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The Vegetation of Mt. Wellington, Tasmania
The Plant Communities and a Census of the Plants

By

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PLATES XIV, XV, XVI

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INTRODUCTION

In this paper a description is given of the vegetation of an area approximately five miles square (approx. Lat. 42° 54′; Long. 147° 17′) lying west of Hobart and including all the Mt. Wellington Park Reserve and part of the Hobart City Water Reserve. These have been resumed since 1906, but before that time were commercially exploited and all the millable timber removed from the lower slopes. Since the creation of these reserves there has been some regeneration, but owing to frequent and often devastating bush fires the original appearance of much of the vegetation has been changed considerably. However, the higher parts are sufficiently untouched and the original composition of the lower parts clear enough to present a picture of the relationships between the various communities.

The plant cover of this area is practically pure Eucalyptus forest formation, covering a vertical range from sea level to 4000 feet. It gives an opportunity of studying the relation of the Eucalyptus forest formation to altitude and climatic and edaphic factors towards the most southerly part of its distribution. The relative dryness of the area has prevented the development of sub-antarctic rain forest and has modified the Austral-Montane formation considerably. A study of this region therefore forms a preliminary step in the study of these formations in Tasmania and helps to extend southwards the study of the montane vegetation of eastern Australia begun by Brough, McLuckie and Petrie (1924) at Mt. Wilson, McLuckie and Petrie (1927) at Kosciusko and Fraser and Vickery (1937-9) at Barrington Tops. Within Tasmania a comparison with the vegetation of Cradle Mt., where conditions are colder and wetter than at Mt. Wellington, can be made and the descriptions of the latter area by Gibbs (1920) and Beadle (1935) extended.

Physiography. (See Map.) The area forms the eastern end of an E-W range about 20 miles long, which rises to 4000 ft. in several places and forms the watershed between the lower courses of the Derwent and Huon Rivers. It is separated from the Mt. Humboldt mass by the valley of the Russell Falls River, which is in turn separated from the central plateau by the valley of the Florentine and Derwent.

The topography is simple, being the eastern and almost square end of the range, rising fairly evenly with increasing gradient, the final 400 ft. at an angle of 30 degrees. In one part the edge of the sill capping the plateau has broken away to form cliffs ('Organ Pipes') about 300 ft. high of the columnar dolerite. The top of the range is almost flat, sloping gradually to the west, with a consistent slope of 9 deg., and falling 200 ft. in about half a mile. There is then a sudden drop of about 30 ft. to a flat swampy plain of glacial origin, at the head of the North-west Bay River. On the western side of these swamps, a steep North-South dolerite ridge (Mt. Arthur) rises to 4100 ft. The northern and eastern sides of the range are drained by small creeks, while the whole of the top drains into the swamps and thence to the N.W. Bay River. This flows south, descending rapidly in a series of cascades, then turning south-east at approx. 1500 ft. through the foot-hills to the D'Entrecasteaux Channel.

Geology.—For the most part, the plateau is capped by a Jurassic (?) dolerite sill about 1600 ft. thick, overlying Triassic sandstones of about 800 ft. depth, resting on an Upper Permian base.

In many places the edges of the dolerite sill have broken away and descended as extensive talus slopes, which have covered over the sandstone, except in isolated places on the shoulders of spurs and in some cases have descended further and covered over mudstones as far down as the 700 ft. contour. Smaller dolerite masses at lower levels are found in the foothills, notably at Neika, Chimney Pot Hill and Mt. Nelson. These are sometimes lower sills intrusive into Permian strata and sometimes the results of block faulting of the main plateau mass.

These talus slopes have an important effect on the vegetation, providing a well drained rocky soil with no surface water. Drainage from above flows through and under this talus to appear when the mudstone and sandstone protrude from beneath. This type of physiography, summit cap of dolerite with talus covering sandstones and mudstones, is characteristic of most of the mountains in the eastern two-thirds of Tasmania and is thus an important ecological feature. The initial stages of a xerosere has formed on this talus slope, which has been colonized except for unstabilized patches (locally called 'Ploughed Fields or Potato Fields'). Serious bush fires and consequent erosion on the south slopes have removed plant and soil covering, and parts have reverted to the open talus which, is being recolonized slowly.

The summit of the plateau shows evidences of glaciation, the area 'Dead Island' being an example of a 'nunatak'.

Soils.—The soils of Mt. Wellington fall into two broad groups, the High Moor and Skeletal soils of the plateau and upper slopes and the podsols below the 2500 ft. contour. In flat to gently sloping sites where they are fully developed, the high moor soils consist of between two to three feet of fine black peat with some coarser organic remains in the top few inches, overlying a stony and clayey horizon of deposition and weathering. There is rarely any evidence of a well-marked horizon of deposition alone. In localities which vary from relatively gentle slopes to cliffs and where the natural erosion process is faster than the weathering process, extensive areas of exposed rock in boulders and sheet rock occur. Frequently some soil and organic material is lodged in cracks and crevices in this rocky terrain. Where the erosion and weathering process are in the balance, areas of skeletal soils occur. These consist of shallow stony, clayey soils with little or no accumulation of organic matter and frequently containing large boulders.

The podsols of the lower slopes consist of dark grey and sandy loams with much organic matter above a more or less distinct bleached horizon, which in turn overlies yellow and grey clays. In areas of somewhat restricted drainage there is a greater accumulation of organic matter, with the result that the soil approaches a peaty sand and directly overlies the clay subsoil.

On the flat tops of the sandstone layers not covered by the talus, acid swamps have developed in some parts consisting of black peaty sand over yellow clay. These are shallow and subject to drying out, and so do not support the Button Grass (*Gymnoschoenus adjustus* Nees.) swamp characteristic of the permanently wet type of acid swamp in the west and south.

Climate. (Information supplied by the Divisional Meteorologist, Hobart.) *Rainfall.*—The mean annual rainfall varies from 23·97 inches to nearly 60 inches on Mt. Wellington. (See Table I).

TABLE I

Place	*Alt. Ft.*	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	*Mean*
Hobart ..	177	1·84	1·49	1·73	1·97	1·85	2·21	2·13	1·83	2·07	2·33	2·43	2·09	23·97
Waterworks	527	2·62	2·01	2·75	3·14	2·47	2·98	2·90	2·30	2·89	3·67	2·65	3·15	33·53
Ferntree ..	1300	4·44	3·62	4·20	4·90	3·94	4·64	4·59	4·17	4·55	5·86	4·74	5·51	55·16
Springs ..	2403	4·48	3·35	4·76	5·47	4·43	5·24	4·74	4·22	4·89	5·72	2·77	5·51	57·58
Gap	4000	4·04	3·36	4·53	5·43	4·04	4·62	4·18	3·52	4·83	6·04	4·95	5·81	55·35

With distance from the mountain, the rainfall decreases rapidly almost independently of altitude, but on the mountain the 1200 contour corresponds approximately with the 50″ isohyet. The seasonal variation in monthly rainfall is not pronounced. At Hobart a mean minimum of 149 points occurs in February, monthly averages gradually increase to 243 points in November, but a slightly secondary minimum is shown in August. There is, however, a marked fluctuation at irregular intervals, the lowest total in one month ranging from 0·03 (January) to 0·39 (September) and the highest total 5·91 (January) to 10·16 (August). Droughts occur. Southern Ocean depressions are responsible for 50 per cent of the rainfall. The rain is gentle; on 70 per cent of the days of rain the amounts are less than 15 points. Heavy falls of over an inch in 24 hours are of comparatively rare occurrence. Local variation is considerable.

In addition to the rain, the mountain above 1300 ft. is often mist-covered as the result of easterly weather, and in the summer the afternoon sea breeze often produces a bank of cloud on the South-east face. In conjunction with other factors this has an important effect on the vegetation.

Temperature.—The average monthly maximum and minimum temperatures for Hobart and the Springs are given in Table II (below).

TABLE II

	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	*Mean*
Hobart ..	71·0 52·8	71·1 53·4	67·9 50·9	62·5 47·7	57·4 43·9	52·7 41·0	52·1 39·6	55·1 41·1	58·8 43·3	62·6 45·6	65·8 48·3	79·0 51·2	62·2 46·6
Springs ..	60·0 44·1	61·7 45·7	57·8 43·7	52·4 40·6	48·4 38·2	44·8 35·9	43·9 34·9	45·3 35·3	49·0 36·4	52·2 38·0	55·6 40·0	58·1 42·7	52·4 39·6

In Hobart the absolute highest temperature was 105·2° F. and absolute lowest 27·7° F.

Table III gives the average hours of sunshine per month for Hobart.

TABLE III

J.	F.	M.	A.	M	J.	J.	A.	S.	O.	N.	D.	*Total*
233·9	194·2	198·2	142·7	142·1	118·2	128·5	159·1	173·1	191·3	220·0	217·0	2118·3

The mean amount of cloud per month (on a scale 0-10) is very even, ranging from 5·8-6·4. The mean monthly humidity for Hobart ranges from 58-80 per cent and for the Springs 70-77. There is considerable wind action in Hobart. Gusts of over 60 m.p.h. may be experienced in any month, and the mean total miles in 24 hours ranges from 150-160 per month. This must be more severe at higher levels, especially on the plateau.

Snow may fall on the mountain in any month, but rarely lies more than a few days at altitudes below 2400 ft. Table IV gives average number of days of snow fall.

TABLE IV

J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	*Total*
0·3	0·2	1·0	1·8	2·7	3·9	4·0	4·6	3·2	2·4	1·7	0·5	26·3

Above 3000 ft. it may lie for weeks at a time during the months from May to September, and at 4000 ft. large areas may be covered continuously during that time and isolated drifts may last into November. Frosts occur down to sea level in open areas in winter months, but forest cover prevents their formation below 1500 ft.

Exposure.—The top and west sides of the summit of Mt. Wellington and the Mt. Arthur ridge and the N.W. sides of the range and its foothills receive maximum sunlight and experience maximum evaporation. The summit ridges experience also lowest temperature and maximum wind. The steep eastern face loses direct sunlight before mid-day in winter, while the shadow of the mountain covers most of the S.E. slopes early in the afternoon. The south face receives little direct sunlight except in summer.

STRUCTURE OF THE PLANT FORMATIONS

Two main formations exist in this area, one including a very reduced third type:

1. *Eucalyptus forest formation.*—This covers the greater part of the area, and varies from open forest of the lower slopes and foothills to dense *E. regnans* forests. Within this formation several sheltered gullies support a 'gully flora' of a subantarctic rain forest type called 'mixed forest of the West Coast' by Gibbs (1920), analagous to the 'gully flora' of tropical rain forest origin occurring in the Eucalyptus formation on the Hawkesbury sandstones (Pidgeon, 1938).
2. *Austral-Montane Formation* (Gibbs, 1920).—This occupies an area of very limited extent on the summit of the range, and is restricted both in area and composition by the relative dryness and warmness of the situation compared with that on mountains further inland where a fuller development obtains. Shrubberies of alpine conifers, dwarf *Arthrotaxis* forests, *Nothofagus* shrubberies and plant mosaics are absent.

The sides of the plateau, except the top of the steep eastern face, are occupied by Eucalyptus forest formation. On the summit all places with sufficient depth of soil and drainage and which are not exposed to the full force of the wind, also support stunted *Eucalyptus coccifera* forest. Elsewhere on the summit the fairly well-drained but shallow soils support the reduced Austral-Montane formation, while the poorly drained area is occupied by swamps analagous to those of Barrington Tops (Fraser and Vickery, 1937-39) and Kosciusko (McLuckie and Petrie, 1927). Exposed rock surface occurs in many places, mainly unstabilized dolerite talus. The initial stages of a xerosere are to be found here, as the slopes are being colonized slowly by the shrubs from the *E. coccifera* and *E. coccifera-urnigera* associations.

THE EUCALYPTUS FORESTS

(1) **E. coccifera** Consociation

These species form a pure consociation between 3600 and 4000 ft. It occupies the rocky soils and stabilized boulder masses, and is limited in its distribution by three main factors:

(*a*) *Drainage and water supply,* which restricts the distribution of the consociation to the steeper and rockier parts, where there is adequate drainage and aeration, but which receive a good supply of water from higher levels. The effects of this factor are everywhere apparent. All slopes of approx. 10-30 degrees with a reasonable supply carry the consociation. The lesser slopes and very shallow soils support the grassland and shrub communities, and the poorly drained areas the swamps. The relation to drainage and water supply is strikingly demonstrated by 'Dead Island'. This is a 'nunatak' within the swamps and rising a few feet above the water table, thus providing sufficient aeration and permanent water for the consociation to develop as an 'island' of eucalypt within the swamp.

Within the consociation where drainage fails or the water supply is inadequate, it is sharply replaced by patches of swamp associes such as mats of *Astelia*, *Gleichenia dicarpa-Baeckia Gunniana* mixtures or by grassland and shrub communities. The relationship between forest and swamp is comparable to that described for *E. pauciflora* on Barrington Tops and Kosciusko.

(*b*) *Exposure.*—Though low temperature may have some effect on the distribution of *E. coccifera,* it seems more probable that the higher transpiration coupled with a rapidly draining and drying soil prevent its establishment on the top of the plateau and high up on the ridges. Exposure reduces the size of the species from trees 15 ft. high and 18 in. thick to prostrate shrubs a few inches high with permanently juvenile foliage at practically the same altitude.

(*c*) *Competition.*—On the side of the plateau the lower limit of the species is determined by competition, mainly with *E. urnigera,* which begins to appear at 3600 ft. Below this level to 3000 ft. the balance is a delicate one and determined by local climatic variation and power of regeneration from fire. *E. coccifera* is more drought and cold resistant than *E. urnigera.* It is unhurt by long periods under snow or even colder conditions, when the foliage is covered with thick masses of ice for a period of days. (An exceptionally long period of icing about 15 years ago killed off large areas of the *E. coccifera* consociation, however.) Though *E. urnigera* is less frost and drought resistant, it regenerates better and grows faster, so that mild winters and fires favour its spread at the expense of the other species. Dense stands of *E. urnigera* saplings occur in many places in the more sheltered and lower parts of the *E. coccifera-urnigera* association, with logs and occasionally large living trees of *E. coccifera* within them, indicating an active extension of the *E. urnigera* component.

The *E. coccifera* consociation (assisted by the rocky nature of the ground) is fairly open in most places, permitting the development of an important shrub stratum. This comprises members of the reduced Austral-Montane association adjoining with the exception of extreme heliophilous and swamp types. In the more sheltered and wetter portions it includes shade and moisture loving species from the lower associations such as *Bauera rubiodes*, *Nothogagus Cunninghami* (shrub form) and *Leptospermum lanigerum*.

The *E. coccifera* consociation is of common occurrence on Tasmanian mountains in the eastern half of the island. It forms with *E. vernicosa* the advance margin of the Eucalypt into the remnants of the Austral-Montane, which survives where cold, exposure, shallow soils and long periods under snow halt the more vigorous tree invader.

(2) **E. coccifera-urnigera** Association

Below 3600 ft. on the outer slopes of the plateau, *E. urnigera* is associated with other Eucalypt species. It does not form pure stands except as consocies of saplings (see above). At the upper limit of its distribution it becomes less frequent until pure *E. coccifera* is found, and on the lower limit it cannot compete with *E. gigantea* and *E. regnans*.

It is confined to stabilized dolerite talus in those parts where good drainage, continuous water supply and shelter from drying winds obtain. Where drainage is poor and conditions are swampy, the species is dwarfed to a shrub and may never develop adult foliage. It is also very scanty on steep slopes where the soils drain out quickly or where the trees are exposed to insolation and drying winds. In such places *E. coccifera* continues in a nearly pure state down to the *E. gigantea* community.

The shrub layer presents a rich and varied facies as a result of the warmer conditions, shelter, the plentiful supply of water draining from above combined with the effects of the open canopy. The more heliophilous types of the summit plateau cannot compete, and are replaced by more mesomorphic species, e.g., *Orites acicularis* and *O. revoluta* are replaced by *O. diversifolia* and *Richea Gunnii* and *R. scorparia* by *R. dracophylla*. *Bauera rubiodes*, *Leptospermum lanigerum* and *Telopea truncata* reach their maximum development in the wetter parts. On the other hand shrubs such as *Gaultheria hispida*, *Cyathodes glauca*, *Prostanthera lasianthos*, *Gahnia psittacorum*, *Hakea macrocarpa*, *Olearia viscosa*, *Correa* spp, *Bedfordia salicina* and *Pleopeltis diversifolia* (Fillices) are at the upper limit of their distribution. The shrub layer is the most varied of any of the associations, containing many elements from the *E. coccifera* and summit plateau associations from above and the *E. obliqua-regnans* association from below. *E. Johnstoni* is common towards the lower levels of the association.

An interesting feature of this association at lower levels is the colonization of sheltered patches of open talus by the fern *Pleopeltis diversifolia*, whose tough rhizomes twine among the boulders and help the accumulation of soil and humus.

At levels below about 2500 ft. *E. urnigera* cannot compete with *E. gigantea* and *E. regnans* and is quickly displaced.

(3) **E. obliqua-regnans** Association (800 ft.-2500 feet)

This association is not a very intimate one and varies within wide limits in its composition according to differences in local climate. On the upper limit, *E. gigantea* may largely or completely replace *E. obliqua*, and one might be justified in defining an association on Mt. Wellington with the former as the important element representing the extensive *E. gigantea* associations found in other parts of the island. However, until these have been studied and defined, these *E. gigantea* communities have been included as an element of the *E. obliqua-regnans*.

At its lower level, *E. obliqua* passes into the open forests of the drought resistant species (*E. obliqua, E. tasmanica, E. viminalis, E. salicifolia, E. linearis*) characteristic of the foothills below 1000 ft.

According to aspect, moisture supply and exposure, either *E. obliqua* or *E. regnans* may become locally dominant or form pure stands. Where specialized conditions prevail specialized communities have developed (gully communities, sandstone communities). *E. urnigera E. Johnstoni and E. globulus* also occur.

This association is the most important type of commercial forest in S.E. Tasmania. For this reason and also because of bush fires it exists in greatly reduced form in the area studied.

Dealing with the two most important species separately:—

E. obliqua

This species has wider distribution in the association, and is found in all parts of the forest, and often forms pure societies on the drier places, such as the tops and western sides of the ridges. It becomes attenuate towards the wetter parts, where it is replaced by *E. regnans* and by *E. gigantea* at high altitudes. It occurs into the open forest association as an important element.

Where this species is dominant the canopy is fairly open, and an important tall shrub layer of a relatively xerophytic type develops with *Acacia verniciflua, Eriostemon squameus, Ozothamnus rosmarinifolius, Pultenea juniperina, P. daphnoides, Monotoca lineata* and *Oxylobium ellipticum* as important characteristics. Frequent fires and consequent denudation have greatly reduced the tall shrub layer in many parts, but there is no doubt that it was an important element in the climax community, and replacement of the older trees was dependent on quick germination and growth in temporary clearings.

E. regnans

From the drier tops and exposed N.W. sides of the ridges towards the shadier S.E. sides, *E. obliqua* is replaced by *E. regnans*. Here the tall shrub layer is also well developed, but presents a more mesomorphic appearance. *Olearia argophylla, Pomaderris apetala, Bedfordia salicina, Acacia dealbata, Zieria Smithii, Prostanthera lasianthos, Gahnia psittacorum, Pittosporum bicolor*, etc., displace the types dominant with *E. obliqua*. There is no low shrub or herb layer (except ferns) in the denser parts, but occasional more open parts support shrubs such as *Gaultheria hispida, Drimys lanceolata, Correa Lawrenciana, Olearia myrsinoides, O. stellulata, Aristotelia peduncularis*. Ferns such as *Polystichum aculeatum, Blechnum capense, Histopteris incisa, Pleopeltis diversifolia*, etc., occur.

In the wettest parts *Olearia argophylla* dominates the shrub layer and has a canopy of leaves about 15 ft. above the ground, supported by a mass of bare stems about 3 inches thick. Only such ferns as *Dicksonia antarctica, Polystichum aculeatum Blechnum* sp. and *Pleopeltis diversifolia* develop on the floor, and the structure approaches that of the lower parts of the 'gully flora', but with occasional *E. regnans* trees.

On the South-east side of the mountain *E. regnans* reached its maximum development, formerly having formed large societies of magnificent trees up to 200 ft. high. These were destroyed by fire in 1914, and subsequent erosion hindered regeneration in many parts. In others it is proceeding actively, and there are large areas of regrowth with the white skeletons of the previous forest rising above them. In these areas the canopy is denser and the shrub layer of less importance than in other parts of the association, but still well represented.

Replacement of the trees in the mature forest takes place in clearings made by falling trees or by fires. The Eucalypt seedlings cannot establish themselves beneath an undisturbed tall shrub layer. The bottoms of the gullies being always moist are never affected by fires, and the Eucalypt can never become established, and a 'gully flora' exists (see below).

Towards the lower levels, *E. regnans* is replaced by the *E. globulus* communities, which occupy the sheltered parts of the open forest association.

The following specialized communities occur in the association:—

(*a*) *'Gully Flora'*

At the bottom of those gullies not exposed to the dry north-westerly winds, *E. regnans* cannot establish itself in the dense shrub layer, and a 'gully flora' exists.

At altitudes up to approx. 1500 ft. the dominants are *Olearia argophylla, Pomaderris apetala* and *Bedfordia salicina*, which form a canopy of leaves 15-20 ft. above the ground, supported by a thicket of bare stems approx. 3 inches in diameter, with occasional thicker ones of *Athernosperma moschata* and *Acacia dealbata*. The shaded ground can support no shrubs, and generally only ferns, stunted *Dicksonia antarctica, Polystichum aculeatum* and *Blechnum* spp. grow on the floor, while *Pleopeltis diversifolia* scrambles over fallen logs and thicker tree stems, and mosses and liverworts may occur on the thinner ones. The area close to the creek at the bottom of the gully is occupied by fern communities dominated by *Dicksonia antarctica* (up to 20 ft. high) and a rich fern, moss and liverwort ground flora. Light breaks, such as may be caused by neighbouring eucalypt trees falling into the gully, may be colonized by *Acacia dealbata*, and mature societies of this species, consisting of trees 9 in. thick, may be seen rising 10-20 ft. above the surrounding vegetation.

At higher altitudes the *Olearia* and *Pomaderris* are replaced by communities of *Nothofagus-Athernosperma* forest, which may be regarded as small areas of reduced microthermal rain forest (Herbert, 1935), existing where local conditions are suitable. They are related to the more extensive forests occurring at the upper reaches of the river valleys in the S.E. of Tasmania (Kermandie, Esperance, etc.), where a similar transition from *E. regnans* forests to *Nothofagus-Athernosperma* forests occurs on a larger scale.

In the gullies on Mt. Wellington the *Nothofagus* trees reach about 40 ft. in height, and the *Athernosperma* 20-30 ft., with occasional trees of *Acacia melanoxylon* and *Olearia argophylla, Bedfordia salicina* and *Pomaderris apetala* in the drier parts. Cold and lack of shelter limit the distribution of most of the 'gully' species to below approx. 2300 ft., with the exception of *Nothofagus* which protrudes into the Eucalypt forest at the heads of some of the gullies and reappears as the shrub form at higher altitudes in the *E. urnigera* and *E. coccifera* associations.

Light breaks in the upper 'gully' vegetation are colonized by *Nothofagus* seedlings and not by Eucalyptus from the surrounding forests, confirming observations on the vigour of this species under suitable moisture conditions made by Herbert (1936) and Fraser and Vickery (1937-39). The frequent periods of low humidity prevent its spread beyond the gullies, except as an occasional small tree in the *E. obliqua-regnans* or as the shrub form at higher altitudes.

(*b*) *Sandstone communities*

The triassic sandstones are exposed on the shoulders of the ridges, which protrude far enough from the main mass of the mountain to have been covered by the dolerite talus from above (2000-2400 ft.). In this acid sandy soil, which in some places is poorly drained and swampy, communities are found which are different to the *E. obliqua-regnans* forests on the mudstone below and the *E. urnigera-coccifera* on the dolerite talus above.

The most striking feature is the dominance of *E. Johnstoni* which is of minor importance elsewhere, and the almost complete absence of *E. urnigera. E. Johnstoni* is of special systematic interest (Brett, 1938), and is confined to Mt. Wellington and a few other places in S.E. Tasmania where it is not common. It appears to some extent in the *E. urnigera-coccifera* association above, where it occupies a position similar to that of *E. subcrenulata* in similar associations in other parts of the island. It is very rare in the *E. obliqua-regnans* forest below.

At the Springs and White Rock, which are fairly well drained, the species attains the height of approx. 30 ft. Shrubs from the drier parts of the *E. obliqua* forest, such as *Monotoca lineata, Oxylobium ellipticum, Eriostemon squameus, Pultenea juniperina*, occur. In the more open parts, plants characteristic of sandy heaths, *Leptospermum scoparium, Epacris impressa, Richea sprengeliodes, Banksia marginata*, etc., appear, and in the wetter parts *Gaultheria hispida, Bauera rubiodes* and *Richea dracophylla*.

At Snake Plains, which is badly drained, the facies is different again. On the north and west of the area the talus from the mountain above has rolled down onto the sandstone, while on the south it is buttressed by a small dolerite mass, and on the east it falls away in cliffs. The top of this sandstone platform is very flat except for small rocky outcrops a few feet high which support dwarf *E. Johnstoni* and the plants of the drier phase. The soil is shallow, and consists of practically pure black peat, supporting mainly a herbaceous vegetation of plants characteristic of acid sandy peaty soils, dwarfed *Gahnia psittacorum, Sprengelia incarnata, Restio australis, Hypolaena laterifolia, Richea sprengeliodes* and dwarf *Melaleuca squamea*, etc. Where the soil is slightly deeper and better drained, dense thickets of myrtaceous shrubs, 6 ft. high (*Leptospermum scoparium* and *Melaleuca squamea*), exist with the hardier plants of the drier phases such as *Monotoca lineata* and *Oxylobium ellipticum*. The small prostrate *Coprosma Moorei* is common on the bare peat. On the talus slope immediately above, the forest is regenerating following the fires of 1914, and dense stands of small trees of *E. Johnstoni* and *E. urnigera*, with an impenetrable mass of *Gahnia psittacorum* and *Bauera rubiodes*, spring from among the fallen logs of the old forest.

On the south side, the ecotone between the swampy plains on the top of the sandstone and the *E. obliqua-regnans* on the well-drained dolerite is very sharp.

(4) The Open Forests of the Lower Slopes and E. globulus Communities

These are outside the area studied, but a brief description is given to complete the picture.

The foothills consist of either mudstone or dolerite ridges. In the case of the first, the soil is shallow and impervious and the water quickly shed, and in the second the soil is subject to drying and cracking. Added to this the rainfall is low (25-30 in.). On the tops and north and west sides of these ridges, there is a stunted open forest of *E. linearis, E. salicifolia, E. viminalis, E. tasmanica*, with occasional *E. obliqua* and *E. globulus* where water conditions are better. The tall shrub layer is scanty or absent, but grasses and *Cyperaceae* and hardy low shrubs such as *Acacia stricta, A. vomeriformis, A. verticillata*, hardy *Epacridaceae Leguminosae* and *Rutaceae* occur.

On dolerite ridges, *E. linearis* often assumes dominance, and may form societies (Chimney-pot Hill), but generally the elements are mixed. In some cases the mudstone ridges have been so denuded of soil that only a stony clay remains, supporting societies of *E. Risdoni* and its hybrid complex (Brett. 1938). The soil is too poor to support grass sward, and hardy small shrubs of *Epacridaceae* and *Leguminosae* fail to cover soil.

On the south and east sides of the ridges, the shade, shelter from the dry north-westerly winds and perhaps the effects of the moist sea breeze and the assistance given to the retention of water by the dip of the mudstone rock, form a marked local climatic contrast to the tops and west sides and have permitted the development of *E. obliqua-globulus* communities. These were formerly of great importance, but the value of the *E. globulus* and *obliqua* timbers led to their exploitation in the early days of the settlement. They now exist in reduced form only towards the heads of the gullies and isolated patches. Towards the top of the ridges, *E. obliqua* and *E. viminalis* predominate, but towards the bottom of the valleys *E. globulus* becomes increasingly important until it forms an almost pure society.

AUSTRAL-MONTANE FORMATION

This formation is very reduced and impure on Mt. Wellington, lacking many of the elements characteristic of other summit plateaux, where rainfall is more reliable and generally moister and colder conditions prevail. The conifers, *Arthrotaxis* spp., *Microcachrys tetragona, Phaerosphaera Hookeriana, Diselma Archeri* are absent, the only one present being *Podocarpus alpina*, and that does not form shrubberies. There are no dwarf mountain forest or herbaceous associations (Gibbs, 1920), with the exception of *Astelia alpina* communities. However, all the more xerophytic shrubs usually found in this formation are present, so the classification is retained. Three types of community are found:

(1) The Shrubberies

These occupy all the flat top of the mountain, except where the *E. coccifera* consociation and the swamp and grassland are found and the upper portion of the steep eastern face. It exists on the top by virtue of its capacity to endure wind and dry conditions too severe for *E. coccifera* and where there is too little soil and too many rocks for the *Poa caespitosa* grassland to compete.

On the upper portion of the steep eastern face, drainage and water supply are sufficient to support the *E. coccifera* consociation, but snow is blown off the flat top into deep drifts on this area and prevents its establishment. The low rounded shrubs of the formation can tolerate these conditions better than the Eucalyptus trees.

The vegetation takes the form of (*a*) rounded bushes 1-3 ft. high, such as *Orites acicularс, O. revoluta, Richea Gunnii, Richea scoparia*; (*b*) more upright bushes, 1-2 ft. high such as *Ozothamnus ledifolius, Olearia ledifolia, O. pinifilia, O. persoonoides, Coprosma nitida, Drimys lanceolata*, etc.; (*c*) prostrate or creeping over boulders, e.g., *Leptospermum rupestre, Bauera rubiodes, Exocarpus humifusa, Pentachondra pumila, Monotoca empetrifolia, Cyathodes dealbata*; (*d*) sub-erect mats to 1 ft. high, e.g., *Baeckea Gunniana, Cyathodes straminea, C. adscendens, Richea acerosa, R. sprengeliodes*; and (*e*) herbs, e.g., *Astelia alpina, Poa caespitosa, Gleichenia dicarpa, Hypolaena laterifolia, Lycopodium* spp. and annuals. Only one 'bolster' plant (Sutton, 1929), *Abrotenella Fosterioides*, exists. Many of these shrubs occur in the *E. coccifera* consociation. Where the weathered rock has accumulated sufficiently to provide stretches of soil, the shrubberies are replaced by *Poa caespitosa* grassland, with scattered shrubs principally *Ozothamnus ledifolius* with *O. Hookeri, Orites acicularis* and *Richea Gunnii* less common.

(2) The Swamps at the Head of the North-west Bay River

Between the Mt. Wellington plateau and the Mt. Arthur ridge, there lies a shallow valley of glacial origin (3650-3800 ft.) about half a mile square. This receives all the drainage from the top of the mountain and a peaty swamp has developed. This is drained by the North-west Bay River which descends rapidly in cascades into the gorge between the Mt. Wellington mass and Mt. Montagu and the Thumbs. The river is very slowly cutting back into the swamp and a border of grassland at the farther edge indicates a succession.

Succession is so very slow that the area has probably remained unchanged over a long period, and the swamp may be regarded as relatively permanent. Succession of dry years have at times reduced the swamp and increased area of the grassland, shrubs and *E. coccifera*, which have been reduced again by the increase of the swamp in wet years.

One method by which the swamp and grassland developed can be observed on the higher areas in the small slowly moving streams flowing over the rock. A succession involving the 'bolster' plant *Abrotenella Fosterioides* can be traced. These plants colonize the edges and shallow waters, and by apical growth throw themselves into spreading mounds, which slow up and dam the flow. When about 3 ft. in diameter, the colony begins to die at the centre forming a bed for the establishment of *Hypolaena laterifolia, Baeckia Gunniana, Astelia alpina, Gleichenia dicarpa* and annuals, and if the drainage continues to be restricted the swamp associes develops. If, however, the stream breaks through and drains away in another direction, the succession tends towards the grass and shrub vegetation. In some places the periphery of mounds once up to 9 ft. in diameter can be traced in the swamp grassland ecotone.

The main part of the swamp consists of a dense mat of vegetation capable of supporting one's weight, the living portion being about 6 inches thick and deriving its firmness mainly from the stiff leaves of *Astelia alpina*. There is considerable local variation in composition, and, though the different successions have not been studied, they are probably as complex as those described for Kosciusko by McLuckie and Petrie (1927). The basis appears to be a mixture of *Astelia alpina, Gleichenia dicarpa* and *Restio australis*, with *Baeckia Gunniana* and *Hypolaena laterifolia* in the slightly drier parts. In places *Astelia alpina* may exist in a practically pure state, while in other intimate mixtures of *Astelia-Gleichenia, Baeckia-Gleichenia, Gleichenia-Hypolaena*, etc., exist. Quite frequently, *Richea scoparia, R. Gunnii, O. acicularis, Ozothamnus Hookeri* have managed to obtain a foothold, the large yellow bushes of *Orites acicularis* being particularly conspicuous.

Sphagnum occurs floating in the pools and as old mounds in the main body of the swamp, which are colonized by shrubs (chiefly *Richea scoparia*), and persist to a relatively late stage in the succession. It does not appear, however, that *Sphagnum* played an important part in the succession, and thus the swamps here are closer to those of Kosciusko than of Barrington Tops.

(3) Grassland

As the result of entranchment and drainage of the upper levels in the past, there is a succession to grassland. *Restio australis* is the first to disappear. *Astelia* and *Gleichenia* become less important, and *Hypolaena laterifolia, Carpha alpina* and *Baeckia Gunniana* become more important, and annual compositae, *Euphrasia collina, Gentiana dimensis*, etc., and shrubs appear. *Poa caespitosa* and the shrubs of the grassland *Ozothamnus* spp. and *Olearia* spp., *Monotoca empetrifolia, Epacris serpillifolia*, etc., increase in importance.

It is probable also that the grassland forms a subclimax on the top of the Mt Wellington plateau, where the soils are too shallow and windswept to support *E. coccifera* and, as erosion is barely balanced by weathering, cannot become deeper. In other places, however, where the soil can accumulate from the weathering of higher elevations, such as the foot of the Mt. Arthur ridge, the *E. coccifera* is invading the grassland slowly.

Conclusions

The Eucalypt Forest Types

These range from dwarfed and fairly open *E. coccifera* forest on the summit to the dense *E. regnans* of the lower slopes. The species show definite vertical sequence. *E. coccifera* exists as a pure consociation down to about 3600 ft. below which the *E. urnigera* appears in increasing amounts to 2500 ft., where it is succeeded by *E. gigantea* and *E. obliqua-regnans*, which is replaced by the open forests and *E. globulus* communities of the lower slopes.

Four main types have been recognized:

(1) *E. coccifera* Consociation

This natural consociation is believed to be widespread in Tasmania, and represents the upper limit of the invasion of the Eucalyptus formation into the Austral-Montane formation. In comparing it with *E. nipophila*(1) consociation 1000 ft. higher at Kosciusko, it is apparent that the shrub layer on Mt. Wellington is of greater richness and importance, and from a Tasmanian viewpoint the facies at Kosciusko is relatively 'warmer' and mesomorphic. The shrubs in common are *Drimys lanceolata, Helichrysum baccharides* (*Ozothamnus Hookeri*) *Oxylobium ellipticum, Podpcarpus alpina, Richea Gunnii* and *Lissanthe montana,* and of these only *Helichrysum baccharoides, Podpcarpus alpina, Lissanthe montana* and *Richea Gunnii* are generally confined to the *E. coccifera* consociation; the others reach their greatest importance at lower levels. Many of the commonest shrubs in the Kosciusko consociation, e.g., *Veronica derwentia, Helichrysum rosmarinifolium, Olearia myrsinoides, Prostanthera cuneata, Cassinia aculeata* occur in Tasmania at very much lower levels only, and the genera of most of the others are represented by low altitude species. The herb species show a similar distribution.

As it is probable that the climate of Kosciusko is much colder than at Mt. Wellington, the 'warmness' of the shrub facies at the former presents an interesting problem. It may be noted that it is the xeromorphic Kosciusko species which are represented in the *E. coccifera* consociation, while the mesomorphic *Veronica derwentia, Helichrysum rosmarinifolium, Cassinea aculeata* are restricted to lower levels which suggests that the difference may be due to the water factor. Unless we assume the existence of strains of different cold resistance in the two places, their absence in *E. coccifera* cannot be due to the temperature but to water availability. The extremely rocky nature of the terrain, the scanty or shallow soil with poor water-retaining capacity, droughts and high winds prevents the establishment of the water-loving species.

It seems not impossible that the endemism of many of the montane species of Epacridaceae and Proteaceae, etc., in Tasmania may be due in part to the advantage their xeromorphic habit gives them over the more mesomorphic forms which dominate the shrub layer at Kosciusko and which can exist in Tasmania only at lower levels.

The *E. Gunnii* consociation described for Kosciusko by McLuckie and Petrie (1927) does not occur on Mt. Wellington. The species referred to there is not

(1) = *E. pauciflora* = *E. coriacea* of McLuckie and Petrie (1927).

the *E. Gunnii* of Tasmania, but is probably *E. glaucescens* (Blakely, 1934). In Tasmania *E. Gunnii Hook.* forms societies at 2500 ft. to 3500 ft. on the Central Plateau, where it prefers marshy conditions and bears little ecological resemblance to the Kosciusko association.

The *E. pauciflora* association of Barrington Tops (Fraser & Vickery, 1937-9) is also not present on the area studied. This species occurs in Tasmania in the 'Midlands' and Central Plateau as extensive open forest. The two associations may be ecologically related, but the local one is yet to be studied. The definite identity of the species in the two places is yet to be confirmed (Brett, 1938).

(2) *The E. coccifera-urnigera* Association

This association is formed by the entry of *E. urnigera* into the *E. coccifera* forest at below 3600 ft. It competes successfully with the slower-growing species under favourable conditions, and on Mt. Wellington has invaded and displaced it over considerable areas. It is, however, less cold, wind and drought resistant, and upward extension is limited by these factors. Extension to lower levels is limited by the competition of the vigorous *E. gigantea* and *E. obliqua-regnans.*

On Mt. Wellington *E. Johnstoni* occurs in the *E. urnigera* association. This species, however, does not assume the importance that its close relative *E. subcrenulata* does on other mountains. A widely-occurring *E. coccifera-subcrenulata-urnigera* association may eventually be defined of which the Mt. Wellington association with *E. Johnstoni,* vice *E. subcrenulata,* will form a part.

The relation of *E. urnigera* to the dolerite talus slope has been described above (p. 102). Little soil exists in this region, and the water quickly percolates through; consequently the shrub layer is still predominantly xeromorphic. The less heliophilous species from the *E. coccifera* consociation above and the more drought-resistant species from the *E. obliqua-regnans* below mingle.

It seems probable that *E. urnigera,* which has perhaps been evolved in Tasmania, has proved specially suited to resist competition on this specialized habitat to which it is still largely confined. Following fires, it competes successfully with *E. coccifera,* but a series of very severe winters will probably reverse this tendency. At lower levels it cannot compete successfully with *E. regnans* and *E. gigantea,* though it persists in these associations as a minor element down to 2000 ft. It is not found off the talus soils, though it can be cultivated on any moist well drained soil type. In swampy places in its own association or even in the upper parts of the *E. obliqua-regnans* association, *E. urnigera* exists as a shrub, often not losing its juvenile foliage. It is a species of great ecological interest, confined to Tasmania, but with affinities there only with *E. divaricata* (see Brett, 1938).

(3) *E. obliqua-regnans* Association

This rather loose association comprises the chief commercial forests in S.E. Tasmania. The composition varies markedly with changes in local climate, *E. obliqua* predominating in the drier parts and *E. regnans* in the more sheltered. Its upper limits are defined by temperature and by soil type and the lower by rainfall. It is thus characteristic of mudstone soils with a rainfall of over 35 in. per annum.

At its upper limits in the drier parts the *E. obliqua* is replaced by *E. gigantea.* On the lower limits, where the rainfall is below 40 in., the *E. obliqua* element of the more exposed parts is replaced by the open forest association and the *E. regnans* element of the more sheltered regions by the *E. globulus-obliqua* communities.

A general comparison of this association with portion of the Eucalypt forest of Barrington Tops (see Fraser & Vickery, 1937-9) is possible. There the crests and upper slopes of the ridges 2800-3500 ft. are occupied by *E. obliqua* forest. This gives place tõ *E. viminalis*, which is in turn replaced by *E. fastigata* at 4200 ft. (*E. fastigata* is closely related to *E. regnans* (see Blakely, 1934)). The higher rainfall at Barrington is probably offset by the greater seasonal variation and higher average temperature, which would also tend to equalize differences in altitude. A comparison of the shrub and fern layers shows many species in common, though the richness and importance of the tall shrub layer in the Tasmanian association is in marked contrast.

The two areas have another feature in common, the presence of subantarctic rain forest in the 'gullies'. On Mt. Wellington these gullies are of course very small in comparison with the wide valleys, whose sides are occupied by this formation in the other case.

The ecological position of *E. viminalis* in these areas and at Kosciusko is worthy of special attention. At the latter place it forms an association with *E. Gunnii* (*E. glaucescens*), while at Barrington it forms an association with *E. obliqua*. On Mt. Wellington it occurs occasionally in the driest portions of the *E. obliqua-regnans* association and in the more sheltered portions of the open forest, but cannot compete with *E. regnans* or *E. globulus* in the regions of higher moisture. Thus it occupies a very minor ecological position in south-east Tasmania, though it forms an important element in other parts. It is interesting to note that at Barrington it cannot compete with *E. fastigata*, which is closely related to *E. regnans*.

Its ecological position has brought *E. viminalis* frequently in contact with *E. globulus*, *E. salicifolia*, etc., with which it has hybridized freely (Brett, 1938). Another ecological juxtaposition which may have produced similar results in the distant past is shown by the case of *E. Johnstoni*, which is suspected by Brett (1938) of having arisen as the result of the stabilization of a hybrid between *E. subcrenulata* and *E. globulus*. Mt. Wellington is one of the few places in Tasmania where the montane dolerite talus, characterized by *E. subcrenulata*, has made contact with the upper edge of the *E. globulus* community. This would at least bring the two species in contact and go some distance to explaining the absence of *E. Johnstoni* from similar habitats on the central mountains On Mt. Wellington, *E. Johnstoni* is scattered through the *E. urnigera* range, with which it has probably hybridized (Brett, 1938).

(4) *Open Forest Association of the Lower Slopes*

The study of ecology of the Eucalypts of this region has not been attempted; the problem is essentially one for the specially trained Eucalyptologist. Primarily distribution is a matter of varying degrees of xeromorphism, the order of increasing drought resistance being, *E. globulus*, *E. obliqua*, *E. viminalis*, *E. linearis*, *E. salicifolia*, *E. tasmanica*. However, the existence of complex hybrid swarms connecting two or more species, together with considerable denudation, would make the task of greater than its ecological importance warrants. The shrub and herb species are typical of the open forests of south-east Australia.

The Austral-Montane Formation

This may be divided into three main parts:

(*a*) *Shrubberies*

These consist of masses of low shrubs, occupying the small patches of soil amongst the large masses of boulders. The important elements are all 'Australian' (Maiden, 1914). Herbs belonging to the sub-antarctic element occur, but they play little part in the maintenance of the community. The important feature of the vegetation is its extreme xeromorphism. This is a response to the edaphic and climatic conditions, which preclude the establishment of any mesophytic perennials. This has meant the sifting out of many of the types characteristic of the more complete development of the formation in other parts. The shrubberies of alpine conifers, *Phaerosphaera Diselma*, *Microcachrys* and of *Nothofagus Gunnii* and *N. Cunninghami*; trees of *Arthrotaxis* spp. are absent. There is also no solid mat of herb mosaics and only one 'bolster' plant is present.

It thus represents a marked contrast to Mt. Field, only 30 miles to the west, where at a slightly higher altitude with heavier rainfall and deeper and more lasting snow, these communities are fully developed.

(*b*) *Swamps*

The swamps bear some resemblance to those of Barrington Tops and Kosciusko, and many species are common to all three, e.g., *Hypolaena laterifolia*, *Restio australis*, *Euphrasia collina*, *Epacris serpillifolia*, *Orreomyrrhs andicola*. Also the waterlogging of the soil affects the advance of the Eucalypt formation similarly. However, the local community presents several important differences. *Sphagnum* does not appear to play as important a part in the succession. This occurs free-floating in many of the pools and as occasional mounds in the more mature part, but development is not extensive. The inclusion of *Astelia* as a very important element makes the character of the vegetation entirely different; its thick stiff leaves and matted habit provides a firm basis, which the other elements, *Gleichenia dicarpa*, *Restio australis*, *Hypolaena laterifolia*, bind together in a solid mass. This is often firm and dry enough to permit shrubs such as *Richea* spp., *Orites acicularis*, etc., to maintain a semiepiphytic existence. *Baeckia Gunniana* plays a very much more, and *Epacris* spp. a very much less, important part in the succession on Mt. Wellington than in the other places. The position of *Abrotenella Fosterioides* is dealt with.

The problem of deciding what climatic sifting has maintained *Astelia alpina* in its important position in the Austral-Montane formation in Tasmania and prevented its appearance at Kosciusko and Barrington is an interesting one.

(*c*) *Grassland*

The *Poa caespitosa* grassland appears to have two origins, the first as a phase in the succession from the swamp to the *E. coccifera* consociation as a result of the slow draining of the swamp, and secondly as a probable subclimax in the higher parts on shallow, but well-drained, soils where accumulation from weathering is balanced by denudation. Shrubs are well represented and a certain number of other herbs and annuals, but the latter are more frequent in the grassland swamp ecotone.

Comparison with Cradle Mt. (Sutton, 1929)

The higher average rainfall of Cradle Mt. has permitted the development of a more complete Austral-Montane formation, which includes all those species which are excluded by the drier conditions from Mt. Wellington and having in greater quantities those plants which are rare there. In addition, Cradle Mt. supports a microthermal rain forest formation of the West Coast type and a Button Grass association. The grassland associtions are practically identical, while the *E. coccifera* consociation is enriched by the greater development of *Nothofagus Cunninghami* and the presence of *N. Gunnii* and *Phyllocladus rhomboidialis* and other species all indicative of better water conditions.

The Hartz Mts., 30 miles S.W. of Hobart, provide another comparison of the influence of climate on floral composition in Tasmania. These mountains receive rainfall intermediate between that of Cradle Mt. and Mt. Wellington, while there is probably little difference in the winter temperatures of the two places. In response to those conditions, the vegetation has developed an intermediate composition. *Arthrotaxis* does not develop in the microthermal rain forest, but is restricted to the edge of the alpine lakes; the shrubberies of alpine conifers and the level plant mosaics are present but poorly developed; on the other hand these other species such as *Milligania* sp. and *Aciphylla procumbens*, etc., which are absent from Mt. Wellington, do occur. The microthermal rain forest is quite extensive in the upper parts of the valleys draining the area, but not as rich as this formation at Cradle Mt.

Ecological Relationships of the Formations

All available evidence goes to show that it is the amount of available water which holds the balance between the Eucalyptus formation and the microthermal rain forest and Austral-Montane formations. In the first case the climate at 2000-3000 ft. is too dry to permit the advance of the microthermal rain forest beyond the sheltered gullies. The balance is not very much in favour of the Eucalypt, for the presence of occasional *Nothofagus* trees in the *E. regnans* forest and the difficulty of replacement of the Eucalyptus trees in the shady tall shrub layer, indicate that it would not require a great increase in rainfall or rainfall reliability to permit the advance of the *Nothofagus* community, with a lower light requirement into the other formation.

In the second case, towards the summit there is no question of the light factor playing any part, and the advance of Eucalypt formation into the Austral-Montane is restrained by poor water-supply, due to edaphic conditions or to exposure to wind in the case of the shrubberies and grassland, or by excessive water in the case of the swamps. It is very unlikely that low temperatures play any significant part in Eucalypt distribution on the summit.

General Summary

The area studied includes the eastern end of the Mt. Wellington range between 800 and 4166 ft. (with a brief description of the open forest outside this area), lying about 5 miles west of Hobart (lat. 42° 54', long. 147° 17'). The mass consists of a dolerite sill, approx. 1600 ft. thick, overlying sandstones and mudstones.

The rainfall varies with altitude from 24" to approx. 60" per annum.

At higher altitudes the soils are high moor and skeletal types, and below 2500 ft. podsol types. The upper portion of the mountain is very rocky and the soil thin or scanty.

Three plant formations (two in reduced form) are represented:

1. Eucalypt forest.
2. Microthermal rain forest.
3. Austral-Montane.

The Eucalypt forest ranges from open forests of the drier low altitudes through dense forests of large trees with an important tall shrub layer to stunted, fairly open, montane-subalpine forest on the summit plateau.

The microthermal rain forest exists as a 'gully flora' in the upper parts of the large tree forests.

The Austral-Montane formation occupies the small area on the summit plateau not occupied by dwarf Eucalypt forest.

The Eucalypt forest has been divided into four types:

(*a*) *E. coccifera* consociation with low shrubs (3500-4000 ft.)

(*b*) *E. coccifera-urnigera* association with tall and low shrubs (2400-3500 ft.).

(c) *E. obliqua-regnans* association with dense tall shrub layer (app. 1000-2500 ft.) and with 'gully' and sandstone communities.

(d) Open forest associations occupying the tops and dryer sides with *E. globulus* communities on the moister sides of the ridges below 1000 ft.

Associations (a), (b), and (c) have been described briefly and compared and contrasted with Eucalyptus associations at Kosciusko and Barrington Tops. A very brief description of association (d) is also given. The 'gully flora' and sandstone communities within the Eucalyptus formation have been described. The relation of this formation with the reduced microthermal rain forest and Austral-Montane formations has been discussed briefly.

The relations of the reduced montane flora of Mt. Wellington to that of other mountains in Tasmania and the sifting effect of climate (mainly rainfall) on its composition are described.

A census of the plant species in the area is presented.

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APPENDIX

The following table has been compiled as the result of observation and collecting over a period of years.

Column 1. Austral-Montane formation of the summit plateau,
,, 2. *E. coccifera* consociation,
,, 3. *E. coccifera-urnigera* association,
,, 4. *E. obliqua-regnans* association,
,, 5. Sandstone communities,
,, 6. Gully communities,
,, 7. Open forest association.

Abbreviations, vc = very common, c = common, lc = locally common. f = frequent, o = occasional, r = rare, vr = very rare.

In order to increase the usefulness of the census, plants recorded by reliable collectors but not observed by the author have been included and marked with an asterisk (*). For sections 1-6 the list may be regarded as fairly complete, but in the case of the open forest association, 7, there may be many omissions, not only because the association lay outside the area studied in more detail but also because it has been greatly altered by the proximity of Hobart and many aliens occur.

The terminology of Ewart's Flora of Victoria and Black's Flora of South Australia has been generally adopted except for the Filices, where that of Melvaine (1936) was used.

Gramineae	1	2	3	4	5	6	7
**Agrostis alba* L.							
parviflora R.Br.	r	vr	vr	o	—	—	—
Anthoxanthum odoratum L. up to 3000′							
**Arrhenantherum elatius* L.							
**Calamagrostis minor* Benth.							
Cynosurus cristatus L. up to 2500′							
Dactylis glomerata L. up to 2500′							
**Danthonia pallidax* R.Br.	—	—	—	c	—	—	c
pauciflora R.Br.	r	r	r	o	—	—	—
racemosa R.Br.	—	—	r	c	—	—	c
semiannularis R.Br.	—	—	—	c	—	—	vc
**Deyeuxia accidens* J. Vickery							
* *Benthamiana* J. Vickery							
* *densa* Benth.							
* *monticola* (R & S). J. Vickery							
* *quadrisecta* (Lab). Benth.							
* *Rodwayi* J. Vickery							
* *scaberula* J. Vickery							
Dichelachne crinata Hook.	—	—	—	o	—	—	—
Hierochloe Fraseri Hook.	c	o	r	—	—	—	—
redolens R.Br.	o	o	o	c	—	—	—
Holcus lanatus L.	—	—	f	vc	o	—	c
**Melia californica* Nell.							
Microlaena stipitoides R.Br.	—	—	o	—	—	—	c
tasmanica R.Br.							
var. *subalpina*	vr	—	—	—	—	—	—
**Pentapogon quadrifidus* Baill.							
Stipa aphylla Rodway	—	—	—	—	—	—	o
setacea R.Br.	—	—	—	c	—	—	—
Themeda triandra Forsk.	—	—	—	c	—	—	vc
Cyperaceae							
Carpha alpina R.Br.	vc	o	o	—	—	—	—
Carex breviculimis R.Br.	—	—	—	—	—	—	r
gaudichaudiana Kunth.	—	—	—	o	—	—	r
longifolia R.Br.	—	—	—	o	—	f	o
* *tasmanica*	—	—	—	—	—	—	r

	1	2	3	4	5	6	7
Gahnia graminifolia Rodway	—	—	—	o	o	—	c
psittacorum Lab.	—	—	f	c	c	c	f
radula Benth.	—	—	—	o	o	—	—
Lepidosperma filiforme Lab.	—	—	—	vr	—	—	r
elatius Lab.							
var. *Oldfieldii*	—	—	—	o	—	—	o
laterale R.Br.	—	—	—	r	—	—	c
lineare R.Br.							
var. *inops.*	—	—	—	r	—	—	c
squamata Lab.	—	—	—	o	o	—	f
Oreobolus pumilio R.Br.	f	—	—	—	—	—	—
**Scirpus cernuus* Vahl.	—	—	—	o	—	—	—
crassiculatus Hook.	f	—	—	—	—	—	—
fluitans L.	—	—	—	r	—	—	—
inundatus Spreng.	o	—	—	f	—	—	—
* *setaceous* L.	—	—	—	r	—	—	—
**Schoenus apogon* R. & S.	—	—	—	—	—	—	r
* *axillaris* Hook.	—	—	—	r	—	—	—
tenuissimus Benth.	—	—	—	r	o	—	—
Uncinia compacta R.Br.	f	r	r	—	—	—	—
riparia R.Br.	—	—	—	—	—	r	—
tenella R.Br.	r	—	—	o	r	—	—
Restionaceae							
Hypolaena laterifolia Benth.	vc	c	f	f	f	—	—
Restio australis R.Br.	lc	—	—	—	lc	—	—
* *complanatus* R.Br.							
* *oligocephalus.* F.v.M.							
Centrolepidaceae							
Centrolepsis aristata R. & S.	—	—	—	—	o	—	o
fascicularis Lab.	—	—	—	—	r	—	r
strigosa R. & S.	—	—	—	—	o	—	r
Juncaceae							
Juncus bufonius L.	—	—	—	o	o	—	r
communis Mey.	—	—	—	lc	—	—	lc
pallidus R.Br.	—	—	—	o	—	—	o
planifolius R.Br.	—	—	—	f	—	—	f
pauciflorus R.Br.	—	—	—	o	—	—	o
prismatocarpus R.Br.	—	—	—	r	—	—	o
Luzula campestri D.C.	o	—	r	f	—	—	r
Oldfieldii Hook.	c	o	r	—	—	—	—
Liliaceae							
Anguillaria dioica R.Br.	—	—	—	o	—	—	c
Arthropodium paniculatum R.Br.	—	—	—	—	—	—	o
Astelia alpina R.Br.	vc	lc	o	—	—	—	—
Bulbine bulbosa Haw.	—	—	—	o	—	—	o
Dianella revoluta R.Br.	—	—	—	o	o	—	f
tasmanica Hook.f.	—	—	vr	c	c	—	—
Drymophora cyanocarpa R.Br.	—	—	f	c	—	—	—
Stypandracaespitosa R.Br.	—	—	—	—	—	—	o
Thysanotus Patersoni R.Br.	—	—	—	—	—	—	o
Xerotes longifolia R.Br. (Lomandra)	—	—	—	o	—	—	vc
Amaryllidaceae							
Hypoxis hygrometrica Lab.	—	—	—	—	—	—	o
Iridaceae							
Diplarrhena moroea Lab.	—	—	—	c	—	—	vc
Orchidaceae							

N.B.—All the members of this family in the area are geophytes. It is difficult to form a reliable estimate of the frequency, and many species recorded as occasional or rare may become locally common.

Acianthus caudatus R.Br.	r	—	—	f	—	—	o
* *exsertus* R.Br.	—	—	—	—	—	—	o
* *reniformis* R.Br.	—	—	—	—	—	—	r
viridis Hook.	—	—	—	f	—	—	o
Caladenia angustata Lindl.	—	r	r	o	r	—	r
carnea R.Br.	—	—	—	—	—	—	o
dilatata R.Br.	—	—	—	o	—	—	f
* *filamentosa* R.Br.	—	—	—	—	—	—	r
* *Patersoni* R.Br.	—		—	—	—	—	r
* *suaveolens* Reichb.	—	—	—	—	—	—	r
* *testacea* R.Br.	—	—	—	—	—	—	r
Caleana major R.Br.	—	—	—	—	—	—	o
minor R.Br.	—	—	—	—	—	—	o
**Calochilus campestris* R.Br.	—	—	—	—	—	—	o
Chilogottis Gunnii Lindl.	—	—	—	vr	—	—	—
Crytostylis reniformis Lindl.	—	—	—	—	—	—	r
Dipodium punctatum R.Br.	—	—	—	vr	—	vr	vr
Diuris maculata Sm.	—	—	—	—	—	—	f
* *pedunculata* R.Br.	—	—	—	—	—	—	o
* *palustris* Lindl.	—	—	—	—	—	—	r
sulphurea R.Br.	—	—	—	—	—	—	f
Eriochilus cucullatus (Lab). Reichb.	—	—	—	—	—	—	r
Gastrodia sesamoides R.Br.	—	—	—	r	—	r	vr
Glossodia major R.Br.	—	—	—	—	—	—	f
Microtis porrifolia R.Br.	—	—	—	—	—	—	o
**Pterostylis barbata* Lindl.	—	—	—	—	—	—	r
* *cucullata* R.Br.	vr	vr	vr	r	r	—	o
longifolia R.Br.	—	—	—	r	f	—	f
nutans R.Br.	—	—	—	o	—	—	o
* *obtusa* R.Br.	—	—	—	r	r	—	r
* *parviflora* R.Br.	—	—	—	—	—	—	r
* *rufa* R.Br.	—	—	—	—	—	—	r
* *squamata* Lindl.	—	—	—	—	—	—	r
Prasophyllum australe R.Br.	—	—	—	r	—	—	o
* *brachystachyum* Lindl.	—	—	—	—	—	—	r
* *dispectans* Hook.f.	—	—	—	—	—	—	r
elatum R.Br.	—	—	—	—	—	—	r
* *brevilabre* Hook.f.	—	—	—	r	—	—	o
fuscum R.Br.	o	—	—	o	r	—	o
nigricans R.Br.	—	—	—	r	—	—	o
* *patens* R.Br.	r	—	—	o	—	—	o
* *rufum* R.Br.	—	—	—	—	—	—	r
Spiranthes australis Lindl.	—	—	—	—	—	—	vr
Thelymitra carnea R.Br.	—	—	—	—	—	—	o
ixiodes Sw.	—	—	—	—	—	—	o
venosa R.Br.	—	—	—	r	—	—	o
Burmanniaceae							
**Thismia Rodwayi* F.v.M.	—	—	—	—	—	vr	—
DICOTYLEDONS							
Casurinaceae							
Casurina stricta Ait.	—	—	—	—	—	—	lc
Fagaceae							
Nothofagus Cunninghami Hook. f. Oers.	—	—	—	lc	—	e	—
Proteaceae							
Banksia marginata Cav.	—	—	o	c	o	—	e
Bellendena montana R.Br.	vc	c	o	—	—	—	—
Grevillea australis R.Br.	—	vr	vr	—	—	—	—
Hakea serecea Sch.	—	—	c	o	—	—	—
var. *lissosperma*	—	—	—	o	o	—	—
epiglottis Lab.	—	—	vr	vr	—	—	—
Lomatia polymorpha R.Br.	vr	vr	vr	—	—	—	—
tinctora R.Br.	—	—	o	vc	c	—	vc

	1	2	3	4	5	6	7
Orites acicularis R.Br.	vc	c	—	—	—	—	—
diversifolia R.Br.	—	r	f	o	—	—	—
revoluta R.Br.	c	c	r	—	—	—	—
Persoonia juniperina R.Br.	—	—	—	r	—	—	o
Telopea truncata R.Br.	—	o	c	r	—	—	—
Santalaceae							
Exocarpus cupressiformis Lab.	—	—	—	f	—	—	f
humifusa R.Br.	c	o	—	—	—	—	—
stricta R.Br.	—	—	—	f	—	—	f
Leptomeria Billardieri R.Br.	—	—	—	r	—	—	o
Malvaceae							
Plagianthus sidiodes H.	—	—	—	o	—	o	—
Portulaccaceae							
**Claytonia australasica* H.							
Caryophyllaceae							
**Moenchia flaccida* H.	vr	—	—	—	—	—	—
Stellaria flaccida H.	—	—	—	o	—	—	—
Ranunculaceae							
Clematis aristata R.Br.	—	—	—	f	—	f	—
gentianoides D.C.	—	—	—	—	—	—	o
Ranunculus hirtus Banks & Sol.	—	—	f	f	—	—	—
lappaceus Sm.	—	—	—	f	—	o	o
*I *parviflorus* Ehr.							
*I *philonotis* Ehr.							
*I var. *pimperenellifolius*							
* *rivularis*							
* var. *inundatus*							
Winteraceae							
Drimys lanceolata (Poir) Baill.	f	c	c	f	o	o	—
Monimiaceae							
Atherosperma moschatum Lab.	—	—	vr	r	—	vc	—
Cruciferae							
I *Brassica sinapistrum* Boiss	—	—	—	o	—	—	—
Cardamine hirsuta L.	—	—	—	o	—	—	—
var. *tenuifolia* H.	f	f	f	o	—	—	o
stylosa D.C.	—	—	—	r	—	—	—
Lauraceae							
Cassytha pubescens R.Br.	—	—	—	o	—	—	f
Pittosporaceae							
Billardiera longiflora Lab.	—	—	—	f	—	—	o
* var. *alpina*	—	—	r	—	—	—	—
Bursaria spinosa Cav.	—	—	—	—	—	—	vc
Marianthus procumbens B.	—	—	r	—	—	—	o
Pittorsporum bicolor H.	—	r	f	f	—	f	—
Saxifragaceaea							
Anopterus glandulosus Lab.	—	—	—	o	—	o	—
Bauera rubiodes Andr.	f	f	c	r	o	—	—
Tetracarpaea tasmanica H.	o	r	r	—	—	—	—
Rosaceae							
Acaena ovina Cunn.	—	—	—	—	—	—	o
sanguisorba Vahl.	o	o	c	vc	c	—	c
var. *montana*	r	—	—	—	—	—	—

	1	2	3	4	5	6	7
I *Rubus fruiticosus* L.	—	—	—	o	—	o	c
Gunnianus H.	o	o	o	—	—	—	—
parvifolius L.	—	—	—	f	—	—	o
Droseraceae							
Drosera arcturi H.	f	—	—	—	—	—	—
auriculata Back.	—	—	—	o	f	—	c
binata Lab.	—	—	—	o	f	—	—
pygmaea D.C.	—	—	—	o	o	—	—
Leguminosae							
Acacia dealbata Link.	—	—	—	vc	—	f	vc
decurrens Willd.	—	—	—	o	—	—	vc
diffusa Lindl.	—	—	—	o	—	—	c
discolor Willd.	—	—	—	f	—	—	f
melanoxylon R.Br.	—	—	—	c	—	c	o
myrtifolia Willd.	—	—	—	—	—	—	c
riceana Hens.	—	—	—	o	o	o	f
verniciflua A. Cunn.	—	—	—	vc	c	o	f
verticillata Willd.	—	—	—	o	o	—	lc
vomeriformis A. Cunn.	—	—	—	—	—	—	f
stricta Willd.	—	—	—	—	—	—	c
Aotus villosa Sm.	—	—	—	o	o	—	c
Bossiaea prostrata R.Br.	—	—	—	—	—	—	f
Daviesia latifolia R.Br.	—	—	—	o	o	o	lc
ulicina Sm.	—	—	—	o	—	—	lc
Dillwynia cinerascens R.Br.	—	—	—	o.	—	—	f
floribunda Sm.	—	—	—	o	—	—	c
Goodia lotifolia Salisb.	—	—	—	o	—	—	r
Hovea heterophylla Cunn.	—	—	—	—	—	—	o
Indigophora australis Willd.	—	—	—	o	—	—	o
Kennedya prostrata R.Br.	—	—	—	—	—	—	c
Pultenea daphnoides Wend.	—	—	—	c	—	—	c
* *dentata* Lab.	—	—	—	—	—	—	r
Gunnii Benth.	—	—	—	o	—	—	f
var. *baeckiodes*	—	—	—	o	—	—	o
juniperina Lab.	—	—	—	vc	—	—	vc
stricta Sims.	—	—	—	o	—	—	f
tenuifolia R.Br.	—	—	—	—	—	—	vr
Oxylobium ellipticum R.Br.	—	o	o	vc	vc	o	c
Sphaerolobium vimineum Sm.	—	—	—	—	—	—	r
I *Trifolium agrarium* L.							
I *glomeratum* L.							
I *praetense* L.							
I *repens* L.							
I *Ulex europaeus* L.							
Geraniaceae							
Geranium dissectum L.	f	f	c	c	—	—	f
sessiflorum Cav.	o	o	o	—	—	—	o
Perlargonium australe Willd.	—	—	—	r	—	—	r
Oxalidaceae							
Oxalis magellanica Forst.	r	o	o	o	—	—	—
Rutaceae							
Boronia pilosa Lab.	—	—	—	vr	—	—	o
pinnata Sm.	—	—	—	r	—	—	f
* *polygalifolia* Lab.	—	—	—	—	—	—	vr
Correa rubra Sm.	—	o	c	c	o	r	f
Lawrenciana Hook.	—	o	c	f	o	r	f
Eriostemon obovalis Cunn.	—	—	—	—	—	—	f
Phebalium squameus Lab.	—	—	—	vc	vc	c	vr
Zieria Smithii Andr.	—	—	—	c	—	f	—

	1	2	3	4	5	6	7
Stackhousiaceae							
Stackhousia linearifolia A. Cunn.	—	r	r	o	—	—	f
Rhamnaceae							
Pomaderris apetala Lab.	—	—	—	vc	o	vc	r
* *elacophylla* F.v.M.							
elliptica Lab.	—	—	—	—	—	—	c
* *racemosa* Hook.							
Spryidium ulicinum Benth.	—	—	—	—	—	—	vr
Sapindaceae							
Dodonaea viscosa L.	—	—	—	f	—	—	l
Linaceae							
I *Linum catharicum* L.	—	—	—	—	—	—	o
I *gallicum* L.	—	—	—	—	—	—	o
Urticaceae							
**Australina Meulleri* Wedd.	—	—	—	r	—	r	—
pusilla Gaud.	—	—	—	r	—	r	—
Urtica incisa Poir.	—	—	—	l	—	l	—
Polygalaceae							
Bredemeyera retusum (Steetz). Chod.	—	—	—	o	—	—	o
volubile (Steetz). Chod.	—	—	—	f	—	—	c
Euphorbiaceae							
Amperea spartiodes Bron.	—	—	—	c	c	—	v
Beyeria viscosa Miq.	—	—	—	c	—	c	lc
**Poranthera microphylla* Bron.	o	—	—	—	—	—	—
Solanaceae							
Solanum aviculare Forst.	—	—	—	r	—	vr	—
Tremandraceae							
Tetratheca glandulosa Lab.	—	—	—	f	—	—	vc
pilosa. Lab.	—	—	—	f	—	—	vc
Elaeocarpaceae							
Aristotelia peduncularis Hook.	—	—	o	f	—	—	f
Dilleniaceae							
Hibbertia fasciculata R.Br.	—	—	—	—	o	—	f
hirsuta Benth.	—	—	—	—	—	—	o
procumbens D.C.	—	—	—	—	—	—	o
stricta R.Br.	—	—	—	r	o	—	f
Guttiferae							
I**Hypericum androsaemum* L.	—	—	—	—	—	—	r
graminium Forst.	—	—	—	r	o	—	o
I* *japonicum* Thunb.	—	—	—	—	—	—	r
Violaceae							
Viola hederacea Lab.	—	e	r	o	r	o	f
Thymeliaceae							
Pimelia cineria R.Br.	—	—	—	r	—	—	o
drupacea Lab.	—	—	—	c	—	f	—
flava R.Br.	—	—	—	r	—	—	o
nivea Lab.	—	—	r	lc	o	—	c
sereeca R.Br.	c	o	r	—	—	—	—
* *involucrata* Banks & Sol.	—	—	—	—	—	—	o
* *humilis* R.Br.	—	—	—	—	—	—	r
Myrtaceae							
Baeckia Gunniana Schau.	vc	f	—	—	—	—	—
* *ramosissima* A. Cunn.	—	—	—	—	—	—	vr

	1	2	3	4	5	6	7
Callistemon salignus D.C.	—	—	—	o	o	—	—
Eucalyptus coccifera Hook.f.	—	d	sd	—	—	—	—
cordata Lab.	—	—	—	—	—	—	l
gigantea Hook.f.	—	—	f	ld	c	—	—
globulus Lab.	—	—	—	lf	—	—	ld
Johnstoni Maiden.	—	—	c	o	d	—	—
linearis Dehn.	—	—	—	—	—	—	vc
obliqua L'Her.	—	—	—	d	c	—	lc
ovata Lab.	—	—	—	r	—	—	o
regnans F.v.M.	—	—	—	d	r	vr	—
salicifolia (Sol) Cav.	—	—	—	—	—	—	vc
tasmanica Blakely	—	—	—	—	—	—	vc
unialata Baker & Smith	—	—	—	—	—	—	—
urnigera Hook.f.	—	—	d	o	—	—	—
viminalis Lab.	—	—	—	r	—	—	vc
For information regarding the complex hybrid swarms see Brett (1938).							
Leptospermum flavescens Sm.	—	—	—	f	f	—	o
lanigerum Sm.	—	lc	lc	c	r	—	—
rupestre Hook.	vc	o	—	—	—	—	—
scoparium Forst.	—	—	—	o	vc	—	vc
Melaleuca squamea Lab.	—	—	—	—	lc	—	—
Onagraceae							
Epilobium Billardierianum Ser.	—	—	r	o	—	—	—
confertifolium Hook.f.	o	—	—	—	—	—	—
Gunnianum Haush.	o	o	f	f	—	—	—
junceum Forst.	—	—	c	o	o	—	o
Halorrhagidaceae							
**Haloragis depressa* (A. Cunn.) Walp.							
micrantha (R.Br.) Thunb.	r	r	r	—	—	—	—
tetragyna Hook.f.	—	—	—	—	—	—	—
teucroides D.C.	—	r	lc	lc	—	—	—
Umbelliferae							
**Daucus glochidatus* (Fisch) Mey.	—	—	—	r	—	—	—
**Eryngium vesiculosum* Lab.							
**Hydrocotyle hirta* R.Br.							
**Orreomyrrhis andicola* Endl.	r	—	—	—	—	—	—
**Xanthosia dissecta* Hook.f.							
* *pilosa* Rudge.							
Ericaceae							
Gaultheria hispida R.Br.	—	r	c	c	o	o	—
Epacridaceae							
Acrotriche serrulata R.Br.	—	—	—	—	—	—	c
Astroloma humifusum R.Br.	—	—	—	—	—	—	c
Brachyloma daphnoides Benth.	—	—	—	—	—	—	f
Cyathodes acerosa R.Br.	—	o	c	c	o	—	o
adscendens Hook.	vc	c	r	—	—	—	—
dealbata R.Br.	o	—	—	—	—	—	—
divaricata Hook.	—	—	f	—	—	—	o
glauca R.Br.	—	o	c	c	o	—	—
parvifolia R.Br.	—	—	o	c	f	—	o
Epacris impressa Lab.	—	—	—	vc	vc	—	vc
lanuginosa R.Br.	—	—	—	—	r	—	r
microphylla R.Br.	—	—	—	—	r	—	o
serpillifolia R.Br.	f	o	—	—	—	—	—
* var. *squarrosa*							
Lissanthe montana R.Br.	o	—	—	—	—	—	—
strigosa R.Br.	—	—	—	—	—	—	c
Monotoca lineata R.Br.	—	—	—	vc	vc	o	—
empetrifolia R.Br.	o	o	—	—	—	—	—

	1	2	3	4	5	6	7
Pentachondra involucrata R.Br.	o	r	vr	—	—	—	—
pumila R.Br.	vc	—	—	—	—	—	—
Richea acerosa F.v.M.	vc	c	—	—	—	—	—
dracophylla R.Br.	—	—	c	r	o	—	—
Gunnii Hook.	c	c	o	—	—	—	—
procera F.v.M.	o	o	o	o	o	—	—
scoparia Hook.	c	c	o	—	—	—	—
sprengeloides F.v.M.	o	o	r	c	c	—	c
Sprengelia incarnata F.v.M.	r	o	r	c	vc	—	vc
Styphelia adscendens R.Br.	—	—	—	—	o	—	—
Trochocarpa thymifolia Spreng.	vc	vc	f	—	—	—	—
Oleaceae							
Notelea ligustrina Vent.	—	—	—	l	—	o	l
Apocyanaceae							
Lyonsia straminea R.Br.	—	—	—	r	—	r	—
Loganiaceae							
Mitrasacme montana Hook.	o	—	—	—	—	—	—
pilosa Lab.	—	—	—	o	—	—	—
Gentianaceae							
Erythraea australis R.Br.	—	—	—	o	—	—	—
Gentiana dimensis Gresb.	f	o	o	o	—	—	—
Boraginaceae							
**Myosotos australis* R.Br.	—	—	—	vr	—	—	—
suaveolens Poir.	r	—	—	—	—	—	—
Labiatae							
Prostanthera lasianthos Lab.	—	—	f	vc	—	c	—
I**Stachys arvensis* L.							
Westringia rigida R.Br.	—	—	—	o	—	—	—
Scrophulariaceae							
Euphrasia collina Hook.	—	—	—	f	—	—	c
var. *alpina* R.Br.	vc	c	c	—	—	—	—
var. *striata* R.Br.	—	o	o	o	—	—	—
scabra R.Br.	—	—	—	—	—	—	o
**Mazus pumilo* R.Br.							
**Ourisia integrifolia* R.Br.							
I**Veronica agrestis* L.							
I *arvensis* L.	—	—	—	—	—	—	r
formosa R.Br.	—	r	c	c	—	—	f
nivea Lindl.	r	r	r	—	—	—	—
* *gracilis* R.Br.	—	—	—	—	—	—	r
I* *serpillifolia*							
Plantaginaceae							
**Plantago lanceolata* Linn.	—	—	—	c	—	—	c
tasmanica Hook.f.	o	—	—	—	—	—	—
varia R.Br.	—	—	—	o	—	—	d
Rubiaceae							
**Asperula oligantha* F.v.M.							
Coprosma Billardieri Hook.f.	—	—	r	c	—	c	c
hirtella Lab.	—	—	o	c	—	—	o
nitida Hook.	f	c	c	—	—	—	—
Moorei Rodway	r	—	—	—	l	—	—
* *repens* Hook.							
**Opercularia varia* Hook.	—	—	—	—	—	—	r
Campanulaceae							
Lobelia gibbosa Lab.	—	—	—	—	—	—	r
Whalenbergia gracilis D.C.	—	—	—	o	—	—	l
saxicola D.C.	o	—	—	—	—	—	—

	1	2	3	4	5	6	7
Goodeniaceae							
Goodenia geniculata R.Br.	—	—	—	o	—	—	f
ovata Sm.	—	—	—	c	o	c	—
Scaevola Hookeri F.v.M.	r	—	—	—	—	—	—
Candolleaceae							
Stylidium graminifolium Swartz.	o	—	r	f	c	—	c
Compositae							
Abrotenella Fosterioides Hook.	o	—	—	—	—	—	—
Brachycome melanocarpa Sand. & F.v.M.	—	—	—	—	—	—	r
* *stipitata* Hook.	—	—	—	—	—	—	o
Cassinia aculeata R.Br.	—	—	—	o	—	—	o
Celmisia longifolia D.C.	vc	c	—	—	—	—	—
Cotula filicula Hook.f.	r	—	—	—	—	—	—
Craspedia alpina Hook.	vc	—	—	—	—	—	—
uniflora Forst.	—	—	—	—	—	—	o
**Cymbonotus Lawsoniana* Gaud.	—	—	—	—	—	—	r
Bedfordia linearis D.C.	—	—	—	—	—	—	vc
salicina D.C.	—	—	f	vc	o	d	l
Erechtites arguta D.C.	—	—	—	r	—	—	—
Gunnii Hook.	o	r	—	—	—	—	—
prenanthoides D.C.	—	—	—	r	—	—	—
Erigeron pappochroma Lab.	o	r	—	—	—	—	—
Gnaphalium alpigenium F.v.M.	r	r	—	—	—	—	—
indutum Hook.f.	—	—	—	r	r	—	—
Helichrysum apiculatum D.C.	c	o	o	o	o	—	c
dealbata Lab.	—	—	—	—	—	—	r
scorpoides Lab.	c	o	o	c	o	—	c
semipapposum D.C.	—	—	—	—	—	—	—
Lagenophora stipitata Druce.	—	—	—	—	—	—	r
**Leptorrhyncus linearis* Less.	—	—	—	—	—	—	r
* *squamatus* Less.	—	—	—	—	—	—	r
Microseris Fosteri Hook.	—	—	—	r	—	—	r
**Millotia tenuifolia* Cass.	—	—	—	—	—	—	o
Olearia argophylla F.v.M.	—	—	—	vc	r	d	—
* *erubescens* Dipp.							
floribunda Benth.	o	r	r	c	o	—	f
glandulosa Benth.	—	—	—	—	—	—	—
Hookeri Benth.	—	—	—	—	—	—	o
ledifolia Benth.	o	o	—	—	—	—	—
lepidophylla Benth.	r	vr	—	—	—	—	—
myrsinoides F.v.M.	—	—	r	f	o	—	o
obcordata Benth.	o	—	—	—	—	—	—
persoonoides Benth.							
var. *alpina*	o	o	r	—	—	—	—
var. *lanceolata*	—	—	c	o	—	—	—
pinifolia Benth.	o	f	o	—	—	—	—
ramulosa Benth.	—	—	r	f	—	—	—
stellulata Benth.	—	f	vc	c	o	o	o
viscosa Benth.	—	—	o	f	o	—	f
Ozothamnus antennaria Hook.	o	o	o	—	—	—	—
Backhousii Hook.	o	r	—	—	—	—	—
* *ericifolius* Hook.	—	—	—	—	—	—	r
Hookeri Hook.	f	—	—	—	—	—	—
ledifolius Hook.	vc	f	r	—	—	—	—
obcordatus D.C.	—	—	—	—	—	—	f
rosmarinifolius D.C.	—	—	—	c	o	f	o
scutellifolius Hook.	—	—	—	—	—	—	r
Gunnii Hook.	r	—	—	—	—	—	—
**Podolepis acuminata* R.Br.	—	—	—	—	—	—	r
Raoulia planchoni Hook.	r	—	—	—	—	—	—
Senecio centropappus F.v.M.	—	—	f	—	—	—	—
dryadens Sieb.	—	—	—	c	f	o	f
lautus Sol.	—	—	—	o	—	o	o

	1	2	3	4	5	6	7
**Senecio* var. *capillifolius*	—	—	—	o	—	o	o
var. *octoleucus*	f	o	o	o	—	—	—
velleyoides A. Cunn.	—	—	—	o	—	—	—
Vittadinia australis D.C.	—	—	—	—	—	—	o

INTRODUCED

Anthemis nobilis L.
Bellis perennis L.
Calendula officinalis L.
Carduus arvense Scop.
Centipeda minima (L.) Br. & Asch.
Chrysanthemum parthenium Pers.
? *Gnaphalium luteo-album* D.C.
Hypochaeris glabra L.
Lapsana communis L.
Picris hieraciodes L.
Sonchus oleraceous L.
Taraxicum dens-leonis Desf.

CONIFERAE

	1	2	3	4	5	6	7
Phyllocladus rhomboidialis Rich.	—	—	vr	—	—	—	—
Podocarpus alpina R.Br.	lc	—	—	—	—	—	—

PTERIDOPHYTA

	1	2	3	4	5	6	7
Lycopodiaceae							
Lycopodium clavatum							
var. *fastigiatum*. L.	f	f	f	—	—	—	—
densum Lab.	o	—	—	—	—	f	—
laterale R.Br.	f	r	r	—	—	r	—
scariosum Forst.	r	—	—	—	—	r	—
* *selago* L.	—	r	r	r	—	r	—
* *varium* R.Br.	r	—	—	—	—	—	—
Selaginellaceae							
Selaginella uliginosa Spreng.	f	o	—	—	—	—	—
Psilotaceae							
Tmesipteris tannensis Bernh.	—	—	—	—	—	o	—
Ophioglossaceae							
**Ophioglossum lusitanicum* L.	—	—	—	—	—	—	vr
Osmundaceae							
**Todea barbara* (L) Moore.							
Schizeaceae							
Schizea bifida Willd.	—	—	—	r	r	—	—
* *fistulosa* Lab.							
Gleicheniaceae							
**Gleichenia circinata* Sw.							
dicarpa R.Br.	vc	c	o	o	—	o	—
* *flabellata* R.Br.	—	—	vr	vr	—	—	—
Hymenophyllaceae							
Hymenophyllum australis Willd.	—	—	—	—	—	c	—
flabellatum Lab.	vr	—	—	—	—	c	—
javanicum Spreng.	—	—	—	—	—	o	—
* *peltatum* (Poir.) Desv.							
* *rarum*	—	—	—	—	—	o	—
tunbrigense (L). Sm.	—	—	—	—	—	r	—
Dicksoniaceae							
**Alsophila australis* R.Br.	—	—	—	vr	—	vr	—
Dicksonia antarctica Lab.	—	—	—	c	—	vc	—
Hypolepis punctata (Thunb.) Mett.	—	—	—	c	—	vc	—
tenuifolia (Forst.) Bern.	—	—	—	r	—	o	—

Polypodiaceae	1	2	3	4	5	6	7
Adiantum aethiopicum L.	—	—	—	r	—	—	r
Anogramma leptophylla (L.) Link.	r	—	—	vr	—	—	—
Asplenium bulbiferum Forst.	—	—	—	o	—	c	—
flabellifolium Cav.	—	—	r	o	—	c	o
flaccidum Forst.	—	—	—	—	—	o	—
Blechnum capense (L.) Schlecht.	—	—	o	vc	c	vc	—
discolor (Forst.) Keys.	—	—	—	vc	—	c	—
fluvitale (R.Br.) Lett.	—	—	—	r	—	r	—
lanceolatum (R.Br.) Sturn.	—	—	—	c	—	c	—
Patersoni (R.Br.) Mett.	—	—	—	—	—	o	—
penna-marina (Poir.) Kuhn.	o	o	o	—	—	—	—
* *vulcania* (Blume.)	—	—	—	r	—	—	—
Chielanthes tenuifolia (Burm) Sw.	—	—	—	—	—	—	o
Doodia caudata (Cav.) R.Br.	—	r	r	—	—	—	—
Doryopteris decomposita (R.Br.) Kuntz.	—	—	—	vr	—	r	—
Histopteris incisa (Thunb.) Sm.	—	—	—	c	—	c	—
Lindsaya linearis Sw.	—	—	—	vr	vr	—	vr
**Pellaea falcata* (R.Br.) Fée.	—	—	—	vr	—	—	—
Pleopeltis diversifolia (Willd.) Melvaine	—	—	f	vc	—	vc	—
Pleurosorus rutifolius (R.Br.) Fée	vr	r	r	o	—	o	—
Polyposium Billardieri (Willd.) C.Ch.	—	—	—	c	—	c	—
gramitidis R.Br.	—	—	—	r	—	o	—
Pteridium aquilinum (L.) Kuhn.	—	—	lc	—	—	—	lc
**Pteris comans* Forst.							
* *tremula* R.Br.							
Polystichum aculeatum (L.) Schott.	o	o	o	c	—	c	—
adiantiforme Schott.	—	—	—	r	—	f	—

PLATE XIV

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Fig. 1.—General view of Mt. Wellington looking west.

Fig. 2.—Aerial view of north side of mountain under snow showing the open character of the *E. coccifera* and *E. coccifera-urnigera* associations above compared with the denser *E. obliqua-regnans* below. (Photog. J. J. N. Barnett.)

Fig. 3.—Aerial view of summit of Mt. Wellington showing shrubberies of Austral-Montane Formation and the rocky nature of the ground. (Photog. J. J. N. Barnett.)

Fig. 4.—Aerial view of top of Mt. Wellington plateau under light snow showing the distribution of the *E. coccifera* consociation (dark) on the better drained portions and the Austral-Montane (snow covered) on the flatter portions. The dark isolated patch in the upper right hand quarter is the "nunatak" Dead Island. (Photog. J. J. N. Barnett.)

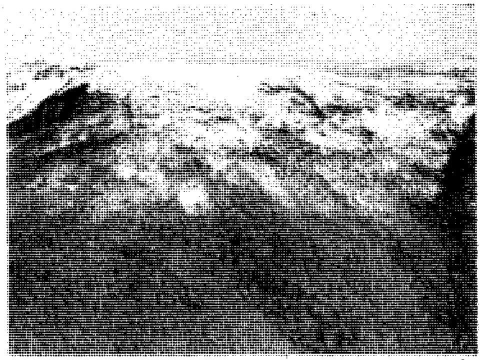
Fig. 5.—*E. coccifera* consociation, general appearance showing the very rocky ground.

Fig. 6.—*E. coccifera* consociation wetter phase showing *Nothofagus Cunninghami* as a tall shrub.

Fig. 7.—*E. coccifera* as a shrub 3 feet high towards the edge of the plateau.

Fig. 8.—*Poa caespitosa* grassland with scattered *Ozothamnus ledifolius.*


1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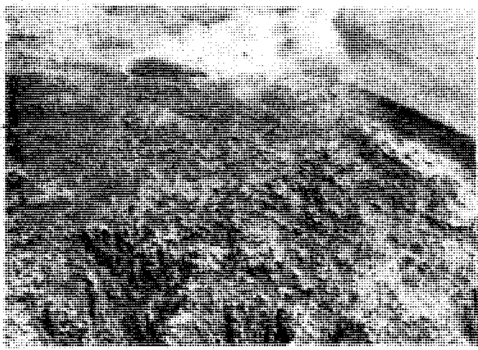
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4


5


6


7

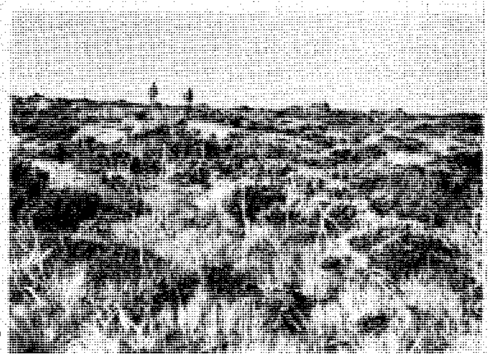
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PLATE XV

FIG. 1.—General view of the swamp community with the " nunatak " Dead Island in the background.

FIG. 2.—Swamp-shrubbery ecotone showing *Baeckia Gunniana*, *Astelia alpina* and *Ozothamnus ledifolius* (shrub).

FIG. 3.—Swamp-*E. coccifera* ecotone, *Astelia alpina*, *Poa caespitosa* and *Richea procera* in foreground.

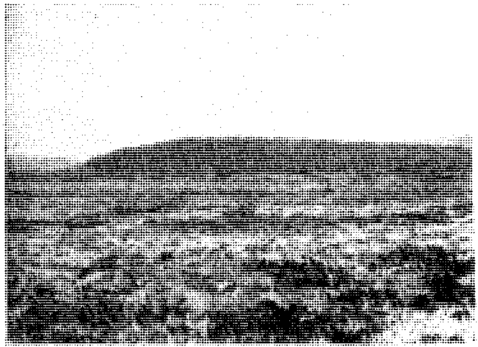
FIG. 4.—Area of swamp-community within *E. coccifera* consociation. Mixture of *Baeckia Gunniana* and *Gleichenia dicarpa* in the foreground.

FIG. 5.—*Abrotenella Fosteriodes* invaded by herb species.

FIG. 6.—*Abrotenella Fosterioides*, old plant in swamp-grassland ecotone nearly completely covered. The shrub in the centre is *Richea Gunnii*.

FIG. 7.—Old *E. coccifera* tree (relict) with *E. urnigera* saplings.

FIG. 8.—*Leptospermum rupestre*, in shrub community near the summit.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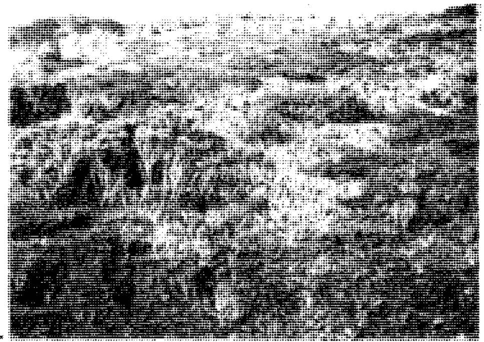
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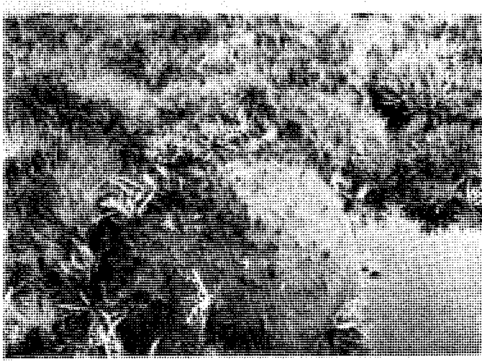
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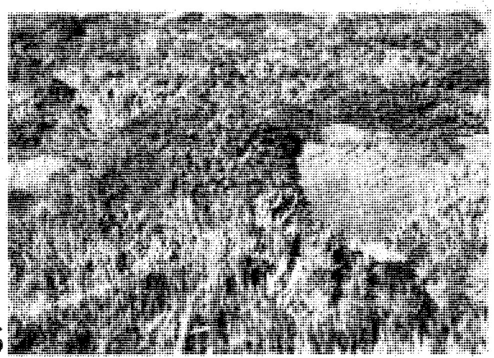
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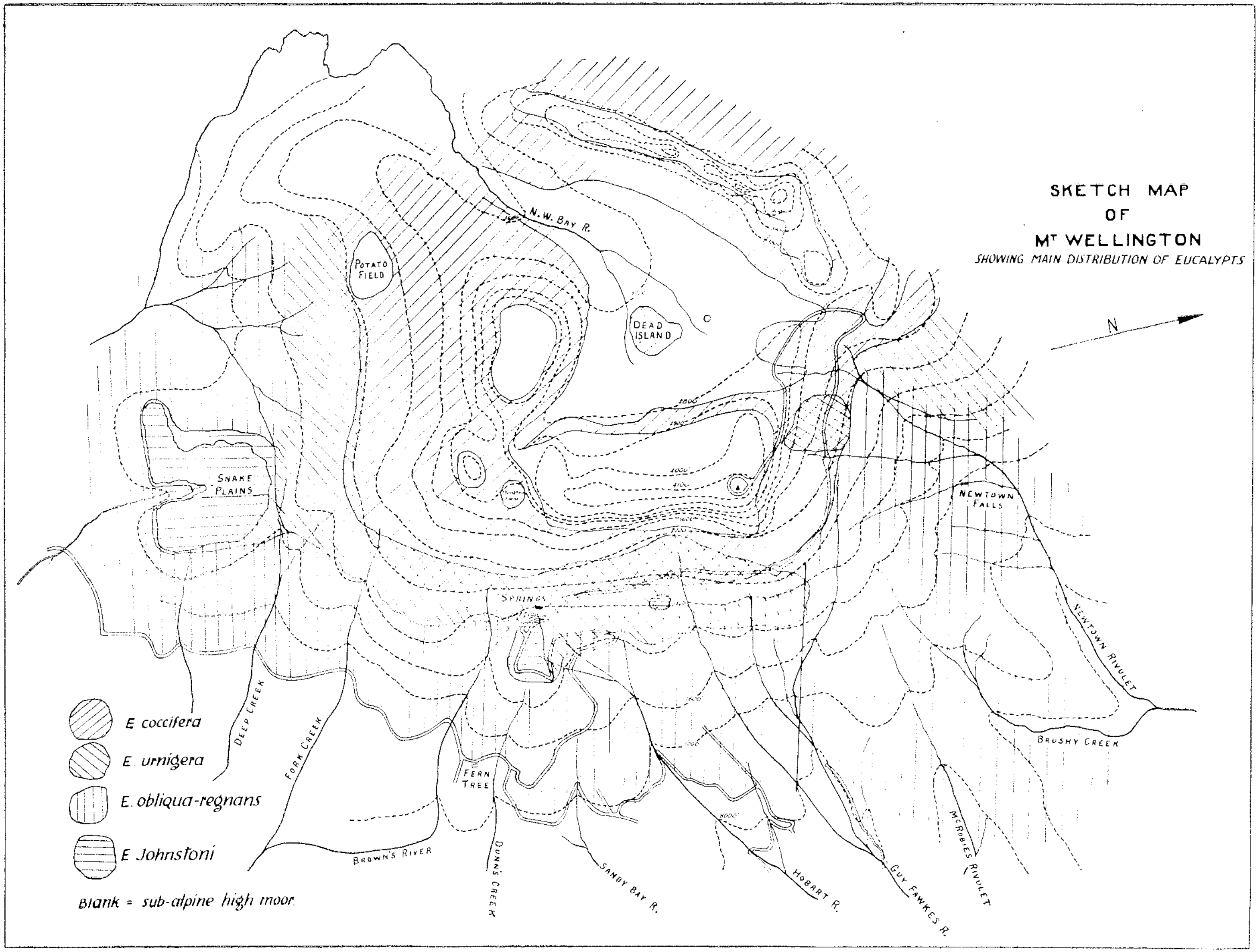
7


8

Sketch map of Mt. Wellington, showing main distribution of Eucalypts.
Scale: 1 mile = $1\frac{1}{4}$ inches [approx.].


SKETCH MAP
OF
Mt WELLINGTON
SHOWING MAIN DISTRIBUTION OF EUCALYPTS
N
N.W. BAY R.
POTATO FIELD
DEAD ISLAND
SNAKE PLAINS
SPRINGS
NEWTOWN FALLS
NEWTOWN RIVULET
BRUSHY CREEK
McROBIES RIVULET
GUY FAWKES R.
HOBART R.
SANDY BAY R.
DUNN'S CREEK
FERN TREE
BROWN'S RIVER
FORK CREEK
DEEP CREEK
E coccifera
E. urnigera
E. obliqua-regnans
E Johnstoni
Blank = sub-alpine high moor.