New Zealand Hepaticae (Liverworts)—IX

A Review of the New Zealand Species of the Genus *Lepidozia*

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[*Received by the Editor, January 27, 1955*]

Abstract

Introduction including discussion on 3 separate systems of classification within the Genus—Description of Genus—Key to Species—Descriptions of 33 Species including 3 new ones, *L. remotifolia*, *L. meridiana*, with var. *paludicola*, *L. Martini*—*Telaranea* treated as a Subgenus—*L. longiscypha*, a Tasmanian species recorded from New Zealand for the first time—*L. tetradactyla* re-instated with *L. Lindenbergii* as a synonym.

Introduction

Lepidozia is an important genus of the primitive family *Lepidoziaceae*. It is a large genus, more plentiful in the Southern than in the Northern Hemisphere, and with many tropical species. It differs from *Bazzania*, in that the leaves have more and deeper divisions, and in the stipules being, in most cases, similar in shape to the leaves and smaller.

In the *Synopsis Hepaticarum* (1845), Gottsche Lindenberg and Nees divided up the genus under the headings of *Microphyllae*, *Incisae*, *Communes*, and *Capillares*. It is anomalous that with 30 or more years of priority, these names to all intents and purposes have been dropped, because Spruce (1876), in addition to ignoring them, replaced them with his own 3 sections *Eu-Lepidozia*, *Ptilolepidozia* and *Microlepidozia*, and placed these on a permanently higher level by calling them Subgenera. Later, Spruce included his *Ptilolepidozia* in *Eu-Lepidozia*. Stephani (1909), who had a wider general knowledge of the genus than Spruce, divided the genus into *Symmetricae* and *Asymmetricae* This is probably the best of the three systems, as the grouping is the simplest and the most natural. But here is another anomaly. Stephani's names, for better or for worse, technically have no standing, either as subgenera, because they contain the types of Spruce's subgenera, or as sections, because they contain the types and lectotypes of the Synopsis Sections, whatever these may be It thus appears that the Rules of Nomenclature can be a hindrance to progressive improvements in taxonomy.

As regards Spruce's Subgenera, his *Eu-Lepidozia* automatically becomes *Lepidozia* Subg. *Lepidozia*, as it contains the type of the genus, *L. reptans* His Subgenus *Microlepidozia* with its Section *Telaranea* is a vexed question As constituted by Spruce, it was characterised by small plants with transverse leaves and unistratose perianths But actually, unistratose perianths are shared by his *Eu-Lepidozia* as in *L. Martini* and *L. tetradactyla*. Evans' discovery that in the branching, the divided leaf is ventral as well as dorsal, does not hold either as an exclusive character, as may be seen in Lindenberg's plate of *L. laevifolia* (1846) with incubous leaves, which shows three divided leaves which are ventral

Spruce's Section *Telaranea* of his Subgenus *Microlepidozia* with its subtransverse leaves and thin-walled perianth will fit in neither subgenus, which

perhaps is why Spruce, apparently as an afterthought, suggested that it may be a new Genus. It was made a Section of *Lepidozia* in 1888, a separate Genus in 1895, a Subgenus in 1914, where I have left it.

I am greatly indebted to Dr. J. Proskauer of The University of California, Berkeley, for interpreting for me the Rules of Nomenclature as they apply to the three separate systems of subdivision within the Genus, also for the correct citations for the Genus and the Subgenera, and the correct date for that part of the Synopsis in question.

Although *L. microphylla, L. pendulina,* and *L. ulothrix* are included in the original eight species referred to *Lepidozia* by Dumortier in his Recueil d'observations sur les *Jungermanniacees*, Dr. Proskauer is of the opinion that as far as Dumortier is concerned, these names are *nomina nuda*.

Genus LEPIDOZIA (Dumortier) Dumortier, Recueil d'observations sur les *Jungermanniacees* p. 19, 1835.

Pleuroschisma section *Lepidozia* Dum. *Syll. Jung. Eur.* 69, 1831.

Mastigophora Nees *Naturg. Eur. Leberm.*, 1, 95. 1833.

Herpetium section *Lepidozia* Nees, *Naturg. Eur. Leberm.*. 3, 31, 1838.

Plants minute to large, pale, yellowish green, olive or brown, forming mats or creeping loosely on earth or rotting wood, in rare cases erect, or pendulous on bark. Stems pinnately to bi-pinnately branched. branches mostly lateral, sometimes with flagellate tips; postical, flagelliferous, small-leaved branches sometimes present. Leaves alternate, transverse to incubous, mostly decurved, mostly quadrifid or 5–6-fid, with sinuses extending to the middle more or less, more rarely 2-3-partite, with divisions extending to or nearly to the base; segments lanceolate to subulate, obtuse or acute, mostly entire. Cells variable in size, rounded-quadrate or oblong-quadrate. or porose with thick walls. Involucral leaves usually with a deeper base than the cauline leaves, variously toothed to ciliate. Perianth terminating a short ventral branch, cylindric or fusiform, 1 or more cells thick, often plicate or angled towards the tip, usually contracted at the mouth, mouth entire, toothed, or more or less fimbriate. ♂ inflorescence on a short ventral branch.

The Lectotype of *Lepidozia* is *L. reptans* (L.) Dum., Spruce *Journ. of Bot.*, xiv, 164, 1876.

KEY TO SUBGENERA

1. Leaves bipartite, divided to the base, or 2 to 3-partite, divided nearly to the base . . . . . Subg *Telaranea*
   Leaves 3 or more fid or partite. not divided to the base 2
2. Plants small. leaves transverse . . . . . Subg. *Microlepidozia*
   Plants small to large, leaves subtransverse to incubous . . . . . Subg *Lepidozia*

KEY TO SPECIES

1. Plants small to large leaves subtransverse to incubous (Subg. *Lepidozia*) 2
   Plants small, leaves transverse (Subg. *Microlepidozia*) 30
2. Leaves asymmetric, cells porose except in *L. glaucophylla* (*Asymmetricae*) 3
   Leaves symmetric. cells not porose (*Symmetricae* in part) 12
3. Leaves dentate or dentate-laciniate (*Incisae*) 4
   Leaves not dentate (*Communes* in part) 5
4. Dorsal base and segments shortly toothed, stipules with 4 segments and 2 small lateral segments . . . . . 1 *Kuhn*

	Branches attenuate and capillary, segments and armature setaceous, often bifid, stipules bifid, variously armed	2 *ulothrix*
5.	Plants glaucous, leaves both large and small	3 *glaucophylla*
	Plants not glaucous, leaves uniform	6
6.	Dorsal base semiorbicular, leaf-segments setaceous, glossy	4 *setigera*
	Dorsal base arched but not semiorbicular, leaf-segments shortly or longly triangular	7
7.	Leaves less than 0.5 mm	8
	Leaves more than 0.5 mm	10
8	Stems woody, much branched branches pendulous, curved, attenuated	9
	Stems prostrate simply pinnate	5 *laevifolia*
9.	Leaves subsymmetric, very remote, 0 25–0.3 mm. divided to more than ⅓ (*Microphyllae*)	6 *microphylla*
	Leaves imbricate, barely 0.5 mm, divided to ¼	7 *procera*
10.	Plants habitually dark brown, leaves crowded, 2 dorsal segments short, cell walls very thick, stems usually erect, dense	8 *obtusiloba*
	Plants mostly pale or light brown, stems not erect and densely compacted	11
11	Plants glossy, leaves concave, cells 30–40μ	9 *concinna*
	Plants more robust, branches pendulous, flagelliform, stem leaves remote on well developed plants, cells 20–30μ	10 *pendulina*
12	Leaves 3 or more fid or partite, but not divided right to the base	13
	Leaves 2-partite to the base, or 2 and 3-partite very near to the base (Subg. *Telaranea*)	33
13	Leaves 3-fid or 3-partite	14
	Leaves more than 3-fid	17
14.	Plants very small, 3rd segment of leaf often not properly developed, stipules rudimentary, ± crenate, cells all separate	11 *integristipula*
	Plants longer, stipules normally divided, cells not separate	15
15	Plants silky, leaves imbricate, cells of segments linear-rectangular as in *L. tetradactyla*	12 *Martini*
	Plants not silky, leaves remote, cells of segments not linear-rectangular	16
16.	Stems filiform, leaves very remote, bifid on branches, segments straight, diverging sometimes 4-fid in *L. dispar*	13 *dispar*
	Stems not filiform, cortex with large hyaline cells, leaf-segments often incurved	14 *remotifolia*
17.	Leaves 4–6-fid	18
	Leaves 8-fid (*Capillares* in part)	29
18	Plants plumose, segments setaceous from near the leaf-base, cells of discus typically in 2 rows (*Capillares* in part)	15 *tetradactyla*
	Plants not plumose, segments, if setaceous, from a discus of more than 2 cells high (except var. *subplumulosa* of *L. tetradactyla*) (*Communes* in part)	19
19.	Discus rectangular, sides parallel or nearly so, segments parallel in *L. Roseana*, segments based on 2 cells	20
	Discus ± narrowed to the base, segments diverging, not always based on 2 cells	22
20	Plants glaucous or whitish, leaves contiguous or scarcely so, lowest row of discus cells twice as long as other cells	16 *centipes*
	Plants not glaucous, often glistening	21
21	Leaf-segments shortish, parallel, ending in 2–3 uniseriate cells	17 *Roseana*

	Leaf-segments as long as the discus, setaceous, ending in 4–5 uniseriate cells	18 *corticola*
22.	Plants small, leaves 0.5 mm or less	. . . 23
	Plants medium to robust, leaves more than 0.5 mm	.. 24
23.	Plants paludicolous, floriferous, leaves distorted when dry ..	19 *leptodictyon*
	Leaves not distorted when dry, segments regular, triangular or lanceolate, middle ones based on 3 cells	20 *patentissima*
24.	Segments of leaves not, or scarcely longer than the discus . ..	25
	Segments mostly longer to much longer than the discus	. . . 26
25	Leaf-segments based on 2 and 4 cells, the more widely based ones usually abruptly narrowed, leaves brownish, glossy, usually imbricate .	21 *Gottscheana*
	Leaf-segments lanceolate from a base of 3–7 cells, not abruptly narrowed, leaves pale to whitish, remote, not glossy	22 *meridiana*
26.	Plants robust, stems woody, much branched, branches flexuous, leaves apparently alway 4-partite, segments spinose, longly tapering from an 8-celled base, cells 20–30μ	23 *spinosissima*
	Stems and branches not woody nor flexuous, stem leaves occasionally 5–6 partite, cells more than 30μ	. 27
27.	Plants pale to whitish, cells uniform, several rows of twin cells in the subula of the segments, moisture-loving	*meridiana* var. *paludicola*
	Plants brownish, cells of subula longer to much longer than broad	. 28
28.	Stems densely bipinnate, branches and branchlets decreasing in size upwards, cells of subulas to 90μ long	24 *Gibbsiana*
	Parts of plants not so inordinately dense, cells of subulas not more than 60μ long ..	25 *praentens*
29	Segments from a semi-circular base of 2 cells high, cells of segments twice as long as broad	26 *radiata*
	Discus 5 cells high (dorsally), cells of leaf-segments 4 times longer than broad	27 *pulcherrima*
30	Plants usually pale green, rarely brownish, habitat usually dry	31
	Plants brown, usually from boggy ground	.. 32
31.	Leaves with a squarrose discus, but segments parallel to stem, narrow-triangular, leaves normally subimbricate	28 *hippuroides*
	Leaves somewhat larger, middle leaf-segments triangular, lateral tooth on outer segments well-developed (in type)	29 *compacta*
32	Stems catenulate, leaves incurved, segments ligulate with many rows of twin cells	30 *Allisonii*
	Leaves remote squarrose, lateral segments with spur well-developed (in type)	31 *calcarata*
33	Leaves 2-partite cleft to the base	32 *Herzogii*
	Leave usually 3-partite, mostly 1½ cells length from the base occasional leaves on the stem 4 partite, branch leaves usually 2-partite	33 *longiseypha*

LEPIDOZIA (Dumort.) Dumort. Subgenus *Lepidozia*

Syn. *Lepidozia* subg. *Eu-Lepidozia* Spruce, Journ of Bot., xiv, 164, 1876 Lectotype *L. reptans*

Plants small to large, leaves subtransverse to incubous.

1. **Lepidozia Kirkii** Steph Fig. 1.

L Kirkii Steph., *Spec. Hep.*, iii, 598, 1909.

This is the simplest form of the very variable species *L. ulothrix.* It differs from *L ulothrix (sensu stricto)* in the crenate to sparsely and sharply toothed segments, and in the stipules regularly 4-fid with an outside lateral tooth on the exterior segments. There are intergrading forms between this species and *L. ulothrix,* but the cell-type is the same throughout, quadrate to rectangular with thick walls.

The North Island plants are as a rule more slender than, and not so typical as those from Stewart Island.

North Island: South Ruahines, 802, A P D.; Ohakune Track, 761, H. M. H ; Mt. Hauhangatahi, 6173, L. B. M.

South Island: Fox Glacier, 8365, Mrs Knight; ground in forest, Avalanche Peak, 9606, W. M.; Paparoa Range, 8361, H. M. H.

Stewart Island · Vicinity of Pt. Pegasus; on logs in forest, 464; on ground amongst manuka, 451; bed of tributary of Pegasus Creek, 478; epiphytic on forest trees, 463, 505; on log in dense forest, 469; banks near waterfall, Pegasus Creek, 2782; logs and trees in forest, 2788; trees back of Freezer in dense bush, 2627; sandy soil, track to Tin Range, 465, 2772; Fort William, 9898; Pryce's Peak 9705, 9567, 9568, all coll. W. M.

Stephani records North and South Island (Krone, Beckett, Kirk) with no mention of type locality.

2. **Lepidozia ulothrix** (Schwaegr) Syn. Hep. Fig. 2

Jungermannia ulothrix Schwaegr. *Prodr Hist. Hep*, 21, 1814.

Lepidozia ulothrix Syn Hep, 57, 1846, Lindenb. *Spec. Hep.*, 57. 1846, *Fl. Tas.*, 232, 1860; St *Spec. Hep*, iii, 589, 1909; Rod. Tas. Bry., ii, *Pap. & Proc. Roy. Soc. Tas.*, *Jungermannia albula* Tayl. *Lond. Journ. of Bot.*, 387, 1844; *Fl. Ant*, 1847; *Lepidozia albula Syn. Hep.*, 211, 1844; *Handb. N Z. Fl* ii. 523, 1867

L. Angelii G. Ms., St.. *Spec Hep.*, iii, 569, 1909

L. dentifolia St , *Spec Hep.*, iii, 599, 1909.

Plants medium to robust, whitish or brownish to dingy green, variable in habit, size and shape of lobes, on earth, rocks or trees. Stems to 4 cm, terete, usually closely pinnate, but in straggly plants, remotely so, occasionally bipinnate, branches sometimes attenuated. Stem leaves densely imbricate, 0·6 x 0·5 mm, very concave, rounded ovate-quadrate, deeply and unequally 4-fid, laciniae from a broad base, gradually or abruptly attenuated, setaceous, dorsal margin or discus ampliate and lacinulate-toothed. In robust specimens the laciniae may be armed with 1–2 long teeth, or even bifid. Stipules rounded, obcuneate, deeply 4-lobed, laciniae mostly 2-fid, either equally or unequally, except in smaller forms Cells unequal, thick-walled, 20–30μ, upper cells of segments elongated. Invol. leaves small rounded-ovate, apices rounded, shortly dentate. Perianth 3½ mm, appears to be 3- or 4-lobed with apices a little toothed. Both perianth and involucre on an extremely short ventral branch.

This species is very variable. Apart from *L. Kirkii,* the simplest form, Stephani has described 3 species, *L hirta, L. Angelii* Gottsche MS, and *L. dentifolia,* but these are not identifiable because they just happen to be forms which came under Stephani's notice. In *L hirta,* the teeth are strong to spinose, and the stipules have 6 segments, really 4 with the 2 outside lateral teeth longly produced. *L. Angelii* has the armature of the dorsal segment and discus subsetaceous, and the stipule segments bifid. *L. dentifolia* also has the subsetaceous

teeth and segments and much divided stipules. That these species are untenable is shown by the fact that one specimen was identified by Herzog as *L. Angelii* and by Nicholson as *L. dentifolia.*

All of these forms, together with *L. Kirkii,* lack the stream-lined elegance of typical *L. ulothrix.*

Typical *L. ulothrix.*

North Island: Te Matawai, Tararuas, 6659 Bot. Div. Herb., V. D. Z.

South Island: Mt. Cassidy Track, 37, W. M.; Fiordland Excursion, 8364, H. H. A.; Arthur's Pass, E. O. Selling det. S. Arnell.

Stewart Island: 2222, L. Cockayne; on ground and lower portion of trees, Table Hill, 477, 9825, 9566, 502; Pryce's Peak, 2659; vicinity of Pegasus, Southern Stewart Island, 8347, 510, 677, 507, 583, 465, 2271, 508, all coll. W. M.

Subsetaceous forms of *L. ulothrix; L. hirta, L. Angelii, L. dentifolia.*

North Island: In bush on very old logs, Paeroa Range, ca, 3,000ft, South of Rotorua, 6177; tree trunk, National Park, ca. 3,500ft, 6172; rocky, shady face of gully near Taupo, 684, K. W. A.; Ohakune Track, Mt. Ruapehu, 2,000–3.000ft, 761; Waiotaka V. (Kaimanawas), 1070, H. M. H.; on ground in bush, Waikaremoana, 2,000ft, 1071, 8362; Ngamoko Track, 9734; Waikare-iti, 3,000ft, 6174; on treefern caudex in bush, Cricklewood Road, Wairoa, 6175, E. A. H.; in forest, Mt. Hauhangatahi, 6173, L. B. M.

South Island: On earth, Kelly's Hill, Arthur's Pass, 108, W. M.

The type appears to have been from Tasmania. Taylor's type of *L. albula* was from the Auckland Is. collected by Hooker.

3. Lepidozia glaucophylla (Tayl.) Syn. Hep. Fig. 3.

Jungermannia glaucophylla Tayl. Lond. Journ. of Bot.. 1844, 580.

Lepidozia glaucophylla Syn. Hep., 1844, 267; L., Spec. Hep., Fasc. vi, 1846, 39; Fl. Tas., 1860; Rod., Tas. Bry., ii, in Pap. & Pro. Roy Soc. Tas, 1916. 69; St, Spec. Hep., iii, 1909, 587.

L. bisbifida St., Spec. Hep., iii, 593, 1909.

L. subquadrata St., Spec. Hep., vi, 341, 1917.

L. brevipinna Pears, in Univ. Cal. Pub. Bot, 10, 1923, 317.

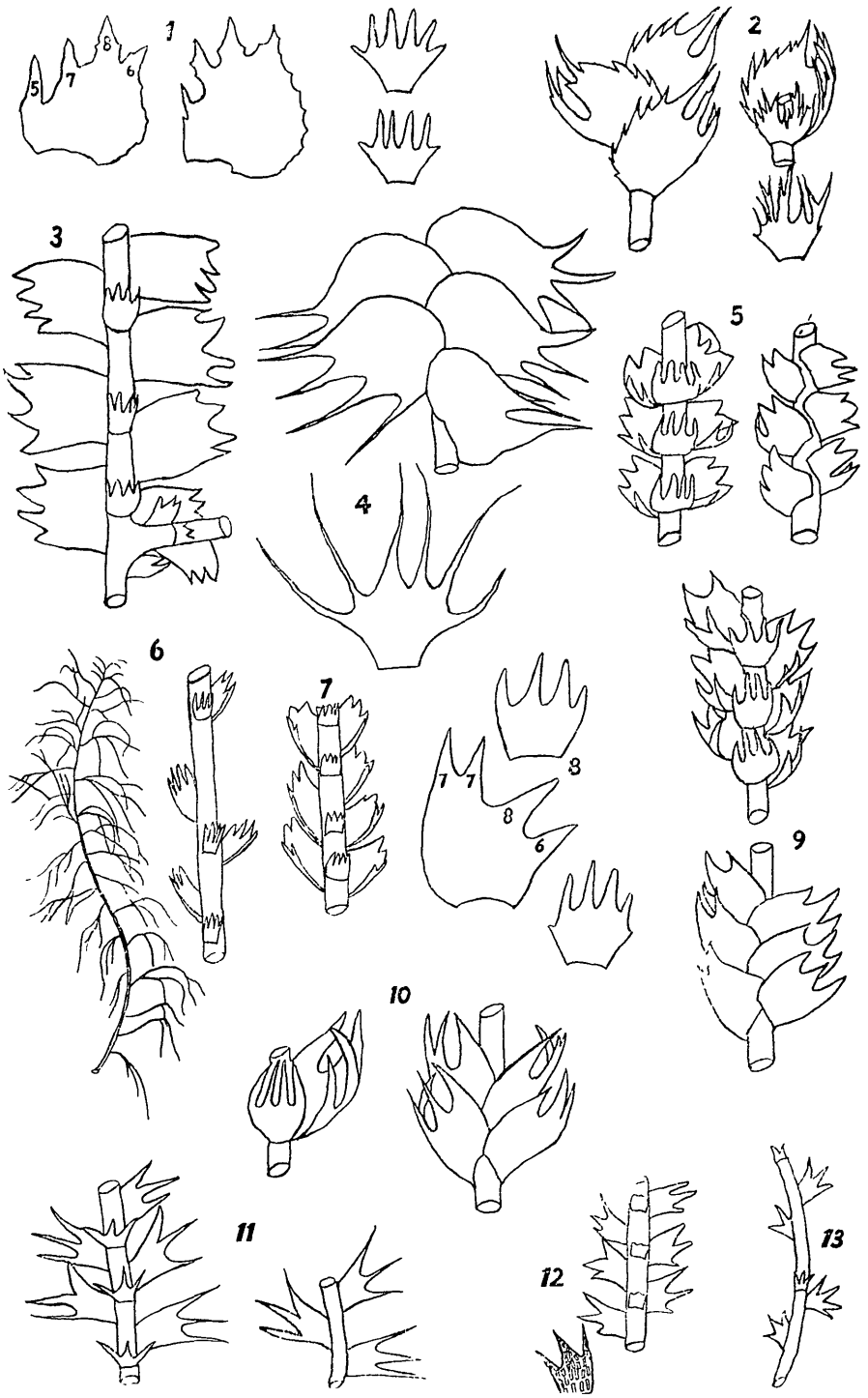
L. digitata Herz., in Trans. Roy. Soc. N.Z., 1938, 45.

Plants sprawly, not congested, glaucous-silvery, rarely browning somewhat. Stems to 3 cm, regularly pinnate, pinnae usually fairly short. Cauline leaves contiguous to remote, broadly ovate-quadrate, sub-horizontal, incurved to involute, usually quadrifid to ca ⅓; insertion sub-transverse, dorsal base a little ampliate, may reach to the middle of the stem, segments triangular, acute, the 2 middle ones bigger, ca 8 cells wide at the base, ca 0 2 mm long; branch leaves smaller to minute. Stipules smallish ca the width of the stem, distant, 4-fid, sometimes spreading, segments ca 0·2 mm. Cells ca 20–30μ, quadrate to rectangular, sometimes brownish small trigones present, cuticle minutely asperate.

Readily distinguished by its glaucous colour, sub-horizontal, incurved, not crowded, stem-leaves, with shortish segments and quadrate cells.

L. digitata Herz. is a form in which all the leaves are small, but it is *L. glaucophylla.* My attention was drawn to this through inability to decide to which species a Waikaremoana plant belonged, 1164. Both Lindenberg and Rodway mention the small leaves, and they are much in evidence in the Tasmanian plants at Kew.

L. Colensoana St., probably belongs here also. Types of the other synonyms have been examined.



TEXT-FIG. 1.—FIG. 1—*L. Kirkii.* FIG. 2—*L. ulothrix.* FIG. 3—*L. glaucophylla.* FIG. 4—*L. setigera.* FIG 5—*L. laevifolia.* FIG. 6—*L. microphylla.* FIG 7—*L. procera* FIG. 8—*L. obtusiloba.* FIG. 9—*L. concinna.* FIG. 10—*L. pendulina.* FIG. 11—*L. Martini.* FIG. 12—*L. integristipula.* FIG. 13—*L. dispar.*

North Island: Plants with small leaves throughout are from dry, shady bank near waterfall, near Atiamuri (type of *L. digitata* Herz.); deep shade under a bank, near Atiamuri; damp bank near Atiamuri; amongst *Bazzania* sp. on log, Mangaiti Bush, K. W. A.

Plants with both large and small leaves are from:

North Island: Great Barrier Is., T. Kirk, 1169, Bot. Div. Herb., under shade of manuka, and on dry bank in Reserve, Whakarewarewa, 1165; dry bank in shade, Rotorua, 1168; shady bank on earth, hillside; under bridge across Puarenga Stream, Whakarewarewa; dry bank in open shade, Rainbow Mountain, K. W. A.; edge of path under scrub, Whakarewarewa, 3685; under mingimingi (*Leucopogon fasciculatus*) scrub, Waiotapu Thermal Reserve, 9398; bank by track to Waikareiti, 2,000–3,000ft under heavy bush, 9290; with *Marsupidium rotundifolium* on overground roots, L. Waikare-iti, 1170; dry pocket in bank near Aniwaniwa Falls (L. Waikaremoana), 1164, E. A. H.; on ground in open, Tikitere Springs (Rotorua), R. C. Lloyd; with *Balantiopsis diplophyllum,* upper reaches of Ruakituri R., 9340, B. Teague.

South Island: Arthur's Pass, 763, Mrs. M Vere; Bealey, S. Berggren; headwaters of E. branch of Hawdon, 764, H. M. H.; Wilkin R., 1167, Doubtful Sound, 1172; Head of L. Manapouri to Wilmot Pass, H834, G. S ; on rock, near summit of Wilmot Pass, 805, W. M.; Milford Track, 1166, F M ; West Coast Fiord, W. A. Thomson.

Antipodes Island: Penguin landing, rock precipice above the penguin colony, among *Hymenophyllum demissum,* 4/4/27, 2604, G. E. Du Rietz.

The type was from Tasmania.

4. Lepidozia setigera St. Fig. 4.

L. setigera St., Spec. Hep., iii, 599, 1909.

Plants robust, loosely tufted, light brown, the upper portion pale green Stems 5–6 cm (Stephani gives 10), simple, regularly pinnate, pinnae ca 1 cm long, of intervals of ca 2–3 mm, apices often curved, shortly attenuated, sometimes flagellate and pendulous. Cauline leaves crowded, large, ca 1 6 mm long, 4–5 laciniate, sometimes reduced to 2, laciniae from a base of about 10 cells, gradually attenuated, ending in long hair-points, of 6–10 extremely narrow, articulated cells, sinuses very broad; discus of 2 mm or more at the widest part, obliquely truncate, dorsal margin semi-circular, ca 1 mm in height, ventral straight or a little ampliate, ca 0 4 mm. Stipules 4–5 laciniate, segments smaller but similar to those of the leaves, occasionally bifid; discus quadrate-obcuneate, ca 0·8 mm tall and broad. Cells round to oval, marginal 10–20μ, gradually increasing to ca 40μ in mid-leaf.

A very beautiful species. It differs from *L. ulothrix,* in the larger segments with larger cells, and the hair points ending in 8–10 elongated cells, also in the entire margins. In its large and broad segments it resembles *L. pendulina.*

North Island: Rotten log on floor of wet kauri forest, Waipoua Forest, H694, 24/4/44; on old stump in bush, Waipoua Forest, 1232, 23/10/44, K. W. A.; growing with *Riccardia* sp on ground. Waipoua Forest, March, 1950, 4621, M. A. Baker.

South Island: Okarito, Westland, T Kirk, 4937, 4929, Bot Div Herb, presumably the type.

Stewart Island: Track to Magog, 5407; on damp ground by side of stream, head of Crooked Reach, Pegasus, 502, 22/1/49, W. M.

5. Lepidozia laevifolia (Tayl.) Syn Hep. Fig. 5.

Jungermannia laevifolia Tayl., *Lond. Journ. of Bot.*, 385, 1844.

Lepidozia laevifolia Syn. Hep., 208, 1845; L. et G., *Spec. Hep.*, *Fasc.* VI, 47, 1846; *Fl. Ant.*, 1847; *Fl. Nov. Zel.*, II, 146, 1855; Fl. Tas. 1860. Handb. N.Z. Fl., ii, 522, 1867.

L. laevifolia St, Spec. Hep., III, 587. 1909, Rod., Tas. Bry., II, *Trans Roy. Soc. Tas.*, 1916.

L. minuta Col., Trans. N.Z. Inst., xviii, 245, 1885.

L. retrusa Col., Trans. N.Z. Inst., XXII, 455, 1889.

L. asperifolia St, Spec. Hep., III, 596, 1909

L. papillata St, Spec Hep, III, 595 1909

Plants small to medium, densely or loosely matted, stocky or extended, on earth or dead wood, extremely variable. Stems procumbent except when scrambling through other bryophytes, pinnately branched, pinnae obtuse or attenuated. Leaves contiguous to imbricate, concave or flat, to 0 6 mm long, 4-fid from ⅓ to ½, segments triangular, acute to acuminate, base 4–8 cells broad or even broader, according to the size of the cells, the posterior ones narrower. Stipules 1½ to twice the width of the stem, according to the size of the leaves, 4-fid, discus often at right angles to the stem with the segments curving upwards. Cells porose, variable in both size and number, usually larger in the middle and base of the discus, cuticle usually minutely papillose. Involl. leaves small, in 3 rows reaching to about ⅓ the length of the perianth, irregularly dentate at apex, very concave, cells not porose Perianth 3–4 mm, mouth shortly dentate.

This is a worrying species because of the wide range of variations in different combinations. The variations occur in the habit and length of stem and branches, the spacing, direction and incurving of the leaves, and perhaps most disconcerting of all, in the size number, shape and clearness of cells, and in the size of the perianth. In spite of Taylor's name of *L. laevifolia*, the most constant character appears to be the presence of minute papillae on the surface of the leaves, shown on Taylor's Campbell Island plant, but not discernible on the Tasmanian type

Spruce, supported by Stephani, has asserted that *L. laevifolia* does not grow in New Zealand, but the Tasmanian type fragment in the Melbourne National Herbarium could well belong to a New Zealand plant, and Lindenberg and Gottsche (1846) used a perianth of a New Zealand plant to complete their description of the species There is also a specimen in New York Herbarium labelled " type " from Campbell Island coll Hooker and this is the size of our ordinary plant, so I have retained the name Stephani called this common plant *L. asperifolia*, but even if the Tasmanian plant is really separate, there are still *L. tetrapila* Tayl (1846) from New Zealand, and *L. minuta* Colenso (1885) and *L. retrusa* Colenso (1889), names which would take precedence over Stephani's.

L. parviterta Steph might belong here also judging by a fragment so called, in his collection, coll W Bell, Otago, 1890, Levier 392. In Stephani's drawing of *L. parvitexta* Stephani mentions the cuticle as "aspera". Herzog's drawing of the original of *L. parvitexta* (1938) has much more slender segments than Stephani's *L. parvitexta* det Stephani from Hally Basin, W Coast, L. Rodway, /93 is certainly *L. procera*

L. Novae-Zelandiae Steph is a form with many capillari-attenuated branches which can come close to *L. procera*

In one or other of its many forms *L. laevifolia* is the commonest species of *Lepidozia* in New Zealand.

6. Lepidozia microphylla (Hook.) Syn. Hep. Fig. 6.

Jungermannia microphylla Hook., *Musci Exot.*, tab. 80, 1818.

Lepidozia microphylla Syn Hep., 202, 1845; L. & G. *Spec. Hep.*, Fasc. vi. 1846, Mitt, *Fl. Nov. Zel.*, ii, 146, 1855; Hook., *Handb. N.Z. Fl.*, ii, 521, 1867; Steph. *Spec. Hep.*, iii. 591, 1909.

Lepidozia multipinna Steph, *Spec. Hep.*, iii, 591, 1909.

Plants tall, dark green, of beautiful habit of growth, loosely caespitose or pendulous from branches. Stems to 10 cm, 2–4 pinnate, rigid woody, primary branches also woody to some distance from the stem, pinnate, alternate, flexuous, flagellate, all branches pendulous. Leaves very remote, small ca 0·3 mm, suberect, plane or a little incurved, 4-fid to about $\frac{2}{5}$ of the length, segments straight, 2 cells wide from a base of 2–4 cells, discus quadrate-rectangular, median cells ca 30μ, marginal and those of the segments to 20μ, mostly rounded quadrate. Stipules small, appressed, quadrate to quadrate-conical, 4-fid, segments straight, narrow. Androecia ± scattered on the branches with about 6 pairs of imbricate bracts with laxer cells.

This species grows to perfection in the rain forests of Fiordland. It can be recognized by its pendulous habit, together with its small, very distant leaves. A West Indian plant was formerly considered as a variety of *L. microphylla*, but Stephani, perhaps unnecessarily, promoted it to a species with the name of *L. commutata* St. The only apparent difference is that the leaves are a little smaller.

North Island: Mt Archeria, Little Barrier Island, ca 2,300ft, with other Lepidozias, 979. R. E. N. Matthews; wet kauri forest floor in quantity, Waipoua Forest, H696, K. W. A., Waipoua Forest, 957, V. W. L; abundant on damp floor of dense rain forest, Waitakere Ranges, H118, L. B. M

South Island: Westland, S. Berggren (1874); Okarito, in Kirk's collection, 4962, Bot. Div. Herb.; Paparoa Range, 3,000–4,000ft, 3555, H. W. Wellman; Caswell Sound, 5172, 5342, V. D. Z; 8 gatherings Fiordland Excursion, H. H. A.; L. Manapouri to Wilmot Pass, 2680, Doubtful Sound, 981, G. S.; Doubtful Sound, 5592, W. M; L Hauroko (Southland), 1,200ft, 179, L Matthews; bush south of L. Hauroko, J. E. Henry, both comm K. W A

The type was from Dusky Sound, coll Menzies.

7. Lepidozia procera Mitt. Fig. 7.

L. procera Mitt. *Fl. Tas.*, 231, 1860; St., *Spec. Hep.*, iii, 683, 1909; Rod, Tas. Bry. ii, *Pap. & Proc. Roy. Soc. Tas.*, 67, 1916.

L breviloba St, Spec. Hep, iii, *596, 1909*

Plants medium to tall, loosely caespitose, variable. Stems to 3 cm longer in the type, with a more or less pronounced dorsal furrow, fairly evenly pinnate, branches attenuate, decurved, rarely pinnulate Leaves slightly imbricate to remote, amplexicaul, obliquely set, upper part decurved or straight, subrectangular with the dorsal margin ampliate, ca 0 4 mm. x 0 3 mm, quadrilobed to about $\frac{1}{3}$, lobes mostly narrowly triangular, from a base of 4–5 cells, the 2 middle ones often the longest, not or scarcely diverging; branch leaves more closely set and more oblique. Stipules small, narrower than the stem, less than 0·2 mm long, lobes short, straight or collected at the apex. Cells upper ca 12μ, more rectangular and longer in the discus, basal ca 25μ.

This species resembles *L. microphylla* in habit and appearance, but the stem leaves are larger and closer on the stems, which are less copiously and slenderly branched. From *L. laevifolia* it differs in the shorter leaf-segments and more rectangular, less concave leaves, and more attenuated branches from a more

acute angle. The cells, too, are generally smaller, but even so, there are difficult connecting forms.

North Island: Great Barrier Island, T. Kirk, 4983, Bot. Div. Herb., probably the type of *L. breviloba* St.; Coromandel, T. Kirk, 6078, Bot. Div. Herb.; Yeats's track, between Ohau South and Pukenatawai, Tararuas, H174, L. B. M.; Ohauiti R., 7297, Bot. Div. Herb.; Coromandel, 3841, 3891, S. Berggren; Akatarawa V. 942. A. P. D., Coromandel, 8309, L. J. Matthews; New York Herb. without number, leg. Colenso, wrongly identified by Mitten as *L. Gottscheana.*

South Island: On *Plagiochila circinalis*, Mt. Alexander, 4,200ft, Caswell Sound area, March, 1949, 5254. V. D Z.: waterfall South of Long Is., Dusky Sound, Haulashore Cove, Doubtful Sound, Fiordland Excursion, 1946, H.H.A.; with *L. microphylla* amongst other hepatics in bush, E of Wairarihiri R., Southland, J. E. Henry, 8294.

Stewart Island: In stream bed, 1 mile from landing; track to Tin Range, 461; on rocks of waterfall, Cedric Creek, N.W. Arm, Paterson's Inlet, 650, W. M.

The type, in Herb. Mitten, New York Botanical Garden, was from Tasmania, 16332, Mr. Gunn.

8. Lepidozia obtusiloba Steph. Fig. 8.

L. obtusiloba Steph. *Spec. Hep.*, III, 598, 1909.

Plants medium to robust, variable, brown to brownish, tufted or pulvinate. Stems to 4 cm, (Stephani gives 10, but this is very unusual), woody, very brittle, erect or spreading, usually regularly and shortly pinnate, pinnae often secund, but may be spreading, broad and short to slender and attenuated. Leaves crowded, obliquely set, posterior segments decurved; sometimes faintly papillate, 0·7 x 0·5 mm, quadrifid, anterior segments short, triangular ca. 0·2 mm, 3rd and 4th segments longer and narrower, diverging; discus obliquely truncate, anterior margin curved, posterior fairly straight. Stipules sub-quadrate, ca 0·4 mm, occasionally with small lateral teeth, quadrifid, segments ligulate to triangular, often obtuse (hence the name). Cell cavities with very thick walls everywhere, ca 18μ on segments 18 x 35μ in the discus, basal still larger, marginal ca 10μ.

Variable in both size and habit, this species is characterized by its brown, sometimes deep brown colour, its usually crowded, rigid leaves with the 2 dorsal segments short, and the very thick walls round the cell cavities.

North Island · Mt. Ruapehu, 1094, A. L. H.; on log, Whakapapa, 3,700ft, 129; near Ohakune Mountain Hut, 4,500ft, 125, G. O. K. S.; Ohakune Track, 3,000–4,000ft, 759, Waiotaka V. (Kaimanawas) 1093, 3618; Northern Ruahines, 1116, 1118, 1089; Oroua V, 1209, H. M. H.; Rongotea Ridge (Central Ruahines), 4,000ft, N. M. Elder; Northwest Ruahines, 1069, Mokai Patea, 5,000ft, bog, Maungapohatu, 9681 (slender), A. P. D.; watercourse on North face of Mt. Hector, 7,404, P. R. B. Herb., V. D. Z.; on logs, edge of bush, L. Waikare-iti, 3,000ft, 1212, E. A. H.; Mt. Egmont, near Humphreys Castle, 1237, L. B. M.

South Island: Arthur's Pass area, on trees and ground · 7, 20, 27, 86 (in part), 114, 39, W. M.; V. D. Z., 1102; 1114, 1107, 1100, 1103, 1106, H. M. H.; 1110, Mrs. Vere; F. M, 1211, 1219; Tracks on Mt. Arthur (Nelson), L43, J. M. Dingley, 1089; G. O. K. S.; Lewis Pass ca 2,800ft, 1096, R. Sainsbury; beech forest, Craigieburn Mts, H82, L. B. M., headwaters of E. branch of Hawdon R., 1115, H. M. H.; forming large cushions on ground in beech forest near Cass, vicinity of Haast Pass, E. B. Ashcroft; Broderick Pass (Southern Alps), B Teague; Milford Track, 1151, F. M.; L. Wakatipu, 1120,

Herb. D. Lillie, J. Meiklejohn; in beech forest, Lower Routeburn V., 120 (in part), G. E. & G. Du Rietz; Franklyn Mts. (L. Te Anau). 695, W. A. Thomson, head of L. Manapouri, Wilkin R (L. Wanaka), G. S.; L. Harris, 111, V. D. Z.; soil on log on Mt. Cargill, 1,200ft, 213, G. S. & J. S. T.; shady bank of Waipori R., South of Dunedin, 1177, K. W. A.; from bog, Mt. Maungatua, 5281; trees, Pryce's Peak, Stewart Island, 9569, W. M.

Auckland and Campbell Is.. " Cape Expedition".

The type was from Otira Gorge. Beckett and Helms mentioned as collectors.

9. Lepidozia concinna Col. Fig. 9.

L. concinna Col. *Trans. N.Z. Inst*. 18. 244. 1885, St.. *Spec Hep* III 597, 1909.

Plants medium, on or near the ground, pale to pale-brown or grey-green, procumbent, pulvinate, variable, differing in appearance according to whether the branches are obtuse or capillary. Stems to 5 cm, fairly regularly pinnate, pinnae attenuate-flagellate, or obtuse, or both on the one stem, oblique. Leaves somewhat glossy, contiguous to imbricate, oblique, ± concave (dorsally), apices a little incurved, quadrifid, ca 0 6 to 0 85 mm long, base ca 0 3 mm wide, segments lanceolate-acuminate, posterior one diverging or curved obliquely upwards; discus obliquely truncate or irregularly curved, dorsal margin a little ampliate Stipules ca 0·4 mm long, quadrifid to the middle or below, segments narrowly acuminate from a broad base, sometimes curled at the apex. Cell cavities of the segments and margins ca 20μ, rounded-quadrate, oval or shapeless, increasing to 40μ, in the lower mid-basal portion. Involl. leaves unequally 4-dentate Perianth cylindric-conical, opening to a 4-lobed mouth as the capsule emerges, basal; capsule with long fragile seta reaching to the surface of the cushion.

This is probably the species referred to in the Handbook as *L. filamentosa* (L. et L.) G. L. et N., which is from Alaska and North America This identification has since been disallowed as there are many differences in the plants

Fairly large, glossy, pale leaves, concave and incurved at the apex, with cells bigger than in *L pendulina*, characterize this species.

North Island. Exposed sandy bank, Waipoua Forest, H695; on earth on hillside, in shade near Atiamuri, 1136; on rotten logs, Pukerimu Bush, E. of Taupo, ca 2,500ft, 197 & 1122, K. W. A ; Mercury Bay, Coromandel Peninsula, L. J. M.; Ohakune Track (Mt. Ruapehu), 1123, Waimarino V , 1174; headwaters of the Waiotaka (Kaimanawas), ca 3,000ft, 1175, H M H.; National Park, G. O. K. S., 1126; on ground and logs, Waikaremoana. 2,000ft, 1138, 1140, 1135, 1141, 1179, Waikare-iti, 3,000ft, 1121, 1124, 1135, E A H.; Puketitiri (H. B.), M. Brownlie, 1143; Otupae (N W. Ruahines), with *L. praemtens*, A P. & H. M. Druce, 1125; Pohangina V , 382 & 415, Upper Hutt, 907, Wallaceville, 1161; S. Ruahines, 777, A P. D.; in bush, Pinehaven, H M. Druce; Tauherenikau R., H. M. H.; 252 (in part), Butterfly Creek (Eastbourne), 63 and 67, W.M., N. Adams; 24661, P. R. B. Herb., 1147, V D. Z ; Makaroro, 1180, E. S. West; damp bank on roadside, Mt Messenger (small), 1121, K W A ; beech forest, Mt. Hikurangi, H152, L. B. M.

South Island: D'Urville Is., 1157, 1156, J. H. McMahon; in manuka scrub. Tasman, 1146, E. Deck; Tableland Track, Mt. Arthur, 170, G O K S ; Punch Bowl, Arthur's Pass, 1210, F. M.; Haast Pass, L26, Miss Matthews; under beech forest, near outlet Waiau R , L Te Anau, 670ft, K W A ; The Caves, L. Te Anau, 5620, 5626, 5617, earth and logs mixed forest Longwood Range, 8473, beech forest, Tapanui, 9788, W. M.; L Wakatipu, Kirk's collection, 6022, P. R B Herb.; near L Harris, 17083, P R B Herb , V D. Z ; Woodlaw (South-

land), L. J. M., 166; Western Fiord, Otago, 1134, W. A. Thomson; L. Manapouri to Wilmot Pass (cells big) 1120, G S.; Dunedin, S Berggren, det Stephani as *L. asperifolia*, 1160; L. Roto-iti, H5650, A. M. & L. G. Jack.

Stewart Island: 1152, Mrs J. D Smith, on trees, Ocean Beach Forest, 422, tree trunk, Glory Harbour, 319, on detritus, foot of rimu, 439, damp log Little Glory, 326, forest floor, West Hut, Tin Range, 474. W. M.

The type, a rather poor specimen, is a1417 Herb. Colenso.

10. Lepidozia pendulina (Hook) Syn. Hep. Fig 10.

Jungermannia pendulina (Hook.) *Musc. Exot.* p. 25, t 60, 1818

Lepidozia pendulina Syn. Hep. 208. 1845, L. & G., *Spec Hep.* Fasc. vi, 49. 1846; *Fl. Nov. Zel.*, ii, 246, 1855; *Handb N.Z Fl.*, n 522. 1867, St, *Spec. Hep.*, iii, 594. 1909

Lepidozia gigantea St, *Spec. Hep.*, iii, 600, 1909

Plants robust, imposing, pale or brown, paling to light brown Stems 3–9 cm. simple, rigid, woody, bi-pinnate, pinnae fairly close, with secondary pinnae arising from near the base, all arched, often secund, pendulous, 1–2 cm long, gradually and longly attenuate with capillary tips. Cauline leaves usually remote, often in pairs which are somewhat distant from one another, irregular in direction, 1·2 mm or more long, deeply divided into 4 longly triangular-acuminate, divaricating segments; discus 1 4 mm broad, obliquely truncate, dorsal margin ampliate Branch leaves closer, more concave, very regular. Stipules concave, 1 2 x 0 8 mm, quadrifid to below the middle, segments triangular-ligulate. Cells mostly oval-quadrate ca 25μ, but lengthening towards the base of the leaf, and in fairly regular rows

A most handsome species when growing at its best in rain forest of Otago and Westland. Can be distinguished by its palish colour, tall stems with pendulous branches, large and deeply quadrifid leaves and stipules. It is fairly constant, but unusual forms are met with, for instance one from Kelly Range, Westland, 101 W. M. is a brownish colour, and has pinnae only 0 5 cm long. Others are smaller and more slender, with stem leaves closer together, while one specimen from Stewart Island, 504, W. M., has uneven leaf-margins, otherwise typical

North Island· Headwaters of Waiotaka (Kaimanawas) ca 3,000ft, 1088, Oroua V. (Ruahines) 1085, 1208, H M H ; Ruahines, 1084, N M Elder: S Ruahines, 771, A P. D ; Mt Egmont, 1130, Dr E B Jardine; near Pool's Gorge ca 5,500ft, 1238, A H. Hornblow; 4,000ft, 25, R C Lloyd; Dawson Falls, 300-400ft, 10263, E A. H , Mt Maungapohatu, 4,000ft, Urewera, 9680, A. P. D

South Island: Arthur's Pass, Bealey R., S Berggren, 1874, 1083; 1074, 1077, H. M. H.; on forest floor, beech, 123, H H. A.; Nothofagus trunks, 42, forest floor, beech near Halpin's Creek. 36a, W. M.; headwaters of E branch of Hawdon R 1078, H M. H ; Maruia Springs (Nelson), 307, J. H McMahon; Paparoa Range, 1087, H W Wellman; near Fox Glacier, 1073, Mrs. Knight; Milford Track, 1079, V. Bevan; Bligh Sound, 8369, Freeman R. (L Manapouri). 36660 Bot. Div. Herb., L Manapouri to Wilmot Pass, H836. Doubtful Sound, 1081. G S : head of Long Sound, 8371, waterfall S. of Long Island, 1086, H H. A.; Otago, 1072, W A Thomson; on trees, the Caves L Te Anau, 5618, the Caves, 5619, forest floor, Doubtful Sound, 5597, trees and forest floor, 5585. W. M ; Dean Forest, under silver beech, L Hauroko, E of L Hauroko, J E Henry, on log, beech forest, Haast Pass, H5749, K W A

Stewart Island: On earth and trees in forest, 494, 504, 714, Mt. Rakiahua, wet banks near tramline, 504, Tin Range, ca 800ft, epiphytic on tree in forest. 588, W. M.

The type was collected at Dusky Sound by Dr. Archibald Menzies

11. Lepidozia integristipula Steph. Fig. 12.

L. integristipula Steph., *Spec. Hep.*, vi, 331, 1924

Plants minute, pale brown, mixed with other hepatics. Stems tightly packed, 0·1 mm wide, which is about ⅓ of the width with the leaves, branched, also numerous stolons with microscopic bifid leaves. Leaves contiguous, obliquely spreading, a little decurved, subquadrate, ca 0 25 mm, 3 or 2-fid, sometimes with the 3rd segment only half-developed, base of segments 2 cells broad, cells ca 20 x 30μ. Stipules poorly developed, narrower than the stem, 2–3 cells broad and tall, retuse.

The above is a description of Kirk's original specimens from Great Barrier Island, Nos. 6060 and 6143 Bot. Div. Herb. However, a much better specimen was collected in the Akatarawa V., Tararuas, by A. P. Druce, 12/1/47, No. 783 Herb. E. A. H. It is distinct in appearance, being lighter in colour, stems longer and less crowded, leaves almost horizontally spreading, and segments if anything a little longer. Nevertheless, the characteristic leaf-shape, leaves bi- or tri-fid or with the 3rd segment only half-developed, the square to oblong cells, all separate, together with the minute and misshapen stipules, are unquestionably the same.

Also from Coromandel, 3843, S. Berggren, 1874. This specimen is more similar to Kirk's than is the Tararua one. It is on clay, with *Symphyogyna* sp.

What I take to be the same species is also in Berggren's collection, from Earnslaw, Dividing Range, Victoria, No. 125, S. Berggren, 1874.

12. Lepidozia martini Hodgson spec. nov. Fig. 11.

Mediocris, debilis, depresso-caespitosa, late expansa, nitens, plumosa. Caulis ad 1 cm, tenuis, parum flexuosus, parum ramosus, rami inaequales, non-attenuati. Folia caulina remota vel sub-imbricata, patentia, obcuneata, trifida, 0 5 mm longa; disco ca 0·2 mm alto, apice ca 0 2 mm lato, basi parum angustiore, cellulis quadratis vel rectangularis, inaequalibus, ad 40μ; laciniis 0·25–0·3 mm longis, strictis, divergentibus, cellulis ad 60μ, 3–4 ob unicam seriem, quae binis fultae plerumque sunt. Folia ramorum tri- vel bifid. Stipulae plerumque 3-fidae, laciniis strictis, divergentibus, parvae. Folia involucra amplectantes. 0 5 mm longa, irregulariter ciliato-dentata. Perianthium basale, ca 1 35 mm longum, 0·45 mm latum, ore non-plicato vel contracto, sed lobato, lobis minute crenulatis.

Plants in a depressed mat amongst roots, greenish fawn to brown, plumose, silky. Stems to 1 cm long, a little flexuous, a little branched, branches very uneven in length.

Leaves mostly sub-imbricate, obcuneate, trifid, ca 0·4–0·5 mm, patent; discus to ca 0·2 mm long, with apex about the same, somewhat narrowed to the base, ventral margin a little decurrent, cells quadrate to rectangular-quadrate, uneven in size, to 40μ, longer in the upper row; segments ca 0 25–0 3 mm long, diverging, cells to 60μ, narrowing to the apex, with 3 or 4 single cells in one series Some branches with all bifid leaves, others with both bi- and trifid leaves or some leaves with the 3rd segment very short. Stipules usually with 3 diverging segments, from a flat, shallow discus, mostly bifid on the branches. Involucral leaves, innermost broad, concave, ca 0·5 mm long, apex irregularly ciliate-dentate; outermost,

bifid, narrower, shorter. Perianth ca 1 35 mm long, 0 45 mm broad, scarcely narrowed to the apex, mouth lobed, lobes minutely crenulate, with projecting apices of the long, narrow apical cells, near to the base of the stem. A short branch with imbricate, more or less appressed leaves springs like an innovation from just below the perianth. It does not appear to be a ♂ branch.

This species differs from *L. tetradactyla* in the constantly 3-fid stem leaves. with the leaf discus 4–5 cells high. From *L. tetradactyla* var. *sub-plumosa* it differs in the 3-fid leaves with widely diverging segments. It is named for Mr. Martin, whose extensive collections of hepatics specially in Stewart Island, have been so helpful.

North Island: In shady pockets on roadside cutting, Waipoua Forest 2568, K. W. A., 15/4/45; in dry cavity on roadside cutting, road to Dawson Falls, 2,000–3,000ft, Mt. Egmont, 10220, E A. H (Type), January, 1955.

South Island: On earth in mixed forest, base of Longwood Range, Southland, W. M., 13/4/52; Franz Josef Glacier, 5, O. Selling, 28/2/49.

Stewart Island· On prostrate stem of tree-fern, Kaipipi Track, Paterson's Inlet, 2048, W. M.

I have chosen the Mt. Egmont plant as the type for this species, as there is plenty of it for distribution purposes, and it is fruiting

13. Lepidozia dispar Mont. Fig. 13,

L. dispar Mont. *Voy. au Pole Sud;* Tayl. *Lond. Journ of Bot.*, 1844; *Syn. Hep.*, 203, 1845; L. et G., *Spec. Hep.*, Fasc. vi, 24, 1846; *Fl. Antarc.*, 158, 1847; *Handb. N.Z.* Fl., ii, 522, 1867; St, *Spec. Hep.*, iii, 590, 1909

Plants minute, yellowish-green, usually creeping on or through other bryophytes. Stems to 1 cm or a little more, filamentous, branches capillary, single or intertwined. Leaves distant, minute, ca 2 5 mm tall, palmati-2-4-fid, usually 3-fid to the middle, segments diverging, usually from a 2-celled base, and ending in 3 single cells; branch leaves 2-fid. Cells 20–30μ. Stipules similar, smaller.

L. dispar differs from *L. patentissima* in the more erect, more distant, more palmate, usually only 3-fid leaves, with more slender segments and smaller cells.

Revolver Cove, Snug Cove (Fiordland Excursion, 1946), H. H. A.; stream margin, Pegasus, Stewart Is., 462, W. M.

Auckland Island: Shore of Musgrave Pen, R. L Oliver (" Cape Expedition "), 1948; on earth hummock in *Metrosideros* forest, interior side of the innermost small peninsula, in Laurie Harbour, No 2242; on *Metrosideros umbellata,* at the track through the rata forest, above Erebus Cove, Port Ross, No. 2276, G. Einar Du Rietz, 1927; also Hombron and Hooker.

Campbell Island, " Cape Expedition," 1948.

The original locality was given as Campbell and Auckland Islands

14. Lepidozia remotifolia Hodgson, sp. nov. Fig. 14

Planta dioica, majuscula, pallens, implicata. Caulis 2–3 cm longus, ad 0 25 mm latus, remote pinnatus, raro bipinnatus, pinnae ca 0 5 cm, saepe capillaceae. Folia caulina remota, semi-verticalia, pellucida, tri-vel quadrifida ad medium, 0 4 mm longa x 0 3 mm lata, sub-rectangulata; disco 2–4 cellulas longo; laciniis porrectis vel incurvis, basi 2 cellulas latis, superne 3 cellulas longis. Cellulae 60 x 40μ, basales ad 80μ Stipula parva, caule parum angustiora, disco 2 cellulas longo, laciniis 1 vel 2 cellulas longis. Perianthium basale, cylindricum, 4 mm longum, ore obtuse lobato. Foliis involucris amplectantibus, laxe cellulosis, parum dentatis.

Plants pale, matted, intricate. Stems 2–3 cm, cortical layer distinct and pellucid with cells 60–80μ, branches and branchlets often capillaceous Cauline leaves distant hyaline, line of insertion oblique, reaching to the middle of the stem (dorsal surface) 3 or 4-fid, 0 4 mm long, 0 3 mm wide at base and apex, discus 2–4 cells deep; the lower row of cells longer, specially if the discus is only 2 cells deep; segments of 2–3 single cells from a base of usually one row of 2 cells, ventral segment sometimes shorter. Branch leaves quite similar but sometimes not so distant, decreasing in size and becoming more distant on capillaceous pinnae. Stipules as wide as the solid part of the stem, but small; discus 2 cells deep, segments 1 or 2 cells long. Involl leaves, inmost pair ± connate, a little dentate, cells very lax, and indistinguishable from those of the perianth. Perianth 4 mm, sub-sessile near the base of the stem, mouth lobed, lobes to ca 0 3 mm, obtuse.

I have chosen the Ruamahanga plant as the type of this species, on account of the perianth. Some of the southern plants differ in the stems and branches being more flexuous and capillary, and the leaves more incurved.

This species differs from *L. meridiana* in the much smaller, more remote stem leaves, which are often only 3-fid, and in the much narrower leaf-segments. From *L. patentissima* it also differs in the narrower leaf-segments, which are mostly based on 2 cells, and in the very remote stem leaves. It also seems to grow in wetter places.

North Island: In or near bog, Mokai Patea, Ruahines, 5,000ft, 6239 with an unnamed species of *Schistochila*, 5954 with *Balantiopsis diplophyllum*, 5946, A. P. D. (1951); Oriwa Lake Hollow, Tararuas, 6620, Bot. Div. Herb., V. D. Z.

South Island· Bealey, 3776a, S. Berggren (1874); head of L. Manapouri, 1230, L. Manapouri to Wilmot Pass, 2681, G. S.; by waterfall, head of Long Island, Dusky Sound, Fiordland Excursion, January-February (1946), H. H. A.; soil at edge of bush, Martin's Bay, Westland, 858, R. E. Hatcher.

Stewart Island: On stones near stream bed, Glory Harbour, Paterson's Inlet, 308, on dripping face of Staircase Falls, head of S.W. Arm, Paterson's Inlet, 487, W. M., robust; No. 08383, L. Cockayne, det. Stephani as *L. patentissima*

The type was from Ruamahanga V., Tararuas, V D Zotov, 3/12/33, 9275, Bot. Div. Herb.

15. Lepidozia tetradactyla (Tayl.) Syn Hep. Fig. 15.

Jungermannia tetradactyla Tayl., *Lond. Journ. of Bot.*, 306, 1844; *Fl. Antarct.*, 1847.
Lepidozia tetradactyla Syn. Hep., 213, 1845; Lindenb., *Spec. Hep.*, Fasc. vi, 68, 1846
L. Lindenbergii Syn. Hep., 213, 1845; Lindenb. *Spec Hep*, Fasc. vi, 66, 1846; Mitt. *Fl. Nov. Zel.*, ii, 146, 1855; Hook., *Handb. N.Z Fl.*, ii. 522, 1867; *Fl Tas* 1860; Steph., *Spec. Hep*, iii, 592. 1909
L. subverticillata Col., *Trans. N.Z. Inst.*, 18, 245, 1885
L. leucocarpa Col., *Trans. N.Z Inst.*, 21, 65, 1888.
L. occulta Col., *Trans. N Z. Inst.*, 22, 456, 1889.
L. hepaticola Steph., *Spec. Hep.*, iii. 592. 1909.

Plants pale green, fading to whitish, or dingy green, small to medium, hairy in appearance, sometimes glistening, common on rotting logs in bush, variable, specially as to size. Stems to 5 cm, irregularly to very regularly pinnate to bipinnate, both pinnae and pinnulae varying in length to 5 mm or more Stem leaves approximate to remote, deeply 4–6-fid, usually 4, 0 5–0 6 mm, discus 2–4 cells high, margins not parallel, setae regular or pointing in different directions, 6–7 cells on end, from a base of 2 cells broad, articulated, 80–90μ x ca 25μ, gradually becoming shorter and narrower towards the apex. Branch leaves a

little smaller, patent, closer, more regular, convex Stipules 4-fid on the main stem, 2–3-fid on the branches, similar to the leaves but smaller. Invol leaves ovate, unequally 3-lobed, lobes uni- or bi-spinose, margins subentire. Perianth often subtended by a tuft of rhizoids, 0·5 cm, large and fleshy, cylindrical, narrowed to the apex, mouth deeply 4-lobed, showing as plicate, laciniate-setaceous. Androecia terminal on pinnae or pinnulae, of ca 6 pairs of tumid bracts, base 4 cells high, generally bifid

L tetradactyla being the first name published must take precedence over Gottsche's name of *L. Lindenbergii* in the Synopsis. Both names and descriptions are given in the Synopsis and Lindenberg's *Species Hepaticarum*, but it has already been recognized that they are synonymous.

Common throughout New Zealand and neighbouring islands, on rotting wood, in bush and under heavy scrub.

A characteristic of *L. longiscypha* sometimes found in *L. tetradactyla* is the presence of shrunken leaves, which become ± inflated on being moistened. Such a one is No. 64, Herb., Petrie.

Forma *subplumulosa.*

From small plants with main stem leaves scarcely to be distinguished from *L. longiscypha,* this species ranges over a variety of subsimilar forms, the most notable of which I have called *subplumulosa*—longer, smoother, silky looking plants, mainly from the south, with a discus of at least 4 cells high, and each segment based on 2 cells. It may be this form which Hooker and Stephani attributed to *L. plumulosa* (South America) Except in No. 921 from Mangaroa Swamp (North Island), the cells of the discus are the wrong shape for *L. plumulosa,* which the older descriptions say are rounded-quadrate. No. 921 (Druce) also has a fair number of the cauline leaves 6-partite, which is also characteristic of *L. plumulosa,* so No. 921 might really be *L. plumulosa.* Unfortunately the type of *L plumulosa* in Manchester Museum Herbarium is unavailable, but anyway, one would need a number of specimens to make a fair comparison Nos. 9699, 9541, 1039, 454, from Stewart Island (Martin), are examples of form *subplumulosa.* Also Nos. 9893, 9628, 9883, also from Stewart Island

The type of *L. tetradactyla* was from Auckland Island

The type of *L Lindenbergii* was from New Zealand

16. Lepidozia centipes Tayl. & Syn. Hep. Fig. 16.

Jungermannia centipes Tayl in Herb Grev.

Lepidozia centipes Syn. Hep., 204; *L. Spec Hep.*, Fasc. vi, 1846; St. *Spec. Hep.*, iii, 584; Rod., Tas Bry., ii, 66 *Trans. Roy Soc. Tas.*, 1916

Plants small, glaucous or white, usually terricolous Stem ca 1 cm or a little more. Branches few, nearly as long as the stem, pectinate. Leaves of a peculiar texture, scarcely altered when dry, approximate on the main stem, contiguous or slightly imbricate on the branches, plano-distichous, sub-horizontal, oblong-quadrate, margins parallel, but dorsal base a little arched and ventral base a little decurrent, 6 or 8, rarely 4 cells broad, tri- or qudrifid, laciniae setaceous, of 6 linear cells from a base formed by the terminal cells of 2 of the lengthwise rows. Cells in ± even rows, both lengthwise and crosswise, ca 35 x 50μ, those of the basal row usually, but not always, almost twice as long as broad. Stipules deeply tri- or quadrifid, segments slender, diverging.

Distinguished by its pale glaucous colour, together with its rectangular, symmetrical, subhorizontal, contiguous, large-celled leaves, with setaceous segments.

One cannot be quite sure from Colenso's description, but it would appear that *L. elegans* Col. must be this species. It was collected on rotten wood, forests, Great Barrier Island, 1888, by C. P. Winklemann, and would be the first gathering of this Tasmanian species in New Zealand The other alternative would be *L. Roseana* St., in which case Colenso's name would take priority. The laciniae of *L. centipes* are setaceous, and there is no intervening row of 2 cells between the actual base and the single cells which become linear towards the top. *L. Roseana* has this extra row of 2 cells, and moreover there are rarely more than 3 single cells on end, and they are not linear.

North Island: In crevices, seaside bank, Parua Bay, Northland, 3005, D. S. Harnett; on wet, overhanging clay bank in bush, H708, from clay bank in heavy forest, H711, above creek in bush, under overhanging bank in pure colony, 1223, all Waipoua Forest, rocky gorge of Pongakawa R. (B. of Plenty), K. W. A ; on moist, hard rock, Orakei (Auckland) 181, J. Langridge; Coromandel Pen , L. J. M., 42, 135; dry sides of cave, Mt Drury (Tauranga), 632, on rooty humus in bush, Waikaremoana, 951, E. A H.; field hut, Tararuas, 3,000ft, 7619, Ruamahanga V., 566, V. D. Z.

South Island: Spur on Bald Hill, Paparoa Range, 594, H. M. H.

Stewart Island: On rocks by waterfall, North Arm of Paterson's Inlet, 635, tram line to Tin Range, 2674, W. M.

In some of these specimens, H711, K. W. A., 181, J. L., also in two gatherings from Bay of Islands, 4034 and 3856, S. Berggren, collected in 1874, some or all of the leaves present a curious appearance, in that the apices are either crenulate with protruding cells of the discus, or with 1 or 2 segments showing as reduced to one roundly quadrate cell, sitting as it were on 2 terminal cells of the lengthwise rows. It may be that the segments have broken off at, or below the first cell.

The type was from Tasmania (Spence).

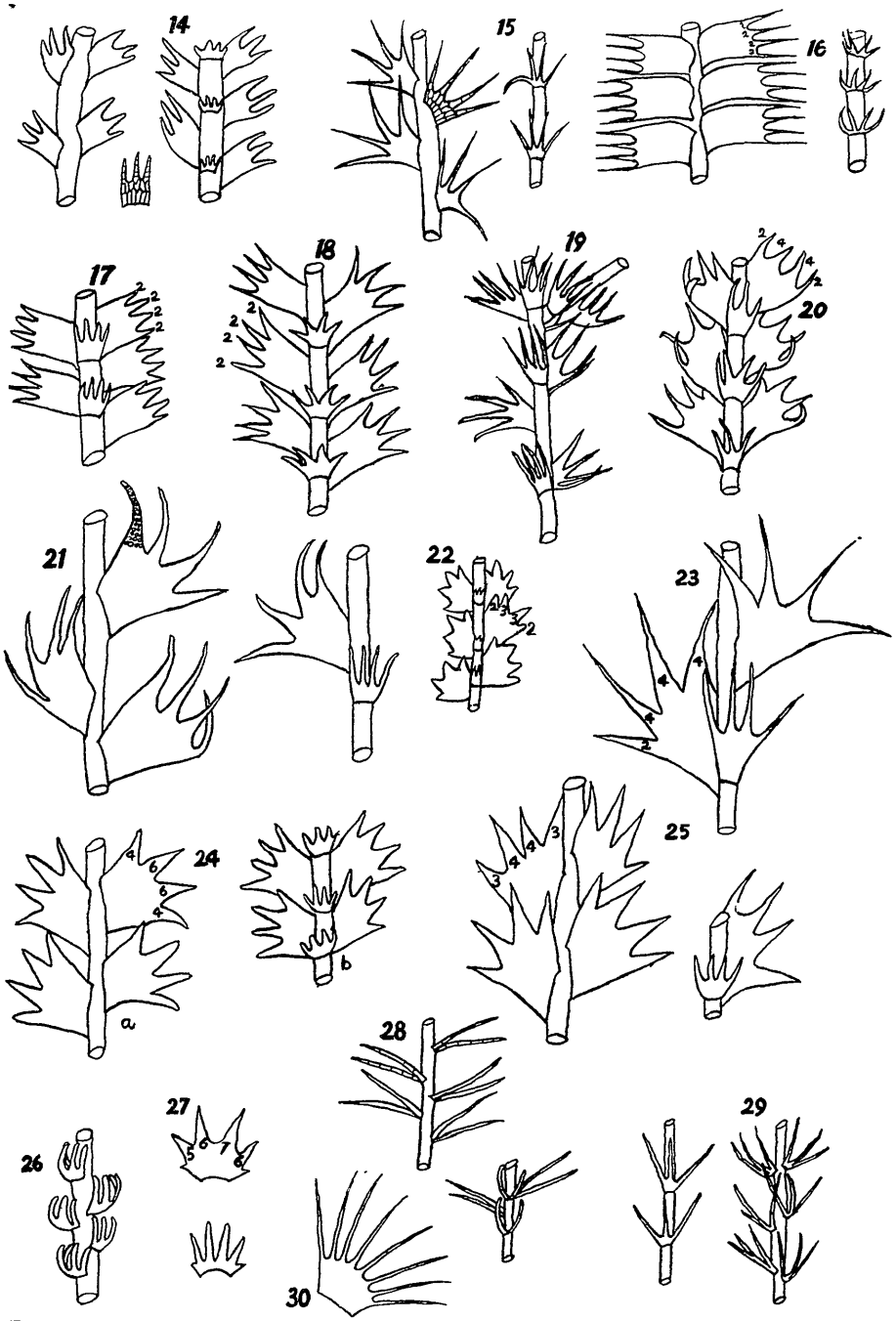
17. **Lepidozia Roseana** Steph. Fig. 17.

L. Roseana Steph., *Spec. Hep.*, iii, 590, 1909.

Plants of medium size, pale or pale green, or whitish when dry, somewhat glossy, of neat habit, on earth or decaying wood. Stems 1 cm or a little more. pinnate but not very densely, branches not attenuated. Leaves mostly imbricate, very regularly obliquely arranged, sub-plane or a little convex and decurved, symmetrical, sub-rectangular, ca 0 5 mm long x 0·35 mm broad, usually 4-fid on the main stem, segments not diverging, generally 2 cells broad at base, obtuse. Stipules a little wider than the stem, 3–4-fid to about half-way. Cells large, ca 45μ, larger at the base.

This is a variable species. It appears that the leaves may be all 3-fid, or both 3 and 4-fid, and though mostly imbricate, they are sometimes sub-remote as in Stephani's drawing. The species differ from *L. Gottscheana* in the rectangular leaves with shorter segments, which in most leaves are all based on 2 cells as in *L. centipes*. The cell-type of *L. Roseana* resembles that of *L. centipes*, but in *L. Roseana* the leaves are oblique in direction, and the segments are shorter and not setaceous.

North Island: On ground in bush, Waiheke Island, 4975, E. A. H.; on ground in cut over forest, Great Barrier Island, with *Radula dentata* 29, with *Bazzania adnexa* 43, R. L.; Waitakere Ranges, 839, 1066, E. D. Swanberg; Rangitikei V., 3,000ft, 1017, 1107, Upper Hutt, 914, Kapiti Island, 1068, A. P. D.; Tauhere-



TEXT-FIG. 2.—FIG. 14—*L. remotifolia.* FIG. 15—*L. tetradactyla.* FIG. 16—*L. centipes.* FIG. 17—*L. Roseana.* FIG. 18—*L. corticola.* FIG. 19—*L. spinosissima.* FIG. 20—*L Gottscheana.* FIG. 21—*L. meridiana* var. *paludicola.* FIG. 22—*L. patentissima.* FIG. 23—*L. Gibbsiana.* FIG. 24—*L meridiana.* (a) Portion of stem, dorsal; (b) of branch ventral. FIG. 25—*L. praenitens.* FIG. 26—*L. Allisonii.* FIG. 27—*L. compacta.* FIG. 28—*L. Herzogii.* FIG. 29—*L. longiscypha.* FIG. 30—*L. pulcherrima.*

nikau R., 251, H. M. H.; dryish bank in bush, Pinehaven, Hutt V, 6798, 6796, 6795, 7038, E. A. H.

South Island: Covering many yards of steep bank under mahoe bush, Town Belt, Mornington, Dunedin, 1225. K W. A ; 25716, Bot. Div. Herb, G. S.; on earth in beech forest, Tapanui, Otago, 9563; on log in forest, Pegasus, Stewart Island, 679, W. M.; Auckland Island, 6797, E. G. Turbott (1944).

No. 60 Herb. D. Petrie, identified by Stephani as *L. centipes* is *L. Roseana*.

Also from Fiji, 25001, Auckland Museum Herbarium, coll. I. Mead. This specimen does not have flagelliform branches, also 3-fid leaves.

No specified locality is given for the type Collectors mentioned are Rose and Petrie.

18. Lepidozia corticola Steph. Fig. 18.

L. corticola Steph., *Spec. Hep.*, iii, 591. 1909.

Plants in flattened mats, glossy brown. Stems ca 2·5 cm, variously pinnate, some pinnate flagelliform. Stem leaves contiguous to sub-remote, sub-horizontally spreading, mostly 4-fid to the middle, discus usually ca 5 cells high and 8 cells broad, rectangular with ventral basal margin more or less decurrent. Segments usually 4, setaceous, more or less divaricating, each based on a double row of cells reaching to the bottom of the discus and ending in at least 4 single cells in one series. Stipules 3 or 4-fid, segments setaceous, divaricating. Cells hexagonal-quadrate, large, 50–60μ Stephani's measurement is much smaller, being only 27 x 36μ.

This species is very close to *L Gottscheana*. The leaf-segments, however, with few exceptions, are all based on 2 cells as in *L. centipes* and *L. Roseana*, as is shown in Stephani's drawing. In *L. Gottscheana* the two middle segments or the 3rd segment only, are based on 3 or 4 cells and abruptly narrowed to 1 or 2 cells respectively. The setaceous segments separate this species from *L. Roseana*.

A gathering from Mt. Hauhangatahi, National Park, 2577, L. B. M, has leaf-segments ending in as many as 6 cells on end, but only a proportion of them are based on 2 cells, nevertheless it has more the appearance of *L. corticola* than of *L. Gottscheana*.

A gathering from Kapiti Island, 9741, A. P. D, has the correct cell makeup, but the leaves are sub-imbricate and decurved, with segments not diverging.

North Island· Manganui, Northland, 221, Auckland Museum Herbarium.

Stewart Island. Ground near Tin Range, 9978, W. M.

The type was collected by Beckett, and would most likely be from the South Island.

19. Lepidozia leptodictyon Herz.

L. leptodictyon Herz, New Spec. N.Z. Hep., *Trans. Roy. Soc. N.Z.*, 68, 1938, p. 45.

Plants paludicolous, dioicous, small, of delicate structure, dingy hyaline, hard to detect, very floriferous Stems ca 1 cm, not much branched, cortical cells very lax, specially on the branches. Leaves distorted in shape when dry, and slow to take up moisture, ca 0 4–0 6 mm long, imbricate to subremote, often varying greatly on the same stem, 3–4-fid, upper ones mostly widening from the base, with shortish triangular segments, lower often with segments straggly and attenuated. Stipules also variable, 2–3-fid with irregular segments. Cells lax, very hyaline, may be quadrate, ca 35μ on upper stem leaves, varying to 30 x 70μ on lower stem and branch leaves, walls mainly with contents adhering to the margins. Involl. leaves very flimsy, difficult to examine, segments narrow from a

long leaf-discus Perianth to 4 mm x 0 7 mm, cylindrical-ovate to cylindrical, mouth shortly lacinulate. Androecia "longe spicata, vermicularia, bracteis multijugis, concavissimis, 3-fid."

A specimen from Maungatua Range, Otago, floating in tarn in deep water, ca 2,900ft, H848, K. W A , seems to be an aquatic form of this species.

From edge of swamp, ca 1,000ft, near Atiamuri, 18/7/29, (type), H70, swampy ground, Tahorakini Block, near Taupo, 6687, sphagnum cushion in swamp, E of Waiotapu V., ca 1,700ft, K. W. A.

I think that this species may be a *Cephalozia.*

20. Lepidozia patentissima (Tayl) Syn Hep. Fig. 22

Jungermannia patentissima Tayl. in *Lond. Journ. of Bot.*, 1844, 386; *Fl. Antarc.*, i, 158. *Lepidozia patentissima Syn. Hep.*, 204, 1845; Lindenb, in *Spec. Hep* , Fasc. vi, 30, 1846; *Handb N.Z. Fl* , ii, 522, 1867, *Spec. Hep.*, iii, 590, 1909.

Plants minute, procumbent. Stems pinnately branched, branches short or flagelliferous, with bifid leaves. Leaves imbricate, semi-vertical, obovate-obcuneate, 0 3 mm tall, 3–4-fid, segments straight, lanceolate, from a broadly triangular base, the basal row of cells, 3 in number, gradually tapering to 1 or 2 single cells, incurved when dry Stipules similar, minute. Cells 30–40μ, showing as large in such a small plant

This description is of the original plant from Auckland Island. The following plants from the mainland are also placed here. Though varying somewhat in appearance, they mostly agree in the small size, the incurved leaves when dry, and the lanceolate, short to shortish leaf-segments, from a triangular base From *L. laevifolia* of the *Asymmetricae* group which is of similar size, it is distinguished by the straight dorsal margin, the quadrate, non-porose cells, and the more even segments.

In his *Species Hepaticarum,* Stephani appears to have confused the description with that of *L. dispar,* which is also present in the type specimen.

North Island: Shady bank near water, Puarenga stream, Whakarewarewa 932, under shade of manuka in Reserve, Whakarewarewa, 850, K W. A.; wet bank in summit scrub, Maungapohatu H133, L. B. M.; National Park, 849, A. L. H.; Kaimanawas, 1089, Kapakapanui (Tararuas) 839, A P. D.; Oroua V., 855, Northern Ruahines, 853, H. M. H.; 6200 in Kirk's collection, identified by Stephani as *L capilligera:* damp clay bank, Zigzag, Pinehaven. 6789, E.A.H.

South Island. Marlborough, 96, J. H. McMahon; beech forest, Arthur's Pass, H77, L. B. M.; on rocks, Arthur's Pass 97, W. M.; near L. Harris, 17083, V. D. Z.; Great Island, Chalky Inlet, 6689, H. H. Allan; Expectation Sound, Caswell Sound, 5322, V D Z ; damp ground near waterfall, Pegasus Creek, Stewart Island, 628, W. M

21. Lepidozia Gottscheana *Syn. Hep.* Fig. 20.

L. Gottscheana Lindenb. in *Syn. Hep.*, 206, 1845; Lindenb. *Spec. Hep.*, Fasc. vi, 35, t vi, 1846; Mitt. *Fl. Nov. Zel.*, ii, 145, 1855; Hook., *Handb. N.Z. Fl* ii, 522, 1867; Steph., *Spec. Hep* . iii. 595, 1909.

L. cancellata Col , *Trans N.Z Inst.*. 18. 244, 1885.

Plants creeping singly, or loosely to closely pulvinate, on earth or rotting wood, glossy, spotted, pale cream to golden brown, very variable, covering a large range of forms, common in bush. Stems ca 2–4 cm. regularly or irregularly pinnate to bi-pinnate, branches obtuse or attenuate, sometimes curved, slender filiform branches sometimes on slender plants. Leaves imbricate to contiguous, flat or concave, line of insertion oblique to subhorizontal 0 6–0 8 mm long, some-

what narrowed to the base, with the ventral margin decurrent, quadrifid, rarely 5- or 6-fid, to above or below the middle, often trifid on the branches, and bifid on the capillary tips; segments usually diverging, subulate, the 2 median segments usually abruptly narrowed from 4 cells to 2, the third segment practically always so, even on the branches, then 3–6 cells in one series. Stipules smaller, but conforming with the leaves, usually 4-fid on the main stem, 3–2-fid on the branches. Cells ca 40–50μ x ca 30–40μ. Perianth as in *L. praenitens*.

L. capilligera, reported from New Zealand by the Handbook and Stephani, is an Australian plant. It is similar to *L. Gottscheana* in some ways, but differs in the slender stem with shortish regularly pinnate branches. The leaf segments, too, are not all regular in their direction However, the leaf-segments are not all based on 2 cells as stated by Stephani following Lindenberg (earlier descriptions have not been seen), but some of them on 3–4 cells as in *L Gottscheana,* and as in Lindenberg's plate There may be specimens of *L Gottscheana* resembling *L. capilligera,* but till more is known of *L. capilligera* it is better to keep the New Zealand plant separate, specially as *L capilligera* is the earlier name.

The New Zealand species *L. tetrapila* (Tayl.) was reduced by Mitten to *L. capilligera,* but the fragment in the Melbourne Herbarium is an asymmetric species, and Lindenberg (1846) compared it with *L. laevifolia.*

Stephani places *L. Gottscheana* in his *Asymmetricae* group, as the ventral margin being decurrent is longer than the dorsal; but its natural home is with the *Symmetricae.*

There appear to be intermediate forms between *L. Gottscheana* and *L. Roseana.*

North Island: Little Barrier Island, R. E. N. Matthews; Waipoua Forest, H763, H764, K. W. A.; 4618, M. A. Baker; Auckland, Kirk's collection, 4895; Waitakeres, 862, E. D. Swanberg; Coromandel Pen., 863, Mt. Pureora, 3,000ft, 6669, Mt. Ruapehu, 865, 866, 859, A. L. H ; Coromandel Pen., 2572, L. J Matthews; E. of Taupo, 2563, 2564, 2570, K. W. A.; Whakapapa, 893, near Ohakune Hut, 131, G. O. K. S ; Ohakune Track, 3,000–4,000ft, H. M. H.; on earth in bush, Waikaremoana and Waikare-iti, 2,000-3,000ft, 20 specimens, Mrs. H Jeffreys, E. A. H ; edges of paths, Whakarewarewa, 3682, E A. H.; Kaimanawas, 992, 981, Rangiwahia (W Ruahines), 5900, Mokai Patea (Ruahines), 5,000ft, 5897, 5940, 6242, Mt. Climie (Rimutakas) ca 2,000ft, A P D.; Tararuas, 2,000–3,000ft. 7183, 7090, 7380, 7633, 7375, 7478, Bot. Div Herb., V D. Z.; H175, H171. L. B M.; N.W. Ruahines, 880, H. M. & A. P D.; Rimutakas, 1507, H. M. H.; Orongorongo R., 7154, V D. Z.; bank in bush, Pinehaven, Upper Hutt, 6800; bank by path Orakei-Korako Thermal Reserve, 10384, bush tracks, Mt. Egmont, 10195, below Stratford Mountain House, Mt Egmont, 10176, near to *L. capilligera*, E A. H.

South Island: Arthur's Pass, 22, W. M.; near Greymouth, 884, Paparoa Range, 1045, H. M. H.; near Fox Glacier, 919, C. Crompton; Mt. Cargill, Silver Peak, 24635, 26455, Bot Div Herb., G. S.; 17517, 2566, H. H. Allan: between Waitati and Dunedin, H909, south of Dunedin, 2571, K W. A ; Revolver Cove, Preservation Inlet, 2566, H. H. Allan; Doubtful Sound, 6607, on earth, base of Longwood Range, Southland, 8467, W M ; Blueskin, Waitati R , S Berggren, 1874.

Stewart Island Mrs J D Smith, 890, 905, 329, 339, 452 514, 641, 475, 449, 3635, 9977, W. M.

The type, which was a poor specimen with deformed leaf-segments, was from New Zealand in Herb. Hooker.

22. Lepidozia meridiana Hodgson sp nov Fig 24.

Sterilis, brunescens vel albicans, subpulvinate. Caulis ad 3 cm, longus, 0 3–4 mm latus, regulariter pinnatim ramosus, rami raro longiores quam 0 5 cm. Folia caulina remota, maxime concava apiceque involuta, ad 0 8 mm longa in plano, apice aequaelata, basi 0 4 mm lata, quadrifida, laciniis basi 5–7 cellulas latis, lanceolatis, parum divergentibus, discus ca 0·35–0 4 mm longus, cellulae 30–40μ, basales elongatae; ramorum magis approximata vel imbricata, planiora. Stipula quadrifida, lacinus breviusculis, sinubus obtusis

Plants sterile, pale greenish-brown to whitish, somewhat glossy, flatly pulvinate Stems to 3 cm, 0·3–0 4 mm wide, usually simply pinnate, pinnae rarely longer than 0·5 cm, at intervals of 0 2–0 5 cm, cortical cells 0·7 mm long; leaf apex 0 6–0·8 mm wide, base ca 0·4 mm wide, subsymmetric, 4-fid to the middle or less, segments lanceolate, strongly incurved, the 2 median ones 5–7 cells wide at base (outer ones may be somewhat narrower and diverging) tapering to usually 3 small single cells at apex. Cells of laciniae 30–40μ, increasing downwards to the base of the leaf to twice that size. Discus subquadrate, 0 35–0 4 mm tall. Branch leaves ± imbricate, smaller and flatter Stipules samewhat small, 4-fid, scarcely to the middle, a little broader than the stem

This species is distinguished by its pale, remote, incurved leaves with lanceolate segments. Even when moistened the tips will not always unbend. The bases of the leaf-segments are, on the whole, broader in the type than in the plants from the mainland.

Stewart Island, 4866, Bot. Div. Herb.; moist ground, Mt Maungatua, 399, G. S. and J. S. T. (small); Supper Cove, Fiordland Excursion, 1196, H. H. A.; L. Manapouri to Wilmot Pass, 1201, G. S.; mixed with *Isotachis Lyallii*, Doubtful Sound, 6695, forest near Hokitika, 86, 92, 100, W M.; Bluff-Invercargill-Winton. 3761, 3819 in part, S. Berggren, 1874. Marlborough, 96. J. H McMahon; decaying log, north of Mt. Christian, Fiordland, 580, R. E. H.

The type was from No. 2 Camp, Auckland Island, E. G. Turbott, 31/10/44, ("Cape Expedition"), Bot. Div. Herb., 1204 Herb., E A H

Lepidozia meridiana var **paludicola** Hodgson var. nov Fig 21.

Folia caulina pleraque quadrifida, nonnulla 5–6-fida, laciniae basi 3–4 cellulas latae, deinde 2 cellulas latae tri-quinque-seriatis, deinde 5 cellulas alia post aliam. Cellulae ubique aubaequales ca 40μ, pellucidae.

I am not sure that this should not be considered a separate species with its much more slender leaf-laciniae, based on not more than 3–4 cells, with 3–5 rows of twin cells below the 5 single ones, and the cells more pellucid and more uniform in size throughout the leaf. But the habit of the leaves and general appearance are similar. Specimens so determined are all from the North Island

On sphagnum in swamp, near Atiamuri 6/9/29, 856, K. W. A. (some stems approaching *L. Gottscheana*); Field Peak (Tararuas) H173, L. B. M.; bog above bush, Tararuas, 949, bog on north side of Mt Egmont, ca 3,000ft, 3663, Mangaroa Swamp, 922, 923, 924, A. P. D.

Type from bog in Oriwa L. Hollow, 3,300ft. Tararuas, coll V. D. Zotov, 15/4/33, No. 6619, Bot Div Herb.

23. Lepidozia spinosissima (Tayl.) Mitt. Fig. 19.

Sendtnera spinosissima Tayl. in *Lond. Journ. of Bot.*, 1846; *Syn. Hep.* Supp. 1847
Lepidozia spinosissima Mitt. in *Fl. Nov. Zel.*, ii, 146; *Handb. N.Z. Fl.*, ii, 522; Steph., *Spec. Hep.*, iii, 594.

Plants loosely tufted to sub-pulvinate, olive green turning to brown when dried. Stems to 10 cm, simple, woody, rigid, pinnate to bi-, occasionally tri-pinnate, pinnae and pinnulae ascending, flagelliform and pendulous or flexuous, stem apices often capitate. Stem leaves to 1 mm, patent to erecto-patent, deeply cleft to ¾ or more of their length, segments rigid, diverging, longly tapering from an 8-celled base, and ending in ca 6 cells end to end; branch leaves smaller. Stipules deeply quadrifid, closely resembling the leaves. Cells 20–30μ, marginal cells of the segments usually broader than tall. Involucral leaves ca 1 mm, concave, 4-fid, laciniae lanceolate to sub-setaceous. Perianth ventral, sessile on the main stem.

Only one perianth has been seen (L. B. Moore), but another stem from Stewart Island, C. Smith, 22, had numerous involucres with sterile archegonia arranged along the stem.

This species resembles *L. microphylla* in habit and appearance, but on examination, the longly spinose leaves at once distinguish it.

North Island: Mangonui, 965, Auckland, 9, H. B. Matthews; Russell-Whangarei Road, 1,100ft, V. W. Lindauer, damp river-bank under ferns in heavy shade, H693, on creek bank in bush, Waipoua Forest; dry wooded ridge, Mt. Messenger (Taranaki), K. W. A.; sides of waterfall, Huia (Manukau), 962, B. Brewin; Manaia Basin (Coromandel Range), 160. Coromandel Peninsula, 65, L. J. M.; wet bank, Coal Creek, 2,100ft (Western Ruahines) 2, Kapakapanui (Tararuas) 882, 889, A. P. D.; Little Akatarawa V., H. M. H., 754; Ohau-iti R., 7081, V. D. Z.; wet bank in bush, Pinehaven (Hutt V.), 6777, E. A. H. In ground around old kauri head, Great Barrier Island, 38, R. L.

South Island. West Haven (Nelson), G. Simpson and J. S. Thomson, 968· Karamea, Miss Foot, 967; rain forest, north of Greymouth, H85. L. B. M.; spur on Bald Hill, Paparoa Range, 971, near Greymouth, 974, H. M. H.; Greenstone (Westland), clothing a vertical stream bank in forest, L24, E. B. Ashcroft; Westland, 4912, Bot. Div. Herb., T. Kirk; near Fox Glacier, 975, Mrs. Knight, head of L. Manapouri, H896, G. S.; Fiordland Excursion, 4 gatherings, H. H. A.; roadside banks, near L. Iolanthe, 5057, W. M.

Stewart Island: In spray of waterfall, Glory Harbour, 303; waterfall, Paterson's Inlet, 2668; bank of stream, Pegasus, 459, W. M.

Type in Herb. Hooker, coll. Edgerley.

24. Lepidozia Gibbsiana Steph. Fig. 23.

L. Gibbsiana Steph., *Spec. Hep.*, vi, 328, 1924, Gibbs in Hep. of N.Z., *Journ. of Bot. British and Foreign*, 49, 266, 1911.

Plants in a pale, dense, soft mat. Stems to 2 cm, pinnate, often a pinna from the lower part, being again pinnate with the same habit as the main stem. Leaves imbricate, a little convex (dorsally), with a hairy appearance due to the very elongated hair-points of the segments, obliquely inserted, total length to ca 0·9 mm, base 3–5 mm broad, deeply divided to about ⅔ of the length into usually 4, sometimes 5–6 longly setaceous segments with 4 basal cells, gradually narrowing to the apex with 7 or 8 single cells on end, sinuses broadly obtuse. Stipules somewhat smaller, otherwise similar to the leaves, sometimes 5–6-fid. Cells ca 35μ single cells of the subula ca 70μ.

This species is perhaps nearest to *L. praenitens*. The closely pinnate stems with unusually long, attenuated leaf-segments enable it to be easily recognized.

North Island: On *Leucobryum candidum*, Waipoua Forest, 4609, M. A. Baker; Waihi, 73, D. Petrie, 1897; old beech stump in forest, ca 3,600ft, Maungapohatu, H131, L. B. M; bush on Maungapohatu, 2,000–2,800ft, G. O. K. S.; with *Bazzania adnexa* Ohakune track, Mt. Ruapehu, 2,000–3,000ft, 8551, H. M. H.; on earth and near to ground, in bush round L. Waikaremoana, 2,000ft, 665, 934, 935, 936, E. A. H.; 940, Mrs. Jeffreys; track to L. Waikare-iti, 938, 9293, E. A. H.; 939, Mrs Jeffreys; L. Wairaumoana (Part of L. Waikaremoana) 936, Mrs G. O. K. Sainsbury; Dawson Falls Road, 2,000ft, Mt. Egmont, 950, A. H. Hornblow.

The type was from Te Aroha, 2,500ft, on stones and rotten wood, forest, L. S. Gibbs, 1041.

25. Lepidozia praenitens. Fig. 25.

Jungermannia praenitens L. et L., in Lehm. *Pug.*, iv. 27.

Lepidozia praenitens Syn. Hep., 206, 1845; L. et G., *Spec. Hep.*, Fasc. vi, 34, t. vi, 1846; Mitt. *Fl. Nov. Zel.*, ii, 145, 1855, Hook. *Handb. N.Z. Fl.*, ii, 522, 1867. Steph. *Spec. Hep.*, iii, 593, 1909, Rod. Tas. Bry., *Trans. Roy. Soc. Tas.*, p. 65, 1916.

Plants medium, pale to golden brown, somewhat glossy, forming a layered mat when in a pure association. Stems procumbent, to ca 3 cm, usually closely pinnate with branches at an angle of 45°, occasionally flagellate, upper branches shorter, median ones may be again branched. Leaves imbricate, not quite symmetrical, obliquely spreading, a little decurved, obcuneate-flagellate, ca 0·6 mm long, apex a little wider, from a base ca 0·2 mm wide or a little more, quadrifid to below the middle, segments lanceolate-attenuate, 2 median ones not less than 4 cells wide at the base, narrowing gradually to a single series of 3–5 cells; may be deeply 3-fid on the secondary branches. Stipules much smaller, deeply incised, segments more setaceous. Cells 50–60μ, usually ca twice as long as broad, specially in the segments, basal hyaline, rounded-quadrate, cortical cells ca 45μ, rounded-quadrate. Involl leaves ovate, 4-dentate. Perianth cylindric, curved, narrowed to a deeply 4–5 dentate mouth, plicate.

This species, which bears a resemblance to *L. Gottscheana*, does not give much trouble. It can be distinguished by the palmately divergent segments, not abruptly narrowed, but lanceolate-spinose, together with the compact branching, and the cells twice as long as broad.

North Island: Auckland, 112, H. B. Matthews; log in bush, Paeroa Range South of Rotorua, ca 3,000ft, 840, Pahautea Bush, East of Taupo, 848, K. W. A.; Ngamoko Track, Waikaremoana, 402, E. A. H., Puketitiri, M. Brownlie, 861, Otupae, N.W. Ruahines, A. P. and H. M. D., 841; Oroua V., Ruahines, 842, H. M. H.; Upper reaches of Ruakituri R. Wairoa, 9339, B. Teague; watercourse North of Field Hut, Tararuas, ca 2,600ft, 7580, Bot. Div. Herb., Field Hut, 2,700ft, 7374, Bot. Div. Herb., Mt. Arawara, 6701, Bot. Div. Herb., Orongorongo R., 2,000ft, 7184, Bot. Div. Herb., V. D. Z.; Kapakapanui, 832, Mt. Climie, Rimutakas, ca 2,000ft, 844, 845, 857 (branches capillaceous, less compact), A. P. D.; Waimarino V. Kaimanawas, H. M. H., 858; bog on north side of Mt. Egmont, 3,000ft, 1336, A. P. D.; Mt. Egmont, bush tracks, 10383, 10234, 10243, E. A. H.

South Island: Lewis Pass, 860, E. Ocenden, Bealey Track, Arthur's Pass (small and pale green, otherwise agreeing), 846, H. M. H.; Kelly's Saddle, Otira, 9610, W. M.; Fox Glacier, 847, Mrs. Knight; track from road to Fox Glacier

on earth-covered rocks, 5062, among stones, head of Hollyford R, 2,000ft, Doubtful Sound, 6108, W. M.; Supper Cove (Fiordland Excursion, 1946), 2 specimens, H. H. A.; damp rocks, road to Rahu Saddle, near Lewis Pass; near head of L. McKerrow, 727, 772; on soil bank in bush, Martin's Bay, 871, R. E. Hatcher.

Stewart Island: On log in forest, Port Pegasus, 693; on log in forest with *Riccardia eriocaula*, Port Pegasus, 475, W. M.

Lepidozia Beckettiana Steph. is not available, but from the description and drawing, one judges it to be *L. praenitens*.

The type was from "Dusky Bay, Novae Zelandiae, Hb L. et Lg e Hb. Hk. sub. n. 27."

26. Lepidozia radiata Steph.

L. radiata St. *Spec. Hep.*, vi, 339, 1924.

Described by Stephani as "pulcherrima, elegantissima", 2 cm long, somewhat rigid, regularly and shortly pinnate, leaves concave, 8-fid from a semi-circular base 2 cells high, segments 7 cells long, cells twice as long as broad Stipules small, 6-fid, a little broader than the stem.

Colenso, locality not stated.

Judging by the description, this species would differ from *L. pulcherrima* in the base or discus, being only 2 cells high, and the cells of the segments only twice as long as broad, whereas in *L. pulcherrima* the discus is 5 cells high (dorsally), and the cells of the leaf-segments 4 times longer than broad. Both species have leaves normally 8-fid.

Colenso's specimen No 1095, ex Herb. Stephani, labelled *L radiata* is *L tetradactyla*.

27. Lepidozia pulcherrima Steph. Fig. 30.

L. pulcherrima St., *Spec. Hep.*, iii, 600, 1909

Plants pale green to light brown, beautiful, in layered mats Stems 3–4 cm, densely and regularly bi-pinnate, stem and pinnae narrowing to the apex, as in a fern frond. Stem leaves contiguous, obcuneate, normally 8-fid, leaf-base dorsally 5 cells, ca 0·35 mm, ventrally 3 cells high, apex rounded, segments each from a 2-celled base, 0 6–0 8 mm long, 7–8 single cells on end, fanning out from the basal part. Cells ca 70 x 40μ, of the segments, ca 120 x 30μ, all hyaline Stipules smaller, similar but symmetrical.

Strictly speaking, Stephani is correct in placing this species in his Asymmetricae group, but although the dorsal base is higher than the ventral, it is straight, and the cells are all rectangular and thin-walled as in the Symmetricae group, of which it has all the appearance

Five specimens from the vicinity of Port Pegasus, Stewart Island, on ground and logs, 626, 670, 467, 436, 608, January, 1949, W. M.; also ground near Tin Range, 9829, W. M.

The type was from Okarito, leg. T. Kirk. No. 4844. Bot. Div. Herb., is very probably a portion of the type specimen

LEPIDOZIA Subgenus MICROLEPIDOZIA Spruce Journ. of Bot., xiv, 165, 1876.

Syn. *Microlepidozia* (Spruce) E. Jorgensen Norges Levermoser. *Bergens Museum Skrifter*, Nr. 16. (343 pp.), p. 303, 1934.

Type *L. setacea* (Weber) Mitten (*M. setacea* (W.) Jorg., p. 303)

Plants very small, leaves transverse.

28. Lepidozia hippuroides (Tayl.) Steph.

Jungermannia hippuroides Tayl., *Lond. Journ. of Bot*, 1845, *Fl Ant*, 159, 1846.
Lepidozia hippuroides Steph., *Spec. Hep.*, III, 594, 1909
L. capillaris (Sw.) *Syn. Hep.*, 212, 1844; Mitt., *Fl. Nov Zel.* II, 1854; Hook., *Handb. N.Z. Fl.*, ii, 522, 1867.

Plants minute to small, terrestrial, usually pale green, very variable. Stems to 0 5 cm, branches short, in laxer forms, longer, may be filiform or filiform-attenuate, with minute, distant, squarrose leaves. Stem leaves subimbricate, subflagellate (when flattened), 0·2 mm or smaller, deeply 4-fid, segments diverging from a squarrose discus, all directed outwards from, or parallel to, the stem, with a basal row of usually 3 cells, followed by several rows of 2 cells, ending in one or more single cells, except when the two median segments are lanceolate and larger. Discus 3–5 cells deep, with a marginal tooth often present. Cells all separate, rounded or quadrate, varying in size in different plants from 12–20μ. Stipules deeply 3-fid, with or without a lateral projection on the discus, maybe 2-fid on the branches. Invol. leaves ovate, apex shortly ciliate, cells elongate to 70μ. Perianth ca 3 5 mm, excluding the long apical cilia, gradually tapering to the apex, with numerous basal rhizoids.

This little plant, growing on poor ground, often under manuka, is easily identified by the peculiar habit of the leaves, transverse, with a squarrose base, and usually diverging segments It merges into *L. compacta* with larger leaves and lanceolate segments. *L. Allisonii* differs in the brown colour, and in the leaves being catenulate, with convex segments having several rows of twin cells. The authors of the synopsis considered it to be the same species as *L. capillaris*, a Jamaican plant now also reported from South Africa, but Stephani disagreed and reinstated it as a species

North Island. Mt. Archeria (Little Barrier Island), 2,000ft, with other hepatics, 1064 (in part), R. E. N. Matthews; Moehau Summit, H6, L. B. M.; Waikaremoana, on ground in light bush, roadside cutting, etc, 1004, 1005, 1006, E. A. H.; 1007, A. L. H.; on decayed bark, Waikare-iti L., 1001, E. A H.; Kuirau Reserve, 1009, damp shady ground near Atiamuri, H66, steep bank of Rangitaiki R., near Murupara, K. W A.; Oriwa L Hollow, 6629 (in part), 6625, Ohau-iti R., 7089, Akatarawa Saddle, 9296 (in part), V D Z.; Waiopehu Ridge (Tararuas), 1083, G. O. K. S (with numerous capillaceous stems), Mt Climie (Rimutakas) ca 2,000ft, 1010, A. P. D.; Otupae (N.W. Ruahines), 881 in part, H. M. and A. P. D.; Hills W. of Silverstream, 991, H. M. H.; banks on hillside, Kiwi, Wairoa, 320, edge of bush track, Mt. Egmont, 10196, E A. H

South Island: On earth, Bald Hill, Paparoas, Greymouth, 1003, H. M. H; Fox Glacier, 1002, C Crompton, 9752, Mrs Knight, 3 specimens, Fiordland Excursion, H. H A; mossy bank in bush, Martin's Bay, 806, R. E. Hatcher.

Stewart Island: Tin Range, on wet ground overlying rock, 605, wet ground in forest, 2178, on treefern caudex 9745, earthen bank, Pegasus, 673, sandy soil overlying rock, Wilson Bay, 9571, W. M.

Auckland Island, on earth hummock in *Metrosideros* forest, 2242, G E Du Rietz; "Cape Expedition," two gatherings.

Also the following numbers in Berggren's collection (1874): 3871 in part, 3886, 3878, 3877, 3882, 3864, 3887, and from Sydney, Professor Roger Heim, April, 1949.

The type was from Auckland or Campbell Island, coll. Hooker.

29. Lepidozia compacta Steph. Fig. 27.

L. compacta Steph. *Spec. Hep.*. iii, 592, 1909.

This species differs from *L. hippuroides* in its greater size. The stem leaves are bigger with narrowly triangular to lanceolate segments which may be 4–5 cells broad at the base or in exceptional cases 5–7 cells wide at the base, with discus 5 cells high. The leaf-direction is similar to that of *L. hippuroides,* or the segments may be convex-incurved, similar to those of *L. Allisonii.* The habit varies. It may be more compact than in *L hippuroides* with branches curved, obtuse, with leaves often bunched at the apex. Stem leaves are often indistinguishable from those of *L. hippuroides.* The lateral tooth, often present in *L. hippuroides,* is naturally more pronounced in the larger leaves of *L. compacta.* In fact, there is no hard and fast line of distinction between the two species, and identification may be just a matter of opinion.

North Island: On sloping ground above Haruru Falls, under edge of tall manuka, Bay of Islands, open somewhat damp hillside, under short fern, Waipoua Forest, H761, light fern land, Kaingaroa Plains, forming rather extensive patches under light manuka, E. of Waiotapu, fern, hill near Atiamuri, K. W. A.; Moehau, under summit scrub, L. B. M., H95; with *Rhizogonium distichum* Waikaremoana, 998, Mrs. H. Jeffreys; under scrub, on sloping banks, Kiwi Valley (Wairoa), 997, 320, shady bank, side of gorge, Otupae, N.W. Ruahines, 996, roadside cutting, Tauruarau Bridge (Napier-Taihape road), 993, E. A. H.; on bark and on ground with mosses, Otupae, A. P. and H. M. D ; Ruapehu, 3868, S. Berggren (1874).

South Island: On soil, overlying rock, side of Halpin's Creek (Arthur's Pass), 52, W. M.; Arthur's Pass, F. M.; steep gully side in open, near top of Maungatua Range, H847, open clay bank on roadside, Berwick, S. of Dunedin, 8299, dry roadside bank by short, open manuka, Clarendon, S. of Dunedin, 8300, K. W. A.; head of L. Manapouri to Wilmot Pass, G. S.; Bluff-Winton, 3819, S. Berggren (1874); on ground in beech forest, Arthur's Pass, 10404, W M , good typical specimen.

Stewart Island: Moist ground, Port Pegasus, 606, W. M

The type was from Waiotapu V., collector, Lauterbach.

30. Lepidozia Allisonii Herzog. Fig. 26.

L. Allisonii Herz., *Trans. Roy Soc. N.Z.*, 68, 43, 1938.

Plants small, dioicous, in a close, low mat, usually brown. Stems to ca 5 cm, a little branched, branches not flagelliform, both stem and branches catenulate (chain-like). Leaves 0 2 mm, convex, usually with the apex directed towards the stem with a catenulate effect, 4-fid to $\frac{3}{4}$ of the length, segments ligulate, consisting of rows of twin cells mostly to the base and topped with one or two single cells, from a discus 2–4 cells deep, the lateral basal tooth absent or much reduced. Cells ca 15μ, with thick walls, trigones, none. Stipules 2–4-fid. Perianth not described, appears not to differ from that of *L. compacta* ♂ plants with numerous antheridia easily detached, with a hyaline rim, leaves closely imbricate with more of the direction of the ordinary leaves of *L. hippuroides.*

This species differs from *L. hippuroides* and *L. compacta* in the more constant dark colour, the convex leaf-segments having more rows of twin cells and incurved towards the stem. *L. calcarata* has longer and more straggly stems, and the leaves are much less regular.

It might be worth mentioning that Sim's drawing of his South African *L. capillaris* strongly resembles *L Allisonii,* except that the discus of the leaf is only 1 cell high.

North Island. Damp, semi-shady ground at edge of manuka, Waipoua Forest, swampy ground near Atiamuri, shady bank, plateau E. of Waiotapu V., bases of carex, etc., in swamp, Waitahanui R. (B. of Plenty), K. W. A.; edge of bush, L. Tarawera, 3514, edges of paths under scrub, Whakarewarewa, 3687, pumice soil Waiotapu Thermal Reserve, 9308, E. A. H.; shady ignembrite cliff, Hauhangaroa Range, 2,500ft, 7022, on *Riccardia* sp. in bog on north side of Mt. Egmont, 3639, damp depression, Mokai Patea (Ruahines) ca 5,000ft, 6243, A. P. D.; Taheke, 3878, also 3875, 3881, S. Berggren.

South Island: Sheltered cave on coastal cliff, not many feet above high tide, Taieri Mouth, K. W. A.; Leslie Clearing, Caswell Sound, 5321, V. D. Z.; Bealey, Berggren.

Stewart Island: On coastal banks, Ocean Beach, 424, W. M.

The type was from damp hollow in tussock land, E. of Taupo, 2/12/33, collector K. W. Allison, No. 1008 Herb., E. A. H

Although not mentioned by Herzog, the type appears to be gemmiferous.

This species bears a strong resemblance to *L. setacea* of the Northern Hemisphere

31. Lepidozia calcarata Steph.

L. calcarata Steph. *Spec. Hep.*, iii, 592, 1909.

Plants brown in colour, bog-frequenting, very variable. Stems to 2 cm, branches long or short, sometimes with bifid leaves. Stem leaves ca 0·4 mm, contiguous to remote, deeply 4-fid, usually incurved, but sometimes arched with the direction of *L. hippuroides*, lanceolate or ligulate, ending in one or more single cells, usually obtuse; leaf-base may, or may not, be armed with a lateral spur, hence the name. Stipules 2–4-fid, cells rounded-quadrate, may be as large as 30μ, but usually smaller. Invol. leaves ovate, in 3 rows, loosely imbricate on a long perianth stalk (in specimen examined), apex ciliate-toothed. Perianth elongated to 0 5 mm, mouth plicate and narrowed, deeply divided into segments ending in long diaphanous hair-points.

This is a bog plant characterized by its brown colour and small remote stem leaves. In the various gatherings one sees exhibited the characters of all 3 species, *L. hippuroides, L. compacta* and *L. Allisonii*, though it is probably nearest to *L. Allisonii*. The lateral spur, which is conspicuous in the type, and which gives the plant its name, may in some cases be absent altogether.

North Island: Growing with sphagnum, Kaitaia, 367, H. B. Matthews; edge of sphagnum bog, manuka hillside, Waipoua Forest, H760; on sphagnum in bog near Atiamuri, 983, K. W. A.; Moanatuatua peat bog (Waikato), 989, L. M. Cranwell; Table Top Bog (Tararuas), 3,400ft, 7379, Bot. Div. Herb., Oriwa L. Hollow, 6618, in part, V. D Z ; sphagnum cushion of summit bog, Bull Mound (Tararuas), 3,700ft, L. B. M.; near, or in bog, Mokai Patea, Ruahines, 5,000ft, 6199, bog, Mt Maungapohatu, Urewera, 4,600ft, 9675, A. P. D ; Mangaroa swamp, T. Kirk, Bot. Div. Herb., 6115.

South Island: Mt. Maungatua, in water, 984; Mt. Maungatua, in mixed tangle of species occurring at wet pond edges, 2,800ft, G. S. and J S. T ; bog, Mossburn. ca 20 miles S. of L Manapouri, 987. Key Summit, near Homer Tunnel, 725, L B. M.

Some of these specimens are intermediate between the types of *L Allisonii* and *L. calcarata.*

Type locality not stated Also reported from Queensland, coll Scortecchini

LEPIDOZIA subg. TELARANEA (Spruce ex P. Sydow) K. Muller, Rabenhorst's *Krypt.-Flora* vi, 2, 276, 1914.

Syns. *Lepidozia* sect. *Telaranea* Spruce ex P. Sydow, Just's Bot Jahresbericht xiv, 1, 554, 1888.

Telaranea (Spruce ex P. Sydow) Schiffner, Englei & Prantll, 3, 103, 1895.

Type *Telaranea chaetophylla* (Spruce) Schiffner (*Lepidozia chaetophylla* Spruce) and *Telaranea nematodes* (Austin) Howe (not (Gottsche) Howe).

Leaves bipartite, cleft to the base, or 2–3-partite, divided nearly to the base.

32. Lepidozia Herzogii Hodgson nom. nov. Fig. 28.

L. Herzogii nom nov. in Martin The Bry of Stewart Island. II. *Trans Roy Soc. N Z.* 78, 485–501, 1950.

L. bisetula Herzog, *Trans Roy. Soc. N.Z*, 68, 44, 1938

The name was preoccupied by *L bisetula* Steph., *Spec. Hep*, vi, 323, 1922, the plant being from New Caledonia.

Plants minute, subhyaline, either creeping on other bryophytes, or in a glistening little mat, in damp shade and often on tree-fern bases. Stems filiform ca 1 cm long, creeping, intricate, irregularly branched. Leaves sub-remote, squarrose, bipartite to the base, segments diverging to ca 0 3 mm from tip to tip, of 5 cells long in one series, cells ca 90μ, becoming narrower and shorter towards the apex, lowest cell ca 30μ wide, all hyaline, with the chlorophyll collected at the transverse walls. Stipules bifid, segments ca 3 cells long, patent, hamate at the apex. Invol. leaves bifid, very flimsy, segments longly setaceous, each with 2 setae on each side, the 2 lowermost arising where the width is reduced to 3 cells, and the 2 uppermost where it is reduced to 2 Stipules similar. Perianth 1 mm, cells very lax, mouth with 12 long setae.

The fructification, here described for the first time, is from a gathering on a rotten log, Roto-a-kui bush, E. of Taupo, ca 2,500ft, K. W. A, 2/11/34.

L. Herzogii can generally be recognized by its appearance, afforded by the bipartite leaves set at right angles to the stem, or nearly so. It has the same cell-type as *L. tetradactyla* and *L. longiscypha*. In all three species the cells may be subject to inflation and constriction.

North Island: Waipoua Forest, bases of tree-ferns in heavy bush, H759, 8218, *Leucobryum* cushion in bush, 2727; wet shady banks near Atiamuri, 930, 8219, 8220; on damp, shady bank, 10 mile Atiamuri-Rotorua Road, H67; base of tree-fern caudex in bush gully, Bay of Plenty, 2726, K. W. A.; Waitakeres, on tree-fern, 6821, E. D. Swanberg; Wairaumoana, L. Waikaremoana, Mrs. G. O. K. Sainsbury; Morere, 923, E. A. H.; Northern Ruahines, H. M H.; Oriwa L. Hollow, Tararuas, 6629 in part, with other hepatics, Ruamahanga, 335, 7263 Bot. Div. Herb., V. D. Z.; on tree-fern fibres, Ohaeawai, 3852, S. Berggren (1874).

South Island: Facile Harbour, ridge to Trig. 17 (Dusky Sound), Fiordland Expedition, H. H. A. (1946).

Stewart Island: In forest, Port Pegasus, 472 in part, 9710, 5397, W. M.

Auckland Island: "Cape Expedition".

The type was from near Russell, on tree-fern fibres with *Bazzania Tayloriana* and *Psiloclada clandestina*, 124, V. W. Lindauer

I think that this species is really *Lepidozia sejuncta* (Angstr.) St., a similar widespread species.

33. Lepidozia longiscypha (Tayl.) Steph. Fig. 29

Jungermannia longiscypha Tayl., Lond. Journ. of Bot., 5, 280, 1846

Lepidozia longiscypha Steph., *Spec. Hep.*, iii. 580. 1909. Rod.. *Tas. Bry.* ii. *Trans. Roy. Soc. Tas.*, 65, 1916.

Plants pale, moisture-loving, straggly tender, variable. Stems 1–3 cm, irregularly pinnately branched, some branches very slender Cauline leaves distant, 0 3 mm long, deeply 2–4, usually 3-partite, segments pointing in different directions, sometimes curved, of 6–7 cells in one series, twice to three times as long as broad, articulated, narrowing towards the apex, discus ½ to 1½ cells high, cells at base ca 30μ, rarely in proper rows. Branch leaves closer, 2–3-partite, segments more regular in direction. Stipules usually 3-fid, may be irregular, full-sized segments similar to those of the leaves, others may be only partly developed and often curved.

New Zealand plants are quite similar to a Tasmanian specimen, No. 177 Rodway, labelled *Lepidozia longiscypha*, also to a Queensland plant, coll. Elizabeth Henry, 6747, Cairns Museum. Herzog (1949) describes var. *occidentalis* of *L. longiscypha* from Western Australia. (The type itself was from W Australia and not from "Australia orientalis," as given by Stephani.) This variety has 3-partite leaves from a deeper base, the cells of which are not arranged in regular rows. There are similar forms also in New Zealand. Leaf-cells may or may not be constricted, regaining their substance when moistened. There seems to be no particular reason for this.

Most specimens appear to be the same as overseas specimens of *Telaranea nematodes*, but *L. longiscypha* is the earlier name.

North Island: Stream bank, Kaimanawas, 4,500ft, 1069, Mokai Patea (Ruahines) ca 5,000ft, 6241, 6237, both with bog associates; bog on north side of Mt. Egmont, ca 3,000ft, 3643, A. P. D.; Otupae, North-West Ruahines, 8223, 3673, A. P. and H. M. D.; bog, Oriwa L. Hollow, Tararuas; Table Top Bog, Tararuas, 6618, 7397, Bot. Div. Herb., V. D. Z.; track to L. Waikare-iti, 9653, E. A. H.; with *Pallavicinia Lyellii*, Waikopatu Str., Waipoua Forest H691 in part, K. W. A.; Ohaewai, 3852, S. Berggren.

South Island: L. Roto-iti, Nelson, 2689, B M Kidson; Bluff-Winton, 3819 in part, S. Berggren (cells smaller).

Stewart Island: On fallen bark, Pegasus, 9604, W. M

New Zealand has not before been cited as a locality for *L. longiscypha*.

The type was from Swan R., on sand, Western Australia, coll. J. Drummond, Herb. Hooker.

Additional Notes

I am sorry to exclude *Lepidozia cavernarum* Herzog, *Trans. Roy. Soc. N.Z.*, 68, 44, 1938. It is the same species as *Cephalozia furcifolia* Steph. (1909). And it is a *Cephalozia*, for the leaves are succubous I have checked up on this with several specimens, and find it to be so.

The legend "*Lepidozia brevifolia*" to Herzog's drawing (1938) might be meant for "*Lepidozia breviloba*," as *L. brevifolia* is a Himalayan species. The drawing of *L. breviloba* appears to be a wrong identification.

Acknowledgments

I gratefully acknowledge the loan of the following types:—From Kew. *L. glaucophylla, L. dispar, L. patentissima.* From the Herbarium National d'Histoire Naturelle, Paris: *L. microphylla* var. from Antilles, Husnot 220; *L. capilligera*

(Schwaegr.) from Novae Hollandiae: Coll. Labillardiere ex Herb Montagne From the Melbourne National Herbarium: Type fragments of *L. praenitens, L. Gottscheana, L. albula, L. tetrapila, L. laevifolia.* From the Herbarium Stephani, Geneva: *L. gigantea, L. Colensoana, L. quadrata, L. bisbifida, L. Kirkii, L. Angelii, L. hirta, L. obtusiloba.* From the Manchester Herbarium: *L. brevipinna.* From New York Herbarium: *L. laevifolia, L. procera.* Also, my sincere thanks to collectors who have sent me specimens.

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