

ART. XVIII.—Notes on the New Zealand Musci.

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[Read before the Philosophical Institute of Canterbury, 2nd August, 1899.]

Plates XIV., XV.

Genus *BARTRAMIA* (Hedwig).

THE genus *Bartramia* is composed of beautiful mosses, with their habitats principally on wet banks and rocks, on stones in streams, and on rocks under the spray of waterfalls. They are an alpine and subalpine genus, and are popularly known as "apple mosses," from the subrotund form of their capsules, which are large and very conspicuous.

The generic description of the genus is: *Capsules* globose, furrowed when dry, erect, cernuous, or pendulous. *Peristome* double, single, or none. *Teeth*: Outer 16, lanceolate, equidistant; inner membranous, bifid, sometimes with alternate cilia. *Calyptra* dimidiate. *Leaves* papillose.

In the "Handbook of the Flora of New Zealand" some of the species placed in this genus have pyriform capsules, although the generic description is "globose"; possibly they have been placed in this genus owing to their specific characters being those of *Bartramia*. That arrangement I have followed in this paper.

The species described in this paper as *B. hallerianoides* is the *B. halleriana* of the Handbook, which is a European species. The great general resemblance of the New Zealand moss to the European one has led to the mistaken description of these two as identical. A critical examination of the two plants has disclosed the following differences between them: The capsule of the New Zealand plant is nearly one-half smaller, obliquely subrotund, mouth oblique, insertion of the fruitstalk with the capsule very oblique. In the other plant the capsule is symmetrical, mouth not oblique, and the insertion of the fruitstalk is central at the base of the capsule. In the former the leaves are more spreading, and the back of the nerve is spinulose, serrated; while in the latter the back of the nerve is smooth.

Another mistake has also occurred in the identification of one of the New Zealand species of *Bartramia* as *B. pomiformis* (a European moss) in vol. xxix., p. 443, of the "Transactions and Proceedings of the New Zealand Institute." Mr. Beckett has there recorded this identification, which was copied from a manuscript list of mosses sent by Mr. W. Bell to Dr. Brotherus, to be named by that gentleman. This

identification is evidently a clerical mistake, as Dr. Brotherus has not published it. *B. pomiformis* has no erect sheathing-base to the leaves. while in the New Zealand moss the bases of the leaves are erect and sheathing.

I have seen no specimens of *B. affinis*, which is a Tasmanian moss, originally described and figured in the "Musci Exoticæ" by W. J. Hooker. The capsule is there figured and described as being spherical, and the leaves with their margins strongly recurved, while the capsule of *B. affinis* of the Handbook is described as being "ovoid." This is evidently a mistake, some other moss having the margins of the leaves recurved having been mistaken for the Tasmanian one. In the species treated in this paper there are only two which have the margins of their leaves recurved; one of them slightly, the other strongly. The latter is the one which is commonly taken by New Zealand botanists for *B. affinis*. It is described in this paper as *B. revisa*.

I have been unable to identify any of the following species: *B. crassinervia*, Mitt., *B. affinis*, *B. consimilis*.

There are two characters in the leaves of the plants in this genus which are useful as a means of classification, forming two very distinct sections—First, leaves having erect sheathing-bases; second, leaves without sheathing-bases. I have adopted this arrangement in the key.

KEY TO THE SPECIES MENTIONED AND DESCRIBED IN THIS PAPER.

Section A: Leaves more or less erect, and sheathing at the base.

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| 1. <i>Bartramia patens</i> , Brid. | 7. <i>Bartramia linearifolia</i> , sp. nov. |
| 2. " <i>gibsonii</i> , sp. nov. | 8. " <i>robustifolia</i> , sp. nov. |
| 3. " <i>brevifolia</i> , sp. nov. | 9. " <i>dwaricata</i> , Mitt. |
| 4. " <i>robusta</i> , Hook. f. and Wils. | 10. " <i>revisa</i> , sp. nov. |
| 5. " <i>hallerianoides</i> , sp. nov. | 11. " <i>comosa</i> , Mitt. |
| 5a. " <i>halleriana</i> . | 12. " <i>bellii</i> , sp. nov. |
| 6. " <i>papillata</i> , Hook. f. and Wils. | 13. " <i>sieberi</i> , Mitt. |

Section B: Leaves without sheathing-bases.

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| 14. <i>Bartramia hapuka</i> , sp. nov. | 21. <i>Bartramia pyriforma</i> , sp. nov. |
| 15. " <i>erwinii</i> , sp. nov. | 22. " <i>remotifolia</i> , Hook. f. and Wils. |
| 16. " <i>ovalitheca</i> , sp. nov. | 23. " <i>buchananii</i> , sp. nov. |
| 17. " <i>tenuis</i> , Taylor. | 24. " <i>pendula</i> , Hook. |
| 18. " <i>joycei</i> , sp. nov. | 25. " <i>elongata</i> , Mitt. |
| 19. " <i>turnerii</i> , sp. nov. | |
| 20. " <i>australis</i> , Mitt. | |

SECTION A.

Leaves more or less erect, and sheathing at the base.

1. ***Bartramia patens***, Bridel.

Species dioecious, growing in dense tufts 1 in. high, yellowish-green above, dark-brown below, subdichotomously

branched. *Branches* $\frac{1}{4}$ in. long. *Leaves* closely imbricating, erecto-patent from an erect sheathing quadrilateral base, subulate, semiconvolute, dilated or auricled at the apex; margins minutely serrated from the sheathing-base to the apex, papillose on the back, nerved to the apex. *Areola*: Upper quadrate; lower long, linear; leaves slightly flexuous when dry. *Perichætral leaves* smaller than the other ones, sheathing at the base. *Fruit* acrocarpous. *Fruitstalk* about $\frac{1}{4}$ in. long. *Capsule* oval, obliquely connected with the fruitstalk, furrowed when dry. *Mouth* small, oblique. *Operculum* convex.

Hab. Wet banks, Mount Fife, Kaikoura; January, 1899. Collected by R. B.

2. *Bartramia gibsonii*, sp. nov.

Plants monœcious, growing in dense tufts $\frac{1}{2}$ in. high, pale-green above, brown below, dichotomously branched. *Branches* $\frac{3}{8}$ in. long. *Leaves* closely imbricating, erecto-patent, subulate, with an erect quadrilateral sheathing-base, semiconvolute; margins minutely serrated from the upper part of the sheathing-base to the apex; nerve continuous, papillose on the back of the leaf. *Areola*: Upper quadrate; lower linear; slightly flexuous when dry. *Perichætral leaves* linear, subulate, tapering from the base into a slender point. *Fruit* acrocarpous. *Fruitstalk* $\frac{1}{2}$ in. high, red, obliquely attached to the capsule. *Capsule* subrotund. *Operculum* shortly conical.

Hab. On wet banks, near the River Hapuka, Kaikoura; January, 1899. Collected by R. B.

3. *Bartramia brevifolia*, sp. nov.

Plants monœcious, growing in dense tufts $1\frac{1}{2}$ in. high, yellowish-green above, brown below, branched. *Branches* fastigiate, $\frac{1}{4}$ in. long, densely radiculose. *Leaves* suberect, imbricating, short, subulate. Base erect, sheathing, quadrate at the upper sides of the sheath; margins minutely serrated; nerve indistinct upwards, excurrent; back of leaves papillose. *Areola*: Upper small, dense, quadrate; lower linear-oblong; leaves introflexed near the top when dry. *Perichætral leaves* erect, subulate, slender, longer than the stem ones, without sheathing-base. *Fruit* acrocarpous. *Fruitstalk* red, slightly flexuous, $\frac{3}{4}$ in. long. *Capsule* ovate, slightly oblique. *Mouth* wide. *Peristome* double; outer teeth 16, lanceolate, red; inner, a membrane divided to the middle into 16 teeth. *Operculum* not found. *Calyptra* cucullate.

Hab. Wet banks and rocks, Mount Torlesse; January, 1886. Collected by R. B.

4. *Bartramia robusta*, Hook. f. and Wils.

Plants monœcious, growing in tufts in patches 2 in. high, pale- or yellowish-green, radiculose. *Stem* fastigiate, branched. *Branches* $\frac{1}{2}$ in. high. *Leaves* imbricating, spreading from an erect sheathing quadrate base, linear lanceolate or subulate, semiconvolute, somewhat brittle; margins serrated, papillose on the back; nerve excurrent. *Areola*: Upper dense, quadrate; lower oblong; scarcely altered when dry. *Perichætal leaves* short, slender, erect, subulate. *Fruit* acrocarpous. *Fruitstalk* slightly flexuous, red, $\frac{1}{2}$ in. high. *Capsule* inclined, subrotund, slightly oblique. *Mouth* small.

Hab. Wet rocks, Mount Torlesse; January, 1886. Collected by R. B.

5. *Bartramia hallerianoides*, sp. nov.

Plants synœcious, growing in large tufts 1 in.—5 in. high, green or yellowish-green above, brownish below, radiculose, sparingly branched. *Branches* projecting above the capsules. *Leaves* imbricating, spreading, subulate; base erect, quadrilateral sheathing papillose; margins spinulose, serrated; nerve excurrent, spinulose, serrated on the back, crisped when dry. *Areola*: Upper small, quadrate; lower linear. *Perichætal leaves* small, erect, tapering into a long slender point. *Fruit* acrocarpous. *Fruitstalk* red, $\frac{1}{8}$ in. long. *Capsule* oblique, subrotund. *Operculum* short, conic. *Peristome* double; outer teeth 16, lanceolate, dense; inner, a membrane divided for two-thirds of its length into 16 keeled teeth, bifid at the apex. *Calyptra* small, cucullate.

Hab. Wet rocks, Port Lyttelton hills, and common near Lake Te Anau. Collected by R. B.

6. *Bartramia papillata*, Hook. f. and Wils.

Plants diœcious, growing in small tufts, pale-green, $\frac{1}{4}$ in.— $\frac{3}{4}$ in. high. *Stems* slightly radiculose, branched. *Branches* fastigiate, $\frac{3}{4}$ in. long. *Leaves* imbricating, slender, erecto-patent, subulate from a narrow erect sheathing quadrilateral base, auricled at the apex, semiconvolute, minutely serrated on the margin, and papillose on the back; nerve excurrent. *Areola*: Upper small, quadrate, dense; lower oblong. *Perichætal leaves* erect, smaller than the stem ones, slender, subulate from an oblong-lanceolate base. *Fruit* acrocarpous. *Fruitstalk* $\frac{3}{8}$ in., inclined. *Capsule* rotund, oblique. *Mouth* small, oblique. *Peristome* double; outer teeth 16, free to the base; inner, a membrane divided to the middle into 16 teeth. *Operculum* and *calyptra* not found.

Hab. Wet banks, West Coast Road; January, 1886. Collected by R. B.

7. *Bartramia linearifolia*, sp. nov.

Plants growing in small tufts $\frac{3}{4}$ in. high, yellowish-green above, brownish below. *Stems* slender, radiculose, branched. *Branches* few, $\frac{1}{2}$ in. long. *Leaves* closely imbricating, erecto-patent, linear, subulate from an erect sheathing-base, semiconvolute; margins serrated, back papillose; nerve indistinct, excurrent. *Areola*: Upper dense, quadrate; lower oblong, slightly dilated at the apex; leaves nearly erect when dry. *Perichaetial leaves* longer than the stem ones, erect, linear-lanceolate, acute. *Fruit* acrocarpous. *Fruitstalk* inclined, $\frac{1}{4}$ in. to $\frac{3}{16}$ in. long. *Capsule* oval. *Mouth* small.

Hab. Wet banks, near Broken River; January, 1886. Collected by R. B.

8. *Bartramia robustifolia*, sp. nov. Plate XIV.

Plants growing in large tufts 2 in. high, pale-green. *Stems* radiculose. *Branches* subdichotomous, $\frac{1}{2}$ in. long. *Leaves* imbricating, spreading, stout, lanceolate, subulate from a broad obovate erect sheathing-base, semiconvolute; margins serrated; back papillose; nerve excurrent. *Areola*: Upper dense, quadrate; lower narrow, oblong; leaves flexuous when dry. *Perichaetial leaves* as long as the stem one, erect, ovate-lanceolate, tapering into a subulate point. *Fruit* acrocarpous. *Fruitstalk* $\frac{3}{4}$ in. long. *Capsule* erect, ovate. *Operculum* conic, obtuse.

Hab. Clinton River, head of Lake Te Anau. Collected by R. B.

9. *Bartramia divaricata*, Mitt.

Plants growing in tufts or patches $1\frac{1}{2}$ in.—2 $\frac{1}{4}$ in. high, yellowish-green above, brown below. *Stems* densely radiculose, branched sparingly, $\frac{1}{2}$ in. long, fastigate. *Leaves* closely imbricating, spreading, lanceolate, acuminate, from a short, erect, quadrate sheathing-base; margins flat, serrated, papillose on the under side; nerve slender, excurrent, becoming spinulose, serrated towards the apex. *Areola*: Upper small, oblong; lower linear; leaves unaltered when dry. *Perichaetial leaves* very small, erect, oblong, rounded to a short hair-point. *Fruit* acrocarpous. *Fruitstalk* red, flexuous, $\frac{5}{8}$ in. long. *Capsule* subhorizontal, pyriform, furrowed when dry; other parts not found.

Hab. Stones in streams, West Coast Road; February, 1883. Collected by R. B.

10. *Bartramia revisa*, sp. nov.

Plants dioecious, growing in dense patches, yellowish-green or green, 1 in.—3 in. high, subdichotomously branched. *Stems* radiculose. *Leaves* closely imbricating, spreading, or erecto-

patent, linear-lanceolate, tapering into a slender point, semi-convolute; base erect, short, sheathing; margins papillose, strongly recurved, papillose on back and nerve; nerve excurrent. *Areola*: Upper small to near the base, dense; lower small, quadrilateral; leaves erect, and points of the branches cuspidate when dry. *Perichætal leaves* small, oblong-lanceolate, apiculate. *Fruit* acrocarpous. *Fruitstalk* $\frac{1}{3}$ in. to $\frac{1}{2}$ in. long, curved at the apex. *Capsule* ovate, pendulous, variable in breadth, furrowed when dry. *Peristome* single, 16, slender, distinct. *Operculum* conic.

Hab. Wet rocks, Port Lyttelton hills; 1886. Collected by R. B. and by Donald Petrie.

11. *Bartramia comosa*, Mitt.

Plants dioecious, growing in dense patches, yellowish-brown above, brown below, 1 in.—2 in. high, densely radiculose, subfastigiately branched. *Branches* $\frac{1}{4}$ in.— $\frac{5}{8}$ in. long. *Leaves* closely imbricating, spreading, upper ones slightly sheathing, ovate-lanceolate, acuminate; middle ones shortly sheathing; margins slightly recurved at the middle, serrulate towards the apex, papillose, plicate near the base; nerve excurrent, long, slender. *Areola* small, dense, above quadrilateral, below linear, erect when dry. *Perichætal leaves* erect, one-half smaller than the upper ones, deltoid, acuminate; nerve disappearing below the apex. *Fruit* acrocarpous. *Fruitstalk* $\frac{1}{4}$ in.— $\frac{2}{3}$ in. long, curved at the apex. *Capsule* elliptic, horizontal, or pendulous, furrowed when dry. *Operculum* small, conic, minutely apiculate. *Peristome* double; outer 16, linear-lanceolate; inner, membranous.

Hab. Wet rocks, Beaumont; October, 1891: D. Petrie.

12. *Bartramia bellii*, sp. nov.

Plants growing in dense patches 2 in. high. *Stems* radiculose, subdichotomously branched or nearly simple, unequal in length, $\frac{3}{8}$ in.— $\frac{5}{8}$ in. *Leaves* closely imbricating, spreading, or erecto-patent from a short erect sheathing-base, ovate-lanceolate, acuminate, tapering into a slender point; margins minutely toothed, slightly recurved near the base, minutely papillose; nerve excurrent; leaves not plicate. *Areola*: Upper small, linear, becoming longer towards the base. *Perichætal leaves* shorter than the upper ones, erect, oblong-lanceolate, tapering into a slender point; nerve ending about the middle. *Fruit* acrocarpous. *Fruitstalk* flexuous, 1 in. long, curved at the apex. *Capsule* broadly ovate, oblong, furrowed when dry.

Hab. Wet rocks, near Lake Harris; February, 1895. Collected by W. Bell.

13. *Bartramia sieberi*, Mitt.

Plants dicecious, growing in dense patches $4\frac{1}{2}$ in. high, yellowish-green above, brown below. *Stem* radiculose, branched, simple or dichotomous, $\frac{1}{2}$ in.—1 in. long. *Leaves* short, closely imbricating, spreading, and erecto-patent, subulate from a short broad sheathing-base, lanceolate, concave, plicate; margins serrated, recurved near the base, papillose on the back; nerve excurrent. *Areola*: Upper small, quadrate; lower narrow, oblong; scarcely altered when dry. *Perichætal leaves* short, erect, deltoid, acute; nerve slender, excurrent. *Fruit* acrocarpous. *Fruitstalk* flexuous, red, $1\frac{1}{2}$ in. long. *Capsule* horizontal or pendulous, furrowed when dry, oblong, pyriform. *Peristome* double; outer 16, linear-lanceolate; inner, membranous, 16. *Operculum* shortly conic. *Calyptra* cucullate.

Hab. Rocks, banks of Teremakau River.

SECTION B.

Leaves without sheathing-bases.

14. *Bartramia hapuka*, sp. nov. Plate XV.

Plants growing in dense patches $1\frac{1}{2}$ in. high, yellowish-green above, brown below. *Stems* radiculose, $1\frac{1}{2}$ in. high; innovations fascicled. *Leaves* closely imbricating, small, erecto-patent, ovate, acuminate, concave; margins recurved, serrated; nerve excurrent. *Areola* small, quadrilateral; leaves erect when dry. *Perichætal leaves* similar to the upper ones. *Fruit* acrocarpous. *Fruitstalk* pale, $\frac{3}{8}$ in. long, flexuous. *Capsule* inclined very obliquely, subrotund. *Mouth* small, oblique, furrowed when dry. *Peristome* double; outer teeth 16; inner shorter than the outer, membranous, divided into 16 processes. *Operculum* convex. *Calyptra* cucullate.

Hab. Wet banks, River Hapuka, near Kaikoura; January, 1898. Collected by R. B.

15. *Bartramia erwinii*, sp. nov.

Plants dicecious, growing in dense patches $\frac{1}{2}$ in.—1 in. high, yellow-green above, brown below. *Stems* slender, radiculose; innovations fascicled, $\frac{3}{8}$ in. *Leaves* small, closely imbricating, secund, erecto-patent, lanceolate, acuminate, ending in slender points; margins slightly recurved, serrated, nerved, keeled, excurrent. *Areola* quadrate; leaves scarcely altered when dry. *Perichætal leaves* smaller than the stem ones, otherwise similar. *Fruit* acrocarpous. *Fruitstalk* $\frac{5}{8}$ in. long, flexuous, reddish. *Capsule* ovate, inclined, obliquely connected with the fruitstalk. *Mouth* oblique, furrowed when dry. *Peristome* double; outer teeth 16, free to

the base; inner, a membrane divided nearly to the base into 16 processes. *Operculum* shortly conic. *Calyptra* cucullate.

Named after Rev. Dr. Erwin, Christchurch.

Hab. Stones, in streams, Benmore; January, 1897. Collected by R. B.

16. **Bartramia ovalitheca**, sp. nov.

Plants dioecious, growing in dense patches $1\frac{1}{2}$ in.— $2\frac{1}{2}$ in. long, yellow-green above, brown below. *Stems* slender, radiculose; innovations slender, fascicled, $\frac{1}{2}$ in. long. *Leaves* closely imbricating, nearly erect, small, ovate-lanceolate, acuminate, tapering into a slender point, concave; margins serrated; nerve excurrent, serrated. *Areola* quadrate, leaves erect; appressed when dry. *Perichætal leaves* erect, slightly smaller than the stem ones, linear-lanceolate, tapering from the base into a slender point. *Fruit* acrocarpous. *Fruitstalk* slender, reddish, $\frac{3}{4}$ in.—1 in. long, inclined. *Capsule* ovate, nearly symmetrical, furrowed when dry. *Operculum* shortly conic. *Peristome* double; outer teeth 16, lanceolate, free to the base; inner, membranous, perforated and lacinated. *Calyptra* cucullate.

Hab. Wet rocks, Mount Torlesse; January, 1886. Collected by R. B.

17. **Bartramia tenuis**, Taylor.

Plants dioecious, growing in small loose patches $\frac{1}{2}$ in. high, yellowish-green above, brown below. *Stem* short, slender; innovations fascicled, slender. *Leaves* small, closely imbricating, erecto-patent, ovate-acuminate, point slender; margins serrated, papillose; nerve slender, excurrent. *Areola* small, quadrate; leaves unaltered when dry. *Perichætal leaves* about one-half smaller than the upper ones, ovate-acuminate. *Fruit* acrocarpous. *Fruitstalk* $\frac{1}{2}$ in. long, inclined. *Capsule* oblong, obliquely attached to the fruitstalk. *Mouth* oblique. *Operculum* conic, furrowed when dry. *Peristome* double; outer 16, linear-lanceolate; inner, membranous, lacinated.

Hab. Damp banks, Paterson's Creek, Otarama. Collected by R. B.

18. **Bartramia joycei**, sp. nov.

Plants growing in loose patches 1 in. high, yellowish-green above, brown below. *Stem* radiculose; innovations fascicled, $\frac{1}{4}$ in.— $\frac{3}{8}$ in. *Leaves* closely imbricating, secund, recurved, ovate-acuminate, tapered into a slender point, concave; margins serrated; nerve excurrent. *Areola* quadrate; leaves scarcely altered when dry. *Perichætal leaves* as long as the upper ones, but narrower, erect. *Fruit* acro-

carpous. *Fruitstalk* inclined, 1 in. long, reddish. *Capsule* very obliquely attached to the fruitstalk, horizontal, 1 to 4 in the perichætium, very oblique, oval, ventricose. *Mouth* small, oblique. *Capsule* furrowed when dry. *Peristome* double; outer 16, linear-lanceolate, free to the base; inner, 16, membranous, bifid. *Operculum* and *calyptra* not found.

Named after John Joyce, Papanui.

Hab. Wet banks, near Lake Te Anau; January, 1890. Collected by R. B.

19. *Bartramia turnerii*, sp. nov.

Plants growing in loose patches 1 in. high, yellowish-green above, brown below. *Stem* radiculose; innovations fascicled, $\frac{1}{2}$ in. long. *Leaves* small, closely imbricating, spreading, subsecund, slightly flexuous, shortly lanceolate, tapering into a slender point, concave; margins serrated; nerve excurrent. *Areola* quadrate; leaves scarcely altered when dry. *Perichætial leaves*, inner smaller than the outer one, ovate-acuminate, tapering into a slender point. *Fruit* acrocarpous. *Fruitstalk* slightly flexuous, inclined, $1\frac{1}{4}$ in. long. *Capsule* ovoid, irregular in outline, very obliquely attached to the fruitstalk, horizontal, ventricose. *Operculum* small, short, conic, acute. *Peristome* double; outer teeth 16, linear-lanceolate, free to the base; inner, 16, bifid at the apex. *Calyptra* cucullate.

Named after Thomas Turner, seed-merchant, Christchurch.

Hab. Wet banks, near River Teremakau, West Coast; January, 1886. Collected by R. B.

20. *Bartramia australis*, Mitt.

Plants dioecious, growing in dense patches $1\frac{1}{2}$ in. high, yellowish above, brown below. *Stems* radiculose, stout; innovations fascicled, stout, $\frac{1}{4}$ in.— $\frac{3}{8}$ in. high. *Leaves* imbricating, erecto-patent, lanceolate, acuminate, tapering into a slender point; margins serrated, papillose on the back; nerve excurrent. *Areola*: Upper small, quadrate; lower slightly larger; leaves scarcely altered when dry. *Perichætial leaves* erect, slender, smaller than the stem ones, linear-lanceolate, acuminate, continued into a slender point. *Fruit* acrocarpous. *Fruitstalk* flexuous, reddish, $1\frac{1}{4}$ in. long. *Capsule* horizontal, very obliquely pyriform, gibbous at the base, furrowed when dry. *Mouth* small, oblique. *Peristome* double; outer teeth 16, free to the base, linear-lanceolate; inner, 16, opposite the outer, thickened on the margins, bifid. *Operculum* shortly conic and acute. *Calyptra* small, cucullate.

Hab. Wet rocks, near River Teremakau; January. 1886. Collected by R. B.

21. *Bartramia pyriforma*, sp. nov.

Plants dioecious, growing in dense patches 1 in.—3½ in. high, yellow-green above, brown below. *Stems* radiculose, simple or dichotomously branched below; innovations slender, fascicled, ½ in.—1 in. long. *Leaves* small, closely imbricating, secund, erecto-patent, broadly ovate-lanceolate, acuminate or cordate-acuminate continued into a slender point, concave; margins serrated; nerve excurrent, minutely toothed near the apex, papillose. *Areola* quadrate; leaves nearly erect when dry. *Perichæatial leaves* smaller than the upper ones, but otherwise similar. *Fruit* acrocarpous. *Fruitstalk* flexuous, red, 1½ in. long. *Capsule* horizontal or inclined obliquely, obovate, with a tapering base, slightly gibbous, furrowed when dry. *Mouth* small, oblique. *Operculum* small, conic, acute. *Peristome* single, 16, linear-lanceolate. *Calyptra* cucullate.

Hab. Rocks dripping with water, near Lake Te Anau; January, 1890. Collected by R. B.

22. *Bartramia remotifolia*, Hook. f. and Wils.

Plants dioecious, growing in loose patches ½ in.—1 in. high, glaucous, pale-green. *Stem* simple, radiculose; innovations fascicled, ½ in. long. *Leaves* imbricating; lower stem ones erect, ovate, acuminate; upper spreading, with an ovate base, tapering into a long slender point; papillose margins, subrecurved, slightly serrated towards the apex; nerve pellucid, excurrent; leaves closely imbricating, spreading, papillose. *Areola* quadrate; leaves nearly erect when dry. *Perichæatial leaves* narrower and shorter than the upper; stem leaves linear-lanceolate, tapering into a long slender point. *Fruit* acrocarpous. *Fruitstalk* 1 in. long, inclined, red. *Capsule* large, obliquely attached to the fruitstalk, obliquely oval. *Mouth* small, oblique. *Operculum* convex, furrowed when dry. *Peristome* double; outer 16, linear-lanceolate, free to the base; inner, 16, membranous, free to the base. *Calyptra* not found. Leaves on the male plant erecto-patent.

Hab. Wet banks, Port Lyttelton hills; January, 1886; banks, near Waimakariri; December, 1887. Collected by R. B.

23. *Bartramia buchanani*, sp. nov.

Plants dioecious, growing in dense patches, yellowish-green above, green at the middle, brown below, 1 in.—3½ in. high. *Stems* radiculose below; innovations fascicled, ⅔ in.—½ in. high. *Leaves*, upper closely imbricating, spreading, ovate-lanceolate, acuminate, tapering into a slender point; margins serrated, back minutely papillose; nerve slender, excurrent. *Areola* small, linear-oblong; leaves flexuous when dry. *Peri-*

chatral leaves erect, smaller than the upper ones, lanceolate, acuminate, tapering into a slender point, innermost smallest. *Fruit* acrocarpous. *Fruitstalk* flexuous, red, $1\frac{1}{2}$ in. long. *Capsule* inclined, obliquely pyriform, gibbous near the base. *Mouth* small, oblique. *Capsule* furrowed when dry. *Peristome* double; outer teeth 16, free to the base, linear-lanceolate; inner, membranous, 16. *Operculum* not found.

Hab. West Coast Road; February, 1883. Collected by R. B.

24. **Bartramia pendula**, Hook.

Plants diœcious, growing in dense patches 1 in.— $3\frac{1}{2}$ in. high, yellowish-green above, brown below. *Stems* erect, radiculose; innovations fascicled, $\frac{3}{4}$ in.— $1\frac{1}{2}$ in. long. *Leaves* closely imbricating, erecto-patent, ovate-lanceolate, acuminate, tapering into a slender point; margins serrated; nerve slender, excurrent, under-surface papillose. *Areola*: Upper small, quadrate; lower linear; leaves incurving when dry. *Perichætal leaves* erect, smaller than the upper ones, linear-lanceolate, acuminate, tapered into a slender point. *Fruit* acrocarpous. *Fruitstalk* flexuous, red, $1\frac{1}{2}$ in. long. *Capsule* horizontal or pendulous, oblong-pyriform, furrowed when dry. *Operculum* convex. *Peristome* double; outer 16, free to the base; inner, membranous, bifid to the middle.

Hab. Damp banks, Milford Sound; January, 1890. Collected by R. B.

25. **Bartramia elongata**, Mitt.

Plants diœcious, growing in large loose patches 2 in.—7 in. high, yellow-green. *Stems* very stout, curved, prostrate, ascending; innovations simple or dichotomously branched. *Leaves* closely imbricating, secund, spreading or erecto-patent, recurved, falcate, furrowed, pellucid, ovate-lanceolate, acuminate; margins distantly toothed; nerve slender, excurrent into a papillose hair-point. *Areola* oblong-linear; alar large, quadrate; leaves scarcely altered when dry. *Perichætal leaves* smaller, erect, linear-lanceolate, innermost acute, outer acuminate with a short hair-point, nerveless. *Fruit* acrocarpous. *Fruitstalk* stout, red, slightly flexuous. *Capsule* horizontal, large, oblong, pyriform, slightly gibbous at the base, furrowed when dry. *Peristome* single, 16, with membranous margins. *Operculum* and *calyptra* not found.

Hab. Wet rocks, near Teremakau River; January, 1886; and near Lake Te Anau; January, 1890. Collected by R. B.