

# Notes on the Moss Collections of the Royal Botanic Garden, Edinburgh

BY

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(WITH 14 FIGURES.)

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For some time past I have been determining the unnamed material of mosses in the Herbarium of the Royal Botanic Garden of Edinburgh. Some of the results seem deserving of publication. There are a considerable number of species new to science, and at least one new genus. In addition to this there are quite a sprinkling of specimens from the original and type gatherings; and the frequent necessity for the student to compare authentic material makes it most desirable that the existence of these at Edinburgh should be put on record. I am therefore proposing to publish in these notes descriptions of the new species, together with references to any others of special interest.

The types of the new species are in the Herbarium of the Royal Botanic Garden, and also in my own collection. The reference "Herb. Edin. (44)," etc., indicates the reference number under which the specimens were sent to me, and under which they will be found.

I have to acknowledge my indebtedness to Mr. Wm. Young, of the Herbarium, for much information and help that has made this publication possible.

The present instalment deals with mosses from India, including Ceylon, Assam, and Burma. In the list I have included Ceylon with India, since most of Dr. Wight's specimens labelled "India" are unlocalized, and may have been collected either in Southern India or Ceylon.

For the most part I have preserved the original spelling of the localities on the labels, and for the sake of exactitude in reference I have retained the altitudes in feet, instead of converting them into metres.

## INDIA AND CEYLON.

### FISSIDENTACEAE.

*Fissidens curvato-involutus* Dix. sp. nov.

Quoad partem vegetativam *F. involuto* Wils. simillimus, sed fructu valde distinctus; seta longa, 1-1.25 cm. alta, pallida (illa specie vix [Notes, R.B.G., Edin., No. XCV, July 1938.]

3 mm., fusca); theca *horizontalis*, in *collum longum curvatum* defluens (ibi erecta, aequalis).

Hab. Botanical Garden, Saharunpore, 1863, coll. W. Bell; Herb. Edin. (9).

I can scarcely detect any vegetative difference from *F. involutus* (the cells are perhaps more highly mamilllose than in that species), but the fruit is quite distinct; the capsules there are small, erect and radially symmetric, dark brown and rather glossy, without any distinct collum; here they are larger, horizontal or subpendulous owing to the curving of the long, distinct, tapering collum; while the seta is paler and very much longer.

### DICRANACEAE.

#### *Dicranum orthophylloides* Dix. sp. nov.

Sat robustum; caulis usque ad 6 cm. altus, densiuscule foliosus; folia patula, saepe *subsecunda*, *haud falcata*, sicca minime mutata, usque ad 1 cm. longa; e basi subamplexicauli sensim in subulam longam, sat tenuem, e medio folio *dense*, *grossiuscule*, sat aequaliter dentatam. Costa sat valida, versus basin 75–100 $\mu$  lata, saepe male definita, superne profunde carinata, dorse argute serrata. Cellulae basilares laxiusculae, parietibus nunc tenuibus nunc incrassatis et porosis; subulae *majusculae*, *latiusculae*, *elongatae*, parietibus crassiusculis, plus minusve porosis; alae distinctae, rubrae, minusculae.

Perichaetia *magna*, bracteis convolutis, internis cuspidate longiuscula abrupte desinentibus. Seta 2–2.25 cm. longa, theca e collo brevi *erecta*, *aequalis*, *laevis*, deoperculata circa 2 mm. longa. Peristomium haud magnum, fusco-purpureum; dentes *solidi*, *fortiter nodosi et lamellati*, superne plus minusve distincte striolati.

Hab. Nepal, coll. (probably) Wallich; Herb. Wight (100 c.).

Very different from any known Indian species. *D. gymnostomum* is without peristome, *D. himalayanum* has entire leaves; *D. lorifolium* is a much larger, laxer plant, with much longer, much more flexuose and spreading leaves, and a slightly asymmetric capsule. The nearest allies are two species recently described by Brotherus from Yunnan, viz. *D. (Pseudochorisodontium) orthophyllum*, which is described as gymnostomous, but on the type gathering of which a capsule shows a well-developed peristome. There, however, the leaves, while very similar to those of the present plant, are more erect, rigid and fragile, while the seta is shorter, about 1.5 cm. A second Yunnanese species, *D. cylindricum*, which I have not seen, differs apparently from *D. orthophyllum* only in having the leaves falcate (and therefore nearer our species), and the capsule in pairs in each perichaetium. It is apparently unknown whether they are peristomate, but from the

measurement given they are considerably larger than in our species, and the seta is longer.

**Brothera Leana** (Sull.) C. M.—Nepal, coll. Wallich; Herb. Edin. (12). A form exhibiting well the branched, articulate brood-filaments.

**Dicranodontium uncinatum** (Harv.) Jaeg.—Nepal, coll. Dr. Wallich; Herb. Edin. (15). This is quite probably the original gathering of the species.

**Atractyllocarpus erectifolius** Mitt. MS. in herb., sp. nov.

Dense caespitosus, circa 2 cm. altus; habitu generis. E speciebus asiaticis *A. sinensi* (Broth.) affinis, sed robustior, foliis longioribus, firmioribus, minus teneriter subulatis, setaque firmiore, theca brevior, deoperculata 1.5 mm. Ab *A. comoso* Dix. celebensi differt caulibus brevioribus, foliis brevioribus, integris (5–7 mm., ibi 8–10 mm.), theca minore, brevior.

Hab. On banks, Tongsa, Bhotan, circa 9,000 ft.; Herb. Mitten.

As in the case of most species of this genus, the characters are not strongly marked, but it appears to differ from the other Asiatic species in the minute, short, dark capsule; the leaves are structurally like most of the species, but are almost or quite entire (in *A. comosus* they are usually slightly toothed at apex), while they are longer and considerably more rigid than in *A. sinensis* (Broth.).

A specimen in the Edinburgh Herbarium labelled "*Atractyllocarpus auriculatus* Mitt., Hb. Griffith, from Kew, 1875," is the same thing, and probably the same gathering.

## LEUCOBRYACEAE.

**Ochrobryum propaguliferum** Dix. sp. nov. (Fig. 1).

A speciebus affinis differt caulibus hic illic propagula apicalia sub specie ramulorum strictorum microphyllorum facile deciduorum emittentibus. Apex folii subcucullatus, breviter acute mucronatus. Limbus folii basilaris (lamina vera) 4–5-seriatus. Leucocysti breviter rectangulares, circa  $1.5 \times 1$ , sectione ubique 2-stratosi (uno dorsali altero ventrali), raro apud extremum apicem dorsales hic illic transverse duplicati.

Hab. Base of Hunasgiriya, under rock, Ceylon, 29th September 1928; coll. A. H. G. Alston (1895) type. Hatton, on rock near Hambantotuoya, Ceylon; 17th March 1929; coll. Alston (2607). India, coll. Wight; Herb. Edin. (52).

A very similar species to the two or three known from Ceylon and South India, but peculiar in the terminal propagula, which however are very deciduous and often lost. They consist of a single short acicular branch (or termination of the stem), some 3–4 mm. long,

consisting of elongate, very narrow, linear or subulate leaves, erect, closely appressed, which with the ramulus itself are highly deciduous. Apart from the propagula the species may be distinguished from the other Ceylonese and South Indian species as follows :—

*O. ceylanicum* Besch. has the leucocysts frequently 3-stratose, and the basal wings are 8–10-seriate.

*O. Mittenii* C. M. has the leucocysts in face view isodiametric, not rectangular as here, and the leaves are very minute.

*O. Nietneri* C. M. has the leaf apex subulate, not cucullate and abruptly apiculate.

*O. Wightii* Besch. has the leucocysts in form as in *O. Mittenii*.

**Leucobryum aduncum** Doz. et Molk.—India, coll. Wight; Herb. Edin. (51). This is probably the original of *L. Wightii* Mitt., which has been reduced by Fleischer to *L. aduncum*.

### CALYMPERACEAE.

**Syrrhopodon Griffithii** Mitt.—Ind. orient., coll. Dr. Wallich; Herb. Edin. (513). This is certainly the often misunderstood *S. Griffithii*. Fleischer (Musci . . . von Buit., i, 208) describes it as having long, ciliate teeth on the leaf sheath. But Mitten's description distinctly says "marginibus integerrimis," and "foliis basi non spinoso-ciliatis." Brotherus has unfortunately followed Fleischer in this, in his arrangement in the Second Edition, where also he has omitted *S. involutus* Schwaeg. (in the neighbourhood of *S. trachyphyllus*).

*Calymperes Griffithii* C. M. MS. e Bescherelle, Essai sur le Genre Calymperes, pp. 269, 285. "Nepal, Wallich, H. 3824" in sched., Herb. Edin. (11). The brief diagnosis which presumably constitutes the publication of this species, drawn from the Key, may be read as follows :—"Eury-cycla. Teniola nulla. Cellulae hyalinae chlorophyllosis vix majores. Folia apice latissimo rotunda. Cellulae chlorophyllosae quadratae, dorso prominulae; marginales denticiformes." In the present specimen the teniole is not always quite absent, but may be slightly developed, though not reaching above the shoulder. The leaves are tubular, entire in the upper part; the nerve is slightly roughened at back.

### POTTIACEAE.

**Hymenostomum edentulum** (Mitt.) Besch.—India, coll. Wight; Herb. Edin. (6). This is probably the original gathering—"Ad Madraspatanam in muris," as given by Mitten.

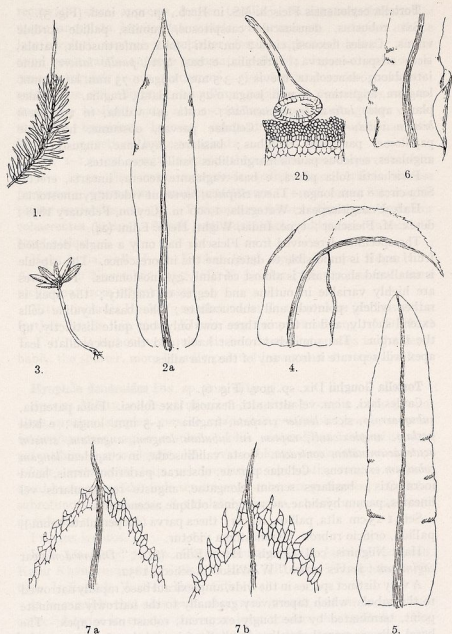


Fig. 1.—*Ochrobryum propaguliferum*: a stem,  $\times 4$ .

Fig. 2.—*Merceyopsis minutissima*: a, leaf,  $\times 40$ ; b, upper part of capsule,  $\times 40$ .

Fig. 3.—*Hyophila dendroides*: stem,  $\times 4$ .

Fig. 4.—*Leptodontium abbreviatum*: leaf,  $\times 20$ .

Fig. 5.—*Tortella ceylonensis*: leaf,  $\times 20$ .

Fig. 6.—*Tortella Goughii*: leaf base,  $\times 20$ .

Fig. 7.—*Tayloria subglabra*: a, leaf apex,  $\times 50$ ; b, do. of var. *spinosa*.

**Tortella ceylonensis** Fleisch. MS. in Herb., sp. nov. ined. (Fig. 5).

Sat robustus, densiuscule caespitosus, humilis, pallide sordide virens. Caules flexuosi, circa 2 cm. alti; folia confertiuscula, patula, sicca crispato-incurva; variabilia, e basi *brevi, paullo latiore*, nunc late oblongo-lanceolata, brevia (3-3.5 mm. longa, 0.75 mm. lata), nunc longiora, angustiora (4 mm. longa, 0.25 mm. lata), fragilia. Margines plani, apice *latiuscule subcucullati*; costa sat valida, in *mucronem brevem validum excurrente*. Cellulae parvae, obscurae, humillime papillosae, parietibus tenuibus; basilares hyalinae, anguste rectangulares, seriebus paucis marginalibus paullo ascendentes.

Perichaetii folia parva, e basi vaginante tenera, linearia, erecta. Seta circa 8 mm. longa. Theca *elliptica, parva*, ut videtur gymnostoma.

Hab. Unasgirispeak, Wategalla, 1,000 m., Ceylon, February 1898; detex. M. Fleischer; type. India, Wight, Herb. Edin. (24).

The specimen I received from Fleischer had only a single, detached fruit, and it is impossible to determine the inflorescence. The capsule is small and short, and is almost certainly gymnostomous. The leaves are highly variable in outline and degree of fragility; the apex is rather widely pointed, and subcucullate; the basal hyaline cells extend shortly, and in two or three rows only, but quite distinctly, up the margin. The somewhat robust habit and the subcucullate leaf apex will separate it from any of the near allies.

**Tortella Goughii** Dix. sp. nov. (Fig. 6).

Caules laxi, 2 cm. vel ultra alti, flexuosi, laxe foliosi. Folia patentia, *subsquarrosa*, sicca *leniter crispata*, fragilia; 4-5 mm. longa; e basi *perlata, amplexicauli, raptim in subulam longem, angustam, sensim acute acuminatam contracta*. Costa validiuscula, in cuspidem *longam robustam* excurrent. Cellulae parvae, obscurae, parietibus firmis, haud incrassatis; basilares sensim elongatae, anguste rectangulares vel lineares, parum hyalinae, ad margines oblique ascendentes.

Seta 1.25 cm. alta, pallida, tenuis; theca parva (deoperculata 1 mm.), pallida, orificio rubro. Gymnostoma videtur.

Hab. Nilghiris, coll. Gough; Herb. Edin. (21). "*Didymodon* near *vaginatum*; leaves entire," W. Wilson in sched., 1852.

A very distinct species in the wide, amplexicaul base, rapidly narrowed to the subula, which tapers very gradually to the narrowly acuminate point, terminated by the longly excurrent, robust nerve apex. The basal cells are scarcely hyaline, but yellowish, and therefore the ascending marginal cells are less conspicuous than in many species, but they are actually well marked in form from the inner lamina cells.

**Leptodontium abbreviatum** Dix. sp. nov. (Fig. 4).

*L. subdenticulato* (C. M.) Fleisch. affine, praecipue cauli *dense tomentoso*; multo autem humilior; caules dense aggregati, 2-3 cm. tantum alti, rigidi, breviter ramosi, *confertissime foliosi*; folia madore pulchre

recurvata, sicca appressa, leniter tortilia; circa 3 mm. longa, late ovato-lanceolata, *breviter, late acutata*, vix acuminata; margines inferne late revoluti, superne irregulariter, fortiter spinulose dentati. Costa apud basin valida, superne angustata, pellucida, dorso carinata, *tenerime muriculata*; vix percurrent. Cellulae majusculae, hexagono-rotundatae vel ellipticae, humillime papillosae; parietibus sat incrassatis; basilares haud alte ascendentes, lineares, elongatae, versus margines breviores, latiores, subquadratae. Folia perichaetialia longiora, angustiora, longe acuminata.

Seta 1-1.5 cm. longa, tenuis; theca parva, cum operculo circa 3 mm. longa, *fusiformis, microstoma*, pallide fusca, orificio intense purpureo; operculum tenui-curvirostrum. Spori forma et magnitudine variabiles, 20-35 $\mu$ . Peristomium breve. Dentes irregulariter cohaerentes lineares, flavidi aut aurantiaci, sublaeves, trabeculati, haud nodosi.

Hab. India, coll. J. D. Hooker (123), type. Takuja, Naga Hills. Assam, 6th November 1935, coll. N. L. Bor (346 p.p.), a few stems picked out from other mosses.

Mitten includes Hooker's number under *L. squarrosus* (and gives the further details "in mont. Khasia, reg. temp. et subtrop., J. D. H. et T. T. !"). It is, however, quite distinct from that species in the dense habit, the shorter, more broadly pointed leaves and shorter capsule.

**Hyophila dendroides** Dix. sp. nov. (Fig. 3).

Species habitu valde peculiaris; caespitosa; caulis circa 3 mm. altus, erectus, simplex, *omnino nudus nisi pro foliolis paucis, minutis, squamiformibus*, apice rosulato, foliis normalibus congestis, late patentibus, 2 mm. longis, late ovato-oblongis, marginibus *valde involutis*, apice rotundatis vel brevissime apiculatis, *integris*. Costa apud basin pervalida, inde sensim angustata, vix percurrent. Cellulae subrotundae, incrassatae, 8-11 $\mu$  latae; laeves; basilares paucae, rectangulares.

Fructus ignotus.

Hab. On rocks, 700 m., Chaur, Kumaon; 18th January 1901, coll. Kabir Khan, curante W. Gollan, in Herb. Mitten, as "*Hyophila* sp.?", type. India, coll. W. Bell, Herb. Edin. (14).

It is possible that this is an abnormal growth, but its having been collected twice in exactly the same form renders this unlikely. The habit is quite unusual, the practically naked stems being crowned with a dense rosulate cluster of spreading leaves, which resemble those of *H. involuta* in their strongly involute margins, but are quite entire.

**Didymodon rufus** Lor.—India, Herb. Menzies; Herb. Edin. (109). Syn. *Barbula asperifolia* Mitt. I have already (Journ. of Bot., 1937, p. 128) shown that Mitten's species must be referred here, the fruit on the present specimen having made this certain.

**Didymodon ovatus** (Mitt.) Broth.—Hot springs, 12,000 ft., Ind. Orient., coll. W. Bell; Herb. Edin. (50). Nag Lubu, alt. 10,000 ft., November 1865, coll. W. Bell; Herb. Edin. (47). The fruit of this has not been described, but I have a fruiting specimen from 8,000 ft., Dharmkot, Dharmsala, Punjab, coll. R. R. Stewart, 22nd May 1917 (1943a), which shows that it is a true *Didymodon*, not *Barbula*. The capsule is longly elliptic; annulus persistent; peristome teeth short, pale, smooth, irregular, united at base into a yellowish membrane.

***Barbula confertifolia* Mitt.**

Below wall, water tank below Gorton Castle, Simla, 2,000 m., 19th Sept. 1889; coll. Sir Geo. Watt (10,015b), c. fr.

No specimens of Mitten's plant exist in our collections, but this agrees vegetatively exactly with the description. Mitten described it from sterile specimens, and Brotherus suggested that it was probably a *Didymodon*, some species of which it resembles in the small, very obtuse, opaque leaves much more than it does most species of *Barbula*. The peristome, however, proves that it belongs to the latter genus, the teeth being long and making a complete spiral twist. The seta is short, 6–8 mm. long, the capsule small, with a lid about one-third its length. Annulus 0. Spores minute.

***Barbula pseudo-Ehrenbergii* Fleisch.**—India, coll. Wight; Herb. Edin. (7, 11). No. 7 has numerous axillary, filiform, straight, hyaline brood-filaments.

***Barbula angustifolia* (Hook. et Grev.) C. M.**—"Calcutta, 1820, J. D. H." in sched. This must be an error. Hooker was not in India until 1847. Moreover, if Hooker had collected the species Mitten would have recorded it in the Musc. Ind. Or., where the only record he gives is "Nepal, Wallich." In all probability therefore this is part of the original Nepal plant, received from Hooker, and erroneously attributed to him as the collector. The date would confirm this conclusion.

The distribution of this species seems curious. I have a single specimen from each of three localities: Marianne Is.; Philippines; and Japan.

***Merceyopsis minutissima* Dix. sp. nov. (Fig. 2).**

Species *minutissima*, *ferè acaulis*. Folia rosulata, patula, 1.5–2 mm. longa, circa 0.4 mm. lata; e basi inferne sat latiore superne paullo angustata, spathulato-lanceolata, *acule acuminata*; marginibus erectis, integris, subfragilibus; costa sat valida, apice in cuspidem sat crassam pungentem excurrans, sectione duces medianos exhibens. Cellulae superiores *valde chlorophyllosae, longitudinaliter seriatae*, a nervo ad marginem sensim minores, media lamina circa 8 $\mu$  latae, subhexagonae, parietibus tenuibus; ad margines ob papillas valde prominentes;

basilares laxae rectangulares, pellucidae, tertiam partem folii vel ultra occupantes.

Autoica; flos ♂ axillaris, paucifolius; antheridia 3-5, majuscula. Folia perichaetii caulinis subsimilia. Seta circa 4 mm.; theca minuta, elliptica, deoperculata 1.5 mm. longa; operculum tenuirostrum. Annulus (?) perlatus, persistens, e cellulis parvis subrotundis, irregularibus 6-8-stratosis. Exothecii cellulae hexagonae, laxiusculae, conflatae. Gymnostoma.

Hab. India, coll. W. Bell; Herb. Edin. (17).

The smallest species of the genus. It has a remarkable and rather disturbing resemblance to *Trichostomum perannulatum* Dix. et Varde, from South India, which is, indeed, vegetatively scarcely separable, though the leaves there are frequently subdenticulate in the upper part. The structure of the capsule there, however, appears to be more Trichostomoid, the peristome is well developed, and the annulus more highly evolved. Here it is broader, but of small rounded cells, scarcely of the specialized type distinguishing the annulus, except the uppermost row. The lid appears to be somewhat adherent to the columella.

*Trichostomum minusculum* Dix. et Varde, of which the fruit is unknown, is also much like it, but has the nerve ceasing below the apex, and narrower leaves.

***Merceyopsis macrocarpa* Dix. sp. nov.**

Sat *robusta*, caulibus usque ad 1 cm. altis. Folia plus minusve comosa, 2-3 mm. longa vel paullo ultra, madida patentia, sicca leniter incurvo-flexuosa, *parum contracta*; e basi angustiore *oblongo-spathulata*, apice *contracto et rotundato*, rarius foliis superioribus paullo acuto; integerrima, marginibus inferioribus peranguste recurvis, cetero planis. Costa infra valida, supra carinata, fere percurrans. Cellulae perdistinctae, 8-10 $\mu$ , laeves, subquadratae, parietibus subincrassatis; basilares per partem folii angustatam rectangulares, sensim majores, latiores, inanes, saepe fuscatae.

Seta circa 4 mm. longa; theca late ovato-oblonga, *turgida*, 1.75-2 mm. longa (deoperculata), leptodermica; exothecii cellulae perlaxae, hexagonae, ad orificium 2-3 seriebus parvae, transverse elongatae. Operculum (in 10,014) longe tenuirostre. Gymnostoma.

Kulu Valley, Kangra, Punjab, alt. 1,500 m., 5th July 1925; coll. Bhaghat Ram Bajaj (208), type. Below Elysium, Simla, 1,225 m., in rock crevices, 19th Sept. 1889; coll. Sir Geo. Watt (10,104 p.p.).

Nearest to *M. gedeanana* (Lac.) Fleisch., but with obtuse leaves, larger, turgid capsules, almost barrel-shaped, which have fewer rows of small cells at the orifice. *M. pellucida* Broth. et Dix. has much fewer rectangular basal cells.

The type specimen had turned black, but Sir Geo. Watt's plant is of a yellowish colour, in cushions that may be 12  $\times$  5 cm. in size.

## ORTHOTRICHACEAE.

**Zygodon Wightii** Dix. et Malta, sp. nov. (Fig. 8).

*Z. Reinwardtii* affinis; habitu graciliore; differt foliis siccis minus crispatis, multo latioribus, late oblongo-ovatis, brevius, latius acutatis, vix acuminatis, marginibus multo minus fortiter, saepe indistincte denticatis, interdum subintegris; costa valde carinata, dorso minutissime sed distincte muriculata. Cellulae subrotundae, parietibus tenuibus, haud pellucidis, humillime papillosae.

Cetera ignota.

Hab. India, coll. Wight; Herb. Edin. (158).

Near to *Z. Reinwardtii*, but quite distinct in the shorter, broader leaves, with shorter points, which are quite without the coarse, irregular toothings of that species; the denticulation resembles rather that of *Hyophila involuta*. The cell structure also is different; the cells in *Z. Reinwardtii* have highly pellucid walls, but the lumen is very opaque with papillae; here the lumen is perhaps more pellucid than the walls. It appears to be dioecious, and is quite without fruit, a condition very unusual in *Z. Reinwardtii*.

It was probably collected in Southern India.

**Macromitrium leptocarpum** Broth.—Ind. Orient., coll. Dr. Ritchie; Herb. Edin. (505, a and b). Two rather distinct forms, b having a somewhat different habit, and wider, somewhat elliptical capsule. They agree with the original plant in everything except that the basal cells are nearly always smooth, while in the Coorg plant they are described as highly tuberculous. This, while frequently a character of importance, is not always so, and I am inclined to think, since the plants agree closely in other respects, it must be held of minor importance here; it appears to be somewhat variable in the type itself.

## FUNARIACEAE.

**Funaria pulchra** Dix. et Varde.—India, coll. Wight; Herb. Edin. (62, 143).

## SPLACHNACEAE.

**Tayloria subglabra** (Griff.) Mitt. nov. var. **spinosa** Dix. (Fig. 7). A planta typica differt foliorum denticulatione, multo fortiore et argutiore; dentes plerumque e 3-4 cellulis instructi, quarum terminalis longa, acuta, subspiniformis.

Hab. India, coll. Wight; Herb. Edin. (58), type. Takuja, Naga Hills, Assam, 1,700 m., 6th November 1935; coll. N. L. Bor (346).

*T. indica* and *T. subglabra* have the upper margins sharply and irregularly toothed, but the teeth, while often composed of more than

one cell, are not very acute, and not at all runcinate as here. No fruit was present on the Edinburgh specimen, but Bor's plant is in good fruit, which does not differ from that of *T. subglabra*.

**Voitia Hookeri** Mitt.—India, coll. W. Bell; Herb. Edin. (42).

*V. stenocarpa* Wils., the name under which this appears in Brotherus, Musci, is a *nomen nudum*.

## BRYACEAE.

**Mielichhoferia Badhwarii** Dix. in Annal. Bryolog. iii, 60.—Near glacier, circa 12,000 ft., Gangotri, N.W. India, October 1881, coll. J. F. Duthie; Herb. Edin. (131). Bashahr, N.W. Himalaya, 1891, coll. J. H. Lace (1198), c. fr.

The fruit has not been described. Seta up to 1.5 cm., pale, thin. Capsule suberect, slightly asymmetric, 4 mm. long (deoperculate), thin-walled, pale; lid convex; collum long, distinct; peristome internal only, well developed; basal membrane fairly high, yellow, smooth; processes linear, nodose, papillose. Spores minute.

**Brachymenium extenuatum** (Mitt.) Jaeg.—Penins. Ind. Or., coll. Wight; Herb. Edin. (200). This is probably part of the original gathering.

**Brachymenium microstomum** Harv.—Nepal, coll. Wallich, circa 1823, Herb. Edin. (16). "G. J. Lyon, 1846; H. 2420b" in sched. This is part of the original gathering. The species is omitted by Brotherus from the "Musci," probably in error. It is a good species, with habit of *B. indicum*, but leaves very rigid and erect when dry, and capsule very long and narrow, with a highly glossy, dark lid, with curved, almost rostellate beak.

**Brachymenium argenteoides** Dix. sp. nov.

§ Dicranobryum. Gracile; *albescens*, habitu *Bryi argentei* laxi vel *Anomobryi*. Caules *filiformes*, *julacei*, parce divisi. Folia sicca madidaque *julacea*, *minuta*, .5–.75 mm. longa, *late spathulato-ovata*, perconcava, *tenui-cuspidata*, integra, tenerrima; costa *valde debilis*, plerumque longe sub apice desinens. Areolatio *pertenuis*, cellulae superiores anguste rhomboideae, *omnino inanes*, *hyalinae*, inferiores plus minusve *chlorophyllosae*, *rectangulares*, omnes *parietibus tenuissimis*.

? Synoicum. Seta 1.25–2 cm. alta, *tenuis*. Theca *suberecta* vel *leniter inclinata*, e collo *brevi distincto* in *setam defluente abrupte elliptica*, ad orem *haud constricta*, *operculo conico*. Peristomium *Cladodii*. Dentes *inter se sat remoti*, *sat tenues*, dorso *minutissime papilloso*, *linea media fere nulla*, *lamellae circa 20*. Endostomii mem-

brana circa dimidiam altitudinem dentium aequans, processus breves sed bene evoluti, haud perforati, sed tenerrimi et facile lacerati; cilia O. Spori minuti.

Hab. Below Elysium, Simla, 1,225 m., in rock crevices, 19th Sept. 1889; coll. Sir Geo. Watt (10,014 p.p.).

A perplexing plant. Vegetatively it might almost be *Bryum argenteum*, and the form of the capsule is not unlike it, while the peristome is rather that of a *Bryum* than a *Brachymenium*. The capsule, however, is only slightly inclined, or suberect, and is in fact very nearly as in *Brachymenium acuminatum* (Harv.), but with a wider mouth; vegetatively, also, it has a considerable resemblance to forms of that species.

It is in fact a rather remarkable connecting link between *Bryum* and *Brachymenium*.

**Anomobryum polymorphum** Dix. sp. nov. (Fig. 9).

Dense caespitosum, humile, vix 2 cm. altum, superne glauco-viride, inferne rubescens. Caulis densifolii, folia erecto-patentia, nec julacea, inferiora laxiora, rubella, oblonga, cymbiformia, obtusa, subcucullata; superne sensim angustiora et acutiora, apicalia penicillata, viridia, lineari-lanceolata, longe, angustissime acuminata. Margines integri. Costa sat debilis, foliis inferioribus sub apice desinens, superioribus saepe percurrents. Cellulae foliorum inferiorum laxae hexagono-rhomboideae, pellucidae, circa  $40-50\mu \times 10-14\mu$ ; superiorum multo longiores et angustiores, lineari-rhomboideae, chlorophyllosae.

Cetera ignota.

Hab. Soc. cum *A. cymbifolio* Lindb.; India, coll. W. Bell; Herb. Edin. (133), type. Very moist rocks, 3,400 m., Bias Valley, Kulu, N.W. Himalayas, 4th September 1928; coll. R. L. Badhwar (1090).

A peculiar and pretty species, having the leaves passing gradually from oval-oblong, cymbiform and obtuse, at the lower part of the stem, and with short, wide cells, to narrowly linear-lanceolate and finely but rigidly acuminate in the upper part, with very narrow, chlorophyllose areolation.

**Bryum Gamblei** Broth. nov. var. **aristifolium** Dix.

Costa in aristam longam, dimidiam partem folii aequantem, excurrents.

Tank below Gorton Castle, Simla, 2,000 m., 19th Sept. 1889; coll. Sir Geo. Watt (10,015a).

I can find nothing but the longly excurrent nerve to separate it from the ordinary form of the species, where it is, as described by Brotherus, "plerumque breviter excedente."

**Bryum micro-caespitium** Dix. sp. nov.

§ *Caespitibryum*. Densissime caespitosum, humile, sericeum, flav-

escens. Caulis vix 1 cm. altus, parce ramosus, aequaliter dense foliosus. Folia *minuta*, vix 1 mm. longa, oblongo-ovata, *raptim angustata*, haud acuminata, margines plani, vel subplani, integri; costa sat valida, flavescent, in cuspidem vel aristam brevem, reflexam, dimidiam partem laminae subaequantem, *rigidam*, *laevem* excurrent. Cellulae minutae, *angustissimae*, *lineares*, subincrassatae; ad margines parum mutatae.

Seta crassiuscula, 6-9 mm. longa, apice arcuata. Theca nutans, *minuta*, operculata 1.5 mm. longa, e collo perbrevis ovata, fusco-rubra; operculum alte, obtuse conicum. Peristomium aurantiacum. Dentes conferti, anguste lanceolati, inde filiformes, dorsaliter tenerrime regulariter papilloso, linea media angulata; lamellae crassae, confertae, *extus humiliter intus alte prominentes*. Endostomium pallidius, membrana basilari sat humili; processus dentes subaequantes, hiantes; cilia *brevia*, vix *nodosa*, papillosa. Spori minuti, 10-12 $\mu$ .

Hab. Near the sources of the Jumna, 2,500-3,000 m., India, October 1868; coll. W. Bell; Herb. Edin. (320).

This might be referred to *Cladodium*, from the imperfect cilia; but from the general habit, the probably dioecious inflorescence, and the minute spores, it is almost certainly best placed in *Caespitibryum*. In habit it is almost a miniature of *B. caespiticium*. In the minuteness of all its parts, the plane-margined, non-bordered leaves, longly and strongly excurrent nerve, it is abundantly distinct. *B. Gamblei* Broth. is much larger, with nerve usually shortly excurrent only, and appendiculate cilia. *B. subrotundum* has much wider cells, seta twice as long, much larger spores, etc.

***Bryum spininervium* Dix. sp. nov.**

§ Trichophora. Dense caespitosum, humile, gracile. Caulis tenuis, ramosus, inferne laxe, superne comose foliosus. Folia sicca *laxe contorta*, e basi anguste decurrente obovato-lanceolata, 3 mm. longa, *sensim breviter acuminata*, marginibus *planis*, subintegris; costa tenuis, in cuspidem sat longam vel integram vel 2-3 *dentibus validis acutis* praeditam excurrent. Rete apud basin perlaxum, superne e cellulis mollibus, laxis, parietibus tenuibus instructum; cellulae marginales 1-2-seriebus angustissimae, limbum *perangustum bene notatum* instruantes.

Dioicum. Seta *tenuis*, circa 1.25 cm. alta. Theca unica immatura, parva, pallide fusca, 2 mm. longa, operculum alte conicum.

Hab. Nepal, coll. Wallich; Herb. Edin. (329). "*Bryum* nr. *capillare*" Wils. in sched.

Resembling the smaller forms of *B. capillare*, but with a very small sporophyte, narrower leaves very narrowly but distinctly bordered, and the nerve excurrent only in a short, straight, cuspidate point, which may be entire, but often has two or three sharp, spinulose teeth.

## BARTRAMIACEAE.

**Breutelia dicranacea** (C. M.) Mitt. (Syn. *B. indica* Mitt.).—India, coll. W. Bell ; Herb. Edin. (96). A slender form with strongly deflexed leaves. Brotherus has reduced *B. indica* to this species, and *B. reflexa* Wils., which is a *nomen nudum*, does not differ. The plant varies much in size, branching, and degree of reflexion of the leaves ; these characters are in no way correlated, nor does the northern plant differ in any constant way from the southern.

## ERPODIACEAE.

**Erpodium mangiferae** C. M.—Bot. Garden, Saharunpore, India, 1,000 ft., 1863, coll. W. Bell (54). This is part of the original gathering of *E. Bellii* Mitt., though the locality is not exactly that given by Mitten in his herbarium, for Bell's No. 54.

## TRACHYPODACEAE.

**Pseudospiridentopsis horrida** (Mitt.) Broth.—Bhotan, Hb. Griffith (843). No doubt part of the original gathering of this magnificent and apparently rare moss.

**Duthiella Wallichii** (Hook.) C. M.—This occurs in several of Bell's gatherings ; one is from "near the sources of the Jumna, 8-10,000 ft., October 1868 (117). No. 231, coll. Hooker, is probably the original gathering."

The true *D. Wallichii* however is but slightly represented, the bulk of the material being the closely allied *D. mussooriensis* Reimers (cf. Hedwigia lxxvi, 1937, 289).

## PTEROBRYACEAE.

**Pterobryopsis Wightii** (Mitt.) Broth.—Penins. Ind. Or., coll. Dr. Wight ; Herb. Edin. (191, 192). Two slightly differing forms, in size and habit. Possibly, but not certainly, one of these is the plant described by Mitten.

**Pterobryopsis nematosa** (C. M.) Dix.—Nepal, coll. Wallich, H. 3827 ; Herb. Edin. (19). New to India proper. Distr. Pegu ; Assam ; Siam.

**Pterobryopsis tumida** (Dicks.) Dix.—Nepal, coll. Hooker, 1821 ; Herb. Edin. (37). Cf. Journ. of Bot., 1937, p. 121. The attribution to Hooker is incorrect, as in the case of *Barbula angustifolia* above.

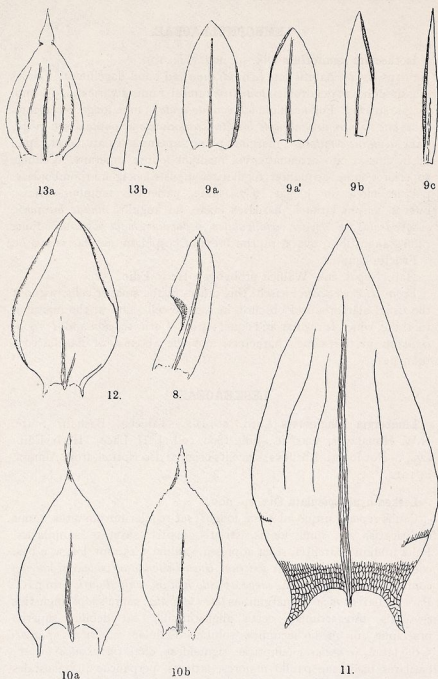


Fig. 8.—*Zygodon Wightii*: leaf,  $\times 20$ .

Fig. 9.—*Anomobryum polymorphum*: *a*, *a'*, lower; *b*, median; *c*, upper leaf.  
All  $\times 20$ .

Fig. 10.—*Isotheicum semitortum*: *a*, stem leaf,  $\times 20$ ; *b*, branch leaf,  $\times 20$ .

Fig. 11.—? *Cirriphyllum alare*: stem leaf,  $\times 40$ .

Fig. 12.—*Plagiotheicum cochleatum*: leaf,  $\times 20$ .

Fig. 13.—*Hylocomium indicum*: *a*, leaf,  $\times 20$ ; *b*, paraphyllia,  $\times 20$ .

## LEMBOPHYLLACEAE.

*Isoetecium semitortum* Dix. sp. nov. (Fig. 10).

*Stirps rigida*, habitu sat *I. rigidissimi* sed haud flagellifera. Caules crassiusculi, vix dendroidei, *pinnatim* ramosi, ramis divaricatis, 5-6 mm. longis, strictis. Folia caulina *late cordato-ovata*, 3 mm. longa, fere 1 mm. lata, *late decurrentia*, *abrupte breviter crassiuscule acuminata* seu cuspidata, *acumine semitorto*; margines plani, superne serrulati; costa apud basin crassa, cito attenuata, vix medium folium superans. Cellulae superiores omnes aequaliter, regulariter anguste hexagono-rhomboideae, parvae, circa 50 $\mu$  longae, 6-7 $\mu$  latae, parietibus tenuibus, firmis; inferne sensim latiores, basilares laxae, ad angulos *multae breviores*, *subquadratae vel breviter rectangulares*, *pellucidae*, *haud obscurae*. Folia ramea angustiora, ovata, raptim breviter cuspidata, *cuspidate semitorta*.

Fructus ignotus.

Hab. Nepal, coll. Wallich probably; Herb. Edin. (51).

From *I. ceylonense* Fleisch. this differs in the smaller cells, without the usual alar group of obscure, incrassate cells, and in the marginal toothings, which is regular and equal; from *I. trichocladon* and *I. rigidissimum* in the same characters, and the absence of flagellaceous branches.

## LESKEACEAE.

*Lindbergia longinervis* Card. et Dix.—Takleeh, Bashahr State, N.W. Himalayas, 5,000 ft., June 1892, coll. J. H. Lace; Herb. Edin. (254). Not found, I believe, since its original description, from Almora, in 1912.

*Leskea hyaloapiculata* Dix. sp. nov.

Caulis repens, usque ad 4 cm. longus, sat regulariter pinnatus, ramis divaricatis, 2-3 mm. longis, strictis, acutis, siccitate subjulaceis. Folia undique patentia, sicca adpressa, caulina 1.25 mm. longa, e basi cordata *raptim in acumen strictum lineari-subulatum subaequi-longum contracta*, apice pertenui, *saepe apiculo hyalino unicellulari terminata*. Pars basilaris concava, marginibus *late explicatis*, supra saepe angustius revolutis, integerrimis; costa angustiuscula, sat debilis, superne praecipue, in medio acumine soluta. Cellulae superiores *parvae*, 5-6 $\mu$  latae, *irregulares* (ellipticae, sigmoideae, etc.), *incrassatae*, *laeves*; basilares medianae paullo majores, latiores, perpaucae juxtacostales elongatae, pellucidiores; marginales *pluribus seriebus minores, transverse ellipticae*. Folia ramea minora, magis sensim, breviter attenuata; costa debilior, ad basin subulae saepe desinens.

Seta vix 1 cm. longa; theca parva, erecta, breviter cylindrica. Operculum haud visum. Peristomii dentes aurantiaci, sat crassi, *striolati*; endostomium?

Hab. Kashmir, 1892-93; coll. J. F. Duthie (12,783 p.p.); Herb. Edin. (326).

Brotherus in Acta Soc. Sci. Fenn., xxiv, 32, under *Leskea Duthiei* n. sp. cites this No. as "in valle Kishenganga prope Gurais, 8-9,000 ft. (n. 12,783 p.p.)." It might have been expected therefore that this would be that plant, but it is very markedly different. *L. Duthiei* has the cells particularly large (15-20 $\mu$  wide), while here they are markedly small, scarcely one-third the width; the margins there also are erect, and the seta only half the length. This is no doubt the plant that was mixed, in that gathering, with *L. Duthiei*. That species, moreover, is a *Lindbergia*, with single peristome and the outer teeth not striolate; here it is doubtful whether the endostome was present or not, but in any case the teeth are striolate, and therefore it is almost certainly a *Leskea*.

*Pseudoleskeopsis laevifolia* (Mitt.) resembles it, but has more catenulate leaves when dry, with broader points.

### THUIDIACEAE.

**Haplocladium Schimper** Thér.—Nepal, coll. T. Thomson; Herb. Edin. (52). (*Hypnum Jacquemontii* Br. et Schimp. is a *nomen nudum*.)

**Haplocladium stratosum** (Mitt.) Dix. comb. nov. (*Leskea stratos* Mitt.; *Pseudoleskea stratos* Jaeg.).—Nepal, coll. Wallich; Herb. Edin. (6). A perplexing plant, which appears to have been altogether omitted by Brotherus. It seems to me without doubt a *Haplocladium*.

**Claopodium nervosum** (Harv.) Fleisch.—India; "*Hypnum nervosum* Hook.;" Herb. Edin. (327) is part of the type gathering.

**Thuidium squarrosulum** Ren. et Card.—Nepal, coll. Wallich; Herb. Edin. (2). This in all probability is part of the type of *Leskea remotifolia* Hook. *ined.*

**Thuidium orientale** Mitt.—Mussooree, 8th June 1845, coll. Dr. W. Jameson (583). A form with short, broad leaves; the stem leaves are less carinate than usual, and the fringed back of the nerve is therefore less conspicuous.

### AMBLYSTEGIACEAE.

**Campylium pachythea** Dix. sp. nov.

Gracilescens; flavo-viride. Caulis prostratus, irregulariter, inaequaliter ramosus; paraphyllia pauca aut nulla; rami adscendentes, tenues, attenuati. Folia breviter decurrentia, *patula, sicca adpressa*, saepe secunda, 1.5-1.75 mm. longa, cordato-lanceolata, *breviter acuminata*; marginibus planis, vel apud infimam basin anguste recurvis,

supra obsolete denticulatis. Costa unica, ad basin sat valida, circa  $\frac{3}{4}$  folii longitudinem aequans. Cellulae subopacae, *anguste lineari-rhomboideae*, serie unica marginali saepe paullo latiores, pellucidiores; inferne sensim latiores, *omnes basilares breviter rectangulares, obscurae*. Folia ramea angustiora, magis fortiter denticulata,

Autoica. Flores ♂ numerosi, turgidi. Folia perichaetia longe recurvata, acumine filiformi, denticulato. Seta 1 cm. alta, tenuis, pallide rubra. Theca e collo defluente curvato horizontalis, *breviter, turgide oblonga*, fusca, gibbosa, operculo magno, *acute conico*.

Hab. India, coll. W. Bell; Herb. Edin. (28a).

In the form and structure of the leaf similar to *C. polygamum*, but with a shorter, not channelled acumen. *C. chrysophyllum* is distinguished by the spreading leaves and dioicous inflorescence.

The foliation in the present species, only slightly spreading when moist, and more or less appressed when dry, is almost distinct in the genus; the only alternative, however, would be to place it in *Amblystegium*, with which the areolation does not agree.

### BRACHYTHECIACEAE.

**Brachythecium Bellii** (Broth.) Par.—Several gatherings, coll. W. Bell, including (120) from near sources of R. Jumna, which is the original station for the species.

**Brachythecium laxifolium** Dix. sp. nov.

Subgen. Velutinum. Gracilis. Caulis repens, *laxe, complanate ramosus*; rami ramulosi. Folia *perlaxa, percomplanata, squarrosa* vel horizontaliter patentia, flexuosa, sicca parum mutata; e basi lata angustissime decurrente, *sensim anguste lanceolato-subulata*, subula subfiliformi, subintegra. Costa tenuis, apud basin subulae soluta. Cellulae *angustissimae*, longae, *subconflatae*; versus basin latiores, alares *paucae, magnae, inanes, rectangulares*, omnes parietibus tenuibus. Folia ramea brevius acuminata, argute denticulata.

Dioicum. Perichaetia turgida; bracteae e basi lata, convoluta, erecta, breviuscule tenuiter subulatae. Seta 1.5–2 cm. alta, *laevis*. Theca brevis, *turgide ovata*, gibbosa. Operculum conicum, acutum.

Hab. Mussoorie, 1,500–2,000 m., 1865, coll. W. Bell (107a), type. Ibidem (107). Himalaya Mts., Capt. Stackhouse; Herb. Edin. (518).

This might be described as a miniature of *B. kashmirensis* (Broth.) and *B. falcatum* (Broth.). It is quite unique in the very slender habit, with very lax, very narrow, complanate, divaricate leaves.

**Cirriphyllum cirrosum** (Schwaegr.) Grout.—India, coll. W. Bell; Herb. Edin. (81). New to India.

(?) **Cirriphyllum alare** Dix. sp. nov. (Fig. 11).

Caulis ut videtur repens, subrigidus, 5-6 cm. longus, irregulariter pin-natus, ramis inaequalibus, 2-5 mm. longis (complanatis?), *subnitidis*. Folia caulina majuscula, stricta, subscariosa, *sicca leniter striata*, 2.5 mm. longa, e basi late, longe decurrente cordato-ovata, *sensim late acutata, vix acuminata*, marginibus planis, apice minute denticu-latis. Costa infra sat valida, inde valde angustata, superne tenuis-sima, sub apice soluta. Cellulae superiores *angustissimae, praelongae, subconflatae*, parietibus tenuibus; inferne sensim latiores, *ad alas decurrentes per laxae, pellucidae*. Folia ramea similia, sed minora, fortius denticulata.

Cetera nulla.

Hab. N.W. Himalaya. "Herb. Falconer; E. India Co., No. 713—Kew, 1875," Herb. Edin. (51).

This is certainly an undescribed species, but its position is quite un-certain. In habit, leaf form and structure it in many ways resembles *Brachythecium rivulare*, but the very narrow upper cells, the rigid, subscariose stem leaves, striate when dry, suggest a different alliance, and the rather vaguely defined genus *Cirriphyllum* is perhaps suffi-ciently catholic to contain it.

## ENTODONTACEAE.

**Orthothecium intricatum** (Hartm.) Schimp.—India, coll. W. Bell; Herb. Edin. (21, b).

**Entodon luridus** Griff.—India, coll. W. Bell; Herb. Edin. (28b, 84).

I have seen no original specimens of this species, nor, I believe, do any exist. I have followed Brotherus in the Musci, and apply the name to a rather slender plant with pinnate stems, rather slender branches, non-complanate leaves, a rather long seta, circa 1.5 cm., a fairly large, dark brown, cylindrical capsule, with the peristome teeth striolate, transversely below, obliquely and vertically above, with the processes smooth.

**Trachyphyllum fragilifolium** Dix. sp. nov.

Pro genere robustiusculum; habitu fere *T. jeyporensis* Dix. et Thér. Caulis irregulariter ramosus, ramis inaequalibus, substrictis, nunc turgidis, foliis majusculis, nunc gracilibus, foliis siccis saepe appressis. Folia majora, 1.25 mm. longa, e basi angustiore ovata, *perconcava, apiculo brevi recto aut reflexo, saepe diffracto*; costa bina, brevissima; margines integri. Cellulae breviter anguste rhomboideae, *laeves*; alares plurimae, Entodontoideae. Folia ramorum graciliora, minora, ovato-acuminata, minus concava, acumine longiore, angusto.

Cetera ignota.

Hab. India, coll. W. Bell; Herb. Edin. (127).

The rather elongate, smooth cells are somewhat inconsistent with the genus, but in a somewhat similar (unpublished) species from China, coll. Giraldi, and issued in Bryoth. E. Levier, the cells are sometimes smooth and sometimes papillose, while in *T. jeyporensis* Dix. et Thér., a very similar plant to the present in other ways, they are distinctly papillose. The apiculus or tip of the acumen is so frequently broken off that it can hardly be accidental.

**Stereophyllum fulvum** (Harv.) Jaeg. (*Leskea fulva* Harv.)—Nepal, coll. Wallich; Herb. Edin. (8, 14). One of these is probably the original gathering of this apparently rare species. The nerve is very variable, usually single and strong, but often double or even wanting.

**Schwetschkeopsis Fabronia** (Hook.) Broth.—Nepal, coll. Wallich, H. 3644; Herb. Edin. (7, 24). No. 24 is part of the type.

#### SEMATOPHYLLACEAE.

**Clastobryum ceylonense** Broth.—India, coll. Wight; Herb. Edin. (158). A slender form. I doubt greatly if it be separable from *C. oligonema* Card. et Varde.

**Foreauella orthothecia** (Schwaegr.) Dix. et Varde.—Penins. Ind. Or., coll. Dr., Wight; Herb. Edin. (195). A slender form.

**Brotherella Harveyana** (Mitt.) Dix. comb. nov. (*Stereodon Harveyanus* Mitt.)—Nepal, coll. Wallich; Herb. Edin. (4). This, which is certainly a *Brotherella*, has been omitted by Brotherus.

**Meiothecium tenuirete** Dix. sp. nov.

Robustum. Habitu et structura *M. turgidelli* Fleisch., foliorum forma *M. fornicati* (Card.) Broth. Folia sicca adpressa, striata, 1 mm. longa, cochleariformia, carinata, late oblongo-ovata, subobtusula, subcucullata, apiculo saepe hamato-recurvo; margines ubique recurvi. Cellulae superiores lineari-rhomboideae, parietibus tenuibus, apud apicem parum mutatae; basillares omnes seriebus duabus raptim majoribus, ellipticis, fuscis; alares laxiores, pellucidae, plurimae, valde decurrentes.

Fructus ignotus.

Hab. Nepal, coll. Dr. Wallich; Herb. Edin. (25).

One of the most distinct species of the genus.

**Taxithelium nepalense** (Schwaegr.) Broth.—Nepal, coll. Wallich; Herb. Edin. (27). Quite probably the original gathering.

## HYPNACEAE.

**Isopterygium Giraldui** (C. M.) Broth.—Near the sources of the Jumna, 8–10,000 ft., October 1868, coll. W. Bell; Herb. Edin. (120, 127). New to India. Distr. China; Japan; Formosa. It is perhaps not more than a robust form of *I. taxirameum* (Mitt.) with leaves undulate when dry.

**Plagiothecium cochleatum** Dix. sp. nov. (Fig. 12).

Stirps parva, caespitosa, vix nitida, *condensata*. Caulis brevis. Folia *conferta*, *subjulacea*, nec complanata, nec secunda, *cochleariformia*, *latissime ovata*, *saepe subrotundata*, apice late rotundato *brevissime apiculato*; costa bina vel furcata,  $\frac{1}{3}$ – $\frac{1}{2}$  folii longitudinem attingens. Rete laxiusculum; cellulae 8–11 $\mu$  latae, pellucidae; inferne sensim latiores, basiales omnes laxae, alares perlaxae, tenerae, decurrentes.

? Autoicum. Seta 1.5 cm. alta.

Hab. Near the sources of the Jumna, 8–10,000 ft., October 1868; coll. W. Bell; Herb. Edin. (43).

Only two setae without capsules were present.

Quite distinct from any known species in the suborbicular, cochleariform leaves, with lax areolation in the lower half of the leaf. *P. paleaceum* has more acuminate, secund leaves, and a laxer, more slender habit.

**Hypnum cupressiforme** Hedw.—India, coll. W. Bell; Herb. Edin. (199). A curious form, in areolation coming near to *H. Vaucheri*, but not quite my var. *vaucherioides* (Journ. Bombay Nat. Hist. Soc., xxxiii, 283) which has strongly falcate leaves, while here they are unusually straight.

**Hypnum revolutum** var. *dolomiticum* (Milde) Moenk. (*H. dolomiticum* Milde).—India, coll. W. Bell; Herb. Edin. (81). An interesting record, confirming the relationship of the plant to *H. revolutum*, which occurs, probably not unfrequently, in the N.W. Himalayas, where the present species was most likely gathered.

**Ectropothecium sikkimense** Ren. et Card.—Mussoorie, 5–7,000 ft., 1863, coll. W. Bell; Herb. Edin. (44, 44a). Simla, on rocks, 7,000 ft., November 1900; Herb. Edin. (86). This was issued in Bryoth. E. Levier under the names *Hypnum mussuriense* C. M., and *Ectropothecium mussuriense* C. M. It is a pretty little plant of an orange or yellow colour, and regularly pinnate, plumose stems.

## HYLOCOMIACEAE.

**Hylocomium indicum** Dix. sp. nov. (Fig. 13).

Habitu *H. pyrenaici* sed multo gracilius, foliis plicatis, siccis minus appressis, unde ramis haud teretes. Ab *H. himalayano* (Mitt.) habitu

omnino alieno, paraphylliis toto caelo distinctis, foliis integerrimis longe distat.

*Gracile*, caules *tenelli*, *distanter irregulariter subpinnatim ramosi*, ramis 5-6 mm. longis, vel ultra, acutis, gracilibus. Inter folia paraphyllia sat numerosa, *magna, foliacea, lanceolata vel triangulari-lanceolata, integerrima* inveniuntur. Folia patentia, sicca suberecta, e basi decurrente late cordato-ovata, 1.25-1.5 mm. longa, *profunde concava, triplicata*, raptim breviter late cuspidata, *integerrima*; costa *unica*, ad basin acuminis soluta. Cellulae laeves, angustae, alares sat numerosae sed male definitae, parvae. Folia ramea minora, magis sensim breviter acuminata.

Hab. Near the sources of the Jumna, 12-14,000 ft., October 1868, coll. W. Bell; Herb. Edin. (110).

Very distinct from all the other species. The paraphyllia are comparatively large, foliose, more or less lanceolate or ovate-lanceolate, and quite distinct from the branched, filiform ones of *H. umbratum* and *H. himalayicum*.

**Cyathothecium** Dix. gen. nov. Hylocomiacearum.

Robustum; caulis irregulariter vel pinnatim ramosus et iterum ramulosus, rami valde complanati. Folia percomplanata, ovato-lanceolata, longe tenuiter acuminata, enervia vel breviter binervia. Autoicum. Fructus cauligena; seta elongata; theca erecta, magna, deoperculata cyathiformis. Peristomium duplex; dentes apud basin plus minusve connati, late lanceolati, pallide fusciscentes, superne perregulariter, horizontaliter, versus apicem oblique striolati, summo apice laeves, ubique pellucidi, laevissimi, nullo modo papilloso, linea media versus apicem saepe hic illic perforata. Endostomii membrana alta (circa dimidiam partem dentium attingens), laevis, pellucida. Processus?

**Cyathothecium distichaceum** Dix. sp. nov. (Fig. 14).

Caulis fasciculatim radiculosus, veresimiliter prostratus, usque ad 8 cm. longus, inaequaliter subpinnatim ramosus, ramis *complanatis*, iterumque parce pinnatis, *nitidis*, strictis, laxiuscule foliosis. Folia caulina *distichacea*, 2-2.5 mm. longa, e basi cordata ovato-lanceolata, concaviuscula, raptim in subulam longam, loriformem vel subfiliformem angustata, saepe paullo undulata, superne denticulata. Costa *male notata, plerumque bina, saepe subnulla*. Cellulae lineari-rhomboidae, subsigmoideae, laeves, versus basim paullo latiores, ad insertionem seriebus paucis laxae, alares laxae, pellucidae, male notatae. Perichaetia majuscula, bracteis paucis, *late vaginantibus*, raptim breviuscule filiformibus. Seta crassiuscula, laevis, 1.25-1.5 cm. alta; theca *erecta*, deoperculata *hemisphaerica*, circa 1.25 mm. lata. Exothecii cellulae *laxae, hexagono-rectangulares, collenchymaticae*, apud orificium seriebus duabus minoribus, fuscis. Peristomium generis (v. supra). Spori parvi, 10-13 $\mu$ . Operculum et calyptra ignota.

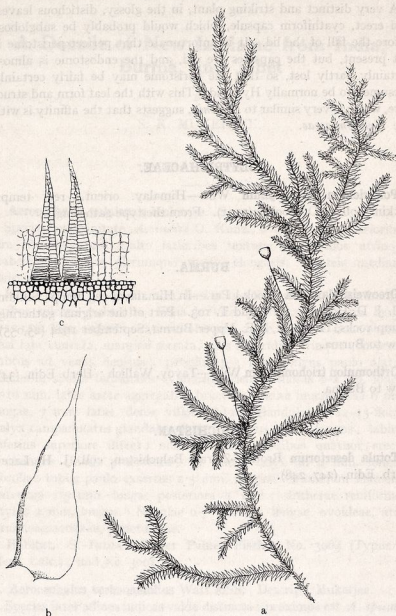


Fig 14.—*Cyathothecium distichaceum*: *a*, plant,  $\times 2$ ; *b*, leaf,  $\times 20$ ;  
*c*, part of peristome,  $\times 50$ .

Hab. Mussoorie, 900-1,500 m., 1863, coll. W. Bell ; Herb. Edin. (39) ; "*Hypnum distichaceum* Mitt. MS." in sched.

A very distinct and striking plant, in the glossy, distichous leaves, and erect, cyathiform capsule, which would probably be subglobose before the fall of the lid. It is unfortunate that perfect peristome is not present, but the capsules are old, and the endostome is almost certainly partly lost, so that the peristome may be fairly certainly presumed to be normally Hypnoid. This with the leaf form and structure, which is very similar to *Gollania*, suggests that the affinity is with the *Hylocomiaceae*.

### POLYTRICHACEAE.

*Polytrichum xanthopilum* Wils.—Himalay. orient., reg. temp., Sikkim, coll. J. D. Hooker (1191). From the type gathering.

### BURMA.

*Oreoweisia laxifolia* (Hook.) Par.—In Himalayas reg. temp., Sikkim, coll. J. D. Hooker ; H. f. and T. 103. Part of the original gathering. Damp rocks, 11,000 ft., N.E. Upper Burma, September 1924 (25,055). New to Burma.

*Orthomnion trichomitrium* Wils.—Tavoy, Wallich ; Herb. Edin. (34). New to Burma.

### BALUCHISTAN.

*Totula desertorum* Broth.—Ziarat, Baluchistan, coll. J. H. Lace ; Herb. Edin. (247, 248).