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ON THE MOSS FLORA OF SIAM.

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So far as I am aware, the only papers published hitherto dealing with Siamese mosses are the following:—

A). Brotherus, V. F. Bryales, in Flora of Koh Chang, by Johs. Schmidt.—Bot. Tidsskr. 24 Bd. (1901).

B). Brotherus, V. F. Siamese Mosses coll. Hosseus.—Beih. Bot. Centralbl., 28, p. 361 (1911).

C). Dixon, H. N. The Mosses of Kaw Tao.—Journ. Siam Soc., Nat. Hist. Suppl., Vol. VIII, No. 1 (1929).

D). Dixon, H. N. New Genera of Asiatic Mosses.—Journ. of Bot., LXIX, p. 1 (1931). (*Microtheciella* gen. nov.).

E). Dixon, H. N. New Species of Mosses from the Malay Peninsula.—Bull. Torr. Bot. Club 51; 240 (1924). (*Ectropothecium siamense* sp. nov.).

A). This paper recorded 44 species, 19 of which were new, including 7 new species of Calymperes.

B). This list includes 15 species, three being new. Of the 12 remaining, one (*Octoblepharum albidum*) was included in **A**).

C). A list of mosses collected in the Island of Kaw Tao by Dr. Kerr, enumerating 19 species, four of which are included in the previous papers.

The last two papers each included only a single species.

It will be seen therefore that up to the present time 75 species have been recorded for Siam, 22 being endemic.

How little has been known of the moss-flora may be judged by the fact that Fleischer, in the *Musci...von Buitenzorg*, where he gives as a rule the full distribution of all the Javanese species, has only a single record for Siam, viz. *Garckea phascoides*, listed by Brotherus in **A**).

For several years past Dr. A. F. G. Kerr has collected mosses in various parts of Siam, and these have come to me for determination. I now give the results of these studies. I have, in addition, received two small collections from the U. S. A. National Museum, one made by J. F. Rock in 1920, the other by Dr. Hugh M. Smith in 1928.

The present paper adds about 145 species, including 32 new to science, bringing the number of known species to 220.

It seemed desirable to include in this list all the species known from Siam. I have therefore incorporated in it all the species recorded in the earlier papers, referring to these as **A**), **B**), &c. All the species not so indicated will be understood to be new records for Siam. I have given the general distribution of these except in the cases where that distribution is a fairly wide one.

Where no collector's name is given it is understood to be Dr. Kerr.

The bryophytic flora of Siam is undoubtedly a rich one, and the present list must not be supposed to represent a large proportion of the actual moss flora. Systematic collecting in the mountainous northern region would no doubt add considerably to it. So far as at present known the species show a marked preponderance of the Malayan element, with a considerable percentage of the Indo-Himalayan, and a small number showing a Japanese-Formosan affinity.

The proportion of endemic species as at present known is about one-fourth of the whole. This is probably a rather larger proportion than is actually the case. Of the 54 species described as new from Siam, four or five were actually known at the time of description as occurring elsewhere, and the number is certain to be increased. The proportion will probably be found to be about one-fifth.

For purposes of comparison it may be mentioned that the

number of species of mosses known from Java is 650, which probably represents very nearly the actual flora; in the Malay peninsula about 400 are known; this may be estimated as somewhere about four-fifths of the actual number of species; collecting there has been done over a much longer period, and by a considerably larger number of collectors, than in Siam. The influence of the Indo-Himalayan flora is likely to be felt in Siam to a much greater extent, while that of the Malayan flora is likely to be reduced. It would appear probable that the moss flora of Siam may be expected ultimately to reach approximately the same numbers as that of the Malay Peninsula.

I have to express my thanks to Prof. W. G. Craib for kindly rectifying and arranging the place-names in the list, and to Dr. Kerr for seeing it through the press.

SPHAGNACEAE.

Sphagnum siamense Dix. sp. nov.

§ *Cymbifolia*. Habitus *S. cymbifolii*. Ab illa specie (*sensu stricto* Warnstorf) differt parietibus cellularum corticalium externis plerumque *uniporosis*. A *S. Beccarii* Hampe differt habitu valde diverso, ramis longioribus, *conspicue deflexis*, foliis rameis majoribus, foliis caulinis plerumque *fibrosis, majoribus*.

Elatum. Caulis 20 cm. et ultra; pallidum, superne carnosum; rami laxiuscule dispositi, deflexi. Folia caulina circa 2 mm. longa, per dimidiam partem superiorem fibrosa.

Hab. *Udawn*. Lôi, Kao Krading; circa 1200 m. alt., forming large masses on open rocky ground, Mar. 1924; coll. A. F. G. Kerr (80).

This plant has the chlorophyllose cells in section triangular, exposed on the inner surface only. In this and in other characters it belongs to the group including *S. cymbifolium* (*sensu stricto*), to which it is obviously very closely allied. It belongs however to a Section separated by Warnstorf in having the outer wall of the stem epidermis bearing usually a single pore (in *S. cymbifolium* 1-4), the only Asiatic species of which is *S. Beccarii* Hampe. This has a very different habit, smaller leaves, and the stem leaves usually without fibrils.

SPHAGNUM PSEUDO-CYMBIFOLIUM C. M.

Chantaburī. Krāt, Kao Kūap, sandy soil in light evergreen forest, 23 Dec., 1929 (428).

Distr. Himalayas; Assam; Formosa; Yunnan.

SPHAGNUM GEDEANUM Doz. & Molk.

Rāchaburī. Kānburī, Kao Ri Yai, circa 1400 m. alt., on ground among grass, 1 Feb., 1926 (141).

SPHAGNUM CUSPIDATUM Ehrh. (*sensu stricto*).

Nakawn Srītamarāt. Tā Samet, marshy ground, under 50 m. alt., 28 Jan., 1928 (250).

This agrees with *S. cuspidatum* Ehrh. emend. Warnst. in every respect except that the border of the stem leaves is only slightly widened below. New to southern Asia; recorded only from Japan by Warnstorf.

SPHAGNUM CUSPIDATULUM C. M.

Pāyap. Doi Angkā, in open swamp, circa 2400 m. alt., 2 May, 1921 (29). Near summit of Doi Sutēp; coll. Hosseus. **B**.

SPHAGNUM SUBRECURVUM Warnst.

Chantaburī. Chantabun, Makām, under 50 m. alt., at foot of shrubs in open scrub, 4. Dec., 1924 (107).

Agrees well with the description. The stem leaves are almost cucullate at apex.

Distr. Java.

Sphagnum densirameum Dix. sp. nov.

§ Subsecunda. Subsect. Multiporosa. Inter species affines asiaticas structura *S. khasiano* Mitt. proximum, habitu autem toto coelo diversum, ramis *densissimis*, longioribus, unde caulis *valde turgidus*, atque foliis majoribus. A *S. auriculato* quoque affine differt foliis caulinis atque rameis subsimilibus.

Folia caulina foliis rameis *simillima*, dense conferta, *patentia*, paullo minus concava, apice paullo latiore; 2 mm. longa; ubique fibrosa; cellulae superficie dorsali multiporosae, ventrali aut pauciporosae aut nonnunquam multiporosae.

Folia ramea caulinis subsimilia, ovata, valde concava, acuta, apice paucidentato.

Hab. Udawn. Lôi, Kao Krading, circa 1200 m. alt., on rocks, Mar., 1924; coll. A. F. G. Kerr (81).

Structurally much like *S. auriculatum* Schimp. (*sensu* Warnstorff), but very marked in its dense branching, and the close similarity between the stem and branch leaves, which are indeed often indistinguishable from one another.

FISSIDENTACEAE.

FISSIDENS SIAMENSIS Broth.

Chantaburī. Kaw Chāng. **A).**

FISSIDENS PAPILLULOSUS Broth.

Chantaburī. Kaw Chāng. **A).** *Surāt.* Kaw Tao. **C).**

FISSIDENS CEYLONENSIS Doz. & Molk.

Pūket. Satul, Tung Wā, Mar., 1928 (267). *Nakawn Sritamarāt.* Songklā, under 50 m. alt., 8 Apr., 1928 (289).

FISSIDENS MITTENII Par.

Chantaburī. Kaw Chāng. **A).**

FISSIDENS SYLVATICUS Griff. (Syn. *F. Zippelianus* Doz. & Molk.).

Chantaburī. Kaw Chāng. **A).** Kao Sabāp, c. 100 m., on damp rocks by waterfall (453). *Pūket.* Trang, Chawng, circa 100 m. alt., on *Arenga saccharifera*, April, 1928 (290).

Brotherus in his paper on the mosses of Koh Chang (p. 116) gives *F. javanicus* Doz. & Molk. as a synonym of *F. sylvaticus* Griff.; I do not know on what authority. This is, however, incorrect. I have examined Griffith's specimens of *F. sylvaticus* at Kew, and they are undoubtedly identical with *F. Zippelianus* Doz. & Molk.; the description and figures entirely bear this out. It is I think quite probable that Brotherus really intended to make this reduction, but that it became transposed to *F. javanicus* (a few lines higher on the page) by a slip.

FISSIDENS JAVANICUS Doz. & Molk. (Syn. *F. acutifolius* Mitt., Musc. Ind. Or., in Journ. Linn. Soc., Bot., Vol., III, Suppl., p. 137).

Chantaburī. Kaw Chāng. A). *Nakawn Srītamārāt*. Kao Lūang, circa 1000 m. alt., 1 May, 1928 (305).

As observed above, this is not identical with *F. sylvaticus* Griff.; but it is entirely so with Mitten's species from Assam. Neither *F. javanicus* nor *F. acutifolius* has been described fruiting, but I have received a specimen from Assam, coll. C. McCann, with a single capsule. This is terminal, on a thin, very pale seta, 5 mm. long, geniculate at base; the operculate capsule is 75 mm. long, quite symmetrical, elliptic, pale coloured, with a short, conical lid.

***Fissidens obtuso-apiculatus* Dix. sp. nov.**

§ Serridium. Subrobustus; caulis ad 2 cm. longus, 3-4 mm. latus. Folia *confertissima*, patentia, valde regulariter disposita, frondem *pennaeformem, perregularem* instrumentia, circa 2 mm. longa, 6 mm. lata, oblongo-lingulata, *haud acuminata, apice rotundato, cum costa excurrente fortiter apiculato*; superne saepe corrugatula, pallida, marginibus superioribus *crenulatis*. Costa *angustiuscula, subconcolor*, superne attenuata, apice in apiculo valido acuto excurrent. Lamina vaginans supra medium folium terminata; lamina dorsalis ad folii basin late auriculata. Cellulae superiores 9-14 micr. latae, irregulares, sat incrassatae, *alte mamillosae*, basin versus majores; ad margines superiores saepe in seriebus pluribus minores, subobscurae.

Seta terminalis, 1-1.4 cm. longa; theca erecta, elliptica, sicca sub ore angustata. Peristomium majusculum, variabile; crura nunc cohaerentia, nunc libera; densissime alte papillosa, *nec horizontaliter nec spiraliter nodosa*.

Hab. Rāchaburī. Kānburi, Sisawat, circa 1000 m. alt., on damp limestone rocks by waterfall in forest, 14 Jan., 1926; coll. A. F. G. Kerr (137).

A marked species in the regularly frondiform stems, of subequal width throughout, with the leaves very closely set and very uniform; rounded above and subobtusely with a strong apiculus. It is perhaps nearest to *F. pulogensis* Broth. from the Philippines, but that has *inter alia* smooth cells, and a very short seta (4 mm.)

The plants are for the most part thickly encrusted with calcareous deposit.

The character of the areolation, with the marginal cells usually somewhat differentiated in several rows, seems to indicate *Serridium* rather than *Amblyothallia*, in spite of the terminal seta.

FISSIDENS NOBILIS Griff.

Udawn. Lôi, Pū Tong, c. 900 m. alt., 23 Mar., 1924, on rock by stream in evergreen forest (95). *Surāt.* Langsūan, Ban Krayè, circa 200 m. alt.; on rock by stream in evergreen forest, 19 Feb., 1927 (188). Bān Kawp Kêp, c. 100 m., 8 Aug., 1927, on ground at edge of stream (220).

DICRANACEAE.

TREMATODON ACUTUS C. M.

Udawn. Lôi, Chiengkān, on damp earth, circa 200 m. alt., Mar., 1924 (90).

Distr. Java; Setschwan.

GARCKEA PHASCOIDES (Hook.) C. M.

Chantaburī. Kaw Chāng. **A).**

DICRANOLOMA BLUMII (Nees) Par.

Pattānī. Gunong Ina, circa 1200 m. alt., 12 Aug., 1923 (60). *Nakawn Srītamaraṭ.* Kao Lūang, circa 1600 m. alt., on trees in forest, 30 Apr., 1928 (299).

LEUCOLOMA MOLLE (C. M.) Mitt.

Rāchaburī. Prachūap, Kao Lūang, on shrubs in open scrub, 1926 (152b). A form with large leaves and very distinct border.

var. *LONGIPILUM* Fleisch.

Nakawn Srītamaraṭ. Kao Lūang, c. 1600 m., on trees in evergreen forest, 30 Apr., 1928 (300a). *Pattānī.* Kao Kalakīrī, circa 900 m. alt., on trees and shrubs, 2 Apr., 1928 (283b).

LEUCOLOMA BIRMENSE C. M.

Chantaburī. Chantabun, Kao Sabāp, on tree trunks in evergreen forest, 8 Jan., 1930 (452).

Distr. Burma.

LEUCOLOMA SIAMENSE Broth.

Chantaburī. Kaw Chāng. A).

CAMPYLOPUS GRACILIS (Mitt.) Jaeg.

Pāyap. Doi Sutēp, 1650 m. alt., on tree in evergreen forest, 5 Jan., 1914 (2). This has the calyptra entire at base. Mitten describes it as "Calyptra basi fimbriata". In No. 72, Hook. & Thomson, however, one of the two plants on which Mitten bases his species, Wilson has a note (Herb. Mus. Brit.) "calyptra *slightly fringed* at base"; and I find only two calyptras present, one of which is very slightly fringed, the other apparently not at all. *C. Milleri* Ren. & Card. appears to me to be only this form.

Campylopus siamensis Dix. & Thér. sp. nov.

Habitu, foliorum forma et structura *C. recurvo* (Mitt.) subsimilis, differt autem colore *flavo-viride*, foliis *omnino epilosis*, atque structura costae, ei *C. flexuosi* Brid. simili, sectione transversali *cellulas ventrales perparvas, hic illic stereideis paucissimis intermixtas*, eurycystes multo majores, exhibente. Theca plerumque *suberecta, subsymmetrica*, leniter plicata.

Hab. Udawn. Lôi, Kao Krading, c. 1200 m., on rocks in open evergreen forest, Mar., 1924, coll. A. F. G. Kerr (85), type. Lôi, Pū Tong, c. 1000 m. alt., Mar., 1924 (94). *Chantaburī*. Krāt, Kao Kūap, very common on open rocks, c. 600 m., alt., 27 Dec., 1929 (437). *Pūket*. Satul, Adang, c. 600 m., on rocks in open, 10 Jan., 1928 (247).

var. nov. subsiamensis Dix. & Thér.

A forma typica differt solum cellulis supra-alaribus rectangularibus paullo altius adscendentibus.

Hab. Rangala, Ceylon, on rocks, 29 Aug., 1926; coll. A. H. G. Alston (1502), type. Ibidem, 1905 p. p. Weddenulli, Rombodde Pass, on wet rocks in open, 30 June, 1928; coll. A. H. G. Alston (1749). Ceylon, Central Province, Thwaites, (C. M. 18a) as *C. recurvus*.

This plant has given rise to a great deal of perplexity. The Ceylonese form is so near to *C. recurvus* that it was mistaken for it by Thwaites, and figures as *C. recurvus* in some at least of his sets, under the number cited. *C. recurvus* is normally hair-pointed, at

least in the upper and perichaetial leaves, but some forms of it do not show any hair points. It is nearly always of a blackish colour, and the leaves are very straight and rigid when dry, and this usually enables it to be known from the present species. The nerve section, however, is distinct, and perhaps forms the safest criterion. In *C. recurvus* it is that of normal *Eu-campylopus*, but in *C. siamensis* it is somewhat markedly distinct. The ventral cells of the nerve are so small and so few that at first sight it appears to belong to the *Palinocraspis* group; careful examination, however, shows that this very thin ventral layer consists of very small, but not stereid cells, in one layer, interspersed here and there with a few true stereids, very much as in *C. flexuosus*. It is in fact somewhat intermediate between the *Eu-campylopus* and *Palinocraspis* types of nerve. The capsule, almost erect and symmetric, is different from the ordinary *Campylopus* capsule, but unfortunately this is also shared, to some extent at least, by *C. recurvus*.

The Ceylon plant scarcely differs at all from the Siamese one; but the supra-alar lax, rectangular cells are carried slightly higher up in the leaf than in that. Both plants are marked, like *C. recurvus*, by the rigid leaves, strongly dentate at apex, the tall, rigid tufts, strongly marked, deep red auricles, etc.

CAMPYLOPUS SERRATUS Lac. (Syn. *C. singaporensis* Fleisch.)
Surāt. Kānchanadit, c. 5 m. alt., on open sandy ground, 1 Aug., 1927 (212).

Distr. Banca; Malay Peninsula; Sumatra; Borneo.

CAMPYLOPUS COMCUS (Hornsch. & Reinw.) Jaeg.

Pāyap. Doi Sutēp, tree trunks, 1500 m. alt., 6 Sept., 1914 (4b p. p.).

CAMPYLOPUS SP.

Nakawn Sritamarāt. Kao Lūang, circa 1700 m. alt., on ground in scrub, 30 April, 1928 (304).

This species has short, brachyphyllous shoots, like *C. flagelliferus* (C. M.) Jaeg., from India, and is probably a form of that; but the leaves are rather finer in the points, with a redder leaf base and auricles.

CAMPYLOPUS RICHARDII (Schwaegr.) Brid. [Syn. *C. Blumii* (Doz. & Molk.) Bry. jav.; &c].

Pāyap. Doi Sutēp. **B**).

DICRANODONTIUM UNCINATUM (Harv.).

Pāyap. Doi Sutēp, on tree trunks, 1500 m. alt., 6 Sept., 1914 (4b p. p.). *Rāchaburī.* Kānburī, Kao Ri Yai, circa 1400 m. alt., 1 Feb., 1926 (139).

LEUCOBRYACEAE.

OCHROBRYUM KURZIANUM Hampe.

Pāyap. Doi Sutēp, **A**). *Chantaburī.* Kao Sabāp, Chantabun, circa 50 m. alt., on decaying log, 5 Dec., 1924 (108). *Rāchaburī.* Kānburī, Tākanun, circa 600 m. alt., on dead tree in bamboo forest, 16 Feb., 1926 (145). *Pūket.* Satul, Adang, 15 Jan., 1928 (245).

LEUCOBRYUM SANCTUM (Brid.) Hampe.

Chantaburī. Kaw Chāng. **A**). Chantabun, Kao Sabāp, on tree trunk in forest, 5 Dec., 1924 (109). Siam, 1920; coll. J. F. Rock (216), Herb. U. S. A. Nat. Mus.

(*Leucobryum brachyphyllum* Hampe. This was recorded by Brotherus in his paper on the Kōh Chang mosses, but it does not figure in the 2nd Ed. of the "Musci", and was presumably a form of *L. aduncum*).

LEUCOBRYUM ADUNCUM Doz. & Molk.

Surāt. Kaw Tao. **C**). Chumpawn, Tā Ngaw, c. 300 m. alt., on stone in evergreen forest, 21 Jan., 1927 (172). *Nakawn Srītamārūt.* Tā Samet, c. 20 m. alt., 27 Jan., 1928, on sandy ground (249).

LEUCOBRYUM BOWRINGII Mitt.

Chantaburī. Kaw Chāng. **A**).

LEUCOBRYUM JAVENSE (Brid.) Mitt.

Pāyap. Doi Sutēp. **B**).

LEUCOBRYUM PENTASTICHUM Doz. & Molk.

Pūket. Satul, Adang, on rocks, 16 Jan., 1928 (248).

I incline to think this only a form of *L. candidum* (Brid.); the same thing indeed as the var. *speirostichum* of that species, from New Zealand. It seems also doubtfully distinct from *L. Teysmannianum* Doz. & Molk. The distinguishing characters given by Fleischer do not seem very convincing.

Leucobryum perichaetiale Dix. sp. nov.

L. scalari C. M. et *L. Poilanei* Thér. affine. Ab illo differt limbo folii (lamina vera) apud basin etiam angustiore, e seriebus 2-3 tantum instructo (verisimiliter quoque characteris sporophyticis). A *L. Poilanei* habitu multo robustiore, caulibus elatis, perichaetii foliis majoribus, longioribus, minus anguste acuminatis, seta brevior (1.5-1.75 cm. longa), theca suberecta.

Hab. Pāyap. Doi Sutêp, alt. circa 1500 m., 6 Sept., 1914 (8), type. *Udawn.* Lôi, Kao Krading, circa 1200 m. alt., on trees in evergreen forest, Mar., 1924 (84). Lôi, Pū Tong, circa 1000 m., alt., on tree in evergreen forest, Mar., 1924 (102).

This plant differs only slightly from *L. scalare*, but the border to the leaf is even narrower than in that species. *L. scalare* moreover has not been found in fruit; the female flowers are described by Fleischer as pseudo-lateral. Here in all the gatherings the plants were abundantly fruiting (less so in 102), the perichaetia terminal on almost every branch of the densely ramose stems, very long and conspicuous. I have not detected any ♂ flowers, but from the constantly fruiting condition it would seem likely that it is phyllodioicous rather than dioicous.

It is also very near *L. Poilanei* Thér. from Cambodge, but that has shorter and less conspicuous perichaetia, a longer seta (2.5 cm.), and the capsule horizontal.

The chlorophyllose cells of the leaf in section are hypercentric near base, almost centric in the upper part. The leucocysts on the ventral surface of the leaf at base are mostly in a single layer, but may occasionally be horizontally divided so as to form a second layer.

LEUCOPHANES CANDIDUM (Hornsch.) Brid.

Pūket. Satul, Klawng Tōn, on stone in forest, 16 Mar., 1928 (262b).

LEUCOPHANES DENSIFOLIUM Mitt.

Pūket. Satul, Klawng Tōn, on stone in forest, 16 Mar., 1928
(262a).

Distr. Pacific Is.; Malay Peninsula.

LEUCOPHANES ALBESCENS C. M.

Surāt. Kaw Tao. **C**).

LEUCOPHANES GLAUDESCENS C. M.

Chantaburī. Kaw Chāng. **A**).

OCTOBLEPHARUM ALBIDUM (L.) Hedw.

Chantaburī. Kaw Chāng. **A**).

Collected by Dr. Kerr in several localities.

ARTHROCORMUS SCHIMPERI Doz. & Molk.

Chantaburī. Kaw Chāng. **A**). *Pūket.* Satul, Adang, under
5 m. alt., 15 Jan., 1928, on rotting trunk in evergreen forest (246).

CALYMPERACEAE.

SYRRHOPODON SUBCONFERTUS Broth.

Chantaburī. Kaw Chāng. **A**). Krāt, Kao Kūap, circa
600 m. alt., on tree in evergreen forest, 27 Dec., 1929 (436 p.p.). Kao
Sabāp, Chantabun, tree trunks, 300 m. alt., 6 Jan., 1930 (448a).

SYRRHOPODON SPICULOSUS Hook. & Grev.

Chantaburī. Kaw Chāng. **A**).

Syrrhopodon subelimbatus Dix. sp. nov.

Eu-syrrhopodon. § Cavifolii. *S. cavifolio* Lac. peraffinis et
proximus. Differt statura *multo minore*, *planta fere acauli*, foliis
minoribus, siccitate *incurvis*, *haud crispatis*, *madidis recurvis*,
minime concavis, latioribus, cancellina *multo brevior*e, tertiam vel
quartam partem folii implente, margine multo fortius spinuloso, e
basi fere denticulato. A reliquis speciebus affinibus limbo foliorum
hyalino omnino carente longe distat.

Hab. Surāt. Kaw Tao, on roots, circa 300 m. alt., Sept.,
1928; coll. A. F. G. Kerr (338).

The only really allied species is *S. cavifolius*, but the present plant is quite distinct in the very small size and almost stemless growth, the recurved leaves much less concave and not crisped when dry, the more spinulose border, and the cancellina, which there occupies approaching half the length of the leaf, here only reaching to one-fourth or one-third. The leaf structure is nearly identical, but the nerve here seems to be rarely spiculose at back below.

S. patulifolius Thér. & Dix. is of quite different habit, with tall stems and long, very narrow leaves.

It may be mentioned that the specific name is given not to indicate any relationship with *S. elimbatus* Dix., but to mark the almost entire absence of hyaline border; it is in fact only indicated by a single row of linear, hyaline cells at margin, reaching a very short distance above the spiculose shoulder; more often, however, not shown at all.

In this connection it may be noted that the presence or absence of a hyaline border to the leaf constitutes the principal—almost the sole—distinction between the Subgenera *Eu-syrrhopodon* and *Orthotheca*. Now in *S. cavifolius* Lac. the border is practically wanting, at least in the Banca plant. Fleischer (*Musci... von Buitenzorg*, I, 208) criticizes Lacoste's figure of the leaf, in not showing the border distinctly: in Lacoste's own plant, however (*Hb. Hampe*, in *Herb. Mus. Brit.*) the leaf shows no trace of border, or at the most a single row of hyaline cells reaching a fraction above the toothed part of the margin, just as in the present plant. It is possible that the Borneo plant possesses a more developed border, and that Fleischer had only seen that.

In *S. cavifolius* the margin of the leaf at shoulder usually presents three or four very short, spinulose teeth on each side, extending over a very short distance just at the shoulder. In the present species the margin becomes denticulate near the base of the leaf, and the toothing continues to or above the shoulder, one or two at least of the teeth being long and almost ciliate.

SYRRHOPODON FASCICULATUS Hook. & Grev.

Surāt. Kaw Tao. C). *Pūket.* Satul, Klawng Tōn, on shrub in forest, 16 Mar., 1928 (263).

SYRRHOPODON REPENS HARV.

Pūket. Satul, Klawng Tōn, circa 200 m. alt., on tree, 14 Mar. 1928 (259).

SYRRHOPODON MUELLERI (DOZ. & MOK.) BRY. JAV.

Pattānī. Kao Kalakiri, circa 400 m. alt., on log in forest, 31 Mar., 1928 (273).

SYRRHOPODON GARDNERI (HOOK.) SCHWAEGR.

Nakawn Sritamarāt. Kao Lūang, circa 1100 m. alt., 29 Apr., 1928 (297c).

Distr. Himalayas; Assam; Ceylon; Java.

Syrrhopodon Kerrii Dix. sp. nov.

Subgen. Orthotheca. *S. Gardneri* (Hook.) affinis, foliis autem (praecipue siccis) *latioribus, minus convolutis*, brevioribus, apice minus angustatis, costa apud apicem dorsaliter *vix hispida*, cellulis inferioribus *humillime* papillosis.

Hab. Pāyap. Doi Sutēp, on tree stump in evergreen forest, circa 900 m. alt., 17 Nov., 1922 coll. A. F. G. Kerr (32).

Very near to *S. Gardneri*, and possibly to be regarded as an extreme subspecies, but apart from the habit and less involute leaves, it differs in the leaf structure; the cells which are there highly spiculose-papillose are here very lowly so; the nerve is only faintly muricate at the back near apex, while there it is hispidulose for some way down. The hyaline cells of the cancellina here are also shorter, and rather smaller,

S. Gardneri varies in leaf form, and the plant figured in Bry. jav. T. 43 is a form closely resembling (in that character) the present species.

CALYMPERES DELESSERTII BESCH.

Surāt. Kaw Tao. **C**).

CALYMPERES SCHMIDTI BROTH.

Chantaburī. Kaw Chāng. **A**).

CALYMPERES SUBTENERUM BROTH.

Chantaburī. Kaw Chāng. **A**).

CALYMPERES BRACHYCAULON Broth.

Chantaburī. Kaw Chāng. **A).**

CALYMPERES ROBUSTIUSCULUM Broth.

Chantaburī. Kaw Chāng. **A).**

CALYMPERES ACUMINATUM Broth.

Chantaburī. Kaw Chāng. **A).**

CALYMPERES SUBINTEGRUM Broth.

Chantaburī. Kaw Chāng. **A).** *Surat.* Kaw Tao. **C).**

CALYMPERES JAVANICUM Fleisch.

Surāt. Kaw Tao. **C).**

CALYMPERES NICOBARENSE Hampe

Surāt. Kaw Tao. **C).** *Pūket.* Satul, Tōla, on fallen tree,
3 Jan., 1928, (243).

CALYMPERES HAMPEI Doz. & Molk.

Chantaburī. Kaw Chāng. **A).**

CALYMPERES MOTLEYI Mitt.

Chantaburī. Kaw Chāng. **A).**

CALYMPERES GRACILESCENS Broth.

Chantaburī. Kaw Chāng. **A).**

CALYMPERES BECCARII Hampe.

Pūket. Satul, Kao Kéo, on tree trunk, 13 Mar., 1928 (257d).

POTTIACEAE.

Hymenostomum siamense Dix. sp. nov.

Dense late caespitosum, habitu *H. edentuli* (Mitt.) sed semper sterile. Ab illa specie differt foliis *brevioribus*, *latioribus*, paullo obtusioribus, cellulis minus obscuris, *paullo majoribus*, 8-11 micr. latis.

Hab. *Surāt.* Kaw Tao, on ground between rocks, 25 July, 1927; coll. A. F. G. Kerr (209), type. On bare earth in light ever-green forest, under 5 m. alt., *ibidem*, 24 Sept., 1928 (329). On bare rock near sea level, *ibidem*, 20 Sept., 1928 (354).

The constant sterility, the broad, short leaves with rather large cells, seem to warrant the separation of this from the widely distributed *H. edentulum*. In that species the cells measure 7-8 micr., and are very obscure; the leaves vary much in size and somewhat in form, but are always, I believe, much narrower in proportion to their length, the widely enrolled margins on this account occupying a larger proportion of the breadth of the leaf.

TRICHOSTOMUM ANGUSTATUM (Mitt.) Fleisch.

Pāyap. Doi Sutēp (24).

TRICHOSTOMUM STENOPHYLLUM (Mitt.) Broth.

Pāyap. Dai Chiendāo, on roots of orchids, Dec., 1931, coll. Put.

Agrees perfectly with the Himalayan plant.

Distr. Himalayas; South India. (The Javan plant is probably different).

TRICHOSTOMUM SARAWAKENSE Dix.

Pūket. Satul, Tung Nui, on limestone rocks in forest, 17 Mar., 1928 (265, 266).

No. 266 is in fruit, which has not hitherto been seen. The seta is thin, about 1 cm. long, the capsule small, 1.5 cm. long (deoperculate), shortly cylindric; fragmentary remains of peristome only remain, but as there are numerous capsules, all in this condition, it is not improbable that the peristome is actually rudimentary.

TRICHOSTOMUM SIAMENSE Broth.

Pāyap. Doi Sutēp. **B**.

HYOPHILA INVOLUTA (Hook.) Jaeg.

Chantaburī. Kaw Chāng. **A**. (as *H. cylindrica* (Hook.) Jaeg.) *Krungtēp.* Bangkok, 23 Oct., 1927, on old brick wall (237).

HYOPHILA MICHOLITZII Broth.

Surāt. Chumpawn, Bān Māp Amarit, circa 50 m. alt., on stone in evergreen forest, 13 Jan., 1927 (158).

The cells are small for the species (3-5 micr.), but I think in spite of this it belongs here; the characteristic brood-bodies are present.

Distr. Ceylon; Malaya; Borneo; New Guinea; China; Japan.

Chionoloma latifolium Dix. sp. nov.

C. indurato (Mitt.) Dix. (Journ. of Bot. lx, 102, 1922) habitu persimile. Differt foliis superne latius, brevius acuminatis, atque limbo pallido *angustiore, multo brevior*.

Hab. Pulau Dayang Bunting, Langkawi, Kedah State, Malaya; on dry limestone rocks in jungle, 23 Aug., 1925; coll. R. E. Holttum (15130), type. *Surāt.* Langsuan, Takō, Siam; on limestone rocks, circa 100 m. alt., 8 Feb., 1927; coll. A. F. G. Kerr (184).

Differs from the Birmese plant rather markedly and apparently constantly in the narrower border, not reaching nearly so high in the leaf. In *C. induratum* the border in its widest part is from 4 to 5 cells in breadth, and reaches to approximately two-thirds the height of the lamina (i. e. the part of the leaf above the sheathing base). In *C. latifolium* the border is much less strongly marked; it consists at the widest of 2 rows of cells, which are much shorter and less incrassate than in *C. induratum*; and it extends much less than half way up the lamina, usually about one-third or even less. In the type gathering from Malaya the leaf points are markedly shorter and broader than in *C. induratum*; but in the Siamese plant this difference is scarcely, or sometimes not at all marked.

The colouring in the older leaves is very striking, being almost that of *Syrrhopodon croceus*.

BARBULA INDICA (Schwaegr.) Brid.

Chantaburī. Kao Ploi Wên, Chantabun, circa 50 m. alt., on old plaster work (455).

Barbula subdenticulata Dix. sp. nov.

B. lowisiadum Broth. affinis sed robustior, sordide atro-viridis. Differt quoque forma foliorum, *ex infima fere basi sensim ad apicem angustatorum, acutiorum.* Folia 2-2.5 mm. longa, marginibus *vel omnino planis vel uno latere ad infimam basin leniter tantum recurvo*; infra apicem apiculatum *plerumque dentibus 1-2 inconspicuis saepe uno latere tantum praeditis.* Costa dorso ad apicem leniter corrugata.

Cellulae superiores minores, 5-7 micr. latae (illa specie 7-10 micr.), subquadratae, obscurae, laeves vel sublaeves, basilares quam in

illa specie multo minus laxae, paucae tantum ad infimam basin rectangulares, hyalinae.

Setae vetustae 2 cm. altae; thecae vetustae solum visae, peristomio destructo.

Hab. Udawn. Lôi, Wang Sapung, on rocks in deciduous forest, by stream, c. 300 m. alt., Mar., 1924; coll. A. F. G. Kerr (78).

Belongs to the group of numerous species of which *B. unguiculata* may be considered the type, and to which *B. louisiadum* Broth., I think, should preferably be attached,—not to *Hydrogonium*, in which it is placed by Fleischer, and in the 2nd Ed. of the "Musci." *B. sordida* Besch. from Tonkin is similar in leaf form and structure, but is a much smaller plant, with nerve much rougher at back, and entire apex. The denticulation in the present species is very minute, irregular and obscure, but most leaves show 1–2 minute teeth on one or both sides of the base of the apiculus. The cells are unusually small, and the slightly enlarged, hyaline rectangular basal cells extend to a very short distance above the insertion.

***Barbula obscuriretis* Dix. sp. nov.**

B. subdenticulatae supra descriptae affinis; differt foliis basi latiore, supra sublingulatis, apice integro, marginibus basilaribus utroque latere anguste recurvis, cellulis basilaribus inanibus magis numerosis, paullo laxioribus; costa per plusquam dimidiam longitudinem alte corrugata. Cellulae superiores minutae, minutissime papillosoe, obscurae. Seta pallida, tenuis; peristomium longitudinem thecae fere aequans.

Hab. Pāyap. Doi Sutēp, Siam, old plaster wall, circa 600 m alt., 17 Nov., 1922; coll. A. F. G. Kerr (34), type. *Rāchaburī.* Kān-burī, Tākanawn, Siam, on rocks by river, 20 Feb., 1926 (146). *Surāt.* Bān Kawp Kēp, Siam, circa 50 m. alt. on limestone rock, 8 Aug., 1927 (215b). Montalban Prov., Rizal, Luzon, *Philippine Is.*, Nov., 1916; coll. C. F. Baker (6350).

This plant is marked by the nerve being highly corrugated at back down to nearly two-thirds of its length. In *B. indica* the corrugation rarely reaches so far down, the upper part of the leaf has a characteristic plica, absent here, and the peristome is quite

different. The leaf is narrower than in most of the allied species, the cells are as small as in *B. subdenticulata*, and being minutely papillose are remarkably obscure. It is still nearer, vegetatively, to *B. angustifolia* (Hook. & Grev.), but differs at once in the Barbuloid peristome.

ORTHOTRICHACEAE.

ANOECTANGIUM STRACHEYANUM Mitt.

Pāyap. Doi Sutēp, on rocks, circa 1350 m. alt., 14 Mar., 1915 (28).

Distr. India; Ceylon; Japan.

MACROMITRIUM GONIORRHYNCHUM (Doz. & Molk.) Mitt.

Pāyap. Doi Sutēp, on tree trunk in evergreen forest, circa 1400 m. alt., 18 Nov., 1922 (43). Doi Chiengdāo, on roots of orchids, Dec., 1931; coll. Put.

MACROMITRIUM FALCATULUM C. M.

Pāyap. Doi Sutēp. **B.** (as *M. falcatum*, false).

MACROMITRIUM NEPALENSE (Hook. & Grev.) Schwaegr.

Udawn. Lôi, Kao Ngôn, circa 600 m. alt., on rocks in evergreen forest, Mar., 1924 (91); Nawng Būa, circa 200 m. alt., on tree in open deciduous forest, 25 March, 1924 (92).

MACROMITRIUM SEMIPELLUCIDUM Doz. & Molk.

Surāt. Langsūan, Nā Sak, circa 50 m. alt., on trees in savannah, 6 Feb., 1927 (182).

Macromitrium brevissimum Dix. sp. nov.

M. concinno Mitt. proximum, sed valde diversum. Caespites *densissimi*, rufo-fusci. Rami condensati, *brevissimi*, 2-4 mm. raro 5 mm. longi. Folia confertissima, eis *M. concinni* similia sed breviora, vix 1 mm. longa, apice *emarginato*, *marginibus recurvis*, unde folia *dorsaliter concavo-cucullata*, costa in apiculo brevissimo *recurvo* excurrente. Cellulae superiores 7-8 micr., rotundatae, *alte mamillosae*, basillares praecipue marginales elongatae, incrassatae, *justa-costales* parum elongatae, omnes grosse tuberculatae.

Seta circa 1 cm. alta, laevis. Calyptra nuda. Theca parva, e collo defluente globoso-ovata, vetustate paullo elongata, *valde microstoma*, laevis. Operculum rectum, longirostrum. Peristomium externum *nullum*, internum membrana pallida brevissima. Spori magnitudine variabiles, 20–35 micr.

Hab. Udown. Nakawin Panom, Muk Dāhān, Siam, circa 200 m. alt., on rock in open deciduous forest, Feb., 1924; coll. A. F. G. Kerr (74), type. Lôi, Dān Sai, circa 600 m. alt., on sandstone in open deciduous forest, Mar., 1924 (100), Lôi, Wang Sapung, circa 300 m. alt., on rock in deciduous forest, Mar., 1924 (79). *Rāchasimā.* Burirām, Nāng Rawng, c. 200 m. alt., on tree in open deciduous forest, Jan., 1924 (73).

A strongly marked species, possibly allied to *M. concinnum* Mitt., but entirely different in many characters, the absence of outer peristome, larger spores, upper cells highly mamilllose (not finely papillose), &c., and especially, and from any species known to me, in the curious leaf apex. This is perhaps best visualized by imagining a very broad-leaved form of e. g. *Trichostomum crispulum*, with strongly cucullate apex and excurrent nerve. If now the apex were deeply emarginate, so as to form a deep sinus on each side of the nerve, it will be realized that each half of the apex has become independently cucullate. That is the case with the leaf of the present species, but inverted, since the nerve apex is *recurved*, not incurved. The emargination is often so deep and the apiculus so recurved that when slightly flattened out, and viewed from above, the nerve apex is not seen, and the leaf appears to terminate in two rounded convex lobes.

The whole plant is extremely dense, with short branches and short, densely disposed leaves.

Macromitrium inflexifolium Dix. sp. nov.

Ad sectionem *M. japonici*, &c., pertinens, *M. bathydronto* Card. proximum. Rami breves, foliis siccis arete incurvo-circinatis, breviter oblongo-lanceolatis; *breviter acutatis*, apud apicem *fortiter incurvis*, marginibus superne crenulatis, costa valida, rufo-fusea, dorso valde prominens, apud apicem fortiter tuberculosa, infra apicem desinens. Cellulae superiores majusculae, subrotundae, sublaeves, parietibus

haud incrassatis; basilares juxtacostales parum elongatae, laeves, marginales in seriebus pluribus perangustae, incrassatae, *juxta infimam costam parvae magnae, inanes, ovatae.*

Seta circa 1 cm. alta, crassiuscula. Calyptra valde pilosa. Theca majuscula, *breviter cylindrica, castanea, ad orem haud contracta; ad orificium cingulo latiusculo subnitente purpureo-fusco paullo incrassata.* Operculum breviter conico-rostratum, basi multo angustiore quam orificii latitudine, rubrum.

Hab. Rāchaburī. Kānburī, Sīawat, Siam, circa 800 m. alt., on *Dendrobium*, 17 Jan., 1926; coll. A. F. G. Kerr (148), type. On rocks in the jungle, Peradeniya, Ceylon, Sept., 1925; coll. A. H. G. Alston (1493). On stone, Sugi, Prov. Tosa, Sikotu, Japan, Mar., 1928; coll. H. Sasaoka (4477)

An interesting species, on account of the distribution, as shown above. It is nearest to *M. bathydonum* Card., from Corea, described and figured by Cardot in *Beihefte Bot. Centralbl.*, Bd. xvii, Heft I, (1904), p. 13. That species has the same peculiar thickened cushion around the orifice of the capsule, which I only know otherwise in one or two Indian species; the capsule is dark in colour; almost exactly, rather widely cylindric in outline, with the somewhat thickened, purplish, rather glossy belt of cells at the orifice, described by Cardot as "ore carnosulo pulviniformi rubro, cellulis incrassatis pluriseriatis formato". The capsule wall is in fact so thickened at the top that the orifice itself when the capsule is just mature is very small compared with the outer diameter of the capsule mouth, and the lid is at base peculiarly small. *M. bathydonum* differs at once in the seta only 2 mm. long.

The Siamese gathering contained a monstrosity, a single seta bearing at its extremity two capsules, united only at their extreme base, fully developed but somewhat malformed.

MACROMITRIUM MIQUELII Mitt.

Nakawn Srītamārāt. Kao Lūang, circa 600 m. alt., on trees in forest, 2 May, 1928 (310).

The characters given by Fleischer to separate *M. Miquelii* from the closely allied species seem to me very slight and elusive,

but such as they are this belongs there rather than to *M. angustifolium* Doz. & Molk., or *M. incurvifolium* (Hook. & Grev.) Schwaegr., although *M. Miquelii* is only recorded from Java, while the other two have a wide distribution.

Macromitrium turgidum Dix. sp. nov.

M. ochraceo (Doz. & Molk.) forsán affine, habitu, colore *pulchre ochraceo*, etc., subsimile, sed ramis brevioribus, *turgidis*, foliis *brevioribus*, siccitate haud patentibus. Folia 3-3.5 mm. longa, lanceolata, 6-8 mm. lata, flexuosa, carinata, *breviter, late acuta, apice cuspidato*, costa percurrente vel breviter excurrente, marginibus superioribus *minute, argute* serrulato-denticulatis. Cellulae superiores *oblique ellipticae, valde conflatae*, apicales anguste rhomboidales, incrassatae, sublaeves; infra sensim elongatae, in parte dimidia fere folii *angustissimae*, juxtacostales breviores, latiores, plus minusve distincte argute tuberculosae.

Seta 1 cm. longa, tenuiuscula, *laevis*. Calyptra magna, *nuda*, basi pulchre laciniata, apice nigrescente. Theca turgide ovalis, versus orificium leniter angustata, laevis vel siccitate leniter angulata; operculum aciculare, thecae longitudinem subaequans.

Hab. Chantaburī. Krāt, Kao Kūap, on tree in evergreen forest, c. 700 m. alt., 27 Dec., 1929; coll. A. F. G. Kerr (438), type. *Rāchaburī.* Prachūap, Kao Lūang, on tree in open evergreen forest, 5 July, 1926; coll. A. F. G. Kerr (151).

Marked by its very turgid stems, orange colour, broad leaves, finely serrulate at apex, elongate upper cells, smooth seta, &c. *M. fulvum* Mitt., which is also a nearly allied species, and also has a smooth seta, has much more narrowly and longly acuminate leaves, and the seta is shorter.

SPLACHNACEAE.

TAYLORIA INDICA Mitt.

Pāyap. Doi Sutēp, circa 1650 m. alt., on trees in evergreen forest, 5 Jan., 1915 (23). Ibidem, (46). Kun Tān Mts., 4200 ft. alt., 22 Nov., 1928; coll. Hugh M. Smith (489) Herb. U. S. A. Nat. Mus.

Distr. Himalayas; Ceylon.

FUNARIACEAE.

FUNARIA DOZYANA (C. M.) Broth.

Pāyap. Doi Sutēp, circa 1506 m. alt., on ground in open evergreen forest, 5 Jan., 1915 (17).

The seta here varies in the same tuft from 5 mm. to 3 cm.!

Distr. Java.

FUNARIA HYGROMETRICA var. *calvescens* (Schwaegr.)

In several localities.

BRYACEAE.

BRACHYMENIUM NEPALENSE Hook.

In numerous localities. Principally in the north.

BRYUM CORONATUM Schwaegr.

A widely distributed moss. *B. doliolum* Duby, recorded by Brotherus in the Mosses of Koh Chang, is identical with *B. coronatum*.

RHODOBRYUM ROSEUM (Weis) Limpr.

Udawn. Lôi, Kao Krading, c. 1200 m. alt., 12 Mar., 1924, on rock at edge of evergreen forest (82).

RHODOBRYUM GIGANTEUM (Hook.) Schimp.

Pāyap. Doi Sutēp, on tree trunks, 1500 m. alt., 6 Sept., 1914 (6). *Ibidem* (45, 65).

MNIACEAE.

Mnium spathulifolium Dix. sp. nov.

M. integro Bry. jav. forsan affine, sed minus, foliis *spathulatis*, *inferne valde angustatis*, supra *omnino integris*; cellulae haud collenchymaticae. Inflorescentia ignota.

Hab. Khun Tan Mts., Siam; 4000 ft. alt., 20 Nov., 1928; coll. Dr. Hugh M. Smith (485).

I determined this at first as *M. minutulum* Besch., of which it has much the habit and leaf form. In that species, however, the cells are not arranged in divergent rows, and are decidedly incrassate,

and the plant is smaller. Here the cells are thin-walled, and are very distinctly arranged in divergent rows. The markedly spatulate form and quite entire border distinguishes it from *M. integrum*. The border is narrow, usually hyaline near apex, but rather stronger and brown below. The cells are rather large, 18-17 micr. in diameter.

ORTHOMNION TRICHOMITRIUM Wils.

Pāyap. Doi Sutēp. **B).**

There can, I think, be no good reason for altering the original spelling, under which it was published, to Orthomnium.

RHIZOGONIACEAE.

RHIZOGONIUM SPINIFORME (L.) Bruch.

Very common and widely distributed.

HYPNODENDRACEAE.

HYPNODENDRON JUNGHUHNII (C. M.) Lindb.

Nakawn Srītamārāt. Kao Lūang, circa 1600 m. alt., on ground, 30 Apr., 1928 (302).

Distr. Java; Sumatra; Celebes; Malay Peninsula.

HYPNODENDRON ARBORESCENS (Mitt.) Lindb.

Pattānī. Kao Kalakīrī, circa 900 m. alt., on trees, 2 Apr., 1928 (282).

BARTRAMIACEAE.

Philonotis perlaxifolia Dix. sp. nov.

Leiocarpus. Gracilis, elata, usque ad 5 cm. alta; caules *tenuissimi*, folia *laxissima*, *late patentia*, *angustissima*, linearia, sensim longe angustissime angustata, circa 1.5 mm. longa, marginibus angustissime leniter recurvis, duplicate denticulatis; costa pro folio sat valida, in aristam fortiter denticulatam excurrens. Cellulae superiores lineares, *subpellucidae*, in angulis superioribus papillosae; inferne sensim latiores, omnes elongatae.

Dioicum. Flores ♂ haud visi. Seta *pertenuis*, 1-3 cm. (fere) alta. Theca parva, pallida, *leptodermica*, suberecta, *leniter plicata*; operculum plano-convexum, tenerum; peristomium *nullum*.

Hab. *Pāyap.* Doi Sutēp, Siam. On damp clay, in evergreen forest, circa 900 m. alt., 17 Nov., 1922; coll. A. F. G. Kerr (37).

Nearest probably to *P. calomicra*, Broth., but differing in the far more distant, widely spreading leaves, sub-plicate capsule, etc.

PHILONOTIS LAXISSIMA (C. M.) Bry. jav.

Surāt. Chumpawn, Kao Tong, circa 300 m. alt., on damp rock, 19 Jan., 1927 (166). *Pattānī.* Kao Kalakīrī, c. 200 m. alt., 29 Mar., 1928, on damp rocks by stream (269).

HEDWIGIACEAE.

CLEISTOSTOMA AMBIGUUM (Hook.) Brid.

Pāyap. Doi Sutēp. **B).** Near Chiangmai, North Siam, Nov., 1922; coll. Mrs. Smith (II); Doi Chiengdāo, on roots of orchids, Dec., 1931; coll. Put, c. fr.

ERPODIACEAE.

MICROTHECIELLA KERRII Dix. in Journ. of Bot., Jan., 1931, p. 1.

Surāt. Langsūan, Bān Trang, circa 50 m. alt., on branches of *Rhabdia lycioides* in river, 17 Feb., 1927 (195).

MYURACEAE.

MYURIUM RUFESCENS (Hornsch. & Reinw.) Fleisch.

Pāyap. Doi Sutēp, circa 1600 m. alt., on trees in evergreen forest, 18 Nov., 1922 (42). *Rāchaburī.* Kao Ri Yai, Kānburī, c. 1200 m. alt., 31 Jan., 1926, on tree in evergreen forest (138).

TRACHYPODACEAE.

TRACHYPODOPSIS CRISPATULA (Hook.) Fleisch.

Chantaburī. Kao Soi Dāo, Chantabun, c. 1500 m. alt., 13 Dec., 1924, on tree trunks in evergreen forest (115a).

TRACHYPUS BICOLOR Reinw. & Hornsch.

Pūket. Trang, Kao Sūng, circa 1100 m. alt., 17 Apr., 1928 (288).

TRACHYUS CUSPIDATUS Fleisch.

Pāyap. Doi Sutēp, circa 1500 m. alt., 6 Sept., 1914 (4a).

This agrees with Fleischer's description, especially in having the (single) capsule without any neck; but I doubt if it be more than a form of *T. bicolor*.

PTEROBRYACEAE.

PENZIGIELLA CORDATA (Harv.) Fleisch.

Pāyap. Doi Sutēp, circa 1600 m. alt., on tree trunk in evergreen forest, 18 Nov., 1922 (49).

In fruit. The fruit appears to be rare.

Distr. Sikkim; Nepal; Khasia.

Endotrichella rigida Dix. sp. nov.

Subrobusta, *perrigida*, flavescens; caules circa 5 cm. alti, vix complanati, densifolii, circa 3 mm. lati. Folia sicca flexuosa, paullo contracta, *haud plicata*, 4 mm. longa, late *obovata*, breviter, rigide cuspidata, concaviuscula, marginibus infra recurvis, supra fortiter, irregulariter denticulatis; ecostata vel obsolete bicostata.

Cellulae superiores breviter rhomboideae, collenchymaticae, parietibus sat incrassatis, porosis; inferne medio folio sensim longiores, angustiores; basilares ad margines *seriebus pluribus laxae, subquadratae* vel breviter rectangulares, pellucidae.

Thecae numerosae, subexsertae, ellipticae; calyptra cucullata; peristomii dentes breves, lati, inter se connati, sublaeves. Processus erecti, lineares, laeves.

Hab. Siam, 1920; coll. J. F. Rock; ex herb. U. S. A. Nat. Mus. (1501).

A well marked species in the compact, rigid tufts, the leaves not plicate when dry, with a broad band of marginal basal, lax, subquadrangle cells, reaching high in the leaf.

Brotherus has described a somewhat allied species from Borneo, *E. assimilis* (in Mitt. Inst. für allgem. Bot. in Hamburg, vii, 125; 1928) which however is much smaller, with more divaricate leaves, the cells not incrassate.

PTEROBRYOPSIS NEMATOSA (C.M.) Dix. comb. nov. (*Meteorium nematosum* C.M.; *Calyptothecium nematosum* Fleisch.)

Prāchinburī. Krabin, Sakêo, circa 50 m. alt., on trees in evergreen forest, 25 Dec., 1924 (122a). *Rāchaburī.* Kānburī, Wangka, circa 200 m. alt., on small tree in bamboo forest, 4 Feb., 1926 (144). *Surāt.* Chumpawn, Tā Ngaw, circa 100 m. alt., on tree in evergreen forest, 20 Jan., 1927 (170).

Distr. Pegu; Assam.

Pterobryopsis cuspidata Dix. sp. nov.

Robusta, pallido-virens, subnitida; caules secundarii ramosi, *percomplanati, stricti*, superne attenuati, saepe *acute cuspidati*, ramulis flagellaceis microphyllis axillariis sparse praediti. Folia complanata e basi vix angustata, parum auriculata, cochleariformia, siccitate plicata, in acumen robustum latum acutum dentatum raptim angustata. Costa variabilis, *simplex*, plerumque inferne validiuscula, superne angustata, *ad basin acuminis attingens*. Cellulae superiores angustae, opacae, inferne elongatae, ad insertionem latam aurantiacae, alares *paucae*, aurantiacae, male definitae.

Fructus ignotus.

Hab. Surāt. Chumpawn, Kao Tong, 18 Jan., 1927, on tree in evergreen forest, circa 600 m. alt., coll. A. F. G. Kerr (164).

A fine, distinct species, somewhat near *P. gedehensis* Fleisch. in structure, but very complanate, rigid, with cuspidate stems, leaves usually longly nerved, alar cells few, &c.

METEORACEAE.

PAPILLARIA FUSCESCENS (Hook.) Jaeg.

Pāyap. Doi Sutēp. **B.** Doi Sutep, 1500–1600 m. alt., hanging from trees in evergreen forest, 18 Nov., 1922 (40). Kun Tān Mts., alt. 4000 ft. 1928; coll. Hugh M. Smith, ex herb. U. S. Nat. Mus. (488); and Doi Angkā, 8000 ft. (513). *Chantaburī.* Kao Sabāp, Chantabun, 700 m. alt., on shrubs and trees in evergreen forest (451b).

FLORIBUNDARIA FLORIBUNDA (Doz. & Molk.) Fleischer.

In numerous localities.

A specimen from Kao Tong, Chumpawn, Surāt, circa 700 m. alt., (163), is referable to var. *minor* C. M.

FLORIBUNDARIA SPARSA (Mitt.) Broth.

Pāyap. Doi Sutēp, **B**.

Doi Sutēp, circa 1650 m. alt., hanging from trees in evergreen forest, 5 Jan., 1915 (19).

BARBELLA PENDULA (Sull.) Fleisch.

Rāchasiṃā. Korāt, Kao Lēm, circa 1100 m. alt., on tree in evergreen forest, 12 Jan., 1925 (124).

BARBELLA ENERVIS (Thw. & Mitt.) Fleisch.

Pāyap. Near Chiangmai, North Siam, Nov., 1922; coll. Mrs. Smith (1).

AEROBRYOPSIS LONGISSIMA (Doz. & Molk.) Fleisch.

From several localities.

AEROBRYIDIUM AUREO-NITENS (Hook.) Broth.

Pāyap. Doi Sutēp, circa 1650 m. alt., hanging from trees in evergreen forest, 5 Jan., 1915 (20). Summit of Doi Chom Cheng, Doi Sutēp Range, alt. 1500–1650 m., Nov., 1920; coll. J. F. Rock, Herb. U. S. A. Nat. Mus. (236a, 1501).

Distr. Himalaya; Khasia; Nilghiris.

It is not impossible that these may belong to *A. laevisetum*, but in absence of fruit it is natural to refer them to the more widely distributed species.

***Aerobryidium laevisetum* Dix. sp. nov.**

Habitus et folia *A. aureo-nitentis* (Hook.) indici; differt tantum ut videtur, sporogonio. Seta 2.75 cm. alta, *laevis*, crassiuscula. Folia perichaetialia erecta, stricta, acumine ut videtur haud teneriter subulato. Theca *brevis, turgida, gibboso-curvata, horizontalis*; exothecii cellulae irregulares, parietibus curvatis, tenuibus; versus orificium breviores, minores. Peristomii dentes lati, aurantiaci, valde striolati. Endostomii membrana aurantiaca, circa 1/3 altitudinem dentium aequans. Processus (imperfecti) angusti, anguste rimosi; cilia singula, brevissima.

Hab. Pāyap. Kun Tān Mts., alt. 4000 ft., Siam, 20 Nov. 1918; coll. Hugh M. Smith, herb. U. S. A. Nat. Mus. (482).

All the species of which the fruit is known have the seta more or less papillose, at least above, and it would therefore appear that the present plant must be separated. The characters are otherwise, however, not strong.

METEORIOPSIS SQUARROSA (Hook.) Fleisch.

Pāyap. Doi Chiengdāo, 4800 ft. alt., on dry branch of tree near stream, 1922; coll. Mrs. E. Smith A).

NECKERACEAE.

NECKEROPSIS GRACILENTA (Bry. jav.) Fleisch.

Pāyap. Doi Chiengdāo, 4800 ft. alt., on dry branch of tree by stream, 1922; coll. Mrs. E. Smith B). *Rāchaburī.* Kao Lūang, Prachūap, 900–1000 m. alt., 4 July, 1926, on trees in evergreen forest (149). *Pūket.* Ranawng, Lam Lieng, on shrub, 2 Feb., 1927 (196d).

NECKEROPSIS EXSERTA (Hook.) Broth.

Pitsanulōk. Nakawn Tai, circa 300 m. alt., on stone in evergreen forest, Apr., 1924 (104). *Udawn.* Lōi, Tālī, c. 400 m., 26 Mar., 1924, on stone by stream in deciduous forest (93).

Distr. Himalayas; Malay Penins.

NECKEROPSIS ANDAMANA (C. M.) Fleisch.

Udawn. Nawngkāi, Chaiyaburī, circa 200 m. alt., on small trees in evergreen forest, Mar., 1924 (75, 76).

The species is described as dioicous, but the two specimens above mentioned are autoicous, and I believe that is the normal inflorescence. It is usually found fruiting.

Distr. Andaman Is.; South India.

NECKEROPSIS NIGRESCENS Broth.

Chantaburī. Kaw Chāng. **A).** *Surāt.* Kaw Tao. **C).**

NECKEROPSIS LEPINEANA (Mont.) Fleisch.

In several localities.

Neckeropsis auriculata Dix. sp. nov.

Paraphysanthus. Habitu *N. crinitae* vel *N. gracilentae* similis, sed minus complanata, paullo robustior. Folia fortiter undulata, e

basi latiore, uno vel altero latere (raro ambo) auricula magna involuta praedito oblonga, apice subtruncato, valide cuspidato. Margines auricularum denticulati, apud apicem folii fortiter irregulariter denticulati. Costa *valida*, sat longe infra apicem soluta. Cellulae superiores parvae, rhomboideae, medio folio inferne sensim elongatae; basilares omnes lineares, latere concavo folii longe adscendentes, limbum indistinctum supra medium folium instruantes. Perichaetium *magnum*, foliis duplo fere longitudinem thecae (deoperculatae) aequantibus, late stricte lineari-loriformibus, dense aequaliter denticulatis. Theca immersa, ovalis, calyptra parva, subcucullata, *nuda*; peristomium pulchre aurantiacum; dentes laeves; processus aequilongi, laeves, inferne *haud perforati*, superne nodosi vel breviter appendiculati. Spori 27-40 micr.

Hab. Chantaburī. Branches of trees in evergreen forest, Kao Sabāp, Chantabun, Siam, 8 Jan., 1930; coll. A. F. G. Kerr (451a), type. Rocks in evergreen forest, ibidem, 9 Jan., 1930 (454).

This appears to be the only species of the genus with marked auricles to the leaves. These vary according to the position of the leaf on the stem; they may be subequal, but more frequently one side has a large auricle, incurved so as to reach far beyond the nerve, while the other side is only slightly involute.

HIMANTOCLADIUM FLACCIDUM Fleisch.

Surāt. Kaw Tao. **C**).

HIMANTOCLADIUM PLUMULA (Nees) Fleisch. (Syn. *Neckera acutata* Mitt.)

Surāt. Chumpawn, Tā Ngaw, circa 100 m. alt., on tree by stream, 20 Jan., 1927 (168).

I have long suspected that *Neckera acutata* Mitt. was this species, and I have now been able to confirm it by examination of a part of the type specimen, in Herb. Kew, received from Mitten's herbarium in the New York Bot. Garden.

Himantocladium strictum Dix. sp. nov.

Stramineum, rigidum, submitens, complanatum, densiuseule pinnatum vel bipinnatum, habitu peculiari, magis Symphysodontis quam Himantocladii. Folia suberecta, adpressa, minime patentia,

perstricta, sicca haud vel parum undulata, forma *H. cyclophylli* (C. M.) sat similia, sed parte dilatata basilari *longiore*, circa dimidiam partem folii vel supra attingente. Costa basi latiuscula, male definita, superne *raptim angustata*, inde *tenerrima* via ultra $\frac{1}{2}$ vel $\frac{2}{3}$ folii *longitudinem* aequans.

Cellulae per totum folium fere *elongatae*, apicales tantum breviter rhomboideae, infra medium folium omnes lineares, perangustae.

Fructus ignotus. Planta feminea sola visa.

Hab. Siam, 1920; coll. J. F. Rock; ex herb. U. S. A. Nat. Mus. (1522).

A very distinct species in the habit and the leaf characters italicized above.

HOMALIA EXIGUA Bry. jav.

Surāt. Kaw Tao. **C**).

HOMALIODENDRON FLABELLATUM (Dicks.) Fleisch.

In several localities.

HOMALIODENDRON SCALPELLIFOLIUM (Mitt.) Fleisch.

Rāchaburī. Prachūap, Kao Lūang, circa 1200 m. alt., in open scrub on shrubs, 5 July, 1924 (152).

HOMALIODENDRON MICRODENDRON (Mont.) Fleisch.

Payāp. Doi Chiengdāo, 4800 ft., North Siam, on edge of rock near stream, 1922; coll. Mrs. E. Smith **D**).

PINNATELLA AMBIGUA (Lac.) Fleisch.

Pūket. Ranawng, Kao Talu, circa 50 m. alt., on limestone rocks, 3 Feb., 1927 (178). A short-leaved form.

PINNATELLA KUHLIANA (Bry. jav.) Fleisch.

Nakawn Sritamarāt. Patalung, Kao Oktalu, circa 100 m. alt., 21 Apr., 1928 (293a). A form with rather numerous microphyllous flagella.

PINNATELLA ALOPECUROIDES (Hook.) Fleisch.

Payāp. Near Chiengmai, North Siam, Nov., 1922; coll. Mrs. Smith (111). With microphyllous ramuli. *Surāt.* Kaw Tao. **C**).

NEMATACEAE.

EPHEMEROPSIS TJIBODENSIS Goeb.

Chantaburī. Krāt, Kao Kūap, c. 700 m., Dec., 1929, on trees in evergreen forest (435). *Surāt.* Langsūan, Bān Krayê, circa 50 m. alt., on leaf of shrub, 19 Feb., 1927 (185). *Pattāni.* Betong, in dense evergreen forest, on leaf, 11 Mar., 1925 (136b). Kao Kalakīrī, circa 800 m. alt., on leaf of shrub in evergreen forest, 1 Apr., 1928 (276). Banang Stā, on leaves of *Saraca*, circa 300 m. alt., 28 July, 1923 (58).

Male flowers have been seen, but no fruit. The fruit has only been recorded from Java and New Zealand, but it has been recently collected by R. E. Holttum at Pulau Penang, in small quantity.

HOOKERIACEAE.

DISTICHOPHYLLUM MITTENII Bry. jav.

Surāt. Kao Lūang, circa 1000 m. alt., on rock in evergreen forest, 10 Aug., 1927 (226),

DISTICHOPHYLLUM SCHMIDTII Broth.

Chantaburī. Kaw Chāng. **A).**

CALLICOSTELLA PAPILLATA (Mont.) Mitt.

Surāt. Chumpawn, Tā Ngaw, circa 100 m. alt., Jan., 1927 (171). *Nakawn Sritamarāt.* Kao Lūang, 1 May, 1928 (309).

CALLICOSTELLA PRABAKTIANA (C. M.) Bry. jav.

Surāt. Klawng Nam Wing, circa 200 m. alt., on damp stone by stream, 4 Mar., 1927 (192).

CHAETOMITRIUM NEMATOSUM Broth.

Pūket. Ranawng, Kao Talu, circa 50 m. alt., on shrub in evergreen forest, 4 Feb., 1927 (181).

Distr. Queensland; New Caledonia; Malay Peninsula.

CHAETOMITRIUM TORQUESCENS Bry. jav.

Prāchinburī. Krabin, Sakêo, circa 50 m. alt., in evergreen forest on trees, 25 Dec., 1924 (122b).

Distr. Java; Amboina; Ceram; New Guinea.

CHAETOMITRIUM PHILIPPINENSE (Mont.) Bry. jav.

Rāchasimā. Burīram, Nāng Rawng, circa 200 m. alt., on tree in evergreen forest, Jan., 1924 (72).

Brotherus gives the distribution of *C. philippinense* as Java, Ceram, Philippines. The present plant agrees well with Fleischer's description and figures of the Javan plant; but these seem to deal with a smaller plant than the original Philippines moss, coll. Cuning, with leaves less constricted below apex. It may be a small form. I am inclined to think, however, that the Philippines moss is the same as *C. elongatum*, and the Javan and Siamese plant a different thing.

C. Mueller's remark that his *C. philippinense* connects *C. elongatum* and *C. leptopoma* seems very apt.

LEPIDOPILUM ADSCENDENS (Schwaegr.) Broth.

Udawn. Lôi, Pū Tong, circa 1300 m. alt., on tree in savannah, Mar., 1924 (96).

Distr. Ceylon; Java; Philippines.

DIMORPHOCLADON BORNEËNSE Dix.

Surāt. Langsūan, Ban Krayê, circa 50 m., on tree by stream in evergreen forest, 19 Feb., 1927 (189). *Pūket.* Ranawng, Lam Lieng, under 50 m. alt., on shrub in evergreen forest, 2 Feb. 1927 (196a). *Pattānī.* Banang Stā, circa 300 m. alt., on leaves of *Saraca*, 28 July, 1923 (28 p.p.). Bētong, in dense evergreen forest, 11 Mar., 1925 (136a).

Distr. Borneo; Sumatra; New Guinea.

This interesting plant was more than once associated with *Ephemeropsis*.

CYATHOPHORACEAE.

CYATHOPHORUM ADIANTUM (Griff.) Mitt.

Pāyap. Near Chiangmai, North Siam, Nov., 1922; coll. Mrs. Smith (VI).

CYATHOPHORUM SPINOSUM C. M.

Chantaburī. Krāt, Kao Kūap, circa 700 m. alt., on trees in evergreen forest, Dec., 1929 (435b).

This has clearly the amphigastria of *C. spinosum*, while Mrs. Smith's gathering has the narrower, more gradually tapering ones of *C. Adiantum*. The nerve there, however, is short and double, and I am doubtful whether the characters are sufficient to keep them apart.

CYATHOPHORUM BURKILLII Dix.

Rāchasimā. Kōrāt, Kao Lēm, circa 1100 m. on tree in evergreen forest, 11 Jan., 1925 (123). *Surāt*. Kao Lūang, circa 1100 m. alt., 10 Aug., 1927; on tree in evergreen forest (223).

Distr. Assam.

HYOPTERYGIACEAE.

HYOPTERYGIUM CEYLANICUM Mitt.

Udawn. Lôi, Pū Tong, circa 1000 m. alt., on stone by stream in evergreen forest, Mar., 1924 (101).

RHACOPILACEAE.

RHACOPILUM SCHMIDII C.M. (*R. indicum* Mitt.)

Pāyap. Doi Sutēp, circa 1600 m. alt., 18 Nov., 1922 (48).

RHACOPILUM CUSPIDIGERUM (Schwaegr.) Mitt. var. DEMISSUM Fleisch.

Udawn. Lôi, Pū Tong, circa 1000 m. alt., Mar., 1924 (103).

Rhacopilum siamense Dix. sp. nov.

Pergacile; laetevirens. E speciebus generis adhuc descriptis *minima*. Corticola, caules dense intertexti, graciles, fragiles, subpinnatim ramosi. Folia sicca assurgentia, involuto-crispata, *parva*, .75 - 1 mm. longa, *late ovata, obtusa*, marginibus *integris vel minute crenulatis*, costa in aristam flexuosam $\frac{1}{3}$ - $\frac{1}{2}$ longitudinem folii aequantem excurrens. Cellulae parvae, pellucidae, *rotundato-rhomboidae*, circa 8-10 micr. longae, parietibus firmis; nunc laeves, nunc altiuscule mamillosae, chlorophyllosae. Amphigastria parva, breviter cordato-triangularia, costa in aristam *praelongam flexuosam* excurrens.

Sporogonium parvum. Seta tenuiuscula, 1 cm. longa. Theca angusta, suberecta vel inclinata, pallide badia, cum operculo 3 mm. longa, collo defluente; operculum pallidius, breviter curvato-rostellatum.

Hab. Pāyap. Summit of Doi Chom Cheng, Doi Sutēp Range, Siam, 1500–1650 m. alt., Nov., 1920; coll. J. F. Rock, herb. U. S. A. Nat. Mus. (151a), type. Ibidem (194a).

The smallest species of the genus, and in this only equalled by an unpublished Sumatran and New Guinea species, which however differs entirely in the form of the leaves and the character of the areolation.

LESKEACEAE.

PELEKIUM VELATUM Mitt.

In numerous localities.

THUIDIUM MEYENIANUM (Hampe) Jaeg.

Udawn. Lôi, Wang Sapung, circa 300 m. alt., on rocks by stream in deciduous forest, Mar., 1924 (77). This is a form which may be called f. *surcularis*; emitting from the tips of the stems and branches numerous very dense-leaved, terete, often curved surculi, without paraphyllia, and with leaves very similar to the stem leaves; they may be 3–4 cm. long. *Surāt.* Kaw Tao. C). Bān Kawp Kêp, circa 50 m. alt., on tree trunks in evergreen forest, 7 Aug., 1927 (217).

THUIDIUM PLUMULOSUM (Doz. & Molk.) Bry. jav.

Surāt. Kao Lūang, circa 200 m. alt., on stone in evergreen forest, 11 Aug., 1927 (230). *Nakawn Srītamārāt.* Patalung, Klawng Hin Kāo, c. 400 m. alt., 18 Apr., 1928, on rock by stream (292). Kao Lūang, c. 700 m. alt., 29 Apr., 1928, on rock in evergreen forest (294).

THUIDIUM GLAUCINUM (Mitt.) Jaeg.

Surāt. Langsūan, Kao Nom Sāo, circa 900 m. alt., 21 Feb., 1927 (201).

THUIDIUM CYMBIFOLIUM (Doz. & Molk.) Bry. jav.

Pāyap. Kun Tān Mts., alt. 4000 ft., 1928; coll. Hugh M. Smith, Herb. U. S. A. Nat. Mus. (480). Doi Angkā, alt. 8000 ft., 1928; coll. Hugh M. Smith, Herb. U. S. A. Nat. Mus. (514). *Surāt.* Kaw Tao. **C**.

BRACHYTHECIACEAE.

Brachythecium siamense Dix. sp. nov.

Gracile; habitu fere *B. populei*; caulis elongatus, sat regulariter pinnatim ramosus, ramis circa 4–5 mm. longis; sericeus, nitidus, viridis. Folia caulina circa 1.5 mm. longa, indistincte plicata, e basi breviter decurrente deltoideo-lanceolata, longe anguste acuminata, acutissima, marginibus erectis vel *superne hic illic angustissime recurvis*, integris; costa sat *debilis, versus medium folium* desinens.

Cellulae superiores anguste rhomboideo-lineares, 6–8 micr. latae, parietibus tenuibus; basilares laxiores, *per totam latitudinem fere majusculae, subquadratae, chlorophyllosae*, ad angulos decurrentes numerosae, versus margines altiuscule ascendentes.

Folia ramea subsimilia, sed acumine saepe subdenticulato.

Fructus ignotus.

Hab. Pāyap. Kun Tān Mts., alt. 4000 ft., Siam, 20 Nov., 1928; coll. Hugh M. Smith, Herb. U. S. A. Nat. Mus. (484a); Doi Chiengdāo, on roots of orchids, Dec., 1931; coll. Put.

The only species of the genus known from this part of Asia; allied to *B. Buchananii* (Hook.), *B. gracillimum* Fleisch., &c; nearest probably to the latter species, but *inter alia* with wider cells. It is also near to *B. lamprocarpum* (C. M.), but is smaller in all its parts, and more rigid.

Rhynchostegiella ovalifolia Dix. sp. nov.

Gracilis; corticola; sordide viridis. Caulis brevis, irregulariter subpinnatim ramosus, ramis circa 5 mm. longis, *complanatis*. Folia *laxe* disposita, complanata, *madida anguste ovata vel ovato-lanceolata*, nunc anguste acutata et acuta, nunc valde breviter et late acuta, planiuscula; sicca *valde convoluta et angustata*; 1–1.5 mm. longa, .4 mm. lata *costa debilis, vix medium folium* attingens. Margines plani, apicem versus integri vel denticulati. Cellulae 7–10 micr. latae, lineari-rhomboideae, subsigmoideae, *dense chlorophyllosae*,

inde *opacae*; basin versus sensim latiores, breviores, magis pellucidae, infimae laxae, ovatae, inanes, alares autem *haud diversae*.

Autoica. *Perichaetia brevia*, foliis patentibus, breviter, late acuminatis, subdenticulatis. Seta 7-8 mm. longa, *laevis*. Theca inclinata, circa 1.5 mm. longa, in setam sat abrupte desinens, pallida, leptodermica; operculum breviuscule rostratum. Peristomium majusculum, aurantiaecum.

Hab. *Nakawn Srītamārāt*, Rong Lek, Siam. On tree in evergreen forest, under 50 m. alt., 9 May, 1928; coll. A. F. G. Kerr (314).

A pretty little plant, very marked in the differentiation between the moist and dry state of the leaves, which when moist are flattened out, oval, and regularly complanate, giving a prettily frondose appearance to the branch, but on drying become extremely narrow and convolute (though otherwise not much altered); much as in *R. cucullata* (Mitt.) (Syn. *Hypnum convolutifolium* Hampe), but in other respects, notably in the smooth seta, it is quite different.

Several species of the genus with smooth setae have become accidentally omitted from Brotherus "Musci" 2nd Ed., including *R. santaiensis* (Broth. & Par.) Broth. from Laos, and *R. leiopoda* Dix. & Varde from S. India. The former differs, *inter alia*, in having a seta three times as long, the latter in the leaves narrowly lanceolate, acuminate.

In the description of the latter plant reference is made to *R. laeviseta* Dix. from Java. This was unfortunate, because in the first place it was an unpublished name, and secondly because it proved to be a mixture of two plants, a *Rhynchostegiella* with rough seta (*R. brachypoda* Fleisch.) and a *Schwetschkea*, with smooth seta (*S. javensis* Fleisch.). In this connection it may be remarked that vegetatively *Schwetschkea* and *Rhynchostegiella* may be very closely alike, though the fruiting characters are distinct enough.

RHYNCHOSTEGIUM VAGANS (Harv.) Jaeg.

Pāyap. West of Chiengdāo, Nov. 1922, by edge of stream; coll. Mrs. Smith (IV),

RHYNCHOSTEGIUM JAVANICUM (Bél.) Besch.

Nakawn Srītamārāt. Kao Lūang, circa 600 m. alt., on trunk of tree, 1 May, 1928 (307).

ENTODONTACEAE.

CAMPYLODONTIUM FLAVESCENS (Hook.) Bry. jav.

Pāyap. Doi Sutēp, 5 Jan., 1915 (21).

ENTODON PPLICATUS C. M.

Pāyap. Doi Sutēp, circa 900 m. alt., on tree trunk in evergreen forest, 17 Nov., 1922 (36).

ERYTHRODONTIUM JULACEUM (Hook.) Par.

Surāt. Bān Kawp Kêp, circa 100 m. alt., on tree trunk, 8 Aug., 1927 (219),

A robust form with long setae, 3-3.5 cm. long.

Trachyphyllum carinatum Dix. sp. nov.

T. jeypurensi Dix. & P. de la Varde (Ann. de Cryptog. exot., I,46, 1928) affine; differt habitu multo minore, densiore, foliis minoribus, fortiter carinatis, cellulis densioribus, alaribus multo minoribus, superioribus valde humiliter scaberulis, costis brevioribus.

Hab. *Pāyap.* Doi Chiengdaō; Siam, Corticolous, on roots of orchids; coll. Put, Dec., 1931.

A very small, dense, golden plant. In *T. jeypurensi* the stem leaves are very broad, finely and rather abruptly acuminate, the branch leaves much smaller, narrower, gradually rather shortly and widely acuminate; in the present plant all the leaves are nearly uniform, and differ as described above in other characters.

Many of the branches end in a defoliated, obtuse, brown tip; it is not clear whether or not this is pathological.

STEREOPHYLLUM TAVOYENSE (Hook.) Jaeg.

Pāyap. Doi Sutēp, circa 330 m. alt., on tree trunks in mixed forest, 13 Sept., 1914 (14).

Distr. India.

SEMATOPHYLLACEAE.

CLASTOBRYUM CAUDATUM (Bry. jav.) Fleisch.

Chantaburī. Chantabun, Kao Sabāp, on branches of trees in evergreen forest, 8 Jan., 1930 (451c).

Distr. Java.

Clastobryum brevifolium Dix. sp. nov.

Stramineo-viride, subnitens. Pro genere *robustum*. Caules 3 cm. longi vel ultra, dense irregulariter pinnati, ramis inaequalibus, usque ad 1.25 cm. longis, *siccitate curvatis*. Folia saepe *secunda*, circa .75 mm. longa, ovato-lanceolata, *breviter acuta, laud acuminata, perconcaeva*, ecostata, marginibus erectis, ad apicem minute distincte denticulatis. Cellulae superiores peranguste lineares, pallidae, laeves, basilares ochraceae, alares *numerosae intense aurantiacae, majusculae, isodiametricae, auriculas optime notatas* instruentes. Propagula haud visa.

Folia perichaetialia majora, longiora, erecto-patentia, acuminata, denticulata; vaginula magna, folia perichaetialia longitudine aequans, seta 1.5 cm. longa. Theca anguste elliptica, suberecta vel inclinata, circa 1.5 mm. longa; operculum rostellatum. Peristomium majusculum, dentibus dimidiam latitudinem orificii subaequantibus, flavidis, *perpellucidis, sparse papillois*, marginatis, dorso tenuiter divisus, ventraliter lamellis crassiusculis prominentibus. Endostomium *nullum*. Spori 20-25 micr., muriculati.

Hab. Pāyap. Doi Sutēp, Siam. On trees in evergreen forest, 1650 m. alt., 5 Jan., 1915; coll. A. F. G. Kerr (22), c. fr., type. Kurseong, Sikkin, 1926, coll. Fr. J. Rigby, comm. Rev. P. Foreau (583), sterile.

Allied to *C. indicum*, but distinct in the rather robust habit, the curved branches, and short leaves, ovoid, very shortly pointed, very concave, with highly marked auricles, quite different in character from *C. indicum*.

ACANTHOCLADIUM SURCULARE (Mitt.) Broth.

Pāyap. Doi Sutēp, 1650 m. alt., on tree in evergreen forest, 5 Jan., 1914 (2b); *ibidem*, on tree trunk, 1000 m. alt., 6 Sept., 1914 (12).

Acanthocladium laxum Dix. sp. nov.

Robustum, stramineum, subnitens, habitu foliisque *A. extenuatum* (Brid.) referens. Caules elongati, remote pinnati, ramis inaequalibus, *saepe cuspidatis*. Folia erecto-patentia, *scariosa*, sicca minime mutata, subundulata; caulina et ramea inferiora late ovata,

concava, *raptim in acumen subpiliforme parce denticulatum contracta*, marginibus erectis, circa 2 mm. longa; ramea, praecipue superiora, angustiora, minora, *sensim brevius latius acuminata, argute denticulata, marginibus superioribus valde revolutis*. Cellulae superiores anguste lineari-rhomboideae, foliorum caulinarum laeves, foliorum ramorum, praecipue superiorum, *papilla unica cellulae lumine sita sparse alte spiculosae*. Cellulae inferiores medianae minime mutatae, ad insertionem aurantiacae, alares quoque latere 3-4 *magnae, vesiculosae, intense pulcherrime purpureae*.

Perichaetia magna, 4-5 mm. longa, bractee magnae, erectae, marginibus saepe revolutis, supra in acumen *robustum, loriforme, subflexuosum, sinuoso-denticulatum* angustatis. Seta 3-4 cm. alta, theca e collo defluente turgide gibboso-ovata, brevis.

Hab. Pāyap. Doi Sutēp, Siam, on rotting log in evergreen forest, circa 1300 m. alt., 20 Nov., 1922; coll. A. F. G. Kerr (52), type. *Chantaburī*, Siam. On tree trunks in evergreen forest, circa 1500 m. alt., Kao Soi Dāo, 13 Dec., 1924; coll. A. F. G. Kerr (115b). Sur troncs pourris, 2000 m. alt., Col de lo Quitto, Tonkin, Sept., 1927; coll. A. Petelot (66), comm. Thériot.

A fine species, forming large straw-coloured mats with habit of the Australasian *A. extenuatum*, but more robust, less pallid, less glossy, with the leaves less finely and longly piliferous, the cells of the branch leaves more or less, often strongly papillose, and the seta much longer. From the deep green *A. ceylonense* Broth. & Dix. it differs in the same characters. It is still nearer to *A. polymorphum* Dix. from Tenasserim, but is more robust, with narrower stem leaves and cuspidate branches; and appears to be without the branches bearing very wide and short leaves with short cells and closely denticulate margins characteristic of that.

ACANTHOCLADIUM LONGIPILUM Broth.

Pāyap. Doi Sutēp. **B**).

TRISMEGISTIA RIGIDA (Hornsch. & Reinw.) Broth.

Nakawn Srītamārāt. Kao Lūang, c. 1600 m. alt., 30 Apr., 1928, on trees in evergreen forest (298).

TRISMEGISTIA LANCIFOLIA (Harv.) Broth.

Pattānī. Bāebaw, circa 400 m. alt., 13 July 1923 (55).

MEIOTHECIUM MICROCARPUM (Harv.) Mitt.

Chantaburī. Klung, under 50 m. alt., on *Randia tomentosa* in savannah, 3 Jan. 1930 (446) c. fr.

Pūket. Satul, Tung Nui, circa 50 m. alt., 17 Mar. 1928, on small tree in scrub (264). *Nakawn Srītamārāt.* Songklā, under 50 m. alt., 30 July, 1928, on tree trunk in scrub (321).

SEMATOPHYLLUM MICROCLADUM (Doz. & Molk.) Broth.

Surāt. Bān Kawp Kēp, circa 50 m. alt., on stone in evergreen forest; 7 Aug., 1927 (216).

Distr. Borneo; Malay Penins.; Celebes; New Guinea.

Sematophyllum striatifolium Dix. sp. nov.

Dense caespitosum; *pallide virens*, gracilescens; propter folia *densa, erecta, stricta, angusta, habitu fere Acroporii.* Rami erecti, folia erecta vel indistincte homomalla, oblongo-lanceolata vel anguste oblonga, nonnunquam oblongo-lingulata, *plerumque valde angusta*, raptim breviter cuspidata, integerrima, circa 1.5 mm. longa, *perconcava, marginibus fortiter reflexis*, (haud revolutis); sicca minime mutata, sed *longitudinaliter distincte tenerrime striata.* Cellulae superiores *perpellucidae*, angustissimae, subincrassatae, laeves, alares vesiculosae, flavidae vel hyalinae.

Fructus ignotus.

Hab. Udawn. Lōi, Pū Tong, Siam. On rocks in evergreen forest, circa 1300 m. alt., Mar., 1924; coll. A. F. G. Kerr (99), type. Summit of Camiguin Volcano, alt. 2000 ft., Camiguin I., Babayanes, Philippines, Mar., 1930; coll. G. Edano (79670, 79671).

Near to *S. subrevolutum* (Broth.) Broth., but much smaller, with much narrower leaves, longer, more pellucid cells, &c. Also like *S. saproxylophilum* (C. M.), but that is still smaller, with finely subulate leaves not striolate when dry.

SEMATOPHYLLUM SUBREVOLUTUM (Broth.) Broth.

Chantaburī. Kaw Chāng. **A**.

SEMATOPHYLLUM LATIFOLIUM Broth.

Pāyap. Doi Sutēp. **B**.

SEMATOPHYLLUM SUBCONNIVENS (Broth.) Dix. comb. nov. (*Rhaphidostegium subconnivens* Broth.)

Chantaburī. Kaw Chāng. **A**).

This species seems to have dropped out of Brotherus, "Musci".

SEMATOPHYLLUM PARVULUM (Broth.) Dix. comb. nov. (*Rhaphidostegium parvulum* Broth. *Rhaphidorrhynchium parvulum* Broth. "Musci", Ed. 2.).

Chantaburī. Kaw Chāng. **A**).

Brotherus, following Fleischer, divides the genus earlier known as *Rhaphidostegium* into *Sematophyllum* and *Rhaphidorrhynchium*, based almost, or indeed I think entirely, on the position of the leaves. I cannot think this a sufficiently good generic character, and prefer to retain all the species under the one genus, the correct name of which is *Sematophyllum*.

TRICHOSTELEUM HAMATUM (Doz. & Molk.) Jaeg.

Nakawn Srītamarāt. Kao Lūang, c. 1100 m. alt., on tree in evergreen forest, 29 Apr., 1928 (297a).

TRICHOSTELEUM TRACHYCYSTIS Broth.

Chantaburī. Kaw Chāng. **A**).

TRICHOSTELEUM BOSCHII (Doz. & Molk.) Jaeg.

Chantaburī. Kaw Chāng. **A**). Kao Sabāp, Chantabun, on tree trunks in evergreen forest, 7 Jan., 1930 (450).

A form with short-pointed leaves and smooth seta, as in *T. singaporense* Fleisch., but the papillae are normal.

TRICHOSTELEUM BRACHYPELMA (C. M.) Jaeg.

Chantaburī. Krāt, Kao Kūap, circa 500 m. alt., on rock in evergreen forest, (439). Krāt, Kao Saming, under 50 m. alt., on log in evergreen forest, (445).

TRICHOSTELEUM MONOSTICTUM (Thw. & Mitt.) Broth. var. *laevius* Dix.

Chantaburī. Kao Sabāp, on tree trunks, 6 Jan. 1930 (448b). Cells smooth or very slightly rugulose.

Very doubtfully distinct from *T. Boschii*; only, in fact, I think, in having a smooth seta. The variety, however, has only been attributed to *T. monostictum*, and I retain the name for the present. It has been found in the Malay Peninsula since its description from S. India.

TRICHOSTELEUM JOHORENSE Dix.

Nakawn Srītamārāt. Songklā, Kao Kêo, circa 300 m. alt., on dead wood in evergreen forest, 28 July, 1928 (320).

Distr. Johore.

Trichosteleum pinnatum Dix. sp. nov.

Corticola et epiphyllum. Gracile. Caulis *elongatus*, usque ad 10 cm. longus, ad folia arborum arcte adhaerens; *sat regulariter, aequaliter pinnatus*, ramis *brevibus*, circa 3 mm. longis, frondem *perangustam plumosiformem percomplanatam* instrumentibus. Folia laxiuscula, saepe seriata, patentia vel late divaricata, *stricta*, vix complanata, *haud falcata*, parva, vix. 8 mm. longa, caulina lanceolato-acuminata, apice subulato, ramea anguste lanceolata, brevius latius acuminata, concava, marginibus erectis, ubique fere tenerrime denticulatis. Cellulae *rhomboideo-lineares, pellucidae, parietibus tenuibus*, unipapillosae; basilares flavidae, alares 2-3, vesiculosae, hyalinae.

Dioicum. Flores ♂ caulibus propriis plurimi. Seta *perbrevis*, 6-7 mm. longa. Bracteae perichaetii breviter late acuminatae, conferte denticulatae.

Hab. Valley between Crag and Western Hill, on leaves of evergreens, Pulau Penang, Malay Peninsula, circa 600 m. alt., 24 Feb., 1929; coll. R. E. Holttum, type. *Pūket.* Ranawng, Lam Lieng, Siam, on shrub in evergreen forest, under 50 m. alt., 2 Feb., 1927; coll. A. F. G. Kerr (196c).

Evidently a species of moist proclivities, from the fact that it is associated with Ephemeroptera in the type, and with *Dimorphocladon borneense* in the Siam plant. It is distinct enough in the habit, and the leaves in no way falcate, strict and narrow, with rigid, not flexuose points, also in the long and narrow, pellucid cells. Especially also in the dioicous inflorescence, unique in the genus. I think

there can be no doubt of this. I have examined several fruiting stems without finding a single ♂ flower, while these are very numerous along the stem and branches of individual, much branched plants. There can be no doubt either of its being actually a *Trichosteleum*.

TRICHOSTELEUM LEPTOCARPOIDES Broth.

Chantaburī. Kaw Chāng. **A**).

ACROPORIUM LAMPROPHYLLUM (Mitt.) Fleisch.

Chantaburī. Krāt, Kao Kūap, circa 600 m. alt., on tree in evergreen forest, 27 Dec., 1928 (436).

ACROPORIUM DIMINUTUM (Brid.) Fleisch.

Surāt. Langsūan, Kao Nom Sāo, circa 900 m. alt., on trees in evergreen forest, 24 Feb., 1927 (199b).

Distr. Sumatra; Java; Moluccas; Philippines; Malay Peninsula.

ACROPORIUM SUBULATUM (Hampe) Jaeg.

Nakawn Srītamarāt. Songklā, Kao Kêo, on shrub in evergreen forest, 27 July, 1928 (319).

This agrees exactly with Hampe's type.

ACROPORIUM SECUNDUM (Reinw. & Hornsch.) Fleisch.

Chantaburī. Krāt, Kao Kūap, circa 800 m. alt., on branch in light evergreen forest, (431). *Surāt*. Langsūan, Kao Nom Sāo, circa 900 m. alt., on trees, 24 Feb., 1927 (199a).

ACROPORIUM HAMULATUM (Fleisch.) Fleisch. f. *procumbens* Fleisch.

Surāt. Langsūan, Kao Nom Sāo, circa 900 m. alt., on trees in evergreen forest, 24 Feb., 1927 (199c, 200). Kao Nawng, circa 1100 m. alt., on tree in evergreen forest (223b). *Nakawn Srītamarāt*. Kao Lūang, circa 1600 m. alt., on trees in evergreen forest, 30 Apr., 1928 (300b).

Distr. Java; Sumatra; Malay Peninsula.

ACROPORIUM ALBIDISSIMUM Dix.

Nakawn Srītamārāt. Kao Lūang, circa 1100 m. alt., on tree in evergreen forest, 29 Apr., 1928 (297b).

Distr. Malay Peninsula; Sumatra.

RHAPHIDOSTICHUM LUXURIANS (Doz. & Molk.) Fleisch.

Nakawn Srītamārāt. Songlā, Kao Kéo, circa 400 m. alt., on stone in light evergreen forest, 27 July, 1928 (318).

TAXITHELIUM INSTRATUM (Brid.) Broth.

Chantaburī. Kaw Chāng. **A**). Krāt, Kao Saming, on fallen tree in evergreen forest, 1 Jan., 1930 (442).

TAXITHELIUM NEPALENSE (Schwaegr.) Broth.

In very numerous localities.

TAXITHELIUM SCHMIDTII Broth.

Chantaburī. Kaw Chāng. **A**).

TAXITHELIUM ALARE Broth.

Surāt. Langsūan, Kao Nom Sāo, circa 1000 m. alt., on shrubs in evergreen forest, 21 Feb., 1927 (190). *Pattānī.* Kao Kalakirī, circa 900 m. alt., on trees and shrubs, 2 Apr., 1928 (283c). *Ibidem*, circa 800 m. alt., 1 Apr. 1928 (277).

Nos. 277 and 190 are a form with the leaf points shorter and less fine than in the type, but I cannot find any other difference.

Distr. Philippines.

TAXITHELIUM BINSTEADII Broth. & Dix.

Krungtēp. Bangkok, on old brick wall in evergreen grove, 10 June, 1928, (316 p.p.) *Nakawn Srītamārāt.* Kao Changlōn, Songklā, circa 100 m. alt., 24 July, 1928 (317).

TAXITHELIUM ISOCLADUM (Bry. jav.) Card.

Chantaburī. Kaw Chāng. **A**). *Pūket.* Ranawng, Kao Talu, circa 50 m. alt., on shrubs, 4 Feb., 1927 (179).

TAXITHELIUM PAPILLATUM (Harv.) Broth.

Chantaburī. Kaw Chāng. **A**). Krāt, Kao Kūap, circa 700 m. alt., on rotting log in evergreen forest, 25 Dec., 1929 (430).
Surāt. Chumpawn, Tā Ngaw, circa 300 m. alt., on stone in evergreen forest, 21 Jan., 1927 (173). This is a form with short, small, wide, rather abruptly cuspidate leaves, which is distinct, and which I have seen from numerous localities; it may be worth describing as a variety.

TAXITHELIUM DISTICHOPHYLLUM (Hampe) Broth.

Chantaburī. Kaw Chāng. **A**).

FOREAUPELLA INDICA Dix. & P. de la Varde.

Pāyap. Kun Tān Mts., 4000 ft. alt., Nov., 1928; coll. Hugh M. Smith, Herb. U. S. A. Nat. Mus. (483, 484b).

Distr. North and South India.

HYPNACEAE.

ISOPTERYGIUM ALBESCENS (Schwaegr.) Jaeg.

Chantaburī. Kaw Chāng. **A**).

Collected by Dr. Kerr in several localities.

ISOPTERYGIUM MINUTIRAMEUM (C. M.) Jaeg.

Krungtēp. Bangkok, 18 Sept., 1927, on old brick work in shady grove.

Isopterygium perpusillum Dix. sp. nov.

Tenerrimum. Habitu fere *I. minutiramei* var. *austro-pusilli* (C. M.) Fleisch., sed gracilius, magis vagans, foliis laxioribus, brevioribus. Albo-viride, nitescens. Corticola. Folia laxiusecula, complanata, subdisticha, late patentia, *valde asymmetrica, late ovata, breviter acute acuminata*, circa 6 mm. longa, 25 mm. lata, marginibus planis vel obsolete denticulatis; ecostata. Cellulae perangustae, laevissimae, inferne vix mutatae, paucissimae tantum ad angulos minutae, breves, (saepe uno tantum latere).

Autoicum. Perichaetii bracteae *numerosae, suberectae, strictae, sensim in acumen subulatum haud flexuosum* denticulatum angustatae. Seta circa 1 cm. longa; theca *minuta*, vix 1 mm. longa, inclinata vel cernua, gibboso-ovata; operculum conico-rostellatum.

Hab. Surāt. Kaw Tao, Siam. On damp rock, circa 300 m. alt., 21 Sept., 1928; coll. A. F. G. Kerr (339), type. On decaying log, *ibidem* (325). On fallen log in evergreen forest, *ibidem* (347).

A minute species, with much the habit of *I. austro-pusillum* (C. M.) which Fleischer reduces to a var. of *I. minutirameum*; but still more delicate, with more distant, broader and shorter leaves.

ISOPTERYGIUM GRACILISSETUM (Hornsch. & Reinw.) Jaeg.

Chantaburī. Chantabun, Kao Soi Dāo, circa 1300 m. alt., on log in evergreen forest, 12 Dec., 1924 (111).

Distr. Java; Sumatra; Borneo; Malay Peninsula; Philippines.

ECTROPOTHECIUM DIXONI Fleisch.

Nakawn Srītamārāt. Kao Lūang, circa 1700 m. alt., 30 Apr., 1928 (303).

Distr. Borneo.

The plicate leaves, and lax basal cells seem to distinguish this, but not very clearly, from *E. buitenzorgii*.

ECTROPOTHECIUM MORITZII (C. M.) Jaeg.

Chantaburī. Kao Sabāp, Chantabun, 6 Jan., 1930 (449),
Pattānī. Kao Kalakīrī, c. 600 m. alt., 31 Mar., 1918, on log in evergreen forest (274).

ECTROPOTHECIUM SIAMENSE Dix.

Pūket. Krasōm, Khaw Pok Hill, 700-800 m. alt., 2 Dec., 1928 (3919). **E**.

Nakawn Srītamārāt. Kao Lūang, circa 1000 m. alt., on rock in forest, 1 May, 1928 (306).

Satul, Bān Tōn, on old log in open, 15 Mar., 1928 (260).

I have it also in my herbarium from Sumatra.

I described the plant as sterile, in **E**; but I have found since that there was fruit there, as there is also No. 260; it is autoicous, with seta 1.25 cm. high, bracts pale, rather broad and not very finely pointed, capsule (imperfect) normal for the genus.

Ectropothecium diversifolium Dix. sp. nov.

Gracillimum; habitu *E. distichello* (C. M.) subsimile; pallide viride, humillimum, densissime intertextum; caules dense pinnati,

foliis confertis, drepanoideis, ovato-oblongis, *longe tenuiter acuminatis, falcato-decurvis*, subintegris. Rami *diversi*, nonnulli caulibus sub-similes, *haud complanati, foliis valde falcatis, decurvatis, longe tenui-acuminatis*, alteri *complanati, foliis latioribus, multo brevius, latius acuminatis, asymmetricis, denticulatis*; omnia enervia, cellulis angustis, elongatis, laevissimis, alaribus paucis, minutis.

Dioicum videtur. Flores ♂ haud visi. Seta 2 cm. alta, theca parva, subglobosa, maturitate urceolata.

Hab. Surāt. Bān Kawp Kêp, Siam; on tree trunk in evergreen forest, circa 50 m. alt., 7 Aug., 1927; coll. A. F. G. Kerr (218).

One of the smallest species, and marked by the dimorphism of the branches, some being like the stem, with Drepanoid, strongly falcate, finely subulate leaves, others complanate, with spreading, asymmetrical but hardly falcate, broader, shortly pointed leaves.

E. distichellum has narrower, smaller leaves, an exceedingly thin seta, &c.

***Ectropothecium micro-verrucosum* Dix. sp. nov.**

§ Trachythecium. *E. verrucoso* (Hampe) Jaeg. affine, sed *minus, gracilius, densissime* intertextum, flavidum; ramis *haud complanatis*, foliis basi angustioribus, superne *longe, angustius subulatis*. Seta paullo longior, 8–10 mm. Bractee perichaetii *longius* subulatae. Theca brevior, turbinata.

Hab. Upper Sarawak, Borneo; coll. Everett, Herb. Mitten (type). Sibu, Sarawak, Borneo, coll. Everett, Herb. Mitten, Brastagi, N. Sumatra, circa 5000 ft., Sept., 1924; coll. R. E. Holtum (15470b). Hoale, Ceram, 1911; coll. E. Stresemann, comm. Th. Herzog (34b, 35). *Pattānī.* Kao Kalakiri, Siam, circa 600 m. alt., on tree in forest, 31 Mar., 1928; coll. A. F. G. Kerr (271).

Very near to *E. verrucosum*, but appears to maintain some constant characters. In Hampe's species the leaves are usually more or less complanate, broader below, and rapidly contracted to the point; here they are denser, smaller, narrower, gradually tapering to a longer and narrower point, and not at all complanate, so that the branches have a very different, highly silky appearance. The capsule

also is smaller and shorter. I have not seen *E. verrucosum* var. *sericeum* Broth. & Par. from the I. of Pines (which Fleischer says he considers probably a distinct species), but from the description I think it very probably is this plant.

Mitten has it in his herbarium under the name of "*E. gelida* Mitt. MS in Herb."; which appears rather meaningless, or at best inappropriate. One of his specimens (unnamed) is labelled "Samoa, Rev. T Powell", but as it was with a Borneo specimen of Everett's one suspects a slip.

ECTROPOTHECIUM DEALBATUM (Hornsch. & Reinw.) Jaeg.

Nakawn Srítamarūt. Wat Kirīwong, on tree, 3 May, 1928 (312).

This is a bright green form, which however agrees in all other respects, including the fruit, with *E. dealbatum*. I have received the same form from several widely separated localities.

ECTROPOTHECIUM ZOLLINGERI (C. M.) Jaeg.

Pūket. Satul, Ban Tōn, circa 50 m. alt., 9 March, 1918, on roots and stones by stream (251).

Almost certainly this species.

VESICULARIA MIQUELII (C. M.) Fleisch.

Pattānī. Bāchaw, circa 400 m. alt., 15 July, 1923, on rocks in evergreen forest (56).

VESICULARIA MONTAGNEI (Bél.) Broth.

Surūt. Chumpawn, Tā Ngaw, 2·50 m. alt., 16 Jan. 1927, on rock in stream (161). Langsūan, Bān Krayê, c. 200 m. alt., 29 Feb., 1927, on rock in evergreen forest (197).

HYLOCOMIACEAE.

MACROTHAMNIELLA PILOSULA (Mitt.) Fleisch.

Surūt. Bān Kawp Kêp, circa 50 m. alt., on limestone rock, 8 Aug., 1927 (215).

Distr. Bhotan; Khasia; Assam; S. India.

MACROTHAMNIUM MACROCARPUM (Hornsch. & Reinw.) Fleisch.
Pāyap. Doi Sutēp, circa 1650 m. alt., on trunk of fallen tree,
 Jan., 1915 (13, 18). *Ibidem* (47).

MACROTHAMNIUM SUBMACROCARPUM (Hampe) Fleisch.
Rāchaburī. Kānburī, Kao Ri Yai, circa 1400 m. alt., on
 rocks in evergreen forest, 1 Feb., 1926 (140).

DIPHYSCIACEAE.

Diphyscium calcareum Dix. sp. nov.

Late, densiuscule caespitosum, *pallide, sordide* virens, inferne calcareo-incrustatum. Caules circa 2 cm. alti, parce divisi, *molles*. Folia laxiuscula, sicca leniter incurvo-flexuosa, *fragilia*, circa 5 mm. longa, .4 mm. lata, e basi paullo angustiore *longe linearia, sensim acuminata, peracuta*, marginibus erectis, inferne paullo sinuosis, apicem versus plus minusve argute dentatis. Costa ad basin valida, circa $\frac{1}{4}$ latitudinem folii aequans, superne sensim angustata, breviter excurrens. Cellulae superiores *subrotundae, valde collenchymatae*, perpellucidae, leniter mamillosae, 12–15 micr. latae, parietibus leniter sinuosis, marginales 1–3 seriebus saepe *multo minores*, basin versus sensim elongatae, infimae breviter lineares, parietibus porosis.

Cetera ignota.

Hab. Pūket. Ranawng, Kao Tālu, Siam. On damp limestone rock in evergreen forest, circa 50 m. alt., 4 Feb., 1927; coll. A. F. G. Kerr (180).

The long, narrow, fragile, narrowly acuminate leaves, sharply toothed above, and distinctly bordered with 1–3 rows of very small cells, render this a very distinct species. It has the habit of a long-leaved Hymenostylium.

POLYTRICHACEAE.

RHACELOPUS PILIFER Bry. jav.

Chantaburī. Kaw Chāng. **A**). *Pūket*. Ranawng, Kraburī. circa 75 m. alt., on damp stone by stream, 28 Jan., 1927 (176).

POGONATUM ALOIDES (Hedw.) P. Beauv.

In several localities.

POGONATUM INFLEXUM Lindb.

Pāyap. Kun Tān Mts., alt. 4000 ft., 1928; coll. Hugh M. Smith, ex Herb. U. S. A. Nat. Mus. (479, 490, 491).

POGONATUM TEYSMANNIANUM (Doz. & Molk.) Bry. jav.

Pāyap. Doi Sutēp, circa 960 m. alt., in evergreen forest, 26 July, 1923 (3).

POGONATUM JUNGHUHNIANUM (Doz. & Molk.) Bry. jav.

Chantaburī. Chantabun, Kao Soi Dāo, circa 1500 m. alt., on exposed earth in open, 13 Dec., 1924 (116).

POGONATUM GYMNOPHYLLUM Mitt.

Pāyap. Doi Angka, alt. 8000 ft., 1928, coll. Hugh M. Smith, ex Herb. U. S. A. Nat. Mus. (512).*

Distr. Sikkim; Khasia; Yunnan; Formosa.

(*Note.* The localities in this paper are arranged as they are in Professor Craib's *Florae Siamensis Enumeratio*, that is to say under the eighteen Circles which existed when the first part of that work appeared, in 1925. Since then the number of Circles have been twice reduced. A. Kerr).

(It may be well to add that the types of the new species described above are for the most part in my herbarium and at Kew. H. N. D.)

