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I. Contributions to the Flora of Otago, New Zealand

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Professor Balfour announced the painful intelligence of the death of Dr W. Balfour Baikie, one of the early members of the Society, who had distinguished himself by his discoveries in Africa. He died of dysentery at Sierra Leone on 30th November last. Dr Baikie had been elected a Fellow of the Society on 11th February 1847.

9th February 1865.—Professor BALFOUR, V.P., in the Chair.

The following donations to the Library were laid on the table :—

Analytical Drawings of Australian Mosses, Fasc. 1, by Ferdinand Mueller, Ph.D., M.D., &c.—From the Author.

The Vegetation of the Chatham Islands, by Ferdinand Mueller, Ph.D., M.D., &c.—From the Author.

Transactions of the Royal Society of Arts, Vol. VI., part 4.—From the Society.

Verhandlungen des Naturforschenden Vereines in Brünn, Band II.—From the Society.

The following donations to the Museum at the Botanic Garden were noticed :—

From Thomas Patton, Esq., Glenalmond—Cones of *Pinus monticola*, taken from young grafted trees three or four years old.

From Robert Liddle, Esq.—Various fruits and seeds from Africa.

From Surgeon-Major Rae—Twin apple, produced at Lochiehead, Fife.

From Dr Murchison—Watch-chain made of shell-lac.

From Thomas Thomson, Esq.—Cones of *Abies Menziesii*, ripened at Keillour, Perth.

Before commencing the public business, Professor Balfour alluded to the loss which the Society had sustained in the death of Dr Hugh Falconer, which melancholy event took place in London on 31st January last. Dr Falconer was a native of Forres; he graduated in Edinburgh in 1829, and wrote a thesis on chorea. He became a fellow of the Botanical Society in July 1841. He had distinguished himself in India as superintendent of the Botanic Gardens

of Saharunpore and Calcutta, and by his valuable palæontological researches in regard to mammalia.

The following Communications were read:—

I. *Contributions to the Flora of Otago, New Zealand.* By
W. LAUDER LINDSAY, M.D., F.R.S.E., F.L.S.

Abstract.—The following remarks have reference mainly to a collection of *Flowering Plants and Ferns*, made in 1861* (October to December) in the district between Dunedin and the Clutha (East Coast).

When (in 1861) I visited Otago, almost nothing could be said to be known of the Flora of the *settled districts* of the *east coast*, or generally of the *interior* of that Province.† All that was then known of its botany was concentrated in Dr Hooker's magnificent "*Flora Novæ Zelandiæ*,"‡ and was the fruit of the collections made by the Naturalists of various survey or exploring expeditions sent from this country.§ Of these contributions to the Otago flora, the most recent, as well as in all respects the most important, are those of Dr Lyall of H.M.S. "*Acheron*," made mostly in 1851. The only locality he visited on the *east coast* was Otago Harbour, whose *shores* he botanised; and this appears to have been the *only* collection made on the *east coast* previous to my visit in 1861. But on the *west coast* he explored most of the larger fjords with which it is indented, and of a series of which it may be said to consist. His predecessors in the botanical exploration of the *west coast* of Otago (for none of them had visited the *east coast*) had apparently all been confined to Dusky Bay, which is a classical name in the flora of Otago in connection with the voyages of the celebrated navigators Cook and Vancouver. Dr Lyall was there-

* When not otherwise specified, all my remarks must be held to refer to this date,—that of my own visit and collections.

† With the exception of certain portions of the *coasts* of Otago, to be hereafter specified, the flora of the *south island* of New Zealand was virtually unknown *south of Akaroa* (Banks's Peninsula), in the Province of Canterbury.

‡ Vol. i., containing "*Flowering Plants and Ferns*," published in 1853.

§ 1. Sir Joseph Banks and Dr Solander: Captain Cook's first expedition, 1769. 2. Forsters, father and son, and Dr Sparrmann: Cook's second voyage of discovery, March 1773. 3. Dr Anderson: Cook's third voyage, 1776–1780. 4. Dr Menzies: Captain Vancouver's expedition.

fore the only botanist who had an opportunity of visiting localities along the whole west coast of Otago, and who ascended, sometimes to a height of 3000 or 4000 feet, the mountains which bound its fjords. Some of the localities visited from the sea by the distinguished naturalists who were the earliest contributors to the Otago flora, have apparently not been since revisited, and there are therefore not a few of the peculiar plants of the west coast which have been, up to this date, collected only by these botanists.

My own collections were made in the *settled districts* between Dunedin, the capital of the province, which is situated at the head of Otago Harbour before mentioned, and the magnificent Clutha river, the Tay of New Zealand. This represents a parallelogram of country about sixty miles long by twenty broad. It may be characterised as the *Lowlands*, or *district of the plains*, in contradistinction to the west coast region, which is that essentially of deep fjords with lofty mountain walls. The *east coast belt* alluded to includes the great plains of the Taieri, Tokomairiro, and Clutha, as well as the upland districts of Greenisland, Saddlehill, Tuapeka, and others. It contains few hills of an elevation higher than 1500 feet, and consists virtually of a succession of plains and gentle uplands. Its flora may be held to represent, so far as it goes, that of the eastern seaboard, eastern plains, and generally the settled districts of Otago. But it differs materially from that of the western alps, which rise to 9000 feet; of the central great lake basins; and of the western fjords—whose flora has, generally speaking, an alpine or sub-alpine character.

The "*Flora Novæ Zelandiæ*" records 104 species of flowering plants and ferns, as occurring on the *coasts* (mostly *western*) of Otago. Of these, 34 species, or 32·68 per cent., were found by me in the *eastern* districts, and are therefore probably generally distributed over Otago. But the majority are peculiar to the western alps or fjords. They include some of the most characteristic and most beautiful herbaceous plants of Otago (*e.g.*, species of *Olearia*, *Celmisia*, *Senecio*, and *Cordylina*).

In addition to the species recorded in the "*Flora Novæ Zelandiæ*," as occurring in Otago, it mentions 193 species as "abundant throughout the islands," as "common in the

middle and north islands;" or otherwise in such terms, *quoad* their geographical range, as to lead to the inference that they are to be looked for in Otago. But it is unsafe to found much on this category; for, on comparing the "*Flora Novæ Zelandiæ*," published in 1853, with the "*Handbook*," issued only a few months ago (1864), I find that there have been in many instances essential modifications of the expressions in question; and that there are in many cases no proofs up to this date that the species so described occur in Otago.

(Here followed in the MSS. a systematic enumeration of the phænogams and ferns collected by the author during his excursions.)

Total Natural Orders,	58
„ Genera,	147
„ Species,	235

Analysing the list in question, with a view to set forth in an abstract form the peculiarities of the flora of the eastern seaboard of Otago, it has to be remarked, in the first place, that five species are *new to science*, viz.,—

1. <i>Viscum</i> Lindsayi. Oliver.	4. <i>Aciphylla</i> Colensoi. Hook. fil.
2. <i>Celmisia</i> Lindsayi. Hook. fil.	5. <i>Crepis</i> Novæ Zelandiæ.
3. <i>Poa</i> Lindsayi. Hook. fil.	Hook. fil.

Of these, the first three were not previously known as natives of New Zealand or other countries. Of the other two, *Crepis Novæ Zelandiæ* had been previously collected in Queen Charlotte's Sound, and *Aciphylla Colensoi* in various parts of the alps of the north and south islands (2000 to 5500 feet in the latter). Three species previously undetected in New Zealand or elsewhere—new to science—may be regarded as very insignificant fruits or results from the botanical exploration of a district of a country botanically new—up to this period virtually an untrodden field. But the number is considerable when we remember—
 1. That Dr Hooker had pointed out, as the result of his investigations during the preparation of his *magnum opus*, the New Zealand Flora, that *novelties* were to be looked for only in the southern *Alps*; 2. That this was the region of the plains, where we could only look for an extension of

the flora of Canterbury and Nelson, both of which provinces had been much more fully, in their interior at least, botanised than Otago; 3. That this was the region of settlement, in which the progress of cultivation was likely to lead to the disappearance of the rarer or less hardy native herbaceous plants, with a corresponding introduction of the more robust emigrants of Britain or Europe. I venture to bring this point somewhat prominently forward for the encouragement of the *local botanist*, who must not be dissuaded from *collecting* under the impression that the work of botanical examination in Otago has been completed, and that no novelties remain to reward his labours. Even should he fail in the *discovery of species new to science*—and this is not likely, at least at any distance from Dunedin—he is almost certain to add new species to the flora of Otago—plants, that is, hitherto undetected within its borders, though found in other parts of New Zealand; and he is thus sure of contributing materially to our present imperfect knowledge of the geographical range of species in that province, as well as in the New Zealand islands in general.

I estimate that to the Otago flora, as it is at present known, which amounts to 591 species in the department of Phanogams and Ferns, *at least a hundred species remain to be added by local botanists.*

My list of Otago plants contains several contributions to the *geographical botany* both of Otago and New Zealand. For instance—

1. *Poa breviglumis*

is not recorded at all in the New Zealand Flora as a native of New Zealand, though it appears in Dr Hooker's "Flora Antarctica."

2. *Juncus australis*,
3. *Luzula Oldfieldii*,

4. *Carex Gaudichaudiana*,

find no place in the "Flora Novæ Zelandiæ," but are recorded in Dr Hooker's "Flora Tasmanicæ."

5. *Potamogeton heterophyllus*

does not appear in the "Flora Novæ Zelandiæ," but is a British plant, occurring also in Tasmania, and in various temperate regions throughout the world.

Again, the following had not been previously found, or recorded as having been found, in Otago; and not a few of them appear in the "*Flora Novæ Zelandiæ*" as north island plants only:—

1. <i>Clematis Colensoi</i> , and
<i>var. rutæfolia</i> .	11. <i>Typha angustifolia</i> .
2. <i>Hypericum japonicum</i> .	12. <i>Ruppia maritima</i> .
3. <i>Myriophyllum elatinoides</i> .	13. <i>Carex testacea</i> .
4. <i>Mesembryanthemum aus-</i>
<i>trale</i> .	14. <i>Carex lucida</i> .
5. <i>Coprosma rotundifolia</i> .	15. <i>Echinopogon ovatus</i> .
6. <i>Asperula perpusilla</i> .	16. <i>Dichelachne crinita</i> .
7. <i>Lagenophora pinnatifida</i> .	17. <i>Agrostis quadriseta</i> .
8. <i>Myosotis antarctica</i> .	18. <i>Arundo conspicua</i> .
9. <i>Mimulus radicans</i> .	19. <i>Deschampsia cæspitosa</i> .
10. <i>Podocarpus dactyloides</i> .	20. <i>Hymenophyllum crispatum</i> .
	21. <i>Hypolepis tenuifolia</i> .
	22. <i>Azolla rubra</i> .

Not the least interesting feature in my collection of 1861 is the circumstance that no less than twenty-five species, or 10·63 per cent. of the whole, are *British* plants, which are equally indigenous to New Zealand. In some of these cases, it will be observed, the *type* only is British, while the *variety* or *form* is peculiar to New Zealand. In others, however, the type, as well as its dominant forms, are equally common to Britain and New Zealand. All are herbaceous, hardy plants; of which it is to be remarked that ten of the twenty-five, or 40 per cent., are aquatics or semi-aquatics, growing in water, marshes, or by the sides of streams, both in Britain and New Zealand, while one or two, which do not generally inhabit such localities in Britain, were found by me frequenting them occasionally in Otago.

In addition, however, to these twenty-five British plants which are *natives* of Otago, and of New Zealand generally, I met with the following familiar British plants, or weeds, growing more or less in a wild state, which have been introduced by man apparently, and are now, or are becoming, *naturalised*:—

N. O. 1. GRAMINEÆ—	5. <i>Holcus mollis</i> , L.
1. <i>Poa annua</i> , L.	6. <i>Phalaris canariensis</i> , L.
2. <i>Festuca bromoides</i> , L.	7. <i>Alopecurus agræstis</i> , L.
3. <i>Lolium perenne</i> , L.	8. <i>Phleum pratense</i> , L.
4. <i>Anthoxanthum odoratum</i> ,
L.	N. O. 2. POLYGONÆ
	9. <i>Rumex acetosa</i> , L.