

VEGETATION OF THE BASALT PLAINS IN WESTERN VICTORIA

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National Herbarium of Victoria

Introductory

Of all the major vegetational provinces in Victoria, the basaltic plains of the W. District are poorest in plant species. From the whole volcanic tract, stretching unbroken for 190 miles between Yan Yean on the extreme E. and Hotspur-Lyons district in the far SW., the total recorded number of higher indigenous plants is at present only 543 species; and it is most unlikely that any future investigations will alter this figure substantially. By comparison, the Brisbane Ra. (a small 'island' of sedimentary Palaeozoic rocks in the E. part of the basaltic area) has 420 species, while the Grampians sandstone (abutting to the NW.) has an exceedingly rich flora embracing 750 species of higher plants—almost one-third of the State's indigenous vegetation.

It may be tempting to explain this poverty in terms of early and sustained pastoral activity. Certainly, the volcanic plains were the first pieces of land to be taken up by squatting families in the late 1830s and early 1840s, and their natural plant cover has been subjected to greater changes than anywhere else in the State. Through much of the basaltic region, native plants are now completely replaced by alien pasture grasses and clovers, crop plants, and a continuing influx of aggressive weeds; even to visualize the original ecological patterns has become difficult. Some basalt species are presumed already extinct, while about 100 others (or 18% of the whole) are now either very rare or localized—e.g. most of the 30 ferns and all but two or three of the 24 orchids. However, the various plant communities in equilibrium before white settlement are indicated by surviving remnants along roadsides and railway tracks, in paddocks too rocky to be cultivated, on a few permanent reservations of forest land, and in the shelter of gorges, cliff crevices or caves. It is apparent that the basalt plains, with associated lava or cinder cones, stony barriers, lakes and streams, never did carry the wealth of species so characteristic of adjoining forests on auriferous hills to the N. and of sandy heathlands toward the coast.

The same lack of variety obtains also among lower cryptogams on basaltic land. E.g., a diligent survey of the moss flora has been rewarded by only about 85 species, compared with more than 120 species in the County of Normanby (at the W. boundary of the plains), and 140 in the County of Buln Buln which includes Wilson's Promontory. Figures are not available for fungi or lichens, but casual inspection would strongly suggest a similar paucity. Only among the land and freshwater algae does diversity of kind seem to approach, or exceed, that in other vegetation provinces.

Land Forms and Plant Cover within the Volcanic Belt

If the volcanic terrain of W. Victoria is young geologically and rather deficient from a floristic point of view, it is at least of equal or greater structural complexity than either the sandy coastal plains carrying heathland or the forested hills of Palaeozoic sedimentary rocks. Plant formations vary all the way from tussock grassland through savannah to woodland and high forest, depending upon physiography

and climate. On the basaltic tract between Melbourne and L. Corangamite, the annual rainfall does not rise above 20 in., with an average at Little R. of only 16.6 in.; but westward from Camperdown there is a significant increase to 32.6 in. at Heywood. In a small area around Lyonville and Trentham, the more elevated basalt at 2,000-2,300 ft receives an annual precipitation exceeding 40 in. (it is 43.6 at Lyonville), and mean winter temperatures here are about 10°F. lower than on basalt plains against the coast. This wide climatic range is paralleled by an improvement in soil quality, from stony drylands N. and W. of Port Phillip to the deep, very fertile chocolate loams of Bungaree, Newlyn, and Trentham districts along the Divide. The effects of climate, soil, and topography are dramatically portrayed in vegetational cover. It is convenient to summarize the characteristics of plant life on the volcanic tracts of W. Victoria with reference to major physiological features, thus:

DRIER STONY BASALT PLAINS

The Keilor Plains through which flow the Maribyrnong R., Werribee R., and Little R., also the plains extending between Geelong and Cressy, are and always have been open, dry tussock grassland, without any arboreal growth or even tall shrubs. A few trees of stunted habit and poor form (viz. *Eucalyptus camaldulensis* and *E. ovata*) occur along streams or in depressions where water may tend to persist. Windbreaks of Monterey Cypress, pines, or various eucalypts have been rather extensively planted and are now a landscape feature on private holdings throughout the region.

R. T. Patton (1930), in discussing the factors responsible for tree growth in Victoria, described the basaltic plains as 'strongly antagonistic to trees', while C. S. Sutton (1916-17) emphasized that 'a rainfall of at least 20 inches in about 100 days is required to favour forest growth'. No part of this drier E. sector of the volcanic belt receives 20 in. in 300 days and, during the 7 months of September to March (inclusive), evaporation greatly exceeds precipitation. A long summer drought is normal, temperatures of more than 100°F. may be experienced in January and February, strong dry winds are frequent, and soils are often shallow with sheets of volcanic rock or boulders outcropping at the surface. However, under even hotter, drier conditions prevailing in the Mallee there is an extensive development of eucalypts, acacias, and other woody plants of great variety; e.g. some 60 species of taller shrubs and trees inhabit the sand-hills of the Kulkyne National Park (N. from Ouyen). The virtual treelessness of the Keilor and Cressy lava plains cannot be attributable to climate alone, but rather to its unfavourable combination with heavier clayey soils and a general flatness of terrain. Over the whole volcanic region, whether moist or dry, the woody species number less than 14% of the total flora. The State's most northerly and driest area of Late Tertiary to Recent lava flows is to be found along the Loddon Valley, northwesterly from Bendigo, where the rainfall at Bridgewater registers only 16.3 in.—an environment even harsher for woody plants than obtains on the W. of Port Phillip.

As in all large grasslands of the world, trees occur wherever these Victorian plains abut on mountain ranges, and a slow transition from grassland to woodland is apparent along some boundaries; even species belonging to other provinces (e.g. coastal heath or box forest) may encroach upon the basalt plain.

The herbaceous perennial is characteristic and dominant everywhere on basalt grassland, taking the life form of a dense tussock (with much reduced leaf surfaces), a rosette plant or creeping mat, a low semi-shrub or perennating tuber (as in the sundews, lilies, and orchids). A small percentage (about 9%) of species consists of

annuals or minute ephemerals which can grow and flower during the few months that moisture is available. The grasses and associate herbs do not form a continuous turf, but are disposed in isolated tufts with much bare ground between individuals. Humus is rarely present in appreciable amounts.

It is in floristic composition, however, that the Keilor basalt plains contrast so strikingly with adjoining formations. The families Compositae and Gramineae are by far the largest groups, and together their representative species make up 23·2%—almost a quarter—of the whole flora. In numbers of individual plants they are also preeminent and, as Patton (1936) remarked, 'each dominates the landscape at its respective flowering period'. The genus *Danthonia* has no fewer than 12 species on the basalt, while the daisy genus *Brachycome* has 10. These two families happen also to be the largest throughout the State; but families consisting wholly of woody plants, e.g. *Myrtaceae*, *Mimosaceae*, *Proteaceae*, and *Epacridaceae*, are very feebly if at all represented on the plains. Such large Victorian genera as *Pultenaea* and *Hibbertia* are absent altogether; indeed, to quote Patton (1936) again, 'the uniqueness of this flora lies in the absence or sparseness of characteristic Australian genera and families'. Only about 10 species (including the showy but now rare *Rutidosia leptorhynchoides*) appear to be confined to the basalt plains; by far the greater number of species are plants of very wide range in and beyond Victoria, some being ecological 'wides'.

Vegetative activity commences when autumn rains thoroughly moisten the dry, cracked soil, and it continues rather slowly through the colder days of winter; but growth is much accelerated during spring, and there is a burst of floral activity from early October when evaporation begins greatly to exceed the rainfall. It is then that the monotonous facies of the grassland is transformed into carpets of colour—chiefly yellow or white from the massed bloom of *Bulbine*, *Anguillaria*, *Goodenia*, *Brachycome*, *Calocephalus*, *Craspedia*, *Podolepis*, *Leptorhynchus*, and *Helichrysum* species. Most grasses bloom in November and may cover the landscape with waving inflorescences to 2 ft high or more. From then, as the season advances, floral colour is provided only by late yellow everlastings (*Helichrysum*), the metallic-hued 'blue devil' (*Eryngium*), and austral bluebells (*Wahlenbergia*) which may persist throughout the heat of summer. Growth is practically dormant from December to April when the parched clay opens up in numerous fissures.

WEATHERED BASALT PLAINS, WITH HIGHER RAINFALL

There is no line of demarcation between the dry tussock grassland just described and the wet tussock grassland that may succeed it with increasing rainfall toward the W. Many species are common to both but, in general, *Poa australis* tends to replace *Themeda australis* and *Stipa* species as a dominant grass on moister country. The most noteworthy difference lies in the gradual appearance of tree growth to form either savannah, woodland or forest, and in the greater frequency of lakes or swampy depressions. Around Hamilton, large spreading trees of *Eucalyptus camaldulensis* give a pleasing park-like aspect to the countryside. At Bransholme, 14 miles SW., the basalt has broken down into ironstone rubble that supports a woodland of *E. viminalis* while, at Heywood, forests of *E. obliqua* and other eucalypts become the climax vegetation on basalt. Poorly drained ground with high water-table is, or was, occupied by *E. ovata*.

BASALT BARRIERS (OR 'STONY RISES')

Between Colac and Camperdown, around Mt Napier and Mt Eccles and along Darlot's Ck. the lava flows became broken into alternating ridges and hollows of

loose rocks; these fragments, often large and angular, are piled irregularly into barriers (from 10 to 50 ft high) and movement over such terrain can be exceedingly difficult. The basalt has not yet weathered into heavy blackish clay, as usual, and soils are skeletal or lacking, so that these tracts were virtually useless for agriculture. Excepting damage by occasional fires, and the depredations of rabbits, the basaltic barriers probably remain in much the same condition as they were before discovery by white men. Good moisture supply and adequate drainage among the stones have favoured the development of *Eucalyptus viminalis* in extensive pure woodlands. The only associate tree is *Acacia melanoxylon*, but shrubberies of *Helichrysum dendroideum* or the hardy divaricate *Hymenanthera dentata* may be locally conspicuous—particularly around the shore-line of L. Corangamite. Occasional bushes of *Solanum aviculare* are often part of the alliance, while *Plagianthus pulchellus* and even *Olearia argophylla* may be present in deep sheltered hollows. *Pteridium esculentum* and yellow-flowered *Senecio lautus* are ubiquitous and usually prolific after a fire. Shade-loving herbs, several small ferns, and many bryophytes occupy moist rock crevices.

ELEVATED POINTS OF ERUPTION

The gently undulating surface of the volcanic tract is dotted with lava or cinder cones, rising to as much as 1,000 ft above the level of the plain. The last phases of vulcanicity in Victoria seem to have been marked by ejection of scoria or ash—perhaps even within the last few thousand years—and some such depositions are so new geologically as to have precluded the natural establishment of trees. Thus the craters of Red Rock near Colac, Mt Leura at Camperdown, and Mt Greenock near Talbot were virtually bare at the time of their discovery. But the scoria of Mt Franklin near Daylesford carried *Eucalyptus viminalis*, with *Casuarina stricta* and *Banksia marginata*, while Mt Napier was also well timbered with *E. viminalis*.

Breached crater walls, from which the lava flows have now weathered into deep rich loams, were heavily forested. Much of this valuable land has long since been cleared to farming, but reserves of *Eucalytus obliqua* and *E. viminalis* on the steep slopes of Mt Warrenheip and Mt Buninyong (near Ballarat) are indicative of the lofty, good-quality forests that once clothed many volcanic hills. The principal understorey tree, as on the 'Stony Rises', was *Acacia melanoxylon*. Such occasional shade-tolerant shrubs as *Pimelea axiflora*, *Coprosma hirtella*, *C. quadrifida*, and *Olearia argophylla* were an adumbration of fern-gully conditions on the higher volcanic slopes; *Dicksonia antarctica* did formerly grow in a few shaded valleys on the sides of lava cones. Some eminences just N. of the Divide, e.g. Spring Hill near Creswick, and Eastern Hill near Eganstown, carried stands of *Eucalyptus pauciflora* with or without *E. obliqua*.

CANYONS AND CAVES

Stream action has often cut deep, gorge-like valleys or canyons through the higher volcanic plateaux. In such situations, and also along the steep 'frozen' edge of some lava flows, thickets of *Hymenanthera dentata* have taken advantage of shelter from wind and of the more abundant moisture supply. This tough bush is frequently accompanied by *Bursaria spinosa*, the herbs *Urtica incisa* and *Sambucus gaudichaudiana*, while *Callistemon paludosus* may be present at the water's edge. The interesting *Discaria pubescens* is a much rarer inhabitant of rocky valleys in basalt, e.g. on Creswick Ck and at Lal Lal Falls; its incidence was discussed by Willis (1955).

In the crevices of escarpments and cliff-faces grow several plants that would be

too tender to survive exposure to wind and insolation of the surrounding plains above, notably *Asplenium flabellifolium*, *Adiantum aethiopicum*, *Pleurosorus rutilifolius*, *Echinopogon ovatus*, *Parietaria debilis*, *Scutellaria humilis*, and *Sigesbeckia orientalis*, also a number of bryophytes. On more exposed ledges, *Bulbine bulbosa*, *Carpobrotus rossii* (often trailing), *Pelargonium australe*, and *P. rodneyanum* may be conspicuous perching plants. At waterfalls, such as the Wannon, Hopkins, Lal Lal, Moorabool, Glenlyon, Trentham, and Turpin's Falls on the Campaspe, grow a few moisture-loving plants not found elsewhere on the basalt; these embrace several ferns (*Doodia* spp.) and aquatic mosses (species of *Tridontium*, *Cratoneuropsis*, *Drepanocladus*, etc.).

The still, cool, humid air of collapsed lava tunnels and caves provides a microclimate in which fern growth may be luxuriant and spectacular. Beauglehole and Learmonth (1957) have given an informative account of the fern flora inhabiting 11 basaltic caves near North Byaduk, where at least 20 species are represented; tree-ferns with trunks up to 18 ft long once flourished in these sheltered caverns, and a few large specimens have still managed to escape despoliation by local residents. Even more remarkable is the very rich moss flora of Byaduk Caves. Among the 62 species recorded from these by A. C. Beauglehole, *Anoetangium bellii* is not known from any other locality in Australia and, until its discovery at Byaduk in 1956, was considered endemic in New Zealand. The saltbush *Rhagodia nutans* may hang from walls and ceilings of open caves, as long festoons or curious curtains of growth up to 10 ft in length.

FRESHWATER STREAMS AND SWAMPS, LAKES, AND PONDS

Water plants comprise true submerged aquatics, marsh species that have only their rooting parts in free water, creeping mud-plants and inhabitants of temporary shallow ponds. All these types are well exemplified on the volcanic tracts of W. Victoria, wherever water is present, but most species are of wide distribution in the State and none is confined to the basalt. Notwithstanding the relatively small area that they occupy in this province, the marsh plants and aquatics make up a considerable portion of the total flora—viz. 84 species, or 15.5% of all higher plants. The two large families Gramineae and Compositae, however, have very few representatives here—only three of the former (*Glyceria australis*, *Phragmites communis*, *Amphibromus neesii*) and one of the latter group (viz. *Cotula coronopifolia*). By contrast, the sedge family Cyperaceae, which numbers 37 species in the whole volcanic belt, has 14 species restricted to swamps, marshy ground along streams, or to shallow water at the edge of lakes. Together with *Triglochin procera* and rushes (*Juncus* spp.), these dominate the more westerly swamps such as Black, Wild Dog, Condah, and Buckley's.

Water-loving *Ranunculus* species (e.g. *R. rivularis*, *R. inundatus*, and *R. glabri-folius*) provide a touch of colour on drying margins during late spring. Through the summer months *Lythrum salicaria* rears decorative magenta flower-spikes to 4 ft.

A dense shrubbery of *Leptospermum lanigerum* frequently marks out waterways through swampy land. It may provide a habitat for *Gahnia clarkei* (probably the largest cyperaceous plant in Australia), as at Hawkesdale, Tower Hill, and L. Condah. A surprising occurrence at L. Elingamite, near Terang, is *Notelaea ligustrina*—usually a shrub of mountain gullies.

All 5 species of *Myriophyllum* are aquatic and in the very deep waters of L. Purumbete, occupying an explosion crater near Camperdown, the robust floating stems of *M. propinquum* may stretch for yards.

SALINE LAKES AND SALT-MARSHES

Associated with brackish water or lakes of high salinity, e.g. L. Corangamite, are 16 species of halophytes most of which normally grow within the influence of the sea. These belong to a dozen different plant families, but are usually modified for such an environment by developing succulent foliage (or stems) and high osmotic pressures in the cell-sap, viz. *Salicornia australasica*, *Suaeda australis*, *Pratia platycalyx*, *Wilsonia rotundifolia*, and *Selliera radicans*. *Angianthus preissianus* and *Cotula vulgaris* are ephemerals of drying saline mud; *Mimulus repens*, with attractive mauve blooms, may form extensive mats over the mud around saline depressions, while *Ruppia maritima*, *Lepilaena preissii* and *Potamogeton pectinatus* are totally submerged aquatics of brackish water.

Brief Outline of Botanical Investigation

The earliest white man to see Victorian basalt plains was Surveyor-General Charles Grimes who discovered the Yarra R. on 2 February 1803. Hamilton Hume and William E. Hovell were the first to walk across these plains, proceeding from Beveridge to Corio Bay in the middle of December 1824. Neither party collected botanical specimens, nor made any significant observations on the flora. It remained for Major Thomas L. Mitchell (1838) to publish the first account of basaltic vegetation in W. Victoria. Mitchell spent a total of 28 days on volcanic terrain from the time he entered it, along the upper Crawford R. (near present Hotspur) on 23 August 1836, until he left the 'trap rocks' in Redesdale district, near the Campaspe R., on 5 October. He was thus fortunate to observe the lush growth and abundant flowering through early spring, and in a good season.

On the Crawford R. basalt, Mitchell found rich soil carrying stringybark eucalypts 'of enormous size'; around Heywood, Mitchell's 'trap ranges' were also well timbered. Between 4 & 10 September he climbed lofty Mt Napier on four occasions, commenting on the luxuriant growth of trees and shrubs almost to the crater rim—the whole summit of the mountain is now bare, showing the effects of successive fires and unrestricted grazing by stock and rabbits. On 7 September, Mitchell collected the type material of an undescribed native pea, *Dillwynia hispida*, at Camp Ck (about half-way between Branhholme and Byaduk). This showy flower has been noted recently at Shelford on the Leigh R., but it is far from common on volcanic soils.

Whilst journeying from Grange Burn Ck toward Mt Sturgeon at the S. extremity of the Grampians, he was impressed by the 'flowery plains' which yielded several kinds of orchids in the genus *Caladenia* (blue, yellow, pink and brown). The 20-22 September found Mitchell between Greenvale and Buangor on 'open downs thickly clothed with excellent grass'. At Middle Ck, toward the Loddon R. at Newstead, he discovered the curious Anchor plant (*Discaria pubescens*), also *Caladenia dilatata*, and a species of *Diuris* growing on 'open plains'.

During the second week of May 1854, William Howitt traversed the elevated volcanic lands between Castlemaine and Creswick. He published (1855) a short account of 'these high green downs', with some references to the 'thinly scattered' she-oaks, banksias, and acacias then present. Five months later, Professor W. H. Harvey—visiting algologist from Dublin—made a hurried excursion to Tower Hill near Koroit, commenting (1869) on 5 plant species that he saw growing around the crater lake. A picture of the unoccupied Camperdown district, in June 1839, emerges from reminiscences written down by George Russell during 1881-84 and published under the editorship of P. L. Brown (1935):

We were struck with the great extent of deep rich soil, many hundred acres being almost without a tree on them and ready to be turned over by the plough. They were covered with a rich sward of kangaroo-grass. The country around had been all burnt by bush-fires during the previous summer, and the grass that was now growing on the ground was as green and luxuriant as if it had been a field of grain. The kangaroos here were very numerous; I saw more than I had ever seen before. They came down from the wooded hills near Mount Leura in the afternoons to feed on the green grass.

After Mitchell's pioneering work of 1836, there had been no substantial botanizing anywhere in Victoria throughout the next 16 years, except for a few collections (now at Kew, England) made in the vicinity of Melbourne by F. M. Adamson during the 1840s and a larger simultaneous collection (also at Kew) assembled by J. G. Robertson of Wando Vale near Casterton. Then came Dr Ferdinand J. H. Mueller, who reached Victoria in August 1852, and was appointed first Colonial Botanist the following January. Within a very few months he had studied the vegetation surrounding Melbourne, including representative basalt plants at Darebin Ck and Merri Ck. Earlier in January 1853, he traversed and collected on the volcanic area 'between the Loddon River and Creswick Ck', also around Ballarat and Ballan.

From 1-13 November 1853, Mueller passed through the greater part of the W. District plains, visiting Bacchus Marsh, L. Colac, and Hopkins R. on his way from Melbourne to the Grampians. For a week in February 1874 and a month in March 1875, he was again in the volcanic region between Colac and Mt Elephant. Among the many plants collected were the minute duckweed *Wolffia arrhiza* on swamps near Mt Emu (a new Australian record) and, from near L. Corangamite, the type of a new peppergrass *Lepidium dubium* which has never been rediscovered. In September 1875, Mueller visited Warrnambool and Belfast, and six months later he was on Mt Warrenheip near Ballarat—apparently his last collecting on a volcanic area W. of Melbourne.

C. Whilhelmi, also en route to the Grampians, collected a few plants on Mt Rouse at Penshurst in January 1857. During the 1850s, and later, Dr Daniel Curdie (of 'Tandarook' near Camperdown) was in contact with Mueller, sending collections from his district—chiefly along Curdie's R. These specimens have been preserved in the National Herbarium of Victoria, as have those of William Allitt who collected around Portland in the 1860s and 1870s. Allitt was the first Curator of Portland Botanic Garden, and among his numerous consignments to Mueller were specimens from the basalt barriers and swamps along Darlot's Ck; many of the Allitt collections are cited throughout the 7 volumes of G. Bentham's *Flora Australiensis* (1863-78). Between 1860 and 1884, Rev. W. T. Whan gathered plants from a wide area around Skipton, where he was in charge of the Presbyterian Church, and some of his specimens (in Melbourne) are from the basalt plains.

The Rev. F. R. M. Wilson (1887), in the three years 1884-87, made a lichen collection of about 10,000 specimens from many parts of the Colony, including basaltic tracts at Birregurra, Lismore, Camperdown, Cobden, Terang, and Warrnambool. His main collection is now in the Sydney Herbarium, but there are numerous duplicates in Melbourne. Between 1892 and 1905, R. A. Bastow collected bryophytes and lichens extensively in S. Victoria. His material (at Melbourne Herbarium) includes many specimens from basalt rocks at Merri Ck (1892 and 1896), Braybrook (1900 and 1905), Buninyong (1898), and Rowsley (1901).

The Rev. H. M. R. Rupp (of later orchidological fame) prepared local plant lists for the Buninyong and Kingston districts (including volcanic tracts) in 1896 and, in 1898, for the Beeac area which is almost entirely basaltic. These valuable MS. records are also housed at Melbourne Herbarium.

H. B. Williamson, a country school teacher stationed at Hawkesdale for 12 years

(1893-1904 inclusive), made a large district collection. Many plants of the basalt were incorporated and, at his death in January 1931, this material all came to the National Herbarium.

Interest in plants of basaltic areas was greatly stimulated by the researches of Dr C. S. Sutton (1916-17), whose 'Sketch of the Keilor Plains Flora' (with appended 'Census of Keilor Plains Flora') is a pioneering work on the ecology of this major vegetation province. Sutton listed 444 species from the Keilor section of the W. District plains; but his figure is inordinately high, including, as it does, some old and very dubious records—viz. the genera *Phylloglossum*, *Tetraria*, *Scleranthus*, *Blenodia*, *Lasiopetalum*, *Hibbertia*, *Prostanthera*, and *Podosperma*—as well as a large number of non-basaltic plants from adjacent formations. Of the latter may be mentioned: littoral and entirely coastal genera (e.g. *Disphyma* which occurs also on Mallee salt-pans, *Tetragonia*, *Cakile*, *Limonium*, *Avicennia*, and several marine phanerogams), plants peculiar to Palaeozoic inliers in the basalt, whether granitic or sedimentary (notably species of *Aphelia*, *Chamaescilla*, *Glossodia*, *Grevillea*, *Bassia*, *Geococcus*, *Daviesia*, *Pultenaea*, *Templetonia*, *Xanthosia*, and *Lissanthe*), and a few species now regarded as naturalized aliens (*Parapholis*, *Monerma*, *Emex*, and *Polycarpon*). Altogether, Sutton's list can be reduced by 114 species; so that the number of undoubtedly basaltic species for the Keilor sector would stand at 330.

The most advanced ecological paper on the basaltic flora is by R. T. Patton (1935) who discusses in detail its characteristics, composition, and habitat. The present writer has drawn freely from information summarized in this important paper. Both Patton and Sutton describe the vegetation of the Basalt Plains as 'Steppe', but there are difficulties in applying the term here. True Steppe of the northern hemisphere is subject to a dormancy both in late summer and again in winter (which is severe); the Victorian basalt grasslands, on the other hand, are dormant only during the droughty summer-autumn period. Two records published by Patton (1935, p. 176) are open to question and may be the result of misidentifications, viz. *Thysanotus tuberosus* (listed as of frequent occurrence) and *Bredemeyera ericinum*. No other collector seems ever to have noted either plant on Newer Basalt, and they are prefixed by a query in the census herewith appended.

The plant life on Lady Julia Percy Is. (a detached point of eruption in Portland Bay 12 miles W. of Port Fairy) was investigated by the McCoy Society from Melbourne University in the summer of 1935-36. Notes on the general vegetation were compiled by A. G. Edmonds (1937), a list of vascular plants and algae being contributed by R. T. Patton (1937). The indigenous vasculares were recorded as 26 species, but 5 of these (viz. his *Asplenium scleroprium*, *Mesembryanthemum australe*, *Lepidium foliosum*, *Alyxia buxifolia*, *Calocephalus brownii*) are coastal plants growing only within the influence of salt spray and independent of any particular geological formation; they are excluded from the present survey of basalt plants. The McCoy Society also carried out extensive hydrological studies, including a survey of the aquatic and marginal flora, at L. Purumbete near Camperdown in 1952; but no account of this work has yet been published.

Floristic explorations throughout the County of Normanby have been made by A. Cliff. Beaglehole (of Gorae West) since 1940. His paper 'Ferns of the Portland District' (1944) includes items peculiar to the basalt region of the far SW. In collaboration with Noel F. Learmonth (1949 & 1956), he has recorded observations on the fern floras of the Darlot's Ck and Byaduk lava caves. Beaglehole has also lodged at the National Herbarium MS. lists of species noted at Mt Eccles (Apr. & Oct. 1960) and at Mt Napier (Dec. 1960). Miss H. I. Aston has listed the present floras of Mt Eccles (Oct. 1960) and Tower Hill near Koroit (Dec. 1960). Her lists

and those of the present writer (for Maribyrnong R. and Sydenham wildflower sanctuary, Inverleigh and Shelford, Lal Lal and Moorabool Falls, Creswick, Colac and Stony Rises, Mt Napier and Mt Eccles, Byaduk Caves, Wannon Falls, and the Loddon R. at Bridgewater) are also available in MSS. at the Melbourne Herbarium. Finally, Willis (1962), while discussing the 'Land Flora of Victoria', has notes on the W. volcanic plains; and in 1963 he gives some account of the past and present vegetation on Mt Napier.

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CENSUS OF VASCULAR FLORA INDIGENOUS TO VOLCANIC TRACTS OF WESTERN VICTORIA

The present enumeration of families, genera, and species conforms to the systematic arrangement adopted by Engler and Prantl in *Die Natürlichen Pflanzenfamilien* (1887-1902), but nomenclature has been brought up to date. Known occurrences in 15 representative areas throughout the basaltic region are indicated by the following abbreviations which follow the author citation for each name:

- KP Keilor Plains (bounded approximately by Melbourne, Yan Yean, Beveridge, Sunbury, Melton, Rowsley, Ripley, You Yangs and Little R.)
- S Shelford district (including Inverleigh and Warrambine Ck)
- LF Lal Lal and Moorabool Falls
- P Piggoreet and Devil's Kitchen
- LB L. Burrumbeet
- SR Stony Rises (between Pirron Yallock and Weerite) and Mt Porndon
- TH Tower Hill near Koroit
- H Hawkesdale district
- N Mt Napier Reserve
- BC Byaduk Caves
- E Mt Eccles National Park
- JP Lady Julia Percy Island
- WF Wannon Falls near Hamilton
- C Creswick-Clunes-Campbelltown area
- B Bridgewater

aq. signifies an aquatic or marsh plant (including halophytes)

Other localities are written in full against species having a very restricted range on the basalt.

PTERIDOPHYTA

OPHIOGLOSSACEÆ

Ophioglossum coriaceum A. Cunn. KP, BC, E, C

HYMENOPHYLLACEÆ

Hymenophyllum cupressiforme Labill. SR, BC

Mecodium australe (Willd.) Copeland BC

Polyphlebium venosum (R. Br.) Copeland BC, E

DICKSONIACEÆ

Dicksonia antarctica Labill. SR, BC

DENNSTÆDTIACEÆ

Hypolepis rugosula (Labill.) J. Sm. BC

Pteridium esculentum (Forst. f.) Nakai KP, S, LF, P, LB, SR, TH, N, BC, E, JP, WF, C

Histiopteris incisa (Thunb.) J. Sm. BC

ADIANTACEÆ

Anogramma leptophylla (L.) Link LF, LB, SR, Hexham, N, BC, E

Adiantum aethiopicum L. KP, LF, SR, TH, N, BC, E

Pteris tremula R. Br. SR, TH, BC

Pellaea falcata (R. Br.) Fée KP, LF, SR, BC, E, Darlot's Ck, Kooroo-cheang Falls, Turpin's Falls

Cheilanthes tenuifolia (Burm. f.) Swartz KP, S, LF, TH, N, BC, E, WF, C

POLYPODIACEÆ

Microsorium diversifolium (Willd.) Copeland BC

ASPLENIACEÆ

Asplenium flabellifolium Cav. KP, LF, LB, SR, N, BC, E, WF, C

A. adiantoides (L.) Lam. BC, Darlot's Ck

A. bulbiferum Forst. f. SR, BC, E, Mt Rouse

Pleurosorus rutifolius (R. Br.) Fée KP, S, LF, LB, SR, N, BC, E, WF, C

ATHYRIACEÆ

Athyrium australe C. Presl BC

ASPIDIACEÆ

- Polystichum proliferum* (R. Br.) C. Presl SR, BC, E
Lastreopsis shepherdii (Kunze ex Mett.)
M. D. Tindale SR, BC, Tyrendarra caves

BLECHNACEÆ

- Blechnum aggregatum* (Colenso)
M. D. Tindale BC
B. minus (R. Br.) Ettings. LF
Doodia caudata (Cav.) R. Br. KP (Broadmeadows), LF, WF
D. media R. Br. KP (Somerton)

MARSILEACEÆ

- Marsilea drummondii* A. Br. aq., KP, S, B
M. hirsuta R. Br. aq., LF, Darlot's Ck, Carisbrook
Pilularia novæ-hollandiæ A. Br. aq., KP

AZOLLACEÆ

- Azolla filiculoides* Lam. aq., KP, SR, C (Kooroocheang)

ISOËTACEÆ

- Isoetes drummondii* A. Br. aq., H, C (Glendonald Ck)

SPERMATOPHYTA—GYMNOSPERMÆ

CUPRESSACEÆ

- Callitris columellaris* F. Muell. KP (Jackson's Ck), B

SPERMATOPHYTA—ANGIOSPERMÆ

TYPHACEÆ

- Typha angustifolia* L. aq., KP, S, SR, TH, C

SPARGANIACEÆ

- Sparganium ramosum* Huds. aq., Mt Emu Ck, Merri R.

POTAMOGETONACEÆ

- Potamogeton sulcatus* A. Bennett aq., C
P. tricarinatus F. Muell. & A. Bennett aq., KP, C (Australasian Mine)
P. ochreatus Raoul aq., KP, Shaw R. near Orford
P. pectinatus L. aq., KP, TH, Moyne R.
P. crispus L. aq., S, L. Colac, Moyne R., Merri R.
P. perfoliatus L. aq., Hopkins R. Falls, Panmure

RUPPIACEÆ

- Ruppia maritima* L. aq., KP, TH, L. Corangamite and nearby lakes, L. Learmonth, Nerrin Nerrin swamps

ZANNICHELLIACEÆ

- Lepilaena bilocularis* T. Kirk aq., L. Calvert, L. Colac, Derrinallum
L. preissii (Lehm.) F. Muell. aq., KP (Altona), L. Modewarre
L. cylindrocarpa (Körnicker) Benth. aq., near You Yangs, L. Martin near Cressy, Nerrin Nerrin swamps, L. Murdeduke

JUNCAGINACEÆ

- Triglochin procera* R. Br. aq., KP, S, LF, TH, WF, C, etc.
T. striata Ruiz & Pav. KP, S, SR, TH, C
T. centrocarpa Hook. H, WF

ALISMATAECEÆ

- Alisma plantago-aquatica* L. aq., KP
Damasonium minus (R. Br.) Buch. aq., KP (Little R.)

HYDROCHARITACEÆ

- Ottelia ovalifolia* (R. Br.) L. C. Rich. aq., KP, SR (Pirron Yallock Ck), C (Kingston)
Vallisneria spiralis L. aq., KP, S, L. Elingamite, Hepburn's Lagoon

GRAMINEÆ

- Microlæna stipoides* (Labill.) R. Br. KP, S, LF, P, TH, E
Puccinellia stricta (Hook f.) C. Blom KP (salt marshes), Colac
Poa australis R. Br. (agg.) KP, S, LF, P, SR, TH, N, BC, E, JP, WF, C
Festuca hookeriana F. Muell. ex Hook. f. H

<i>Glyceria australis</i> C. E. Hubbard	aq., KP, LF, SR, Ballan, C
<i>Agropyron scabrum</i> (Labill.) Pal. Beauv.	KP, S, LF, P, LB, SR, N, E, WF, C
<i>Amphibromus neesii</i> Steud.	aq., KP, C, B
<i>Dichelachne crinita</i> (L. f.) Hook. f.	KP, LF, N, E, JP, C
<i>D. sciurea</i> (R. Br.) Hook. f.	Mt Buninyong
<i>Deyeuxia quadriseta</i> (Labill.) Benth.	KP
<i>Agrostis rudis</i> Roem. & Schult.	L. Corangamite
<i>A. venusta</i> Trin.	KP
<i>A. aemula</i> R. Br.	KP
<i>A. avenacea</i> J. F. Gmel.	KP, S, LF, LB, SR, TH, N, E, JP, WF, C
<i>Alopecurus geniculatus</i> L.	Penshurst
<i>Echinopogon ovatus</i> (Forst. f.) Pal. Beauv.	KP, LF, SR, N, BC, E
<i>Pentapogon quadrifidus</i> (Labill.) Baill.	H
<i>Eragrostis brownii</i> (Kunth) Nees ex Steud.	KP, S, LF, Colac, C
<i>E. australasica</i> (Steud.) C. E. Hubbard	L. Murdeduke near Winchelsea, L. Goldsmith near Beaufort
<i>Tripogon loliiformis</i> (F. Muell.) C. E. Hubbard	Lara
<i>Chloris truncata</i> R. Br.	KP, S, B
<i>Cynodon dactylon</i> (L.) Pers.	KP, S, LB, SR, C, B
<i>Sporobolus virginicus</i> (L.) Kunth	S
<i>Phragmites communis</i> Trin.	aq., KP, S, LB, SR, TH, C
<i>Enneapogon nigricans</i> (R. Br.) Pal. Beauv.	KP, B
<i>Danthonia induta</i> J. W. Vickery	KP, B
<i>D. geniculata</i> J. M. Black	KP, S, LF, P, LB, SR, H, BC, C
<i>D. carphoides</i> F. Muell. ex Benth.	KP, B
<i>D. richardsonii</i> A. B. Cashmore	KP (Sydenham)
<i>D. linkii</i> Kunth	KP
<i>D. auriculata</i> J. M. Black	KP, C
<i>D. duttoniana</i> A. B. Cashmore	KP, S, C, B
<i>D. procera</i> J. W. Vickery	Tylden
<i>D. eriantha</i> Lindl. in Mitch.	C, B
<i>D. caespitosa</i> Gaudich.	KP, S, SR, ?N, ?BC, WF, C
<i>D. pilosa</i> R. Br.	KP, LF, P, SR, N, E
<i>D. penicillata</i> (Labill.) Pal. Beauv.	KP, S, LF, P, N, E
<i>Aristida behriana</i> F. Muell.	B
<i>Stipa setacea</i> R. Br.	KP
<i>S. semibarbata</i> R. Br.	KP, S, B
<i>S. aristiglumis</i> F. Muell.	KP, S, B
<i>S. blackii</i> C. E. Hubbard	KP (near Mt Cottrell)
<i>S. variabilis</i> D. K. Hughes	KP, S, LB, SR, C, B
<i>S. compacta</i> D. K. Hughes	TH
<i>S. eremophila</i> F. M. Reader	C (near Cattle Station Hill)
<i>Panicum prolatum</i> F. Muell.	KP, B
<i>P. effusum</i> R. Br.	KP (Little R.), Lara
<i>Paspalum distichum</i> L.	aq., KP, S, C, B
<i>Hemarthria uncinata</i> R. Br.	KP, E, C
<i>Dichanthium sericeum</i> (R. Br.) A. Camus	KP, C (Creswick Ck Gorge)
<i>Themeda australis</i> (R. Br.) Stapf	KP, S, LF, E, C, B
<i>Imperata cylindrica</i> (L.) Pal. Beauv.	SR
CYPERACEÆ	
<i>Cyperus tenellus</i> L. f.	KP, P, H
<i>C. lucidus</i> R. Br.	aq., SR, Colac, WF
<i>C. gunnii</i> Hook. f.	LF
<i>C. sanguinolentus</i> Vahl	Lara
<i>Scirpus americanus</i> Pers.	aq., KP, P, SR, TH, Mt Emu Ck
<i>S. nodosus</i> Rottb.	KP, S, P, LB, TH, JP, WF
<i>S. validus</i> Vahl	aq., KP, S, LF, E
<i>S. maritimus</i> L.	aq., KP, S, SR, Colac
<i>S. fluitans</i> L.	aq., KP
<i>S. antarcticus</i> L.	KP, N, E, C
<i>S. cernuus</i> Vahl	TH, E

- S. victoriensis* N. A. Wakefield
S. inundatus (R. Br.) Poir.
S. platycarpus S. T. Blake
Eleocharis sphacelata R. Br.
E. acuta R. Br.
E. pusilla R. Br.
E. gracilis R. Br.
Schænus breviculmis Benth.
S. nitens (R. Br.) Poir.
S. apogon Roem. & Schult.
S. latelaminatus Kükenth.
Cladium procerum S. T. Blake
C. articulatum R. Br.
Gahnia clarkei G. Benl
G. filum (Labill.) F. Muell.
Lepidosperma laterale R. Br.
Carex appressa R. Br.
C. tereticaulis F. Muell.
C. inversa R. Br.
C. gaudichaudiana Kunth
C. iynx E. Nelmes
C. fascicularis Soland. ex Boott
C. breviculmis R. Br.
C. bichenoviana Boott
C. brownii Tuckerm.
C. gunniana Boott
- KP (Werribee), C (Glendonald Ck)
 aq., KP, LF, P, SR, WF, C
 KP (Sydenham), Turpin's Falls
 aq., KP
 aq., KP, S, LF, LB, TH, C, B
 KP (Sydenham), Mt Emu Ck, H, C, B
 H
 KP (St Albans—rare)
 TH, Mt Emu Ck
 KP, LF, WF, C
 H
 aq., TH
 aq., L. Terang
 TH, H, L. Condah, L. Elingamite
 aq., KP, H
 KP
 aq., KP, LF, P, SR, TH, E, WF, C
 KP, H, C
 KP, E, B
 LF, C
 L. Corangamite
 aq., KP, SR, C (Birch's Ck)
 KP, S, LF, H, N
 KP (St Albans, Little R.), Mt Emu Ck
 H
 aq., H
- LEMNACEÆ**
Lemna minor L.
L. trisulca L.
Wolffia arrhiza (L.) Hork. ex Wimm.
- aq., KP, S, SR (Kooroocheang)
 aq., H, L. Terang, L. Purrumbete, Merri R.
 aq., KP, Mt Emu Ck, SR, L. Terang
- CENTROLEPIDACEÆ**
Trithuria submersa Hook. f.
Centrolepis strigosa (R. Br.) Roem. & Schult.
C. aristata (R. Br.) Roem. & Schult.
C. glabra (F. Muell.) Hieron.
Aphelia gracilis Sond.
- aq., Mt Emu Ck, H
 KP (near You Yangs), H
 H
 Mt Emu Ck, H
 H
- JUNCACEÆ**
Luzula campestris (L.) DC.
Juncus pauciflorus R. Br.
J. pallidus R. Br.
J. polyanthemus Buch.
J. australis Hook. f.
J. filicaulis Buch.
J. radula Buch.
J. subsecundus N. A. Wakefield
J. caespiticius E. Mey. in Lehm.
J. bufonius L.
J. plebeius R. Br.
J. holoschoenus R. Br.
J. prismatocarpus R. Br.
- KP, S, SR, N, E, C
 LF, P, TH, WF
 KP, LF, P, SR, TH, JP, WF, C
 KP, SR, TH, E, ?WF
 LF, P
 ?S, LF
 KP, SR
 B
 TH, H, WF
 KP, LF, P, E, B
 KP, LF, C
 aq., KP, C
 aq., H
- LILIACEÆ**
Lomandra micrantha (Endl.) Ewart
L. filiformis (Thunb.) Britten
L. longifolia Labill.
L. glauca (R. Br.) Ewart
Caesia vittata R. Br.
Arthropodium minus R. Br.
Dichopogon strictus (R. Br.) J. G. Baker
Thysanotus patersonii R. Br.
 ? *T. tuberosus* R. Br.
Bulbine bulbosa (R. Br.) Haw.
- KP (Stony Ck)
 KP, S, H, B
 LF, P, SR, C
 KP (Werribee), H
 KP, H
 KP, C (Australasian Mine)
 KP
 KP
 KP
 KP, LF, Hamilton, C

- Tricoryne elatior* R. Br. KP, Colac, C
Dianella tasmanica Hook. f. LF, SR, WF
D. revoluta R. Br. KP, S, SR, BC, E, WF
D. laevis R. Br. KP, S, H
Anguillaria dioica R. Br. KP, S, N, C
Burchardia umbellata R. Br. KP, H
- HYPOXIDACEÆ
- Hypoxis glabella* R. Br. KP, E, C
- ORCHIDACEÆ
- Thelymitra aristata* Lindl. KP
T. ixioides Swartz KP
Gastrodia sesamoides R. Br. Mt Buninyong
Diuris punctata Sm. KP, WF (? extinct)
D. palustris Lindl. KP (Sydenham, Laverton & Lara)
D. sulphurea R. Br. KP (Little R.)
D. pedunculata R. Br. KP, H
D. fastidiosa R. S. Rogers KP (Tottenham—? extinct)
Microtis unifolia (Forst. f.) Reichenb. f. KP (Sydenham), H
Prasophyllum fuscum R. Br. KP, C (N. Creswick)
P. odoratum R. S. Rogers KP, Lara
P. gracile R. S. Rogers H
Chiloglottis reflexa (Labill.) Druce E
Acianthus exsertus R. Br. KP, H, ?E
Eriochilus cucullatus (Labill.) Reichenb. f. KP (Bulla)
Corybas sp. E
Pterostylis truncata R. D. FitzG. KP (Tottenham-Sunshine)
P. pedunculata R. Br. E
P. nutans R. Br. E, WF
P. curta R. Br. LB, WF
P. cynocephala R. D. FitzG. KP
P. mutica R. Br. KP, H
Spiranthes sinensis (Pers.) Ames H, Condah Swamp
Dipodium punctatum (Sm.) R. Br. SR
- CASUARINACEÆ
- Casuarina stricta* Dryand. in Ait. KP, S, P, SR, TH, E, C
C. luehmannii R. T. Baker KP (between Mt Cottrell and Balliang)
C. paludosa Sieber ex Spreng. Kirkstall near Port Fairy
- URTICACEÆ
- Urtica incisa* Poir. KP, LF, SR, TH, BC, E, WF
Parietaria debilis Forst. f. KP, P, N, BC, E
- PROTEACEÆ
- Hakea microcarpa* R. Br. 'Towards Mt Elephant'
Banksia marginata Cav. KP, LF, E, C, Mt Franklin
- SANTALACEÆ
- Exocarpos cupressiformis* Labill. KP, Beeac, SR, E
Thesium australe R. Br. KP (Braybrook, Lancefield)
- LORANTHACEÆ
- Amyema preissii* (Miq.) van Tiegh. KP, SR
A. pendula (Sieber ex DC.) van Tiegh. P, SR, N, E, WF
A. quandang (Lindl.) van Tiegh. H
Lysiana exocarpi (Behr) van Tiegh. KP
Muellerina eucalyptoides (DC.) B. A. Barlow KP, S, E
- POLYGONACEÆ
- Rumex brownii* Campd. KP, S, LF, P, LB, SR, TH, N, BC, E, WF, C
R. dumosus A. Cunn. ex Meissn. KP, S, C
R. bidens R. Br. aq., KP, S, SR, C (Birch's Ck)
Polygonum plebeium R. Br. KP, E
P. prostratum R. Br. KP, S, LF, P, WF, C
P. hydropiper L. aq., KP
P. minus Huds. aq., KP, S, LF, E
- M

- P. subsessile* R. Br. KP, C (Kingston)
P. strigosum R. Br. aq., H, C (Kingston)
Muehlenbeckia cunninghamii (Meissn.) F. Muell. KP, C (? extinct)
- CHENOPODIACEÆ**
Rhagodia nutans R. Br. KP, S, LF, SR, N, BC, E, WF, C
R. parabolica R. Br. KP
R. baccata (Labill.) M KP, SR, TH, JP
Chenopodium glaucum L. KP, S, LB, SR, TH, E, JP
C. pseudomicrophyllum Aellen KP, E
C. pumilio R. Br. KP, S, SR
Atriplex semibaccata R. Br. KP, SR
A. muelleri Benth. KP
Bassia quinquecupis (F. Muell.) F. Muell. KP
Kochia crassiloba R. H. Anderson KP
K. villosa Lindl. KP
Enchylaena tomentosa R. Br. KP (Little R.), JP
Suaeda australis (R. Br.) Moq. KP, SR
Salicornia australasica (Moq.) Hj. Eichler aq., KP, S, SR, TH, JP, Streatham
- AMARATHACEÆ**
Ptilotus spathulatus (R. Br.) Poir. KP, S, LF, C (Ullina), B
P. macrocephalus (R. Br.) Poir. KP, S, Cressy
P. erubescens Schlechtendal Streatham
Alternanthera denticulata R. Br. KP, LF, C, B
- FICOIDACEÆ**
Carpobrotus ? rossii (Haw.) N. E. Br. KP, S, LF, P, E, JP, WF
- PORTULACACEÆ**
Portulaca oleracea L. KP
Calandrinia calyptrata Hook. f. KP, N, BC, E, C
Claytonia australasica Hook. f. aq., KP, SR, Terang, WF, C
Montia fontana L. aq., H
- CARYOPHYLLACEÆ**
Stellaria pungens Brongn. KP, P
S. palustris Ehrh. ex Retz. KP, S
Sagina apetala L. KP, N, E, JP, B
S. procumbens L. H, E
Spergularia rubra (L.) J. & C. Presl KP, S, JP, C
S. media (L.) C. Presl KP (Merri Ck), Colac
? Scleranthus diander R. Br. KP (Werribee)
- CERATOPHYLLACEÆ**
Ceratophyllum demersum L. aq., L. Terang
- RANUNCULACEÆ**
Clematis microphylla DC. KP, S, SR, Beeac
C. aristata R. Br. ex DC. SR
Myosurus minimus L. aq., Mt Emu Ck
Ranunculus trichophyllus Chaix aq., KP, H, Belfast Lough
R. lappaceus Sm. KP, SR, E
R. rivularis Banks & Soland. ex DC. aq., KP, SR, E, Belfast Lough, WF
R. inundatus R. Br. ex DC. aq., LB
R. glabrifolius Hook. Mt Mercer, 8 mls S. of Beaufort at L. Goldsmith
R. sessiliflorus R. Br. ex DC. KP, N, BC, E, WF, C
- LAURACEÆ**
Cassytha melantha R. Br. KP (Djerriwarrh Ck), SR
- CRUCIFERÆ**
Lepidium dubium Thel. 'Near Mt Elephant' (TYPE)
L. aschersonii Thell. KP (Williamstown), Cressy, L. Corangamite, Mortlake, Streatham
L. hyssopifolium Desv. KP, Beeac, H, E, C, B

<i>Cardamine laciniata</i> F. Muell.	KP
<i>C. debilis</i> Banks ex DC.	LF, E
<i>Rorippa islandica</i> (Oeder) Borb.	S
<i>Hymenolobus procumbens</i> (L.) Nutt. ex J. M. Black	KP
<i>Cuphonotus antipodus</i> (F. Muell.) J. M. Black	KP (Werribee), Carisbrook
DROSERACEÆ	
<i>Drosera whittakeri</i> Planch.	KP, S, WF
<i>D. glanduligera</i> Lehm.	KP
<i>D. auriculata</i> Bakh. ex Planch.	KP
<i>D. peltata</i> Sm. ex Willd.	KP, S
CRASSULACEÆ	
<i>Crassula peduncularis</i> (Sm.) Meigen	KP, C, B
<i>C. macrantha</i> (Hook. f.) Diels & Pritz.	KP, E, B
<i>C. sieberiana</i> (Schult. & Schult. f.) Druce	KP, S, LF, P, LB, N, E, WF, C
<i>C. helmsii</i> (Kirk) Cockayne	aq., KP, S, LF, SR, TH, WF, C
PITTOSPORACEÆ	
<i>Bursaria spinosa</i> Cav.	KP, S, LF, P, SR, TH, BC, E, WF, B
ROSACEÆ	
<i>Rubus triphyllus</i> Thunb.	S, LF, SR, N, E, WF
<i>Aphanes australiana</i> (Rothm.) Rothm.	H, E
<i>Acæna ovina</i> A. Cunn.	KP, S, LF, SR, N, E
<i>A. anserinifolia</i> (Forst. & Forst. f.) Druce	KP, S, LF, P, SR, TH, N, E, WF, C
MIMOSACEÆ	
<i>Acacia armata</i> R. Br.	KP, S, H
<i>A. acinacea</i> Lindl.	KP, B
<i>A. retinodes</i> Schlechtendal	KP, P, C (Creswick Ck Gorge)
<i>A. melanoxylon</i> R. Br.	KP, S, LF, P, LB, SR, TH, N, BC, E, WF, C
<i>A. implexa</i> Benth.	KP, Mt Kooroocheang
<i>A. verticillata</i> (L'Hérit.) Willd.	KP, SR, H, WF
<i>A. mearnsii</i> De Wild.	KP, S, LF, P, Colac, N, WF
<i>A. dealbata</i> Link.	KP
CÆSALPINIACEÆ	
<i>Cassia eremophila</i> A. Cunn. ex Vog.	KP (Jackson's Ck)
PAPILIONACEÆ	
<i>Daviesia latifolia</i> R. Br. in Ait. f.	H
<i>Eutaxia microphylla</i> (R. Br.) J. M. Black	KP, S, C
<i>Dillwynia hispida</i> Lindl.	S, Camp Ck E. of Branhholme (TYPE)
<i>D. sericea</i> A. Cunn. in Field	KP (Braybrook)
<i>D. cinerascens</i> R. Br.	KP
<i>Bossia prostrata</i> R. Br.	KP, H
<i>Goodia lotifolia</i> Salisb.	SR
<i>Lotus australis</i> Andr.	KP, C (Kingston)
<i>L. corniculatus</i> L.	LB, C
<i>Indigofera australis</i> Willd.	KP, Koroit
<i>Psoralea tenax</i> Lindl.	KP
<i>P. parva</i> F. Muell.	KP, Lara, S
<i>Swainsona procumbens</i> (F. Muell.) F. Muell.	C (Lawrence & near Racecourse)
<i>S. oroboides</i> F. Muell. ex Benth.	Lara, Beeac
<i>Desmodium varians</i> (Labill.) Endl.	LF
<i>Glycine clandestina</i> J. Wendl.	KP, LF, E
<i>G. latrobeana</i> (Meissn.) Benth.	KP (Little R.), H, C (N. Creswick)
<i>G. tabacina</i> (Labill.) Benth.	KP (Werribee), Lara, Beeac
<i>Kennedya prostrata</i> R. Br. in Ait. f.	KP, S
<i>Hardenbergia violacea</i> (Schneev.) Stearn	KP
GERANIACEÆ	
<i>Geranium pilosum</i> sens. lat. (non. certe Forst. f.)	KP, S, LF, P, LB, SR, TH, N, BC, E, WF, C
<i>Erodium crinitum</i> R. C. Carolin	KP, C

<i>Pelargonium australe</i> Willd.	KP, LF, P, LB, SR, N, BC, E, JP, WF, C
<i>P. rodneyanum</i> Lindl.	KP, S, LF, P
OXALIDACEÆ	
<i>Oxalis corniculata</i> L.	KP, S, LF, P, SR, TH, N, BC, E, WF, C, B
LINACEÆ	
<i>Linum marginale</i> A. Cunn. ex Planch.	KP
ZYGOPHYLLACEÆ	
<i>Zygophyllum glaucum</i> F. Muell.	KP (Jackson's Ck, Werribee)
<i>Tribulus terrestris</i> L.	KP
RUTACEÆ	
<i>Correa glabra</i> Lindl.	KP, P
POLYGALACEÆ	
<i>Comesperma volubile</i> Labill.	H
? <i>C. ericinum</i> DC.	KP (St Albans)
<i>C. polygaloides</i> F. Muell.	KP (St Albans, 'near Station Peak')
EUPHORBIACEÆ	
<i>Euphorbia drummondii</i> Boiss.	KP
<i>Poranthera microphylla</i> Brongn.	KP, N, E
STACKHOUSIACEÆ	
<i>Stackhousia monogyna</i> Labill.	KP, H, N
<i>S. viminea</i> Sm. in Rees	KP
SAPINDACEÆ	
<i>Dodonaea cuneata</i> Sm. in Rees	KP, P, SR
RHAMNACEÆ	
<i>Discaria pubescens</i> (Brongn.) Druce	LF, C (Creswick Ck & Birch's Ck)
<i>Cryptandra amara</i> Sm. in Rees	KP (Digger's Rest & Bulla)
<i>Pamaderris aspera</i> Sieber ex DC.	KP (Digger's Rest)
MALVACEÆ	
<i>Lavatera plebeia</i> Sims	KP (Werribee), BC, E
<i>Plagianthus pulchellus</i> (Willd.) A. Gray	KP, S, SR, Mt Emu Ck
<i>Sida corrugata</i> Lindl.	Bacchus Marsh, B
HYPERICACEÆ	
<i>Hypericum gramineum</i> Forst. f.	KP, S, SR, TH, N, BC, E, WF, C
ELATINACEÆ	
<i>Elatine gratioloides</i> A. Cunn.	aq., KP, Colac, H
VIOLACEÆ	
<i>Viola hederacea</i> Labill.	KP, SR, TH, N, E, WF
<i>V. betonicifolia</i> Sm. in Rees	Mt Buninyong, N
<i>Hymenanchera dentata</i> R. Br. ex DC.	KP, S, LF, P, SR, N, BC, WF, C
THYMELÆACEÆ	
<i>Pimelea glauca</i> R. Br.	KP, S, C
<i>P. humilis</i> R. Br.	KP, S
<i>P. serpyllifolia</i> R. Br.	KP, C (Lawrence)
<i>P. curviflora</i> R. Br.	KP, C, B
<i>P. axiflora</i> F. Muell. ex Meissn.	Mt Buninyong
LYTHRACEÆ	
<i>Lythrum salicaria</i> L.	aq., KP (Werribee), LF, H, C (Birch's Ck)
<i>L. hyssopifolia</i> L.	KP, S, SR, TH, C, B
MYRTACEÆ	
<i>Eucalytus ovata</i> Labill.	KP, LF, SR, TH, WF, C
<i>E. viminalis</i> Labill.	KP, LF, P, SR, N, E, WF, Mt Franklin
<i>E. camaldulensis</i> Dehnh.	KP, S, LB, WF, B
<i>E. pauciflora</i> Sieber ex Spreng.	C (Spring & Eganstown Hills)
<i>E. obliqua</i> L'Hérit.	LF, Mt Warrenheip, Clarke's Hill & Spring Hill
<i>E. radiata</i> Sieber ex DC.	KP (Bulla), LF
<i>E. microcarpa</i> (Maiden) Maiden	KP, B

- E. melliodora* A. Cunn. ex Schauer KP, B
Leptospermum lanigerum (Ait.) Sm. KP, S, LF, SR, TH, WF, C (Birch's Ck)
L. juniperinum Sm. SR
L. obovatum Sweet WF
Callistemon paludosus F. Muell. KP, P, C (Birch's Ck)
Melaleuca squarrosa Donn ex Sm. SR
Calytrix tetragona Labill. KP (Jackson's Ck & Digger's Rest)
- ONAGRACEÆ**
Epilobium junceum Forst. f. ex Spreng. KP, LF, P, SR, TH, N, E, JP, C, B
E. billardierianum Ser. ex DC. KP, P, SR, BC, WF, Turpin's Falls
E. hirtigerum A. Cunn. Turpin's Falls
- HALORAGACEÆ**
Haloragis heterophylla Brongn. KP, S, C, B
H. tetragyna (Labill.) Hook. f. KP
H. brownii (Hook. f.) Schindl. aq., H
Myriophyllum propinquum A. Cunn. aq., KP, LF, TH, L. Purumbete, WF, C
M. elatinoides Gaudich. aq., TH, near L. Learmonth
M. verrucosum Lindl. aq., KP, LB
M. muelleri Sond. aq., KP, L. Calvert, L. Terangpom
M. integrifolium (Hook. f.) Hook. f. aq., H
- UMBELLIFERÆ**
Centella asiatica (L.) Urban KP, WF
Hydrocotyle vulgaris L. aq., TH
H. laxiflora DC. KP, S, N, E, C
H. pterocarpa F. Muell. H
H. hirta R. Br. ex A. Rich. KP, SR, TH, N, E
H. sibthorpioides Lam. S, LF, TH, E, WF, C
H. tripartita R. Br. ex A. Rich. KP
H. muscosa R. Br. ex A. Rich. aq., H
H. callicarpa Bunge in Lehm. KP, E
H. capillaris F. Muell. KP
Oreomyrrhis eriopoda (DC.) Hook. f. KP, C (near Newlyn Reservoir)
Eryngium rostratum Cav. KP, S, C, B
E. vesiculosum Labill. KP, S
Daucus glochidiatus (Labill.) Fisch. et al. KP, N, E
Sium latifolium L. aq., L. Corangamite, Mt Elephant, Mortlake
Lilaeopsis polyantha (Gandoger) Hj. Eichler KP, Turpin's Falls
Apium leptophyllum (Pers.) F. Muell. KP (Darebin Ck)
ex Benth aq., KP, S, LF, E, JP, WF
A. prostratum Labill.
- EPACRIDACEÆ**
Astroloma humifusum (Cav.) R. Br. KP (Bulla)
Acrotriche serrulata (Labill.) R. Br. LF
A. prostrata F. Muell. LF, Mt Buninyong
- MYRSINACEÆ**
Myrsine howittiana (F. Muell. ex Mez) D. Prain KP
- PRIMULACEÆ**
Samolus repens (Forst. et Forst. f.) Pers. aq., KP, L. Learmonth, Warrion, L. Goldsmith
- OLEACEÆ**
Notelaea ligustrina Vent. L. Elingamite near Terang
- LOGANIACEÆ**
Mitrasacme paradoxa R. Br. KP (Werribee), Beeac
M. distylis F. Muell. KP ('beyond Little R.'), H
- GENTIANACEÆ**
Centaurium spicatum (Pers.) Druce KP, L. Goldsmith near Beaufort
Sebaea ovata (Labill.) R. Br. KP, N, E, C
S. albidiflora F. Muell. KP, Mt Emu Ck

MENYANTHACEÆ

Nymphoides crenatum (F. Muell.) O. Kuntze aq., 'near L. Colac'

CONVOLVULACEÆ

Convolvulus erubescens Sims

Calystegia sepium (L.) R. Br.

Dichondra repens Forst. et Forst. f.

Wilsonia rotundifolia Hook.

KP, S, LF, P, C, B

S, Mt Emu Ck, Heywood, C (Kingston)

KP, S, SR, TH, N, BC, E, JP, WF

aq., KP (saline marshes), LB, L. Corangamite, L. Calvert, L. Goldsmith

CUSCUTACEÆ

Cuscuta australis R. Br.

C. tasmanica Engelm.

KP (Werribee)

KP (Altona & Laverton), L. Goldsmith

BORAGINACEÆ

Cynoglossum australe R. Br.

C. suaveolens R. Br.

Myosotis australis R. Br.

Plagiobothrys elachanthus (F. Muell.)

I. M. Johnston

TH, E

KP, S, SR, N, E, C

KP (Little R.), LF, N, E

Lara

VERBENACEÆ

Verbena officinalis L.

KP (Deep Ck), S, C (Kingston)

LABIATÆ

Ajuga australis R. Br.

Teucrium racemosum R. Br.

Mentha australis R. Br.

M. diemenica Spreng.

M. laxiflora Benth.

Lycopus australis R. Br.

Scutellaria humilis R. Br.

Prunella vulgaris L.

KP, SR, TH, N, BC, E

KP (Little R.)

KP, S, LF, P, E, WF

KP (Bulla), LB, SR

E

LF, Daylesford

KP (Jackson's Ck), TH, E

KP, LF, C

SOLANACEÆ

Solanum nigrum L.

S. aviculare Forst. f.

S. laciniatum Ait.

Nicotiana suaveolens Lehm.

KP, S, LF, P, LB, SR, TH, N, BC, E, WF, C

KP, LF, SR, N, BC, E, JP

P, TH, WF, C (Kooroocheang Falls)

KP

SCROPHULARIACEÆ

Mimulus repens R. Br.

Gratiola peruviana L.

Limosella aquatica L.

Veronica derwentia Andr.

V. gracilis R. Br.

V. calycina R. Br.

aq., KP, S, SR, TH, B

KP, LF, SR, C

aq., KP, SR, Colac, Beeac, C

LF, TH, E, C

KP, Beeac

KP (Little R.), SR

LENTIBULARIACEÆ

Utricularia dichotoma Labill.

U. flexuosa Vahl

aq., KP

aq., 'swamps between L. Colac and Birregurra'

MYOPORACEÆ

Myoporum deserti A. Cunn. ex Benth.

M. viscosum R. Br.

M. insulare R. Br.

M. parvifolium R. Br.

KP

KP, E

KP, TH

aq., KP ('once at Newport'), Colac, Camperdown

PLANTAGINACEÆ

Plantago varia R. Br.

KP, S, LF, N, C

RUBIACEÆ

Coprosma hirtella Labill.

C. quadrifida (Labill.) Robinson

Asperula conferta Hook. f.

A. scoparia Hook. f.

Galium gaudichaudii DC.

Nertera reptans (F. Muell.) Benth.

Mt Warrenheip & Mt Rouse, E

WF

KP, S, SR, E

N, E

KP, S, SR, BC, E, WF, C

Colac, H

CAPRIFOLIACEÆ	
<i>Sambucus gaudichaudiana</i> DC.	KP, LF, SR, TH, E, WF, C (Creswick Ck Gorge)
CAMPANULACEÆ	
<i>Wahlenbergia bicolor</i> Lothian	KP, S, LF, P, LB, SR, C, B
<i>W. consimilis</i> Lothian	KP, E
<i>W. tadgellii</i> Lothian	KP, N, E
<i>W. quadrifida</i> (R. Br.) Alph. DC.	KP, LF, N, E
LOBELIACEÆ	
<i>Lobelia alata</i> Labill.	aq., KP, S, TH, WF
<i>L. pratioides</i> Benth.	KP, L. Corangamite, Mt Elephant, Mt Emu Ck, H
<i>Pratia concolor</i> (R. Br.) Druce	aq., KP, Colac, B
<i>P. platycalyx</i> (F. Muell.) Benth.	aq., TH, L. Corangamite, Mt Elephant, Penshurst
<i>P. pedunculata</i> (R. Br.) Benth.	Mt Elephant, N, E
<i>Isotoma fluviatilis</i> (R. Br.) F. Muell.	aq., KP, LF, WF, C
ex Benth.	
GOODENIACEÆ	
<i>Goodenia ovata</i> Sm.	KP, Heywood
<i>G. geniculata</i> R. Br.	KP (Little R.)
<i>G. pinnatifida</i> Schlechtendal	KP, S, C
<i>G. heteromera</i> F. Muell.	KP (Little R.)
<i>G. gracilis</i> R. Br.	KP (Little R.)
<i>G. humilis</i> R. Br.	KP (Werribee), H
<i>Velleia paradoxa</i> R. Br.	KP, S
<i>Selliera radicans</i> Cav.	aq., KP, TH
STYLIDIACEÆ	
<i>Stylidium despectum</i> R. Br.	KP ('beyond Little R.')
<i>S. graminifolium</i> Swartz	KP, S
<i>Levenhookia dubia</i> Sond. in Lehm.	KP, Beeac
COMPOSITÆ	
<i>Lagenophora stipitata</i> (Labill.) Druce	H, N, E
<i>Solenogyne belliioides</i> Cass.	KP, S, LF, C
<i>Brachycome decipiens</i> Hook. f.	KP
<i>B. cardiocarpa</i> F. Muell. ex Benth.	KP (Darebin Ck), H
<i>B. leptocarpa</i> F. Muell.	KP, C
<i>B. graminea</i> (Labill.) F. Muell.	KP
<i>B. parvula</i> Hook. f.	KP (Little R.)
<i>B. diversifolia</i> (R. Graham ex Hook.) Fisch, et C. Mey.	KP (Braybrook), Beeac
<i>B. readeri</i> G. L. Davis	Penshurst
<i>B. debilis</i> Sond.	KP (Little R.), Beeac
<i>B. marginata</i> Benth.	KP
<i>B. perpusilla</i> (Steetz) J. M. Black	KP (Werribee), Beeac, H
<i>Minuria leptophylla</i> DC.	KP
<i>Calotis scapigera</i> Hook.	KP
<i>C. scabiosifolia</i> Sond. et F. Muell.	KP (Werribee & Little R.)
<i>Vittadinia triloba</i> (Gaudich.) DC.	KP, S, C, B
<i>Olearia argophylla</i> (Labill.) Benth.	SR, TH
<i>O. decurrens</i> (DC.) Benth.	KP (Bulla)
<i>Sigesbeckia orientalis</i> L.	KP, E
<i>Cotula coronopifolia</i> L.	aq., KP, S, Colac, TH, JP, WF, C
<i>C. vulgaris</i> Levyns	KP, Mt Emu Ck, Beeac
<i>C. australis</i> (Sieber ex Spreng.) Hook. f.	KP, N, E
<i>C. reptans</i> (Benth.) Benth.	KP, S. Colac, Mt Elephant
<i>Centipeda minima</i> (L.) A. Br. & Aschers.	H
<i>C. cunninghamii</i> (DC.) A. Br. & Aschers.	KP, LF, P, WF, C
<i>Isoëtopsis graminifolia</i> Turcz.	KP, H, C
<i>Stuartina muelleri</i> Sond.	KP, BC, E
<i>Gnaphalium luteo-album</i> L.	KP, P, SR, TH, N, E, WF

<i>G. japonicum</i> Thunb.	LF, SR, N, E
<i>G. involucreatum</i> Forst. f.	KP, LF, SR, E
<i>G. purpureum</i> L.	KP (Sydenham)
<i>G. indutum</i> Hook. f.	JP, C
<i>Cassinia longifolia</i> R. Br.	KP (Werribee), BC, E
<i>C. aculeata</i> (Labill.) R. Br.	KP, SR
<i>Helipterum albicans</i> (A. Cunn.) DC.	KP (Little R.), Streatham
<i>H. anthemoides</i> (Sieber ex Spreng.) DC.	KP (Sydenham)
<i>H. corymbiflorum</i> Schlechtendal	KP (Sydenham)
<i>H. australe</i> (A. Gray) Druce	KP
<i>H. demissum</i> (A. Gray) Druce	KP (Werribee)
<i>Ixiolana leptolepis</i> (DC.) Benth.	KP, C
<i>Helichrysum scorpioides</i> Labill.	KP, C
<i>H. rutidolepis</i> DC.	KP (Little R.)
<i>H. apiculatum</i> (Labill.) DC.	KP, S, C, B
<i>H. semipapposum</i> (Labill.) DC.	KP, LF, P, BC, B
<i>H. dendroideum</i> N. A. Wakefield	SR, TH, N, E, WF
<i>H. rosmarinifolium</i> (Labill.) Benth.	H
<i>Leptorhynchus tenuifolius</i> F. Muell.	KP, S
<i>L. squamatus</i> (Labill.) Lessing	KP, S, LF
<i>L. panætioides</i> (DC.) Benth.	KP (Sydneyham)
<i>L. elongatus</i> DC.	C (N. Creswick)
<i>Millotia tenuifolia</i> Cass.	KP
<i>Rutidosia leptorhynchoides</i>	KP (St Albans & Sydenham), Craigie
<i>R. multiflora</i> (Nees) Robinson	KP, S, C
<i>Podolepis jaceoides</i> (Sims) Druce	KP
<i>Myriocephalus rhizocephalus</i> (DC.) Benth.	KP, H, C
<i>Angianthus preissianus</i> (Steetz) Benth.	KP (Altona), Streatham
<i>Calocephalus lacteus</i> Brongn.	KP, S
<i>C. citreus</i> Brongn.	KP, S, C
<i>Craspedia uniflora</i> Forst. f.	KP, Beeac, C
<i>C. chrysantha</i> (Schlechtendal) Benth.	KP
<i>Senecio lautus</i> Forst. f. ex Willd.	KP, LF, SR, TH, N, BC, E, JP, WF
<i>S. linearifolius</i> A. Rich.	KP, LF
<i>S. platylepis</i> DC.	Beeac
<i>S. glossanthus</i> (Sond.) R. O. Belcher	KP
<i>S. cunninghamii</i> DC.	KP (Little R., Digger's Rest)
<i>S. odoratus</i> Hornem.	SR, TH, E
<i>S. biserratus</i> R. O. Belcher	H
<i>S. minimus</i> Poir.	LF, SR, E
<i>S. hispidulus</i> A. Rich.	KP, P, ? SR.
<i>S. glomeratus</i> Desf. ex Poir.	SR, N
<i>S. quadridentatus</i> Labill.	KP, S, LF, P, LB, SR, BC, E, WF, C
<i>S. squarrosus</i> A. Rich.	KP (Little R.), H
<i>Cymbonotus preissianus</i> Steetz	KP, Beeac, E, WF, C
<i>Microseris lanceolata</i> (Walp.) Schult.-Bip.	KP, near Mt Warrenheip & Mt Elephant, Beeac, L. Calvert



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