

THE
PROCEEDINGS
OF THE
LINNEAN SOCIETY
OF
NEW SOUTH WALES,
VOL. IV.,
[WITH TWENTY-SEVEN PLATES.]



SYDNEY:
PRINTED AND PUBLISHED FOR THE SOCIETY BY
F. W. WHITE, 39 MARKET STREET,
AND SOLD BY THE SOCIETY,
1880.

WEDNESDAY, MARCH 25TH, 1879.

The Rev. J. E. Tenison-Woods, F.G.S., etc, President, in the Chair.

DONATIONS.

The Illustrated Monograph of the Grasses of Queensland, from the Board of Inquiry into the Causes of Disease in Live Stock and Plants, Brisbane.

Vol. I., Part 3, of the Australian Medical Journal,—from the Medical Society of Victoria.

PAPERS READ.

ON THE RELATIONS OF THE BRISBANE FLORA.

By THE REV. J. E. TENISON-WOODS, F.G.S., F.L.S., &c., &c.

Now that the great work of cataloguing our Australian Flora has been concluded, and that the *Flora Australiensis* of Bentham and Mueller is a standard of reference to which recourse can easily be had, the preparation of local floras will be the first care of Australian botanists. Until this is done, the real character of Australian vegetation will hardly be manifest. At present our knowledge does not go much further than an enumeration of species. Their geographical distribution has hardly been touched upon. Information as to the habitat where each specimen has been found is of course given in the "Flora," but the range of the species is not attempted. It could not be, indeed, without rendering the work inconveniently bulky, and as yet the information at the disposal of Mr. Bentham for the purpose is necessarily very small. Nor can this deficiency be remedied until a very large number of local floras have been published, and for this I suppose we shall have to wait many

years. In the mean time what is very important is to have a good census made at certain important stations, such as Port Jackson, and at distinct points on the coast, and in the interior, where marked differences might be expected. This, of course, will be a work of considerable time and care, and we must look for its accomplishment only when botany shall have become a more popular study, and when the colonies can boast of a larger number of scientific votaries than they now possess. We may wonder, however, that Sydney has not had a census of its plants made. But this is a desideratum which will soon, no doubt, be supplied. Tasmania has recently been favored by a very elaborate census from the hands of Baron von Mueller, a census which, as it was made under his care, and with the benefit of his vast experience and knowledge, must be ever regarded as the most valuable that could be composed. Brisbane has for the last few years had the advantage of a resident botanist of wide experience, and whose long acquaintance with the Australian and New Zealand flora, eminently qualified him as a careful collector. This is our hon. member Mr. F. M. Bailey, F.L.S., who has collected in almost every part of Queensland, and examined every district of the colony with the greatest deliberation and care. I had the advantage of benefitting by his experience in many a botanical ramble near Brisbane, and in a special excursion along the northern coast within the tropics, including Port Mackay, Port Denison, and Cleveland Bay. He has also been employed by the Government in preparing a herbarium, and consequently has had opportunities of becoming thoroughly acquainted with the local flora of Brisbane. After much consideration, Mr. Bailey has agreed with me that the census of the flora would be about the most valuable we could select in Queensland. The station is sub-tropical, and exactly intermediate between the very characteristic Australian features of Port Jackson and the tropical and almost Asiatic aspect of the more northern portions of the colony. The radius of the district we

include is 24 miles round the city, which is in Lat. $27^{\circ} 28'$. This radius gives us the sea coast near Moreton Bay, and an approach to the mountain flora of the table land. The tract is well watered by rivers, and enriched by that dense vegetation known as river scrubs. We thus have considerable tracts of marshy ground both fresh and salt, and though we include no mountain range of any height above a thousand feet, yet there are hills and rises sufficient to give a dry soil with the diversified flora we might expect upon elevated ridges. In the scrubs we have a moisture and deep shade which in this climate is favorable to the growth of any tropical plant, and the range of the temperature and the rainfall are all favorable to the growth of any plant which would flourish in a much warmer latitude. The annual rainfall is about 51 inches. The mean temperature 75° F. maximum in shade 104° , minimum in shade 36° .

Before giving any of the results of the examination of the census which follows, it may be useful to make one or two observations. It should be borne in mind that a census refers only to orders, genera, and species, and takes no account of the prevalence of individuals. Thus an exceptional plant which is outside the usual features of the order and genus to which it belongs, may be a very rare plant, yet its peculiarities give a name and character to the flora, while a world-wide species which is common everywhere is not taken into account. And thus it is that very distinct botanical provinces may bear no marked peculiarity externally. A stranger from Europe would see nothing especially attracting his attention in the flora of Brisbane, except perhaps its luxuriance and verdure. He would see the fields and open spaces covered with grass, and the trees, except for their darker or richer foliage, not unlike what he had been accustomed to elsewhere. He would see the same weeds growing much in the same places, and in the same abundance that he saw around his own house, and unless he were a very close observer, he would hardly detect the peculiarities of some

of the tropical stragglers. And this resemblance points to a remarkable fact that must be taken into account in estimating the Australian flora. We have both in genera and species a certain amount of world-wide forms, and these are for the most part species which are richest in individuals as well. If we were, for instance, to take away the grasses, ferns, sedges, and rushes, (*Juncea*, &c.) from the Brisbane flora, its connection with the floras of other parts of the world would seem very slight, but in the absence of such members of a flora, the aspect of the country would be a desert indeed. Take them all in all, therefore, our resemblances are greater than our differences, and this must limit our notions of the exclusive peculiarities of the Australian flora.

We must next enquire what are the peculiarities of this flora. I cannot do better in this matter than enumerate those stated by Dr. Hooker in his admirable essay, which forms the introduction to the Flora of Tasmania. He says the chief peculiarities of the Australian flora are that it contains more genera and species peculiar to its own area, and fewer plants belonging to other parts of the world than any other country of equal extent. About two-fifths of its genera, and upwards of seven-eighths of its species are entirely confined to Australia. Many of the plants have a very peculiar habit or physiognomy, giving in some cases a character to the forest scenery, (as *Eucalypti*, *Proteaceæ*, *Acaciæ*, *Casuarinæ*, *Coniferæ*,) or are themselves of anomalous or grotesque appearance (as *Xanthorrhæa*, *Kingia*, *Delabechia*, *Casuarina*, *Banksia*, *Dryandra*, &c.) A great many of the species have anomalous organs, as the pitchers of *Cephalotus*, the deciduous bark, and remarkable vertical leaves of the *Eucalypti*, the phyllodia of *Acacia*, the fleshy peduncle of *Exocarpus*, the inflorescence and ragged foliage of many *Proteaceæ*. Many genera and species display singular structural peculiarities, as the ovules of *Banksia*, calyptra of *Eucalyptus*, stigma of *Goodeniaceæ*, staminal column of *Stylidium*, irritable labellum of

various *Orchideæ*, flowers sunk in the wood of some *Leptospermeæ*, pericarp of *Casuarina*, receptacle and inner staminodia of *Eupomatia*, stomata of *Proteaceæ*.

There are no natural orders restricted to Australia except *Tremandriæ*,* which though confined to this continent has much affinity with *Pittosporæ* (through *Cheiranthra*), as well as *Polygalæ*. But there are certain natural orders called Australian, not because they are restricted to Australia, but because they are best represented there, and rare elsewhere. They are *Stackhousiæ*, containing only about 20 species, and of which representatives are found in N. Zealand, and the Philippine Islands; *Goodeniaceæ*, very closely allied to *Campanulaceæ* and *Lobeliaceæ*; *Stylidiæ*, the same; *Epacridæ*, an order almost confined to Australia; those species found outside belonging to four of the 24 Australia genera, except one S. American species, and one or two from N. Caledonia, which might almost be referred to the Australians; and *Casnamie*, an order which has only a single genus. There are very few species which are not Australian. There are also two sections of *Junceæ*, which were regarded as orders by Hooker, *Xeroteæ* and *Aphyllanthææ*. There are other orders not strictly Australian, but which are largely developed on the Continent, and are more or less characteristic of its vegetation. These are *Dilleniaceæ*, *Rutaceæ*, *Proteaceæ*, *Restiaceæ*, *Thymelææ*, *Droseraceæ*. Two other orders were included by Hooker, but they are only regarded as sections of *Amaryllideæ*, and *Sterculiaceæ*. With the exception of *Dilleniaceæ*, which after Australia abounds most in India, all the other orders are abundant in South Africa next to Australia.

We must remember however that these Australian features are developed more in the South-west part of the Continent than elsewhere, and that the Tropics contain them in the smallest proportion. Of the very Australian genera, only one (*Epacridæ*)

* *Brunoniaceæ* was also included by Hooker, but this as depending upon one species has been included as a very aberrant form of *Goodeniaceæ*.

obtains its developement in the South-east, the rest have their maximum in the South-west.* None of those orders which are either peculiar to Australia, or have their greatest developement in Australia, or which are peculiarly characteristic of the continental flora; none of these have their maximum in the Tropics. But on the other hand in those large orders which are well represented in Australia, but which are not peculiar to it, we find the greatest number in the Tropics of the Continent.

These facts will prepare us for some of the facts which an examination of the Brisbane flora will manifest. We must remember that we are dealing with the least Australian portion of its flora, or rather the confines of the least Australian portion. Dr. Hooker in his essay, brings the tropical flora on the East side as far South as Brisbane, and on the West side, still lower. If it be understood by this that the majority of the species found within these limits are tropical, or such as are usually found in the Tropics, it would not be correct, as far as Brisbane is concerned. The flora there is strictly intermediate; the tropical and temperate Australian species are about equally divided. There are in fact about an equal number of the plants found in the Brisbane flora, which extend into New South Wales on the one hand, or into the Tropics on the other.

In the Brisbane flora we have 123 Nat. orders, 633 genera and 1228 species. This gives an average of 5 genera and 10 species nearly for each order, and about 2 species for each genus. The flora in itself is seen from these figures to be somewhat large and very diversified. It is however, less than Great Britain, which numbers about 1400 flowering plants. In this it is in harmony with the whole flora of Australia, which in proportion to its extent is also very large and diversified. Comparing it numerically with Tasmania it is very much superior. Hooker gives the numbers

* This must only be regarded as approximate, because when local floras are published some of the orders may be found to have their maximum intermediate between the S. E. and S. W. extremities of the Continent.

thus:—Orders 93, Genera 394, (not including *Filices*) and species 1063. According to Baron von Mueller in the census published in the Proceedings of the Royal Society for 1874, the orders were about the same; the genera, including *Filices*, were raised in number to 501, and the species reduced to 979. The way to account for this discrepancy is to bear in mind that in the early appreciation of a flora many varieties are mistaken for species. The number of genera are much reduced by Mueller, but new discoveries have since been made of plants extending to Tasmania which were not supposed to exist there. We might say generally that the plants of Tasmania are about 1000, and the genera would average about two species to each or half the number of plants. This corresponds with what is generally known of islands. The total number of species seems to be invariably less than any given continental area of equal extent, and the number of genera in proportion to species is also relatively larger. I shall presently make a closer examination of the relations between the Tasmanian flora and that of Brisbane, but I will first try to point out the peculiarities of the latter, proceeding from orders to genera and species.

If we compare the natural orders in Australia, first we find according to Hooker, that the proportion which the largest Natural Orders bear to the flora of the whole world, gives us the following, arranged according to their numerical preponderance. *Compositæ*, *Leguminosæ*, *Gramineæ*, *Orchideæ*. In Brisbane we have the same orders, but in the following order *Leguminosæ*, *Gramineæ*, *Compositæ*, *Orchideæ*. For Australia generally, it is *Leguminosæ*, *Myrtaceæ*, *Proteaceæ*, *Compositæ*. This shows that the flora of Brisbane is more in union with the world-flora generally than with Australia—a result quite in harmony with the preceding conclusion, taken from its tropical character. Taking nine of the principal orders in their numerical order, from the flora of the world, we have the following:—*Compositæ*, *Leguminosæ*, *Gramineæ*, *Orchideæ*, *Rubiaceæ*, *Euphorbiaceæ*, *Labiataæ*, *Myrtaceæ*,

Cyperaceæ. For Australia it is *Leguminosæ*, *Myrtaceæ*, *Proteaceæ*, *Compositæ*, *Gramineæ*, *Cyperaceæ*, *Epacrideæ*, *Goodeniaceæ*, *Orchideæ*. Again we find that the Brisbane list is near to the world's flora, or a normal character, though as the list is extended we begin to see the evidence of an Australian character. The order is *Leguminosæ*, *Gramineæ*, *Compositæ*, *Orchideæ*, *Euphorbiaceæ*, *Liliaceæ*, *Cyperaceæ*, *Myrtaceæ*, *Rubiaceæ*. In the predominance of the *Liliaceæ* there is a feature of the African flora, but in no other point is there any resemblance. In the position of *Euphorbiaceæ* there is an Indian resemblance, but *Rubiaceæ* takes the second place in that flora.

These are of course only very rough and general estimates, but they begin to reveal the remarkable character of the flora of Brisbane. I will now give a list of eleven Natural Orders with the number of genera and species in each, including the ferns which are not included in any of Hooker's estimates, but which play a very important part in the vegetation of the neighbourhood of Brisbane. A far more important part indeed is played by them in Brisbane than Tasmania, where it is generally admitted they influence in a very striking manner the vegetation and the scenery.

If we take the natural orders according to the way they are specifically represented in the Brisbane flora, we have the following list:

	SPECIES.		GENERA.
1 Leguminosæ.....	115	..	51
2 Gramineæ.....	19	..	49
3 Cyperaceæ.....	79	..	19
4 Filices.....	66	..	25
5 Orchideæ.....	59	..	31
6 Compositæ.....	58	..	41
7 Myrtaceæ.....	53	..	15
8 Euphorbiaceæ.....	40	..	24
9 Liliaceæ.....	26	..	20

		SPECIES.		GENERA.
10 Rubiaceæ.....	24	..	15	
11 Rutaceæ.....	22	..	13	
12 Epacrideæ.....	21	..	10	
13 Proteaceæ.....	21	..	11	

Let us now take the Tasmanian flora as a representative of the vegetation of South-east Australia:

		SPECIES.		GENERA.
6 Compositæ.....	106	..	28	
5 Orchideæ.....	71	..	27	
12 Epacrideæ.....	62	..	11	
1 Leguminosæ.....	59	..	20	
3 Cyperaceæ.....	56	..	14	
4 Filices.....	49	..	23	
2 Gramineæ.....	42	..	17	
9 Liliaceæ.....	28	..	18	
7 Myrtaceæ.....	26	..	8	
13 Proteaceæ.....	23	..	12	
11 Rutaceæ.....	18	..	5	
10 Rubiaceæ.....	14	..	5	
8 Euphorbiaceæ.....	10	..	9	

Here the same orders have the position very much altered, and some cannot be considered so representative or characteristic as *Goodeniaceæ*, sp. 13, gen. 6; *Thymeleæ*, sp. 18, gen. 3; *Umbelliferæ*, sp. 21, gen. 12; *Scrophularinæ*, sp. 18, gen. 8; *Labiataæ*, sp. 14, gen. 8. The same orders at Brisbane are only poorly represented. *Goodeniaceæ* has sp. 11, gen. 5; *Thymeleæ*, sp. 4, gen. 2; *Umbelliferæ*, sp. 14, gen. 8; *Scrophularinæ*, sp. 8, gen. 7; *Labiataæ*, sp. 9, gen. 7. Some of all the preceding are introduced.

On the other hand we have the following unexceptionally common Indian orders represented in the Brisbane flora. *Anonaceæ*, *Menispermææ*, *Celastrinææ*, *Melastomaceææ*, *Araliaceææ*, *Myrsinææ*, *Acanthaceææ*, *Dioscorideææ*, which are entirely absent from the Tasmanian flora.

Turning now to the genera, we find that out of 1300 which are given by Hooker as the number for all Australia, about half are found in the Brisbane flora, which is a very large proportion. Between 500 and 600 of the whole Australian flora are endemic, but a much smaller portion are endemic in Brisbane. The proportion is about 20 per cent, while nearly half belong to genera which are found all over the world. The following table will show the generic character of the flora at one glance:

Genera found in Australia.. ..	20 per cent.
Ditto ditto in Australia and Asia, ..	24 per cent.
Ditto ditto in Pacific	9½ per cent.
Ditto ditto in Australia and Africa ..	9½ per cent.
Ditto ditto in Australia and Madagascar	1 per cent.
Ditto ditto in America	6½ per cent.
Ditto ditto in New Zealand	5 per cent.
Ditto widely distributed	45 per cent.
Tropical genera	16 per cent.
Genera found generally in warm climates	9 per cent.

These proportions must not be understood to be exclusive, that is to say, some of the Indian and Australian genera may appear also in the African percentage, because existing there as well. By tropical genera is meant, found generally in tropical countries. This per centage also appears in the genera entered above as 'widely distributed,' as also in those found 'in warm climates.' So in reality 25 of the 45 per cent. of genera widely distributed, are the inhabitants of warm climates, such as Brisbane or else the tropics. The proportion of the tropical genera does not warrant us in regarding the Brisbane flora as a tropical one.

Of the Australian genera, that is to say those most abundantly represented in Australia, I make the following list, which are arranged nearly in the order of their abundance:—*Acacia*, *Eucalyptus*, *Melaleuca*, *Leucopogon*, *Stylidium*, *Grevillea*, *Hakea*, *Pimelea*, *Goodenia*, *Persoonia*, *Pultenaea*, *Daviesia*, *Olearia*, *Boronia*, *Banksia*, *Dryandra*, *Lepidosperma*, *Xerotes*, *Dodonaea*, *Drosera*,

Dampiera, *Helichrysum*, *Trichinum*.* Of these *Dryandra* (*Proteaceæ*) and *Trichinum* are not represented at all, and with the exception of *Acacia* and *Eucalyptus*, the rest are all poorly represented.

The following table will show the representative genera in the Brisbane flora:—

GENUS.	SP. IN BRISBANE.	TASMANIAN SP.
<i>Panicum</i>	21	0
<i>Acacia</i>	20	17
<i>Cyperus</i>	19	1
<i>Eucalyptus</i>	16	11
<i>Dendrobium</i>	11	1
<i>Solanum</i>	9	2
<i>Polygonum</i>	9	5
<i>Carex</i>	9	12
<i>Leucopogon</i>	8	9
<i>Phyllanthus</i>	8	2
<i>Polypodium</i>	8	4
<i>Pteris</i>	8	5
<i>Loranthus</i>	8	(?) 0
<i>Pultenaea</i>	8	13
<i>Melaleuca</i>	7	4
<i>Andropogon</i>	7	0
<i>Persoonia</i>	6	2
<i>Lindsaea</i>	6	1
<i>Desmodium</i>	6	1

If we compare some of these figures with the number of species of some of the same genera in S. Australia and S. West Australia according to Hooker, the result is very striking.

GENUS.	SP. IN W. AUSTRALIA.	SP. IN S.E. AUSTRALIA.
<i>Acacia</i>	99	133
<i>Eucalyptus</i>	46	55
<i>Leucopogon</i>	70	50

* Some of these have 100 species in Australia, and none less than 50.

GENUS.	SP. IN W.	SP. IN S.E.
	AUSTRALIA.	AUSTRALIA.
Pultenaea.....	15	50
Melaleuca	100	27
Persoonia	25	40

It must be remarked, however, that a great many changes will have to be made in Hooker's tables, especially with regard to the genera, as many which he regarded as confined to S.W. Australia, occur in the census subjoined for Brisbane. Of this *Jacksonia* and *Chorizema* are instances, and many others might be cited as common to S.E. and S.W. Australia.

In this essay I am gradually comparing the relations of the Brisbane flora, proceeding from the general to the particular, and hitherto the comparison, as far as orders and genera are concerned, can only be regarded as a very general and rough estimate. When we come to the comparison of species, the results are much more reliable, but they bear out all that has previously been concluded, thus showing that rough as the previous methods are, they are still in general accordance with the facts. This is the more remarkable if we advert to the fact that in botany generic distinctions are made on very slight grounds, and that the grouping into natural orders is made on the basis of a very general and sometimes loose resemblance. Yet it does seem remarkable that when we have made certain groups of plants founded on some slight peculiarity, that this peculiarity is found to affect generally certain prescribed geographical limits. Take as an instance the genus *Brachycome* (*Compositæ*), which is only distinguished from *Bellis* by the dry or scarious margins of the involucre bracts. Yet such a peculiarity is confined to Australia and N. Zealand (three species only), and one S. African, while *Bellis* is scarcely found outside the Mediterranean region. *Bedfordia* is an Australian *Senecio*, with a stellate tomentum, and an axillary inflorescence; yet in the very large and widely distributed genus *Senecio*, numbering

perhaps 460 species, and occurring abundantly in every country in the world, this peculiarity is only seen in the two species of *Bedfordia*, and in South-east Australia and Tasmania only. Sometimes, however, genera appear in very isolated positions with reference to the main body of its congeners. We have instances of this in many orders, but more commonly in those less highly organized, as the phrase is, though the lower organization is not very evident. Such instances are not numerous enough to affect the general result.

We come now to the estimate of the species. These may be divided, first into species which are common to New South Wales and Queensland. Of such the flora includes about one-third of its whole number. But in this estimate some of those plants are included which extend into the tropics as well, and some which are not much more than on the Northern confines of the neighbouring colonies. A very much smaller proportion, about 12½ per cent. extend into the island of Tasmania, and all of these extend into the colony of Victoria as well. There are some which extend into Victoria and not into Tasmania; these form about 10½ per cent of the whole. A few are found in South Australia and not in either Victoria or Tasmania, but the number is very small, and when such instances do occur they are always found on the Northern or almost tropical boundaries of the remote colony and not near the coast. It must be remembered that the flora of Eastern Australia is very different according to the side of the dividing range on which the estimate is made. If on the coast side, it is of a character more in unison with the flora of Brisbane, and possesses features which are maintained to a certain extent with Tasmania and Victoria, south of the great divide. It is in these features that the per centage of species common to the four colonies are found. The flora of the west side of the divide is more or less of a desert character, especially as we proceed further from the watershed. The Brisbane flora has very few representatives of this part of the continent, or rather

it should be said, has very few species which extend so far inland, and these are the only direct points of contact between it and the South Australian flora. There are however about 12 per cent of species which are found in all the colonies as far even as Western Australia. It is only in such instances that there is anything in common between the flora of Brisbane and that of West Australia. The plants are common in all Australia. Sometimes they are common all over the world as well, but sometimes they are typical Australian species, but found in every part of the continent. There is no instance of a typical West Australian species in the Brisbane flora.

About eight per cent of the Brisbane plants are common and widely distributed over the globe, but this estimate includes the introduced plants. Some of these are equally widely spread in Australia, but not all, because some are Asiatic or African weeds and only found in sub-tropical climates.

The tropical element in the flora forms about one-third of the whole. This shows how thoroughly intermediate in character it is. We have seen that the New South Wales, or as we may express it, the South-east Australian element forms also one-third of the flora. But the tropical element is of a varied character, partly littoral, and partly belonging to dry and somewhat elevated lands. In it we find nearly 14 per cent of species which extend into Asia, for the most part into the Malayan Peninsula, or Indian Archipelago, though some extend also into China and India. Fully $3\frac{1}{2}$ per cent are common to Africa and Brisbane, but none of these species are found in Africa without occurring in Asia as well, though for want of definite information the intermediate stations appear very remote. Of species which are common in America there are only $2\frac{1}{2}$ per cent., and were all the introduced plants eliminated from the estimate, the American element would be probably reduced to nil. That is to say of purely American forms, because a good many plants which I have classed as widely distributed are to be found in America as in other places.

Pacific species occur to the extent of a fraction over six per cent. The localities are various. New Caledonia is probably the island which furnishes the largest number of species, though some are found in the islands near the North-east Coast. There is a smaller number of species common to New Zealand and Brisbane: in all not quite five per cent. Considering the immense distance between the two places and the amount of sea which intervenes, it is an astonishing thing that the per centage is so high.

In all these estimates it must be borne in mind that the widely spread species are to be found amongst the grasses, ferns, sedges, and rushes, and if these were eliminated from the calculation, the per centage of species which are common to Brisbane and other portions of the world, would be reduced one third for every place except other parts of Australia. Or in other words it is very largely in the grasses, sedges, rushes, and ferns that the flora of Brisbane has any representatives outside the continent. If moreover, we were to remove the common weeds and introduced plants the isolation of the Brisbane flora from all except Australia would be much more complete, and though its resemblances (generic) would be many and wide, its actual specific union would be with the nearest portions of the Asiatic continent.

For comparison, it may be well to insert here Baron v. Mueller's valuable report on the tropical vegetation of Australia, from Gregory's exploration to the sources of the Victoria River, North Australia. It may be remembered that the Baron was the botanist to this expedition, and his report the most valuable we have yet on the vegetation of Northern Australia. He says,

1. "The various arboreous and shrubby clothing of the Eastern slopes of the Eastern Ranges, where numerous Indian genera of umbrageous trees are interspersed with Australian; this, called, the "Brushwood" or Cedar country, further contains the most numerous representatives of the Polynesian and Malayan floras; together with *Cycas* 30 feet high, and various palms of the genera *Calamus*, *Areca*, *Caryota*, and *Livistona*.

2. The "Brigalow Scrub" extends over the elevated sandstone plains west of the Coast Range in East Australia, as far as Newcastle Range, (Lat. 18° to 20°). This is also a very varied vegetation, chiefly of small trees and shrubs of *Cappariidæ*, *Pittosporidæ*, *Bauhinia*, *Sterculiaceæ*. Here *Delabechia* and *Brachychiton*, form a remarkably secondary feature; distinguished as the Bottle-tree Scrub, from their tumid trunks. This vegetation extends from the Burdekin to Upper Darling Rivers, and ceases somewhere about the Lower Barcoo country.

3. Open downs of basalt, nearly destitute of trees, except along the watercourses. The vegetation is chiefly herbaceous and much of it is annual; the soil is rich, and after the rains produces a luxuriant crop of excellent grass and herbaceous plants.

4. The desert presents various assemblages of plants according as the soil is saline, clay or sand, but the plants are almost the same as those of extratropical Australia, with the exception of various species of *Portulacca*, *Solanum*, *Euphorbia*, *Cassia*, *Gomphrena*, *Ptilotus*, *Trianthema*, *Aylmeria*, and other *Paronychiæ*.

5. The sandstone tableland presents an arid, cheerless landscape described by the learned Baron in terms, says Dr. Hooker, which apply perfectly well to the sandstone tablelands of the peninsula of India, and indeed many of the characteristic genera are common to both. These consist of *Terminalia*, *Melia*, *Cochlospermum*, *Sterculia*, *Buchanania*, *Zizyphus*, *Nauclea*, *Bauhinia*, *Indigofera*, *Erythrina*, *Gardenia*, *Strychnos*, *Santalum*, a profusion of Andropogoneous grasses and other shrubs and herbs, all of which the Indian botanist recognizes at once as the prominent features of the sandstone ranges of Western Bengal and Central India.

6. The sea coasts are chiefly tenanted by an Indian vegetation consisting of *Avicennia*, *Rhizophoræ*, *Pandaneæ*, *Spinifex*, *Loysia*, *Surinna*, *Ægiceras*, *Pemphis*, *Tribulus*, together with *Colubrina*, *Iapomæa*, &c."

Baron v. Mueller has also stated that nearly 250 of the species occurring in the Colony of Victoria extend north of the latitude

of Moreton Bay. Of these Dr. Hooker says about 90 are found in Tasmania. The Brisbane flora which we may also call that of Moreton Bay, is however a littoral, or almost littoral one, and we should not consider it strictly as tropical as Dr. Hooker himself observes.

In the Brisbane flora we find about $4\frac{1}{2}$ per cent of species which are peculiar to Queensland. They have not been found even on the confines of N.S. Wales, which it must be remembered is not 200 miles from Brisbane. This is rather a large per centage of endemic plants for such a locality.

The careful examinations of Mr. Bailey have added nearly 50 plants to the Brisbane flora, and about a dozen of these had not previously been found in Queensland.

It is not necessary for me to say anything about the introduced plants, as they have been ably dealt with in a preceding paper by Mr. Bailey himself. I may observe, however, that he quite agrees with me in thinking that the evidence of introduction is far from being well established in every case. *Verbena bonariensis* is a case in point. When the unfortunate Dr. Leichhardt started on his overland journey to Port Essington, this plant was so spread over some of the first country he explored, that he named it in consequence Vervain Plains. This may have spread from the settled districts, but only five or six years had elapsed since the Darling Downs had been inhabited by a very few settlers.

I should like to be able to add something about the useful qualities, either industrial or medicinal, of the Brisbane flora, but on this subject I have very little information. One of the most painstaking and industrious enquirers into this subject has been Dr. Bancroft. He has discovered the wonderful therapeutic properties of the *Duboisia myoporoides*, which bids fair to supersede Belladonna in medicine. The same indefatigable gentleman has made some interesting experiments on the various species of

Cassia around Brisbane, and has found that they are quite similar to *Senna* in their properties. *Macadamia ternifolia*, the Queensland nut, is really a valuable fruit. *Eugenia Smithii*, or Lillipilli, and *Melodorum Leichhardtii* are also fair eating. The latter goes by the name of the native banana, though it is very different from a banana, and in reality allied to the custard apple. *Citrus Australis* is also a passable native orange.

The flora of Brisbane contains many very elegant additions to the flower garden. No one who has made the journey from Moreton Bay to Ipswich, but must have been struck by the richness and luxuriance of the foliage, and the variety and beauty of the flowers which line the banks of the River Brisbane. *Castanospermum Australe*, with its lovely foliage, conspicuous flowers, and still more conspicuous pods; *Eleocarpus grandis* (the Queensland quandong), with its massive rounded heads of glossy bright green, would adorn any scenery, but especially such dark and beautiful masses of vines, twiners, ferns, and mossy green stems, as fill the Queensland river-scrubs. The whole atmosphere is perfumed with the leaves of *Mallotus elaeoxylodes*, while another and rather showy-leaved plant of the same genus (*M. Philippinensis*) is said to possess valuable medicinal qualities for the cure of tape-worm. Belonging to the same order (*Euphorbiaceæ*), we have that remarkable exception to the sexual rule in plants. *Alchornea ilicifolia*, which reproduces itself from seed through several generations from female plants alone, without the intervention of any male flowers. Strangely enough too the seeds have often two embryos at the base. There is another species of this plant, the male flowers of which are unknown. This is *A. Thozetiana*, Baill., at Rockhampton and northwards.

It would be very easy to extend this part of my essay to an indefinite length, though I can say little or nothing as to the actual discoveries that have been made, but I think I can add to the value of this paper by indicating the line of enquiry that

botanists may take, if they wish to pursue the subject further. There are in the flora of Brisbane certain plants which do not occur in other parts of Australia where they are so accessible. They are so intimately connected with valuable trees or shrubs, that it would be most important to ascertain if they possessed the same useful characters. Thus in the order *Styracaceæ*, we have a species of *Symplocos** (*S. spicata*, Roxb.), and all the members of the genus are valuable as dyes or teas. In the *Ebenaceæ* we have two species of ebony (*Diospyros*)† and as the black wood which bears the name is derived from several species, we may hope to find ebony in Australia. It should be remembered that the heart-wood is the only valuable portion, the outer or sap wood being soft and worthless. In the order *Sapotaceæ* we have four species of *Achras*. The fruits of many trees of this genus are eaten, and the bark of *A. sapota*, which grows in the West Indies, is considered equal to *Cinchona* as a febrifuge. It is a tree of this order (*Isonandra gutta*, Hook.) which yields the valuable gutta-percha of commerce. We have also a species of *Chrysophyllum*, a genus which yields the star apple of the West Indies. The remarkable gum which exudes from our *Achras Australis* is worth investigation. I can answer for its disagreeable tenacity when it gets about the hands. Amongst the *Ardisiads* (*Myrsinaceæ*) we have three genera. The whole are said to be more or less stimulating in their leaves, roots, or bark. Amongst the *Rubiaceæ* we have *Morinda*, many of the species of which yield a red dye. *Ixora* is said to have valuable medicinal qualities. Among the *Violaceæ* a good many species of *Ionidium* are emetic, and used as a remedy in *Elephantiasis*. Dr. Bancroft, of India, speaks favorably of it.‡

* This genus is very variously placed by different authors.

† In the "Flora Australiensis" the Australian species are placed in R. Brown's genus *Cargillia*, because of the two ovules in each ovary cell.

‡ See "Periera," Vol. II., Part 2, p. 575. Also "Comp. Bot. Mag., 1, 278 Flora Medica.

The whole of the *Violaceæ* are said to have purgative and emetic qualities in their roots. I am almost afraid to refer to authors for this subject, they are so many; but I may especially cite an old work of Koebers, in praise of the Violet, (*Schediasma in laudem Violæ purpureo-caruleo*, 1667,) and *Pio De Viola specimen botanico-medicum*, Turin, 1813. Probably some also may have met Kite's "Medicinal Effects of the Resin of *Acaroides resinifera* (*Xanthorrhoea hastilis*, or grass tree) from Botany Bay," London, 1795; as well as Forster's work on "The Esculent Plants of the Islands of the Southern Ocean," Berlin, 1786; Villar's "Catalogue of Vegetable Substances which may serve to nourish Man," Grenoble, ann. 2, 8.

Amongst the *Nyctagineæ* we have *Boerhavia*, a genus which has emetic and cathartic properties in the roots of all the known species. *Pisonia*, of which we have one species, is supposed to possess the same properties. We have also among the *Amarantaceæ*, *Deeringia celosioides*, the bitter acrid leaves of which are used against measles in Java. Our *Achyranthes aspera* is used in India in dropsical cases, but Dr. Lindley, from whose "Vegetable Kingdom" I take the fact, does not tell us how it is exhibited. Amongst the *Thymeleæ*, the *Pimelea* deserves some notice. I have heard it confidently asserted by bushmen, that a decoction of the bark was a remedy for syphilitic symptoms. In the genera of *Capparidaceæ*, we have *Capparis*. We have some plants which must contain valuable stimulant qualities. *Polanisia* is used as a vesicant or sinapism. All the *Laurineæ* should be worth examination. We have four species of *Cryptocarya*, a genus which yields the Brazilian nutmeg. In spite of the bad name which the order *Proteaceæ* has for utility, I think they are worthy of attention. Some of them have extremely bitter barks, and the flowers of others yield a yellow dye. The bark of *Isopogon ceratophylla* is used as a bitter tonic in Victoria.

I merely suggest by such scattered observations a line of enquiry in which much might yet be done. So far we have

ascertained very little beyond the names and external characters of the plants included in the following census, but it may be confidently said that its publication may do much to aid those who may hereafter apply themselves to ascertain the economic characters of the Brisbane flora.