

BRYOPHYTIC FLORA OF CHI-TOU⁽¹⁾

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Chi-tou, being one of the tracts of the Experimental Forest of the National Taiwan University, is noted for luxuriant growth of vegetation. Situated in Nan-tou Hsien, central Taiwan, and bounded by Cho-shan in the south and Phenix Mountain in the north, it has the topography ranging from gently rolling to irregular, rugged and rough, representing elevations from 200 to 1,800 meters. Its annual average temperature is 17°C, and rainfalls 2,000 millimeters.

Research has been carried on extensively on the forest trees and various other groups of plants but few studies have been made on the lower plants and practically none on the bryophytes. So from a bryological point of view Chi-tou is far from being well known.

Realizing the important roles that bryophytes play in forest formation, such as in providing ground cover, holding moisture, disintegration of rock in forming soils as well as indicators of something of the potentialities of the land on which they grow, the authors took interest in the study of the mosses and liverworts that flourish so richly at Chi-tou.

The following is a fragmentary report of our study.

The materials for this study are based on the specimens collected from the trips, dated July 3-14, 1952 & Feb. 12, 1960, 41 species collected by Mr. M. T. Kao; March 14-16, 1956, a casual collection of 20 species made by Miss Y. S. Wang; and March 26-30, 1963, 66 species by M. T. Kao and C. S. Feung.

Listed below are 38 species of mosses and 22 liverworts, of which 9 mosses and 5 liverworts are reported for the first time from Taiwan, *Pogonatum* cf. *Wallisi*, *Breutelia* sp., and *Chiloscyphus breviculus* are found not described previously; the remained appear to be first records for Chi-tou.

Previous descriptions of *Lepidozia setacea* and *Lophocolea bidentata* were not complete and our studies have added several new features.

Names of collectors are abbreviated as follows: K. (M. T. Kao), F. (C. S. Feung) and W. (Y. S. Wang).

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Musci**Bryales****Polytrichaceae**

Pogonatum heteroproliferum Horikawa. Chi-tou, 1,800 m., 3rd compartment, wet soil, July 8, '52, K-39.

Pogonatum inflexum (Lindb.) Jaeg. Chi-tou, 1,300-1,600 m., sandy soil, July 14, '52, K-53.

**Pogonatum nudiusculum* Mitt. Chi-ti, 1,300-1,600 m., sandy soil, July 14, '52, K-45, 50.

Pogonatum cf. *Wallisi*. Chi-tou, 1,800 m., 3rd compartment, wet ground, July 8, '52, K-35 (1151).

Ditrichaceae

Ditrichum flexifolium (Hook.) Hampe. Chi-tou, 3rd. compartment, 1,800 m., wet ground, July 12, '52 K-43.

**Ditrichum heteromallum* (Hedw.) E. G. Britton. Chi-tou, on soil, hill slope, Jan. 10, '63, KF-273 (1665).

Dicranaceae

Dicranella coarctata (C. M.) Bryol. Jav. Chi-tou, 1,400 m., on soil, hill slope, Jan. 10, '63, KF-270.

Trematodon longicollis Michx. Chi-tou, 1,200 m., on soil, hill slope, Jan. 10, '63, KF-269 (1663).

Leucobryaceae

**Leucobryum Nakaii* Horikawa. Chi-tou, wet ground, Mar. 15, '56, W-84.

Octoblepharum albidum Hedw. Chi-tou, tree trunk, Mar. 15, '56, W-94.

Calymperaceae

Calymperes tunerculorum (Dix. & Ther.) Broth. Chi-tou, 3rd. compartment, 1,800 m., on rotten wood, wet forest ground, July 8, '52, K-32,

Funariaceae

Funaria calvescens Schwaeger. Chi-tou, 1,500 m., 3rd. compartment, on a dripping cliff, July 2, '52, K-44.

Bryaceae

Pohlia wahlenbergii (Web. & Mohr.) Andrews. Chi-tou, 1,600 m., on rocks, Feb. 16, '60, K-501.

Rhodobryum roseum (Hedw.) Limpr. Chi-tou, 1,300-1,600 m., on shady wet ground, July, '52, K-57.

Mniaceae

Mnium Maximowiczii Lindb. Chi-tou, 1,200 m., on rocks, Mar. 26, '63, KF-1650.

Rhizogoniaceae

Rhizogonium spiniforme (Hedw.) Britton. Chi-tou, 1,600 m., on rotten wood, Feb. 16, '60, K-105a; 1,200 m., on trunk base of *Cryptomeria*, Mar. 20, '63, KF-1653 & Mar. 26, '63, KF-1653a and 1653b.

Bartramiaceae

Bartramia norvegica (Gummn.) Lindb. Cho-shan, 800-150 m., on wet cliff, July 7, '53, K-29.

**Breutelia chrysocoma* (Dicks.) Lindb. Chi-tou, 1,600 m., on decaying log, Feb. 12, '60, K-503.

Breutelia sp. Chi-tou, 1,300-1,600 m., Chi-ti, on wet ground, July 14, '52, K-51.

Philonotis palustris Mitt. Chi-tou, 1,300 m., on wet soil, mountain slope, Jan. 10, '63, KF-1667.

Philonotis socia Mitt. Chi-tou, 1,100 m., on shady wet ground, Feb. 12, 1960, K-1410.

Philonotis turneriana (Schwgr.) Mitt. Chi-tou, shady ground, 1,100 m., Feb. 12, 1960, K-1672.

Pterobryaceae

Endotrichella elegans (Doz. & Molk.) Fleisch. Chi-tou 1,200 m., on *Ginkgo* trunk, Mar. 20, '63, KF-1652; Feb. 2, '60, K-104.

Meteoriaceae

Meteoriopsis reclinata (Mitt.) Fleisch. Chi-tou, on cliff, Mar. 14, '56; W-28; W-97.

**Meteoriopsis squarrosa* (Hook.) Fleisch. Chi-tou, on cliff, Mar. 15, '56, W-29.

Neckeraceae

Homaliodendron microdendron (Mont.) Fleisch, Chi-tou, cliff, Mar. 20, '60, KF-1651.

Hookeriaceae

Distichophyllum Mittenii Bosch et Lac. Chi-tou, 1,800 m., 3rd. compartment, under cliff, July 8, '52, K-36.

Hookeria nipponensis (Besch.) Broth. Chi-tou, 1,100 m., on damp soil, near Zen-mou (神木), Mar. 14, '56, W-1236.

Hypopterygiaceae

Hypopterygium ceylanicum Mitt. Chi-tou, 1,200 m., on shady soil, Jan. 10, '63, KF-2661; 276.

**Hypopterygium japonicum* Mitt. Chi-tou, on shady rock, Jan. 10, '63, KF-274 (1662).

Thuidiaceae

**Pelekium bifarium* Fleisch. Chi-tou, on rocks, mixed in *Plagiochila*, 1,300 m., Mar. 26, '63, KF-1669 (tree form).

**Pelekium velatum* Mitt. Chi-tou, on rocks, Mar. 14, '56, KW-1770; 6th compartment, on rocks, wet ground, July 10, '52, K-41a; 3rd. compartment, 1,800 m., on decaying wood, wet ground, July 8, '52.

Thuidium glaucinum (Mitt.) Jaeg. Chi-tou, Nan-tou Hsien, 1,200 m., on rocks, Mar. 26, '63, KF-348.

Hypnaceae

Brachythecium Buchunani (Hook.) Jaeg. Chi-tou, 1,200 m., Nan-tou Hsien, at base of *Cunninghamia lanceolata*, Jan. 11, '63, KF-267 (1660).

Ctenidium lychnites (Mitt.) Broth. Mt. Phenix, 1,650 m., Feb. 14, 1955, K-89; 89a; 89b; 89c; Mar. 14, '56, W-1226; 1227.

Entodon Bandongiae (C. M.) Jaeg. Chi-tou, 1,100 m., on rocks, Feb. 12, '60, K-500.

**Eurhynchium celebicum* (Bryol. Jav.) Bartram. Chi-tou, 1,100 m., on decaying wood, Jan. 10, '63, KF-275 (1664).

Eurhynchium vagans (Harv.) Bartram. Chi-tou, Nan-tou Hsien, 1,200 m., on wet rocks, Jan. 10, '63, KF-282 (1659).

Hepaticae**Ptilidiaceae**

Trichocolea tomentella (Ehrh.) Dum. Chi-tou, 1,300 m., on decaying wood, Mar. 26, '63, KF-279a.

Lepidoziaceae

Bazzania tricrenata (Wabl.) Trevis. Chi-tou, Zen-mou, Mar. 14, '56, W-561.

Lepidozia setacea (Web.) Mitt. Chi-tou, 3rd compartment, 1,600 m., on rocks, shady wet ground, July 8, '52, K-34.

Calypogeiaceae

Calypogeia trichomanis (L.) Corda. Chi-tou, 1,200 m., on wet rock, Mar. 21, '63, KF-350.

Epigoniaceae

**Nardia crenulata* (Sm.) S. C. Lindb. Chi-tou, on rocks, 3rd. compartment, Mar. 26, '63, K-247.

**Jungermania lanceolata* L. Chi-tou, 1,000 m., on rocks, Jan. 12, '63, KF-276.

Harpanthaceae

Chiloscyphus breviculus sp. nov. Chi-tou, 1,200 m., on rocks, Jan. 10, '63, KF-279.

Lophocolea bidentata (L.) Dum. Chi-tou, 6th compartment, on rocks, wet forest ground, July 10, '52, K-37; on damp humus, Mar. 14, '56, W-257.

Plagiochilaceae

Plagiochila acanthophylla Gott. Chi-tou, 1,200 m., on rocks, Mar. 26, '63, KF-1654.

Plagiochila belangeriana Lindb. Chi-tou, 1,200 m., on rocks, Mar., 26, '63, KF-1654.

Plagiochila ovalifolia fo. *descendens* S. H. Chi-tou, 1,200 m., Mar. 26, '63, KF-278.

Scapaniaceae

**Scapania gracilis* (Lindb.) Kaal. Chi-tou, 1,200 m., on rocks, Mar. 26, '63, KF-1655.

**Scapania undulata* (L.) Dum. Chi-tou, 1,300-1,600 m., swampy ground, Chi-ti, July 14, '52, K-56.

Schistochilaceae

Schistochila formosana Horikawa Chi-tou, 1,300-1,600 m., swampy ground, July 14, '52, K-54a.

Lejeuneaceae

Ptychanthus striatus Nees. Chi-tou, on rocks, 3rd compartment, Mar. 26, '63, K-34; 347.

Frullaniaceae

Frullania concava Horikawa. Chi-tou, 1,200 m., on rocks, Mar. 26, '63, KF-1668.

Metzgeriaceae

Metzgeria fruticulosa (Dicks.) Evans. Chi-tou, 1,600 m., 6th compartment, on rotten wood, July 10, '52, K-42; 296.

Marchantiaceae

Conocephalum conicum (L.) Dum. Chi-tou, 1,300-1,600 m., swampy ground, July 14, '52, K-55; Mar. 15, '56, W-11; W-279.

Dumortiera hirsuta (Sw.) Reinw., Bl. et Nees. Chi-tou, 6th compartment, 800-1,600 m., on rocks, wet ground, K-28; Mar. 14, '56, W-567.

Marchantia polymorpha L. Chi-tou, 1,300-1,600 m., on rocks. K-46; 3rd compartment, 1,500 m., on rock, wet ground, July 7, '52, K-31.

**Preissia quadrata* (Scop.) Nees. Chi-tou, wet rock, at the foot of a spring, Mar. 26, '63, KF-1670.

Asterella tenella (L.) Beauv. Chi-tou, wet rocks, Mar. 26, '63, KF-562.

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The above list consists of 38 species of mosses belonging to 17 families, 27 genera, and 22 species of liverworts belonging to 12 families, 19 genera.

Species new to the island are marked with an asterisk.

Annotation

1. *Pogonatum hetero-proliferum* Horikawa, *P. inflexum* (Lindb.) Jaeg. and *P. nudiusculum* Mitt. are indicator mosses, usually growing on acid soil. *P. nudiusculum* is a first record for Taiwan.

2. *Pogonatum* cf. *Wallisi*. This is a robust, reddish brown and tufted moss resembling *P. Wallisi* Jaeg. (Bartram, 1939, p. 393) in height and general appearance. Stem 7-12 cm. high, usually simple or with one innovation above, rhizome bulbous, felted with reddish brown tomentum, its cross section consisting of a distinct central zone and an outer zone of larger parachymatous cells; lower leaves small, appressed, the upper ones gradually larger, curved and slightly flexuose when dry, spreading when moist, gradually linear-lanceolate from a sheathing base, carinate-concave, sharply acute, 10 mm. long or longer, coarsely spinose-serrate toward the base; costa broad, percurrent, distantly toothed on back above; but lamellae differ from that of *P. Wallisi* in bearing rows of 2-3 cells on lower part of leaf (never as high as 6 cells as described in *P. Wallisi*) terminal cells rounded slightly flattened and sparsely papillose

(fig. 1.). This variable number of lamellae cells is not commonly met with among the other members of this genus. Since the morphology of the lamellae cells is considered important in determining the species, the present taxon may therefore present a new species.

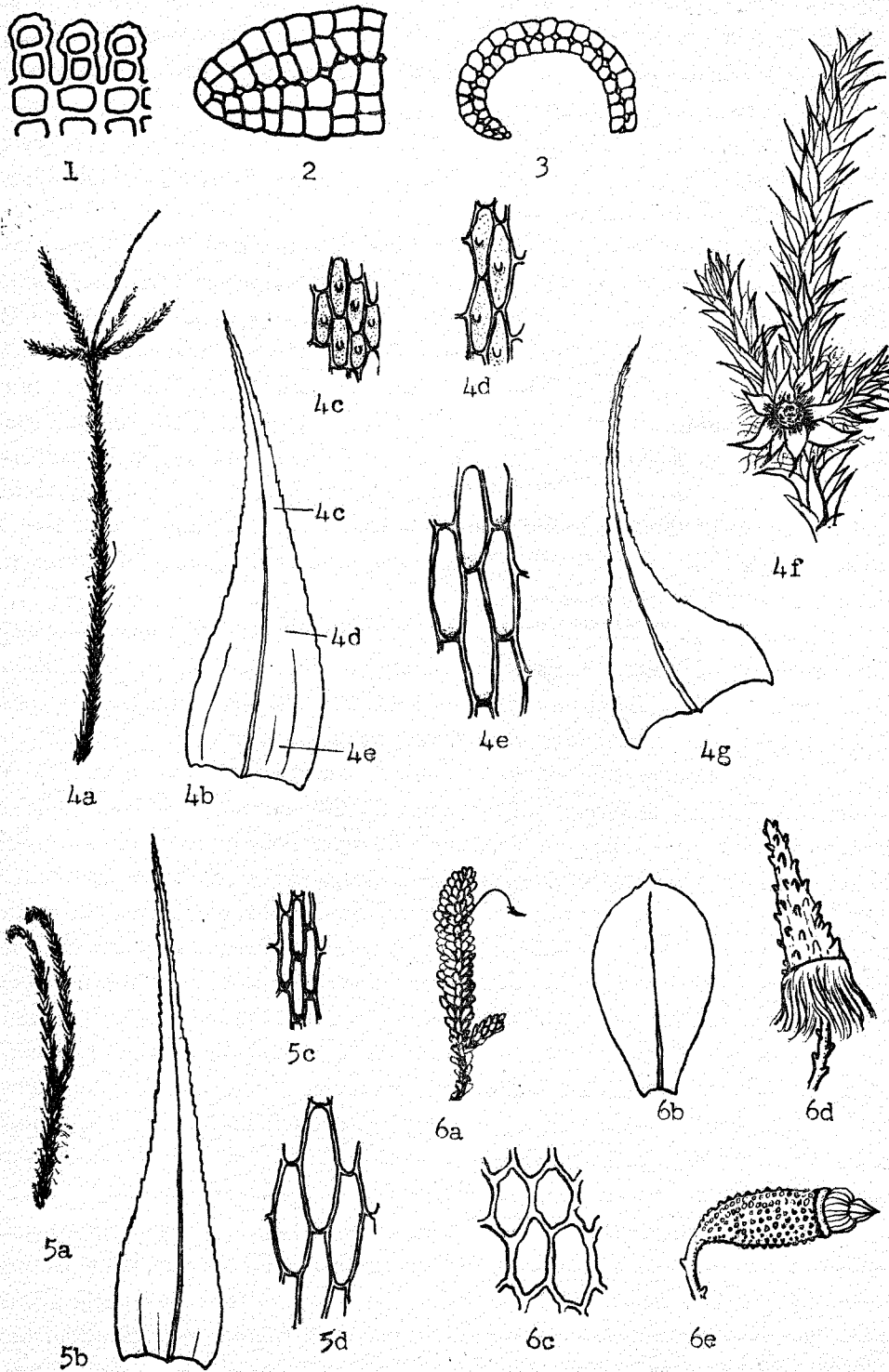
3. *Districhum heteromallum* (Hedw.) E. G. Britton. It is the most delicate moss collected from Chi-tou, bright yellowish green in color, about 1 cm. high, often in large patches, on hilly soils.

4. *Octoblepharum albidum* Hedw. It was first reported from Taiwan by Noguchi in 1934, grown at the base of a tree at Sun-moon Lake, Taichung. The present specimen is in a small patch closely appressed on a tiny piece of decaying wood, about $2\frac{1}{2} \times \frac{2}{3}$ inches. This species is characterized with cylindrical capsules. Bartram reported in 1939 that *C. albidum* Hedw. was cosmopolitan, distributed at low altitude in tropical regions. Both Noguchi and Bartram reported that only scanty material was found and so was in our collection. It indicates that *C. albidum* is an uncommon moss and not easy to be seen. Sections of the upper leaf showed a triangular chlorocyst with 2 or 3 layers of leucocysts on each side (fig. 2.), but not 3 or 4 layers as described in Bartram.

5. *Leucobryum Nakaii* Horikawa. It is a plant of 2 cm. high; leaves sparsely and irregularly papillose, a character which was not described by Horikawa; cross section of the leaf shown 2 layers of leucocyst cells with one layer of square chlorocyst cells in between (fig. 3.); capsules not seen. First record for Taiwan.

6. *Pohlia Wahlenbergii* (Web. et Mohr.) Andrews. It was described in Welch 1957, Indiana Mosses, p. 231 and Conard 1956. As compared with Welch's Indiana specimen the following characteristics were revealed very close to that of the former: plants in tufts, stem 1-2 cm. long, branched below and matted with abundant brownish tomentum; leaves numerous, narrowly lanceolate, entire below and serrate above; median leaf cells pellucid, not rhombic-hexagonal, but linear above, rectangular below, basal cells reddish; seta erect, reddish brown 4-7 cm. high, instead of 4 cm. as given in Welch; capsule pendent reddish brown, neck short, and broad, inconspicuous. Welch reported that the plant grows in water or wet clay banks, but the present specimen is found on a rocky cliff. Another collection of the same species was made from Yang Ming Shan, Taipei by Mr. T. C. Huang, April 24, 1960 (1671) and the seta is shorter, more reddish and stronger in texture than that of the present one.

7. *Breutelia chrysocoma* (Dicks.) Lindb. (figs. 4a-g). It came in a small packet of some 20 plants grown on decaying logs. Only four of them having setae and capsules which were too young for study; a few were male plants with conspicuous discoid flowers born at the base of the terminal branches (fig. 4f). Characteristics similar to that of *Breutelia chrysocoma* (Dicks.) Lindb.



(Watson, 1959, p. 233) are: stem 5-12 cm. high sparsely branched, covered with reddish brown tomentum; leaves 2-5 mm. long, lanceolate, slightly plicate at base, acuminate at tip, toothed margins and with some what differentiated alar cells; leaf cells narrowly elongated up above, with knobbed papillae mostly at ends or corners of cells; basal leaf cells rectangular, hyaline without papillae; nerve vanishing in the toothed point.

The male flower, surrounded by large bracts is often borne at the base of branches. Shrunken antheridia were found mixed with numerous paraphyses, all brown in color. As compared with *B. arundinifolia* Fl. collected by Nakamura Taizo from Hwa-lien, 1940, it is less robust and much slender and taller in general appearance, and leaves less plicated. First record for Taiwan.

8. *Breutelia* sp. (figs. 5a-d). Plant yellow brown, julaceous 3-4 cm. high, reddish-brown tomentum from bottom to half-way up; stem tip slightly falcate; leaves secund, 2-3 plicates at base, gradually linear-lanceolate bluntly serrate on back of costa and on margins; leaf cells with papillae irregularly located in ends of cells, basal leaf cells rectangular, somewhat bulged in middle. Capsule not found. In some respects resembling *Dicranoloma reflexifolium* (Bartram 1939, p. 55). Including *B. arundinifolia*, *B. chrysocoma* and *Breutelia* sp., 3 species of *Breutelia* now found in Taiwan.

9. *Endotrichella elegans* (Doz. & Molk.) Fleisch. This is a robust, pendent moss commonly distributed in Taichung, Nan-tou Hsien and adjacent regions, grown in patches, often hanging on trees, in damp deciduous forests, leaves widely spreading, twisted and contorted toward points when dry, deeply plicate, broadly ovate, long-acuminate; capsules laterally immersed.

10. *Meteoriopsis squarrosa* (Hook.) Fleisch. Plants yellowish-green in dense masses growing on rocks, irregularly branched; leaves ovate-lanceolate from a clasping base, leaf cells pellucid, smooth or with one or two faint papillae over lumens. It differs from *M. squarrosa* (Hook.) Fleisch in bearing paired minute teeth on the margin of the leaf, and growing on rocks, not on trees as described by Bartram (1939, p. 231.).

11. *Distichophyllum Mittenii* Bosch et Lac. This hepatic-like, tropical moss (figs 6a-e) was found several times in Chi-tou. Plants pale green, 2-5 cm.; leaves several rows, costa ending below the pointed apex; slightly wavy before

Figs. 1. *Pogonatum* cf. *Wallisi*, lamellae. 2. *Octoblepharum albidum* Hedw. leaf c. s. \times 120. 3. *Leucobryum Nakaii* Horikawa leaf c. s. \times 90. 4a-g. *Breutelia chrysocoma* (Dicks.) Lindb. a. Female plant \times 1. b. Branch leaf \times 30. c. e. Leaf cells \times 225. f. Portion of a male plant showing a male flower \times 4. g. Bract from male flower \times 30. 5a-d *Breutelia* sp. a. Habit \times 1. b. Branch leaf \times 30. c. Upper leaf cells \times 225. d. Basal leaf cells \times 225. 6a-e. *Distichophyllum mittenii* Bosch et Lac. a. Habit \times r. b. Leaf \times 10. c. Portion of leaf cells \times 325. d. Capsule with calyptra. e. Capsule without calyptra.

ending; leaf cells hexagonal walls thickened all around; seta lateral, often arising in groups of 2 or 3; calyptra conical, papillose and fringed at base.

12. *Lepidozia setacea* (Web.) Mitt. (figs. 7a-d) In this specimen, globose antheridia in rows were found at the tips of short lateral male branches. Such findings have not been reported in earlier papers.

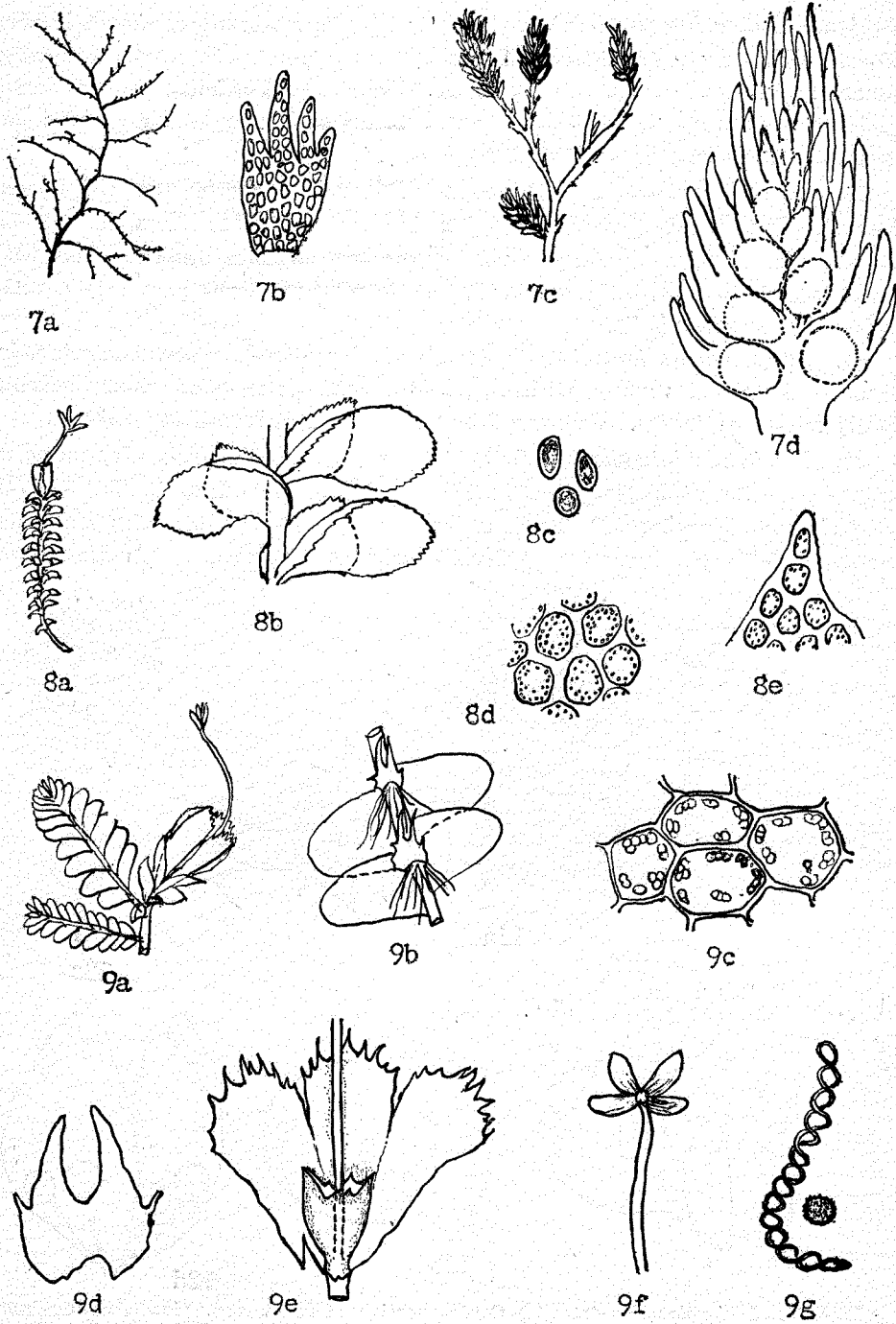
13. *Scapania gracilis* (Lindb.) Kaal. (figs. 8a-e) Plant 2-3 cm. tall, ascending; antical lobe being 2/3 of the size of the postical one, the postical lobe is obtusely rounded with some what reflexed hind margins, teeth all round the margin of the lobe, each being one or two cells high; leaf cells with thick walls and corner thickenings; gemmae pale green, 1-2 cells in clusters, found at the tips of the upper leaves; perianths common, compressed with toothed mouth margin, bracts larger than vegetative leaves; spores rounded, dark brown. Its distinguishing characters are the reflexed hind margin, and the clustered gemmae. *Scapania undulata* (L.) Dum. As distinguished from *S. gracilis*, this species has reddish purple leaf lobes which are not reflexed. Both *S. gracilis* and *S. undulata* are first records for Taiwan.

14. *Nardia crenulata* (Sm.) S. C. Lindb. Small plants, 1-2 cm. high, prostrate, and unbranched; grown on swampy ground. First record for Taiwan.

15. *Chiloscyphus breviculus* sp. nov.⁽¹⁾ Autoecious. Plants prostrate, grown in great patches; stem up to 2 cm. long, 2-3 mm. wide; leaves succubous; leaf cells of the margin and mid-leaf 10-14u×12-18u, with thick walls but corners not thickened; underleaves, bifid, each cleft bearing a short projection on the side (fig. 9d); rhizoids tufted, arising from the base of the underleaves (fig. 9b); perianth large and long exerted (fig. 9e), triquetrous and angles-winged, about 3-7 cells deep, mouth more or less spinous-dentate, each tooth 3-4 celled; calyptra (fig. 9e) low, not extending above the perianth as in other

(1) Plantae prostratae in magnis hyadis crescentes; caules usque ad longitudinem 2 cm., latitudine 2-3 mm.; folia succubous; cellulae foliorum magnitudine in margine folii et in medio, cum parietibus crassis, angulis autem non crassis; folia ex parte adversa crescentia bifida, cum brevibus projectionibus, in unaquaque latere unam (fig. 4); rhiza cristata, surgentia ex fundamento foliorum ex parte adversa crescentium; perianthos magnum atque (=et) longe enitens (fig. 5), triquetrum et habens alas longitudine circiter 3-7 cellularum, os habens plus minusve spinas dentifomes, quarum una habens 3-4 cellularum; calyptra humilis, non extendens supra perianthos sicut aliae eiusdem generis; capsula oviformis; seta longa, in maturitate erecta semina colore leviter fulvo, levia 4-5u in diametro; elatae longitudine 42u.

Figs. 7a-d. *Lepidozia setacea* (Web.) Mitt. a. Habit×1. b. Leaf×40. c. Antheridial branches×10. d. Portion of antheridial branch×40. 8a-e *Scapania gracilis* (Lindb.) Kaal. a. Habit×1. b. Portion of plant, dorsal view×15. c. Gemmae×325. d. Median leaf cells×325. e. Leaf apex showing one tooth×325. 9a-g *Chiloscyphus breviculus* a. Habit×7. b. Portion of plant, ventral view×10. c. Leaf cells×325. d. Under leaf×30. e. Perianth torn, showing calyptra×15. f. Old dehisced capsule×7. g. Elater & spore×325.

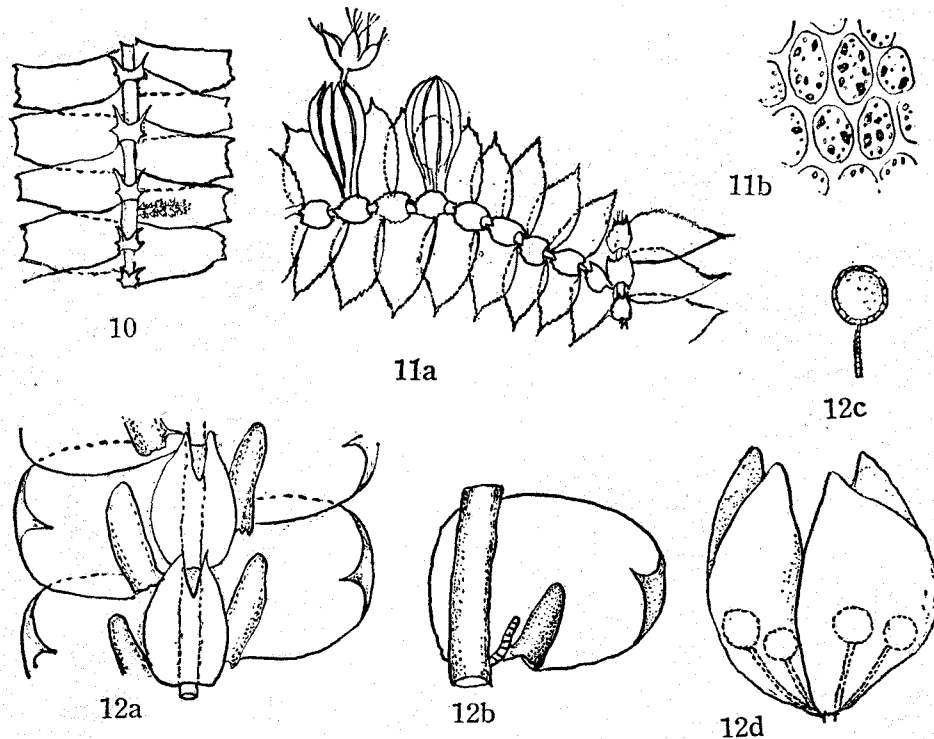


species of the genus, bracts irregular; capsule ovoid; seta, long and extended at maturity; spores brownish, finely papillose (fig. 9g), 4-5 μ in diam.; elater 42 μ long. According to Macvicar (1960, p. 247) the present specimen is very close to *Chiloscyphus polyanthus* but it differs from the latter in the following respects: Calyptra small, not extended beyond the perianth; leaves entire 1-1.5 mm. long, apex not so rounded as in *C. polyanthus*; underleaves bifid but the teeth not so long as that of *C. polyanthus*.

16. *Lophocolea bidentata* (L.) Corda. This unique species (fig. 10) resembling closely to *Lophocolea bidentata* but innovation arising from the ventral side and the slender, spreading clefts are the two features differing from that of the latter. Besides, the irregularly, bluntly toothed leaves look very similar to *Leptoscythus diversifolia*.

17. *Jungermannia lanceolata* L. (or *Apozia lanceolata*). Stems creeping, irregularly branched usually with flagelliform and gemiporous shoots bearing closely appressed leaves. Gemmae 1 or 2-celled. First record for Taiwan.

18. *Plagiochila belangerian* Lindb. The present specimen is very close to *Plagiochila belangerian* described in Hattori Journ. Bot. Lab. 2: 71, fig. VII, except in two respects: (1) Teeth of leaf apex extending into long filaments, usually of 5-8 cells, instead of 2-3 cells long as described. (2) Antheridium,



Figs. 10. *Lophocolea bidentata* (L.) Corda, portion of plant, ven. view showing innovation. 11a-b. *Ptychanthus striatus* Nees. a. Habit $\times 6$. b. Medean leaf cells $\times 325$. 12a-d. *Frullania concava* Horikawa a. Portion of plant, ven. view $\times 64$. b. Postal & ventral lobes & stylus $\times 64$. c. Antheridium $\times 64$. d. Male bracts with antheridia $\times 64$.

globose, with elongated mouth, arranged in two rows are very vivid. These were not mentioned in the description.

19. *Ptychanthus striatus* Nees. A conspicuous, bipinnately branched hepatica growing in large patches; stem 3-6 inches long (figs. 11a-b); perianth and capsules arising in pairs from lateral branches.

20. *Frullania concava* Horikawa. (figs. 12a-d) A conspicuous hepatica collected from rocks, dark reddish brown. A microscopic examination of the antical lobe fails to reveal the "large cells" which are usually present in other *Frullania*, but a row of 4-6 cells projecting out from the mouth region of the postical lobe, the stylus was prominent, often covered by the underleaves; the globose antheridia with long stalks spread out among a mass of paraphyses from a crushed antheridial branch. They were born at the axis of the curved antical lobe and the underleaf of the antheridial branch which is often short and laterally born. The presence of a cellular projection is the character resembling to that of *F. reiparia* (Conard, 1956). A satisfactory description of the species has not been found.

21. *Metzgeria fruticulosa* (Dicks.) Evans. This specimen is very difficult to determine. Several attempts were made to the anatomy of the thallus, but the tissues failed to show their original shape. It is very close to the description given in Journ. of Hat. Bot. Lab. 20: 131-132. It was found twice at Chi-tou.

溪 頭 苔 蘚 植 物 誌

楊 寶 瑜 李 文 瓊

溪頭為臺大實驗林之一區，座落於臺灣中部，植物頗繁茂。本區之苔蘚植物因前未有人調查過，故作者等嘗試探求。本文所得之資料，得自整理分類數年來收集之標本，計得苔類38種和蘚類22種，其中9種苔類和5種蘚類屬臺灣新記錄，全列於本文中藉供有心於苔蘚植物者之參考。

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