

APRIL, 1903.

VOL. XVII, No. 1

THE OTTAWA NATURALIST.

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VOL. XVII.

1903.

THE
OTTAWA NATURALIST,

Being Vol. XIX. of the

TRANSACTIONS

OF THE

OTTAWA FIELD-NATURALISTS' CLUB,

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Incorporated March, 1884.

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OTTAWA PRINTING COMPANY (LIMITED.)

1903.



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THE OTTAWA NATURALIST.

VOL. XVII.

OTTAWA, APRIL, 1903.

No. 1.

THE REPORT OF THE COUNCIL OF THE OTTAWA FIELD-NATURALISTS' CLUB FOR THE YEAR ENDING MARCH 17TH, 1903.

The total membership of the Club is at present 262, of which 254 are ordinary members and eight corresponding.

Mr. W. T. Macoun represented the Club at the meeting of the Royal Society of Canada held in Toronto in May, and read a report on the work done by the Club during the year.

SOIRÉES.

Seven soirées were held during the winter, the lectures arranged for by the Soirée Committee covering a great variety of subjects. The programme was published on page 210 of THE OTTAWA NATURALIST.

These lectures were delivered as arranged except the last two. Professor E. E. Prince being ill was not able to be present, and Mr. Andrew Halkett kindly undertook to explain the slides, so that the lecture was not postponed. The last part of the programme had to be dispensed with (Mar. 17th) as Dr. Ami was absent from the city. The lecturers were all residents of Ottawa except Professor D. P. Penhallow of McGill University, Montreal. The Council is pleased to be able to report that the whole course has been well attended by appreciative audiences.

EXCURSIONS.

Sub-excursions on Saturday afternoons were arranged for April 12th, 19th and 26th and May 3rd, 10th and 31st. The first and third of these were not held on account of rain. On April 19th about 175 members and friends met at Aylmer and collected

the Mayflower (*Epigaea repens*) and other plants, also insects and rock specimens. A similar excursion was held on May 3rd to Beaver Meadow, west of Hull, Que., when fifty attended. Rideau Park, a new locality, was visited May 10th when forty or fifty members were present. Many plants were found but unfortunately the frost of the previous night had destroyed most of them. Considerable interest was taken in the boulder clay and Utica shale of this locality. Autumn sub-excursions were also held at the end of August and through September to Hull, Aylmer, Rockcliffe and the Montreal Road, principally by the botanical and entomological branches. Roots of native violets and other perennial plants were collected. Sub-excursions were held by the entomologists to collect moss for sifting for insects in October, and a list of fifty-one species of beetles was made as well as representatives of some other orders of insects.

Two general excursions were held during the summer to Chelsea. The first on May 17th, when 250 members and friends of the Club attended, and the second on September 6th, when about 200 were present. Both excursions were highly successful.

THE OTTAWA NATURALIST.

THE OTTAWA NATURALIST has been published regularly under the continued editorship of Mr. James M. Macoun. Volume XVI has been completed, consisting of twelve numbers which contain 248 pages and four plates. Uncoloured copies of the Geological Map of the city of Ottawa and vicinity were purchased from the Geological Survey Department for distribution with the December number of THE OTTAWA NATURALIST to all Canadian members of the Club. This map is on the scale of one mile to an inch and covers an area of over twenty miles square. Some copies which remain may still be purchased from the treasurer.

The following are some of the more important papers published during the year :

Birds of Sable Island, N.S.; Canadian Hummingbirds, by W. E. Saunders.

Five New Ranunculi; New Northwestern Plants, by Edw. L. Greene.

Marl Deposits of Eastern Canada, by R. W. Ells.

On the Nepheline Rocks of Ice River, B.C.; Dr. Alfred R. C. Selwyn, C.M.G., F.R.S., Director Geological Survey of Canada, 1869-1894, by A. E. Barlow.

On the Genus *Arctophila*, by Dr. Theo. Holm.

Notes on some Fresh-water and Land Shells; Description of a Fossil *Cyrena*; On the Genus *Trimerella*, by J. F. Whiteaves.

Notes on the Arboretum and Botanic Gardens, Central Experimental Farm, by W. T. Macoun.

Notes on Some Canadian Birds, by Wm. H. Moore

Nesting of Some Canadian Warblers (two parts), by Wm. L. Kells.

Field Notes on the Geology of the country about Chelsea, Que., H. M. Ami.

Observations on Animals Native in the Algonquin Park, by Andrew Halkett.

The Educational Value of Nature Study, by A. E. Attwood.

Notes on the Size of Hawks' Eggs, by J. E. Keays.

Contributions to Canadian Botany No. XVI, by James M. Macoun.

Ottawa *Satyrinæ*, A. E. Richard.

Besides these there are numerous short papers on scientific subjects, reports of soirées and excursions and of the work done by the various branches of the Club, and reviews of scientific books.

REPORTS OF BRANCHES.

The Geological Branch did not present any formal report this year as Dr. Ami's paper, which was on the programme for the last soirée, would have covered the same ground. The branch, has, however, continued its work, and leaders in this subject have attended all the excursions and explained the salient geological features of the places visited. Part of the skeleton of a large fish, probably a salmon, was found in a calcareous nodule at Besserer Grove and is now in Dr. Ami's possession.

The Botanical Section reports a most successful year's work. The botanical sub-excursions were well attended, several species new to this region were discovered and many new localities found

for rare species. The more active botanical workers have met twice a month for the purpose of discussing methods of work and other matters of interest, and it is expected that these meetings will result in a more systematic prosecution of botanical work in the vicinity of Ottawa.

The Entomological Branch reports a continuance of useful work both in the field and in the study. Many additions were made during the year to our faunal lists, especially in the order Lepidoptera, and the life histories of many species have been ascertained by breeding specimens. The branch has been holding fortnightly meetings during the winter, with a satisfactory attendance, and the proceedings have been both interesting and profitable to the members. The quickened interest in the subject will doubtless result in increased collecting during the coming season, and of greatly enlarged knowledge of our insects and their habits.

The Ornithological Branch reports that although there was a fair amount of interest manifested in the study of birds there were few who did much systematic work. The dates of arrivals of birds were recorded as usual by several of the members. An interesting feature of the report is the list of birds which breed at the Central Experimental Farm. When the farm was taken over by the Government in 1886, comparatively few birds bred there, but the planting of the trees in the belts and ornamental grounds has increased the number to thirty-eight. THE OTTAWA NATURALIST was well supplied with ornithological notes but unfortunately few of these were written by local members.

The Report of the Zoological Branch recommends the study of the smaller mammalia as likely to afford a useful field of research. This would embrace insectivorous mammals, such as moles and shrews; rodents, such as mice, voles and squirrels; and cheiropterous mammals, or bats. A black squirrel and a silver fox were mentioned as having been recently exhibited alive in shop windows on Sparks street. In regard to batrachians the observations of Mr. W. S. Odell concerning *Spelerpes bilineatus* were referred to and Mr. Andrew Halkett exhibited at the meeting at which the report was read three living so-called mud-puppies. The principal part of the report deals with the collecting of

representative Canadian fishes during the past season as a nucleus of a new collection for the Department of Marine and Fisheries, and cites examples belonging to the four great groups into which the fishes of the Dominion are divisible.

The treasurer reports a balance on hand of \$41.73.

The Council desires to express its gratification at the honors recently paid two of the members of the Club in the awarding by Cambridge University to Dr. Robert Bell, the President, of the degree of Doctor of Science, and in the granting of the Bigsby Medal to Dr. H. M. Ami, a former president, by the Geological Society of London.

The Council desires to place on record its sense of the loss which the Club has sustained through the sudden death of Dr. J. A. MacCabe, late principal of the Normal School, who for many years was a member of the Club. The Club was much indebted to him for the frequent use of rooms for meetings and for the permanent use of a room for the library. His genial presence and inspiring addresses added much to the interest of the meetings which he attended.

The thanks of the Club are due to Mr. J. F. White, M.A., the present Principal of the Normal School, for continuing to us the privileges we now enjoy; also to the daily newspapers of the city for kindly inserting notices of our meetings free of charge.

Respectfully submitted.

W. J. WILSON,
Secretary.

THE OTTAWA FIELD NATURALISTS' CLUB.

The Treasurer's Statement for the year ending March 17, 1903.

| RECEIPTS. | EXPENDITURE. |
|--------------------------------------|---|
| Balance from previous year. \$129 28 | Printing OTTAWA NATURALIST, 12 numbers, 248 pp. \$295 00 |
| Subscriptions, 1902-03 . \$136 | Illustrations 29 37 |
| Arrears 62 | Authors' extras 33 55 |
| Advertisements 198 00 | Miscellaneous printing, wrappers, post cards, etc. 19 68 |
| OTTAWA NATURALISTS sold.. 42 25 | Postage 377 60 |
| Maps of Ottawa sold. 1 30 | Editor 24 79 |
| Government grant 200 00 | Editor 50 00 |
| | 452 39 |
| | Less 5% for cash on printers' bill (\$377.60) 18 88 |
| | — \$433 51 |
| | Soirée expenses 68 23 |
| | Geological Survey Dept., 500 copies of Map of Ottawa .. 16 74 |
| | Sundry expenses, postage, stationery, etc 10 82 |
| | Balance 41 73 |
| | — \$571 03 |
| | \$571 03 |

Examined and found correct.

J. BALLANTYNE, }
R. B. WHITE, } Auditors.

March 17, 1903.

ARTHUR GIBSON,
Treasurer.

MAILING LIST.

The Publishing Committee is preparing a new mailing list, and members of the Club and subscribers to THE OTTAWA NATURALIST are requested to advise either the Secretary or the Treasurer of any changes that have been made in their addresses. It is the desire of the Publishing Committee to make the mailing list as nearly correct as possible, and in order to do this they must be aided by those who have not received the Club journal regularly.

YUKON HEPATICÆ.

ALEXANDER W. EVANS.

(With Plates I and II.)

Our knowledge of the hepaticæ occurring in the Territory of Yukon is based on two collections. The first was made by Mr. R. S. Williams in 1898, the second by Professor John Macoun in 1902. Mr. Williams's collection was reported upon by Dr. Marshall A. Howe,¹ who listed twenty-four species. One of these species, however, determined from gemmiparous material, is somewhat doubtful and two additional species have since been detected among Mr. Williams's specimens, so that twenty-five are now definitely known from his collection. Of these twenty-five species, fifteen came from Dawson, while the remainder were collected south of the sixtieth parallel and should not therefore, strictly speaking, be included among the hepaticæ of Yukon. Professor Macoun's entire collection was made in the vicinity of Dawson and is composed of thirty-six species, including all except two of those found by Mr. Williams in the same region. At present, therefore, thirty-eight species are known with certainty from Yukon Territory. All of these species have a wide distribution at high latitudes and many of the more common ones are found in temperate regions also. Upon comparing the Yukon species with those found in other arctic countries where the hepaticæ are fairly well known, we find that all except two have been recorded from Norway, all except six from Siberia, all except eight from Greenland, and all except fourteen from the adjacent Territory of Alaska. Eighteen of the species are known from all four of these regions, and it is probable that others have a like circumpolar distribution. Twenty-five of the Yukon species are known from the United States.

Two of the species in Professor Macoun's collection, *Jungermannia Sahlbergii*, Lindb. & Arnell, and *Lophosia Kaurini* (Limpr.) Steph., have not before been recorded from America. The first of these is of especial interest. It was originally described from material collected in the Jenisei region of Siberia. In spite of its

¹ Bull. New York Bot. Garden, 2⁶: 101-105, pl. 14. 1901.

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strong superficial resemblance to *Lophozia Rutheana*, Lindberg recognized its distinctness and made it the type of his section *Mesoptychia*. Schiffner afterwards raised this section to sub-generic rank under *Lophozia*. The Yukon specimens, however, which are more complete than those originally found, show conclusively that *J. Sahlbergii* should be considered the type of a distinct genus, for which Lindberg's appropriate sectional name may be retained. In the following enumeration the numbers quoted refer to the specimens collected by Professor Macoun.

Marchantiaceæ

1. ASTERELLA FRAGRANS, (Schleich.) Trevis.
Hunker Creek (61).
2. PREISSIA QUADRATA, (Scop.) Nees.
Hunker Creek (62).
3. MARCHANTIA POLYMORPHA, L.
Dawson (1); West Dawson (Williams).

Metzgeriaceæ.

4. RICCARDIA PINGUIS, (L.) S. F. Gray.
Dawson (5); Bonanza Creek (85).

Jungermanniaceæ.

5. GYMNOTRIUM CORALLOIDES, Nees.
Indian Divide (98).
6. NARDIA SCALARIS, (Schrad.) S. F. Gray.
Dawson (Williams).
7. ARNELIA FENNICA, (Gottsche) Lindb. Meddel. Soc. F. et Fl.
Fenn. 14 : 70. 1887. Lindb. & Arnell, Kongl. Sv. Vet. Akad.
Handl. 23⁵ : 35. 1889.

Jungermannia Fennica, Gottsche ; G. & R. *Hep. Eur.* 418. 1868.
Southbya Fennica, Gottsche, l. c.

Hunker Creek (64 *p.p.*); Dawson (Williams), a few fragments only, not listed by Howe. A widely distributed species, now known in the Old World from Norway, Sweden, Finland, Italy and Siberia. In North America the species has been previously collected by Dusén in Greenland, and by

Macoun at Lake Manitoba and in the Rocky Mountains of British Columbia.

MESOPTYCHIA, (Lindb.) gen. nov.

Jungermannia, B. *Eujungermannia*, b *Mesoptychia*, Lindb.; Lindb. & Arnell, Kongl. Sv. Vet. Akad. Handl. 23⁵: 39. 1889.

Lophozia, subgenus *Mesoptychia*, Schiffn.; Engler & Prantl, Die natürl. Pflanzenfam, 1³: 85. 1893.

Stem simple or sparingly branched, sometimes with subfloral innovations: rhizoids numerous: leaves alternate, succubous, more or less deeply bilobed and longitudinally folded at about the middle; antical lobe convex; postical lobe concave; underleaves deeply bifid with ciliate divisions: leaf cells with distinct trigones and verruculose cuticle: ♀ inflorescence terminal on a stem or leading branch; bracts and bracteoles similar to the leaves and underleaves, more or less adnate to the perigynium; perianth free with two rounded lateral keels and a sharper antical keel (*i.e.* epigynianthous), contracted and short-ciliate at the mouth; perigynium pendent at right angles to the axis, cylindrical, with numerous scattered rhizoids, smooth inside; calyptra fleshy, covering the whole of the sporophyte except the foot and bearing the unfertilized archegonia at its base: ♂ inflorescence intercalary on a stem or leading branch; bracts similar to the leaves but often with a small tooth-like or sac-like lobe at antical base; paraphyses (when present) in the form of minute filamentous or subulate hairs; bracteoles similar to the underleaves: young sporophyte of the ordinary jungermanniaceous type, divided into capsule, stalk and foot, the last being bluntly conical and extending around the base of the stalk as a narrow collar; mature capsule unknown.

8. MESOPTYCHIA SAHLBERGII, (Lindb. & Arnell).

Jungermannia Sahlbergii, Lindb. & Arnell, *l. c.* 40.

Lophozia Sahlbergii, Schiffn. *l. c.* 85.

Robust, brownish-green or reddish, growing in loose tufts: stems slightly flattened, 0.8 mm. wide, 0.4 mm. thick

on well developed individuals : rhizoids yellowish to reddish : leaves imbricated, obliquely inserted, widely spreading, very broadly orbicular, 1.9 mm. long, 3 mm. wide, antical lobe often a little smaller than the postical, broadly ovate, slightly decurrent, antical margin rounded, apex rounded to subacute, usually terminating in an apiculum consisting of a row of from one to four cells ; sinus (in explanate leaves) varying from obtuse to broadly and shallowly lunulate or truncate ; postical lobe orbicular, postical margin rounded, sometimes subcordate at base, more rarely short-decurrent, apex rounded to obtuse, sometimes apiculate ; margin repand, indistinctly crenulate from projecting cells, sometimes bearing one or two short teeth at about the middle of the antical lobe or near the postical base ; leaf-cells at the edge of leaf 0.025 x 0.021 mm., in the middle isodiametric, averaging 0.031 mm., slightly elongated at the base, trigones slightly bulging into cell-cavities ; verruculæ of cuticle densely crowded, oval or circular in outline : underleaves with lanceolate or subulate long-attenuate divisions, each 1.4 mm. long, 0.17 mm. wide ; marginal cilia six to fifteen on each division, mostly two to twenty cells long and one to five cells wide at base ; cells of underleaf with more uniformly thickened walls than in leaf, trigones indistinct, cuticle verruculose : inflorescence dioicous ; ♀ bracts alternate in about three pairs, the innermost quadrate, 2 mm. long, with sharper lobes than in the leaves, both antical and postical commonly apiculate, marginal teeth more usual than on ordinary leaves : innermost bracteole often torn in two and carried down by the developing perigynium ; perianth ovate in outline, 2.7 mm. long, 1.4 mm. in diameter, one cell thick, irregularly lobed at the contracted mouth, the lobes short-ciliate on their margins with cilia from one to four cells long and one cell broad throughout ; perigynium cylindrical, hollow, rounded at the apex, 3 mm. long, 1.4 mm. in diameter, the wall about ten cells thick (0.25 mm.), somewhat thinner toward junction with perianth : calyptra about five cells thick (0.15 mm.) over capsule, thicker in lower part ; archegonia usually ten to sixteen : antheridia few in the axil of each ♂ bract. (*Plate I.*)

Hunker Creek (51, 57); Dawson (Williams), not listed by Howe. New to America. Previously recorded from Siberia only. The Yukon material has been compared with Siberian specimens kindly communicated by Dr. Arnell.

The genus *Mesoptychia* is allied to *Lophobia* and also to *Acrobolbus*, both of which have succubous, alternate and variously lobate leaves. It is distinguished from the first of these genera by the possession of a perigynium and from the second by the possession of a perianth. The perigynium of *Mesoptychia* is further distinguished from that of *Acrobolbus* by being hollow and by carrying down with it, as it develops, the unfertilized archeogonia. The occurrence of both perianth and saccate perigynium in the same plant is a most remarkable feature but is not entirely unique, for we find it duplicated in *Arnellia*. In this genus, however, the leaves although succubous are undivided and opposite, coalescing in pairs at their antical bases, and the underleaves are simple. In the genus *Gyrothyra* as well as in *Nardia hæmatosticta* and the allied *N. Breidleri*, we also find a certain approach to the condition described for *Mesoptychia*. In these plants the end of the female branch becomes fleshy after fertilization and forms an erect perigynium, which encloses the developing sporophyte. On the outside of this fleshy perigynium are borne the perichæatial bracts and at its mouth the rudimentary perianth. The lower part of the perigynium extends downward as a small solid bulbous enlargement, into which the foot of the sporophyte penetrate more or less deeply. In *Gyrothyra* the unfertilized archeogonia remain near the mouth of the perigynium, somewhat as in *Acrobolbus*, while in the two species of *Nardia* they are found at the bottom. The most essential difference between the three plants just discussed and *Mesoptychia* lies in the fact that their perigynia are erect, growing upward at right angles to the fruiting axis, while in *Mesoptychia* they are pendent and grow downward. There are of course many other differences drawn from purely vegetative characters.

As in other saccate genera, the development of the perigynium in *Mesoptychia* is dependent upon fertilization. The

perianth, on the other hand, is found whether fertilization has taken place or not. So far as observed, innovations are never produced where fertilization has occurred. The leaves of *L. Sahlbergii* exhibit considerable variation but the antical lobe is almost invariably sharper and a little smaller than the postical; in the perichætical bracts, however, this difference tends to disappear.

9. LOPHOZIA RUTHEANA, (Limpr.) M. A. Howe, Bull. New York Bot. Garden, 2⁶ : 102. 1901. (*Plate II.*)

Bonanza Creek (14), also collected by Williams at the same locality; Hunker Creek (46). These are the only known American stations, but the range of the species extends through northern Europe into Siberia.

Two very full descriptions of *L. Rutheana* have already been published, the first being Limpricht's original description,¹ the second Lindberg's description of his *Jungermannia lophocoleoides*,² which is now acknowledged to be a synonym of *L. Rutheana*. At the same time the species resembles *Mesoptychia Sahlbergii* so closely, especially when sterile, that it may be well to emphasize the more important differential characters. Of course fruiting specimens are very distinct, and, even in the case of sexual individuals where fertilization has not taken place, the parocious inflorescence of *L. Rutheana* and the dioicous inflorescence of the *Mesoptychia* may usually be demonstrated without much trouble.

The two species are of about the same size and they resemble each other in color. Both species, moreover, have bifid leaves and conspicuous underleaves and both show distinct trigones in their leaf-cells and a strongly verruculose cuticle. In *L. Rutheana*, however, the leaves are not folded and are sometimes gibbous at the bottom of the sinus. The apices of the lobes are very variable, being sometimes rounded, sometimes obtuse and sometimes acute, but they are rarely or never distinctly apiculate. If there is any inequality in the size of the lobes or any difference in their

¹ Jahresb. Schles. Gesell. vaterl. Cultur, 61 : 207. 1884.

² Lindb. & Arnell, Kongl. Sv. Vet. Akad. Handl. 23⁵ : 41. 1887.

apices, it is the postical lobe which is smaller and more sharply pointed, just the opposite of what we find in *Mesoptychia Sahlbergii*. The leaf-cells of *L. Rutheana* average 0.023×0.032 mm. at the margin of the leaf, 0.055×0.030 mm. in the middle and 0.055×0.039 mm. near the base. They are therefore a little larger than in the *Mesoptychia* and are more distinctly elongated in the median and basal portions of the leaf. The trigones of the two species are similar, but the verruculæ the cuticle of *L. Rutheana* are fusiform in shape, rather than oval or circular, and lend the leaf-surface a distinctly striated appearance. The underleaves of *L. Rutheana* are much more variable than in *Mesoptychia Sahlbergii*. They are occasionally bifid but are more commonly trifold to quinquefid with the median division distinctly larger than the others. The divisions are lanceolate and end in long filiform points which are commonly curved in various ways. In some cases one or more of the divisions arise from the surface at the base of the underleaf instead of from the margin. The divisions are often sparingly ciliate, but each one rarely shows more than a half dozen cilia and the latter are shorter and broader than in the *Mesoptychia*.

The perichæatial bracts of *L. Rutheana* are broader than long, measuring 2.5×3 mm., and commonly show obtuse lobes. The perianth is very large, measuring when mature 5 mm. in length and 1.4 mm. in diameter; its wall is three to five cells thick (0.14 mm.) at the base, two cells thick to about the middle and one cell thick in the upper part. The perianth is gradually narrowed above the middle but is not distinctly beaked nor contracted at the mouth. The latter is minutely setulose, the thick-walled setulæ being two cells long or less. With respect to the folds of the perianth descriptions vary. Lindberg states that it is obtusely trigonous, the third keel being postical, but asserts that while young it is often laterally compressed. Limpricht emphasizes the lateral compression and adds that there is sometimes a shallow groove down one lateral face and a corresponding low ridge down the other, sometimes a groove on each face. He also states that a trigonous perianth with the third keel antical is of occa-

sional but rare occurrence. According to my own experience the compressed perianth is a very constant feature of the species. The perigonal bracteoles of *L. Rutheana* are sometimes, but not always, shorter than the ordinary underleaves.

10 LOPHOZIA KAURINI, (Limpr.) Steph. Bull. de l'Herb. Boissier, II. I : 1147. 1901.

Jungermannia Hornschuchiana parvica, Ekstrand, Bot. Notis. 1879 : 36.

Jungermannia (Lophozia) Kaurini, Limpr. Jahresb. Schles. Gesell. vaterl. Cultur, 61 : 204. 1884.

Jungermannia Muelleri, forma *parvica*, Bernet, Cat. Hép. Sud-Ouest de la Suisse, etc. 68. Pl. 3. 1888.

Hunker Creek (44 p.p., 49, 63). New to America. Previously known from Norway, Switzerland and Siberia.

Limpricht's description of *L. Kaurini* and the beautiful figures published by M. Bernet give so clear an idea of the species that only its more important characters will be alluded to here. It agrees with *L. Rutheana* in its paroicous inflorescence, in its bifid leaves and in the possession of underleaves. It is, however, less robust and shows little or no trace of purplish or reddish coloration. The lobes of its leaves are rounded to acute and on slender shoots are not infrequently apiculate; the sinus is broad, varying from obtuse to lunulate. According to Limpricht obtuse or rounded lobes are to be regarded as the more typical, but acute lobes are about as frequent in the Yukon material. In most cases the lobes are subequal in size, but sometimes the postical lobe is slightly the larger and in such cases tends to be blunter also. The leaf-cells are somewhat smaller than in *L. Rutheana*, averaging 0.035 x 0.025 mm. in the middle of the leaf; the trigones also are less conspicuous, but the cuticle is similarly striate-verruculose. The underleaves are small and are commonly undivided; they vary from subulate to lanceolate and end in a long attenuate point. Sometimes an underleaf will bear one or two short marginal teeth or occasionally a longer tooth near the base.

The perianth of *L. Kaurini* is clavate in shape and measures 3 mm. in length and 1.4 mm. in diameter. It is terete except when very young, and is abruptly contracted into a short and broad beak with a setulose mouth, the setulæ consisting of single, projecting, thin-walled cells. The character of the perianth shows that the species is related to *L. Muellieri* and its allies.

11. LOPHOZIA HETEROCOLPA, (Thed.) M. A. Howe.

Dawson (2, 6); West Dawson (8); Hunker Creek (29 *p.p.*, 44 *p.p.*, 48, 59, 67, 79, 80 *p.p.*). Also collected by Williams at Dawson. Nos. 29, 79 and 80 are a little doubtful and show an approach to *L. Muellieri* (Nees) Dumort. They are referred to *L. heterocolpa* because they are gemmiparous, and the writer would include under the same species the gemmiparous specimens referred by Howe to *Geocalyx graveolens*.

12. LOPHOZIA VENTRICOSA, (Dicks.) Dumort.

Dawson (34 *p.p.*); West Dawson (7); Indian Divide (93, 101); Hunker Creek (41, 55, 75 *p.p.*); Bonanza Creek (86 *p.p.*).

13. LOPHOZIA WENZELII, (Nees) Steph. Bull. de l'Herb. Boissier, II. 2: 35. 1902.

Jungermannia Wenzelii, Nees, Naturg. der europ. Leberm. 2: 58. 1836.

Hunker Creek (82 *p.p.*). The species is widely distributed in northern Europe and in Siberia. It is also known from Greenland, but has not before been reported from the American mainland.

14. LOPHOZIA INFLATA, (Huds.) M. A. Howe.

Hunker Creek (70).

15. LOPHOZIA FLOERKII, (Web. & Mohr) Schiffn.

Hunker Creek (76, 81).

16. LOPHOZIA BARBATA, (Schreb.) Dumort.

Klondike River bottom (Williams).

17. LOPHOZIA LYONI, (Tayl.) Steph.

Klondike (Williams); West Dawson (84); Indian

Divide (92, 94); Hunker Creek (38, 68 *p.p.*, 83); Bonanza Creek (90).

18. LOPHOZIA BINSTEADII, (Kaalaas).

Jungermannia Binsteadii, Kaalaas, Vid.-Selsk. Skrifter, 1898^o : 9.

Dawson (34 *p.p.*); Bonanza Creek (11, 12, 22, 35). Originally described from Norwegian specimens. Recently recorded from Greenland. Determination confirmed by C. Jensen.

The species is close to *L. gracilis* (Schleich.) Steph. but is destitute of flagelliform branches bearing gemmæ. The walls of its leaf-cells also are much more thickened and show very conspicuous trigones. Some doubt is thrown on the validity of the species by C. Jensen,¹ who suggests that it may pass into slender forms of *L. Lyoni*.

19. LOPHOZIA INCISA, (Schrad.) Dumort.

Klondike (Williams); Hunker Creek (53 *p.p.*, 80 *p.p.*).

20. SPHENOLOBUS KUNZEANUS, (Hübner.) Steph.

Hunker Creek (74).

21. SPHENOLOBUS MICHAUXII, (Web.) Steph.

Hunker Creek (25, 53 *p.p.*).

22. SPHENOLOBUS SAXICOLUS, (Schrad.) Steph.

Klondike (Williams); Hunker Creek (54); Gold Bottom Creek (78); Indian Divide (99).

23. SPHENOLOBUS MINUTUS, (Crantz) Steph.

Dawson (Williams); Hunker Creek (26, 27, 40, 50); Bonanza Creek (102); Indian Divide (100).

24. MYLIA ANOMALA, (Hook.) S. F. Gray.

Dawson (Williams); Hunker Creek (72); Bonanza Creek (13, 18, 36).

25. LOPHOCOLEA MINOR, Nees.

Bonanza Creek (88).

¹ Öfversigt Kongl. Vetensk. Akad. Förh. 1900⁶ : 798.

26. CEPHALOZIA BICUSPIDATA, (L.) Dumort.
Bonanza Creek (15); Hunker Creek (75 *p.p.*).
27. CEPHALOZIA PLENICEPS, (Aust.) Lindb.
Hunker Creek (32, 60, 65); Bonanza Creek (89).
28. CEPHALOZIA LUNULÆFOLIA, Dumort.
Dawson (34 *p.p.*).
29. CEPHALOZIA LEUCANTHA, Spruce.
Hunker Creek (71).
30. ODONTOSCHISMA MACOUNII, (Aust.) Underw.
Dawson (Williams), listed as *O. Sphagni*; Hunker Creek (24, 52, 58, 90); Bonanza Creek (16 *p.p.*, 20 *p.p.*). Not previously collected in fruit. The species will be fully described in another connection.
31. KANTIA TRICHOMANIS, (L.) S. F. Gray.
Hunker Creek (42).
32. BLEPHAROSTOMA TRICHOPHYLLUM, (L.) Dumort.
Bonanza Creek (Williams); same locality (10, 19 *p.p.*, 21); Hunker Creek (29, 31, 33, 39, 44, 45 *p.p.*, 48, 61, 66, 73 *p.p.*); Indian Divide (95).
33. TEMNOMA SETIFORME, (Ehrh.) M. A. Howe.
Gold Bottom Creek (77).
34. PTILIDIUM CILIARE, (L.) Nees.
Dawson (Williams); Hunker Creek (28, 37, 69); Bonanza Creek (87).
35. DIPLOPHYLLLEIA ALBICANS, (L.) Trevis.
Bonanza Creek (9).
36. DIPLOPHYLLLEIA TAXIFOLIA, (Wahl.) Trevis.
Bonanza Creek (86 *p.p.*); Indian Divide (96, 97).
37. SCAPANIA CURTA, (Mart.) Dumort.
Bonanza Creek (19 *p.p.*); Hunker Creek (30, 43, 64 *p.p.*, 66 *p.p.*).

38. SCAPANIA UNDULATA, (L.) Dumort.
Hunker Creek (68, 82 p.p.).
Yale University, March, 1903.

EXPLANATION OF PLATES.

Plate I.

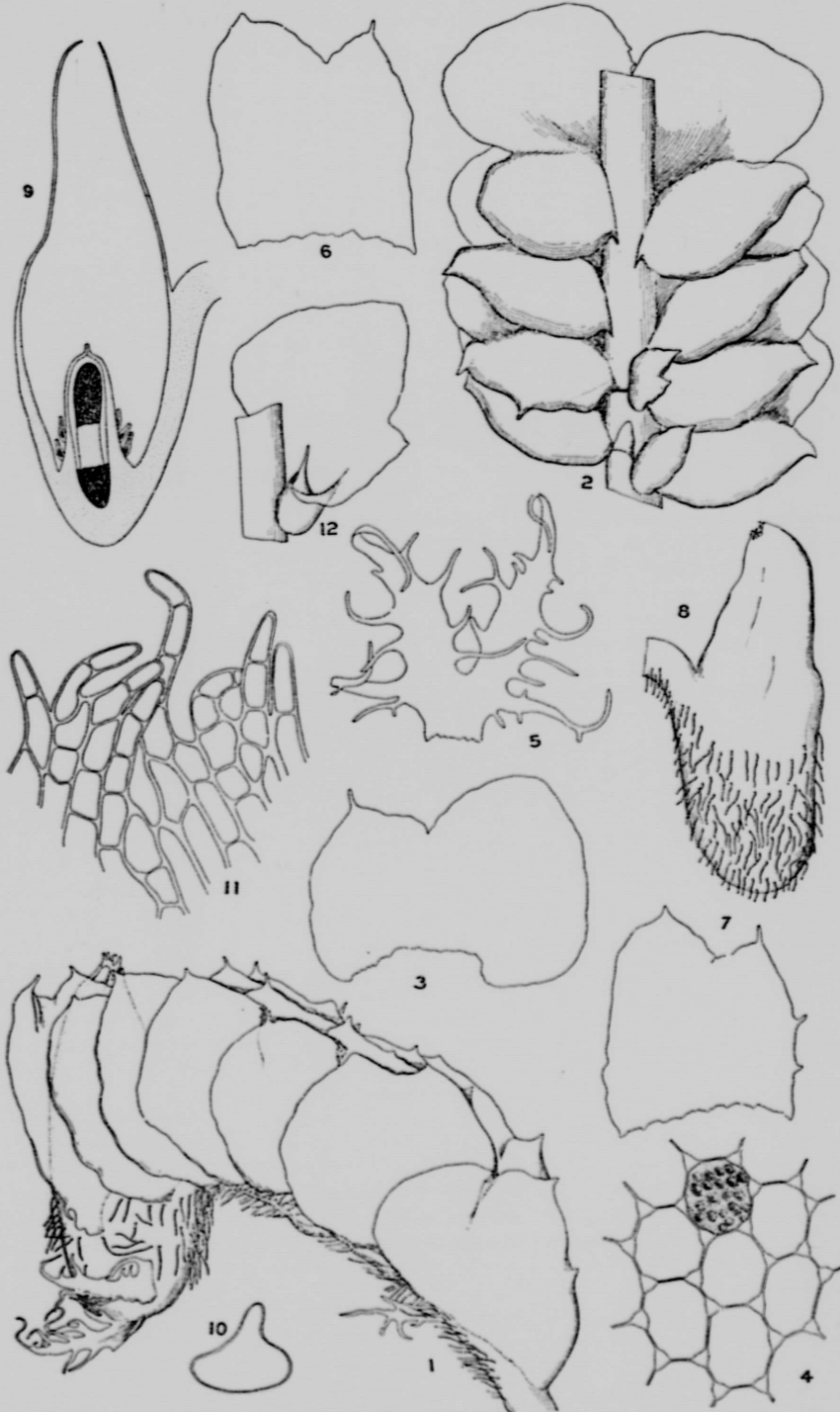
MESOPTYCHIA SAHLBERGII, (Lindb. & Arnell) Evans.

- Fig. 1. Fruiting stem. $\times 12$.
Fig. 2. Part of stem showing perigonial bracts and ordinary leaves, antical view. $\times 12$.
Fig. 3. A leaf spread out. $\times 12$.
Fig. 4. Cells from middle of leaf, one shaded to show the verruculae on the cuticle. $\times 300$.
Fig. 5. Underleaf. $\times 35$.
Figs. 6, 7. Perichæatial bracts. $\times 12$.
Fig. 8. End of fruiting stem with the bracts removed, showing perianth and perigynium. $\times 12$.
Fig. 9. Longitudinal section through same. $\times 16$.
Fig. 10. Transverse section of perianth. $\times 12$.
Fig. 11. Teeth from mouth of perianth. $\times 225$.
Fig. 12. Perigonial bract. $\times 12$.
The figures were all drawn from Professor Macoun's No. 57.

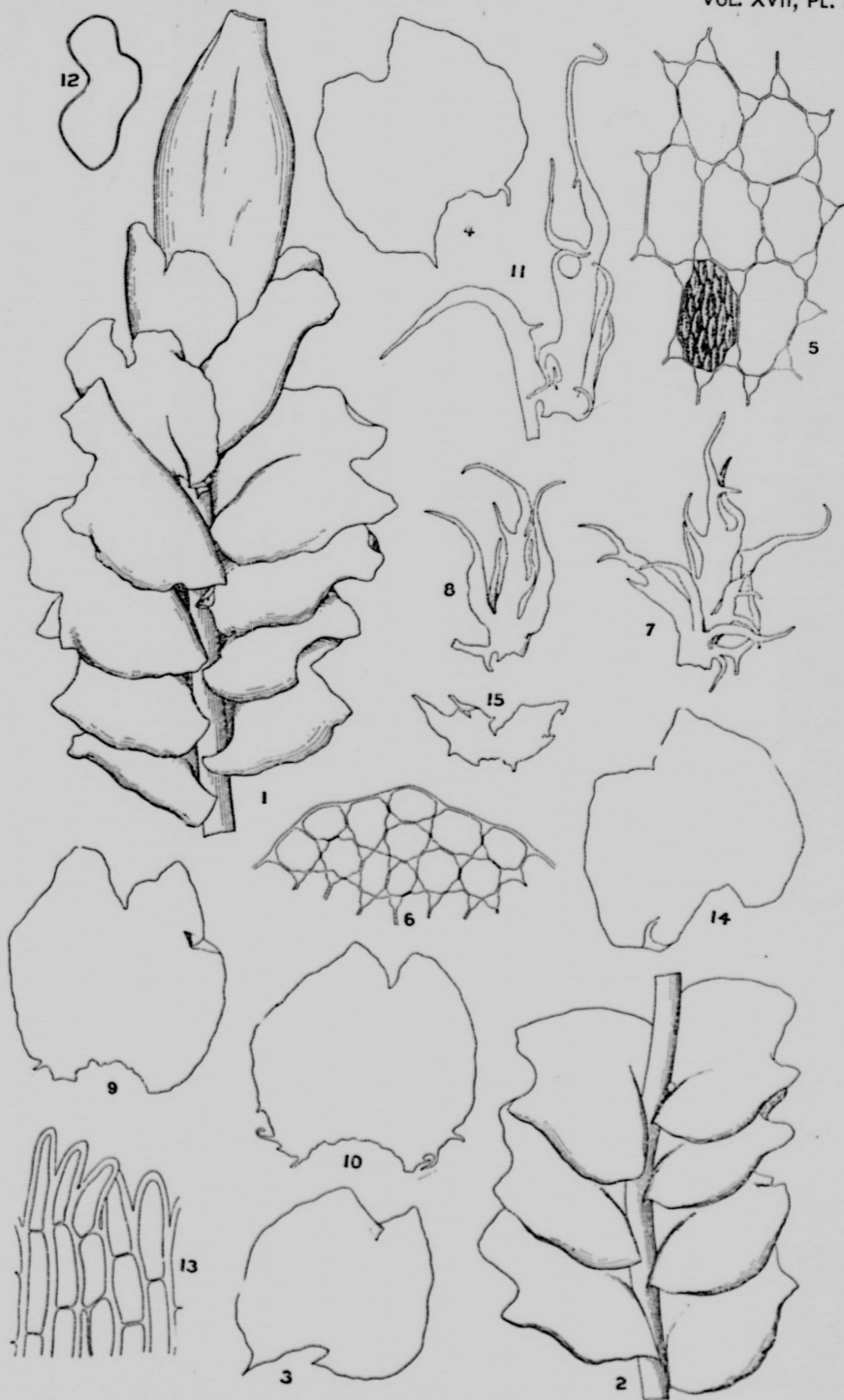
Plate II.

LOPHOZIA RUTHEANA, (Limpr.) M. A. Howe.

- Fig. 1. Fruiting stem, antical view. $\times 12$.
Fig. 2. Part of stem showing ordinary leaves and perigonial bract, antical view. $\times 12$.
Figs. 3, 4. Leaves spread out. $\times 12$.
Fig. 5. Cells from middle of leaf, one shaded to show the verruculae on the cuticle. $\times 300$.
Fig. 6. Cells from apex of antical lobe. $\times 225$.
Figs. 7, 8. Underleaves. $\times 20$.
Figs. 9, 10. Perichæatial bracts. $\times 12$.
Fig. 11. Perichæatial bracteole. $\times 20$.
Fig. 12. Transverse section of perianth. $\times 12$.
Fig. 13. Teeth from mouth of perianth. $\times 225$.
Fig. 14. Perigonial bract. $\times 12$.
Fig. 15. Perigonial bracteole, more specialized than usual. $\times 20$.
The figures were all drawn from Professor Macoun's No. 14.



Mesoptychia Sahlbergii, (Lindb. & Arnell) Evans.



Lophozia Rutheana, (Limpr.) M. A. Howe.

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