

THE COMBOYNE PLATEAU.

ITS GENERAL CONFORMATION AND FLORA.

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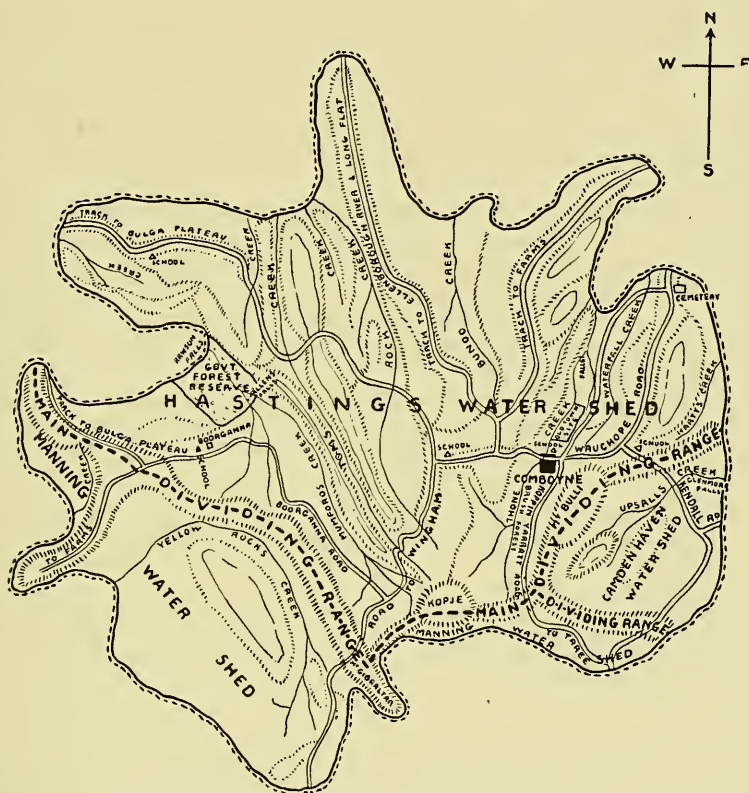
(One Text-figure.)

[Read 26th August, 1925.]

The Comboyne Plateau is situated in the County of Macquarie, about 170 miles north and a little east of Sydney, though 250 miles by rail and road, and about 20 miles by air line from the coast. Its average height above sea-level is 2,200 feet, though its highest point, Mount Gibraltar, rises to about 3,200 feet. There are two other mountains or high elevations, Mount Bulli, about 2,700 feet, and The Kopje, about 2,600 feet above sea-level. These three points occupy the south-east quadrant, and are situated near the edge, which falls away very abruptly in the case of Mount Gibraltar, less so in the other two cases. The rest of the Plateau is hilly, well intersected with perennial streams forming three watersheds. That on the east, taking its origin at the eastern base of Mount Bulli, is the watershed of the Camden Haven River, which, running through Kendall, reaches the sea at Laurieton; that on the south and south-west is the watershed of the Manning, which, lower down, runs through Wingham and Taree; that on the north, north-west and west forms the watershed of the Hastings, running out at Port Macquarie.

The area of the Plateau is estimated at about 70 square miles, the larger portion of it having been covered with Softwood Brush or Rain Forest. The formation is basaltic, the soil being of a rich red colour. This red soil reaches in places to a considerable depth, getting shallower towards the edges, especially to the north and west, where the formation is of sandstone or sedimentary deposit, and here, as one would expect, the hardwood timber, especially *Eucalyptus*, with a sprinkling of *Casuarina torulosa*, predominates. At the junction of the two formations it is usual to find *Tristania conferta* (the Brush Box). At isolated spots on the area, especially elevated ones, the sandstone—in using the term “sandstone” I am not confining myself to pure sandstone, of which there is very little, though it does occur in isolated patches—or sedimentary formation outcrops, and here again the hardwoods prevail. At the extreme summit of Mount Bulli one comes across *Eucalyptus quadrangulata*, this being the only place on the Comboyne where it is found, and the farthest north that it has been recorded, the Hunter River being its northern previously recorded limit (see Maiden, *Critical Revision, Genus Eucalyptus*, iii, p. 76). The country on top is now mostly cleared for dairying purposes, so that it is difficult to imagine this plateau in its virgin state. There is now only a comparatively small area of virgin brush forest left in the centre, though the Government has set apart 200 acres at the western edge, on Mumford's Creek, as a reserve, which area includes two fine waterfalls, the Allen Falls, not very high, but over which a large body of water is pre-

cipitated, and the Rawson Falls, the finest on the plateau, with a vertical drop in the first face of 270 feet, comprising a large body of water. This brush forest reserve has remained practically in its virgin beauty, except that the Red Cedar was removed years ago, and here there is a splendid assortment of softwoods with



Rough Map of the Comboyne Plateau.

E. C. Chisholm, del.

Scale about $\frac{3}{8}$ inch to 1 mile.

Elkhorns, Bird's Nest ferns and a host of climbing ferns, tree-ferns and palms. Hardwoods in the form of Brush Box, *Tristania conferta*, and Tallow Wood, *Eucalyptus microcorys* also are found here, with a sprinkling of *Eucalyptus saligna* (the Sydney Blue Gum).

The average annual rainfall recorded for the Plateau for the last 16 years is about 60 inches; the maximum in this period was 98.87 inches in 1921, and the minimum 42 inches in 1915. Last year (1924) 57 inches were recorded.

The history of the early settlement is interesting, but as this aspect is not the purpose of this paper, I will only allude to it briefly in passing. The earliest pioneers were two brothers O'Shaunessey, who arrived on the Plateau about 30 years ago. After remaining here for a time one of them died and the other, failing to get sympathetic encouragement from the Government, abandoned his selection and left the Plateau, and for some years no one ventured to take up land. About 25 years ago the present pioneer settlers arrived, mostly from the

South Coast of New South Wales—Robertson, Kangaroo Valley and neighbouring places—in several families, who, with Government encouragement, began clearing for permanent settlement. When the brush forests were cleared and planted with *Paspalum* the growth was phenomenal, due to the rich humus of decaying leaves having enriched the soil from time immemorial to a depth of several feet, having been replenished year by year while the forest was under natural conditions, but, once cleared, each year of grass cultivation gradually depleted this rich humus, which was not being replaced, until at the present time the soil has lost to a great extent its former value and requires the help of fertilizers to produce good crops or grass. Below is an analysis of the soil of a part that had 20 years or so ago been part of a brush forest, but since that time has been under *Paspalum* or other grasses.

There is no doubt that the Earthworm plays a large part in fertilizing the soil by bringing up earth from the deeper layers and depositing it at the surface, so replenishing the top soil. But for this factor the fertility of the soil of this plateau would be much less than it is, as the Earthworm here is very numerous. Cockchafer larvae, which are abundant, probably do a little in this direction also.

The following analysis of a sample of Comboyne soil was kindly carried out for me by Mr. Ronald White, B.Sc.:—

Specific Gravity ($H_2O = 1$) 4.7. (Ether used to determine Sp. Gr. and then calculated to water). Very slightly soluble in hot or cold water. Chocolate brown in colour. Probably of volcanic origin, igneous rock broken down by weathering.

Composition.

Iron as ferric oxide and carbonate	4.32%
Lime, Calcium Carbonate and Calcium Sulphate, Anhydrite	0.78%
Magnesium, as chloride	0.23%
Potassium, as chloride	0.01%
Sodium, chloride and sulphate	3.03%
Organic matter (Humus)	2.11%
Clayey and siliceous matter, with traces of aluminous earths and phosphates	89.52%
	100.00%

Examined bacteriologically, cultures on Agar and Gelatine gave colonies containing *Saccharomyces* (yeasts), *Streptococcus aureus* and an unidentified anaerobic bacillus. There was no appearance of the presence of any organism capable of nitrogen-fixation, to which fact any soil deficiencies might be due.

The Flora of the Plateau.

The Filicales are well represented. Of the Tree-ferns both *Dicksonia* and *Alsophila* are numerous. *Asplenium nidus* (Bird's Nest Fern) and *Platycterium bifurcatum*, especially the former, are prominent features of the Brush Forest, almost covering the trunks and branches of some of the forest trees. One of the favourite hosts of these is *Tarrietia actinophylla* (Stave Wood), trees of which are also generally covered with many climbing ferns and orchids. *Adiantum aethiopicum* (the common Maiden-hair) is quite rare, though other species of the genus are fairly plentiful, among them *A. formosum*, which seems to prefer rocky situations. Ground and climbing ferns are numerous.

The Pines are only represented on the Plateau by one species, *Callitris Macleayana* (Stringybark Pine or Port Macquarie Pine) which grows to fine proportions. *Araucaria Cunninghamii* (Moreton Bay Pine) is found between the Plateau and Kendall to the east.

There are only two Palms, *Archontophoenix Cunninghamiana* (Bangalow) and *Linosyris monostachyus* (Walking-stick Palm). *Livistona australis* (Cabbage Palm) is entirely absent, curiously enough, although represented well on the coast and also on the next plateau to the south-west, viz., the Bulga, about 10 miles away.

All the Araceae grow here, the most interesting species of which is *Typhonium Brownii*, an Arum, whose flower is large and striking, growing close to the ground and of a liver colour. It appears to favour the western end of the plateau.

The Liliaceae and Iridaceae are poorly represented, while the Orchidaceae are mostly of the genus *Dendrobium*, of which *D. speciosum* (Rock Lily) and others are found as epiphytes on the trunks and branches of numerous brush trees. I have never seen the former growing on rocks here, though smaller forms, e.g., *D. Kingianum*, are commonly found in rocky situations.

The remaining Monocotyledons, viz., Grasses, etc., I am not including amongst the flora recorded.

The only *Casuarina* is *C. torulosa* (Forest Oak), which grows on sandstone ridges, or sedimentary rock, mostly at the edges of the plateau.

The family Fagaceae is represented by *Fagus Moorei* (Negrohead Beech), which is extremely rare, although many trees were undoubtedly destroyed during clearing. This appears to be near its extreme limit south, though it has lately been recorded from Barrington Tops. Of the genus *Ficus* I have recorded three species; *F. stephanocarpa* is a rare form here; the other two, *F. rubiginosa* and *F. macrophylla*, Port Jackson and Moreton Bay Figs respectively, are fairly common in the brushes and grow to a good height.

The Proteaceae are very poorly represented. *Orites excelsa* is called here "Silky Oak," from the resemblance of the wood to that of *Grevillea robusta*, which does not occur so far south, nor, so far as I have been able to determine, does any species of the genus. This timber, *O. excelsa*, which is plentiful, is in fair demand for milling and used for much the same purposes as *Grevillea robusta*, being much in demand for cabinet work. *Stenocarpus salignus* (Red Silky Oak or Beef Wood) is uncommon on the plateau, but is in great demand for cabinet work, the timber being a rich red, beautifully figured. It is used about the coast for gun stocks. No Banksias occur here. *Hakea*, *Persoonia* and *Lomatia* occur, but in one or two species only. *Lambertia* is absent.

Santalaceae are represented by *Exocarpus cupressiformis* (Native Cherry) growing on sandstone or sedimentary rock, though I know of one very fine tree growing in the midst of brush timber and this is the largest tree of its kind I have seen.

I have so far only recorded two species of the family Loranthaceae, viz., *Phrygilanthus celastroides* growing on *Cryptocarya australis* (Moreton Bay Laurel) and *Daphnandra tenuipes* (Yellow Wood), and *Loranthus dictyophlebus* growing on *Cryptocarya australis* and *Doryphora sassafras*.

Codonocarpus attenuatus, of the family Phytolaccaceae, is a handsome tree, bearing bell-shaped fruit in clusters at the top of the tree and with a light delicate foliage.

Clematis, with two species, is fairly common, but *Ranunculus lappaceus* (Buttercup) is decidedly uncommon. *Legnephora Moorei*, a climber with large, ivy-shaped leaves, is fairly numerous, festooning the trees. Its fruit is a black

berry forming clusters resembling small bunches of grapes, and very like them in outward appearance. *Eupomatia laurina* occurs in the brushes. The foliage is intensely shiny and of a bright green.

Of the Monimiaceae, *Wilkiea macrophylla* is one of the "Native Plums," bearing black oval fruit in clusters. *Daphnandra tenuipes* and *Doryphora sassafras* are plentiful everywhere.

The Lauraceae are fairly well represented, and among them are some valuable timbers and handsome trees, *Cinnamomum Oliveri* and *C. virens*, "Black Sassafras" or "Cinnamon Laurels." The former especially is worthy of cultivation, having a fine canopy and good shade, with a nice appearance. *Litsea dealbata* is one of the so-called "Wild Plums," bearing oval black fruit. It is a shapely shrub with large leaves with well marked veins and silvery underside. This would be worth cultivating. *Litsea reticulata* (Scaly Beech) is used a good deal for cabinet work, as it is easily worked and the timber has a pretty figure, and for building purposes. *Cryptocarya glaucescens* (Nutmeg Laurel) is very abundant and *Cryptocarya australis* (Moreton Bay Laurel) is also plentiful and marked by its beautiful symmetry and thick foliage; both would make fine ornamental shrubs.

Passing to the Saxifragaceae, *Quintinia Sieberi* (Opossum Tree) grows in the brushes, especially near creeks, and attains fair proportions. *Anopteris Macleayanus* has a superficial resemblance to the Waratah.

The Pittosporaceae include *Pittosporum undulatum*, which is not plentiful and mostly found in the neighbourhood of creeks. *Hymenosporum flavum* is a plant well worthy of cultivation, bearing large yellow jasmine-shaped flowers with a fine perfume and large leaves, though of rather straggling habit.

The family Cunoniaceae is represented by several valuable species. *Schizomeria ovata* (White Ash) is a handsome tree with large leaf and bearing fruit to outward appearance like that of the Lilly Pilly. It is very little, if at all, used here as a timber. *Ceratopetalum apetalum* (Coach Wood), a very valuable timber, used a good deal in coach work and railway carriage building, grows plentifully in the brushes and to fine proportions. *C. gummiferum* (Christmas Bush) does not occur on the Plateau, though between here and the coast, on the road to Kendall, I have seen fine trees a foot in diameter at the butt and very tall. They occupied a narrow belt, but for some unknown reason the large trees seemed to be dying. *Geissois Benthami* (Leather Jacket) is used a good deal for milling purposes in much the same capacity as Coach Wood, though inferior to it. A peculiarity of this timber is that in certain patches the wood is of stony hardness and gritty, so that the expert axemen avoid it if possible, as they complain that it takes the edge off the axe more than any other timber. On a superficial inspection the timber resembles Coach Wood rather closely. *Ackama Muelleri* (Brush Corkwood) is plentiful in the brushes. *Callicoma serratifolia* is common along the course of creeks, but grows to no great size.

The Rosaceae are well represented by four species of *Rubus*, *R. parvifolius* alone growing on sandstone, the other three species in the brushes.

The Leguminosae, including the Acacias, are poorly represented, only seven of the latter being found, of which *A. juniperina*, *A. floribunda* and *A. decurrens* var. *mollis* are decidedly rare. The prevailing species are *A. melanoxylon*, *A. intertexta* and *A. binervata*. The two former, with *A. elongata*, do well on the basalt, *A. binervata* on sandstone or sedimentary rock. I have only come across one *Cassia*, viz., *C. sophora*. The only representative of *Daviesia* found here is *D. corymbosa* var. *arborea*, a very handsome tree, especially when in bloom,

flowering in great profusion and growing on the sandstone at the edge of the Plateau, especially on the northern side. *Gastrolobium Boormanii* is fairly plentiful on the southern side. *Indigofera australis* is not plentiful and found mostly just below the edge. It is reputed poisonous to stock. *Kennedya* is represented by three species, only found on sandstone. There is a total absence of *Hardenbergia*.

The family Rutaceae is fairly represented. *Boronia* and *Eriostemon* are not found. *Bosistoa euodiformis* (Bone Wood), the vernacular name from the very light colour of the timber, is used a good deal in cabinet and ornamental work. It grows to a large-sized tree and is an inhabitant of the brushes. *Geijera salicifolia* is a handsome tree with dark green leaves and would make a fine ornamental tree under cultivation. *Zieria Smithii* is present as a small bush. *Acronychia laevis* is a very common species, bearing a profusion of white berries, superficially resembling the fruit of the Lilly Pilly, which are greatly sought after by the Top Knot fruit pigeon, *Lopholaimus antarcticus*. *A. Baueri* is not so plentiful.

The family Meliaceae is well represented, some of the species being very valuable for their timber. *Cedrela australis* (Red Cedar) is the most valuable of all, and has been cut out here for many years, with the exception of a few trees in inaccessible places. A few seedlings and small trees are still to be seen at the western end of the Plateau. *Melia Azedarach* (White Cedar) is decidedly rare; for a long time after my arrival here I was told there was no White Cedar growing on top, but after careful searching I located three or four trees. It seems to have no particular value as a timber tree. *Dysoxylum Fraseranum* (Rosewood) is a valuable timber, used in the mills for building purposes, mostly for lining walls and ceilings. It has a pretty figure and for this reason is used in ornamental work. It is rich red in colour and has a very pleasant perfume. *D. rufum* is plentiful, but of no value as a timber. *Synoum glandulosum* (Pencil Cedar) grows plentifully, but is more of a shrub than a tree, and as such would make a handsome ornamental tree under cultivation on account of its symmetrical shape and pretty foliage. It does not seem to have any particular uses as a timber. All of this family grow on the basalt, and are inhabitants of the brush forests.

Comesperma is the only genus of the family Polygalaceae found, and it grows on sandstone country at the edge.

Of the family Euphorbiaceae, *Breynia oblongifolia* is a handsome shrub bearing small fruit hanging under the leaves. *Baloghia lucida* (Brush Bloodwood) grows to a fair sized tree, and is chiefly interesting from the amount of reddish sap that runs out when an incision is made into the trunk. *Homalanthus populifolius* (Bleeding Heart Tree), the popular name being due to its heart-shaped leaves which at one stage assume a bright-red hue, is a handsome tree with large leaves and should be worth cultivating. It is fairly plentiful.

The family Celastraceae is represented by *Celastrus australis*, a climbing vine with bright green shining leaves, which when in fruit is covered with small orange-coloured berries, and *Denhamia pittosporoides*, a tree resembling *Elaeocarpus reticulatus* to some extent, though its fruit resembles that of *Pittosporum*.

Of the Sapindaceae, *Sarcopteryx stipitata* is chiefly remarkable for its bright red berries, which arrest the eye. *Dodonaea triquetra* grows on the sandstone or sedimentary rock.

Akania Hillii is the only representative of the Akanaceae. This has sharp thorny edges to the long narrow stiff leaf and bears a red berry.

Of the Rhamnaceae, *Emmenospermum alphonoides* is a fine shapely tree with shiny green leaves and bearing a small white flower and small orange-coloured berries. It would make a good ornamental tree.

The family Vitaceae is represented by *Vitis hypoglauca*, which is very plentiful, festooning even the highest trees in the brushes, and *V. Baudiniana*, much less plentiful and occurring mostly at the southern and western edges of the Plateau. This does not seem to grow to the same proportions as *V. hypoglauca*, the trunks of whose vines attain a diameter of 7 or 8 inches, which, when cut into, exude, in great quantities, a watery juice made use of as a drink by bushmen when thirsty.

The family Elaeocarpaceae is represented by *Elaeocarpus* and *Sloanea*. Of the former genus I have only found *E. reticulatus* and it is not very plentiful, seeming to prefer the edges of brushes at the junction of basalt and sandstone or sedimentary strata. *Sloanea Woollsi* (Yellow Carrabeen) is a brushwood tree of some importance, used a good deal at the mill. One use to which it is put is the manufacture of broom handles. It is a tall tree with a curious buttress formation of the trunk as it rises from the ground, and generally triangular.

The family Malvaceae has two genera represented in *Sida* and *Hibiscus*. *H. heterophyllus*, a tall shrub, bears a large conspicuous white flower with a purple centre having a superficial resemblance to a Magnolia, and with a prickly stem, and is found only on the southern slopes of the mountain side.

The family Sterculiaceae is represented by three genera and four species. *Brachychiton acerifolius* (Flame Tree) is one of the glories of the brushes when in flower, which only happens once in three or four years, and at this time it sheds its leaves and the whole tree becomes one mass of bright red cup-shaped blossoms, forming a beautiful contrast to the dark green of the brush trees in the background. *Brachychiton populneus* (Kurrajong) is not seen on top, and I only know of one tree on the western side some distance down on junction strata. *Tarrietia actinophylla* (Stave Wood) is used for milling purposes. It is buttressed as it rises from the ground and is the host of numerous ferns, orchids and mosses, and is usually one of the most heavily laden of all. *Commerconia Fraseri*, called here "Kurrajong," has large angular leaves, somewhat resembling those of the Plane Tree, and medium-sized white flowers. It prefers the edge of the basalt.

There are two species of *Hibbertia*, *H. volubilis*, which is a twining and trailing vine with a large handsome yellow flower like a dog-rose, and *H. dentata*, like a smaller edition of the former with smaller flowers and also of climbing habit. These, especially the former, are numerous, though the first-named seems to prefer the basalt, while *H. dentata* grows more on the edge. These two are the only representatives of the Dilleniaceae.

Of the family Violaceae, the only species of *Viola* I have found is *V. hederacea*, and that mostly in moist situations, especially near streams.

One species only of Flacourtiaceae, *Streptothamnus Beckleri*, has been observed. It is a vine with ivy-shaped leaves and the flower in bud superficially resembles the Fuchsia, hanging on a long stalk.

I have only met with one species of *Passiflora*, viz., *P. alba*, with a white flower; I have cultivated this and it has made a handsome ornamental vine, bearing flowers and fruit freely. It is an introduced species, and is poisonous to stock.

Pimelea ligustrina is the only representative of the Thymeleaceae, and is found growing on sandstone formation.

The family Myrtaceae is mostly represented by *Eucalyptus* on the sandstone or sedimentary rock, *Eugenia* and *Tristania* on the basalt, or at the junction of the two. *Myrtus Beckleri*, a tree of small growth or shrub, would do well in a shrubbery, as it is a shapely species mostly found on basalt. *Eugenia Smithii* (Lilly Pilly), fairly plentiful on basalt, bears pinkish-white fruit in profusion; it is a tree well suited for ornamental purposes on account of its thick foliage and symmetry. *Eugenia corynantha* is called here "White Cherry," on account of its light-coloured wood; the fruit is pear-shaped, the smaller end distal and of a red colour and a fair size. *Eugenia cyanocarpa*, a Lilly Pilly with purplish fruit, resembles *E. Smithii*. *Syncarpia laurifolia* (Turpentine) only grows in a small area on the southern side of the Plateau, at the edge of a brush forest; it is used principally as a timber for wharf piles, being one of the few timbers which the *Teredo* will not attack. *Backhousia myrtifolia* grows along courses of creeks, often at the edge of the basalt. *Tristania conferta* (Brush Box) is a fine tree, growing to high dimensions and greatly valued as a hardwood, a large quantity passing through the mills. Its favourite situation seems to be at the junction of basalt and other formation at the edge of brush forests. As an ornamental tree it is well known about the suburbs of Sydney. *Tristania laurina*, a Water Gum, called erroneously here by many "Flooded Gum", is generally found in damp situations, especially along the courses of creeks, and the nearer it is to water the larger the tree grows, and the redder the timber becomes. It is valued for many purposes, one of which is the making of axe handles, but to get the most benefit from it by making the wood tougher, it is usual to let the timber lie under water for a week or so before fashioning it. *T. neriiifolia* I have failed to find here, though I have often searched for it. Most of the species of *Eucalyptus* grow on the sandstone or sedimentary rock at the fringe of the Plateau, though several species grow in the brushes on the basalt, but probably in these cases the depth of the basalt is not great. They are never very numerous in the brushes, and this rather points to the fact that although many seeds must be shed, only a comparatively few survive; it is quite uncommon to find seedlings under trees. Along the courses of creeks, where one would expect the basalt capping to be thinner, there are magnificent specimens of *E. saligna*. I have recorded thirteen species for the Plateau; some are rare, and two are represented by single specimens. Around the base of the Plateau, within a radius of ten miles, I have recorded eight more. These occur on the lower lands approximating sea-level. Many of these are species found in the Picton district, which the surrounding country somewhat resembles. *E. Andrewsi*, called here "Messmate" and "White Top," is a species with a useful timber, a large quantity of which passes through the mills and is used for much the same purposes as Tallow Wood (*E. microcorys*), though inferior to it, the two timbers being much alike. The former is inclined to possess gum veins, while *E. microcorys* is free from them, and will stand a heavier strain. *E. Andrewsi* is only found on the southern edge of the Plateau, on the higher elevations, on sedimentary formation; it grows to a fair height with good girth, the trunk and main branches being covered with a rough bark resembling that of *E. piperita*, while the upper branches are smooth. *E. pilularis* (Blackbutt) is only found on the northern and eastern edges of the Plateau, growing on junction strata or sedimentary rock, and continues easterly to the coast; some very fine trees are to be seen along the road to Kendall. It does not seem to be so plentiful between the Plateau and Wauchope in a north-easterly direction, though nearer the coast and about Port Macquarie it is plentiful. This timber passes through the mills in large quantities, but being full of gum veins it is of not the same

value as Tallow Wood. *E. acmenioides* (White Mahogany) grows on sandstone all around the fringe of the Plateau and is very plentiful. It is not much used as a timber, and is considered worthless by the mills; it is good for fencing purposes. *E. microcorys* (Tallow Wood) is about the most useful hardwood timber of all, and in great demand at the mills. Being free of gum veins and durable, it has many uses. One peculiarity about the timber is its greasy nature, and for this reason it is largely used as flooring for dancing halls, and also to a great extent in bridge building and decking. It grows to a fine tall tree with a straight trunk, many trees having a diameter, a few feet from the butt, of 5 feet. This tree is found growing on basalt in the brush forests, and frequently at the junction of basalt and other strata, and also on the latter alone. It is fairly well distributed throughout the Plateau, though it has been very much thinned out in late years for milling purposes. *E. quadrangulata* (Black Box) is only found in a very limited area on the eastern side at a high elevation on the summit of Mount Bulli; a few seedlings have found their way to the lower levels, though these make poor growth on the red soil compared to those on higher ground on black soil. This tree has not been recorded previously further north than the Hunter River. Its timber is not considered of any particular value and is not used at the mills. It does not grow to any great size. *E. saligna* (Sydney Blue Gum or Flooded Gum) is a valuable timber and passes in fair quantity through the mills. The timber is of a red colour and used for wood-blocks and by wheelwrights and for shipbuilding purposes. In the neighbourhood of creeks at the edges of brush forests and on the basalt itself, especially if near running water, it grows to immense proportions. It is a smooth gum with a varying amount of rough bark at the butt, and is to be found growing all over the Plateau, though considerably thinned out in the centre, and found well distributed on the junction strata at the edge of the Plateau. *E. grandis* shows a considerable resemblance to *E. saligna*; the timber of the two species is much alike in colour, and the two forms are often confused, both going by the name of "Flooded Gum." I have gathered from timber men that one timber is more interlocked than the other, but the real distinction lies in the fruit, that of *E. saligna* having invariably three valves which are well exerted and straight, or slightly everted, while in that of *E. grandis* the valves are four, or frequently five, in number, less exerted and inverted and of a paler colour. The timber is used for much the same purposes as that of *E. saligna*. At the junction of basalt with other formations I have seen splendid specimens of this species, though it is not nearly as plentiful as *E. saligna*. The trunks of the two trees are almost identical in appearance, as is also the general shape of the tree and the foliage. *E. propinqua*, a Grey Gum, and the common Grey Gum here, grows only on the edges of the Plateau outside of the basalt, and is found on the lower levels in fair quantity, where it seems to do better, growing to larger proportions than on top; near sea-level about Kendall there are some fine trees. The timber is red, but little used here, probably on account of it being too far from the mills. The bark is shed in patches, the denuded surface acquiring a salmon tint, giving the trunk a remarkable appearance. The fruit of this species is small. *E. punctata*, a larger-fruited Grey Gum, is not found right on top, but below the edge of the Plateau on the mountain side, especially to the north and west. It has a red timber, very hard and remarkably like that of Ironbark, and has been passed as such on many occasions. However, on striking the timber with the blunt end of the axe the impact gives a dull sound and the axe does not rebound, as in the case of Ironbark, which gives a ringing note and a larger rebound. This is one of the many tests employed to distinguish

between the two. It is inferior to Ironbark, though looked upon as a very valuable timber and as a fairly efficient substitute; it has not the same tensile strength, and, moreover, contains many gum veins. It is used largely for railway sleepers and wood blocking. *E. canaliculata* is a Grey Gum with a large fruit and angulated pedicel. The fruit is larger and coarser than that of *E. punctata*, and the timber, instead of being red, as is the case with the latter, is yellow. There is one tree only known to me that answers to these characters, and it is growing on top of a hill which has been partially cleared and on basalt formation close to an existing brush forest. In appearance it is quite different from *E. punctata*, especially in regard to its bark, which is rougher and has not the same clean appearance. Moreover, a peculiarity that struck me was its manner of flowering. This takes place on the medium-sized stems close to the main trunk, about half way up the tree, and directly off these stems which are 3 inches or so in diameter. The size of the tree in question is not large, the height would be about 40 feet and the diameter of the trunk at the butt ten inches to a foot. *E. tereticornis* (Forest Red Gum) is found only at the edge of the Plateau and is not very plentiful, though much more so off the mountain in the surrounding low level land. This species is only found on the sandstone or sedimentary soil, frequently in the company of *E. propinqua* and, on the lower levels, of *E. amplifolia* and *E. paniculata*. It appears to have no particular value as a timber, the saw mills here not using it; the timber is red. I know of only one specimen of *E. amplifolia* (Broad-leaved Forest Red Gum), growing at the edge of brush at the junction of basalt and other strata, though in the surrounding country around the foot of the mountain it is very plentiful. The timber does not seem to be of any particular value, and it does not attain large proportions. *E. corymbosa* (Bloodwood) is plentiful outside the basalt all round the edge of the Plateau. As a timber it is not thought very much of on account of its numerous gum veins; it is used for posts and culverts, but is not used by the mills here.

Leptospermum flavescens is the only species of the genus recorded, and is not at all plentiful, being found mostly off the basalt. *Callistemon* is represented by a crimson-flowered form, *C. lanceolatus* var., growing on rugged country at the edge of pure basalt. *Melaleuca Leucadendron* grows towards the southern side of the Plateau, where there is a mixture of soils.

Two forms of the Araliaceae are represented: *Tieghemopanax Murrayi*, which grows in great profusion in the brushes, has a palm-like appearance with a leaf somewhat resembling that of the Red Cedar. There is a good deal of confusion as to the identity of this species; it commonly goes by the name of "Aralia." It belongs to the family Araliaceae, but is not the true *Aralia*, which does not grow here. This tree is interesting on account of the occurrence of two or three isolated individuals in the Jamieson Valley on the Blue Mountains, close to the track leading down the "Valley of the Waters" at Wentworth Falls. As it is essentially a North Coast form, one wonders how it found its way there. The other species is *T. sambucifolius*, which is fairly plentiful.

The family Epacridaceae is represented only by *Trochocarpa laurina*, a tree sometimes called here "Wild Cherry," from the fact that it bears small fruit, though with little resemblance to the Cherry, and a *Leucopogon*.

Sideroxylon australe (Black Apple), of the family Sapotaceae, is a tree inhabiting the brush forests, the fruit of which is large and of a coarse texture. It is plentiful.

Diospyros cargillia (Ebenaceae), one of the so-called "Black Plums," bearing a small egg-shaped black fruit with the calyx of the flower well represented at its base, is not plentiful.

Of the Apocynaceae, most are climbing forms. *Chilocarpus australis* is a vine which, growing up into the trees, festoons them and is interesting on account of its long oval salmon-coloured fruit of the same tint as a ripe persimmon. *Alyxia ruscifolius* is a low shrub with prickly leaves growing in whorls of three. *Lyonsia straminea* and *L. largiflorens* are creepers festooning the brush trees.

The family Asclepiadaceae is represented by *Marsdenia*, of which *M. rostrata* is the only one noted. This is interesting from the fact that in some districts it is under suspicion of being poisonous to stock, though not here as yet. I have found it in partially cleared paddocks used as grazing land for dairy cows.

Ehretia acuminata (Borraginaceae) is interesting from the fact of its being one of our few deciduous trees. On superficial inspection it bears a good deal of resemblance to the cultivated Cherry in its general shape and form of leaf. It bears a profusion of small yellow fruits. It is a brush tree, and plentiful.

Clerodendron tomentosum (Verbenaceae), an inhabitant of the brushes bearing a purple fruit surrounded by a fleshy collar, is not very plentiful. *Gmelina Leichhardtii* (White Beech), a very valuable timber, is much sought after as a softwood for the interior of houses, a large quantity passing through the mills. It grows to a fine tall tree, the trunk having a whitish appearance and the timber being light coloured. It is a typical brush tree.

The Labiatae are poorly represented. *Plectranthus parviflorus* is a small plant liking moist situations, bearing a spiked purple inflorescence. *Prostanthera ovalifolia* var. *latifolia* is a shrub bearing handsome purple flowers growing on mixed strata.

The Solanaceae are well represented in the genus *Solanum*, of which *S. opacum*, bearing small white flowers, is of small growth; *S. pungentium* is thorny and grows close to the ground with a large purple flower. The others, *S. simile*, *S. aviculare* and *S. verbascifolium* var. *auriculatum*, especially the last-named, are of much higher growth. They all bear fruit, mostly yellow or blackish in colour, and purple flowers. *S. pseudo-capsicum* is an introduced plant growing in great profusion here, having a white flower and orange-red berries. *S. verbascifolium* var. *auriculatum*, commonly called "Tobacco Plant" from the nature of its large leaf, has taken possession of many acres of the top after the areas have been cleared of the original brush. *Duboisia myoporoides*, known as "Cork Wood" on account of its rough bark, is also a feature of the cleared land, and grows into a medium-sized tree, bearing small white flowers. The leaves contain duboisine, consisting of a mixture of the alkaloids hyoscyne and hyoscyamine, which is used as a mydriatic in ophthalmic practice.

The only representative of Bignoniaceae is *Tecoma australis*, which is a climber festooning the brush trees, and when bearing flowers is very handsome.

Eranthemum variabile, of the family Acanthaceae, is a small plant with a mauve-coloured flower.

Myoporum acuminatum is the only representative of the Myoporaceae, and is very rare. I only know of one tree on the Plateau. It would make a fine ornamental tree, being shapely, with dense foliage.

Turning to the Rubiaceae, *Morinda jasminoides* is a climber bearing small whitish flowers in profusion, the fruit being a small orange-coloured berry with a mosaic pattern dividing it into segments. *Psychotria loniceroides* is a small tree growing fairly plentifully in the brushes, having a leaf shaped somewhat after that of the Loquat, but softer in consistency.

Sambucus xanthocarpa (Native Elderberry) is fairly plentiful and is the only representative of the family Caprifoliaceae.

Melothria Cunninghamii is a climbing form of the Cucurbitaceae.

Members of the family Compositae are not numerous, being mostly of the genera *Helichrysum*, *Gnaphalium*, *Erechites*, *Senecio* and *Olearia*.

On reviewing this paper several interesting facts obtrude themselves. The entire absence of *Livistona australis* (the Cabbage Palm) which one would expect to occur here, since it inhabits basalt formation and is to be found 20 miles east on the coast and 10 miles south-west on the Bulga Plateau at an elevation as high or higher than this. One cannot help wondering why it has not gained a foothold on this plateau, and this is the more remarkable since the fruit forms a part of the food of several species of Fruit Pigeon which are abundant on both plateaux and migrate from one to the other. The absence of *Ceratopetalum gummiferum* is more easily explained, seeing that it grows almost entirely on sandstone. The small area of sandstone, comparatively speaking, on the plateau also accounts for the paucity of genera of the Proteaceae and Epacridaceae.

I have been on the look out for *Alphitonia excelsa* (Red Ash), which I have failed to find, and can get no information about it, so I am almost forced to the conclusion that it does not occur here. The genus *Flindersia* (The Teak and its allies) does not occur, nor does *Castanospermum australe* (Black Bean), their habitat being further north.

In conclusion I wish to record my grateful thanks to Mr. J. H. Maiden, late Director, and Dr. Darnell-Smith, the present Director of the Botanic Gardens, for affording me facilities for having the plants identified, and also to the staff of the National Herbarium, especially to Mr. W. F. Blakely, who has done most of the work and given me much information.

List of the Plants of the Comboyne Plateau.

Hymenophyllaceae: *Trichomanes venosum* R. Br.

Cyatheaceae: *Dicksonia Youngiae* C. Moore, *Alsophila australis* R. Br., *A. Cooperi* F.v.M., *A. Leichhardtiana* F.v.M.

Polypodiaceae: *Dryopteris decomposita* R. Br., *D. punctata* Thunb., *D. parasitica* (L.) O. Kuntze, *D. acuminata* Lowe, *Arthropteris Beckleri*, *A. tenella* Forst., *Davallia dubia* R. Br., *Athyrium umbrosum* Ait., *Asplenium nidus* L., *A. adiantoides* L., *Blechnum cartilagineum* Sw., *B. serrulatum* Rich., *B. Patersoni* R. Br., *B. discolor* Forst., *B. capense* (L.) Schlecht., *Doodia aspera* R. Br., *Pellaea falcata* R. Br., *Cheilanthes tenuifolia* Sw. var. *Sieberi* Benth., *Adiantum aethiopicum* L., *A. formosum* R. Br., *A. affine* Willd., *Pteris tremula* R. Br., *Histiopteris incisa* Thunb., *Pteridium aquilinum* L., *Polypodium Brownii* Wickstr., *P. diversifolium* Willd., *Cyclophorus confluens* R. Br., *Platynerium bifurcatum* Cav., *Pellaea paradoxica* (R. Br.).

Gleicheniaceae: *Gleichenia circinata* Sw., *G. flabellata* R. Br.

Osmundaceae: *Todea barbara* (L.) Moore.

Pinaceae: *Callitris Macleayana* F.v.M.

Potamogetonaceae: *Potamogeton tricarinatus* F.v.M.

Cyperaceae: *Gahnia aspera* Spreng., *G. psittacorum* Labill., *Lepidospermum concavum* R. Br.

Palmae: *Linospadix monostachyus* Wendl. and Drude, *Archontophoenix Cunninghamiana* Wendl. and Drude.

Araceae: *Typhonium Brownii* Schott., *Colocasia macrorrhiza* Schott., *Gymnostachys anceps* R. Br., *Pothos longipes* Schott.



Liliaceae: *Stypandra glauca* R. Br., *Xerotes longifolia* R. Br., *Xanthorrhoea resinosa* Pers., *Geitonoplesium cymosum* A. Cunn., *Eustrephus latifolius* R. Br., *Rhipogonum album* R. Br., *Smilax glycyphylla* Sm., *S. australis* R. Br.

Iridaceae: *Libertia paniculata* Spreng.

Orchidaceae: *Dendrobium speciosum* Sm., *D. Kingianum* Bidw., *D. pugioniforme* A. Cunn., *D. gracilicaule* F.v.M., *D. teretifolium* R. Br., *Bulbophyllum Shepherdi* F.v.M., *Spiranthes australis* Lindl.

Casuarineae: *Casuarina torulosa* Ait.

Fagaceae: *Fagus Moorei* F.v.M.

Moraceae: *Cudrania javanensis* Trec., *Ficus rubiginosa* Desf., *F. macrophylla* Desf., *F. stephanocarpa* Warb.

Urticaceae: *Urtica incisa* Poir., *Laportea gigas* Wedd.

Proteaceae: *Persoonia media* R. Br., *Helicia glabriflora* F.v.M., *Orites excelsa* R. Br., *Hakea saligna* R. Br., *Lomatia ilicifolia* R. Br., *Stenocarpus salignus* R. Br.

Santalaceae: *Exocarpus cupressiformis* Labill.

Loranthaceae: *Loranthus dictyophlebus* F.v.M., *Phrygilanthus celastroides* (Sieb.) Eichl.

Polygonaceae: *Polygonum hydropiper* L.

Phytolaccaceae: *Codonocarpus attenuatus* Hook.

Ranunculaceae: *Clematis aristata* R. Br., *C. glycinoides* DC., *Ranunculus lappaceus* Sm.

Menispermaceae: *Legnephora Moorei* Miers.

Magnoliaceae: *Drimys dipetala* F.v.M.

Anonaceae: *Eupomatia laurina* R. Br.

Monimiaceae: *Piptocalyx Moorei* Oliv., *Wilkiea macrophylla* A. DC., *Palmeria scandens* F.v.M., *Daphnandra tenuipes* Perk., *Doryphora sassafras* Endl.

Lauraceae: *Cinnamomum Oliveri* Bailey, *C. virens* R. T. Baker, *Litsea dealbata* Nees, *L. reticulata* Benth., *Cryptocarya glaucescens* R. Br., *C. australis* Benth.

Saxifragaceae: *Quintinia Sieberi* A. DC., *Anopteris Macleayanus* F.v.M.

Pittosporaceae: *Pittosporum undulatum* Andr., *Hymenosporum flavum* F.v.M., *Bursaria spinosa* Cav., *Billardiera scandens* Sm., *Citriobatus multiflorus* A. Cunn.

Cunoniaceae: *Aphanopetalum resinosum* Endl., *Geissois Benthami* F.v.M., *Ackama Muelleri* Benth., *Schizomeria ovata* D. Don, *Ceratopetalum apetalum* D. Don, *Weinmannia rubifolia* Benth., *Callicoma serratifolia* Andr.

Rosaceae: *Rubus moluccanus* L., *R. parvifolius* L., *R. rosaefolius* Sm., *R. Moorei* F.v.M., *Acaena ovina* A. Cunn.

Leguminosae: *Acacia elongata* DC., *A. melanoxyton* R. Br., *A. intertexta*, *A. binervata* DC., *A. longifolia* Willd., *A. floribunda* F.v.M., *A. decurrens* Willd. var. *mollis* Lindl., *A. juniperina* Willd., *Cassia sophera* L., *Daviesia corymbosa* Sm. var. *arborea* Maiden, *Gastrolobium Boormani* Maiden and Betche, *Indigofera australis* Willd., *Kennedyia rubicunda* Vent., *K. prostrata* R. Br.

Geraniaceae: *Geranium dissectum* L., *Pelargonium inodorum* Willd.

Oxalidaceae: *Oxalis corniculata* L.

Rutaceae: *Bosistoa euodiformis* F.v.M., *Geijera salicifolia* Schott., *Evodia micrococca* F.v.M., *Zieria Smithii* Andr., *Acronychia laevis* R. and G. Forst., *A. Baueri* Schott.

Meliaceae: *Cedrela australis* F.v.M., *Melia Azedarach* L., *Dysoxylum Fraserianum* Benth., *D. rufum* Benth., *Synoum glandulosum* A. Juss.

Polygalaceae: *Comesperma ericinum* DC.

Euphorbiaceae: *Breynia oblongifolia* J. Muell., *Claoxylon australe* Baill., *Baloghia lucida* Endl., *Homalanthus populifolius* Grah.

- Celastraceae: *Celastrus australis* Harv., *Denhamia pittosporoides* F.v.M.
 Sapindaceae: *Diploglottis Cunninghamii* Hook., *Sarcopteryx stipitata* Radlk.,
Nephelium leiocarpum F.v.M., *Dodonaea triquetra* Wendl.
 Akaniaceae: *Akania Hillii* Hook.
 Rhamnaceae: *Emmenospermum alphitonioides* F.v.M.
 Vitaceae: *Vitis Baudiniana* F.v.M., *V. hypoglauca* F.v.M.
 Elaeocarpaceae: *Elaeocarpus reticulatus* Sm., *Sloanea Woollsii* F.v.M.
 Malvaceae: *Sida rhombifolia* L., *Hibiscus heterophyllus* Vent.
 Sterculiaceae: *Brachychiton acerifolius* F.v.M., *B. populneus* R. Br., *Tarrietia actinophylla* Bailey, *Commerconia Fraseri* J. Gay.
 Dilleniaceae: *Hibbertia volubilis* Andr., *H. dentata* R. Br.
 Violaceae: *Viola hederacea* Labill.
 Flacourtiaceae: *Streptothamnus Beckleri* F.v.M.
 Passifloraceae: *Passiflora alba* Link and Otto.
 Thymeleaceae: *Pimelea ligustrina* Labill.
 Myrtaceae: *Myrtus Beckleri* F.v.M., *Eugenia Smithii* Poir., *E. corynantha* F.v.M., *E. cyanocarpa* F.v.M., *Syncarpia laurifolia* Ten., *Backhousia myrtifolia* Hook and Harv., *Tristania conferta* R. Br., *T. laurina* R. Br., *Eucalyptus Andrewsi* Maiden, *E. pilularis* Sm., *E. acenioides* Schau., *E. microcorys* F.v.M., *E. quadrangulata* Deane and Maiden, *E. saligna* Sm., *E. grandis* Maiden, *E. propinqua* Deane and Maiden, *E. punctata* DC., *E. canaliculata* Maiden, *E. tereticornis* Sm., *E. amplifolia* Naudin, *E. corymbosa* Sm., *Leptospermum flavescens* Sm., *Callistemon lanceolatus* DC. var., *Melaleuca Leucadendron* L.
 Oenotheraceae: *Epilobium glabellum* G. Forst.
 Araliaceae: *Tieghemopanax Murrayi* R. Viguier, *T. sambucifolius* R. Viguier.
 Umbelliferae: *Hydrocotyle asiatica* L.
 Epacridaceae: *Trochocarpa laurina* R. Br., *Leucopogon* sp.
 Sapotaceae: *Sideroxylon australe* Benth. and Hook.
 Ebenaceae: *Diospyros cargillia* F.v.M.
 Gentianaceae: *Erythraea australis* R. Br.
 Apocynaceae: *Chilocarpus australis* F.v.M., *Alyxia ruscifolius*, R. Br., *Lyonsia straminea* R. Br., *L. largiflorens* F.v.M.
 Asclepiadaceae: *Marsdenia rostrata* R. Br.
 Borraginaceae: *Ehretia acuminata* R. Br.
 Verbenaceae: *Clerodendron tomentosum* R. Br., *Gmelina Leichhardtii* F.v.M.
 Labiatae: *Plectranthus parviflorus* Henck., *Prostanthera ovalifolia* R. Br. var. *latifolia* Benth.
 Solanaceae: *Solanum opacum* A. Br., *S. aviculare* G. Forst., *S. simile* F.v.M., *S. verbascifolium* L., var. *auriculatum* Ait., *S. pseudo-capsicum* L., *S. pungentium* R. Br., *Duboisia myoporoides* R. Br.
 Bignoniaceae: *Tecoma australis* R. Br.
 Acanthaceae: *Eranthemum variabile* R. Br.
 Myoporaceae: *Myoporum acuminatum* R. Br.
 Plantaginaceae: *Plantago varia* R. Br.
 Rubiaceae: *Morinda jasminoides* A. Cunn., *Psychotria loniceroides* Sieb.
 Caprifoliaceae: *Sambucus xanthocarpa* F.v.M.
 Cucurbitaceae: *Melothria Cunninghamii* Benth.
 Compositae: *Olearia dentata* Moench., *Helichrysum elatum* A. Cunn., *H. Beckleri* F.v.M., *H. diosmifolium* Don, *H. bracteatum* Willd., *H. ferrugineum* Less., *Gnaphalium japonicum* Thunb., *Erechites prenanthoides* DC., *Senecio dryadeus* Sieb., *Olearia ramulosa* Benth.

Additional Determinations.

(Added 26th August, 1925.)

Cycadaceae: *Macrozamia Perowskiana* Miq. Only one plant found; stem about eight inches in diameter.

Taxaceae: *Podocarpus elata* R. Br. Brown or She Pine; very rare.
