midrib fairly distinct, lateral veins rather obscure, and arranged at angles of from 7–15 degrees with the midrib, margins nerve-like, oil glands very numerous, petiole 1–1.3 cm. long.

Buds sessile, operculum pointed, about 3–4 mm. long, scarcely as long as the calyx-tube, the cluster stellate, peduncle about 1 mm. long.

Flowers up to eleven in the umbel. Anthers small, creamy-white, versatile, renantherous.

Fruits sessile, globular-truncate, brown, shining as if varnished, sometimes studded with small pale dots, 5–6 mm. long, 5–6 mm. in diameter, restricted at the orifice, inner rim 1 mm. thick, valves sunk.

Bark smooth and white except for a few rough flakes at the base.

Habitat—Summit of Mount Buffalo, Victoria, near the Government Chalet, growing on siliceous granite formation

at 4,400 feet above sea-level, and known as Willow Gum. The species flowers in December.

Seedlings—*Hypocotyl* erect, terete, red, glabrous, up to 2.3 cm. long.

Cotyledons obtusely quadrilateral to orbicular-reniform, entire, about 3 mm. long, 5 mm. broad, upperside green, underside red to reddish-green, glabrous; petiole about 3 mm. long.

Seedling foliage opposite, entire, glabrous, oblong-lanceolate to elliptical-lanceolate, petiole 1–2 mm. long; midrib prominent on underside, lateral veins fairly distinct, and arranged at angles of from 40–60 degrees with the midrib. On seedlings 5 inches high the second pair of leaves were elliptical-lanceolate, and up to 2 cm. long by 8 mm. broad, while the sixth pair were elliptical, and 2.5 cm. long by 1 cm. broad.

This species is named in honour of the late Sir Thomas Livingstone Mitchell, Surveyor General, who collected many native plants, and was the second explorer to pass Mount Buffalo.

Affinities.

1. With *E. vitrea* R. T. Baker. From this it differs somewhat in its leaf venation, for the prominent, almost parallel veins of *E. vitrea* are not represented in this new species. The pedicellate hemispherical fruits of *E. vitrea* are also different; the operculum of that species is shorter and more obtuse, while the peduncle is very much larger. The bark of the new species is smooth and white, that of *E. vitrea* being fibrous over the greater part of the trunk.

2. *E. nitida* Hook. f. From this it differs in its more globular fruits, pointed instead of obtuse buds, and is an umbrageous tree, while *E. nitida* is only a tall shrubby plant.

3. With *E. stellulata* Sieb. It resembles this species in its stellate buds and to some extent in the shape of its fruits, but differs in its leaf venation, colour of bark which is white, while that of *E. stellulata* is slate-coloured, and in its seedling foliage.

4. With *E. Moorei* Maiden and Cabbage. Its resemblances and differences are similar to those mentioned in the case of *E. stellulata*, and in addition *E. Moorei* only grows as a Mallee-like shrub of about 10–12 feet high.

I have to thank Mr. J. Newton of the Chalet, Mount Buffalo, for supplementing my collection of specimens.

EXPLANATION OF PLATES.

PLATE XXXVII.

Eucalyptus pumila.

1. Seedling plant. Pokolbin.
2. Juvenile (reversion) foliage.
3. Buds and leaves.
4. Fruits.

PLATE XXXVIII.

Eucalyptus Mitchelli.

1. Seedling with cotyledons. Mount Buffalo.
2. Seedling leaves, except first pair and cotyledons.
3. Buds, fruits and leaves.

PLATE XXXIX.

Eucalyptus Mitchelli.

Trees at back of Chalet, Mount Buffalo.



Cambage, Richard Hind. 1918. "Two new species of Eucalyptus." *Journal and proceedings of the Royal Society of New South Wales* 52, 453–460.

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