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**Résultats des expéditions scientifiques genevoises
au Népal en 1952 et 1954 (partie botanique)**

19. Musci

A. NOGUCHI

SPHAGNACEAE

Sphagnum plumulosum Roll.

DISTR.: Europe, Himalayas, Yunnan, Japan, North America, Chile, Patagonia.

NEPAL: Between Chyaubas (27°37', 85°47') and Risingo (27°37', 85°54'), amongst Rhododendrons, alt. 2020 m, April 1, 1952, *Zimmermann 129* (det. A. Leroy Andrews).

Sphagnum recurvum Beauv.

DISTR.: Europe, Caucasus, Asia, North America.

NEPAL: Descending towards Tāksindu (27°35', 86°38') along the Dudh Kosi, in forest, alt. 2800 m, April 10, 1952, *Zimmermann 232*; left bank, slope in forest, alt. 2870 m, May 10, 1952, *Zimmermann 486* (det. A. Leroy Andrews).

ANDREAEACEAE

Andreaea rupestris Hedw.

DISTR.: Europe, Caucasus, Korea, Japan, North America, Tasmania, New Zealand.

NEPAL: Summit of a mountain, west of the base camp, alt. 5450 m, April 23, 1952, *Zimmermann 317a*.

OBS.: This specimen has longer leaf points than the ordinary one.

POLYTRICHACEAE

Oligotrichum semilamellatum (Hook.) Mitt.

DISTR.: Himalayas.

NEPAL: Between Ghāt (27°43', 86°43') and Chaunrikharka (27°42', 86°43'), alt. 2670 m, Oct. 27, 1954, *Zimmermann 1867*.

OBS.: The size of the dorsal lamellae varies considerably. Frequently the lamellae are extremely small and tend to be serrate.

Pogonatum microstomum (R. Br.) Brid.

DISTR.: Himalayas, Setschwan, Yunnan, Ceylon, Philippines, Formosa.

NEPAL: Near Ringmo (27°35', 86°36'), alt. 2900 m, June 14, 1952, *Zimmermann 826a*; between Melingo (27°51', 86°47'), and Thyāngboche (27°51', 86°46'), alt. 3650 m, April 28, 1952, *Zimmermann 365a*; between Thāmi (27°50', 86°39') and Pāre (27°49', 86°39'), alt. 3400 m, Oct. 12, 1954, *Zimmermann 1630a*; Gumila (27°45', 86°42'), alt. 2600 m, Oct. 26, 1954, *Zimmermann 1855*; Monjo, alt. 2760 m, Oct. 26, 1954, *Zimmermann 1844e*.

Pogonatum perichaetile (Mont.) Jaeg.

DISTR.: Himalayas, Setschwan.

NEPAL: Beding (27°55', 86°21'), alt. 3600 m, Sept. 22, 1954, *Zimmermann 1409*; lake-side camp, in the direction of Gaurisankar (27°58', 86°20'), alt. 4700 m, Oct. 1, 1954, *Zimmermann 1517*; along Menlungtse (28°01', 86°26'), in the direction of Gaurisankar, alt. 4640 m, Oct. 1, 1954, *Zimmermann 1537a*.

OBS.: The plants in *1517* and *1537a* are small, slender, and compactly foliated.

Pogonatum tortipes Mitt.

DISTR.: Himalayas, Setschwan, Tibet, Japan.

NEPAL: Camp at Chyaubas (27°37', 85°47'), alt. 1950 m, Sept. 8, 1954, *Zimmermann s. n.*; Risingo (27°37', 85°54'), on the ground, alt. 2700 m, Oct. 30, 1954, *Zimmermann 1956*; near Gārma (27°26', 86°35'), alt. 2000 m, Oct. 31, 1954, *Zimmermann 1966A*.

OBS.: This species extends discontinuously from the Himalayas to Japan. At present I have not yet examined any collection of this species come from the stations between the two localities.

Pogonatum urnigerum (Hedw.) Palis.

DISTR.: Europe, Canary, Caucasus, Persia, Pakistan, North Asia, Japan, East China, North America.

NEPAL: Melung La (27°58', 86°30'), among rocks, alt. 4700 m, Oct. 9, 1954, *Zimmermann 1597B*; Chule (27°57', 86°36'), near Tarangan (27°53', 86°38'), alt. 4500 m, Oct. 11, 1954, *Zimmermann 1612B*.

***Polytrichum alpinum* Hedw.**

DISTR.: Almost cosmopolitan.

NEPAL: A mountain, near Lobuje (27°57', 86°49'), alt. 5230 m, May 31, 1952, *Zimmermann 575b*, mixed with *Pohlia crudoides*.

***Polytrichum formosum* Hedw.**

DISTR.: Europe, Madeira, Algeria, Syria, Caucasus, Korea, Japan, Formosa, North America.

NEPAL: Thyāngboche (27°51', 86°46'), alt. 3850 m, in forest, June 4, 1952, *Zimmermann 662*.

OBS.: This species ranges widely, but seems to be unreported from Nepal. The plants are poor and the terminal cells of lamellae differ somewhat from the ordinary one, but I could not find enough difference to warrant specific distinction.

DITRICHACEAE

***Ditrichum flexicaule* (Schleich.) Hampe.**

DISTR.: Europe, Algeria, Canary, Caucasus, Middle Asia, Siberia, East China, Formosa, Japan, North America.

NEPAL: Lobuje (27°57', 86°49'), alt. 4850 m, April 24, 1952, *Zimmermann 328*; a mountain along Lobujya Khosi, alt. 4700 m, May 15, 1952, *Zimmermann 517*; base camp entrance of the valley of Yeti, alt. 5130 m, May 29, 1952, *Zimmermann 546*.

***Ceratodon purpureus* (Hedw.) Brid.**

DISTR.: Cosmopolitan.

NEPAL: Between the base camp and Lobuje, alt. 4850 m, May 31, 1952, *Zimmermann 565*.

***Distichium capillaceum* (Hedw.) BSG.**

DISTR.: Almost cosmopolitan.

NEPAL: A mountain along the valley of Lobujya Khola, alt. 4700 m, May 15, 1952, *Zimmermann 516a*; Melung La (27°58', 86°30'), alt. 4700 m, Oct. 9, 1954, *Zimmermann 1600*, mixed with *Gymnostomum recurvirostrum*; *ibid.*, 5000 m, Oct. 9,

1954, *Zimmermann 1597*; moraine, near Lobuje (27°57', 86°49'), alt. 4870 m, April 21, 1952, *Zimmermann 301*; Camp de base, alt. 5070 m, May 30, 1952, *Zimmermann 552*; moraine, nr. the camp at Lobuje, alt. 5100 m, April 24, 1952, *Zimmermann 323*; Melung La, on rocks, alt. 5150 m, Oct. 7, 1954, *Zimmermann 1587b*; towards the Camp I, in the bottom of a ravine, alt. 5340 m, May 19, 1952, *Zimmermann 526b*; entrance of the valley of Yeti, alt. 5420 m, May 29, 1952, *Zimmermann 543*.

DICRANACEAE

Aongstroemia orientalis Mitt.

DISTR.: Sikkim, Buthan, Burma, Philippines, Formosa, Japan.

NEPAL: Near the base camp, in the direction of Lobuje, alt. 5100 m, May 31, 1952, *Zimmermann 558ba*; entrance of the valley of Yeti, alt. 5300 m, May 29, 1952, *Zimmermann 539a*.

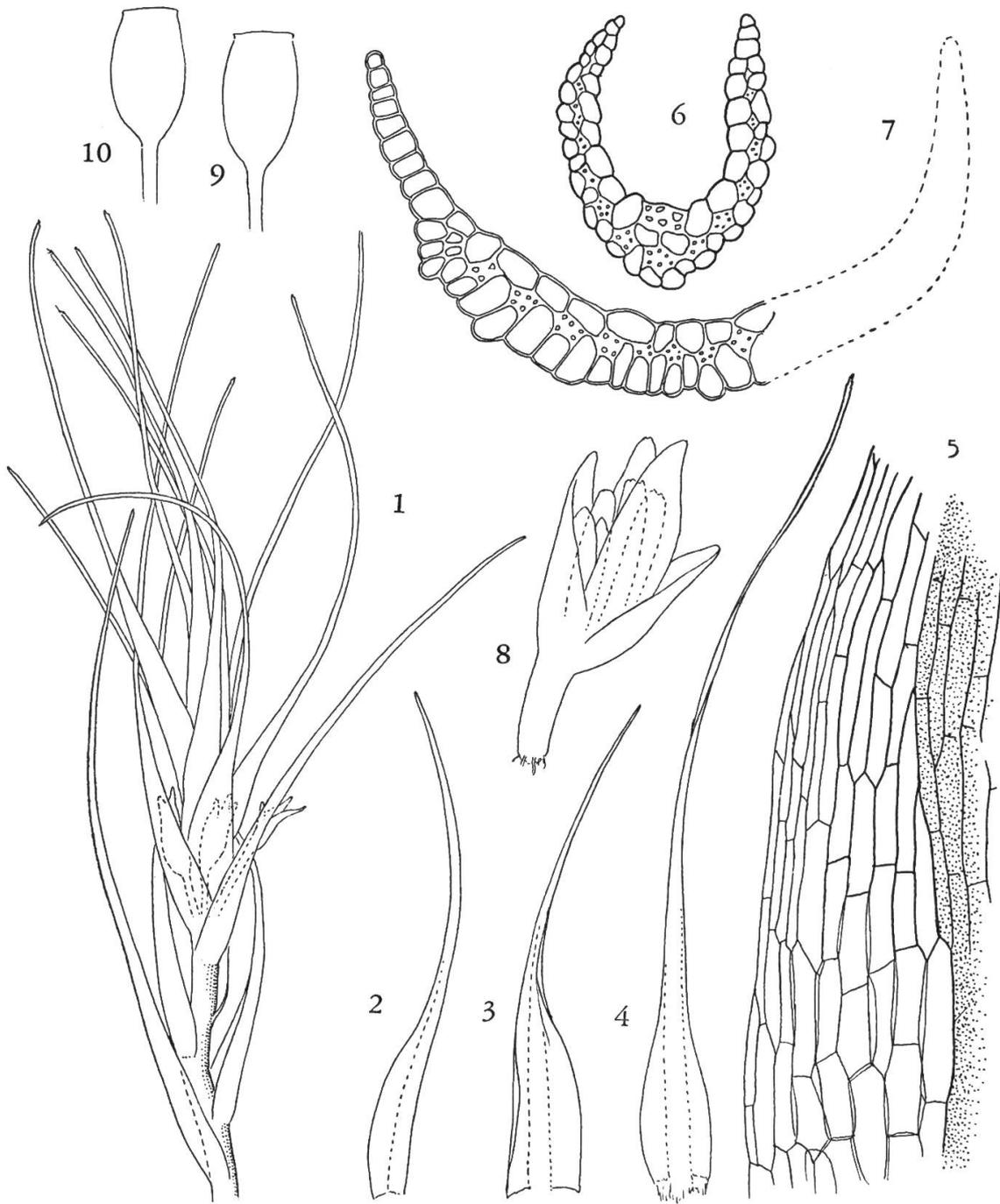
OBS.: This has a wide range from the Himalayas eastward to the Philippines and Formosa and northward to Japan. In Japan this has been known hitherto under the name of *Anomobryum fuji-alpinum* and has been found on Mts Fuji and Yatsugatake in central Honshu.

Campylopediella ditrichoides Noguchi, spec. nov. (Tab. 1).

Monoica. Planta dense caespitosa, haud nitida, fuscoviridis inferne nigrescenti-fusca. *Caulis* erectus, ad 3 cm longus, parce ramosus vel simplex, densiuscule foliosus. *Folia* caulina sicca laxè adpressa vel ± falcata, flexuosula, madida erecto-patentia, inferiora e basi oblonga sensim elongatum subulata, canaliculato-concava, ad 2.5 mm longa, superiora multo majora ad 4.5 mm longa, e basi oblonga sensim longissime subulatum attenuata, canaliculato-concava, marginibus integris apice parce dentatis, costa lata basica tertiam partem folii occupante, in acumine evanida, cellulis laminalibus laxis sublinearibus, parietibus tenuibus, 70-85 × 10-14 μ, basilaribus et juxtacostalibus latioribus, rectangularibus, marginalibus 2-3-seriebus angustioribus linearibus, parietibus tenuibus. *Bracteae perichaetii* internae alte vaginantes, ad 8 mm longae, costa tenuissima. *Seta* lateralis erecta, sicca flexuosula madida ± arcuata, lutea, 7-10 mm longa, 0.13 mm lata. *Theca* erecta, oblonga, fusca, 0.8-1.1 × 0.4-0.6 mm, stomatibus nullis. *Peristomii* dentes destructi. *Sporae* globosae, minute papillosae, ca 20 μ in diam. *Flores masculii* laterales, ca 0.6 mm alti, paraphysibus nullis.

NEPAL: Thyāngboche (27°51', 86°46'), alt. 3850 m, June 4, 1952, *Zimmermann 662b*-type; *ibid*, alt. 4000 m, June 4, 1952, *Zimmermann 661Bd*, *661h*.

OBS.: This species is so closely allied to *Campylopediella tenella* in its general appearance that at first I thought it to be *C. tenella*. However, the almost straight seta and the lack of a paroicous inflorescence of the present moss are the characteristics of *C. tenella*. The structure of the costa of this moss is characteristic of those in the genus *Campylopediella*, although the setae are neither flexuose when dry nor cygneous when moist.



TAB. 1. *Campylopodiella ditrichoides* Noguchi

1, a part of plant, bearing three male inflorescences, $\times 18$ - 2, 3, 4, leaves, $\times 18$ - 5, basal part of leaf, $\times 162$ - 6, 7, cross sections of leaf (6 upper, 7 lower parts), $\times 300$ - 8, male inflorescence, $\times 48$ - 9, 10, deperculate capsules, $\times 13$.

Dicranodontium denudatum (Brid.) Britton.

DISTR.: Europe, Caucasus, Siberia, Japan, North America.

NEPAL: Along Kangtego, in the direction of Thyāngboche (27°51', 86°46'), alt. 3500 m, Oct. 21, 1954, *Zimmermann 1786*; Melingo (27°51', 86°47'), near Thyāngboche, alt. 3650 m, April 28, 1952, *Zimmermann 364e, 367c*.

Paraleucobryum enerve (Thed.) Loeske.

DISTR.: Europe, Caucasus, Sikkim, Formosa, Japan, North America.

NEPAL: Melingo, near Thyāngboche, alt. 3650 m, April 28, 1952, *Zimmermann 364-1*; near Yazab and Mingbo (27°50', 86°50'), alt. 3800 m, Oct. 22, 1954, *Zimmermann 1814b*; Taweche (27°54', 86°46'), on rocks, alt. 4300 m, June 2, 1952, *Zimmermann 603a*; meadow of Pheriche (27°54', 86°49'), rock crevice, alt. 4300 m, June 2, 1952, *Zimmermann 611*; Tarangan (27°53', 86°38'), alt. 4500 m, Oct. 11, 1954, *Zimmermann 1612c*; moraine, near Lobuje (27°57', 86°49'), alt. 4850 m, April 21, 1952, *Zimmermann 303*; Chouk Pula (27°56', 86°48'), on rocks, alt. 5000 m, April 19, 1952, *Zimmermann 291*; base camp, on rocks, alt. 5050 m, May 29, 1952, *Zimmermann 536a*; moraine, right side of the base camp at Lobuje, alt. 5150 m, April 24, 1952, *Zimmermann 320*; near the base camp, entrance of the valley of Yeti, alt. 5200 m, May 29, 1952, *Zimmermann 548a*; in the direction of the Camp I, on rocks, alt. 5420 m, May 19, 1952, *Zimmermann 529*.

OBS.: All collections were made on sandy soil. In some collections the leaves are longer than usual, but they are hardly falcate.

Cynodontium gracilescens (Web. & Mohr) Schimp.

DISTR.: Europe, Canada, Japan.

NEPAL: Between Kunde (27°49', 86°43') and Khumjung (27°49', 86°43'), on rocks, alt. 3810 m, June 7, 1952, *Zimmermann 706*; Thyāngboche (27°51', 86°46'), alt. 3850 m, June 4, 1952, *Zimmermann 662d*; a mountain near Thyāngboche, alt. 4000 m, June 4, 1952, *Zimmermann 661f*.

Cynodontium polycarpum (Hedw.) Schimp.

DISTR.: Europe, Caucasus, Japan, North America.

NEPAL: Thyāngboche, on rocks, alt. 3700 m, April 17, 1952, *Zimmermann 274a*.

OBS.: In this the leaves are less toothed than in the European material, but they agree so perfectly in other essential respects that I have no hesitation in identifying it with *Cynodontium polycarpum*.

Dicranum majus Turn.

DISTR.: Europe, Caucasus, Siberia, Japan, North America.

NEPAL: Melingo (27°51', 86°47'), near Thyāngboche, alt. 3650 m, April 28, 1952, *Zimmermann 364d*.

OBS.: The plants are smaller and have narrower leaves than usual.

Dicranum spec.

NEPAL: Lobuje-Karpo (27°56', 86°52'), slope to pass, alt. 4850 m, April 25, 1952, *Zimmermann 331b*.

OBS.: The material is scanty. The leaves are entire and cell walls are thick and strongly pitted.

LEUCOBRYACEAE

Leucobryum neilgherrense C. Müll. ?

DISTR.: Ceylon, Indonesia, Malaya, Korea, Japan.

NEPAL: Täksindu (27°35', 86°38'), near Ringmo (27°35', 86°36'), on dead wood, alt. 1850 m, Oct. 30, 1954, *Zimmermann 1950*.

POTTIACEAE

Anoetangium compactum Schw.

DISTR.: Almost cosmopolitan.

NEPAL: Namche Bazar (27°49', 86°43'), alt. 3000 m, Oct. 17, 1954, *Zimmermann s.n.*; along Menlungtse (28°01', 86°26'), in the direction of Gaurisankar (27°58', 86°20'), alt. 4640 m, Oct. 1, 1954, *Zimmermann 1537*.

Anoetangium crispulum Wils.

DISTR.: Himalayas, China, Amur, Japan.

NEPAL: Pekarnās near Lakhop (27°23', 86°33'), alt. 2770 m, Nov. 1, 1954, *Zimmermann 1975*.

Anoetangium tortifolium Wils.

DISTR.: Himalayas, South East China, Yunnan.

NEPAL : Taweche (27°54', 86°46'), on rocks, alt. 4300 m, June 2, 1952, *Zimmermann 603c*; a mountain, along the valley of Lobujya Khola, alt. 4700 m, May 15, 1952, *Zimmermann 516*; a mountain, West of Lobuje, at the base of rock cliff, alt. 5180 m, May 30, 1952, *Zimmermann 572a/1*.

Anoetangium spec.

NEPAL : The Sun Kosi, on rocks, alt. 3500 m, Nov. 5, 1954, *Zimmermann 2075*.

Gymnostomum recurvirostrum Hedw.

DISTR.: Widely distributed in the northern hemisphere.

NEPAL : Between Those and Chaugma, alt. 1750 m, April 6, 1952, *Zimmermann 182a*.

Trichostomum cylindricum (Bruch) C. Müll.

DISTR.: Almost cosmopolitan.

NEPAL : Melingo (27°51', 86°47'), near Thyāngboche, alt. 3650 m, April 28, 1952, *Zimmermann 368a*.

OBS.: The generic position of this species is still a problem; certain authors include this in the genus *Tortella*.

Tortella tortuosa (Hedw.) Limpr.

DISTR.: Widely distributed in the northern hemisphere.

NEPAL : Near a lake above Chola Khola, alt. 4500 m, April 18, 1952, *Zimmermann 286*; a mountain, west of Lobuje, alt. 5180 m, May 30, 1952, *Zimmermann 573*.

Barbula constricta Mitt.

DISTR.: Himalayas, China, Japan.

NEPAL : Meadow at Satama (27°48', 86°40'), by Bhote Kosi, alt. 3200 m, Oct. 14, 1954, *Zimmermann 1667, 1667b*.

Barbula vinealis Brid. aff.

NEPAL : Thāmi (27°50', 86°39'), alt. 3400 m, Oct. 12, 1954, *Zimmermann 1629*.

Bryoerythrophyllum atrorubens (Besch.) Chen.

DISTR.: Himalayas, Japan.

Nepal : Benkar (27°46', 86°43'), on ferns, alt. 2670 m, May 8, 1952, *Zimmermann 443a*.

GRIMMIACEAE

Grimmia doniana Smith.

DISTR.: Europe, Caucasus, Japan, Kamchatka, North America.

NEPAL: Moraine, nr. the base camp at Lobuje (27°57', 86°49'), alt. 5000 m, April 24, 1952, *Zimmermann 325a*.

Grimmia funalis (Schwegr.) Schimp.

DISTR.: Europe, Caucasus, Altai, Japan, North America.

NEPAL: Melung La (27°58', 86°30'), alt. 4700 m, Oct. 9, 1954 *Zimmermann, 1000a*.

Grimmia subdoniana Noguchi, spec. nov. (Tab. 2).

Planta dense caespitosa, nigrescens superne fusco-viridis, lanoso-canescens. *Caulis* parce ramosus vel simplex, dense foliosus, ad 1.5 cm longus. *Folia* caulina sicca adpressa madida erecto-patentia, inferiora ovato-oblonga, epilosa acuta, concava, ca 1.5 mm longa, superiora ad 2.5 mm longa, longe pilosa, pilis hyalinis remote dentatis, marginibus medio \pm recurvis, integris, costa tenuis, continua, cellulis medianis rectangularibus, parietibus crassis sinuatis, 13-20 \times 5-6.5 μ , superioribus brevioribus, inferioribus majoribus, elongato-rectangularibus vel sublinearibus, parietibus inaequaliter crassis, marginalibus basilaribus irregulariter quadratis vel rectangularibus, parietibus crassis. *Bractee perichaetii* internae haud diversae sed pilis longioribus. *Seta* terminalis, ca 1.5 mm longa, sicca torta, madida arcuato-curvata. *Theca* vix exserta, erecta vel \pm inclinata oblonga, ca 1 \times 0.55 mm, stomatibus paucis. *Peristomii* dentes lutescenti, late lineari-lanceolati, longitudinaliter perforati vel saepe 2-3-divisi, apice obtusi, dense papilloso, ca 0.3 mm longi. Operculum conicum obtusum, ca 0.25 mm longum. *Sporae* globosae, laeves, 10-12 μ in diam.

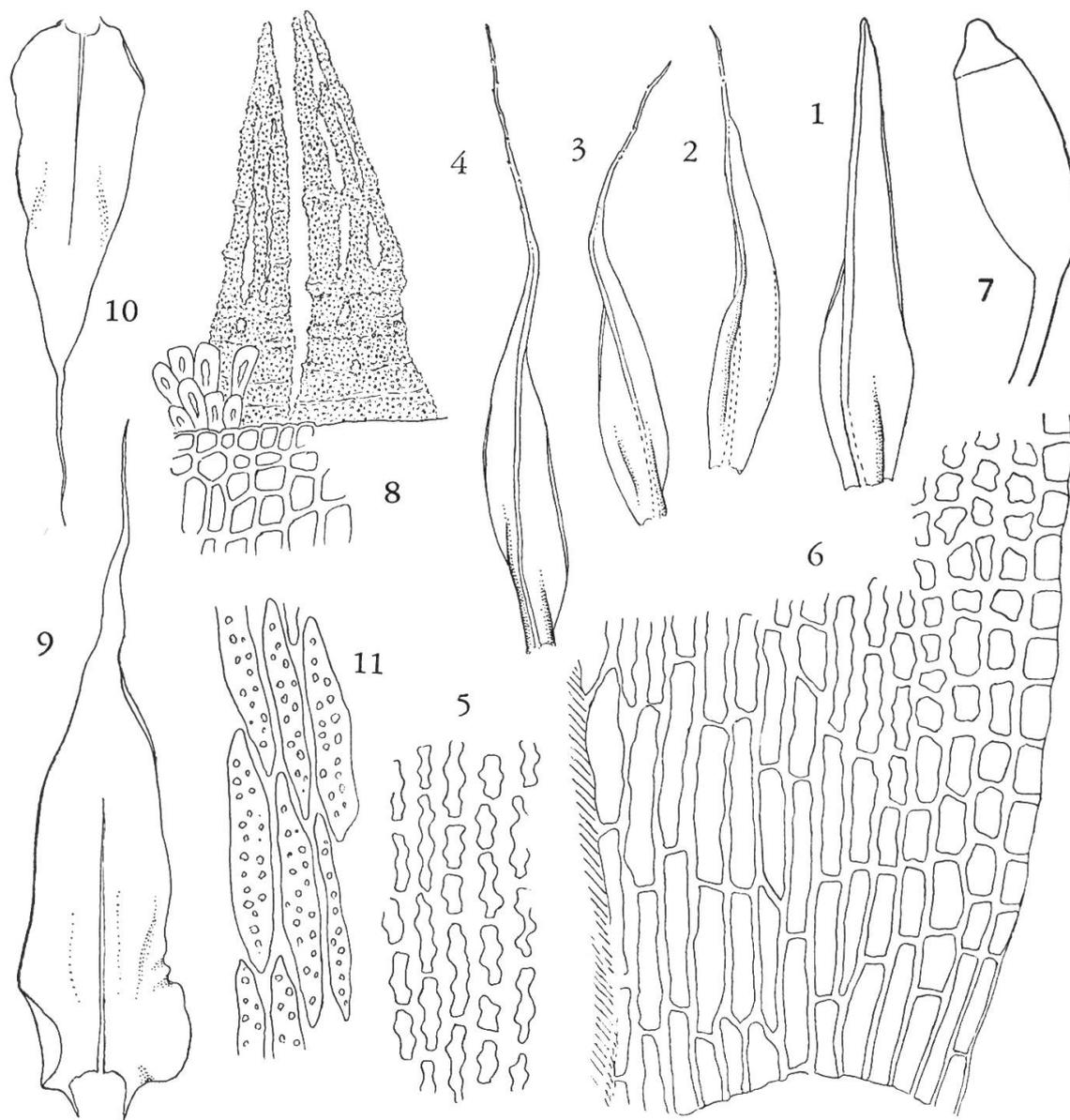
NEPAL: Moraine, near Lobuje (27°57', 86°49'), alt. 4870 m, April 2, 1952, *Zimmermann 301*-type, 304; moraine, near the base camp at Lobuje, alt. 5000 m, April 24, 1952, *Zimmermann 325*; near the base camp, in the direction of Lobuje, alt. 5100 m, May 31, 1952, *Zimmermann 558*.

OBS.: The present species is allied to *Grimmia pulvinata*, but is distinguished from the latter by the large and long, rectangular cells which occupy a broad area of the inferior part of leaves. The arcuate seta and the areolation of the leaf base serve to separate this species from *G. ovalis*, another allied species.

Grimmia ovalis (Hedw.) Lindb.

DISTR.: Europe, Caucasus, Himalayas, Nilghir, Ceylon, North East Asia, North America.

NEPAL: Lake-side camp, in the direction of Melungtse (28°01', 86°26'), alt. 4850 m, Sept. 29, 1954, *Zimmermann 1468*.



TAB. 2. *Grimmia subdoniana* Noguchi (fig. 1-8).

Papillaria capillacea Noguchi (fig. 9-11).

1-4, leaves, $\times 24$ - 5, cells from middle of leaf, $\times 300$ - 6, basal angle of leaf, $\times 300$ - 7, capsule, $\times 18$ - 8, peristome teeth, $\times 162$ - 9, stem leaf, $\times 24$ - 10, branch leaf, $\times 24$ - 11, cells from middle of leaf, $\times 462$.

Grimmia spec.

NEPAL : Moraine, nr. the base camp at Lobuje, alt. 5100 m, April 24, 1952, *Zimmermann 324a*; near the camp I, alt. 5300 m, May 19, 1952, *Zimmermann 525a*.

OBS.: These collections are sterile and fragmental so that they cannot be identified with any species.

Rhacomitrium crispulum Hook. f. & Wils.

NEPAL : Namche Bazar (27°49', 86°43'), alt. 3650 m, Oct. 15, 1954, *Zimmermann 1698*; between Tanga (27°39', 86°37') and Lizebou, on a mountain pass, alt. 4000 m, June 14, 1952, *Zimmermann 815a*; Gaurisankar (27°58', 86°20'), alt. 4200 m, Oct. 2, 1954, *Zimmermann 1558*; Tascho, on rocks, alt. 4300 m, June 2, 1952, *Zimmermann 603e*; Hadengi La (27°55', 86°25'), alt. 4760 m, Sept. 26, 1954, *Zimmermann 1457*; Gaurisankar, lake-side camp, alt. 5000 m, Oct. 3, 1954, *Zimmermann 1575, 1576*; Chouk Pula pass (27°56', 86°48'), on rocks, alt. 5000 m, April 19, 1952, *Zimmermann 293*; nr. the base camp, on rocks, alt. 5250 m, April 23, 1954, *Zimmermann 312*; valley of Yeti, alt. 5300 m, May 29, 1952, *Zimmermann 539b*; near the base camp, alt. 5300 m, May 29, 1952, *Zimmermann 539*; *ibid.* alt. 5420 m, May 29, 1952, *Zimmermann 544b*; hill west of the base camp, alt. 5150 m, April 23, 1952, *Zimmermann 309*; *ibid.* Alt. 5450 m, April 23, 1952, *Zimmermann 315*.

OBS.: This species seems to be common in the higher stations of Nepal. According to BARTRAM (*Lloydia* 5:258. 1942) *Rhacomitrium javanicum* known from Java, Borneo, Formosa, Himalayas, Yunnan and Ceylon is identical with *R. crispulum*.

The length of the hyaline hairpoint varies considerably: frequently it is long and conspicuous, and gives the plant a striking, silvery gray appearance. The collections with the hairpoint of this type are *Zimmermann 293, 603e, 815a, 1558, 1576*.

Concerning the geographical range of this species CLIFFORD (*Bryologist* 58: 333. 1955) mentions: *The general distribution of R. crispulum may be taken as circum-polar in the south with two northward projecting arms. One of these follows the Andean chain through South America to Guatemala while the other includes New Zealand, the Eastern Highlands of Australia and the mountains of New Guinea, Sumatra, Java and Borneo..., but the records from Asia were too few to justify mapping the distribution...*

Rhacomitrium fasciculare (Hedw.) Brid.

DISTR.: Europe, East Siberia, Japan, North America.

NEPAL : Beding (27°55', 86°21'), alt. 3600 m, Sept. 22, 1954, *Zimmermann 1413*; Chouk Pula pass (27°56', 86°48'), on rocks, alt. 5000 m, April 19, 1952, *Zimmermann 291a*.

Rhacomitrium heterostichum (Hedw.) Brid.

DISTR.: Europe, Azor, Madeira, Japan, North America, New Zealand, Tasmania.

NEPAL: Chouk Pula pass, alt. 5000 m, April 19, 1952, *Zimmermann 292*; near the base camp, entrance of the valley of Yeti, alt. 5350 m, May 29, 1952, *Zimmermann 540c*; near the camp I, alt. 5400 m, May 19, 1952, *Zimmermann 527b*; nr. base camp, alt. 5450 m, April 23, 1952, *Zimmermann 315a*.

var. **sudeticum** (Funck.) Jones.

DISTR.: Europe, Caucasus, Japan, North America.

NEPAL: Nr. the base camp, alt. 5450 m, April 23, 1952, *Zimmermann 315b*.

FUNARIACEAE

Funaria hygrometrica Hedw.

DISTR.: Cosmopolitan.

NEPAL: Between Mānga-Deorali (near Charikot) and Namdu, roadside, alt. 2300 m, April 3, 1952, *Zimmermann 156*; Lakhop ($27^{\circ}23'$, $86^{\circ}33'$), alt. 2840 m, Nov. 1, 1954, *Zimmermann 1977*; Bhote Kosi, Satama, alt. 3400 m. Oct. 14, 1954, *Zimmermann 1656*.

SPLACHNACEAE

Tayloria hornschuchii (Grev. & Arn.) Broth.

DISTR.: Europe, North America.

NEPAL: Between Lobuje ($27^{\circ}57'$, $86^{\circ}49'$) and Kārpo ($27^{\circ}56'$, $86^{\circ}52'$), alt. 4850 m, April 25, 1952, *Zimmermann 333*.

Tetraplodon mnioides (Hedw.) BSG.

DISTR.: Widely distributed in the northern hemisphere and at high altitude of the tropics.

NEPAL: Chukhung ($27^{\circ}55'$, $86^{\circ}52'$), alt. 4650 m, April 27, 1952, *Zimmermann 354*.

OBS.: The plants are sterile and form very compact cushions.

Tetraplodon urceolatus BSG.

DISTR.: Europe, Caucasus, Himalayas, North America.

NEPAL: Between Lobuje and Kārpo, alt. 4850 m, April 25, 1952, *Zimmermann 330*.

OBS.: The plants bear old capsules. The setae are about 7 mm long.

BRYACEAE

Mielichhoferia nitida Hornsch.?

NEPAL: Near the base camp, in crevices of rocks, alt. 5220 m, May 30, 1952, *Zimmermann 555a*.

OBS.: Compared with European plants these have a narrower leaf acumen. Unfortunately the material is sterile.

Pohlia cruda Hedw.

DISTR.: Almost cosmopolitan.

NEPAL: Melung La (27°58', 86°30'), alt. 5000 m, Oct. 9, 1954, *Zimmermann 1597a*.

Pohlia crudoides (Sull. & Lesq.) Broth.

DISTR.: Europe, North America.

OBS.: A mountain near Lobuje (27°57', 86°49'), alt. 5230 m, May 31, 1952, *Zimmermann 575b*.

Pohlia elongata Hedw.

DISTR.: Northern hemisphere.

NEPAL: Monjo (27°47', 86°44'), alt. 2760 m, Oct. 26, 1954, *Zimmermann 1844a*; Ringmo (27°35', 86°36'), on the ground, alt. 2700 m, Oct. 30, 1954, *Zimmermann 1956a*; between Lobuje and Kārpo, alt. 4860 m, April 25, 1952, *Zimmermann 334*.

Pohlia longicollis (Heldw.) Lindb.

DISTR.: Northern hemisphere.

NEPAL: Pheriche (27°54', 86°49'), alt. 4300-4400 m, April 17, 1952, *Zimmermann 278g*.

Bryum argenteum Hedw.

DISTR.: Cosmopolitan.

NEPAL: Gaurisankar (27°58', 86°20'), alt. 4450 m, Oct. 9, 1954, *Zimmermann 1567*; Chukhung (27°55', 86°52'), in the bottom of the ravine, alt. 4700 m, April 27, 1952, *Zimmermann 357a*.

Bryum capillare Hedw.

DISTR.: Northern hemisphere.

NEPAL: Phuleli (27°34', 86°39'), near Tāksindu (27°35', 86°38'), alt. 2050 m, Oct. 29, 1954, *Zimmermann 1948*.

MNIACEAE

Mnium longirostre Brid.

DISTR.: Almost cosmopolitan.

NEPAL: Ghāt (27°43', 86°43'), alongside Chaunrikharka (27°42', 86°43'), alt. 2600 m, May 9, 1952, *Zimmermann 453f*.

AULACOMNIACEAE

Aulacomnium palustre (Hedw.) Schwaegr.

DISTR.: Almost cosmopolitan.

NEPAL: Dingboche (27°54', 86°50'), stream-side, alt. 4460 m, April 28, 1952, *Zimmermann 361*.

MEESEACEAE

Meesia triquetra (Hedw.) Aong.

NEPAL: Namche Bazar (27°49', 86°43'), in the direction of the Dudh Kosi, alt. 3200 m, Oct. 17, 1954, *Zimmermann 1730*.

OBS.: In this species the sporophyte seems to exhibit vast variations, not only in the length of setae but also in the size of capsules. The Nepalese collection seems to bear smaller sporophytes than usual. The longest seta is only about 5 cm in length in comparison to 10 cm in a Russian collection, which I have studied. Other than the Nepalese collection, only two are at hand, one of which came from near Mosqua and the other from Amur district, East Siberia. They are larger than the Nepalese plants and bear longer and larger capsules. I have, however, been unable to find any valid differences between them, except, the size of sporophyte.

This species is widely distributed in the subarctic zone of the Northern Hemisphere; elsewhere it occurs in several disjunct localities. According to GAMS (*Man. Bryol.*: 301. 1932) and GODWIN & RICHARDS (*Rev. Bryol. Lich.* 5:127. 1946) the geographical range of this species in the early Post-glacial period covered a wider area than at the present time.

BARTRAMIACEAE

Anacolia sinensis Broth.

DISTR.: Himalayas, Yunnan.

NEPAL: A mountain near Thyāngboche (27°51', 86°46'), among rocks, alt. 4000 m, June 4, 1952, *Zimmermann 661B*; Taweche (27°54', 86°46'), rock-cliff, alt. 4300 m, June 2, 1952, *Zimmermann 603b*; a mountain, west of Lobuje (27°57', 86°49'), rock-cliff, alt. 5180 m, May 31, 1952, *Zimmermann 572*.

OBS.: The genus *Anacolia* is found in the mountainous regions of the tropics or subtropics, where it is represented by a few species. The discovery of a species of *Anacolia* in Nepal is of much interest. This species was first described by BROTHERUS from the specimens collected in Yunnan and Szechwan. Although they are sterile, the collections cited above agree well with BROTHERUS' description.

***Bartramia ithyphylla* Brid.**

DISTR.: Europe, Siberia, Kamchatka, North America, Japan, Formosa.

NEPAL: Melingo, near Thyāngboche (27°51', 86°46'), alt. 3650 m, April 28, 1952, *Zimmermann* 365; on the way up to camp I, alt. 5400 m, May 19, 1952, *Zimmermann* 527.

***Philonotis lutea* Mitt.**

DISTR.: Sikkim, Japan.

NEPAL: Imja Khola, near Thyāngboche, alt. 3100 m, Oct. 20, 1954, *Zimmermann* 1773.

***Philonotis fontana* (Hedw.) Brid.**

DISTR.: Northern hemisphere.

NEPAL: Taweche (27°54', 86°46'), alt. 4300 m, April 17, 1952, *Zimmermann* 277.

OBS.: *Philonotis fontana* and *P. lutea* are very closely allied, and further researches may indicate that the latter should be reduced to a synonym under the former.

ORTHOTRICHACEAE

***Amphidium mougeotii* (BSG.) Schimp.**

DISTR.: Europe, Caucasus, Japan, North America.

NEPAL: Taweche, alt. 4300-4400 m, April 17, 1952, *Zimmermann* 278e; in the bottom of the ravine of Chukhung (27°55', 86°52'), on tombstone, alt. 4700 m, April 27, 1952, *Zimmermann* 357.

Uloa spec.

NEPAL: Melung La Pass (27°58', 86°30'), among rocks, alt. 5150 m, Oct. 7, 1954, *Zimmermann* 1587a.

OBS.: As the plant is sterile, I prefer to let it remain unnamed.

TRACHYPODACEAE

Trachypus bicolor Reinw. & Hornsch.

DISTR.: Ceylon, Himalayas, Indonesia, China, Philippines, Formosa, Japan.

NEPAL: A mountain west of Lobuje (27°57', 86°49'), alt. 5180 m, May 31, 1952, *Zimmermann 574*.

OBS.: This species is most luxuriant in the mountainous regions of the tropics and subtropics.

Trachypodopsis auriculata (Mitt.) Fleisch.

DISTR.: Himalayas, Formosa, Hawaii.

Chaurikharka Kosi, on decayed logs, alt. 2700 m, May 9, 1952, *Zimmermann 459*.

Trachypodopsis serrulata var. **crispatula** (Hook.) Zant.

DISTR.: Himalayas, Yunnan, China, India, Ceylon, Philippines, Formosa, Mexico, Guatemala.

NEPAL: Taksindu (27°35', 86°38'), alt. 2700 m. Oct. 29, 1954, *Zimmermann 1951*; Bhote Kosi, on the way to Monjo (27°47', 86°44'), alt. 2820 m, June 9, 1952, *Zimmermann 728b*; Dudh Kosi, alt. 2830 m, May 2, 1952, *Zimmermann 394b*.

OBS.: The intraspecific variations of *Trachypodopsis serrulata* were fully discussed by VAN ZANTEN (*Blumea* 9:517. 1959).

var. **guilbertii** (Thér. & P. Varde) Zant.

NEPAL: Ghāt (27°43', 86°43'), among rocks, alt. 2640 m, June 11, 1952, *Zimmermann 753a*.

OBS.: The short, elliptical cells characteristic of this variety are present across the whole leaf except for the marginal bands of several elongate cells along the median portion. These short cells descend along the costa, reaching nearly to the base, but become elongate at the basal angles.

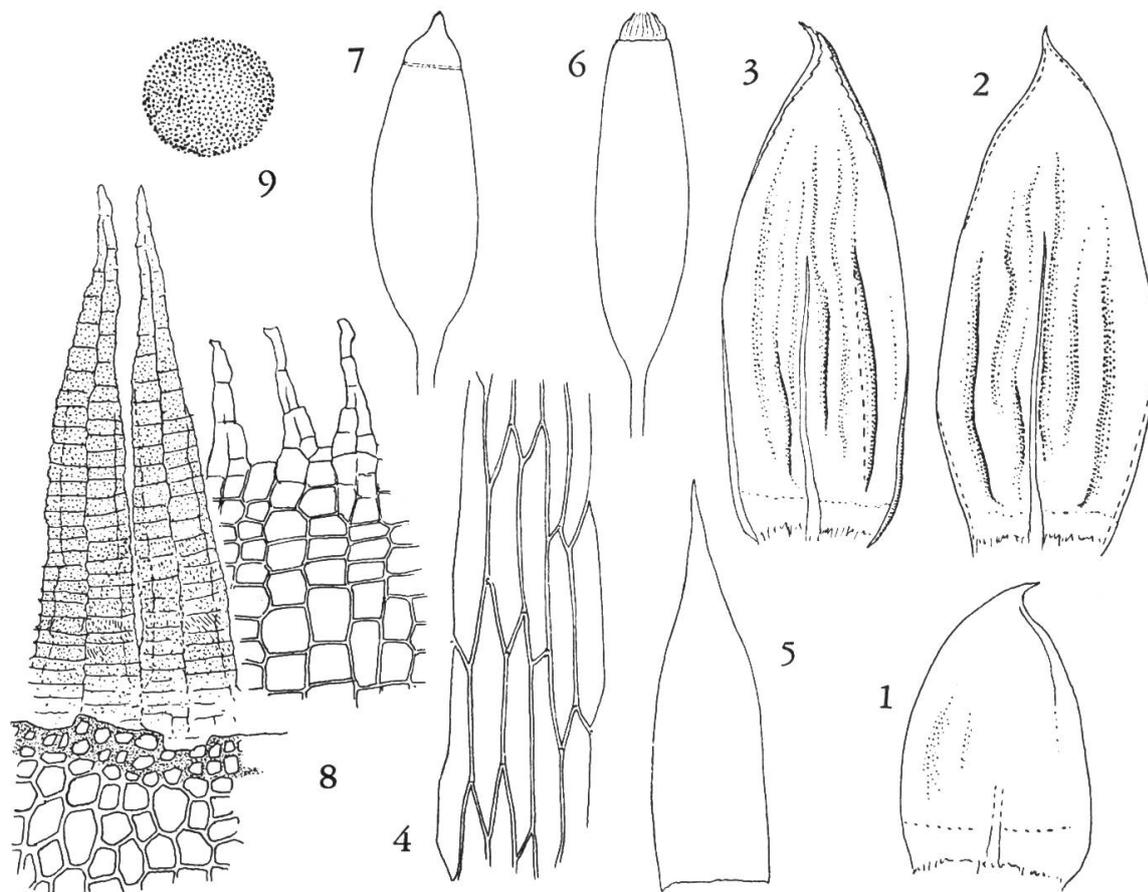
This variety has hitherto been known only from Cambodia and Vietnam, but its occurrence in Nepal makes a wide distribution in the Himalayas.

METEORACEAE

Papillaria capillacea Noguchi, spec. nov. (Tab. 2).

Planta fuscescenti- superne lutescenti-viridis, haud nitida. *Caules* secundarii flexuosi, elongati, ca 10 cm longi, densiuscule foliosi, haud complanati, superne attenuati, laxe ramosi, ramis basilaribus elongatis ca 3-4 cm longis, parce ramulosis, superioribus brevioribus

simplicibus, apice obtusis vel attenuatis. *Folia* caulina sicca laxe adpressa, madida erecto-patentia, ovato-oblonga raptim flexuosum piliferum attenuata, basi cordata alaribus decurrentibus, concava, longitudinaliter plicata, ad 2.7×0.65 mm, marginibus subintegris vel remote crenulatis, costa tenuissima ad medium folii evanida, pellucida, cellulis pellucidis, medianis oblongo-hexagonis vel sublinearibus, parietibus hic illic crassis, minute denseque papillois (plerumque ca 2-seriebus), papillis irregularibus, $53-65 \times 6-8.5\mu$, basilaribus latioribus, laevibus, hyalinis. *Folia* caulina apicalia et ramea minora.



TAB. 3. *Rozea pterogonioides* (Hook.) Jaeg.

1, stem leaf, $\times 36$ - 2, 3, branch leaves, $\times 36$ - 4, cells from middle of branch leaf, $\times 462$ - 5, inner perichaetial bract, $\times 24$ - 6, 7, capsules, $\times 13$ - 8, peristome, $\times 162$ - 9, spore, $\times 462$.

NEPAL : Between Monjo ($27^{\circ}47'$, $86^{\circ}44'$) and Benkar ($27^{\circ}46'$, $86^{\circ}43'$), alt. 2700 m, Oct. 26, 1954, *Zimmermann 1846*.

OBS.: This species seems to be allied to *P. formosana*, but in the former the leaves are ovate oblong, in contrast to the ovate leaves of the latter species, and the areolation of leaves makes them more hyaline,

Papillaria fuscescens (Hook.) Jaeg.

DISTR.: Ceylon, Himalayas, Yunnan, Malaya, Indonesia, Philippines.

NEPAL: On the way up to Risingo (27°37', 85°54'), alt. 2000 m, April 1, 1952, *Zimmermann 133a*; between Iksa (27°38', 86°10') and Those (27°35', 86°17'), alt. 2150 m, April 5, 1952, *Zimmermann 170a*; between Iksa and Sikrigāon, alt. 2370 m, April 5, 1952, *Zimmermann 171a*; between Those and Chyāngma, alt. 1750 m, April 5, 1952, *Zimmermann 181a*; Kharte, alt. 2000 m, Nov. 2, 1954, *Zimmermann 1902/1a*.

Papillaria semitorta (C. Müll.) Jaeg.

DISTR.: India, Indonesia.

NEPAL: Between Those and Chyāngma, alt. 1750 m, April 6, 1952, *Zimmermann 182a*.

Meteorium buchanani (Brid.) Broth.

DISTR.: Ceylon, Himalayas, Yunnan.

NEPAL: Benkar (27°46', 86°43'), on ferns, alt. 2670 m, May 8, 1952, *Zimmermann 443*.

OBS.: This collection is larger and bears leaves more concave than usual.

Meteorium helminthocladum (C. Müll.) Fleisch.

DISTR.: Oriental Asia.

NEPAL: Namche Bazar, alongside the Dudh Kosi, alt. 2850 m, Oct. 17, 1954, *Zimmermann 1750A*; along side the Bhote Kosi, alt. 2860 m, May 2, 1952, *Zimmermann 390b*.

Aerobryidium filamentosum (Hook.) Fleisch.

DISTR.: Ceylon, Himalayas, Yunnan, Setschwan.

NEPAL: Alongside the Bhote Kosi, alt. 2860 m, May 2, 1952, *Zimmermann 391*.

Aerobryidium punctulatum (C. Müll.) Dixon.

DISTR.: Ceylon, Himalayas.

NEPAL: Between Iksa (27°38', 86°10') and Those (27°35', 86°17'), alt. 2150 m, April 5, 1952, *Zimmermann 170*.

Barbella stevensii (Ren. & Card.) Fleisch.

DISTR.: Himalayas.

NEPAL: Mānga-Deorali (between Risingo and Charikot) Pass, alt. 2195 m, April 2, 1952, *Zimmermann 154a*.

Barbella pendula (Sull.) Fleisch.

DISTR.: Ceylon, Sumatra, Java, China, Formosa, Japan, North America.

NEPAL: Nr. Benkar ($27^{\circ}47'$, $86^{\circ}43'$), along side the Bhote Kosi, alt. 2685 m, May 7, 1952, *Zimmermann 433c*.

Meteoriopsis ancistrodes (Ren. & Card.) Broth.

DISTR.: Himalayas, East Asia.

NEPAL: Khärte, alt. 2000 m, Nov. 2, 1954, *Zimmermann 1902/1*.

Meteoriopsis reclinata (C. Müll.) Fleisch.

DISTR.: Ceylon, Himalayas, Java, Celebes, Philippines, Formosa, Japan.

NEPAL: Chyaubas ($27^{\circ}37'$, $85^{\circ}47'$), at the base of rock-cliff facing north, alt. 1890 m, March 31, 1952, *Zimmermann 127*.

Meteoriopsis squarrosa (Hook.) Fleisch.

DISTR.: Himalayas, India, Ceylon, Malakka, Sumatra, Java.

NEPAL: Mānga Deorali Pass (between Risingo and Charikot), alt. 2195 m, April 2, 1952, *Zimmermann 154b*.

Floribundaria floribunda (Doz. & Molk.) Fleisch.

DISTR.: Widely distributed in the tropics of the old world.

NEPAL: On the way down to Tāksindu ($27^{\circ}35'$, $86^{\circ}38'$), alt. 2470 m, April 10, 1952, *Zimmermann 234b*.

NECKERACEAE

Homaliodendron montagneanum (C. Müll.) Fleisch.

DISTR.: Himalayas, Indonesia.

NEPAL: Alongside the Dudh Kosi, alt. 2850 m, May 2, 1952, *Zimmermann 394*.

Homaliodendron scalpellifolium (Mitt.) Fleisch.

DISTR.: Ceylon, India, Vietnam, Setschwan, Formosa, Japan.

NEPAL: Ghāt ($27^{\circ}43'$, $86^{\circ}43'$), alongside the Chaunrikharka Khola, on old tree trunks, alt. 2600 m, May 9, 1952, *Zimmermann 453a*.

FABRONIACEAE

Schwetschkeopsis formosana Nog.

DISTR.: Formosa.

NEPAL: Melingo, near Thyāngboche (27°51', 86°46'), alt. 3650 m, April 28, 1952, *Zimmermann 366b*; Orchia, alt. 3950 m, April 28, 1952, *Zimmermann 362*.

OBS.: Although the plants are sterile, the alar cells of the leaves show that they belong to *Schwetschkeopsis*. Because the sporophyte of this species is unknown the generic position of this interesting moss is a rather tentative one.

THUIDIACEAE

Claopodium nervosum (Harv.) Fleisch.

DISTR.: Ceylon, Himalayas, Java, Celebes, Hunan, Japan, Korea.

NEPAL: Near Banepa (27°37', 85°31'), amongst rhododendrons, alt. 1500-1560 m, March 30, 1952, *Zimmermann 105b*.

Thuidium cymbifolium Doz. & Molk.

DISTR.: India, Malaya, Indonesia, Philippines, Formosa, Japan.

NEPAL: Lumding Khola, alt. 2885 m, June 13, 1952, *Zimmermann 791c*; Sukhchauri Pass (27°04', 86°21') to the camp at Arindunga (26°58', 86°18'), alt. 800 m, Nov. 7, 1954, *Zimmermann s.n.*; between Okhaldhunga (27°19', 86°30') and Mānebhānjyāng (27°13', 86°27'), alt. 1700 m, Nov. 4, 1954, *Zimmermann 2023*; Okhaldunga to Ponkhu (27°16', 86°29'), alt. 1800 m, Nov. 4, 1954, *Zimmermann 2030B*; between Ghāt and Chaunrikharka, alt. 2700 m, Oct. 27, 1954, *Zimmermann 1871B*.

Thuidium delicatulum (Hedw.) Mitt.

DISTR.: Europe, Caucasus, Siberia, Amur, China, Japan, North America.

NEPAL: Between Thāmi (27°50', 86°39') and Pāre (27°49', 86°39'), alt. 3400 m, Oct. 12, 1954, *Zimmermann 1629A*.

Thuidium glaucinum Mitt.

DISTR.: Himalayas, India, Ceylon, Formosa, Japan.

NEPAL: Hill to the N-W of Banepa, amongst rhododendrons, alt. 1500-1560 m, March 30, 1952, *Zimmermann 105a*, mixed with *Thuidium cymbifolium*; Katmandu, alt. 1350 m, Sept. 3, 1954, *Zimmermann 1019B*.

Actinothuidium hookeri (Mitt.) Broth.*DISTR.*: Himalayas, Yunnan, Formosa.NEPAL: Buyand Pass to Buyand, alt. 2940 m, April 11, 1952, *Zimmermann 255*, 255M; Okhaldhunga, alt. 2910 m, Nov. 2, 1954, *Zimmermann 1983A*.**Abietinella abietina** (Brid.) C. Müll.*DISTR.*: Europe, Caucasus, Asia, North America.NEPAL: Ghāt (27°43', 86°43'), nr. Chaunrikharka, on old tree trunks, alt. 2600 m, May 9, 1952, *Zimmermann 453*; Gaurisankar (27°58', 86°20'), alt. 4200 m, Oct. 2, 1954, *Zimmermann 1557A*.

AMBLYSTEGIACEAE

Drepanocladus uncinatus (Hedw.) Warnst.*DISTR.*: Almost cosmopolitan.NEPAL: Between Chule (27°57', 86°36') and Tarangan (27°53', 86°38'), alt. 4500 m, Oct. 11, 1954, *Zimmermann 1612*.**Calliergon cordifolium** (Hedw.) Kindb.*DISTR.*: Europe, Siberia, Amur, North America, New Zealand.NEPAL: Chukhung (27°55', 86°52'), alt. 4470 m, April 27, 1952, *Zimmermann 350*.

BRACHYTHECIACEAE

Brachythecium flagellare (Hedw.) Jenn.*DISTR.*: Europe, Algeria, Caucasus, Asia, North America, New Zealand.NEPAL: Benkar (27°46', 86°43'), alongside the Bhote Kosi, on dead branches of trees, alt. 2670 m, May 8, 1952, *Zimmermann 442*.

ENTODONTACEAE

Entodon rubicundus (Mitt.) Jaeg. & Sauerb.*DISTR.*: Himalayas, East Asia.NEPAL: Katmandu, alt. 1350 m, Sept. 3, 1954, *Zimmermann 1007A*.

Rozea pterogonioides (Hook.) Jaeg. (Tab. 3).

Plants forming compact mats, brownish yellow, frequently reddish brown, less glossy. Stems creeping, denuded, densely branched. Branches suberect, arcuate, densely foliate, terete with the apex acute or obtuse, simple, up to 1-1.5 cm long, frequently new branches arising from the median part of preceding branches and turning to one side. Stem leaves ovate, acute and recurved at apex, about 0.7 mm long by 0.5 mm wide, the costa faint, barely reaching the middle of the leaf. Branch leaves strongly appressed when dry, obliquely spreading when moist, oblong, longitudinally, deeply 3-furrowed, up to 1.5 mm long by 0.6 mm wide, both apical and basal leaves of branches smaller, the costa single, reaching at least the middle of the leaf. Margins serrate and strongly recurved near apex, distinctly recurved at lower half. Leaf cells narrowly rhomboid-hexagonal or linear-rhomboidal, thin-walled, median cells $45-65 \times 4-5 \mu$, cells becoming shorter towards leaf base, distinctly loose and rectangular at bases and basal angles of leaves, brownish yellow, $20-35 \times 10-18 \mu$. Inner perichaetial bracts oblong with a lanceolate acumen, up to 1.5 mm long by 0.4 mm wide, the base brownish yellow, the costa none, cells linear. Sporogonium on branches, seta 12-15 mm long, 0.15 mm wide, brown, straight or nearly so. Capsule erect, oblong-cylindrical, brown, $1.8-0.65 \times 2-0.7$ mm, annulus none. Peristome well-developed, exostome teeth linear-lanceolate, yellowish, paler upward, densely and minutely papillose, frequently striated by chains of minute papillae at lower part, about 0.3 mm long, the inner peristome thin, hyaline colourless, indistinctly papillose, the basal membrane high, reaching half the length of exostome teeth, the processes much shorter than exostome teeth. Spores globosae, densely and minutely papillose, $18-25 \mu$. Operculum conical or conic-mucronate, about 0.4 mm high.

DISTR.: Himalayas, Yunnan, Burma.

NEPAL: Melingo, near Thyāngboche ($27^{\circ}51'$, $86^{\circ}46'$), alt. 3650 m, April 28, 1952, *Zimmermann 364f*.

OBS.: The genus *Rozea* occurs in two widely separated areas, Mexico and Yunnan to Himalayas, a pattern of distribution that is very interesting. *R. pterogonioides* seems frequent in the Eastern Himalayas.

HYPNACEAE

Pylaisia aurea (Hook.) Broth.

DISTR.: Himalayas.

NEPAL: Melingo, near Thyāngboche, alt. 3650 m, April 28, 1952, *Zimmermann 364a*.

Hypnum plumaeforme Wils.

DISTR.: China, Vietnam, Formosa, Korea, Japan.

NEPAL: Between Chyaubas ($27^{\circ}37'$, $85^{\circ}47'$) and Risingo ($27^{\circ}37'$, $85^{\circ}54'$), amongst rhododendrons, alt. 2020 m, April 1, 1952, *Zimmermann 129 a*; between Thyāngboche ($27^{\circ}51'$, $86^{\circ}46'$) and Pangboche ($27^{\circ}52'$, $86^{\circ}48'$), alt. 3780 m, April 17, 1952, *Zimmermann 275*.

Hypnum nakaoanum Ando, mss.

DISTR.: Himalayas.

NEPAL: Melingo, near Thyāngboche, alt. 3650 m, April 28, 1952, *Zimmermann 368f*; Thyāngboche, alt. 3680 m, June 3, 1952, *Zimmermann 647a*; near Khumjung (27°49', 86°43'), alt. 3820 m, June 7, 1952, *Zimmermann 703a*; Dingboche (27°54', 86°50'), alt. 4300 m, April 26, 1952, *Zimmermann 345*; Pheriche (27°54', 86°49'), alt. 4300-4400 m, April 17, 1952, *Zimmermann 278d*; Lobuje (27°57', 86°49'), alt. 5230 m, May 31, 1952, *Zimmermann 575a* (det. H. Ando).

Pleurozium schreberi (BSG.) Mitt.

DISTR., Cosmopolitan.

NEPAL: Kyāngshar Khola, alt. 2845 m, May 7, 1952, *Zimmermann 425d*.

Rhytidium rugosum (Hedw.) Kindb.

DISTR.: Europe, Caucasus, Asia, North America.

NEPAL: Near the base camp, on the way to the ravine of Yeti, alt. 5170 m, May 29, 1952, *Zimmermann 547*; Lobuje, alt. 5230 m, May 31, 1952, *Zimmermann 575f*.

HYLOCOMIACEAE

Macrothamnium submacrocarpum (Hamp.) Fleisch.

DISTR.: Himalayas.

NEPAL: Descending towards Buyand, alt. 2820 m, April 11, 1952, *Zimmermann 256a*; Lumding Khola, alt. 3000 m, June 13, 1952, *Zimmermann 791Ba*.

