

Schizæa bifida, Swartz. W. L. W.
 Botrychium ternatum, Swartz. W. L. W.

LYCOPODIACEÆ.

Lycopodium billardieri, Spring. Banks and Sol. !
 var. varium. W. L. W.
 " densum, R. Br. W. L. W.
 " fastigiatum, R. Br. W. L. W. !
 " scariosum, Forst. W. L. W. !
 " volubile, Forst.

Tmesipteris tannerensis, Forst.

Isoetes, sp. "In deep water in the bed of the Motu, between Opotiki and Cape Runaway, but I was unable to obtain specimens on account of the depth of the water." H. B. Kirk.

MARSILEACEÆ.

Azolla rubra, R. Br. Poverty Bay, &c. : W. L. W. !

ART. XLIX.—On the History of Botany in Otago.

By T. KIRK, F.L.S.

[Read before the Wellington Philosophical Society, 17th February, 1897.]

THE publication of Mr. Petrie's copious and valuable "List of the Flowering-plants indigenous to Otago" in the last volume of "Transactions of the New Zealand Institute" naturally attracts attention to the efforts of earlier labourers in the same field, so that no apology is needed for presenting a brief statement of the results of their efforts. The elaboration of the flora or fauna of any district can only be effected by a long succession of earnest workers, those of the present taking up the work where it fell from the hands of their predecessors, and in their turn passing it on to those who succeed them. It is well that the memory of the pioneers in any branch of research should be treasured by those who reap the benefit of their labours.

The first botanists to visit any part of Otago were Reinwold and George Forster, and Dr. Sparrman, who accompanied Cook's second expedition, and landed at Dusky Sound in 1772. Their collections were not large, comprising fewer than 170 species, including those obtained in Queen Charlotte Sound, &c. Most of these were published in G. Forster's "Florulæ Insularum Australium Prodrômus," but the descriptions were very poor. Amongst the plants obtained by them were the famous *Cordyline indivisa* and the true *Gentiana saxosa*.

Dr. Archibald Menzies, surgeon to Captain Vancouver's expedition, collected largely at Dusky Sound in 1791, especially in Ferns, Musci and Hepaticæ. Many beautiful species collected by him were described by Sir William Hooker in his "Musci Exotici," and in Hooker and Greville's "Icones Filicum." *Gentiana saxosa* was also collected by Menzies, but was not seen by other collectors until it was found by Professor Hutton at the Bluff in 1873.

Dr. Lyall, surgeon on H.M.S. "Acheron," during Captain Stokes's survey of the South Island, 1847-49, made large collections of plants in Stewart Island, Foveaux Strait, and the west coast of Otago, including many important additions to the flora, the most striking being the grand *Ranunculus lyalli* (found in a flowerless state only) and *Senecio bifistulosus*. These and others were described by Sir Joseph Hooker in "Flora Novæ-Zelandiæ."

In 1861 Dr. W. Lauder Lindsay visited Otago, spending rather less than three months in the district, during which he made excursions to Taieri Ferry, Clutha Ferry, Tuapeka, Wetherstone's Diggings, and other places within sixty miles of Dunedin, and proved himself a most indefatigable collector and acute observer. Long known as an able lichenologist, he exhibited a decided preference for lichens and other cryptogams, of which he made extensive collections, but was scarcely less enthusiastic in his investigation of the flowering-plants of the district, adding *Celmisia lindsayi* and *Poa lindsayi* to the flora. *Viscum lindsayi*, named in his honour by Professor Oliver, was originally discovered by Mr. Buchanan. The results of his work were published in 1868, under the title of "Contributions to New Zealand Botany," with several coloured illustrations by Fitch. He gives a catalogue of the plants collected during his excursions, showing 199 species of flowering-plants, 40 ferns, &c., 149 lichens, 110 diatoms, with numerous mosses, algæ, and fungi, making a total of 610 species, of which 50 were supposed to be undescribed. The work abounds with critical notes, which are always interesting, and often of high value, the whole constituting an almost unique contribution to the botanical literature of the colony.

In 1862-63 Sir James Hector and Mr. Buchanan explored large portions of the West Coast sounds and mountains, and succeeded in making numerous important additions to the flora, most of which were described in the "Handbook of the New Zealand Flora" by Sir Joseph Hooker, 1864-67. In addition to the discovery of new species, they greatly extended our knowledge of indigenous plants. Amongst the most remarkable of their discoveries were *Pachycladon novæ-zelandiæ*, *Ranunculus buchanani*, *R. chordorhizos*, *R. pachyrhizus*, *Hectorella cæspitosa*, &c.

Mr. Buchanan had previously done good botanical work in various parts of the district. Some of his additions were described in the Handbook, while others, such as *Colobanthus buchamani*, *C. canaliculatus*, &c., have but recently received the attention they merit. In 1865 he prepared his "Sketch of the Botany of Otago," with a catalogue of the flowering-plants and ferns collected in the district to that date. This was not published until 1869, when it appeared in the Appendix to the first volume of "Transactions of the New Zealand Institute," greatly increasing the value of the volume. In the Sketch he divided the provincial district into an eastern and a western region, the dividing-line extending along the course of the Clutha from Lake Wanaka to the Nuggets. He enumerates 600 species, of which 393 are dicotyledons, 118 monocotyledons, the remainder ferns and fern allies. When the difficulties under which the author had to labour at that time are considered, and the fact that the concluding portion of the Handbook had not been published is taken into account, it will be seen that its accuracy is remarkable. In this respect it has not been excelled by any later production of a similar character. Until his removal to Wellington Mr. Buchanan held the office of botanist and draughtsman to the Geological Survey of Otago. Numerous papers on Otago plants, with illustrations from his facile pencil, are scattered through the annual volumes of "Transactions of the New Zealand Institute." It should be added that his "Sketch of the Botany of Otago" was the first local flora published in the colony.

In 1872 Mr. J. S. Webb published a short list of plants found in the vicinity of Invercargill in the fifth volume of the "Transactions of the New Zealand Institute," which comprised three or four species not previously recorded for the Otago district.

Mr. G. M. Thomson published a copious list of interesting plants not previously recorded for the Otago district in the "Transactions of the New Zealand Institute," vol. ix., p. 538. Amongst them are several species of considerable interest—*Melicytus macrophyllus*, a northern plant, the occurrence of which in Otago could not have been anticipated; *Senecio sciadophilus*; and *Myrsine chathamica*. A catalogue of the naturalised plants of the district, by the same author, appeared in vol. vii., p. 370, of the Transactions.

Under the title of "Contributions to the Botany of Otago," a list of about a hundred flowering-plants and ferns not previously recorded for the district was published by the present writer in the tenth volume of the Transactions. The list comprised *Carmichaelia monroi*, *Drosera pygmaea*, only known elsewhere in the colony at its northern extremity, *Celmisia*

walkeri, *Gratiola nana*, *Potamogeton pectinatus*, *Carex acicularis*, *Stipa arundinacea*, &c.

In 1880 Mr. G. M. Thomson and Mr. Petrie visited Stewart Island. The latter gentleman published an interesting account of the trip, with a valuable list of the flowering-plants collected, in vol. xiii., p. 323, of the Transactions. *Liparophyllum gunnii*, *Actinotus bellidioides*, *Ehrharta thomsoni*, and *Carex longiculmis* were amongst the interesting additions recorded.

Dr. Lyall had collected numerous plants on the island during his visit in the "Acheron." Mr. G. M. Thomson had visited it on two previous occasions, when he discovered the fine *Brachycome*, named in his honour; and the late Mr. Charles Traill had collected for several years previously, but, with the exception of Dr. Lyall's plants which are included in the "Handbook," nothing had been published.

Mr. Petrie's "List of the Flowering-plants indigenous to Otago," published in the "Transactions of the New Zealand Institute," vol. xxviii., page 540, is the last and the most important contribution to the botany of the southern district, and embodies the results of nearly twenty years' work. Mr. Petrie is a close and acute observer, who made good use of the advantages offered by his position as Chief Inspector of Schools to the Education Board of Otago in working up the central portions of the district, the botany of which was but little known. The results of his examination of Mount St. Bathan's, Mount Pisa, Mount Ida, Mount Cardrona, and other high peaks constitute a marked feature in the botanical history of New Zealand during recent years, and have from time to time been published in the Transactions.

In his List he roughly divides the district into three—eastern, central, and western, Stewart Island making a fourth; but the district lists are not so complete as their author evidently intended to make them; for instance, in his paper on Stewart Island (Trans., xiii., 323) he enumerated two hundred species of flowering-plants collected by him on that island; but the number of Stewart Island plants mentioned in the general list is considerably less. This, however, is, after all, a small matter, and will only be felt by one who, like myself, finds it continually necessary to refer to local lists. I am thankful to have so complete and accurate a catalogue available for reference. Mr. Buchanan's list comprised 507 species of flowering-plants, of which 393 were dicotyledons, and 114 monocotyledons. Mr. Petrie enumerates 532 dicotyledons and 229 monocotyledons, showing an increase of fully 50 per cent. in the number of species, and greatly reducing the enormous discrepancy between the two classes, as shown by Mr. Buchanan's list.

Although not so expressed, Mr. Petrie's list is evidently restricted to plants collected by himself. He gives as an appendix a separate list of plants reported to occur in Otago, but not observed by him. This might have been considerably extended.

In the hope of rendering this Otago Florula still more comprehensive, I venture to add a few species not included in Mr. Petrie's enumeration, and append a short list of plants which have been erroneously recorded by various authors as indigenous to the Otago district. In conclusion, I am glad to acknowledge my indebtedness for the assistance derived from Mr. Petrie's work during the preparation of the "Student's Flora," now in the press.

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SPECIES EITHER WHOLLY OMITTED FROM MR. PETRIE'S LIST
OR MENTIONED WITH A VERY RESTRICTED RANGE OF DIS-
TRIBUTION.

- Clematis hexasepala*, DC. Bluff Harbour: *T. K.*
Ranunculus traversii, *Hook. f.* In a deep valley near Lake Harris; below Mount Earnslaw: *T. K.*
Ranunculus ensyii, *T. Kirk.* East Taieri Hills: *J. Buchanan!*
Ranunculus recens, *T. Kirk.* Otago: *Buchanan!*
Melicytus macrophyllus, *A. Cunn.* Waikari Creek: *G. M. Thomson!*
Pittosporum rigidum, *Hook. f.* Dusky Sound: *Hector and Buchanan!*
Colobanthus quitensis, *Bart.* Otago: *Buchanan!*
Colobanthus canaliculatus, *T. Kirk.* Otago: *Buchanan!*
Colobanthus buechanani, *T. Kirk.* Otago: *Buchanan!*
Colobanthus brevisepalus, *T. Kirk.* Gorge Creek and Kurow: *Petrie!*
Elæocarpus dentatus, *Vahl.* Catlin's River: *T. Kirk.*
Carmichaelia grandiflora, *Hook. f.* Milford Sound: *Lyall.*
Drosera pygmæa, DC. The Bluff Hill: *T. K.*
Gunnera mixta, *T. Kirk.* *Buchanan! Hamilton! Petrie!*
Gunnera flavida, *Colenso.* The most common species in Southland: *T. K.*
Gunnera pro-repens. Ryal Bush: *T. Waugh!*
Gunnera hamiltonii. New River Heads: *W. S. Hamilton! Stewart Island.*
Gunnera microcarpa, *T. Kirk.* Near Invercargill, &c.: *T. Waugh!*
Gunnera arenaria, *Cheesem. var.* Sandy Point, &c.: *T. Waugh!*
Callitriche muelleri, *F. Sond.* Stewart Island: *T. K.*
Epilobium tasmanicum, *Hausk.* Mountains above Lake Harris, 3,000ft.: *T. K.*

- Epilobium purpuratum*, Hook. f. Alps of Otago, 6,000ft.:
Buchanan!
- Epilobium novæ-zelandiæ*, Haussk. Eweburn Creek and
Naseby: *Petrie!*
- Epilobium vernicosum*, Cheesem. Clinton Valley, Te Anau:
Petrie!
- Epilobium pycnostachyum*, Haussk. Otago lake district:
Buchanan!
- Epilobium polyclonum*, Haussk. Otago: *Buchanan; Petrie!*
- Tetragonia expansa*, Murr. Dog Island: *T. K.*
- Actinotus novæ-zelandiæ*, *Petrie.* Longwood Range: *T. K.*
Doubtless not unfrequent on the West Coast mountains.
- Aciphylla lyallii*, Hook. f. Dusky Bay: *Lyall; Buchanan!*
- Ligusticum lyallii*, Hook. f. Port Preservation: *Lyall!*
- Ligusticum fiabellatum*, *T. Kirk.* Stewart Island.
- Panax lineare*, Hook. f. Mountains above Lake Harris: *T. K.*
Frequent in the West Coast Sounds: *Hector!*
- Aralia lyallii*, *T. Kirk.* Coal Island, Preservation Inlet; Rua-
puke and other islands in Foveaux Strait; southern portion
of Stewart Island; common. Extinct in Paterson Inlet.
- Griselinia lucida*, *Forst.* Catlin's River: *Lindsay.* Martin's
Bay, Dusky Sound: *T. K.*
- Corokia cotoneaster*, *Raoul.* Otago: *Buchanan!*
- Olearia traillii*, *T. Kirk:* Puysegur Point. Stewart Island: *T. K.*
- Olearia nitida*, var. *cordatifolia.* Perhaps the most handsome
form of this variable species. Bluff Hill. Stewart Island:
T. K.
- Olearia oleifolia*, *T. Kirk.* Resolution Island: *J. D. Enys!*
- Olearia nummularifolia*, Hook. f. Otago Lake District:
Hector and Buchanan! Maungatua: *B. C. Aston!*
- Olearia forsteri*, Hook. f. Near Oamaru: *R. Kidd!*
- Celmisia lindsayi*, Hook. f. The reputed Lake Harris station
for this fine plant is very doubtful indeed, the plant being
purely littoral. In "crevices of the trap rocks at the
Nuggets," the specimens are small, sometimes not more
than 3in.—4in. high, but on the tops of the cliffs at the
back of the pilot's house, Catlin's River, it forms huge
masses 6ft.—8ft. in diameter or more, with the branches stout
and woody at the base. Probably common on the north
side of Foveaux Strait. One of the most beautiful species
of the genus.
- Abrotanella muscosa*, *T. Kirk.* Summit of Rakiahua, Stewart
Island: *T. K.*
- Abrotanella linearis*, *Bergg.* Port Pegasus: *T. K.*
- Cotula traillii*, *T. Kirk.* Stewart Island: *T. K.*
- Senecio bifistulosus*, Hook. f. Dusky Sound: *Lyall; Bu-
chanan!* Also in Chalky Bay (identified in the absence
of flowers).

- Lobelia anceps*, *Thunb.* Oamaru: *R. Kidd*!
- Gaultheria perplexa*, *T. Kirk*, MS. Bluff Hill, &c.; Stewart-Island: *T. Kirk*.
- Cyathodes pumila*, *Hook. f.* Otago: *Buchanan*! Maungatua: *B. C. Aston*!
- Archeria traversii*, *var. australis*. West Coast Sounds; Mount Anglem, Stewart Island: *T. K.*
- Dracophyllum strictum*, *Hook. f.* West Coast Sounds. Common.
- Myrsine pendula*, *Col.* Stewart Island: *T. K.*
- Mitrasacme novæ-zelandiæ*, *Hook. f.* Dusky Sound; *Buchanan*. Stewart Island: *T. K.*
- Gentiana lineata*, *T. Kirk*. Crest of the Longwood Range: *T. K.*
- Liparophyllum gunnii*, *Hook. f.* Crest of the Longwood Range.
- Sebæa ovata*, *R. Br.* Otago: *Buchanan*!
- Exarrhena lyallii*, *Hook. f.* Milford Sound: *Lyall*.
- Convolvulus sepium*, *L.* Near Winton: *T. K.* Herekoperu-Island: *T. K.*
- Dichondra radicans*, *MSS.* Stewart Island.
- Limosella aquatica*, *L.* The typical form, with broad oblong-lanceolate or spatulate leaves. Near Kingston: *T. K.* The only locality in which it has at present been seen. Mr. Petrie sends a plant with cleistogamous flowers which may belong to another species.
- Limosella curdeyana*, *F. Muell.* Owake; plentiful: *T. K.* (1875).
- Veronica parviflora*, *Vahl.* Otago: *Buchanan*.
- Veronica ligustrifolia*, *A. Cunn.* Otago and Stewart Island: *Lyall*; *Buchanan*.
- Veronica hillii*, *Colenso.* Otago: *Buchanan* (1867).
- Veronica buchanani*, *Hook. f.* Lake district: *Buchanan*! Mount Kyeburn; Mount Arnold; Otemata River: *Petrie*! 3,000ft.—4,000ft.
- Veronica tetragona*, *Hook.* Greenstone Valley: *Buchanan* (1867).
- Veronica uniflora*, *T. Kirk.* Hector's Col, Mount Aspiring; 5,000ft.: *Buchanan*!
- Veronica quadrifaria*, *T. Kirk.* Mount Alta; 5,000ft.: *Buchanan*!
- Veronica tumida*, *T. Kirk.* Otago: *Buchanan*!
- Veronica gilliesiana*, *T. Kirk.* Mountains of the west coast: *Buchanan*!
- Veronica dasphylla*, *T. Kirk* (*Logania tetragona*, *Hook. f.*). Mountains of the west coast: *Buchanan*!
- Veronica erecta*, *T. Kirk.* Mount Bonpland (?): *Mr. Martin*!
- Veronica muelleri*, *Buch.* Hector's Col, Mount Aspiring Range; 5,000ft.: *Buchanan*!

- Euphrasia repens*, *Hook. f.* Bluff Island: *Lyall*. Oreti River, *T. K.* Port Pegasus, *T. K.*
- Utricularia monanthos*, *Hook. f.* Stewart Island. Doubtless the *U. colensoi* of Mr. Petrie's list, due to a clerical error.
- Teucrium parviflorum*, *Hook. f.* Water of Leith, near Dunedin: *T. K.*
- Pimelea virgata*, *Vahl.* By the ascent to the Crown Range, Cardrona, and elsewhere: *T. K.*
- Fagus blairii*, *T. Kirk.* Head of Lake Wakatipu. Valley of the Dart, &c.: *T. K.*
- Ascarina lucida*, *Hook. f.* Preservation Inlet; plentiful: *T. K.* Stewart Island; rare: *C. Traill!*
- Urtica australis*, *Hook. f.* Dog Island: *T. K.*
- Dacrydium intermedium*, *T. Kirk.* West Coast Sounds; common on Stewart Island: *T. K.*
- Dacrydium westlandicum*, *T. Kirk.* Martin's Bay.
- Lemna minor*, *L.* Near Invercargill and elsewhere: *T. K.*
- Potamogeton pectinatus*, *L.* Waihola Lake: *T. K.* (1876).
- Potamogeton oblongifolius*, *Schrad.* Near Invercargill: *J. S. Webb!*
- Cordyline indivisa*, *Steud.* Dusky Sound: *Forster; Buchanan.* Milford Sound: *T. K.*
- Juncus antarcticus*, *Hook. f.* Swamp near Lind's Crossing, Southland: *T. K.* Mount Anglem, Stewart Island: *T. K.*
- Juncus scheuzerioides*, *Gaudich.* Lake district: *Hector and Buchanan!*
- Centrolepis strigosa*, *Roem. and Schult.* Bluff Hill: *T. K.*
- Scirpus fluitans*, *L.* Bluff Harbour: *T. K.*
- Uncinia nervosa*, *Boott.* By the Routeburn: *T. K.* Port Pegasus, Stewart Island: *T. K.*
- Carex australis*, *T. Kirk.* Stewart Island: *T. K.*
- Carex solandri*, *Boott.* Near Dunedin, &c.; Stewart Island: *T. K.*
- Ehrharta thomsoni*, *Petrie.* Crest of the Longwood Range: *T. K.* Probably common on the West Coast mountains.
- Simplicia laxa*, *T. Kirk.* Waikouaiti and Deep Stream: *Petrie!*
- Agrostis scabra*, *Willd.* (*A. parviflora*, *R. Br., Hook. f., Fl. N.Z., i., 296*). Abundant in the Lake district and elsewhere: *Hector and Buchanan.* Certainly indigenous: *T. K.*
- Agrostis spencei*, *T. Kirk, MSS.* Sea-cliffs, Te Waewae Bay.
- Arundo fulvida*, *Buch.* Maitaia: *Buchanan!*
- Poa foliosa*, *Hook. f.* The typical plant, not found on the mainland. Herekopere Island: *T. K.*
- Poa walkeri*, *T. Kirk, MSS.* Riverton, in salt marshes; Stewart Island: *T. K.*
- Poa anceps*, *Forst.* Stewart Island: *Petrie*, "List of Stewart Island Plants." Rakiapura; rare: *T. K.*

PLANTS ERRONEOUSLY RECORDED BY VARIOUS AUTHORS AS
HAVING BEEN COLLECTED IN THE OTAGO DISTRICT.

- Ranunculus areolatus*, *Petrie*.—Scraps of the Scandinavian *R. pygmaeus*, *Wahl.* (mixed with fragments of *R. rivularis*, *Banks and Sol.*), said to have been collected at Lake Wakatipu, were given to Mr. Petrie, who described them under this name.
- Carmichaelia australis*, *R. Br.*—Not found south of the Marlborough district.
- Carmichaelia odorata*, *Col.* Some other species must have been mistaken for this.
- Metrosideros scandens*, *Banks and Sol.*—Included in Buchanan's list, but has not been seen in Otago of late years, although reported from the Auckland Islands.
- Azorella reniformis*, *Benth. and Hook. f.*—I am indebted to Mr. Petrie for specimens of the Otago plant so named by him, which must be referred to *A. haastii*, *Hook. f.* The stipules of the Otago plant are ciliate, while those of *A. reniformis* are acute, and quite entire; the fruits of *A. haastii* are usually shorter than the pedicels, while those of *A. reniformis* usually exceed the pedicels. I fell into exactly the same mistake with a form of *A. haastii* from the Spencer Mountains.
- Ligusticum acutifolium*, *T. Kirk.*—This has only been found on the Snares, which are outside the district.
- Pseudopanax lessonii*, *C. Koch.*—Buchanan's specimen, named *Panax lessonii* in the "Herbarium of the Otago Museum," is a narrow-leaved form of *Panax colensoi*, *Hook. f.*
- Veronica carnea*, *J. B. Arnst.*—A garden plant of unknown origin, certainly not indigenous in New Zealand.
- Pimelea urvilleana*, *A. Rich.*—Probably a clerical error.
- Libocedrus doniana*, *Endlich.*—Evidently a slip of the pen for *L. bidwillii*, *Hook. f.*
- Potamogeton heterophyllus*, *Schreb.*—The name occurs in Lindsay's list, the young state of *P. cheesemani* having been mistaken for it.
- Carex neesiana*, *Endlich.*—Has not been found in New Zealand, *C. solandri* being usually mistaken for it.
- Stipa teretifolia*, *Steudel.* (*Dichelachne stipoides*, *Hook. f.*).—Doubtless a clerical error, as the plant is not found south of Poverty Bay.
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