AUSTRAL HEPATICAE, XIX. SOME TAXA NEW TO NEW ZEALAND AND NEW CALEDONIA

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I. INTRODUCTION

A variety of antipodal taxa have been dealt with under the above title by myself, Dr. John E. Engel, or both of us joined in authorship. The present paper continues this tradition. A number of new records and new taxa are proposed so that the names and other documentation will be available for a joint work we proposed to issue on the Hepaticae of New Zealand. All types are to be deposited an the Field Museum of Natural History, Chicago.

II. ANEURACEAE (METZGERIALES)

1. Austral Aneura Species

Because of the simplicity in their organization, the species of Aneura are exceedingly difficult to study. An additional, inherent problem is that herbarium material -- especially when sterile -- is virtually useless for critical examination. Showalter (1926, 1928) has shown that in the protean A. pinguis, supposedly of subcosmopolitan range (cf. Schuster, 1983, p. 607), genetically incompatible races exist and one must almost conclude that such simplified species have undergone at least incipient speciation, with the structural simplification so marked that traditional means of separating species no longer exist. Under such conditions any attempts at taxonomic judgments are surely premature so long as they are based only on herbarium material. I venture to give the following preliminary notes chiefly because, having collected all but one of the taxa in the field, I believe that these entities represent real species. Unfortunately only fragmentary types have been seen, so that application of the several earlier names is, at this point, highly preliminary. A key for orientation follows:

KEY TO SOME AUSTRALASIAN TAXA OF ANEURA

1. Thalli devoid of gemmae. . . . . 2.

2. Oil-bodies few, usually (2-3)4-10(12) per cell, the larger granular, opaque, to 8-15 x 12-20 μ or even larger. Thalli translucent, pure green, not extremely brittle. Epidermal capsule-wall cells with thickenings (as in Riccardia) confined to adaxial walls.

subg. Lobatiriccardia Mizutani & Hattori. .3.

3. Thalli thin, relatively slight, margins never denticulate. Oil-

bodies (2-5)6-12 per cell. . . . . 4.

4. Thallus margins unistratose and decolorate, hyaline for 2-3(4) cell rows, shallowly crenulate. Oil-bodies (2-3)4-9(10) per cell, very variable, the largest 13-15 x 32-36 or 28 x 33 to 24 x 38 μ. Thalli firmer, larger, to 7.5-8.5 mm wide, but only 9-10 cells high. Calyptra not hairy, with scattered, irregular, multicellular "tubercles."

A. subaquatica Schust., sp. n.

4. Thallus margins neither unistratose nor decolorate. Oil-bodies (3-5)6-12 per cell, at most 8-10 x 12-15 to 15 x 20 μ. Thalli 3-6(7) mm wide but 10-15 cells high.

A. lobata subsp. australis Schust., subsp. n.

3. Thalli wide, to 10 mm wide or more, margins (especially toward apices) denticulate with blunt, 1-celled teeth. Oil-bodies 3-7(8) per cell usually, the larger 14 x 23 to 8-10 x 27 μ.

A. gigantea Schust., sp. n.

2. Oil-bodies numerous [usually (7-12)13-25, or even 40-50 per cell], minute, glistening or obscurely few-segmented, under 4-6 x 6-8 μ, usually much smaller. Thalli opaque, yellow-green, brittle, with smooth margins that may be sharp or blunt. Epidermal capsule-wall cells with longitudinal radial walls with thickenings of both faces. . . . . 5.

5. Shoot calyptra ± clavate, rounded at the summit, hairy, with bristles or trichomes, at least prior to maturity.

A. pinguis (L.) Dum.

5. Shoot calyptra cylindrical, the apex rounded-truncate, with a depressed umbilicus, much as in Liochlaena lanceolata.

A. novaecaledoniae Schust., sp. n.

1. Thalli developing parenchymatous, pluricellular gemmae from stalk cells originating from dorsal epidermal cells.

subg. Austroaneura Schust., subg. n. [A. kaguensis Hewson]

Aneura subaquatica Schust., sp. n. Species A. lobatae s. lat. similis thallo tenui, marginibus non denticulatis. Distincta ut: marginibus unistratosis hyalinisque per 2-3(4) ordines cellularum, exiliter crenulatis; guttae olei variantes plerumque 4-9 omni in cellula, maximis 24-28 x 33-38 μm; thallo latiore (usque ad 8.5 mm lat.) tenuiore autem, solum 9-10 cellulis alt.

Type. New Zealand, North Island: Lake Rotoiti (RMS 84-2962b).

Aneura lobata subsp. australis Schust., subsp. n. Subspecies cuius thalli crassiores quam in subsp. lobata (10-15 cellulis alt.); sporae maiores (16.5-19 µm); guttae olei numerosiores (plerumque 6-12 omni in cellula); aliter subsp. lobatae similis.

Type. New Zealand, South Island: Fox Glacier (RMS 48358).

This plant is discussed in some detail in Schuster (1964, pp. 214-15), where it is stated the discrepancies may "prove adequate to separate the New Zealand plant as a subspecies."

Aneura gigantea Schust., sp. n. Species a A. lobata et A. subaquatica differens ut thallus latior (10-12 mm vel plus lat.) in margine denticulatus, dentibus unicellularibus.

Type. New Zealand, South Island: Purakanui Falls, Otago (RMS 84-2454).

Aneura novaecaledoniae Schust., sp. n. Species A. pingui similis ut thallus opacus, rigidus, flavovirensque; distincta calyptra surculi levis cylindricaque, apex rotundo-truncatus, et umbilicus depressus.

Type. New Caledonia: Mandjélia, above Puebo, 20°24' S., 600-700 m. (RMS 84-4196).

Growing as a pioneer over rocks and boulders in the bed of a deeply shaded rivulet, forming flat, closely adnate patches. It is distinct from all other Aneura species I have seen in the peculiar, chimney-like shoot calyptrae which are reminiscent of the perianths of Liochlaena lanceolata.

Aneura subg. Austroaneura Schust., subsp. n. Subgenus subg. Aneurae simile magnitudine vigente, thallo solido opacoque et ramificatione sparsa; distinctus a subsp. Aneura et ex omnibus aliis Aneuraceis gemmis stipitatis singulis, parenchymatis, pluricellularibus superficii thalli.

Type. A. kaguensis Hewson.

2. Dendroceropsis Schust. and Hyaloneura Schust., new subgenera of Riccardia.

The intrageneric classification of Riccardia remains chaotic. A clearer comprehension of the genus will come about only after the genus is divided into natural groups, subgenera and sections, so that the numerous species can be given some comprehensible organization. In 1964 I proposed Phycaneura and Anomaneura for isolated austral elements; Hässel (1972), in a major paper on temperate-subantarctic South American taxa, proposed additional subgenera [Arceoneura Häss., Trichothallia Häss., Lophoneura Häss., Spinella (Schiffn. & Gott.)

Hässs.]. The bulk of taxa, however, remain simply assigned to Riccardia, without subgeneric placements. Furthermore, some of the Hässel subgenera will need major emendations, since the Australasian taxa, in several cases, do not fit well into her groups, as currently defined. For the moment, two subgenera, one occurring from Malaysia to New Guinea (subg. Hyaloneura), the other an alpine in New Zealand (Dendroceropsis), need to be segregated.

Riccardia subg. Dendroceropsis Schust., subg. n.

Cellulae thalli epidermales (a sectionibus transversis visae) a cellulis interioribus discriminatae, ut in Spinella et Arceoneura. Subgenus novus a his differens ut (a) cellulae epidermales globosae ad ovoideas ad digitiformes, extremitatibus rotundatis tantummodo discretis, thallo itaque plus minusve mammillato; cellulae thalli ventrales non discriminatas; (b) thallus axem principalem non determinate elongatum 1.8-3 mm lat., habens, axes secondarios (et partim tertiarios) efficiens, qui proiectiones laterales ferunt, et qui lamellati, cellulis hyalinis sine chloroplastis uno in strato iacentibus; (c) dentes marginales, et pinnae ultimatae et margines thalli crispati et/aut sinuosi.

Type [and only] species. R. pseudodendroceros Schust., sp. n. [The above diagnosis represents a descriptio generico-specifica.] Type. Paparoa Range, near Mt. Euclid, 4300-4400 ft, in tussock zone, South I., New Zealand (RMS 84-1503).

Occurring at the bases of snow tussock culms; with the aspect of Dendroceros -- and wholly unlike any Riccardia in appearance. Indeed, initially regarded as a sterile Dendroceros and, as such, much of the material was discarded in the field!

Riccardia subg. Hyaloneura Schust., subg. n.

Subgenus subgeneri Riccardiae simile ut cellulae epidermales a cellulis internis non valde differentiatae quamquam magnitudine multo inferiores. A Riccardia distinctum ut (a) thalli vigentes, 2.5 mm lat. x 3 cm vel plus long., solum, autem, ca. 4 cellulis alti; (b) thallus perspicue applanatus, sectionibus transversis usque ad 20 plo latioribus quam altae; (c) margines thalli per cellulas hyalinas sine chlorophyllo, quae ut limbus differentiales, valde praetexti; hic limbus e cellulis oblique aut perpendiculariter margine elongatis formatus.

Type. R. albo-marginata (Steph.) Schiffn. Also R. argento-limbata Hews. & Grolle here.

Both this subgenus and Dendroceropsis agree in the distinct border of chlorophyll-free cells forming a unistratose margin. In other respects the two groups are very different and the hyaline border has surely been independently evolved. Unfortunately, Dendroceropsis is largely sterile and even though I collected R. argento-limbata in

New Guinea, I was unable to find material with sporophytes. Both subgenera need further study.

I have not seen living plants of Hyaloneura, except in the field, so have no data as to oil-bodies. In Dendroceropsis, however, the gibbous epidermal cells bear, in ca. 25-40% of cases, a solitary oil-body, ca. 7 x 7-9 to 8-9 x 11-13 μ. The much larger hypodermal cells bear 1-2 larger oil-bodies [each 10-11 x 16 to 11-12(14) x 19-22 μ]. The hyaline marginal cells, although devoid of chloroplasts, typically bear oil-bodies.

III. ACROSCYPHUS Kitagawa, Acta Phytotax. Geobot. 35:1, 1984 (Balantiopsidaceae, Jungermanniales)

In 1964 Grolle described as new the genus Neesioscyphus and assigned here, aside from several neotropical taxa, a plant he described as N. phoenicorhizus Grolle, from New Zealand. Although this plant shares with Neesioscyphus the isophyllous gynoecium and the purely ventral-intercalary branching, it differs in the: (a) stem formed of rigid, almost bast-fiber-like cells; (b) large, Isotachis-like, but very shallowly bilobed underleaves; (c) purplish or intensely claret-red rhizoids; (d) lateral leaves not bilobed but irregularly 3-4-toothed; (e) small leaf cells, 13-18 x 20-24 μ, evenly thick-walled; (f) secondary pigments of cell walls, aside from rhizoids, at least in part brownish, never reddish, although stem cortex in part reddish. Grolle expressed his doubts that this plant really fitted into Neesioscyphus, but stated that its proper systematic position could be established only after sporophytes and androecia were found. Study of living material of A. nitidissimus Schust., sp. n., has shown that it possesses (0)1-2 highly glistening, homogeneous oil-bodies per cell and that it (and presumably also the other species I refer to Acroscyphus) thus differs from all other members of the Balantiopsidaceae (incl. Isotachidaceae) in this respect. Even though, provisionally, I retain Acroscyphus in the Balantiopsidaceae, this is based on ignorance rather than on conviction.

The above lines were written in early 1984, and I there assigned 3 of the 4 species in the following key to a new genus "Austroscyphus." When the present MS was about to be sent for publication, Dr. J. J. Engel provided me with a xerox of tne May 1984 paper by Dr. N. Kitagawa, describing Acroscyphus. It is an extraordinary coincidence that the two of us should, independently, conclude that such a taxon exists -- and even adopt, independently, generic epithets of such similarity. My concept, as the above lines indicate, was buttressed by the discovery that the genus had homogeneous oil-bodies; Kitagawa's was based on a much fuller suite of features, for he had available ♂ and ♀ plants with young sporophytes, but not oil-bodies. The two independent studies thus fully corroborate the distinctness of the genus.

The coincidence is even more extraordinary because in Jan. 1984, in Vol. II of the New Manual of Bryology, I published a plate of Ruizanthus Schust., a bitypic genus known only from Venezuela

(Schuster, 1978, p. 240) which seems, clearly, the nearest ally of Acroscyphus. My figures of Ruizanthus (Schuster, 1984, fig. 61, p. 994) evidently were not yet available to Dr. Kitagawa when he published Acroscyphus since his fig. 1:6-7 demonstrates beyond a doubt that Ruizanthus and Acroscyphus are immediately allied. Indeed, one could consider the two genera to be merely subgenera of a single genus, were it not for the differences in the oil-bodies and rhizoid color. In Schuster (1984, p. 998) Ruizanthus is assigned to an autonomous subfamily of Balantiopsidaceae, the Ruizanthoideae Schust., principally on the basis of the short-ovoid capsules with nonspiral valves. I would predict that when mature capsules of Acroscyphus are found, this genus, like Ruizanthus, will prove to have nonspiral capsule valves. On that basis the two are here assigned to the Ruizanthoideae and are separated as follows:

1. Oil-bodies large, granular-botryoidal, 2-3(4) per cell. Antheridia ca. 4-5 per bract, with paraphyses. Rhizoids colorless. Ventral-intercalary stolons frequent. Leaves symmetrically (2)3-4-lobed or -cuspidate at apex. Stem with a differentiated cortex, in 1-2 layers, of small, thick-walled cells contrasted to the larger, leptodermous medullary cells.

Ruizanthus Schust.

1. Oil-bodies homogeneous, small, glistening (0-1)2 per cell. Antheridia 1 per bract, without paraphyses. Rhizoids magenta or claret-red. Ventral-intercalary stolons lacking. Leaves variable: unlobed, lobulate, or 2-4-lobulate at apex. Stem in cross section uniformly formed of thick-walled cells, all similar in diameter.

Acroscyphus Kitagawa

The two genera agree in, i.a. (a) exclusively ventral-intercalary branching; (b) fasciculate rhizoids from bases of the large, bifid underleaves; (c) succubous leaves, with cells firm-walled, often, locally, elongated and sometimes tiered; (d) ♀ bracts erect, mutually involute, identical to bracteole in size and similar in form; (e) antheridial stalk biseriate; (f) gynoecium erect, somewhat swollen below foot of sporophyte but, at best, developing an incipient marsupium; (g) perianth arising gradually (and almost imperceptibly) from a polystratose base [=? Isotachis-type perigynium]; (h) sporophyte with short-ovoid capsule, with erect valves (conjectural for Acroscyphus).

My "genus" Austroscyphus was based primarily on the following new species. It and A. tjiwideiensis agree in the exclusively brownish wall pigments of the gametophyte, aside from rhizoids, and in the broad, unlobed leaves. These two species appear to form a complex distinct at least at the sectional level from the type of Acroscyphus and for them I retain the epithet Austroscyphus. Four taxa belong to Acroscyphus, separable as follows:

1. Leaves wider than long, the apices rounded to rounded-truncate. Aside from rhizoids no reddish pigmentation, the stem cortex brown to brownish. Underleaves, or most of them, divided 0.3-0.45 by a

V-shaped sinus, the disk margins mostly with 1-2 strong teeth on each side, in lower half.

Sectio Austroscyphus Schust., sect. n. . . . . .2.

2. Cuticle smooth; leaves subrotundate to quadrate-rotundate, apex rounded to sinuous, basal margins edentate, with antical bases slightly decurrent. Median cells 12-14(15) x (28)32-40(42) μ, ± rectangulate, longer walls occasionally with an intermediate thickening. [New Zealand].

A. nitidissimus Schust., sp. n.

2. Cuticle finely but closely papillose, the rather soft-textured plants dull; leaves oblate to reniform-oblate, much wider than long, apex broadly rounded to sinuous, the dorsal margins often with 1-2 teeth near base, the postical margins usually with 1-2 (3) teeth; antical leaf base long-decurrent. Median cells with medium to large-sized trigones, not or little elongated, (25)28-37 x 28-38(42) μ, polygonal. [Java].

A. tjiwideiensis (Sde.-Lac.) Schust. & Engel, comb. n.

1. Leaves lingulate to lingulate-falcate, clearly longer than wide, apices mostly (2)3-4-5-toothed or lobulate, occasionally subentire. Secondary pigments, at least of stem, largely or entirely reddish. Cuticle smooth.

Sectio Acroscyphus Kitagawa. . . . . 3.

3. Leaves lobulate to subentire at apex; underleaves 0.12-0.2 bilobed, margins entire or with 1-2 low teeth of each side. ♀ Bracts subrectangulate, entire-margined in lower 0.5; perianth (juvenile) subentire. [New Zealand].

A. phoenicorhizus (Grolle) Schust. & Engel, comb. n.

3. Leaves sharply (2)3-4-lobed or lobulate at apex; underleaves 0.35-0.5 bifid, with mostly 1-3 coarse teeth on each side. ♀ Bracts narrowly ovate, margins with several conspicuous teeth, some of which arise from basal 0.5; perianth laciniate-lobulate at mouth. [New Caledonia].

A. iwatsukii Kitagawa

Acroscyphus sect. Austroscyphus Schust., sect. n.

Sectio a Neesioscypho differens ut (a) rhizoidea colore magentea aut vinaceae; (b) cauliculi rigidi, cellulis et medullae et corticis pachydermatis; (c) folia non bilobata, in culmine integra aut subintegra. A Clasmatocolea differens ut (1) rhizoidea pigmentifera; (2) eamificatio nonnisi ventrali-intercalaris.

Type. Acroscyphus nitidissimus Schust., sp. n.

Acroscyphus nitidissimus Schust., sp. n.

Plantae caespitosae, parce ramosae, omnes rami ventrali-inter-

calares, colore lignei ad brunneos, aspectu valde nitidi et politi. Folia concava anticaliter assurgentia conniventia, rotundo-quadrata, apice rotundato ad repandi-sinuosum, basibus anticalibus paululum decurrentibus, marginibus apicibusque edentatis. Amphigastria subquadrata, 0.35 bifida, sinu forma letterae V, lobis subacutis ad acutos, triangularibus, marginibus lateralibus 1-2-dentes grossos ad basim latos habentibus. Cellulae mediae basalesque 12-14(15) x (28)30-40(42) µm, pachydermatae; guttae olei (0)1-2 in omni cellula; lucentiae, homogeneae, 3-5 x 5-6 µm ad 3.2-3.5 x 3.2-4 µm. Rhizoidea in fasciculis e basibus amphigastriorum, colore vinacea aut magentea.

Type. New Zealand, South Island, Buller: Paparoa Range, NW. of Mt. Euclid, 4300-4500 ft (RMS 84-1423).

In the field this plant was regarded as something unique. The exceedingly shiny and polished-appearing gametophyte, erect in growth, with concave, unlobed and edentate leaves, antically connivent or assurgent, were highly distinctive. The combination of (a) leaf cells, in leaf middle and below, elongated, rectangular, occasionally locally tiered; (b) purely ventral-intercalary branching; (c) bifid and toothed underleaves, suggests a remote affinity to Balantiopsidaceae subf. Isotachidoideae. Yet the cells bear 2 (less often 1 or 0) small, glistening oil-bodies -- and such oil-bodies have not been seen in any other member of the Balantiopsidaceae (incl. Isotachidoideae). As a consequence, a very isolated element is surely at hand: a close affinity to Neesioscyphus seems unlikely to me. The edentate, wide leaves plus the deeply bifid underleaves with a sharp, V-shaped sinus, and 1-2 sharp, coarse lateral teeth of the disk margins, suggest A. tjiwideiensis (Sde.-Lac.) Schust. & Engel, comb. n.V This, however, is very different in the much broader leaves, strongly decurrent antically; in the roughened cuticle; and in the relatively thin-walled cells with distinct trigones.

The equally thick-walled cells, smooth cuticle, and only moderately decurrent antical leaf bases suggest a closer affinity to Acroscyphus phoenicorhizus (Grolle) Schuster & Engel, comb. n. [Basionym: Neesioscyphus phoenicorhizus Grolle, Oesterr. Bot. Zeitschr. III:27, 1964.] That species, however, has more ovate-lanceolate underleaves, divided 0.12-0.2 via a U-shaped notch with rounded base. According to Grolle (l.c.) it grows in flat patches or mats, has lingulate leaves with apices often irregularly 4-5-dentate and the stem cortex is mostly reddish-tinged, which is not the case in A. nitidissimus. Unfortunately, no mention is made of the texture of the plants.

With the recognition of Acroscyphus a number of problems are resolved: (a) the phytogeographically unlikely position of "Clasmatocolea" tjiwideiensis, and equally unlikely phytogeography of Neesioscyphus (New World tropical, except for the subalpine-alpine antipodal, Australasian "N." phoenicorhizus); (b) the anomalous position of "C." tjiwideiensis in Geocalycaceae, a group otherwise not known to produce anthocyanin-type pigments. The unsatisfactory prior taxonomy of this complex is self-evident from the fact that 2 of the 4 known taxa were

placed by Grolle (1960, p. 73; 1964, p. 27) respectively into Clasmatocolea (Geocalycaceae, Geocalycineae) and Neesioscyphus (Balantiopsidaceae, Balantiopsidineae) -- thus exceedingly far apart in the phylogenetic systems of Schuster (1979, 1984).

The 4 taxa of Acroscyphus, with 3 or 4 Gondwanalandic, the fourth on the "wrong" side of Wallace's Line, in Java, roughly parallel the range o Zoopsis H.f. & T. Strikingly, the purely neotropical range of Neesioscyphus Grolle and Ruizanthus Schust. parallel the range of Zoopsidella Schust. The phytogeographical analogies are instructive and, surely, significant.

IV. CHAETOPHYLLOPSIDACEAE (JUNGERMANNIALES)

The family was described (Schuster, 1961) to include 2 monotypic genera, Chaetophyllopsis Schust. [with C. whiteleggei (Carr. & Pears.) Schust.] and Herzogianthus Schust. [with H. vaginatus (Herz.) Schust.]. The group is highly isolated but related, perhaps remotely, to the Ptilidiaceae. A third species has come to light, as follows:

Herzogianthus sanguineus Schust., sp. n.

Species a H. vagiantus differens ut: (a) ramificatio irregularis, multis ramis primariis folia normalia, non-vaginata, non-connata, succubaque; foliis cauliculi similia, habentibus; ramificatio penitus irregulariter 2(3)-pinnata; (b) folia cauliculi variantia, saepe sine lobo anticali accessorio, lobus dorsalis solum 1-pauca cilia habens, duobus lobis ventralibus plerumque sine ciliis; (c) cilia 100-150 µm long.; (d) amphigastria cauliculi bifida, sine ciliis aut solum 1-2 cilia habentia; (d) plantae colore intense vinaceae, in situ saepe fere nigrae piceae.

Type. New Zealand, South Island, Buller: W. slope of Paparoa Range, NW. of Mt. Euclid, 4300-4400 ft (RMS 84-1427).

The plants grew in low turf and were densely caespitose, thus very different from H. vaginatus as regards growth pattern. The latter, very regularly once-pinnate, with all primary branches usually vaginate-leaved, grows rather closely prostrate or creeping. The intensity of the pigmentation is remarkable: exposed sectors are all almost reddish black, when viewed by reflected light. The color suggests a rather fleshy Lepidolaena. Plants are soft yet brittle, with fleshy stems, and are relatively fragile -- quite unlike H. vaginatus. They are also much less setigerous than the latter: stem leaves are often virtually devoid of cilia, although dorsal lobes commonly bear several setae; ventral lobes are eciliate or bear, at most, 1-2 cilia each.

V. LEJEUNEACEAE

The Lejeuneaceae of Australasia remain exceedingly poorly known. The following represent several new taxa discovered during 1984.

1. New taxa of Cololejeunea (Spr.) Schiffn.:

Cololejeunea inflexifolia Schust., sp. n.

Species C. cucullifoliae (Herz.) Schust. et C. ellipsoideae Schust. similis ut: (a) apices foliorum rotundati ad obtusos, omnes cellulae non-tuberculatae; (b) lobuli numquam polymorphici; (c) folia remota, convexa, aspectu quasi inflata. Species nova ab ambabus speciebus ut: (a) lobuli 2 dentes apicales iuxtapositos praebentes, dentibus suprapositis; (b) apices lobi obtuse triangulares et valde decurvato-inflexi, apice cauliculum versus directo; (c) styli distincti e (3)4-5 cellulis superpositis formati.

Type. New Zealand, South Island, Westland: Lake Mahinapua Forest Reserve, N. of Ross (RMS 84-1133; on twigs of Myrsine nummularia).

Distinct from all Cololejeunea species of Australasia in the (a) strongly inflated lobule (whose antical margin, in situ, is completely hidden); (b) lobule apex, much as in Aphanolejeunea, bearing 2 closely juxtaposed teeth, with the proximal tooth 1-celled and elongated, the distal, 2-celled, with the apical cell usually oriented so that (in ventral aspect) it lies over the proximal 1-celled tooth; (c) styli filiform and 3-4-5-celled; (d) deflexed-inflexed triangular lobe apex so curved under that its apex often overlies and obscures the 2 ventral teeth of the lobule apex.

Cololejeunea fragilis Schust., sp. n.

Species C. cucullifoliae et C. ellipsoideae similis ut: (a) apex lobuli singulum dentem apicalem potius quam 2 iuxtapositos habet; (b) apex loborum non deflexo-inflexus; (c) stylus vestigialis, tantummodo papilla. Species nova ex ambabus speciebus distincta ut: (a) habens non modo illum dentem apicalem unicellularem sed etiam dentem proximalem tricellularem qui paululum a distali iacit; (b) lobi convexi obovoidei, solum ca. 0.25 maiores quam lobuli.

Type. New Zealand, South Island: Waterfall Track, W. of Lewis Pass, Lewis Pass Reserve; on leaf of Pseudowintera colorata (RMS 84-1699d; trace only, on Hoyer's Fluid slide). Growing with Ephemeropsis trentepohlioides, Austrolejeunea olgae, A. hispida, and Cololejeunea laevigata.

Unfortunately known only from a trace, mixed with the aforementioned taxa. This tiny species, with the remote-leaved shoots only 340-360 μ wide, is barely 0.2 the size of C. pulchella. Perhaps remotely allied to C. minutissima and C. cucullifolia, but clearly different in: (a) the obovate lobes, widest distad of their middle; (b) distal lobular tooth 1-celled, proximal, 3-celled vs. a 2-celled distal tooth and low proximal angulation in the last 2 species.

Cololejeunea pulchella (Mitt.) Schust. var. stylifera Schust., var. n.

Varietas C. pulchellae typicae et C. laevigatae (Mitt.) Schust. similis foliis non-inflatis, nitidis ± umbricatis, et lobulis 2-3 ad 3-4 dentes habentibus; ab ambabus differns ut: (a) styli ex 1-2 ad 6-7 cellulas cauliculi elongatas + papilla mucosa distali formati;

(b) folia super axem valde elevata; (c) lobulus 3(4) dentes habens, dente maxime distali 2-3 cellulis a carina seiuncto; (d) perianthium aegre compressum.

Type. New Zealand, North Island: Lake Rotoiti, Nelson Lakes Natl. Park (RMS 84-2964; on twigs of Myrsine). Plants occurred mixed with Austrolejeunea hispida, Drepanolejeunea sp., Radula physoloba, and Frullania spp.

Stem leaves are so elevated above the creeping stem that, in dorsal aspect, much of the stem is exposed, the leaves looking relatively distant. As in var. pulchella, leaves are rather narrowly obovate from a narrow base. If the stylus criteria prove constant, we perhaps have an autonomous species.

2. A new species of Cheilolejeunea (Spr.) Schiffn.
Cheilolejeunea novaezelandiae Schust., sp. n.

Species C. albovirenti (H. f. & T.) Hodgs. et C. campbelliensi (Steph.) Schust. similis ut: (a) inflorescentiae, autoeciae; (b) ♀ innovationes, nisi sporadicaliter nullae, typi Pycnolejeuneae (cf. Schuster, 1984). Species a C. albovirente distincta ut folium ad angulum ca. 70° patet et non cochleariforme; et transitione abrupta e carina ad lobum, ambobus ad angulum ca. 45°; sinus amphigastrii plerumque apertus, saepe forma litterae U. A C. campbelliense distincta ut: (a) lobi foliorum acuti ad anguste triangulares, deflexo-involuti; (b) cellulae carinae ut tuberculi alti pachydermates elevatae; (c) amphigastria magna, saepe imbricata, 3 plo latiora quam caulicula vel plus; (d) guttae olei 1-2(3) in omni cellula, in segmenta tenuiter divisae; (e) dens apicalis lobularis unicellularis, rectus et acutissimus.

Type. New Zealand, South Island, Buller: W. slope of Paparoa Range, W. of Morgan Tarn, 4000-4300 ft (RMS 84-1526).

This autoecious species has the ♀ innovations always paired on acrogynous gynoecia. These innovations show Pycnolejeunea-type merophyte sequencing (for terms see Schuster, 1980, where the concept of merophyte sequencing is discussed). Leaf lobes are geniculate, with the triangularly pointed lobe apex strongly deflexed or involute. Keelar cells are maximally tuberculate-produced, the apical thickening strongly biconvex. Mature leaves have marginal cells similarly, if less strongly, armed -- so that lobes are denticulate in profile. The oil-bodies are unique, in all Cheilolejeunea species I have seen, in being finely botryoidal or granular-botryoidal; they are often single and then crescentic, but more often 2 (rarely 3) per cell.

VI. TREUBIALES

The Treubiaceae were monographed by Schuster & Scott (1969), in which memoir the primitive Treubia tasmanica Schust. & Scott was described. In this species, unlike in all others from Australasia examined, about 60-85% of median leaf cells bear solitary oil-bodies and the oil-body-bearing cells are scarcely differentiated from those

which contain, as visible inclusions, only chloroplasts. This relatively small species, (4)5-9 mm wide x 15-35(40) mm long, remains known only from Tasmania. It appears to be replaced in alpine-subalpine sectors of New Zealand by the following:

Treubia pygmaea Schust., sp. n.

Species a T. tasmanica differens ut: (a) folia unistratosa per latitudinem 16-20 cellulis; cellulae folii magnitudine satis variantes, et cellulae sparsae in sectoribus marginali-periferalibus foliorum ocellos 1.8-2.4 latiores quam diameter cellularum contiguarum formantes; partes mediae laminae cellulas sparsas area multo maiores (1.5-2.5 X) quam cellulae propinquae habentes; cellulae partis mediae folii 50-60% sine guttis olei.

Type. New Zealand, South Island, Buller: E. slope of Paparoa Range, along steep rivulet, 1.5-2 km below Morgan Tarn, 3100-3200 ft (RMS 84-1664).

This species, like T. tasmanica, has oil-bodies present in over 95% of marginal leaf sectors (vs. under 25% in T. lacunosa!) so that these sectors appear quite opaque. Even though, as in T. tasmanica, epidermal leaf cells are never strikingly enlarged (vs. in T. lacunosa, where large epidermal ocelli are a prominent feature), T. pygmaea shows some very large internal cells of polystratose median and basal leaf sectors; these cells may bear oil-bodies up to 90 x 120 to 95 x 140 μ. In this respect, T. pygmaea superficially resembles T. lacunosa, but the latter has both epidermal and inner cells in part strikingly enlarged, forming ocelli.

VII. MARCHANTIALES

1. Reboulia hemisphaerica subsp. australis, subsp. n.

Subsp. a subspecie hemisphaerica differens ut: (a) ut videtur semper autoecia (♂ disci in ramis thalli distinctis a ♀ receptaculis); (b) ♂ disci subacute elevati, e tela thalli circumdente valde delimitati, per circulum parvum squamarum minutarum sed perspicuarum circumdati.

Type. New Zealand, North Island, Rangitoto I.in Auckland Harbour (RMS, John Braggins, and Margaret Brown 84-2673).

I have collected R. hemisphaerica throughout the Northern Hemisphere, from Japan to North America, Europe, Macaronesia, and North Africa. All populations seen -- probably well over 200 in the field alone -- uniformly agreed in developing ill-defined androecia, with the several aggregated, low ostioles not sharply circumscribed. Both "normal" paroecious populations have been seen as well as occasional dioecious ones (Japan and Spain; these to be reported on). No plant seen from the Northern Hemisphere ever had autoecious inflorescences and, more significantly, large, discoid, elevated, sharply defined ♂ receptacles, bounded peripherally by a circlet of small, dark scales, aside from subsp. orientalis. Such well-defined androecia are reminiscent of those seen, i.a., in Conocephalum and Lunularia.

It is possible this taxon deserves the rank of an autonomous species but since I have seen very few populations from New Zealand (and only the type had well-developed mature androecia), I hesitate to ascribe more than subspecies status to the plant. Spore criteria may yet dictate treatment as a separate species.

The status of the New Zealand plant is visibly complicated by the fact that in Japan similar plants, with well-defined androecia occur (cf. Inoue, 1976, pl. 73). These, however, differ as follows:

PRELIMINARY KEY TO SUBSPECIES OF R. HEMISPHAERICA

1. Monoecious. . . . . 2.

2. Autoecious: ♂ and ♀ receptacles normally on separate branches. ♂ Receptacle large, circular or subcircular, well delimited, elevated above thallus and circumscribed by a ringlike depression between it and thallus, the depression giving rise to small paleae. . . . . 3.

3. ♂ and ♀ Receptacles typically on leading or elongated thallus segments. [New Zealand].

R. hemisphaerica subsp. australis

3. ♀ (and sometimes ♂) Receptacles typically on abbreviated ventral-intercalary segments that are narrow-based or suostipitate (main thallus usually remaining sterile, typically innovating apically, the innovation often remaining sterile, often again innovating; sometimes an innovation androecial at apex). [Japan].

R. hemisphaerica subsp. orientalis, subsp. n.

2. Paroecious: ♂ receptacle ill defined, or 1 or 2 posterior to ♀ receptacle, often reniform or irregular in form, usually small, little elevated and not sharply bounded, without well-developed circlet of peripheral scales. Both ♂ and ♀ receptacles typically at apices of leading thallus segments, sporadically to exceptionally on abbreviated lateroventral segments.

R. hemisphaerica subsp. hemisphaerica

1. Dioecious; ♂ and ♀ receptacles on different plants. [Scattered: southern Europe, etc.].

R. hemisphaerica subsp. dioica, subsp. n.

The above subclassification of the protean R. hemisphaerica is probably overly simplistic. With further study, elevations in rank may be needed, and, at the species level, numerous names are available, some of which may be applicable. It is not worth the effort to clear up now what may prove to be a major undertaking requiring decades of effort to disentangle. For the moment the 4 subspecies admitted here seem reasonably sharply separable. The 2 new subspecies admitted are distinguishable as follows:

Reboulia hemisphaerica subsp. orientalis Schust., subsp. n.

Subsp. a subspecie hemisphaerica distincta ut: (a) inflorescentia

semper autoecia; (b) ♂ disci in thallo non dorsales sed terminales. ♀ Receptaculis similes, disco bene definito, ex incisura terminali eminante, super superficiem thalli elevato, ostiola antheridialia coarctata continente; (c) ♀ receptaculae plerumque e ramis parvis stipitatis, ventrali-intercalaribus ex thallo principali (qui aut sterili aut ♂), rarius ex incisuris apicalibus segmentorum principalium, derivatae.

Type. Mt. Amagi, Izu Peninsula, Shizuoka Pref., Honshu, Japan (RMS 74-305).

The type material has ♂ disks often terminal on main segments, but sometimes terminating ventral-intercalary branches. In other populations (e.g., those figured by Inoue, 1976, pl. 73: 1,7,12), main thalli may remain sterile, but show apical innovations which may also remain sterile but may produce ♂ disks. Inoue also shows the ♂ disk as circular, well defined, with many antheridial ostioles. His pl. 73:11 shows an elevated, sharply demarcated disk, but lacking peripheral paleae. In my type the elevated ♂ disk is fringed by small, dark scales -- as in subsp. australis. Such paleae are very rarely developed and bound only the most optimally developed androecia in subsp. hemisphaerica. [The highly variable sexual situation in that subspecies will be discussed extensively in Vol. V of my The Hepaticae and Anthocerotae of North America; in sched.] Subsp. orientalis seems closest to subsp. australis in the terminal position of the always well-developed, elevated, ♂ receptacles. All of the numerous phenotypes of subsp. hemisphaerica seen have ♂ receptacles strictly dorsal on, usually leading, thallus segments.

Reboulia hemisphaerica subsp. dioica Schust., subsp. n.

Subspecies ex omni alia prole R. hemisphaericae distincta gametophyto unisexuali.

Type. Granada, Spain: gardens of the Generalife (RMS 73-001).

Unisexual populations of R. hemisphaerica have seldom been seen; they apparently do not occur at all in North America. I anticipate discussing them in more detail in another connection.

2. The genus Dumortiera new to New Zealand.

Monoclea and Dumortiera are mong the "giants" in the Marchantiidae and, correspondingly, almost impossible to overlook. Because of the translucent thalli, the two are readily confused in the field by the uninitiated. During three long periods (1961-62, 1967, 1983-84) in New Zealand, I repeatedly searched for Dumortiera -- the common Monoclea usually being found, but not Dumortiera. However, on March 18, 1984, D. hirsuta s. lat. was discovered along the "Kiwanis Track" along a small stream, at the east end of Herikino State Forest, south of Kaitaia, below an extensive Nikau Palm grove forest (RMS 84-2550).

The Dumortiera population was at the stream edge, where subject to inundation. Plants were fertile, but lacked capsules. They

lacked the velvety thallus surface of the "nepalensis" or "velutina" phase (= D. nepalensis) but had vestigial indications of the surface areolation (remnants of the vertical walls of the obsolute air chamber partitions).

It is inexplicable to me that such a conspicuous and prominent liverwort should have remained undiscovered for so many years in New Zealand. There is nothing in the habitat that cannot be repeatedly duplicated elsewhere in New Zealand -- yet the genus seems to be consistently absent from otherwise seemingly appropriate loci. At the single known station there is limited but clear evidence of human disturbance, suggesting that perhaps the species was introduced.

FOOTNOTE

⩛ Basionym: Chiloscyphus tjiwideiensis Sde.-Lac., Nedrl. Kruidk. Arch. 3:418, 1854. Placed by Grolle (1960, p. 73) and Engel (1980, p. 154) into Clasmatocolea, as C. tjiwideiensis (Sde.-Lac.) Grolle. However, anthocyanin-derived, reddish pigments never seem to occur in the Geocalycaceae, s. lat. (incl. Lophocoleaceae), and the rhizoid color alone seems to eliminate the species from Clasmatocolea and other Lophocoleoideae. Also, as Engel (l.c., p. 9) has shown, of 20 species assigned by him to Clasmatocolea, following Grolle (l.c.), only "Clasmatocolea" tjiwideiensis has branching reduced to only the ventral-intercalary type. The species is also the only one of those assigned to Clasmatocolea which is Malaysian (and tropical) in range, while all other taxa are subantarctic to temperate-antipodal in range. Pigmentation patterns, branching modes, and phytogeography all suggest that the species was misplaced by Grolle in Clasmatocolea.

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