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I. THE GENERA *Usnea, Ramalina, Himantormia, Alectoria, Cornicularia*

By

I. MACKENZIE LAMB, D.Sc.

Farlow Herbarium, Harvard University

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(Manuscript received December 1961)

ABSTRACT

THIS report is primarily concerned with the material of genera ascribed to the family Usneaceae so far available from the British Antarctic Territory. In addition to the British collections those of Argentinian, Belgian, French, Swedish and United States' expeditions prior to 1958 have been used. Five genera, *Usnea*, *Ramalina*, *Himantormia*, *Alectoria* and *Cornicularia* are represented. The four *Usnea* species all belong to the subgenus *Neuropogon* and are similar in having a wide ecological range. *Ramalina* is considered to be represented by one species only, and a new genus, *Himantormia*, is established for *Ramalina lugubris* Hue (1915). Four species of *Alectoria* and two of *Cornicularia* are also present. The species of these genera are described, details being given of their structure, chemical constituents and geographical distribution. Three species, *Alectoria nigricans*, *A. chalybeiformis* and *Cornicularia aculeata*, are recorded for the first time from the Antarctic.

CONTENTS

I. INTRODUCTION

THIS is the first of a series of reports on the taxonomy of the lichens of the southern part of the British Antarctic Territory (Graham Land, the South Shetland Islands and the South Orkney Islands). It deals with five of the genera—*Usnea*, *Ramalina*, *Himantormia*, *Alectoria* and *Cornicularia*. The genera are traditionally included in the family Usneaceae, but we prefer to avoid this formal circumscription, as the present delimitation of lichen families and suprageneric categories is somewhat uncertain and greatly in need of revision in the light of modern taxonomic principles.

Most of the material on which this series of reports is based is preserved in the Cryptogamic Herbarium of the British Museum (Natural History), London, and smaller collections exist in other institutions. The following list gives the locations of the collections studied, with the abbreviations used in this report for the herbaria and the expeditions concerned.

Herbarium	*Abbreviation Used in Text*	*Expedition*	*Abbreviation Used in Text*	*Publication of Results*
Cryptogamic Herbarium, British Museum (Natural History), London, England	BM	Scottish National Antarctic Expedition, 1902–04*	SNAE	Darbishire (1905)
		Shackleton-Rowett Antarctic Expedition, 1921–22	SRAE	Unpublished except for Pyrenocarp lichens (Lamb, 1948*c*)
		Discovery Investigations (voyages of R.R.S. *Discovery II*), 1931–33, 1934–35, 1936–37	DI	
		British Graham Land Expedition, 1934–37	BGLE	
		Falkland Islands Dependencies Survey,† 1944 onwards	FIDS	
Herb. E. A. Vainio,‡ Turun Yliopiston Kasvitieteellinen Laitos, Turku, Finland	TUR	Belgian Antarctic Expedition, 1897–99	BAE	Vainio (1903)
Naturhistoriska Riksmuseet Botaniska Avdelningen, Stockholm, Sweden	S	Swedish South Polar Expedition, 1901–04	SAE	Darbishire (1912)
Laboratoire de Cryptogamie, Muséum National d'Histoire Naturelle, Paris, France	PC	French Antarctic Expedition, 1903–05	FAE 1903–05	Hue (1908)
		French Antarctic Expedition, 1908–10	FAE 1908–10	Hue (1915)
Sección de Botánica, Universidad de Buenos Aires, Buenos Aires, Argentina	BASB	Several Argentinian expeditions from 1948 onwards. Most material collected by Dr. Oscar Kühnemann in 1954	AE	Unpublished
U.S. National Museum, Smithsonian Institution, Washington, D.C., U.S.A.	US	United States Antarctic Service Expedition, 1939–41	USAS	Data on the lichens collected in the Graham Land region hitherto unpublished
Farlow Herbarium, Harvard University, Cambridge, Mass., U.S.A.	FH	Some collections from "New South Shetland"§ in the herbarium of Thomas Taylor (d. 1848), and a small collection from the South Shetland Islands made by M. Neushul in 1958		Unpublished

* Only a few lichens collected by this expedition are present in the BM; the main collection has not been located.
† Known as "Operation Tabarin" prior to 1946 and renamed British Antarctic Survey on 1 January, 1962.
‡ Name spelt as "Wainio" in the report cited, subsequently altered to "Vainio" which is the form used in the present report.
§ Now known as the South Shetland Islands.

The present author had the privilege of collecting and making field studies in west and east Graham Land and the South Shetlands during the years 1944–45, while a member of "Operation Tabarin", the forerunner of the Falkland Islands Dependencies Survey which has recently been renamed the British Antarctic Survey. An account of the Pyrenocarp lichens, incorporating the results of these field studies, and also a general summary of lichenological investigations in Antarctica up to 1945, was published in 1948 (Lamb, 1948*c*). Since that date, apart from some scattered incidental notes (Lamb, 1947, p. 274; 1948*a*; 1948*b*, p. 225, 236, 241, 242, 249; 1953, p. 431; 1954, p. 116, 126; Llano, 1950, p. 15, 76, 162, 196; Motyka, 1936, p. 31–33, 35) nothing further has been published on the lichens of the British Antarctic Territory, although important contributions have appeared dealing with those of east Antarctica or with Antarctic lichenology generally (Dodge, 1948; Dodge and Rudolph, 1955; Llano, 1956).

II. SYSTEMATIC ACCOUNT

IN the synonymy of the species here dealt with, only those synonyms published subsequently to volume VIII of Zahlbruckner's Catalogus (Zahlbruckner, 1931–32) are consistently enumerated. Earlier synonyms will be found in that work by referring to the index—volume IX (Zahlbruckner, 1933–34).

Abbreviations used in the text for chemical reagents are as follows: PD, paraphenylenediamine ($C_6H_4(NH_2)_2$), 5 per cent solution in 95 per cent alcohol, freshly made up for each occasion; I, iodine dissolved in an aqueous solution of potassium iodide and diluted to a light brown colour; K, a saturated aqueous solution of potassium hydroxide (KOH); C, a fresh saturated aqueous solution of calcium hypochlorite ($Ca(OCl)_2$); KC, an application of K followed rapidly by an application of C.

A plus sign indicates positive reaction and a minus sign negative reaction.

1. Genus ***Usnea*** Wiggers, 1780, p. 90; *emend.* Acharius, 1803, p. 306

This large genus, of world-wide distribution, has been described monographically by Motyka (1936, 1937, 1938, 1947). The Antarctic species all belong to the subgenus *Neuropogon*, characterized by the strongly yellow thallus with black variegation, black apothecial discs (except in *U. trachycarpa*) and exclusively saxicolous habitat. A treatment of the Antarctic species (under *Neuropogon*) was published by the present author in 1939 (Lamb, 1939), with supplementary notes nine years later (Lamb, 1948*a*). The present study introduces a few necessary nomenclatural and taxonomic changes. Both Motyka (1947, p. 319–21, 348) and Dodge (1948, p. 196) have put forward strong arguments in favour of including *Neuropogon* in *Usnea* as a subgenus, and these views are now followed in the present treatment. Motyka (1936) points out that the characters distinguishing *Neuropogon* are neither unique to this subgenus nor constantly correlated with each other; the species do, however, present a general spectrum of characteristics which show correlation with geographical distribution of bipolar type and apparently monophyletic Antarctic origin.

The ratio of the thickness of the tissues composing the branches (cortex, medulla and central chondroid axis) is an important criterion in delimiting the species of *Usnea*. Asahina (1954*a*, 1954*b*, 1955, 1956) has elaborated a numerical formula by which this ratio can be expressed for any given species. The nature of the lichen acid present (in addition to the dibenzofurane compound usnic acid, which occurs in the cortex of all species) is also of taxonomic significance. Other important characters are presence or absence of soredia, shape and colour of the latter when present, and relative smoothness, papillosity or annulation of the surface of the branches, in addition to the morphology and colour of the apothecia in those species which produce these reproductive structures.

Antarctic species of this genus are usually very conspicuous, often covering rocks with dense tufts or swards which from a distance may be mistaken for grass by casual or untrained observers (Plates Ia and Va). Weddell (1825) wrote of "a patch of short grass" at Cape Dundas in the South Orkneys, and both Rudmose Brown and Darbishire (1912, p. 24) and Marr (1935, p. 368) were inclined to consider that what he saw, presumably from some distance, was in fact a species of *Usnea* subgen. *Neuropogon*. This is possible, but it should be remembered that a true grass, *Deschampsia antarctica* Desv., has recently been recorded from the islands in question, "in patches as much as a yard or two square" (Skottsberg, 1954, p. 331), and so Weddell's observation may well have been correct.

Subgenus ***Neuropogon*** (Nees and Flotow, 1835, p. 496; *emend.* Nylander, 1860, p. 272) Motyka, 1936, p. 18

Neuropogon (as genus) was erected on the basis of two species, *N. pöppigii* Nees & Fw. and *N. antennarius* Nees & Fw. The former species was transferred to *Chlorea* by Nylander (1860, p. 275), *Letharia* by Darbishire (1912, p. 33), *Rhytidocaulon* by Elenkin (1916, p. 266) and *Usnea* subgen. *Protousnea* by Motyka (1936, p. 10). Thus, by tacit agreement, *N. antennarius* has long been considered as the representative or type species of the genus or subgenus. Motyka (1936, p. 28) cites *N. antennarius* as a synonym of *Usnea* (*Neuropogon*) *aurantiaco-atra* (Wulf.) Bory, using the latter name in the sense of *U. fasciata* Torrey (see remarks below under *U. fasciata*). The present author has not been able to examine any type or authentic material of *N. antennarius*, which was described from the Chilean Andes, near Antuco, but has seen material of *U. fasciata* subsequently collected in the same locality (Lamb, 1939, p. 225, as *Neuropogon aurantiaco-ater* f. *egentissimus*). There can be little doubt therefore that the subgenus *Neuropogon*, as lectotypified by *N. antennarius* Nees & Fw. is correctly interpreted by Motyka and other modern authors.

All the Antarctic species of the subgenus seem to have similar ecological requirements, with a rather wide range of tolerance as regards altitude and edaphic factors. Lynge (1941) has already noted some of the ecological characters of *U. sulphurea* in the Arctic regions, stating that it is calciphobe, restricted to the more durable types of rock, not nitrophilous, and that it occurs at altitudes up to over 5,000 ft. (1,540 m.). The Antarctic species, notably *U. antarctica* and *U. fasciata*, are also not nitrophilous, but certainly not nitrophobe; at lower altitudes they may grow in highly nitrogenous situations, as around penguin rookeries, and so appear to be completely indifferent as regards this edaphic factor. They may be found at all levels from the shoreline up to 1,000 ft. (308 m.) (*U. fasciata*), 1,800 ft. (550 m.) (*U. antarctica*), or 3,500 ft. (1,080 m.) (*U. sulphurea*). The optimum environment seems to be a short distance inland, on gently sloping stony slopes which are periodically irrigated by trickling snow melt water (Lamb, 1948*a*, p. 145).

Key to the species of Graham Land and adjacent islands

1*a*. Medulla of main branches usually lax (cottony or arachnoid), rarely more or less compact; central chondroid axis thin, occupying one-fifth to one-third of the diameter of the branch. Branches often breaking across transversely and remaining held together by the central strand. Plants small, forming tufts 2–3, rarely 4 cm. high. Soredia present (except in poorly developed specimens) ... ... *U. sulphurea*

1*b*. Medulla of main branches always dense and compact; central chondroid axis thicker, occupying one-third to one-half of the diameter of the branch. Branches rigid and hard, never becoming broken and dislocated transversely (although sometimes with blackened transverse annular cracks, cf. *U. acromelana*). Plants usually larger (except in *U. acromelana* var. *decipiens*), forming tufts 4-7 or even up to 15 cm. high in exceptionally luxuriant specimens. Soredia present or absent.

2*a*. Soredia present; very rarely fertile.

3*a*. Soredia prominent, pulvinate to subglobose, often blackish, compact, not loosely pulverulent; main branches not papillate, but often with distinct black annular cracks. Plants comparatively small, 2–3 cm. high. Active phase containing norstictic acid (medulla K+ red, PD+ yellow) ... ... *U. acromelana* var. *decipiens*

3*b*. Soredia usually eroded (rarely convex), commonly pale coloured (whitish-yellow), pulverulent; main branches more or less distinctly papillate, without black annular cracks. Plants (when well developed) larger, 4–5 cm. tall, exceptionally up to 8 or even 15 cm. Active phase containing fumarprotocetraric acid (medulla K+ brown or —, PD+ red) ... ... *U. antarctica*

2*b*. Soredia absent; often fertile; in other respects similar to *U. antarctica* ... ... *U. fasciata*

Usnea acromelana Stirton, 1898, p. 388

Syn. *Neuropogon acromelanus* (Stirton) M. Lamb, 1939, p. 218.

var. *decipiens* (M. Lamb) M. Lamb, **n. comb.**

Syn. *Neuropogon acromelanus* var. *decipiens* M. Lamb, 1939, p. 219.
Icon. Plate IVa: the type material in BM, ×4.
Plate IVb: specimen from Brabant Island, west Graham Land, BAE No. 249 *pr. p.* in TUR, ×4.
Lamb, 1939, pl. 5, fig. 5: the type material in BM, ×1.

Morphological description. Thallus branches stipate-caespitose, many springing from a common basal holdfast, 2–3 cm. high, sparingly subdichotomously branched, tapering gradually from base to apex, or sometimes thickest somewhat above the base, in thickest parts 0·5–1·0 mm. diameter, terete, rigid, smooth or in places faintly transversely plicate (not papillate), the lower parts yellow, the upper branches widely blackened; surface mostly distinctly nitidous, the thicker branches often with distinct black annular cracks. The ultimate blackened branchlets subulate-attenuate, somewhat coarse, not capillary.

Soredia conspicuous on upper branches, hemispherical-pulvinate to subglobose, 0·3–1·0 mm. diameter, yellowish-aeruginose, grey or blackish, compact (not loosely pulverulent).

Apothecia apparently of rare occurrence (seen only in one specimen, from west Graham Land), situated near the ends of the branches, 2–3 mm. diameter, with yellow, smooth or slightly uneven thalline receptacle without cilia; disc black, matt or subnitid. (For further details, see Lamb, 1948*a*, p. 150.)

Axis solid, corneous, thick, occupying up to half the diameter of the branch; medulla compact, whitish.

Reactions and chemical constituents. The type material from Tasmania, as well as the Antarctic specimens seen, contains usnic acid and norstictic acid (proved by crystallographic test), the medulla giving the reactions K+ red with formation of crystals, PD+ yellow. A Chilean specimen has been found in the inactive phase, PD— (Lamb, 1948*a*, p. 150).

Discussion. Both the BAE, 1897–99, specimens and the FIDS specimen resemble the Tasmanian type-material very closely in appearance and anatomical structure, with compact medulla and central axis of the same relative thickness. Vainio (1903, p. 11) included the BAE, 1897–99, material, together with some plants of *U. antarctica*, under the name "*Usnea sulphurea* var. *sorediifera*". The present author's gathering from Wiencke Island in 1944 was the second Antarctic record and the only known fertile specimen.

This variety of *U. acromelana* may resemble certain states of *U. sulphurea* having a more compact medulla, but in that species the central axis, at least in Antarctic specimens, seldom exceeds one-third of the diameter of the branch, and the branches have a strong tendency to fracture and dislocate; the soredia are also considerably smaller and less conspicuous than in *U. acromelana* var. *decipiens*.

Geographical distribution. Circumpolar sub-Antarctic, penetrating southwards to Antarctica apparently only in the Graham Land sector; an outlying Cordilleran station in Peru (Lamb, 1939, p. 219; 1948*a*, p. 150).

The specimens examined are listed in Appendix Table I.

Usnea antarctica Du Rietz, 1926*a*, p. 93

Syn. *Neuropogon antarcticus* (Du Rietz) M. Lamb, 1939, p. 210.
Usnea sulphurea var. *granulifera* Vainio, 1903, p. 11; *Usnea melaxantha* var. *granulifera* (Vainio) Hue, 1915, p. 27; *Usnea granulifera* (Vainio) Motyka, 1936, p. 35.
Usnea subpapillata Dodge, 1948, p. 204.
Neuropogon melaxanthus var. *sorediifer* Crombie, 1876*a*, p. 182; *Usnea melaxantha* var. *sorediifera* (Crombie) Müller Argoviensis, 1896, p. 200; *Neuropogon antarcticus* f. *sorediifer* (Crombie) M. Lamb, 1939, p. 213 (= active chemical phase).
Usnea crombii Dodge, 1948, p. 212 (= active chemical phase).
Usnea crombii var. *sublaevis* Dodge, 1948, p. 213 (= active chemical phase).

Icon. Plate Ia: field photograph showing growth on agglomerate at Deception Island.
Plate IIa: specimen from Deception Island, FIDS No. B1119, BM, ×1.
Plate IIc: specimen from Wiencke Island, FIDS No. A1745, BM, ×1.
Plate IIIa: portion of specimen FIDS No. A1745 magnified, ×4.
Vainio, 1903, pl. III, fig. 19: type specimen of *Usnea sulphurea* var. *granulifera*, ×1.
Dodge & Baker, 1938, pl. 51, figs. 217–22: habit sketches and anatomical details.
Lamb, 1939, pl. 6, fig. 8: three specimens from South Shetland Islands, BM, ×1.
pl. 6, fig. 9: specimen from the classical locality in east Antarctica, BM, ×1.
pl. 6, fig. 10: apothecia in type material of *Usnea sulphurea* var. *granulifera*, ×3.
pl. 6, fig. 12: type specimen of *Neuropogon melaxanthus* var. *sorediifer* = active phase, ×1.
pl. 11, fig. 26: specimen from Galindez Island, west Graham Land, BM, ×1.

Morphological description. Thallus erect or subdecumbent, (2–) 3–6 (exceptionally up to 15) cm. tall, sparingly to copiously branched, rigid, without lateral fibrillose branchlets, the branches gradually attenuated and acuminate at the tips, which may be either relatively coarse or subcapillary. Basal parts of branches yellow, more or less distinctly papillate; apical branches black or purple-black variegated or completely blackened. Surface of branches matt or slightly nitid, without annular black cracks.

Soredia usually abundant on the upper branches, sometimes on the lower branches also, pale (whitish-yellow) or occasionally blackening, usually eroded, more rarely convex, farinose- or granulose-pulverulent.

Apothecia very rare, 5–8 mm. diameter, eciliate, with the receptacle papillate to papillate-rugose and sometimes sorediate on the underside. Disc brown-black to black. (For further details, see Lamb, 1939, p. 213, 1948*a*, p. 147.)

Axis solid, corneous, thick, occupying one-third to one-half of the diameter of the branch; medulla compact, white or whitish.

Reactions and chemical constituents. Most specimens occur in the typical or inactive phase with usnic acid only (medulla K−, PD−); relatively few contain, in addition to usnic acid, varying amounts of fumarprotocetraric acid (K+ brown or −, PD+ red, or yellow when the acid is present in low concentration). This active phase was formerly distinguished (Lamb, 1939, p. 213) as a separate variety, *Neuropogon antarcticus* var. *sorediifer* (Crombie), but it seems to be without taxonomic significance, since all transitional gradations exist between the typical acid-deficient phase and plants rich in fumarprotocetraric acid ("sorediifera"-phase). Intermediate phases have the medulla K−, reacting PD+ persistently yellow or later with the appearance of a few red specks. Even when the fumarprotocetraric acid is present in high concentration, it is often difficult to obtain the characteristic crystals from glycerin-alcohol-aniline solution by Asahina's method. The distribution pattern of the two phases in the Graham Land sector (Fig. 1) appears to show a more southerly extension of the typical acid-deficient phase, but from the Palmer Archipelago northwards the two phases occur together, and in fact occasionally may be found growing intermingled on the same rock. Northwards in the sub-Antarctic zone the "sorediifera"-phase replaces the typical phase, occurring in Îles de Kerguelen, Heard Island and Fuegia (Lamb, 1939, p. 214).

Discussion. This is the commonest species in the region, and very variable and polymorphic. Most of the specimens from Graham Land, the South Shetlands and the South Orkneys have the characters of "*Usnea sulphurea* var. *granulifera*" Vainio (syn. *Usnea granulifera* (Vainio) Motyka), i.e. more densely papillate-tuberculate main branches with more or less matt (not waxy or glistening) surface and a tendency for the soredia, at first eroded, to become finally convex-pulvinate. However, all intergrades exist to plants with faintly papillate or smooth, "waxy" branches, corresponding to the type specimen of *U. antarctica*. Plants of the latter type are less common in our area, but have been seen from several localities including the South Shetlands and the Berthelot Islands. Considerable variation in the degree of papillosity may often be seen in different branches of the same tuft. Some specimens, mainly from Deception Island, South Shetlands, have very copious soredia not only on the upper branches but also far down on the main stems, where they form round, pseudocyphella-like patches; such states correspond morphologically to "*Neuropogon melaxanthus* var. *sorediifer*" Crombie (syn. *N. antarcticus* f. *sorediifer* (Crombie) M. Lamb, *Usnea crombii* Dodge). Since some doubt appears to have existed regarding the identity of Crombie's plant, the following description of the type specimen in the British Museum is

appended (Kerguelen, 1874, coll. A. E. Eaton, British Transit of Venus Expedition, 1874–75, illustrated in Lamb, 1939, pl. 6, fig. 12):

A well branched, densely caespitose tuft 4·5 cm. high springing from a strong basal holdfast, and ramifying almost from the base, the main branches terete, 1·0–1·5 mm. thick, for the most part *rather coarsely but not densely verruculose-papillate*, in some places ± smooth; not foveolate or scrobiculate. Some small, rounded, pseudocyphella-like soredia present on the main lower branches. Upper branches 0·3–0·8 mm. thick, with *numerous, round, eroded to plane* (*rarely slightly convex*), *pale soredia.* Greater part of thallus pale-coloured (now brownish-buff, presumably yellow when freshly gathered); black only on the upper branches, the pointed, coarsely subcapillary, ultimate branchlets either annulate-variegated or entirely black. Soredia pale sulphur-yellowish, pulverulent. (No apothecia present.) Central axis thick, solid, corneous, white, occupying half or more of the diameter of the branch. Medulla compact, thin, white, K+ brownish, PD+ yellow then intense red.

The type specimens of *Usnea crombii* Dodge and its var. *sublaevis* Dodge, generously made available on loan by Professor C. W. Dodge, were compared directly with the above described type of "var. *sorediifer*", and in the opinion of the present author are conspecific with it, i.e. referable to the active chemical phase of *U. antarctica.* Fumarprotecetraric acid was proved crystallographically in the type specimen of *U. crombii* by Dr. Mason Hale; in the type of Crombie's "var. *sorediifer*" the test was inconclusive, but with strong probability of the same substance.

Another point worthy of attention in connection with sub-Antarctic plants of the active chemical phase is the nature of their phycobionts ("gonidia", "symbiotic algae"). In *U. crombii*, as well as in some other sub-Antarctic species, Dodge (1948, p. 209–16) described the phycobionts as filamentous algae, suggestive of *Trentepohlia*, and removed the species in question from subgen. *Neuropogon* to subgen. *Usnea* (*Euusnea*), sect. *Laevigatae*, subsect. *Roccellinae* Motyka, the species of which are supposed to possess a trentepohlioid phycobiont. The present author, examining the algae in the type specimen of *U. crombii*, was unable to find any such filamentous form, but found the phycobiont to be unicellular, globose, thin-walled, with a *parietal* chromatophore invaginated on one side. No autospore-formation was observed. These algae obviously belonged to the Chlorococcales, but were clearly not referable to *Trebouxia*, the commonest chlorococcalean phycobiont of lichens, on account of the parietal chloroplast. Similar algae are also present in the type specimen of Crombie's "var. *sorediifer*". In contrast, the algae of some specimens of *U. antarctica* examined, from the South Shetlands and Graham Land, appeared to be *Trebouxia*, with axial chloroplast. However, it must be pointed out that the certain recognition of algal genera in dried herbarium specimens of lichens is very difficult, on account of post-mortem alteration of the chloroplast, and this particular problem will be satisfactorily settled only when cultures of the phycobionts can be isolated from freshly gathered material and brought back for detailed study in the living state. In any case, a difference in the phycobiont *per se* cannot be considered of fundamental significance in the taxonomy of the lichen species (cf. Santesson, 1953).

The papillation of the main branches is quite variable; in the type specimen from Geikie Ridge ("Geikie Land"), Victoria Land, east Antarctica, they are in some places entirely smooth, but mostly sparsely and minutely papillate-verruculose. Another specimen, in the British Museum, collected by the same expedition in the same locality, shows all transitions from smooth to distinctly verruculose branches. The type specimen of *Usnea subpapillata* Dodge from Queen Mary Land, east Antarctica, which was examined through the courtesy of Professor Dodge, has distinctly papillate main branches, and agrees in every respect with *U. antarctica.* Two other species proposed by Dodge, 1948, *U. pustulata* and *U. subfoveolata*, also closely resemble *U. antarctica*, according to the present author's examination of the type specimens, but their eventual disposition should be postponed until the variability of populations of *U. antarctica* in the eastern parts of the continent has been studied further. Strongly papillate states of *U. antarctica*, as met with in the Graham Land area, bear a strong resemblance to *U. fasciata* Torrey, apart from the presence of soredia, and the two species are obviously very closely related. Very rarely, as mentioned previously (Lamb, 1948*a*, p. 147), some of the soredia may proliferate, or germinate *in situ*, to form minute dark spinulose outgrowths; apparently a teratological phenomenon of no taxonomic significance.

Hue (1908, 1915) referred to the present species either as "*Usnea melaxantha* var. *granulifera*" or "*Usnea melaxantha* var. *sorediifera*". Vainio (1903) called it "*Usnea sulphurea* var. *granulifera*". Two

Arctic specimens in Herb. Vainio (TUR) from Jan Mayen, thus named by him, are not this species, but typical *U. sulphurea* (Koenig) Th. Fries.

Fertile specimens of *U. antarctica* have been seen from only three localities in the present study, all of which are on the west coast of Graham Land: Auguste Island, Galindez Island, and Cape Anna.

The highest recorded altitude for *U. antarctica* in Graham Land is 1,800 ft. (550 m.), in the mountains behind Hope Bay.

Murray (1963, p.71) has recently transferred *Usnea laxissima* Dodge (1948) to *Neuropogon antarcticus* as a variety. My examination of the type specimen, which was not seen by Murray, shows this disposition to be incorrect. *U. laxissima* has a thin axial strand only one-fifth to one-quarter of the diameter of the branch, and so is more closely related to *U. sulphurea* than to *U. antarctica;* it should probably be regarded as a distinct species, pending further study and observation in the field.

Geographical distribution. Antarctic and probably completely circumpolar, with outlying sub-Antarctic stations for the chemically active or "sorediifera"-phase (Fuegia, Kerguelen, Heard Island). The species was originally described from Geikie Ridge ("Geikie Land"), Victoria Land, east Antarctica; a number of specimens (now in the herbarium of the Missouri Botanical Garden) have also been collected from Terre Adélie and Queen Mary Land, and it has also been recorded by Dodge and Baker (1938, p. 603) from Marie Byrd Land including King Edward VII Land, thus suggesting a continuous circumpolar distribution.

The specimens examined are listed in Appendix Table II.

Usnea fasciata Torrey, 1823, p. 106

Syn. *Usnea sulphurea* var. *normalis* Vainio, 1903, p. 11; *Neuropogon aurantiaco-ater* f. *normalis* (Vainio) M. Lamb, 1939, p. 224 (= semi-active chemical phase).

Neuropogon antennarius Nees & Flotow, 1835, p. 497; *Usnea antennaria* (Nees & Flotow) Massalongo, 1853, p. 73.*

Usnea melaxantha var. *fasciata* (Torrey) Hooker & Babington *in* Hooker, 1844–47 (1847), p. 520 (*saltem nomen*).

Usnea melaxantha var. *Jacquinii* Hooker & Babington *in* Hooker, 1844–47 (1847), p. 520.*

Usnea trachycarpa var. *eciliata* Räsänen, 1932, p. 10.*

Usnea taylori var. *Kranckii* Räsänen, 1932, p. 10.* (cf. M. Lamb, 1948*a*, p. 153.)

Usnea melaxantha var. *nigropallida* Cengia Sambo, 1926*a*, p. 91; *Neuropogon aurantiaco-ater* f. *nigropallidus* (Cengia Sambo) M. Lamb, 1939, p. 224.

Neuropogon aurantiaco-ater f. *egentissimus* M. Lamb, 1939, p. 225 (= inactive chemical phase).

"*Usnea aurantiacoatra* Bory" *in* Motyka, 1936, p. 27; "*Neuropogon aurantiaco-ater* (Jacq. emend. Mot.) M. Lamb" *in* M. Lamb, 1939, p. 221. (Non *Lichen aurantiaco-ater* Jacquin, 1781: see below.)

Icon. Plate Ib: field photograph showing growth on rocks recently free of snow on Wiencke Island, west Graham Land.

Plate IId: specimen of the inactive phase from King George Island, South Shetland Islands, AE No. 35054, BASB, ×1.

Plate IIb: specimen of the semi-active phase from Galindez Island, west Graham Land, BGLE No. 1340 *pr. p.*, BM, ×1.

Plate IIe: specimen of the active phase from Signy Island, South Orkney Islands, FIDS No. H73–1a, BM, with black gall-like structures or "carpoids", ×1.

Torrey, 1823, pl. 9, figs. 1–4: coloured illustration of the type material, approx. ×1.

Lamb, 1939, pl. 8, fig. 18: type material of *Usnea melaxantha* var. *nigropallida*, ×1.

pl. 9, fig. 20: specimen of the semi-active phase from Galindez Island, west Graham Land, BM, ×1.

pl. 10, fig. 23: possibly authentic material of *U. fasciata* Torrey, from South Shetland Islands, in New York Botanical Garden, erroneously referred to as the type specimen, ×1.†

Lamb, 1959, pl. IX, fig. 31: coloured illustration of specimen from Patagonia, Argentina, ×1.‡

* According to information given by Motyka, 1936, p. 28.
† Listed by Lamb (1939) as "*Neuropogon aurantiaco-ater* f. *normalis*".
‡ Listed by Lamb (1939) as "*Usnea aurantiacoatra*".

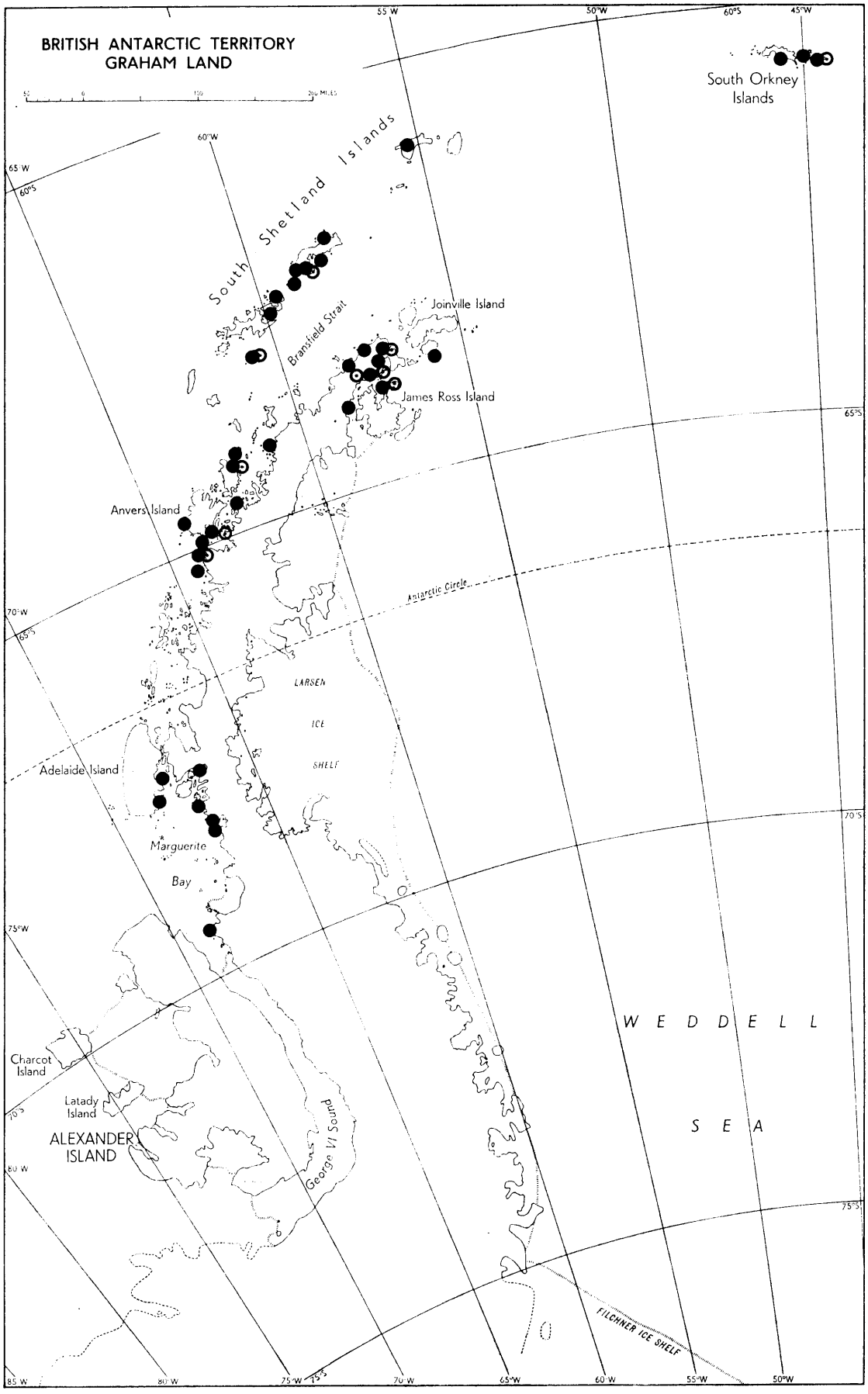

FIGURE 1

The known distribution of *Usnea antarctica* DR. in the Graham Land region. (Black circles indicate the typical inactive phase; open circles indicate the active phase.)

Morphological description. Thallus erect, sparingly to copiously branched, (3–) 5–10 (–12) cm. high, rigid, usually without divaricate lateral fibrillose branchlets, many branches springing from a common basal holdfast. Main branches yellow, 1·5–2·5 mm. diameter (or up to 3·5 mm. in very robust specimens), with distinctly verruculose-papillate surface, only exceptionally more or less smooth or becoming scrobiculate-corrugated (chiefly in sub-Antarctic specimens). Papillae concolorous with rest of thallus or sometimes blackening. Apical branches annulately black-and-yellow variegated, or partly entirely blackened, acuminate, varying from relatively coarse to subcapillary.

No soredia present.

Apothecia usually present, often very abundant, lateral on apical branches or often apparently terminal, 0·15–1·30 (–1·70) cm. diameter, at first concave, then becoming flattened, with black, subnitid disc and yellow receptacle forming a narrow, persistent thalline margin; thalline receptacle usually without fibrillae (these present in the f. *strigulosa*), on underside varying from densely verruculose-papillate (the normal condition) to sharply reticulately or convolutely ridged (aged condition).

Axis solid, corneous, thick, occupying about half or more of the diameter of the branch; medulla compact, whitish, very thin.

Reactions and chemical constituents. Three chemical phases may be distinguished, these being gradations in the content of fumarprotocetraric acid, the normal constituent of the species besides usnic acid. The state with abundant fumarprotocetraric acid (active phase) has the medulla K+ brown, PD+ intense red; that with somewhat less abundant concentration (here called the semi-active or "normalis"-phase) gives the same reaction with PD, but is unchanged by K; and completely acid-deficient specimens (inactive or "egentissimus"-phase) are K—, PD—. These three intergrading phases were formerly (Lamb, 1939) distinguished respectively as the typical form, f. *normalis* (Vainio) M. Lamb, and f. *egentissimus* M. Lamb, of "*Neuropogon aurantiaco-ater*". It seems clear, however, that they are taxonomically insignificant.* The fumarprotocetraric acid, as in *U. antarctica*, is often difficult to demonstrate by crystallographic test. The actual type specimen of *U. fasciata* not having been seen either by Motyka or the present author, it is impossible to state which of these chemical phases it represents; the specimen seen and designated as the type by M. Lamb (1939, p. 223) apparently cannot be such (see below). All these phases are represented in our area by approximately equal numbers of specimens, and Fig. 2, in which only the completely active and inactive phases have been plotted, shows that no distributional difference is evident. Occurrence of different phases side by side is not uncommon. Also in sub-Antarctic (South American) stations, from Fuegia northwards to the Chilean province of Bio-Bio, the active and inactive phases appear to be randomly intermingled; lists of localities are given by Lamb (1939, 1948*a*).

Discussion. *Usnea fasciata* is undoubtedly the most conspicuous and beautiful lichen of the Antarctic regions. It normally grows on bare rock, but may occasionally be found in compact moss tufts; in one such specimen examined, from King George Island (FIDS No. G27-1), the basal branches immersed in the moss had turned black, and, had the specimen been complete, could probably have been traced down to the original holdfasts on the underlying rock. Hence the apparent muscicole occurrence is probably due to a subsequent growth of moss over the rock around the *Usnea* tufts. The species may be found from sea-level up to an altitude of at least 1,000 ft. (308 m.) on King George Island, South Shetlands, and on Brabant Island, west Graham Land.

Motyka (1936, p. 27) and Lamb (1939, p. 221; 1948*a*, p. 151) referred to this species as *Usnea* (or *Neuropogon*) *aurantiacoatra* (Jacquin). This determination was based solely on interpretation of the original description and figure (Jacquin, 1781, p. 369; pl. 11, fig. 2), the type specimen being presumably no longer in existence. As thus interpreted, *Usnea aurantiacoatra* (Jacquin) Bory corresponded to the present species in containing fumarprotocetraric acid in the active phase, but was otherwise similar to *U. melaxantha* Acharius, which contains norstictic instead of fumarprotocetraric acid. However, this interpretation has now been proved untenable by the experiment described below, which shows that *Lichen aurantiaco-ater* Jacquin is synonymous with *Usnea melaxantha* Acharius.

Jacquin's specimen was from the Magellan region, without precise indication of locality; it is one of three lichen species described in the work cited, the other two (*Lichen elongatus* and *Lichen antarcticus*) being from "Fretum Magellanicum". All three specimens were collected by Commerson on the voyage

* A similar case of intergrading phases of concentration has been noted by Des Abbayes (1933) in the genus *Ramalina*. *R. farinacea* Ach. may give the reactions K+ yellow then red, K+ yellow only, or K—. Des Abbayes considers that the creation of taxonomic names for such phases with intergrading reactions "semble tout à fait contraire à l'esprit scientifique et répugne au simple bon sens".

of Bougainville round the world in 1766–1769. Both the Falkland Islands and the Magellan Straits were visited on this voyage, so that the type specimen of *Lichen aurantiaco-ater* could have come from either locality. Jacquin's coloured illustration shows a plant with the morphological characters of the present species or of *U. melaxantha* Acharius. His note and reproduction of the colour is, however, significant, a point which up till now escaped our attention. In the original description it is stated: "*dum in aqua humescunt, coloris sunt ex rubro aurantiaci . . . In icone color exhibetur madefacti.*" In the plate the main branches are coloured orange-red.

It is known that some depsidones of the β-orcinol group (norstictic acid, salazinic acid) readily undergo decomposition to give a red colour; in nature this can take place by seepage of alkaline moisture, in artificial conditions by soaking in tap water (Asahina, 1953, p. 228; Hillmann, 1936, p. 114, 308; Kurokawa, 1960, p. 356). Other related depsidones, such as fumarprotocetraric acid, do not show this phenomenon. Jacquin's description therefore indicates a plant containing either norstictic or salazinic acid.

To verify this deduction, the following experiment was carried out: pieces of the present species (*U. fasciata*, from Galindez Island, west Graham Land, BGLE, 1935, active phase with abundant fumarprotocetraric acid) and of *Usnea melaxantha* Acharius (from the Falkland Islands, I. M. Lamb, 1944, containing abundant norstictic acid), both of the same sulphur-yellow colour, were soaked in equal amounts of tap water for five days. At the end of that time, *U. melaxantha* from the Falklands had turned intense orange-red (exactly the colour shown in Jacquin's figure), while *U. fasciata* from Graham Land had remained unchanged in colour (yellow). The conclusions are clear: *Lichen aurantiaco-ater* Jacquin is not synonymous with *Usnea fasciata*, but it is identical with *U. melaxantha* Acharius, and the name *aurantiaco-atra*, having priority, must replace the epithet *melaxantha* (Acharius, 1803) for the species containing norstictic acid.

Names which undoubtedly refer to the present species (with Fumarprotocetraric acid) are *Usnea fasciata* Torrey (1823), and *Usnea sulphurea* var. *normalis* Vainio (1903). According to the information given by Motyka (1936, p. 28), *Neuropogon antennarius* Nees and Flotow (1835) should belong here also. *Usnea fasciata* Torrey is therefore the prior and correct name for this species. Even though the type-specimen appears to be no longer in existence, there can be no doubt that it refers here and not to *U. aurantiaco-ater* (*sensu vero* = "*melaxantha*") because the latter does not occur in the South Shetlands.

Torrey's article (1823) commences with the transcription of a letter written to him by Dr. S. L. Mitchill, 1 July, 1822, from whom he received the material. Mitchill wrote: "Captain Napier however improved the opportunity of examining a rock upon an island of the group called New South Shetland, from whose top the snow had been melted; and of gathering specimens of a small vegetable which grows upon it. These he presented to me for consideration. I beg you to accept some of them for your herbarium, with a request that you would communicate to me your opinion respecting them." The original description is brief but brings out many of the characteristic features ("roughened by minute papillae . . . branches . . . beautifully articulated by transverse black bands"). No mention is made of soredia, nor are any shown in the coloured illustration (pl. 9, figs. 1–4), which is not particularly good.

Black hemispherical "cephalodia" are mentioned as present on the branches, and clearly shown in the figure. These bodies are not infrequently present on both *U. fasciata* and *U. antarctica*, and resemble convex, immarginate apothecia of a parasitic Ascomycete (Plate IIe); also in section they show an apothecium-like structure, with several layers resembling a brown hypothecium and a hymenium with green-black epithecium. However, asci are never present, and laterally a transition can be traced into the normal thallus tissues of the *Usnea* (cortex and medullary layer). The bodies therefore appear to be gall-like structures produced by the lichen in response to some unknown stimulus. Similar but paler coloured outgrowths on other species of *Usnea* have been described as "*Biatoropsis Usnearum*"; these have been shown by Santesson (1952, p. 422) and Galløe (1950, pl. 112) to be galls, in some cases associated with the attack of a lichenicolous fungus (*Abrothallus*). Galløe (1950) proposes the term "carpoids" for these bodies, suggesting that they may represent abortive apothecia. Grummann (1960) has also described some of these "carpoid" galls on *Usnea* species.

The present author (Lamb, 1939) described and figured a fertile specimen of *U. fasciata* from the South Shetlands, in the herbarium of the New York Botanical Garden, as the type specimen. This was obviously an error, for Torrey (1823) specifically states: "Apothecia—none in the specimens I have seen." The label (not original) on this specimen stated: "*Usnea fasciata* Torr. in Sill. Jour. [*Silliman's American*

Journal of Sciences and Arts]. On volcanic rocks, New South Shetland 'Almost the only vegetable in those desolate regions' Dr. Mitchill." No date of collection is given. In the Muséum National d'Histoire Naturelle, Paris (PC), there is a specimen labelled "*Usnea fasciata* Torr. New.—Shetland Greville dd 1821". It had been annotated in Nylander's writing "*Neuropogon melaxanthus* var.". Probably a number of specimens were gathered on different occasions in the South Shetlands by American sealers between 1820 and 1830 and forwarded to various herbaria where they were filed as *Usnea fasciata* Torr.

Hue (1908, 1915) referred to this species as "*Usnea melaxantha*"; Vainio (1903) described it as "*Usnea sulphurea* var. *normalis*".

The question may arise as to whether *Usnea fasciata* and *U. aurantiaco-atra* (*sensu vero* = "*melaxantha*", hereafter referred to simply as *U. aurantiaco-atra*) are really distinct species. As the only conspicuous difference between them lies in their chemical constitution (fumarprotocetraric acid in *U. fasciata*, norstictic acid in *U. aurantiaco-atra*), they might be regarded as purely "chemical" species, which have been rejected by some lichenologists (Müller Argoviensis, 1891; Lamb, 1951*a*, 1951*b*). During the last decade opinion has tended to swing in favour of recognizing morphologically identical but chemically different strains as distinct taxa (Culberson, 1960). A logical proposal, intermediate between the two extremes of opinion, has been put forward by Dahl (1950), who suggests that chemical differences, like morphological differences, are of varying taxonomic significance, and should be evaluated separately in each particular case; when a chemical character is found to show distinct correlation with another character, not necessarily morphological (it may be distributional or even ecological), its taxonomic significance is considerably reinforced, up to the point of justifying differentiation at the species level.

According to this viewpoint, an analysis of the morphological and distributional differences between *Usnea fasciata* and *U. aurantiaco-atra* indicates that they should be regarded as separate species.

Morphologically, field and herbarium studies have shown that there is usually a recognizable difference between the two species, although intermediate or overlapping states may occur. In *U. fasciata* the thicker branches usually remain perfectly terete and are closely and densely verruculose-papillate; in *U. aurantiaco-atra* they are more sparsely papillate or even completely smooth in places, and very often become strongly indented-foveolate and non-papillate with age; cf. Lamb, 1939, pl. 11, fig. 25. An extensive population of *U. aurantiaco-atra* was studied by the present author at the summit of Mount William near Stanley, Falkland Islands, in 1944; it was there abundant on a flat rock face, and numerous random samples were taken from an area of about one square metre. These samples show all intergrades from young thalli with verruculose-papillate branches to old thalli with strongly foveolate-indented, non-papillate branches, and the development of foveolation was observed to take place by the formation of ridges connecting groups of neighbouring papillae; in this way the original papillae become obliterated and a system of anastomosing folds or ridges is developed with hollowed-out foveolations in between. In *U. fasciata*, out of hundreds of specimens examined, very few were of this scrobiculate-corrugated type, most of these being from sub-Antarctic localities (Tierra del Fuego), with only two specimens from the Antarctic proper (South Shetlands). Typically papillate *U. fasciata*, indistinguishable from Antarctic specimens, occurs also in the southern temperate zone, for example, in Argentina, Tierra del Fuego, and Chilean provinces Bio-Bio and Antuco. It can therefore be said that a characteristic morphological difference exists between populations of the two species, although this difference may not be manifested in all individuals, especially if those belonging to different age-groups are compared.

Geographically, a much clearer distinctive pattern emerges between the two species, although they overlap. *U. aurantiaco-atra* is most abundant in the Falkland Islands, occurs less abundantly in cold-temperate South America (Lamb, 1939, p. 228), and does not occur in Graham Land or its adjacent islands. *U. fasciata* appears to have its centre of distribution in the South Orkneys and South Shetlands and down the west coast of Graham Land to somewhat south of the Antarctic Circle (Fig. 2), with a northward extension into the sub-Antarctic part of South America, overlapping with that of *U. aurantiaco-atra*. It also occurs in South Georgia, where *U. aurantiaco-atra* appears to be absent (Lamb, 1948*a*, p. 151, as "*Neuropogon aurantiaco-ater*", p. 154).

Geographical distribution. Antarctic, sub-Antarctic and southern temperate, restricted to the Graham Land and South American sector (see preceding paragraph). In contradistinction to *U. antarctica*, it appears to be entirely absent on the eastern side of Graham Land (Fig. 2).

The specimens examined are listed in Appendix Table III.

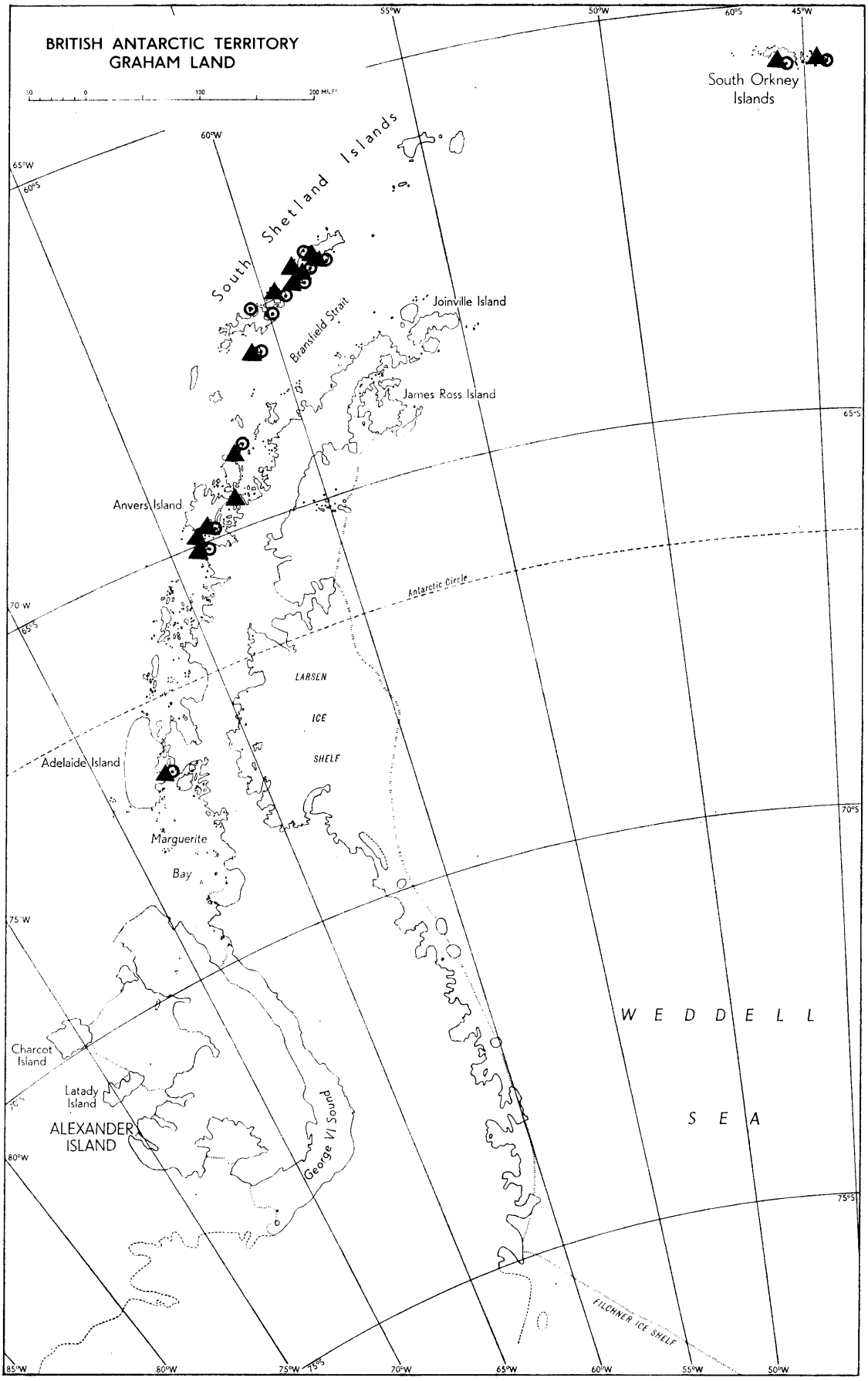

FIGURE 2

The known distribution of *Usnea fasciata* Torrey in the Graham Land region. (Triangles indicate the active phase; open circles indicate the inactive phase.)

f. ***strigulosa*** (Zahlbruckner) M. Lamb, **n.comb.**

Syn. *Usnea melaxantha* var. *subciliata* f. *strigulosa* Zahlbruckner, 1903, p. 360; *Usnea sulphurea* var. *subciliata* f. *strigulosa* (Zahlbruckner) Zahlbruckner, 1929–30 (1930), p. 603; *Usnea strigulosa* (Zahlbruckner) Motyka, 1936, p. 30; *Neuropogon strigulosus* (Zahlbruckner) M. Lamb, 1939, p. 229; *Neuropogon aurantiaco-ater* f. *strigulosus* (Zahlbruckner) M. Lamb, 1948*a*, p. 152; *Usnea aurantiaco-atra* f. *strigulosa* (Zahlbruckner) M. Lamb, 1959, p. 156.

Icon. Lamb, 1939, pl. 10, fig. 22: the type specimen in Herb. Mus. Vienna, ×1.

Morphological description. Thallus branches beset with fibrillose branchlets; a variable number of marginal cilia present on the apothecial receptacles.

This form, originally described from Patagonia, has not been previously recorded from the Antarctic. Only one specimen was seen out of the numerous collections of *U. fasciata* examined, so that it cannot be common in the area. The specimen was in the active chemical phase, with medulla K+ brown, PD+ red.

Geographical distribution. (See Appendix Table IV.)

Usnea sulphurea (Koenig) Th. Fries, 1867, p. 9

Syn. *Lichen sulphureus* Koenig in Olafsen, 1772, Appendix, p. 16 (according to Zahlbruckner, Cat. Lich. Univ.; not seen); in Olafsen, 1775, p. 242 (as "Lychen sulphureus"; seen); *Neuropogon sulphureus* (Koenig) Hellbom, 1896, p. 21; *Neuropogon melaxanthus* f. *sulphurea* (Koenig) Hue, 1890, p. 272.

Usnea frigida Dodge & Baker, 1938, p. 603 (*e descript.*).

Icon. Plate Va: field photograph showing extensive population on rocks and stones of morainic hill on James Ross Island, east Graham Land.

Plate IIIb: specimen from Egg Island, east Graham Land, FIDS No. D2756, BM, ×4.

Lamb, 1939, pl. 5, fig. 4: specimen from the Andes of Ecuador, BM, ×1.

Dodge and Baker, 1938, pl. 51, figs. 223–5: habit sketch, anatomical structure; as *Usnea frigida.*

Morphological description. Thallus small, usually 2–3 cm. high, rarely up to 4 cm., erect or subdecumbent, closely caespitose-branched from a small common basal holdfast, yellow in lower parts, extensively blackened above, somewhat soft in texture (not hard and rigid); main branches terete, 0·5–1·3 mm. diameter, smooth or minutely scabrid (the papillae when present much smaller than in *U. antarctica*, and often blackened), rarely faintly scrobiculate, matt or subnitid, often fracturing and becoming dislocated to expose the thin central strand, further up annulately black-variegated. Terminal branches entirely or almost entirely black, ending in acuminate to subcapillary tips.

Soredia usually present (absent in some specimens), small and punctiform or up to 0·4 (–0·8) mm. diameter, commonly blackened but sometimes pale (whitish), not obviously pulverulent, often appearing almost smooth, plane to erumpent, when well developed convex-pulvinate to subglobose.

Apothecia unknown.

Axis thin, occupying only one-fifth to one-third of the diameter of the main branches, and appearing like a thin white string holding the portions together when ruptured; medulla white, thick, typically loose or cottony, more rarely compact.

Reactions and chemical constituents. Most of the Antarctic specimens, like those of the Arctic, contain usnic acid only (typical inactive phase, K—, PD—). A smaller proportion of the Graham Land population occurs in a weakly active phase containing a small amount of norstictic acid, with medulla K+ faint red or —, PD+ yellow (norstictic acid proved in several specimens by crystallographic test). This active phase is randomly distributed together with the typical phase from the tip of the peninsula to the latitude of Marguerite Bay, south of which only the inactive condition has been found (Fig. 3); this does not of course signify much, owing to the small number of collections from the southern part of Graham Land.

Discussion. As previously pointed out by the present author (Lamb, 1948*a*, p. 144), the Antarctic population of this bipolar species exhibits a spectrum of variability slightly different from that manifested in the Arctic regions, suggesting incipient phylogenetic divergence. However, this difference is inconstant

in expression and appreciable only by statistical examination of large numbers of specimens, so that it cannot be indicated taxonomically. In general, Arctic specimens tend to have a more compact medulla than those of the Antarctic. The occasional Antarctic specimens with more or less compact medulla can usually be easily recognized by the distinctive appearance, the only risk of confusion being with *U. acromelana* var. *decipiens*, which is a much more rigid plant with thicker central axial strand (see p. 5). Sometimes the branches are almost entirely black, with yellow only at the extreme base.

Although the type specimen of *Usnea frigida* Dodge & Baker, from Marie Byrd Land, has not been available for study, a microscopic preparation kindly supplied by Dr. Dodge, together with the published description and figures, leaves little doubt that it is synonymous with *U. sulphurea*. Another specimen from Marie Byrd Land, collected by the same expedition of 1933–35, seen in the herbarium of the Missouri Botanical Garden, and numerous specimens of typical *U. sulphurea* collected from the same region by the United States Antarctic Service Expedition of 1939–41 (USAS), are present in the Smithsonian Institution herbarium (US). A typical specimen has been seen also from Cap de Margerie, Terre Adélie, in the herbarium of the Missouri Botanical Garden, ex Herb. Melbourne Botanical Garden.

In addition to the ecological information on this species in the Arctic regions by Lynge (1941), some interesting phytosociological data on its occurrence in Greenland are given by Gelting (1955, p. 306). On the east side of Graham Land it is the dominant fruticose lichen, in places covering extensive tracts of terrain (Plate Va).

Geographical distribution. Bipolar, with scattered connecting stations mostly at high altitudes in the South American Cordillera. The only species of the genus in the Northern Hemisphere, with the exception of the somewhat doubtful "*Neuropogon lambii*" Imshaug (1954, p. 155) described from Washington State, U.S.A. In the Arctic it is circumpolar, but not found on the European, Asian or North American mainlands (distribution map in Lynge, 1941). Cordilleran records are from Ecuador, Peru, Bolivia, Chile and Argentina (Motyka, 1936, p. 23; Lamb, 1939, p. 209, and 1948*a*, p. 143, 1959, p. 154). Whether or not these Cordilleran stations are relictual, marking the historic route of migration between the Arctic and the Antarctic, is a complex question which cannot be entered into here; it is discussed by Du Rietz (1940). In Antarctica the species is probably circumpolar (seen from Terre Adélie and Victoria, Marie Byrd and Graham Lands); it was recently described also from the Cape Hallett area by Murray (1963, p.71) as *Neuropogon sulphureus*. In the British Antarctic Territory its distribution is distinctly more southerly than that of *U. fasciata* and *U. antarctica*, although there is a considerable overlap. It is concentrated on the Graham Land peninsula and adjacent islands, and is apparently absent in the South Orkneys and South Shetlands (Fig. 3). It replaces *U. antarctica* as the dominant species of *Usnea* on the east side of Graham Land.

The specimens examined are listed in Appendix Table V.

2. Genus ***Ramalina*** Acharius, 1810, p. 122 and 598

The following species is the only one known to occur in the Antarctic; a second recorded species, *R. lugubris* Hue, is here transferred to the new genus *Himantormia*, p. 18.

Ramalina terebrata Hooker & Taylor, 1844, p. 654

Syn. *Evernia De Gasperii* Cengia Sambo, 1926*b*, p. 40 (*fide* Motyka, 1960, p. 455).

Icon. Plate Vb: specimen from Deception Island, South Shetland Islands, FIDS No. B2310, BM, ×1.
Plate Vc: specimen from Deception Island, FIDS No. B1128, BM, ×1.
Plate Vd: part of large fertile specimen from the Falkland Islands, coll. A. G. Bennett, BM, ×1.
Cengia Sambo, 1926*b*, pl. IX: as *Evernia De Gasperii*.

Morphological description. Thallus erect to subprostrate, in fresh state pale greenish straw-yellow, becoming darker yellowish or buff after some years in the herbarium, matt, composed of numerous, flat, dorsiventral laciniae springing from a small common undifferentiated basal holdfast. Laciniae varying greatly in length and breadth; in Fuegian and Falkland Islands specimens up to 25 cm. or more long and 2 cm. wide, in Antarctic samples seldom exceeding 6 cm. in length and 0·6 cm. in width; rigid in dry

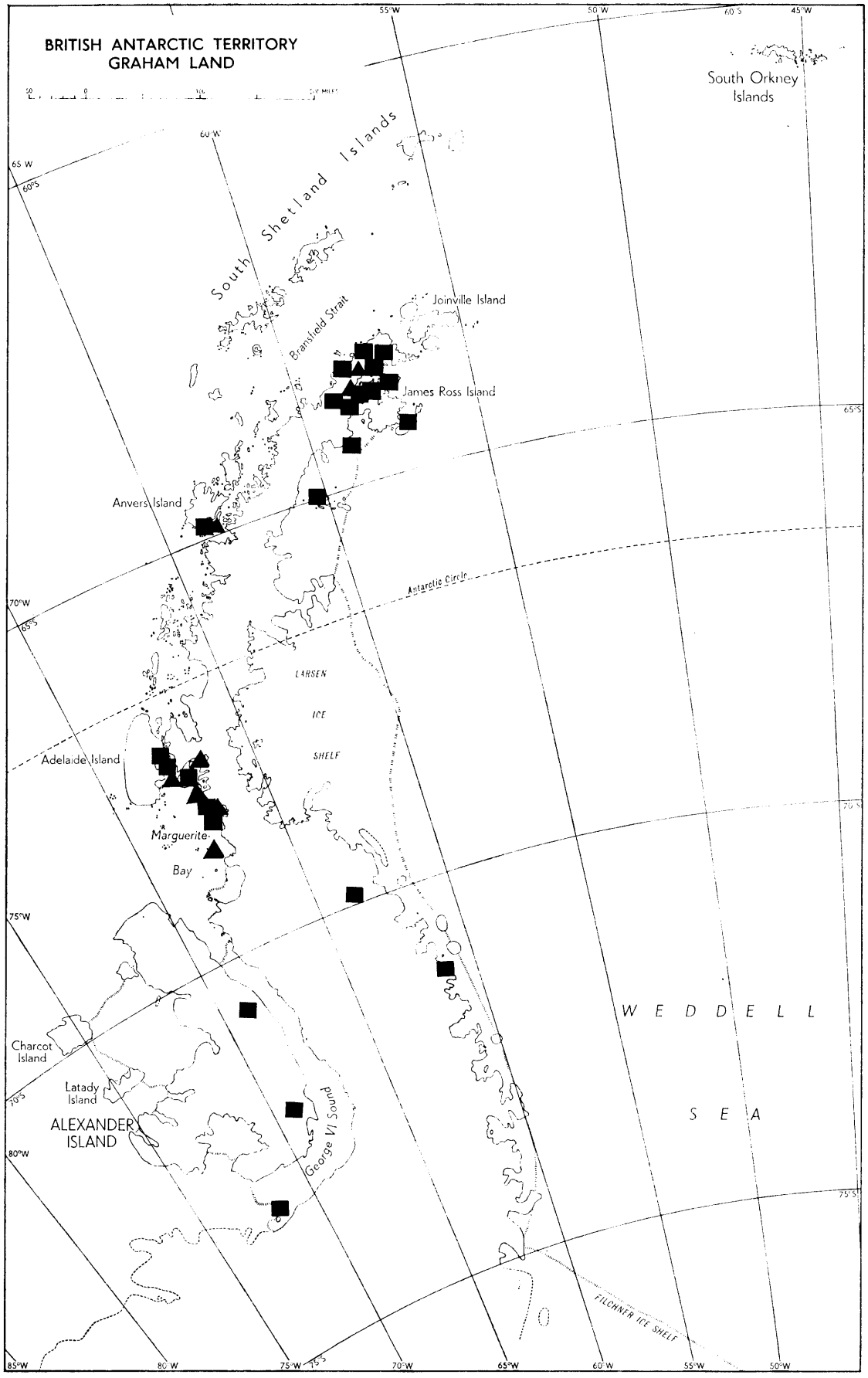

FIGURE 3

The known distribution of *Usnea sulphurea* (Koen.) Th. Fr. in the Graham Land region. (Squares indicate the typical inactive phase; triangles indicate the active phase.)

condition, simple or subdichotomously branched, sometimes proliferating to form small lateral lacinioles. Both faces of laciniae with numerous, pale, rounded or elongated pseudocyphellae which become powdery- or granulose-sorediate, and finally ulcerated, forming holes of various size through the thallus, which thus finally becomes extensively perforated.

Apothecia uncommon (none seen in Antarctic material), superficial or marginal, sessile, scutelliform, 1–3 mm. diameter, lecanorine, plane to convex, more or less concolorous with the thallus. Spores 6–8 in ascus, 1-septate, straight or moderately curved, (13–) 16–21 × 4–5μ.

Reactions and chemical constituents. Thallus externally and internally K−, C−, PD−; usnic acid only could be demonstrated in several specimens examined by Asahina's crystallographic method.

Discussion. Hooker and Taylor, in their original description, which was based on specimens from the Falkland Islands and Cape Horn, state that the thallus varies in size from one inch to one and a half feet. Antarctic specimens are very much smaller, and appear to be constantly sterile.

Structurally, the thallus consists of (a) an outer cortex of "decomposed" gelatinized structure, interspersed with granules of usnic acid in its outer part; (b) a variable number of strands of hyaline chondroid mechanical tissue on the inner side of the cortex and confluent with it; and (c) a central algal-medullary tissue, with separate, loosely interwoven hyphae and bright green globose algae (probably *Trebouxia*). This structure places the species in the subgenus *Ramalina*, section *Ramalina*, subsection *Ramalina* (syn. subgen. *Euramalina*, sect. *Bitectae*, subsect. *Myelopoea* in the classification proposed by Du Rietz, 1926*b*). In the pseudocyphellae the cortex is interrupted to expose the algal-medullary layer, and soredia are formed as small rounded grains consisting of algal cells enmeshed in a compact weft of hyphae. By degrees these soredial grains become more compact and regularly globose, with an indistinctly paraplectenchymatous cortex nubilated with granules of usnic acid, and may be regarded as isidia of soredial origin.

Pycnidia were found in a specimen collected by the present author at Puerto Deseado, Argentinian Patagonia, in 1960; they are formed in the algal-medullary layer and are spherical or flattened-ellipsoid in section, up to 360μ in diameter, with colourless wall. The conidia are fusiform-bacillar, straight, 3–4 × 0·5–0·7μ.

The record of "*Ramalina scopulorum*" from Port Louis, Falkland Islands, by Darbishire (1912, p. 34) refers to the present species, according to the determination of Dr. R. Santesson (in S).

Geographical distribution. Sub-Antarctic and temperate South America, Falkland Islands, South Shetlands, and islands off the west and north-east coasts of Graham Land; not yet found in the South Orkneys, but almost certainly occurs there. Recently also reported by Magnusson (1956, p. 357) from Hawaii, a remarkable disjunction but one not without parallel in some of the higher plants (see Skottsberg, 1936).

The specimens examined are listed in Appendix Table VI.

3. Genus ***Himantormia*** M. Lamb, **n. gen.**

Diagnosis. *Protothallus bene evolutus, areolatus vel rugoso-verrucosus, corticatus, algis destitutus. Metathallus fruticulosus, e ramis elongatis erectis constans subteretibus vel vulgo applanatis dorsiventralibusque, axi chondroideo singulo crasso solido centrali praeditis, extrinsecus pallio thallino (cortex et stratum algo-medullare) tenui vestitis, vel partim hoc evanescente vel disrupto axi chondroideo late denudato et dein corticato. Apothecia laciniis metathalli enata, e pallio thallino orta, superficialia, rotundata, excipulo subtus (lamina tenui viso) incolori et integro marginem proprium formante et receptaculo basali thallino algas fovente imposito. Paraphyses haud clathratae. Asci infissitunicati, amyloidei. Sporae incolores, simplices. Genus familiae Usneacearum (Ascomycetes lichenisati, ascohymeniales, discocarpici, ordinis Lecanorales)*, Ramalinae *ut videtur proxime affine, sed ab ea structura protothalli, metathalli et apotheciorum necnon sporis simplicibus distans.*

Protothallus well developed, areolate or rugose-verrucose, corticate, not containing algae (except in initials of assimilative metathallus).

Metathallus fruticulose, consisting of elongated, erect, ± terete or usually flattened and dorsiventral branches. Branches internally with a single, solid, undivided, massive central axis of chondroid mechanical tissue consisting

of longitudinally-running, conglutinated, pachydermatic hyphae; thallus mantle (cortex+algal-medullary layer) thin, continuous in young branches, in older branches commonly disrupted, dispersed or evanescent, exposing the now corticated surface of the chondroid axis.

Apothecia formed on the metathallus branches from the assimilative layer, superficial, sessile, discoid, with a proper margin formed by the sides of an entire colourless excipulum proprium, which is embedded in a basal thalline receptacle containing algae. True paraphyses present (branched and sometimes anastomosing, but not clathrate). Asci infissitunicate,* giving amyloid reaction with iodine. Spores colourless, one-celled.

Pycnidia immersed in thallus mantle, ostiolate; conidia one-celled, bacillar.

(Phycobiont trebouxioid.)

Type and as yet only known species:

Himantormia lugubris (Hue) M. Lamb, **n. comb.**

Syn. *Ramalina lugubris* Hue, 1915, p. 34.

Icon. Plate VIb: the type specimen in PC, seen from above, ×1.
Plate VIa: the same specimen as Plate VIb, seen from below, ×1.
Plate VIc: specimen from Mt. Flora, Hope Bay, east Graham Land, FIDS No. D2858, basal protothallus on rock, ×5.
Plate VId: vertical section of an apothecium in the type specimen, showing thalline receptacle, basal excipulum, hypothecium and hymenium.
Figs. 4, 5 and 6.

Morphological description. Protothallus well developed around the bases of the metathallus branches, and often extending outwards beyond them to a width of 5–10 mm.; black (rarely in places paler, fuscous), matt, 0·2–0·5 (–0·8) mm. thick, areolate to congested-granulose or rugose-nodulose, sometimes minutely cerebriform-wrinkled, effuse at periphery, closely concrescent to the rock by its whole underside; it resembles the thallus of a dark crustose lichen. The upper side is covered by a dark brown to aeruginose-blackish cortical layer 10–18 (–20)μ thick composed of thick-walled, pigmented hyphae 4–5μ diameter, compactly intricated in various directions and conglutinated. Inner medullary tissue extending downwards to the rock surface, of loosely interwoven hyphae running in various directions, irregularly interspersed with masses of brown granular substance (not dissolved by K or HCl) and some rock-crystals. The hyphae are colourless, very pachydermatic, 5–7μ diameter. No algae are present in the protothallus.

Metathallus laciniae crowded, firmly attached, stipate-caespitose, arising from the protothallus, simple or sparingly dichotomously or irregularly branched, rigid, in young stages ± terete or oval in cross-section, then usually becoming strongly flattened and strap-shaped, up to 3 (–4) cm. long, 2·0–3·5 (–10·0) mm. broad, 0·3–0·8 mm. thick, plane or sometimes somewhat inrolled at the edges (but not markedly canaliculate), erect in centre of tuft, more decumbent at periphery. Rarely the branches may remain persistently ± terete or oval in cross-section. General colour of tufts dark fuscous-cinereous; the young, ± terete branches blackened towards the base, upwards covered with a continuous, smooth, matt or subnitid, cream-coloured to isabelline or alutaceous thallus mantle; as they increase in size and become ± flattened, the thallus mantle becomes verrucose (Fig. 4, centre and right), then often disrupted into discrete lumps or lobulate patches on the surface of the black, chondroid ground tissue, or occasionally strongly convex-verrucose or verrucose-areolate. The ground tissue, which is the exposed surface of the chondroid central axis, is jet-black, nitid, of carbonized appearance; it may be smooth or minutely wrinkled or ± longitudinally finely nervose-striated. Finally the verrucose or dispersed-patchy thallus mantle may also darken to dark ash-grey. Sometimes, under severe growth conditions, the thallus forms extensive, low, subcrustose patches with very crowded and stunted, completely blackened laciniae not over one centimetre in length.

This assimilative thallus (metathallus) commences with the appearance of groups of a few phycobiont algae in certain of the areolae or verruculae of the protothallus, immediately below the cortex. These assimilative portions then begin to elongate orthotropically, but at first retain the loosely interwoven medulla internally; apparently not until they attain a length of a few millimetres does the internal chondroid

* "Infissituniqués" of Dughi (1956) = "Unitunicate" of Luttrell (1951) and seems to be a preferable term, all asci being really bitunicate in the sense that their wall consists of two layers.

FIGURE 4
Himantormia lugubris (Hue) M. Lamb. Portions of the type material; ×4.

axial tissue become differentiated. The cortical layer of these up-growing metathallus portions undergoes a change in both colour and structure, becoming paler brown and ± capitate-fastigiate, with the outermost, brown-pigmented cells rounded, fairly thin-walled, 3·0–4·5μ diameter.

Transverse (Fig. 5) and longitudinal sections of adult metathallus laciniae show a central, very massive, undivided, solid strand of clear, colourless chondroid mechanical tissue composed of conglutinated, longitudinally running, thick-walled hyphae 4·5–6·0μ diameter with lumina about 1μ diameter. This axis is clothed (entirely or usually only partially) with a thin layer of thallus mantle consisting of cortex + algal-medullary layer. The cortex is poorly developed, up to 15μ thick, ± colourless, clear, gelatinized, in some places reduced to an almost structureless, gelatinous necral layer, in other places gelatinized-cellular, with small, round to radially oblong cell lumina 1·5–2·5μ diameter. Algal-medullary layer (45–) 60–120 (–150)μ thick, somewhat lax to compact, ± continuously filled with phycobiont algae; the hyphae rather thin-walled, interspersed with sordid isabelline granules. Where the chondroid axis is exposed, its surface is corticated and pigmented, with a gelatinized cortex 20–30μ thick, brown-pigmented (occasionally ± aeruginose) in its outermost one-quarter to one-third (the outer cells sometimes distinctly brown-capitate), and of gelatinized palisade-structure, of radial or partly intricated, fistulose lumina up to 1μ wide in a gelatinous matrix.

Apothecia abundant in some specimens, rare or absent in others, produced on the upper parts of the metathallus-branches, originating superficially on the thallus mantle (rarely also apparently terminal), discoid, sessile, well constricted at base, 1·5–3·5 (–4·0) mm. diameter at maturity, dark reddish brown to blackish or black, ± nitid, smooth, not pruinose, at first scutelliform, plane or slightly concave, immarginate or with a faintly indicated, thin, non-prominent, entire, concolorous proper margin; thalline receptacle present on underside, usually not visible at the margin, paler (concolorous with the thallus mantle), smooth to scrobiculate or lumpy. Larger apothecia are undulate-convex and immarginate.

In section (Plate VId; Fig. 5), the apothecia are seen to be immersed in a thalline receptacle containing algae, but have a well developed, entire proper exciple which forms an alga-free margin. The excipulum persists as a hyaline cupule below the hypothecium, 30–60μ thick, of gelatinized, indistinctly palisadic structure, with many of the lumina (about 1μ wide) elongated perpendicularly. At the sides, where it forms the margin of the apothecium, the excipulum is bounded by an outermost, dark brown cortical layer 6–10μ thick consisting of thick-walled, heavily pigmented, rounded cells 4–7μ diameter. Basal thalline receptacle consisting of outer cortex and inner algal-medullary layer; the latter, with loosely

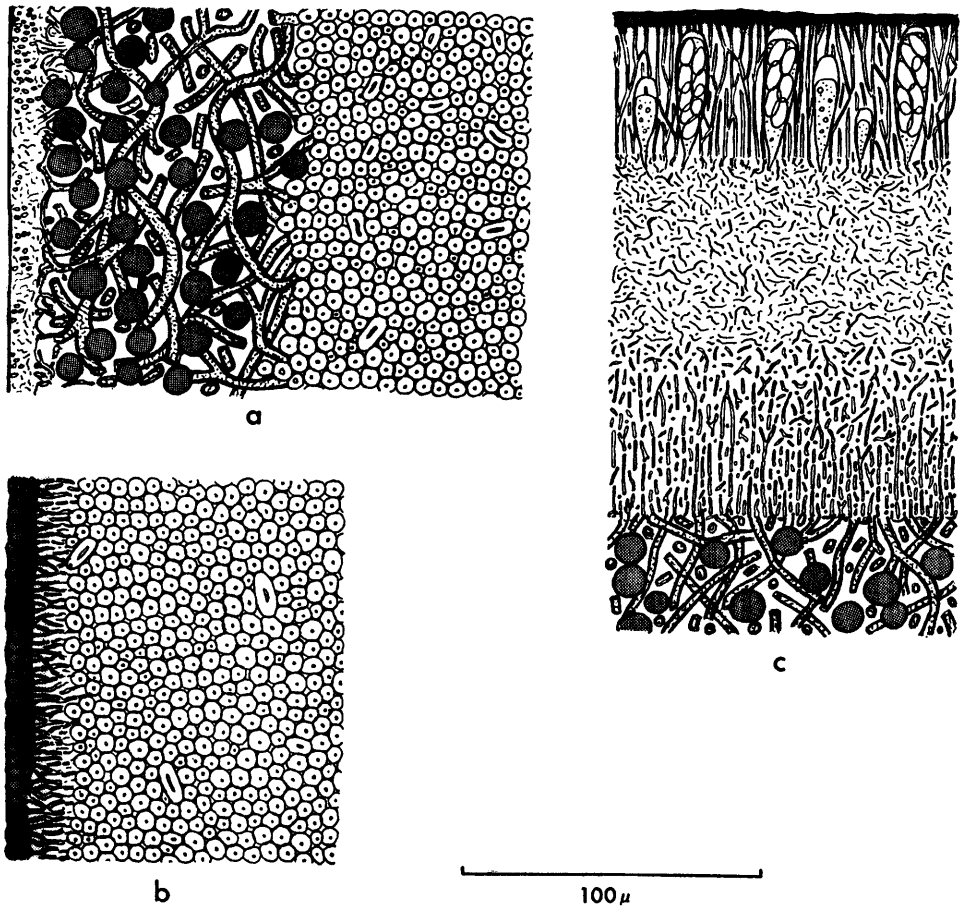

FIGURE 5

Himantormia lugubris (Hue) M. Lamb. Transverse sections of outer part of thallus branch (a) with thallus mantle, (b) with black cortex; (c) vertical section of part of apothecium showing hymenium, hypothecium, basal excipulum and algal-medullary layer.

intricated hyphae and scattered groups of algae, lies immediately beneath the basal excipulum. The cortex of the receptacle is similar to that of the thallus mantle. Hypothecium hyaline, 30–75μ deep, of gelatinized structure, consisting of narrow hyphal lumina about 0·7μ wide intertexted in various directions in the clear gelatinous matrix. Hymenium 45–60μ high, gradually pale brown to dark brown in its uppermost 6–10μ, otherwise hyaline, not guttulate. Paraphyses concrete, conglutinated, not well visible in water, but distinct after treatment with K: branched and occasionally anastomosing, but not clathrate, 1·5–2·0μ thick (actual thickness seems to be 1·0–1·5μ), septate, not articulated, with septa 9–12μ apart, only slightly capitate at the tips (up to 3μ in K). The brown epithecial pigment is secreted from the tips of the paraphyses into the surrounding mucilage. With iodine, the hymenium stains blue then dark aeruginose (asci+hymenial mucilage); the upper subhymenial part of the hypothecium also stains blue or purplish-blue. Asci clavate, 35–40$\times$9–11μ, with gelatinous wall about 1μ thick at sides, thickened at apex up to 8–10μ in immature asci (there sometimes with a narrow invaginated plasm-canal), the entire ascus-wall amyloid (I+blue). Spores (Fig. 6) 6–8 in ascus, irregularly biseriate or partly uniseriate, one-celled, colourless, ellipsoid, thin-walled, minute, 8–9$\times$4·0–4·5μ.

Pycnidia uncommon, occurring in the thallus mantle of the laciniae as minute black spots in verrucose swellings about 0·15 mm. diameter. In section (in Neushul No. 590) immersed, globose, about 90μ diameter, with colourless to faintly brownish, indistinctly paraplectenchymatic wall, the cortical tissue around the ostiole modified to become paraplectenchymatic with rounded, rather thick-walled cells about 5μ diameter and heavily pigmented (dark brown or dark aeruginose). Conidia (Fig. 6) one-celled, colour-

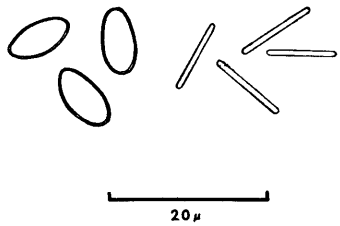

FIGURE 6
Himantormia lugubris (Hue) M. Lamb. Ascospores and pycnidiospores.

less, elongate rod-shaped, straight, 9–10 (–12)×0·8–1·0μ, borne terminally on unbranched exobasidial conidiophores.

Phycobiont trebouxioid, bright green, globose, thin-walled cells 7–12μ diameter, occurring singly or in coherent clumps, without obvious pyrenoid; mode of multiplication not definitely ascertained.

Reactions and chemical constituents. The medullary layer of the thallus mantle, where exposed by slicing, was found in all specimens seen to be K+ more or less distinct persistent yellow, PD+ distinct persistent yellow. No reactions occur in any of the thallus tissues with C or I. Fragments of the type material and several of the other specimens were submitted to Dr. Mason Hale (US), who kindly examined them by crystallographic methods. In addition to the presence of small quantities of atranorine, the substance obviously responsible for the yellow K reaction, he was able to demonstrate a second lichen acid, presumably a depsidone, giving the reactions PD+ yellow, K— or vaguely reddish in thallus sections; on recrystallization from GAOT (glycerin–alcohol–ortho–toluidine) solution, this substance yields yellow, imbricated, flattened crystals of leaf-like form, and in Dr. Hale's opinion is apparently referable to an undescribed lichen acid related to the salazinic acid group (depsidones, β-orcinol derivatives).

Discussion. Taxonomic affinities: "*Ramalina*" *lugubris* Hue, if examined after the key to the genera of the family Usneaceae in Zahlbruckner's treatment (1926, p. 239), appears in its characters to approach *Ramalina*, *Everniopsis*, *Usnea* and *Letharia*. (The inclusion of *Thamnolia* and *Siphula* in the Usneaceae is probably incorrect.)

Everniopsis possesses a single chondroid axial strand running through the thallus laciniae (Duvigneaud, 1942, p. 360, fig. 23, as *Hendrickxia pseudoreticulata*), but it differs essentially from *Himantormia* in having all the thallus-branches, even the youngest, distinctly dorsiventral (flattened-foliose).

Usnea (including *Neuropogon*) has a similar thallus structure, with a single, central chondroid strand, but the thallus branches are nearly always of radial symmetry, terete and cylindrical (or at most angulose-subterete), scarcely ever distinctly flattened. The absence in *Himantormia* of the dibenzofurane compound usnic acid, of regular occurrence in *Usnea* species, also seems to constitute a distinctive difference.

Concerning the genus *Letharia*, its delimitation is somewhat controversial. The type species (*L. vulpina*) has thallus branches which are terete to angulate or slightly compressed, but not flattened or dorsiventral; the loose internal medullary tissue is traversed by several chondroid axial strands, sometimes partly united. Du Rietz (1926*a*, p. 90) regards this as the structure typical of the genus *Letharia*, and places in that genus only the two species *vulpina* and *californica*. Keissler, 1958–60 (1958, p. 52), accepts this structure as typical of *Letharia*, and includes here also, in spite of the absence of chondroid axial strands, *L. divaricata* and *L. thamnodes*, which are usually classed as species of *Evernia*. However, Zahlbruckner (1930, p. 200, and elsewhere) delimits *Letharia* more widely to include also species which have a single, solid, central chondroid axis. This view has been followed by Asahina (1952), who described a new species *Letharia Togashii*, with a single central axial strand. Motyka (1936, p. 43) is in agreement with Du Rietz in restricting *Letharia* to the species with several separate chondroid strands in a loose medulla, i.e. *vulpina* and *californica*; the species with a single central chondroid axis which were included by Zahlbruckner in *Letharia* are placed by Motyka in *Usnea* subgenus *Chlorea* (Nyl.) Mot., and Asahina's "*Letharia*" *Togashii* also obviously belongs to this group. This latter group of species, despite the possession of a single massive chondroid axial strand, obviously has no close taxonomic affinity with our genus *Himantormia*; in addition to the non-dorsiventral thallus branches, ± isodiametric in cross-section, they show other incompatible features, notably the truly lecanorine structure of the apothecia and the complete investment of the

thallus branches with a continuous thallus mantle. It is therefore impossible to include "*Ramalina*" *lugubris* in *Letharia* either *sensu stricto* or as more widely delimited (including *Usnea* subgenus *Chlorea*).

It should be mentioned that in addition to the morphological and anatomical differences separating *Himantormia* from the above-mentioned genera *Everniopsis*, *Usnea* and *Letharia*, the mode of fixation to the substratum is also widely different; all these genera possess merely a simple, anatomically undifferentiated fixation disc ("Haftscheibe") unlike the well developed, corticated, verrucose-areolate protothallus of *Himantormia*.

In spite of the obvious difference in spore-septation (a difference which is probably unduly emphasized in lichen taxonomy), it seems that the closest relationship of *Himantormia* in the Usneaceae is with the genus *Ramalina*. Habitually there is a considerable resemblance, and *H. lugubris* could easily be mistaken for a *Ramalina* on superficial inspection. Considerable attention was therefore given to a comparison of the structure of the Antarctic plant with various *Ramalina* species. The results of this comparison show that *Himantormia* differs from *Ramalina* so markedly, not only in the one-celled spores, but also in a number of anatomical characters, that it is impossible to unite them in the same genus.

The first major difference is in the structure of the protothallus, which in *Himantormia* is well developed and anatomically differentiated, with cortical and medullary layers. In *Ramalina* no such protothallus is produced, and the fixation disc which corresponds to it in position is an undifferentiated, effusely radiating structure, without cortical or medullary layers (Brandt, 1906, pl. VII, fig. 5).

Secondly, the metathallus branches of *Ramalina* are structurally different; the mechanical chondroid tissue is never in the form of a solid central axis, but occurs either as isolated strands in the loose medullary tissue or as a continuous irregular ring immediately beneath the cortex (Brandt, 1906, pl. IV, fig. 7; pl. V, fig. 10; pl. VI, figs. 1–5), and is never widely exposed on the outer surface by disruption and denudation of the outer assimilative layers. The exposed chondroid axis of *Himantormia*, on the other hand, with its dark-pigmented outer cortical layer, is a conspicuous feature of the older laciniae, and resembles a sclerotium or rhizomorph in its anatomical structure.

Thirdly, the apothecial structure in species of *Ramalina* is typically lecanorine; no distinct excipulum proprium is developed; the margin is formed of thallus tissue containing algae, and algal-medullary tissue occurs immediately below the hypothecium (Keissler, 1958–60 (1958), p. 22, fig. 19; (1959), p. 232, and present author's own observations). In *Himantormia* the apothecium is essentially a "biatorine" structure inserted into a basal thalline receptacle. The nomenclature of this type of apothecium presents some difficulties. It might be regarded as an emergent type of the "lecanoroid" apothecium (Frey, 1936, p. 200, fig. 1). In the classification of apothecial types proposed by Dughi (1952) it approaches closest to the "superlecideine" and "mycolecanorine" types, but is not identical, as the excipulum proprium does not give rise at the sides to any kind of thalline tissues. However it may be classified, it is a type of apothecial structure distinct from that found in *Ramalina* (and other genera of the Usneaceae also). It is rather similar to that illustrated by Asahina (1935, p. 15, fig. 7) for *Nephromopsis rugosa*. A corresponding type of anatomy is found in the apothecia of the genus *Omphalodium* Mey & Fw., usually included in the Parmeliaceae, but perhaps really belonging to the Umbilicariaceae (Santesson, 1942); the type-species, *O. pisacomense*, was examined. In the latter the structure is more clearly mycolecanorine than in *Himantormia*, with the thallus cortex investing the edges of the excipulum proprium at the sides. *Omphalodium* is otherwise widely different from *Himantormia* in its foliose, umbilicarioid growth-form and lack of internal chondroid mechanical tissue.

As regards its ecology, this species, which Hue (1915) aptly described as having "l'aspect d'un petit buisson qui aurait échappé à un incendie", seems to have a normal altitudinal range from 100 to 1,980 ft. (30 to 610 m.) above sea-level, but occurs as low as 50 ft. (15 m.) in the South Orkneys. It usually occurs on more or less isolated rocks projecting above the snow and ice, associated with *Usnea* subgen. *Neuropogon* and several species of crustose lichens, predominantly *Rhizocarpon*-species of the *geographicum*-group. A few specimens have been seen growing in moss tufts (on King George Island, South Shetlands). It is not nitrophilous, and in general its ecology, like that of the *Usnea* (*Neuropogon*) species, is such as to convey the impression of a species probably capable of having survived maximum historic glaciation on ice-free rock faces and nunataks.

Geographical distribution. Apparently an Antarctic endemic restricted to the Graham Land sector (South Shetlands, west and north-east Graham Land); see Fig. 7.

The specimens examined are listed in Appendix Table VII.

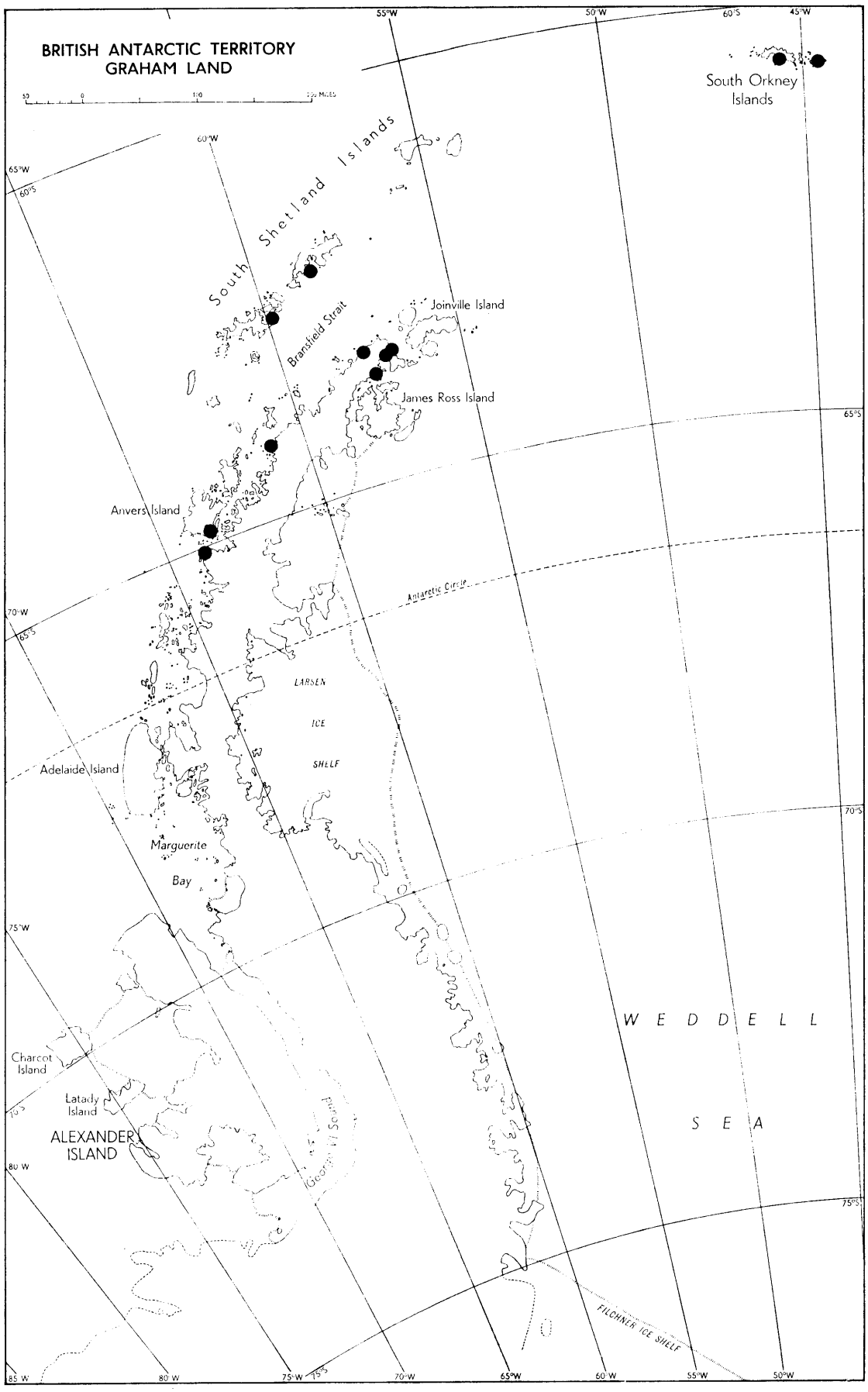

FIGURE 7

The known distribution of *Himantormia lugubris* (Hue) M. Lamb.

4. Genus *Alectoria* Acharius, 1810, p. 120 and 592

Key to the species of Graham Land and adjacent islands

1*a*. Growing directly on bare rock or over loose gravel; thallus black or blackish (brown only where shaded); thallus attached by intercalary holdfasts on the branches.
  2*a*. Thallus branches loosely entangled, not forming rosettes, moderately branched, terete, without divaricate or secondary branchlets ... ... *A.* (*Teretiusculae*) *pubescens*
  2*b*. Thallus branches adnate to the rock and forming rosettes, closely and intricately branched, terete or ± flattened, often producing minute divaricate secondary branchlets *A.* (*Teretiusculae*) *minuscula*
1*b*. Growing among or over moss tufts; thallus dark brown to blackish-brown (or partly pale). Thallus attached by base of branches only.
  3*a*. Basal branches paler (whitish to pinkish-grey), terminal branches brown-blackish; surface matt; C+ pink or red ... ... *A.* (*Alectoria*) *nigricans*
  3*b*. Branches uniformly dark brown to brown-blackish; surface matt to slightly lustrous; C— ... ... *A.* (*Bryopogon*) *chalybeiformis*

Section *Alectoria*

Syn. *Alectoria* sect. *Eualectoria* Th. Fries, 1871, p. 19.

Spores 2–4 in ascus, becoming brownish. Pseudocyphellae present. Thallus mainly yellowish or grey, only partly blackish, prostrate to erect, with basal holdfasts only.

Alectoria nigricans (Acharius) Nylander, 1861, p. 71

Syn. *Cornicularia ochroleuca* β *C. nigricans* Acharius, 1810, p. 615; *Bryopogon nigricans* (Acharius) Gyelnik, 1935*a*, p. 239.

Icon. Plate IXa: specimen from Signy Island, South Orkney Islands, FIDS No. H73-1e, in BM, ×1. Keissler, 1958–60, Lief. 5 (1960), pl. V, fig. 1: habit photograph.

Morphological description. Thallus forming loose tufts, erect, rigid, the branches up to 6 cm. high, subdichotomously branched, terete, paler in lower parts (whitish to ivory- or buff-coloured or pinkish-grey), the upper parts dark, black or blackish-brown, the entire plant usually with completely matt surface, only rarely somewhat lustrous. Main branches 0·5–1·0 mm. diameter; terminal branches finer, straight or deflexed. Pseudocyphellae present on main branches, whitish, longitudinally elongated. No soredia.

Apothecia (not seen in Antarctic specimens) lateral, but often apparently terminal by reflexion of the branches bearing them, 1·5–4·0 mm. diameter, soon convex with the thalline margin excluded; disc brown, naked, slightly shining. Spores 2 (–3) in ascus, ovoid, very thick-walled, simple, colourless or finally darkening (brownish), 21–35×15–20μ (according to Th. Fries (1871, p. 22)), in the present author's Newfoundland specimens 32–42×20–25μ.

Reactions and chemical constituents. Pale parts of thallus K+ yellowish, C+ pink or red, PD+ yellow or orange-yellow. According to Asahina (1936, p. 689–90), the PD reaction of *A. nigricans* is negative, but Lynge (1937, p. 167) stated it to be PD+ yellow or yellowish orange, especially on the pseudocyphellae. My own observations, on Antarctic and Newfoundland specimens, are in agreement with those of Lynge, and I noted furthermore that the acetone extract is PD+ intense yellow deepening to orange-red. *A. nigricans* contains a lichen acid which gives a red reaction with $Ca(OCl)_2$, and old herbarium specimens characteristically take on a pink tinge and stain the underlying paper light red, as already noted by Th. Fries (1871, p. 22). Zopf (1907, p. 163) states that *A. nigricans* contains a substance called "Alectorialsäure", of unknown composition, which is the cause of the C+ red reaction.

No further information on the identity of this lichen acid has since been published, but Professor Y. Asahina, of the Research Institute for Natural Resources, Tokyo, Japan, to whom Newfoundland material of *Alectoria nigricans* was recently submitted for chemical investigation, states *in litt.*: "Zopf's Alectorialic acid (Flechtenstoffe,* p. 163) must be considered as the principal ingredient of *A. nigricans*,

* Zopf, 1907.

although he gave no chemical composition. I have used a dried acetone extract for the usual tests and obtained the following results: C+ red (transitory), KC+ red (more durable), PD+ yellow, Fe in alcohol brownish violet. It is almost insoluble in hot benzene, moderately soluble in hot ether and in acetone. On recrystallization from G.E. [glycerine–acetic acid] as well as from G.A.Py. [glycerine–alcohol–pyridine], fine rod-like trichites are finally obtained. With hot soda solution it gives rise to yellowish wart-like granules. The Rf value of the paper chromatogram (solvent butanol-ammonia) is 0·20. This spot of Alectorialic acid reflects a yellowish-white light on exposure to U.V. ray, whereas that of Barbatolic acid (Rf 0·16) absorbs the U.V. ray completely, giving no reflected light."

Discussion. This species normally grows on the ground, usually among mosses, and is nearly always sterile, except for some unknown reason in Newfoundland and Labrador. Here apothecia are quite commonly produced, as Du Rietz (1926*c*, p. 23) mentioned and the present author confirmed while collecting in northern Newfoundland in 1953.

Geographical distribution. New to Antarctica; a bipolar species, having a circumpolar distribution in the Northern Hemisphere, with southern outliers in the mountains of central Europe and extending in North America south to the latitudes of British Columbia and Newfoundland (see Du Rietz, 1926*c*, p. 22). In the Southern Hemisphere it has been reported from Tierra del Fuego by Räsänen (1932, p. 12), in a variety *implexiformis* Räs. In Antarctica, known so far only from the South Orkney Islands.

The specimens examined are listed in Appendix Table VIII.

Section ***Bryopogon*** (Link) Th. Fries, 1871, p. 23

Syn. *Bryopogon* Link, 1833, p. 164.

Spores 8 in ascus, colourless. Pseudocyphellae usually absent. Thallus brown, grey or blackish, prostrate to erect, with basal holdfasts only.

Gyelnik (1935*a*) used the generic name *Bryopogon* indiscriminately for species of both section *Alectoria* (*Eualectoria*) and section *Bryopogon* in the current accepted sense. To retain this current usage, section *Alectoria* should be typified with *A. sarmentosa* Ach., and section *Bryopogon* with *Bryopogon jubatus* (L.) Link; see discussion in Dodge and Baker, 1938, p. 598.

Alectoria chalybeiformis (Linnaeus) S. Gray, 1821, p. 408*

Syn. *Lichen chalybeiformis* Linnaeus, 1753, p. 1155.

Icon. Plate VIIIc: specimen from Signy Island, South Orkneys, FIDS No. H74-1f, BM, ×1.
Plate VIIId: portion of specimen FIDS No., H74-1f, magnified, ×4.
Keissler, 1958–60, Lief. 5 (1960), pl. III, fig. 3: habit photograph.

Morphological description. Thallus prostrate, dark brown to blackish-brown, with irregularly ramifying, terete or slightly compressed, subfoveolate or twisted branches up to 6 (–10) cm. long, in the thickest parts up to 0·5 (–0·7) mm. diameter, the terminal branches subcapillary. Colour more or less uniform throughout (not paler at the base); surface matt to slightly lustrous. No pseudocyphellae present.

Soredia rarely present (not seen in Antarctic specimens).

Apothecia unknown.

Reactions and chemical constituents. Thallus K−, C−, PD−; however, when soredia are present, they stain red with PD (Lynge, 1937, p. 167, and present author's observation). The identity of the causal substance, apparently present only in the soredia, has not been established; the only proved chemical ingredient of this species is the polyhydric alcohol D-arabitol (Solberg, 1955). On account of the dark colour of the thallus in this and similar *Alectoria* species, the reactions should be studied either on sections under the microscope or, as recommended by Asahina (1936), by rolling some of the filaments into a small ball, moistening with the reagent, and squeezing between folds of white filter paper.

A. chalybeiformis, which has very often been confused with other species of the *Alectoria jubata* group,

* This combination has usually been attributed to Röhling, 1813, p. 137, but inspection of that reference shows that *chalybeiformis* is there intended as a subspecific taxon of *Alectoria jubata*; see Sjödin, 1954, p. 121.

grows on the ground among mosses or over rocks (usually with mosses), and rarely also, in Europe, on the bark of trees. According to Motyka (1958, p. 227), it is an ornithocoprophilous species, or at least occurs associated with nitrophilous lichens. Apothecia have never been reported.

Geographical distribution. New to Antarctica, and apparently to the Southern Hemisphere as a whole, although it is probable that the record of "*Bryopogon jubatum*" from the South Orkneys by Darbishire (1905, p. 106) refers to this species; unfortunately the specimen, together with the other lichens collected by the Scottish National Antarctic Expedition of 1902–04 (SNAE) cannot be traced at present. What appears to be the same record was mentioned subsequently by Darbishire (1912, p. 59) as "*Bryopogon prolixum*". The distribution of *A. chalybeiformis* in the Northern Hemisphere appears to be circumpolar; it occurs from the Arctic (Spitsbergen, Greenland, Arctic North America) through northern Europe to the Alps of central Europe, and also in the mountains of Asia and Japan (Motyka, 1958, p. 227; Keissler, 1958–60 [1958], p. 128, footnote). In Antarctica, it is known as yet only from the South Orkney Islands.

The specimens examined are listed in Appendix Table IX.

Section ***Teretiusculae*** (Hillmann) M. Lamb, **n. comb.**

Syn. *Parmelia* subgen. *Euparmelia* sect. *Teretiusculae* Hillmann, 1936, p. 104.
Alectoria sect. *Subparmelia* Degelius, 1938, p. 286, footnote.
Alectoria sect. *Pseudephebe* Choisy, 1955, p. 26 (*nom. inval.*, no Latin diagnosis).

Spores 8 in ascus, colourless. Pseudocyphellae absent. Thallus black (brown only in shaded portions), prostrate, attached by intercalary holdfasts.

All the above sectional names were based on the same two species, *pubescens* and *minuscula*, and so Hillmann's epithet has priority. As Degelius has pointed out (1937, p. 133–4), the thallus anatomy of both these species is more in accordance with *Alectoria* than with *Parmelia*, with cortex of longitudinally running hyphae, not of perpendicular hyphae as in *Parmelia*. Hillmann (1936) preferred to retain the species in *Parmelia*, arguing that the presence of scattered "rhizinae" on the branches agreed better with that genus than with *Alectoria*. In actual fact, these structures are not rhizinae, but holdfast discs. Fig. 8 shows these black discoid holdfasts in very young thalli of *A. pubescens*. Imshaug (1957) has reported attachment of young filaments by both ends in *A. minuscula*, resulting in loop-formation by intercalary growth.

FIGURE 8

Alectoria pubescens (L.) Howe jr. Early growth stages on white quartz rock from the Debenham Islands, west Graham Land, BGLE No. 1541 *pr. p.*, showing discoid holdfasts; ×10.

Alectoria pubescens (Linnaeus) Howe jr., 1912, p. 23

Syn. *Lichen pubescens* Linnaeus, 1753, p. 1155; *Parmelia pubescens* (Linnaeus) Vainio, 1888, p. 22.
Alectoria nigerrima Hue, 1915, p. 40; *Alectoria bicolor* var. *nigerrima* (Hue) Gyelnik, 1935*b*, p. 4; *Bryopogon bicolor* var. *nigerrimus* (Hue) Gyelnik, 1935*a*, p. 237.

Icon. Plate VIIIa: specimen from Wiencke Island, west Graham Land, FIDS No. A1749, BM, ×1.
Plate VIIIb: portion of specimen FIDS No. A1749, magnified, ×4.
Lamb, 1959, pl. X, fig. 34: habit drawing, ×1.

Morphological description. Thallus black or blackish (brown only where shaded on underside or in crevices of the rock), thread-like, repeatedly dichotomously branched, forming low, felted mats up to 5 cm. or more across over the substratum, to which it is loosely attached by occasional, small, black, discoid, intercalary holdfasts. Branches terete, loosely entangled in various directions, not forming distinct rosettes, up to 0·2 mm. diameter, somewhat nitid, smooth or in places nodulose. No soredia or pseudocyphellae; no minute divaricate secondary branchlets produced.

Apothecia (not seen in Antarctic specimens) lateral, sessile, scutelliform, 2–5 mm. diameter, entirely black or blackish-brown, plane to convex, with smooth or subcrenulate, ± prominent thalline margin which may sometimes become excluded. Epithecium brown. Spores 8 in ascus (or fewer by abortion), ellipsoid, 7–12×6–8μ.

Pycnoconidia 5–7×1μ (according to Anders (1928), and Wade (1959)), not seen in our material.

Reactions and chemical constituents. The thallus gives no colour reactions with K, C or PD, and no extracellular chemical constituents have been recorded.

Discussion. The type material of *Alectoria nigerrima* Hue from Cape Tuxen, west Graham Land, is typical *A. pubescens*, as already stated by the present author (Lamb, 1948*b*, p. 244).

The species is fairly common in our area on rocks and gravelly detritus. It occurs in more sheltered situations and generally at lower altitudes than *A. minuscula* and, in contrast to the latter, shows little morphological variability.

Geographical distribution. Bipolar; in the Northern Hemisphere circumpolar, Arctic and sub-Arctic, occurring also in alpine regions of the temperate zone. "*Alectoria nigerrima*" recorded by Räsänen (1932, p. 12) from Tierra del Fuego may refer to the present species, but the specimen has not been seen by the present author. In Antarctica, *A. pubescens*, unlike the closely related *A. minuscula*, appears to be restricted to the Graham Land sector, the southernmost known localities being in the Marguerite Bay area.

The specimens examined are listed in Appendix Table X.

Alectoria minuscula (Nylander ex Arnold) Degelius, 1938, p. 286

Syn. *Imbricaria lanata* var. *minuscula** Nylander ex Arnold, 1878, p. 293; *Parmelia minuscula* (Nylander ex Arnold) Nylander, 1887, p. 205; *Cornicularia lanata* var. *minuscula* (Nylander ex Arnold) Hue, 1915, p. 41.
Parmelia Almquistii f. *nitida* Lynge, 1928, p. 197 (*fide* Degelius, 1937, p. 134).
Parmelia Almquistii f. *opaca* Lynge, 1928 (*fide* Degelius, 1937).
Alectoria antarctica Dodge & Baker, 1938, p. 599.
Alectoria intricata Hue, 1915, p. 41 (refers to f. *biformis*, cf. below).

Icon. Plate VIIa: field photograph showing rosette-growth of colonies on sloping rock face at View Point, east Graham Land.
Plate VIe: rosettes on a stone from Alectoria Island, east Graham Land, FIDS No. D2468, ×1.

* The epithet *minuscula* appeared in several publications of Nylander from 1863 onwards, but without any description until validly published by Arnold in 1878 as *Imbricaria lanata* var. *minuscula*. The combination *Alectoria minuscula* was not made by Nylander in 1871 as stated in Zahlbruckner's Cat. Lich. Univ.

Plate VIIb: specimen from Egg Island, east Graham Land, FIDS No. D2757, ×4.
Dix, 1950, pl. III, fig. 3: habit photograph.
Dodge and Baker, 1938, pl. 51, figs. 209–16: habit sketches and details of anatomy; as *Alectoria antarctica*.
Other illustrations are listed under the various forms below.

Morphological description. Similar to *A. pubescens*, but smaller, closely adpressed to the rock, often forming orbicular rosettes up to 3 cm. diameter, the hair-like branches repeatedly dichotomously divided, frequently with a tendency to produce minute divaricate side-branchlets, and occasionally ± flattened and applanate towards the tips; they are attached here and there to the rock by small, black, discoid holdfasts, as in *A. pubescens*.

Apothecia rare, 1–3 mm. diameter, blackish, with usually crenulate thalline margin. Spores somewhat smaller than in *A. pubescens*, 8–9×5–7μ.

Reactions and chemical constituents. K−, $Ca(OCl)_2$−, PD−; chemical composition unknown, probably no extracellular substances present.

Discussion. All specimens seen from Graham Land are sterile. In this respect, the apothecia described for "*Alectoria antarctica*" by Dodge and Baker present somewhat of a problem. The type specimen from Marie Byrd Land (Siple *et al.*, No. R-1) was unfortunately not available, but Dr. C. W. Dodge kindly sent a microscopic preparation made from it, together with two other authentic specimens from the same locality, both of them representing the typical condition of *A. minuscula*. The microscopic preparation of the type specimen contains several good sections of an apothecium agreeing in structure with the description and figures of Dodge and Baker (1938), with a dark brown excipulum, paler brown hypothecium, and no trace of any algae or algal-medullary tissue. Previously (Lamb, 1948*b*, p. 245) it was hinted that this structure, aberrant for the species, might be due to poor development or degeneration. However, examination of the sections fails to support this view; the hymenial tissues are obviously in good condition and show no signs of degeneration. The apothecia in section appear to be lecideine, as in species of *Lecidea* and *Buellia*. Two explanations appear to be possible: either that these apothecia belong to the lichen but are abnormal (they occurred apparently only in one specimen out of the 25 recorded by Dodge and Baker), or that they are those of a parasitic or parasymbiotic Ascomycete (perhaps a species of *Nesolechia*). Murray (1963, p.70) is also of the opinion that *A. antarctica* Dodge & Baker is probably not distinct from *A. minuscula*.

M. E. Hale (1954), who studied the species in Arctic Canada (Baffin Island), has shown that it is one of the pioneer lichen species on newly exposed rocks. It is obviously a much hardier plant than *A. pubescens*, and this feature is revealed not only in its greater range southwards in Antarctica (see below), but also in its more alpine distribution in the temperate zones of the Northern Hemisphere (Lynge and Scholander, 1932, p. 70–1; Dahl, 1950, p. 149; Frey, 1952, p. 426).

Geographical distribution. Bipolar; distribution in the Northern Hemisphere is similar to that of *A. pubescens*. In the Southern Hemisphere, the only reported occurrences known to the present author outside Antarctica are from New Zealand (Murray, 1960, p. 399), and Tierra del Fuego (Räsänen, 1932, p. 19, as the f. *biformis*). In Antarctica, it is probably circumpolar; Dodge and Baker (1938, as *Alectoria antarctica*) have reported it from Marie Byrd Land (including King Edward VII Land) and Victoria Land, and we have also seen specimens from Queen Mary Coast and the coast of Terre Adélie (in the herbarium of the Missouri Botanical Garden). There is a specimen in BM, referable to f. *biformis*, from Victoria Land (Cape Sastrugi, Evans Cove), collected by the British (*Terra Nova*) Antarctic Expedition of 1910–13, determined by Darbishire as "*Parmelia lanata*" and published by him as such (Darbishire, 1923, p. 32). In the Graham Land sector it has been found as far south as lichen collections have been made, and does not appear to occur in the South Orkneys or South Shetland Islands.

A. minuscula is a rather variable species morphologically, and a number of taxonomic forms have been discriminated. The following key will serve to characterize those occurring in Antarctica, but it must be pointed out that these forms intergrade considerably, and probably represent growth-stages or environmental modifications of questionable taxonomic value.

1*a*. Thallus branches uniform, not markedly dimorphic (minute secondary branchlets absent or little developed), terete, separate, with the substratum visible in between ... ... f. *minuscula*

1*b*. Thallus branches dimorphic, with formation of numerous, crowded, minute, secondary branchlets; branches terete or ± flattened, separate or congested.
  2*a*. Peripheral branches flattened and applanate ... ... f. *applanata*
  2*b*. Peripheral branches terete (or absent).
    3*a*. Peripheral branches present; central part of thallus not crustose ... ... f. *biformis*
    3*b*. Peripheral branches absent or almost so; thallus consisting of irregular, pulvinate, crustose masses of secondary branchlets ... ... f. *congesta*

f. ***minuscula***

The specimens examined are listed in Appendix Table XI.

f. ***applanata*** (Lynge) M. Lamb, 1940, p. 264

Syn. *Parmelia minuscula* f. *applanata* Lynge *in* Lynge and Scholander, 1932, p. 72.
Parmelia minuscula subsp. *minutissima* Räsänen, 1917, p. 118.

Icon. Plate VIId: specimen from east Graham Land, between Hope Bay and Duse Bay, FIDS No. D2557, BM, ×4.
Lynge and Scholander, 1932, pl. VI, fig. 3: habit photograph.
Räsänen, 1917, p. 118, fig. 1: sketch of branch apices; as *Parmelia minuscula* subsp. *minutissima*.

Geographical distribution. (See Appendix Table XII.)

f. ***biformis*** (Vainio) M. Lamb, 1948*b*, p. 243

Syn. *Parmelia pubescens* f. *biformis* Vainio, 1903, p. 14.
Alectoria intricata Hue, 1915, p. 41; *Alectoria bicolor* var. *intricata* (Hue) Gyelnik, 1935*b*, p. 3; *Bryopogon bicolor* var. *intricatus* (Hue) Gyelnik, 1935*a*, p. 238.

Icon. Plate VIIc: specimen from east Graham Land, View Point, FIDS No. D2615 *pr. p.*, BM, ×4.

Geographical distribution. (See Appendix Table XIII.)

f. ***congesta*** (Zahlbruckner) M. Lamb, 1948*b*, p. 244

Syn. *Parmelia pubescens* var. *congesta* Zahlbruckner, 1906, p. 52; *Alectoria congesta* (Zahlbruckner) Dodge, 1948, p. 195.

Icon. Plate IXc: part of specimen from Debenham Islands, west Graham Land, BGLE No. 1498 *pr. p.*, BM, ×4.

Geographical distribution. (See Appendix Table XIV.)

5. Genus ***Cornicularia*** (Schreber) Acharius, 1794, p. 259

Syn. *Lichen* sect. *Cornicularia* Schreber, 1791, p. 768.

With some hesitation we follow Du Rietz (1926*c*), Hillmann and Grummann (1957) and Keissler (1958–60) in regarding *Cornicularia* as belonging to the family Usneaceae, as it shows in some respects a transition to the Parmeliaceae (*Cetraria*). It is distinguished anatomically from *Alectoria* by the structure of the thallus cortex, which is of gelatinized, "decomposed" structure with branching hyphal lumina interwoven in various directions (in *Alectoria* of longitudinally parallel hyphae).

Key to the species of Graham Land and adjacent islands

1*a*. Thallus branches beset with fascicles of minute, cylindrical, divaricate, isidioid branchlets ... ... *C. epiphorella*

1*b*. Thallus branches sometimes with small thorny side-branchlets, but without fasciculate, isidioid branchlets ... ... *C. aculeata*

Cornicularia aculeata (Schreber) Acharius, 1803, p. 302

Syn. *Lichen aculeatus* Schreber, 1771, p. 125.
Lichen islandicus γ. tenuissimus Linnaeus, 1753, p. 1145; *Cornicularia tenuissima* (Linnaeus) Zahlbruckner *in* Keissler, 1928, p. 64.

Icon. Plate IXb: specimen from King George Island, South Shetland Islands, Kühnemann No. 35032, BASB, ×1.
Anders, 1928, pl. XXVI, fig. 11: habit photograph; as *Cetraria aculeata.*
Galløe, 1948, pl. 87–90: habit and details of anatomical structure.
Howard, 1950, pl. IXD: habit photograph; as *Cornicularia tenuissima.*
Keissler, 1958–60, Lief. 5 (1960), pl. IV, fig. 3 and pl. V, fig. 4: habit photographs of typical and other forms; as *Cornicularia tenuissima.*
Weber and Shushan, 1955, pl. 5B: habit photograph; as *Cornicularia tenuissima.*

Morphological description. Thallus shrubby, erect, forming clumps, 3–10 cm. high, loosely attached to the substratum and often tending to die off below, grey-brown to brown or dark brown, often very shiny in younger parts, the branches 1–2 mm. thick, cylindrical or partly deflated-angulate, repeatedly branched, sometimes with small, thorny side-branchlets but without fasciculate isidioid outgrowths; internally becoming hollow and fistulose.

Apothecia (not present in the Antarctic material seen) terminal, concolorous with the thallus, with subulate cilia on the thalline margin. Spores 8 in ascus, simple, ellipsoid, colourless, minute, 5–9×3–4μ (according to Th. Fries, 1871, p. 101).

Reactions and chemical constituents. Thallus K−, C−, PD−; an aliphatic compound is present, identified as protolichesterinic acid by Zopf (1907, p. 15), but said to be rangiformic acid by Mitchell (1959, p. 14).

Discussion. Usually grows on the ground, often among mosses and other terricolous lichens, sometimes on mossy rocks, but not on bare rock.

Geographical distribution. New to Antarctica; a bipolar species with wide distribution in the Arctic and temperate zones of the Northern Hemisphere. Its distribution in the Southern Hemisphere is incompletely known, but it occurs in Patagonia and Tierra del Fuego (Jatta, 1906, p. 5; Du Rietz, 1926*c*, p. 36; Räsänen, 1932, p. 12), the Falkland Islands (collected by the present author near Stanley in 1946) and New Zealand (Murray, 1960, p. 399). The few specimens seen indicate fairly widespread occurrence in northern Graham Land, the South Shetland Islands and South Orkney Islands.

The specimens examined are listed in Appendix Table XV.

Cornicularia epiphorella (Nylander) Du Rietz, 1926*c*, p. 32

Syn. *Cetraria epiphorella* Nylander ex Crombie, 1876*b*, p. 227.
Cetraria aculeata var. *gracilenta* Krempelhuber, 1868, p. 315; *Cetraria gracilenta* (Krempelhuber) Vainio, 1903, p. 13.

Icon. Vainio, 1903, pl. III, fig. 28: habit photograph; as *Cetraria gracilenta.*

Morphological description. Very similar to *C. aculeata*, but more slender, and with the branches bearing lateral fascicles of minute, cylindrical, isidia-like outgrowths, which break off easily.

Reactions. K−, C−, PD−; chemical constitution unknown.

Discussion. Du Rietz (1926*c*, p. 34) considers the minute cylindrical outgrowths to be true isidia, and states that they may give rise to small punctate soredia on becoming detached.

Similar in its ecology to the foregoing species, to which it is undoubtedly closely related. Du Rietz (1926*c*, p. 34) mentions its occasional occurrence on trees, as well as on the ground, in Tierra del Fuego.

Geographical distribution. Southernmost South America (Patagonia and Fuegia); Falkland Islands (specimen in BM collected by G. Howkins, 1945). The first note on its Antarctic occurrence was by Skottsberg, who annotated a Fuegian specimen of this species with the remark "Kam bei Mount Bransfield in Louis Philippe Land* reichlich vor" (quoted in Du Rietz, 1926*c*, p. 34, footnote). The Mount Bransfield collection had been lost in the wreck of the SAE ship *Antarctic*, and Skottsberg was speaking from memory. The existence of *C. epiphorella* in the Antarctic can now be confirmed by a collection from the South Orkneys, details of which are given in Appendix Table XVI.

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* Now known as the Louis-Philippe Plateau.

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* In earlier works spelt Wainio.

SPECIMENS EXAMINED

The following points should be noted when comparing the information given in Tables I–XVI with that appearing on the specimen labels.

Locality. The place-names used in the tables are those currently accepted for use in British official publications, as listed in the Gazetteer of the British Antarctic Territory, South Georgia and the South Sandwich Islands, 1962 edition, published by H.M. Stationery Office. The Argentine equivalents are given after the tables. Unofficial place-names appear on many specimen labels, and if these are quoted in the tables they are given in inverted commas.

Position. The latitude and longitude of the locality where each specimen was collected is given in the tables as far as possible to the nearest minute of a degree, but if the precise locality is unknown the figure quoted is the mid-point of the feature named. Some specimen labels still bear provisional figures assigned in the field.

Specimen number. In most cases only the actual number will be found on the specimen label, and not the name or date of the expedition (or its abbreviation; see p. 2) which precedes the number. However, specimens collected by the F.I.D.S. (Falkland Islands Dependencies Survey or its forerunner "Operation Tabarin") also bear prefix letters A, B or BB, C, D, E, G, H and N, which indicate the bases from which the material was collected. A small letter following the number indicates a subdivision of the original specimen.

TABLE I

Usnea acromelana var. *decipiens*

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
BRABANT I.	64°15′	62°20′	990	300	On isolated rock in middle of glacier	1897–99	BAE 249 *pr. p.*	TUR (Nos. 354, 355)	ster.	E. Racovitza
WIENCKE I., Noble Peak (N.W. buttress)	64°48′	63°25′	700	215	Associated with *Usnea antarctica* on rock projecting through snow. N. exposure	15 Oct. 1944	FIDS*	BM	*fert.*	I. M. Lamb

* No number.

TABLE IIa

Usnea antarctica

Typical acid-deficient phase (PD—)

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
(Not given)	—	—	500	150	—	1915	*	BM	ster.	A. G. Bennett
LAURIE I., Cape Geddes	60°42′	44°35′	—	—	On steep slopes above general level of snow-covered ground	8 Apr. 1946	FIDS C3–1001b	BM	ster.	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	60	18	On scree slope of large boulders near base hut	23 May 1946	FIDS C6–1002a	BM	ster.	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	100–200	30–60	On slope facing N.W.	3 Oct. 1946	FIDS C8–1003–2b	BM	ster.	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	15	4	N.W. coast of C. Geddes: on exposed rocks	27 Nov. 1946	FIDS C19–1006a	BM	ster.	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	40–70	12–21	On loose rocks recently exposed	27 Nov. 1946	FIDS C20–1007a	BM	ster.	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	100	30	—	28 Nov. 1946	FIDS C24–1008b	BM	ster.	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	100–250	30–75	On boulders and rock faces	22 Dec. 1946	FIDS C42–1014a	BM	ster.	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	—	—	On steep slopes	3 Jan. 1947	FIDS C44–1015e	BM	ster.	FIDS
FREDRIKSEN I.	60°45′	45°00′	400	120	On rock outcrop	4 Jan. 1933	DI 1931–33/1090 *pr. p.*	BM	ster.	DI 1931–33
FREDRIKSEN I.	60°45′	45°00′	80–150	25–45	Abundant on scree slope at N.W. end of island	4 Jan. 1933	DI 1931–33/252	BM	ster.	DI 1931–33
SIGNY I.	60°43′	45°38′	0	0	150 yd. inland	18 Dec. 1947	FIDS H74–1c	BM	ster.	P. E. Biggs
SIGNY I., near Berry Head	60°42′	45°36′	50	15	300 yd. from Berry Head	13 Jan. 1948	FIDS H80–1c	BM	ster.	P. E. Biggs
SIGNY I., Gourlay Point	60°44′	45°35′	80	25	—	15 Jan. 1948	FIDS H82–1b	BM	ster.	P. E. Biggs
SIGNY I., Jebsen Point	60°43′	45°40′	40	12	—	16 Jan. 1948	FIDS H84–1a	BM	ster.	P. E. Biggs
SIGNY I., Borge Bay	60°43′	45°36′	30	9	N.-facing slope	Feb. 1944	FIDS H3040	BM	ster.	T. Hooley
SIGNY I., Borge Bay	60°43′	45°36′	80	25	Near base hut	26 Apr. 1947	FIDS H53–1a	BM	ster.	G. de Q. Robin

* No number.

TABLE IIa (*continued*)

South Shetland Islands

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
ELEPHANT I.	61°10′	55°14′	100	30	Near beach among moss (*Hypnum* sp.) "the only vegetable matter noticed on the island"	27 Feb. 1922	SRAE 31 *pr. p.*	BM	ster.	SRAE
KING GEORGE I., Esther Harbour	61°55′	57°56′	0	0	E. side	6 Jan. 1937	DI 1936–37/1949	BM	ster.	DI 1936–37
KING GEORGE I., Admiralty Bay	62°07′	58°27′	—	—	—	1918	*	BM	ster.	A. G. Bennett
KING GEORGE I., Martel Inlet	62°03′	58°23′	20	6	N. of base hut at cliff top	1 Mar. 1947	FIDS G36–9	BM	ster.	D. Nicholson and A. Reece
KING GEORGE I., Martel Inlet (Visca Anchorage)	62°03′	58°23′	—	—	—	17 Dec. 1934	DI 1934–35/1481 *pr. p.*	BM	ster.	DI 1934–35
KING GEORGE I., Ardley I.	62°12′	58°56′	—	—	—	2 Jan. 1954	AE 35005–35008 AE 35023 *pr. p.* AE 35029	BASB	ster.	O. Kühnemann
FILDES STRAIT	62°14′	58°59′	—	—	Base of low crags near foreshore	18 Dec. 1934	DI 1934–35/1482 *pr. p.*	BM	ster.	DI 1934–35
FILDES STRAIT	62°14′	58°59′	—	—	Base of low crags near foreshore	21 Dec. 1934	DI 1934–35/1483 *pr. p.*	BM	ster.	DI 1934–35
NELSON I., Harmony Cove	62°19′	59°11′	—	—	—	14 Dec. 1934	DI 1934–35/1480 *pr. p.*	BM	ster.	DI 1934–35
ROBERT I., Coppermine Cove	62°22′	59°45′	—	—	"On fairly exposed dry rock faces"	31 Dec. 1934	DI 1934–35/1485 *pr. p.*	BM	ster.	DI 1934–35
GREENWICH I., Yankee Harbour	62°32′	59°47′	—	—	On slopes above penguin rookery	13 Dec. 1934	DI 1934–35/1479 *pr. p.*	BM	ster.	DI 1934–35
DECEPTION I.	62°57′	60°38′	—	—	—	Dec. 1909	FAE 1908–10/290 *pr. p.* FAE 1908–10/291 *pr. p.*	PC	ster.	FAE 1908–10
DECEPTION I.	62°57′	60°38′	—	—	—	—	*	BM	ster.	A. G. Bennett
DECEPTION I.	62°57′	60°38′	—	—	Seen from distance as pale green zone on rocks	10 Jan. 1936	BGLE 1360 *pr. p.*	BM	ster.	BGLE
DECEPTION I.	62°57′	60°38′	—	—	—	10 Jan. 1936	BGLE 1361 *pr. p.*	BM	ster.	BGLE
DECEPTION I.	62°57′	60°38′	—	—	10 ft. below ridge	1944	FIDS BB110a	BM	ster.	J. Matheson
DECEPTION I.	62°57′	60°38′	50–75	8–23	Summit of pinnacle near top of glacier	8 Mar. 1944	FIDS BB115	BM	ster.	N. F. Layther
DECEPTION I.	62°57′	60°38′	600	180	Summit of glacier near Whalers Bay	5 Feb. 1945	FIDS B2348 FIDS B2356	BM	ster.	E. H. Back
DECEPTION I.	62°57′	60°38′	—	—	—	Feb. 1954	*	BM	ster.	J. Fay

* No number.

TABLE IIa (*continued*)

South Shetland Islands—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
DECEPTION I., Baily Head	62°58′	60°30′	—	—	Growing in moss tufts by "Chinstrap" penguin colony on tuff	16 Jan. 1936	BGLE 1381 *pr. p.*	BM	ster.	BGLE
DECEPTION I., Baily Head	62°58′	60°30′	300	92	From tuff cliffs above main "Chinstrap" penguin colony	20 Jan. 1936	BGLE 1399 BGLE 1400	BM	ster.	BGLE
DECEPTION I., S.E. side of harbour	62°59′	60°34′	50	15	On sloping sides and tops of agglomerate rocks, forming dense sward. N.W. exposure	6 Feb. 1944	FIDS B1119 *pr. p.*	BM	ster.	I. M. Lamb
DECEPTION I., S.E. wall of harbour	62°59′	60°34′	—	—	On lower slopes of agglomerate cliffs	24 Dec. 1934	DI 1934–35/1484 *pr. p.*	BM	ster.	DI 1934–35
DECEPTION I., Fildes Point	63°00′	60°34′	—	—	—	13 Feb. 1944	FIDS BB118a FIDS BB121a	BM	ster.	N. F. Layther
DECEPTION I., S.W. side of Neptune's Bellows	63°00′	60°34′	—	—	—	10 Jan. 1935	DI 1934–35/1488 *pr. p.*	BM	ster.	DI 1934–35
DECEPTION I., S.W. side of Neptune's Bellows	63°00′	60°34′	—	—	—	17 Jan. 1936	BGLE 1384	BM	ster.	BGLE
DECEPTION I., Ronald Hill	62°59′	60°35′	300	92	—	9 Feb. 1945	FIDS B2332	BM	ster.	G. Davies

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
2 mi. N.N.W. of MT. JACQUINOT	63°21′	57°53′	50	15	—	18 Oct. 1946	FIDS D367–3 FIDS D367–6a FIDS D367–10a	BM	ster.	A. Reece
2 mi. S.E. of C. ROQUEMAUREL	63°33′	58°56′	500	150	—	3 Sept. 1946	FIDS D338–7	BM	ster.	J. D. Andrew
BRIALMONT COVE, Spring Point	64°17′	61°04′	—	—	—	14 Jan. 1954	AE 35087	BASB	ster.	O. Kühnemann

TABLE IIa (*continued*)

West Graham Land—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
AUGUSTE I.	64°03′	61°36′	—	—	On vertical cliff face	1897–99	BAE 208‡ *pr. p.*	TUR	*fert.*	E. Racovitza
BRABANT I.	64°15′	62°20′	990	300	On isolated rock in middle of glacier	1897–99	BAE 249 *pr. p.*	TUR	ster.	E. Racovitza
MELCHIOR Is.,†	64°19′	62°57′	—	—	—	7 Mar. 1941	USAS 334 USAS 352	US	ster.	R. G. Frazier C. W. Bailey P. A. Siple
MELCHIOR Is.,†	64°19′	62°57′	—	—	—	5 Mar. 1941	USAS 349	US	ster.	P. A. Siple
MELCHIOR Is., island N.E. of Omega I.	64°19′	62°55′	—	—	—	6 Mar. 1941	USAS 354	US	ster.	P. A. Siple
MELCHIOR Is., Omega ("Lystad") I.	64°20′	62°56′	—	—	—	14 Mar. 1941	USAS 331	US	ster.	J. C. McCoy and P. A. Siple
MELCHIOR Is., Omega ("Lystad") I.	64°20′	62°56′	—	—	—	1 Mar. 1941	USAS 358	US	ster.	P. A. Siple
MELCHIOR Is., Omega ("Lystad") I.	64°20′	62°56′	—	—	—	27 Feb. 1941	USAS 370	US	ster.	H. H. Richardson and P. A. Siple
CAPE ANNA ("Cap Anna Osterreith")	64°36′	62°26′	—	—	In cracks in cliff	1897–99	BAE 197 *pr. p.*	TUR	*fert.*	E. Racovitza
ANVERS I.	64°45′	64°05′	—	—	Widespread on dry faces of weathered rocks near hut	7 Dec. 1957	FIDS N57–15	BM	ster.	FIDS
WIENCKE I., Noble Peak	64°48′	63°25′	700	215	N. exposure on N.W. buttress. On rock projecting through snow	15 Oct. 1944	FIDS A1288 *pr. p.* FIDS A1292 FIDS A1310 *pr. p.* FIDS A1316	BM	ster.	I. M. Lamb
WIENCKE I., Noble Peak	64°48′	63°25′	400	120	N.E. exposure on N.W. buttress of rock outcrop	19 Nov. 1944	FIDS A1745 FIDS A1748	BM	ster.	I. M. Lamb
WIENCKE I., hill E. of Wall Range	64°49′	63°22′	1,200	360	On N.-facing rocky slope	8 Oct. 1944	FIDS A1323 *pr. p.* FIDS A1325	BM	ster.	I. M. Lamb
WIENCKE I., Goudier I.	64°50′	63°31′	—	—	—	Dec. 1908	FAE 1908–10/83 *pr. p.*	PC	ster.	FAE 1908–10
WIENCKE I., Port Lockroy	64°50′	63°31′	80	25	On granodiorite cliffs	18 Jan. 1935	DI 1934–35/1489 *pr. p.*	BM	ster.	DI 1934–35
WIENCKE I., Port Lockroy	64°50′	63°31′	40	12	On vertical N.-facing granodiorite cliff. Near penguin rookery	27 Mar. 1944	FIDS A1190	BM	ster.	I. M. Lamb
DOUMER I.	64°51′	63°55′	150	45	On N. side of rock outcrop. N. exposure	12 Dec. 1944	FIDS A1922	BM	ster.	I. M. Lamb
BOOTH I.	65°05′	64°00′	—	—	—	Sept. 1904	FAE 1903–05*	PC	ster.	FAE 1903–05

* No number.
† Precise localities unidentified.
‡ Type specimen of *Usnea sulphurea* var. *granulifera* Vain.

TABLE IIa (*continued*)

West Graham Land—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
BOOTH I.	65°05′	64°00′	—	—	—	Jan. 1909	FAE 1908–10/149 *pr. p.*	PC	ster.	FAE 1908–10
HOVGAARD I.	65°08′	64°07′	—	—	—	Feb. 1904	FAE 1903–05/17 (903)	PC	ster.	FAE 1903–05
PETERMANN I.	65°11′	64°11′	—	—	—	Jan. 1909	FAE 1908–10/140 *pr. p.* FAE 1908–10/144 FAE 1908–10/151–I *pr. p.* FAE 1908–10/154–II *pr. p.*	PC	ster.	FAE 1908–10
PETERMANN I.	65°11′	64°11′	—	—	—	Mar. 1909	FAE 1908–10/284 *pr. p.*	PC	ster.	FAE 1908–10
PETERMANN I.	65°11′	64°11′	—	—	—	Nov. 1909	FAE 1908–10/686 *pr. p.*	PC	ster.	FAE 1908–10
RASMUSSEN I. ("Cape Rasmussen")	65°15′	64°06′	—	—	—	21 Jan. 1936	BGLE 1479 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	10–25	3–8	On N.-facing low sea-cliff	27 Mar. 1935	BGLE 1113 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	10–25	3–8	On N.-facing low sea-cliff	31 Mar. 1935	BGLE 1116 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	0	0	N.W.-facing rock slopes	31 Mar. 1935	BGLE 1118 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	10–20	3–6	On vertical N.-facing rock	27 May 1935	BGLE 1163 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	N.-facing rock by *Penola*'s winter anchorage	24 Oct. 1935	BGLE 1245 BGLE 1248 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	N.-facing rock by *Penola*'s winter anchorage	1 Nov. 1935	BGLE 1253 *pr. p.* BGLE 1253–17a	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	—	23 Nov. 1935	BGLE 1265 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	N.-facing lower cliffs with occurrence of *Colobanthus* "specially protected situation"	14 Dec. 1935	BGLE 1304	BM	*fert.*	BGLE
ARGENTINE IS. Galindez I.	65°15′	64°15′	—	—	"From typical boulder area recently uncovered from snow"	27 Dec. 1935	BGLE 1328 *pr. p.*	BM	ster.	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	"On rocks recently free of snow" on summit of island	1 Jan. 1936	BGLE 1340–1b	BM	ster.	BGLE
ARGENTINE IS. Galindez I.	65°15′	64°15′	—	—	"Exposed throughout most of winter" on summit of island	2 Jan. 1936	BGLE 1341	BM	ster.	BGLE
BERTHELOT IS.	65°19′	64°10′	—	—	—	—	BGLE*	BM	ster.	BGLE
BERTHELOT IS., Green I.	65°19′	64°10′	—	—	—	18 Mar. 1935	BGLE 1081 *pr. p.*	BM	ster.	BGLE

TABLE IIa (*continued*)

West Graham Land—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
BERTHELOT Is., Green I.	65°19′	64°10′	—	—	On N.-facing sea-cliff	18 Mar. 1935	BGLE 1085 BGLE 1094 *pr. p.*	BM	ster.	BGLE
ADELAIDE I.	67°15′	68°30′	—	—	S.E. corner of island	16 Feb. 1937	BGLE 1564 *pr. p.*	BM	ster.	BGLE
MARGUERITE BAY, island south of Horseshoe I.	67°53′	67°17′	—	—	—	15 Dec. 1936	BGLE 1519	BM	ster.	BGLE
MARGUERITE BAY, small unnamed island	68°30′	69°00′	—	—	—	Jan. 1909	FAE 1908–10/267 *pr. p.* FAE 1908–10/269 *pr. p.*	PC	ster.	FAE 1908–10
MARGUERITE BAY, Jenny I.	67°44′	68°25′	30	9	N.E. side of island on exposed rock	17 Oct. 1948	FIDS E466–1a	BM	ster.	V. E. Fuchs and B. Stonehouse
MARGUERITE BAY, Léonie Is.	67°36′	68°17′	—	—	From extreme edge of lichen area	16 Feb. 1937	BGLE 1563	BM	ster.	BGLE
MARGUERITE BAY, Léonie Is. (Lagoon I.)	67°36′	68°15′	—	—	—	26 Feb. 1936	BGLE 1449–11a	BM	ster.	BGLE
MARGUERITE BAY, Léonie Is.	67°36′	68°17′	—	—	Plentiful	22 Oct. 1948	FIDS E468–3	BM	ster.	B. Stonehouse
MARGUERITE BAY, The Narrows	67°36′	67°12′	—	—	W. end of The Narrows on beach boulders	25 Jul. 1936	BGLE 1488 *pr. p.*	BM	ster.	BGLE
MARGUERITE BAY, Bourgeois Fjord	67°40′	67°05′	—	—	S. side of fjord	15 Dec. 1936	BGLE 1518 *pr. p.*	BM	ster.	BGLE
MARGUERITE BAY, Lagotellerie I.	67°53′	67°24′	—	—	From low point at E. end	20 Jul. 1936	BGLE 1487	BM	ster.	BGLE
MARGUERITE BAY, Debenham Is. (Barry I.)	68°08′	67°07′	—	—	—	26 Nov. 1936	BGLE 1498 *pr. p.*	BM	ster.	BGLE
MARGUERITE BAY, Debenham Is. (Barbara I.)	68°08′	67°07′	—	—	At gneiss end	5 Jan. 1937	BGLE 1542 *pr. p.*	BM	ster.	BGLE
MARGUERITE BAY, Roman Four Promontory	68°13′	66°58′	90	28	On exposed rock	8 Dec. 1947	FIDS 1072b	BM	ster.	B. Stonehouse
MARGUERITE BAY, Neny Fjord	68°16′	66°50′	—	—	On exposed rock	18 Aug. 1947	FIDS E1061	BM	ster.	B. Stonehouse
MARGUERITE BAY, Neny Fjord (Red Rock Ridge)	68°18′	67°05′	400	120	—	19 Jan. 1948	FIDS E1158 FIDS E1162	BM	ster.	A. R. C. Butson
Col S.W. of Wordie Ice Shelf	69°40′	68°30′ approx.	—	—	On nunatak	2 Oct. 1936	BGLE 1496 *pr. p.*	BM	ster.	BGLE

TABLE IIa (*continued*)

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
HOPE BAY	63°24′	57°00′	—	—	—	11 Nov. 1903	SAE*	S	ster.	C. Skottsberg
HOPE BAY, low hill on E. side	63°24′	57°00′	350	105	Common amongst loose blocks of rock	16 Apr. 1945	FIDS D2375 *pr. p.* FIDS D2395	BM	ster.	I. M. Lamb
HOPE BAY, Above Lake Boeckella	63°24′	57°00′	350	105	Common on rocks and loose stones on hillock	25 Oct. 1945	FIDS D2532	BM	ster.	I. M. Lamb
HOPE BAY, Scar Hills	63°25′	57°01′	300	92	On loose stone	25 Nov. 1945	FIDS D2497	BM	ster.	I. M. Lamb
THE STEEPLE	63°26′	57°03′	1,000	305	On west side of N.-facing vertical cliff irrigated by trickling melt-water	8 Nov. 1945	FIDS D2578	BM	ster.	I. M. Lamb
MT. CARREL	63°26′	57°03′	1,800	550	—	26 Oct. 1945	FIDS D2540	BM	ster.	E. H. Back
ABARIN PENINSULA, isolated nunatak 3 mi. S.W. of Summit Pass	63°29′	57°06′	700	215	—	5 Nov. 1945	FIDS D2556 FIDS D2558	BM	ster.	L. Ashton
TABARIN PENINSULA, Brown Bluff	63°32′	56°55′	1,250	385	Abundant on rock of N. face	19 Mar. 1946	FIDS D105–2	BM	ster.	J. D. Andrew
TABARIN PENINSULA, Brown Bluff	63°32′	56°55′	1,700	520	On vesicular basalt of N. face	25 Mar. 1946	FIDS D107–2a	BM	ster.	J. D. Andrew
DUSE BAY, View Point	63°33′	57°22′	450	137	On moraine boulders	13 Nov. 1945	FIDS D2633 *pr. p.*	BM	ster.	G. Davies
DUSE BAY, View Point (N. side)	63°33′	57°22′	*c.*50	*c.*15	N. exposure on rock outcrop	10 Nov. 1945	FIDS D2622	BM	ster.	
PAULET I.	63°35′	55°47′	—	—	—	Oct. 1903	SAE*	S	ster.	C. Skottsberg
BEAK I.	63°37′	57°20′	30	9	On loose stones on low col running across island	28 Dec. 1945	FIDS D2712 *pr. p.*	BM	ster.	I. M. Lamb
BEAK I.	63°37′	57°20′	1,200	366	—	6 Jan. 1946	FIDS D2865	BM	ster.	E. H. Back
3 mi. N.E. of CHURCH PT.	63°39′	57°51′	10–50	3–15	—	26 Dec. 1945	FIDS D2650	BM	ster.	V. I. Russell
EAGLE I.	63°40′	57°30	50	15	N.E. part of island	28 Dec. 1945	FIDS D2848	BM	ster.	V. I. Russell
LONG I.	63°46′	58°12′	60	18	S.W. end of island on rock outcrop	17 Aug. 1945	FIDS D2445	BM	ster.	I. M. Lamb
DEVIL I.	63°48′	57°17′	680	207	On E. peak	13 Nov. 1945	FIDS 2587 *pr. p.*	BM	ster.	C. Davies and V. I. Russell

* No number.

TABLE IIb

Usnea antarctica

Active or "sorediifera" phase (PD+ yellow, orange or red)

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
LAURIE I., Cape Geddes	60°42′	44°35′	100	30	On recently exposed rocks on N.W. slope	28 Nov. 1946	FIDS C24–1008c	BM	ster.	FIDS

South Shetland Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
KING GEORGE I., Ardley I.	62°12′	58°56′	—	—	—	2 Jan. 1954	AE 35022	BASB	ster.	O. Kühnemann
DECEPTION I.	62°57′	60°38′	300	*c.*90	On tuff cliffs above "chin-strap" penguin rookery	10 Jan. 1936 20 Jan. 1936	BGLE 1360 *pr. p.* BGLE 1400–30a	BM BM	ster. ster.	BGLE BGLE
DECEPTION I.	62°57′	60°38′	—	—	—	Feb. 1954	*	BM	ster.	J. Fay
DECEPTION I., S.E. side of harbour	62°57′	60°38′	50	15	On sloping sides and tops of large agglomerate rocks. N.W. exposure	6 Feb. 1944	FIDS B1119 *pr. p.*	BM	ster.	I. M. Lamb

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
BRABANT I.	64°15′	62°20′	990	300	On isolated rock in middle of glacier	1897–99	BAE 249 *pr. p.*	TUR	ster.	E. Racovitza
MELCHIOR IS., Omega ("Lystad") I.	64°20′	62°56′	—	—	—	1 Mar. 1941	USAS 381	US	ster.	P. A. Siple
WIENCKE I., Noble Peak	64°48′	63°25′	700	215	On rock projecting through snow on N.W. buttress. N. exposure	15 Oct. 1944	FIDS A1288 *pr. p.* FIDS A1293 FIDS A1310 *pr. p.* FIDS A1312 FIDS A1314 FIDS A1315	BM	ster.	I. M. Lamb
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	"Typical boulder area recently uncovered by snowmelt"	27 Dec. 1935	BGLE 1328 *pr. p.*	BM	ster.	BGLE

* No number.

TABLE IIb (*continued*)

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
HOPE BAY, low hill on E. side	63°24′	57°00′	350	105	—	16 Apr. 1945	FIDS D2375 *pr. p.*	BM	ster.	I. M. Lamb
MT. CARDINALL	63°27′	57°10′	750	230	—	14 Dec. 1946	FIDS D115–12a	BM	ster.	J. D. Andrew
DUSE BAY, View Point	63°33′	57°22′	—	—	—	13 Nov. 1945	FIDS D2633 *pr. p.*	BM	ster.	G. Davies
3 mi. N.E. of CHURCH POINT	63°39′	57°51′	10–50	3–15	—	26 Dec. 1945	FIDS D2656	BM	ster.	V. I. Russell
RUSSELL E. GLACIER	63°44′	58°17′	1,800	550	At foot of glacier	14 Dec. 1946	FIDS D369–12b	BM	ster.	A. Reece
MT. REECE ("Mt. Fitzroy")	63°48′	58°29′	800	245	—	19 Dec. 1946	FIDS D374–10a	BM	ster.	A. Reece
DEVIL I.	63°48′	57°17′	—	—	On E. peak	13 Nov. 1945	FIDS D2587 *pr. p.*	BM	ster.	G. Davies and V. I. Russell

TABLE IIc

Usnea antarctica

Chemical phase indeterminable as specimens preserved in fluid

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
S. ORKNEY IS.	—	—	—	—	—	1933	DI 1931–33*	BM	ster.	DI 1931–33
S. SHETLAND IS., Deception I.	62°57′	60°38′	—	—	—	1931	DI 1931–33*	BM	ster.	DI 1931–33

* No number.

TABLE IIIa

Usnea fasciata

Active phase with abundant fumarprotocetraric acid (K+ brown, PD+ red)

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
"POWELL'S GROUP" (Powell I.?)	—	—	—	—	—	—	*	BM	*fert.*	—
LAURIE I., Cape Geddes	60°42′	44°35′	100–200	30–60	On slope facing N.W.	3 Oct. 1946	FIDS C8–1003–2c FIDS C8–1003–5	BM	*fert.*	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	—	—	On steep slopes	3 Jan. 1947	FIDS C44–1015a FIDS C44–1015d	BM BM	ster. *fert.*	FIDS FIDS
SIGNY I.	60°43′	45°38′	0	0	150 yd. inland	18 Dec. 1947	FIDS H74–1b	BM	*fert.*	P. E. Biggs
SIGNY I., near North Point	60°41′	45°38′	80	25	300 yd. S. of North Point	16 Jan. 1948	FIDS H83–1a	BM	*fert.*	P. E. Biggs
SIGNY I., near Berry Head	60°42′	45°36′	50	15	300 yd. from Berry Head	13 Jan. 1948	FIDS H80–1b	BM	*fert.*	P. E. Biggs
SIGNY I., Borge Bay	60°43′	45°36′	200	60	—	1 Apr. 1934	DI 1934–35/1	BM	*fert.*	DI 1934–35
SIGNY I., Gneiss Hills	60°44′	45°39′	800	245	On southernmost hill	18 Dec. 1947	FIDS H73–1d	BM	*fert.*	P. E. Biggs

South Shetland Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
"NEW S. SHETLAND IS."	—	—	—	—	—	1830	*	US	*fert.*	J. Eights
KING GEORGE I.	62°00′	58°15′	—	—	—	Dec. 1909	FAE 1908–10/302	PC	*fert.*	FAE 1908–10
KING GEORGE I., Martel Inlet (Visca Anchorage)	62°03′	58°23′	60	18	—	18 Dec. 1934	DI 1934–35/1481 *pr. p.*	BM	*fert.*	DI 1934–35
KING GEORGE I., Keller Peninsula	62°03′	58°26′	800–1,000	245–305	At N. end of range	21 Feb. 1947	FIDS G27–10	BM	*fert.*	D. Nicholson and A. Reece
KING GEORGE I., Mackellar Inlet	62°03′	58°28′	0	0	On level stony ground a few yards from shore on E. side of inlet	21 Jan. 1937	DI 1936–37/1954 *pr. p.*	BM	*fert.*	DI 1936–37
KING GEORGE I., Ardley I.	62°12′	58°56′	—	—	—	2 Jan. 1954	AE 35004	BASB	ster.	O. Kühnemann
NELSON I., Harmony Cove	62°19′	59°11′	—	—	—	2 Dec. 1954	AE 35076 AE 35077	BASB	ster.	O. Kühnemann
ROBERT I., Coppermine Cove	62°22′	59°45′	80–200	25–60	On dry mossy slopes with some shelter	31 Dec. 1934	DI 1934–35/1485 *pr. p.*	BM	*fert.*	DI 1934–35

* No number.

TABLE IIIa (*continued*)

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
BRABANT I.	64°15′	62°20′	990	300	On rock in middle of glacier	1897–99	BAE 249 *pr. p.*	TUR	*fert.*	E. Racovitza
MELCHIOR Is., Omega ("Lystad") I.	64°20′	62°56′	—	—	—	14 Mar. 1941	USAS 367	US	ster.	P. A. Siple
CAPE ANNA ("Cap Anna Osterreith")	64°33′	62°26′	—	—	In cracks of cliff	1897–99	BAE 197 *pr. p.*	TUR	*fert.*	E. Racovitza
WIENCKE I., Noble Peak	64°48′	63°25′	*c.* 750	*c.*230	Abundant on N.-facing slope on N. buttress	20 Nov. 1944	FIDS A1789 *pr. p.*	BM	*fert.*	I. M. Lamb
BOOTH I.	65°05′	64°00′	—	—	—	Nov. 1904	FAE 1903–05*	PC	*fert.*	FAE 1903–05
BOOTH I.	65°05′	64°00′	—	—	—	Dec. 1908	FAE 1908–10/122	PC	*fert.*	FAE 1908–10
PETERMANN I.	65°11′	64°11′	—	—	—	Jan. 1909	FAE 1908–10/169	PC	*fert.*	FAE 1908–10
ARGENTINE Is., Galindez I.	65°15′	64°15′	—		On vertical N.-facing rock	27 May 1935	BGLE 1163 *pr. p.*	BM	ster.	BGLE
ARGENTINE Is., Galindez I.	65°15′	64°15′	—	—	On low N.-facing cliff in sheltered position; with *Colobanthus*	29 Dec. 1935	BGLE 1333	BM	ster.	BGLE
ARGENTINE Is., Galindez I.	65°15′	64°15′	—	—	On summit of island snow-covered until recently	2 Jan. 1936	BGLE 1340 *pr. p.*	BM	*fert.*	BGLE
ARGENTINE Is., Galindez I.	65°15′	64°15′	—	—	On summit of island, exposed throughout most of winter	2 Jan. 1936	BGLE 1341 *pr. p.*	BM	ster.	BGLE
CAPE TUXEN	65°16′	64°08′	—	—	—	Jan. 1909	FAE 1908–10/186 *pr. p.*	PC	*fert.*	FAE 1908–10

TABLE IIIb

Usnea fasciata

Semi-active or "normalis" phase with less abundant fumarprotocetraric acid (K—, PD+ red)

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
SIGNY I., Borge Bay	60°43′	45°36′	—	—	—	18 Jan. 1933	DI 1931–33/254	BM	*fert.*	DI 1931–33
SIGNY I., Gneiss Hills	60°44′	45°39′	800	245	On southernmost hill	18 Dec. 1947	FIDS H73–1a	BM	*fert.*	P. E. Biggs

* No number.

TABLE IIIb (*continued*)

South Shetland Islands

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
KING GEORGE I., Admiralty Bay	62°07′	58°27′	—	—	—	20 Dec. 1918	*	BM	*fert.*	A. G. Bennett
KING GEORGE I., Martel Inlet (Visca Anchorage)	62°03′	58°23′	120	37	—	17 Dec. 1934	DI 1934–35/1481 *pr. p.*	BM	ster.	DI 1933–35
KING GEORGE I., Martel Inlet (Visca Anchorage)	62°03′	58°23′	1,200	360	On top of volcanic dyke	17 Dec. 1934	DI 1934–35/1481 *pr. p.*	BM	*fert.*	DI 1933–35
KING GEORGE I., Keller Peninsula	62°03′	58°26′	800–1,000	245–305	At highest part of N. end of range	21 Feb. 1947	FIDS G27–1	BM	*fert.*	D. Nicholson and A. Reece
KING GEORGE I., Ardley I.	62°12′	58°56′	—	—	—	2 Jan. 1954	AE 35023 *pr. p.*	BASB	ster.	O. Kühnemann
KING GEORGE I., Potter Cove	62°13′	58°42′	—	—	—	28 Jan. 1955	AE 35058	BASB	*fert.*	O. Kühnemann
FILDES STRAIT	62°14′	58°59′	—	—	—	18 Dec. 1934	DI 1934–35/1482	BM	*fert.*	DI 1934–35
NELSON I., Harmony Cove	62°19′	59°11′	—	—	—	14 Dec. 1934	DI 1934–35/1480 *pr. p.*	BM	ster.	DI 1934–35
NELSON I., Harmony Cove	62°19′	59°11′	—	—	—	2 Dec. 1954	AE 35075	BASB	*fert.*	O. Kühnemann

West Graham Land

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
BRABANT I.	64°15′	62°20′	990	300	On isolated rock in middle of glacier	1897–99	BAE 249 *pr. p.*	TUR	ster.	E. Racovitza
MELCHIOR Is.,‡	64°19′	62°57′	—	—	—	7 Mar. 1941	USAS 352	US	*fert.*	P. A. Siple
MELCHIOR Is., Omega ("Lystad") I.	64°20′	62°56′	20–30	6–9	—	14 Mar. 1941	USAS 331	US	ster.	J. C. McCoy and P. A. Siple
WIENCKE I., Noble Peak	64°48′	63°25′	750	230	Abundant on N.-facing slope of N. buttress	20 Nov. 1944	FIDS A1789 *pr. p.*	BM	*fert.*	I. M. Lamb
CAPE RENARD	65°01′	63°43′	160	48	On isolated rock in middle of glacier	1897–99	BAE 266† *pr. p.*	TUR	*fert.*	E. Racovitza
ARGENTINE Is., Galindez I.	65°15′	64°15′	—	—	On summit of island, snow-covered until recently	2 Jan. 1936	BGLE 1340–1a	BM	*fert.*	BGLE

* No number.
† Lectotype of *Usnea sulphurea* var. *normalis* Vain.
‡ Precise locality unidentified.

TABLE IIIc

Usnea fasciata

Inactive or "egentissima" phase without fumarprotocetraric acid (K—, PD—)

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
LAURIE I., Scotia Bay	60°46′	44°40′	—	—	—	1903	SNAE 1903*	BM	*fert.*	SNAE
SIGNY I.	60°43′	45°38′	—	—	150 yd. inland near sea-level	18 Dec. 1947	FIDS H74–1a	BM	*fert.*	P. E. Biggs

South Shetland Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
"NEW S. SHETLAND"	—	—	—	—	—	*c.*1823	*	FH†	*fert.*	—
KING GEORGE I., Martel Inlet (Visca Anchorage)	62°03′	58°23′	120	38	—	17 Dec. 1934	DI 1934–35/1481 *pr. p.*	BM	*fert.*	DI 1934–35
KING GEORGE I., Martel Inlet (Visca Anchorage)	62°03′	58°23′	500	150	—	18 Dec. 1934	DI 1934–35/1481 *pr. p.*	BM	*fert.*	DI 1934–35
KING GEORGE I., Keller Peninsula	62°03′	58°26′	700–800	215–245	On E. peak of range	20 Feb. 1947	FIDS G24–6	BM	*fert.*	D. Nicholson and A. Reece
KING GEORGE I., Potter Cove	62°13′	58°42′	—	—	—	10 Jan. 1955	AE 35054	BASB	*fert.*	O. Kühnemann
KING GEORGE I., Potter Cove	62°13′	58°42′	—	—	—	28 Jan. 1955	AE 35056 AE 35069 AE 35070	BASB BASB BASB	*fert.* ster. ster.	O. Kühnemann
NELSON I., Harmony Cove	62°19′	59°11′	—	—	—	2 Dec. 1954	AE 35073	BASB	*fert.*	O. Kühnemann
ROBERT I., Coppermine Cove	62°22′	59°45	100	30	On sheltered N.E. slopes	31 Dec. 1934	DI 1934–35/1485 *pr. p.*	BM	*fert.*	DI 1934–35
HALF MOON I.	62°35′	59°55′	—	—	—	9 Jan. 1958 10 Jan. 1958	588, 589, 592	FH	*fert.*	M. Neushul
DESOLATION I.	62°28′	60°23′	100–150	30–45	On sheltered talus facing N.E.	8 Jan. 1935	DI 1934–35/1487 *pr. p.*	BM	*fert.*	DI 1934–35
DECEPTION I.	62°57	60°38	—	—	—	Dec. 1908	FAE 1908–10/78	PC	*fert.*	FAE 1908–10

* No number.

† Thomas Taylor, in whose herbarium this specimen is preserved, has annotated it as follows: "This new and beautiful species has been found in New South Shetland; the specimen was given to me by Mr. Edwards (Surgeon to Capt. Parry in his 1st and 2nd voyage) having been imported by a friend of his in Liverpool.—1823."

TABLE IIIc (*continued*)

West Graham Land

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
AUGUSTE I.	64°03′	61°36′	—	—	On vertical cliff face	1897–99	BAE 208 *pr. p.*	TUR	ster.	E. Racovitza
WIENCKE I., Noble Peak	64°48′	63°25′	*c.*750	*c.*230	Abundant on rocks on N-facing slope	20 Nov. 1944	FIDS A1789 *pr. p.*	BM	*fert.*	I. M. Lamb
HOVGAARD I.	65°08′	64°07′	—	—	—	Feb. 1904	FAE 1903–05/17/903	PC	*fert.*	FAE 1903–05
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	On summit of island from rocks recently free from snow	1 Jan. 1936	BGLE 1340 *pr. p.*	BM	*fert.*	BGLE
CAPE TUXEN	65°16′	64°08′	—	—	—	Jan. 1909	FAE 1908–10/186 *pr. p.*	PC	*fert.*	FAE 1908–10
MARGUERITE BAY, Jenny I.	67°44′	68°25′	—	—	—	Jan. 1909	FAE 1908–10/227 *pr. p.*	PC	ster.	FAE 1908–10
MARGUERITE BAY, small unnamed island	68°30′	69°00′	—	—	—	Jan. 1909	FAE 1908–10/267 *pr. p.*	PC	ster.	FAE 1908–10

TABLE IIId

Usnea fasciata

Chemical phase indeterminable as preserved in fluid

South Shetland Islands

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
SNOW I.	62°46′	61°23′	—	—	In large quantities on exposed rocks	1931	DI 1931–33*	BM	ster.	DI 1931–33

TABLE IV

Usnea fasciata* f. *strigulosa

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
S. ORKNEY IS., Signy I., Gneiss Hills	60°44′	45°39′	800	245	On southernmost hill	18 Dec. 1947	FIDS H73-1c	BM	*fert.*	P. E. Biggs

* No number.

TABLE Va

Usnea sulphurea

Typical inactive phase (K—, PD—)

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
WIENCKE I., hill E. of Wall Range	64°49′	63°22′	1,200	360	On N.-facing rocky slope	8 Oct. 1944	FIDS A1323 *pr. p.*	BM	I. M. Lamb
LAUBEUF FJORD, Webb I.	67°27′	67°57′	50	15	—	29 Nov. 1948	FIDS E454–5	BM	B. Stonehouse and V. E. Fuchs
MARGUERITE BAY, Léonie Is. (Lagoon I.)	67°36′	68°15′	—	—	—	26 Feb. 1936	BGLE 1449–11b	BM	BGLE
MARGUERITE BAY, Bourgeois Fjord	67°40′	67°05′	2,000	615	On mountain adjoining glacier	20 Aug. 1940	USAS 10	US	P. Knowles
MARGUERITE BAY, Square Bay	67°51′	67°00′	350	105	On S.E. side of bay	19 Dec. 1946	FIDS E1009–2	BM	J. E. Tonkin
MARGUERITE BAY, Roman Four Promontory	68°13′	66°58′	90	28	On exposed rock	8 Dec. 1947	FIDS E1072a	BM	B. Stonehouse
MARGUERITE BAY, Mikkelsen Bay (Moraine Cove)	68°35′	67°07′	40	12	—	29 Oct. 1949	FIDS E629a	BM	B. Stonehouse
ALEXANDER I., Ablation Point	70°48′	68°22′	—	—	—	26 Oct. 1936	BGLE 1497	BM	BGLE
ALEXANDER I., Ablation Point	70°48′	68°22′	1,200–1,500	360–460	On sandstone. E. exposure	14 Dec. 1949	FIDS E622	BM	V. E. Fuchs and R. J. Adie
ALEXANDER I., Stephenson Nunatak	72°11′	69°05′	1,250	375	In sheltered crevices of rock face. W. exposure	4 Dec. 1949	FIDS E612–1	BM	V. E. Fuchs and R. J. Adie
ALEXANDER I., Stephenson Nunatak	72°11′	69°05′	1,700	525	—	5 Dec. 1949	FIDS E616–7, 10a	BM	V. E. Fuchs and R. J. Adie
BUTTRESS NUNATAKS	72°22′	66°47′	550	165	—	1 Dec. 1949	FIDS E609	BM	V. E. Fuchs and R. J. Adie
GEORGE VI SOUND, Eklund Is.	73°16′	71°45′	—	—	—	1939–41	USAS 87	US	C. Eklund
GEORGE VI SOUND, Eklund Is. (rock pinnacle at S.E. corner of group)	73°16′	71°45′	—	—	Profuse on most surfaces including deep inside crevices where it looked less black and dry. The only lichen observed	20 Nov. 1949	FIDS E604	BM	V. E. Fuchs and R. J. Adie

TABLE Va (*continued*)

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
THE PYRAMID	63°26′	57°01′	1,859	572	—	30 Apr. 1945	FIDS D2425	BM	I. M. Lamb
TABARIN PENINSULA, isolated nunatak 3 mi. S.W. of Summit Pass	63°29′	57°06′	700	215	—	5 Nov. 1945	FIDS D2554	BM	L. Ashton
TABARIN PENINSULA, Mineral Hill	63°29′	57°03′	1,400	430	On N.E. face	23 Mar. 1946	FIDS D106–1	BM	J. D. Andrew
THEODOLITE HILL	63°29′	57°35′	*c.*2,500	*c.*660	—	14 Sep. 1946	FIDS D347–3, 9, 11	BM	A. Reece
TABARIN PENINSULA, Cone Nunatak	63°37′	57°01′	1,250	385	On tuff agglomerate of N.E. face	27 Mar. 1946	FIDS D109–6b	BM	J. D. Andrew
DUSE BAY, View Point	63°33′	57°22′	*c.*450	*c.*135	On loose stones on flat summit	10 Nov. 1945	FIDS D2595	BM	I. M. Lamb
Ridge 5 mi. E.S.E. of MT. D'URVILLE	63°33′	58°04′	2,800	860	—	13 Sep. 1946	FIDS D343a	BM	A. Reece
RUSSELL E. GLACIER	63°44′	58°17′	1,800	550	On moraine at foot of glacier	14 Dec. 1946	FIDS D369–9a FIDS D369–12a	BM	A. Reece
RUSSELL E. GLACIER	63°44′	58°17′	1,300	400	On moraine at foot of glacier	17 Dec. 1946	FIDS D371–4a	BM	A. Reece
RUSSELL E. GLACIER	63°44′	58°17′	1,800	550	On nunatak above glacier piedmont	3 Jan. 1947	FIDS D381–6, 7	BM	A. Reece
MT. REECE ("Mt. Fitzroy")	63°48′	58°29′	800	245	—	19 Dec. 1946	FIDS D374–10b	BM	A. Reece
Ridge between MT. REECE and VICTORY GLACIER	63°48′	58°33′	3,500	1,080	On rocky ridge	2 Jan. 1947	FIDS D380–5, 7a	BM	A. Reece
BEAK I.	63°37′	57°20′	30	9	On loose stones on col running across island	28 Dec. 1945	FIDS D2712 *pr. p.*	BM	I. M. Lamb
EGG I.	63°41′	57°42′	400	120	On E. sides of erratics on summit	11 Nov. 1945	FIDS D2756 *pr. p.*	BM	I. M. Lamb
VEGA I., False I. Point	63°55′	57°20′	20–60	6–18	On stony isthmus	5 Dec. 1945	FIDS D2718 FIDS D2722	BM	I. M. Lamb
HERBERT SOUND	63°55′	57°40′	*c.*300	*c.*90	On hill about a mile inland	23 Nov. 1945	FIDS D2734 FIDS D2736	BM	V. I. Russell
LONG I.	63°46′	58°12′	370	114	—	20 Aug. 1946	FIDS D368–2a	BM	A. Reece
ALECTORIA I.	63°59′	58°37′	100–200	30–60	On rocks	18 Aug. 1945	FIDS D2462 FIDS D2467 *pr. p.*	BM	I. M. Lamb
JAMES ROSS I., Cape Lachman	63°47′	57°47′	60–200	18–60	Frequent on lee sides of erratics on isthmus behind cape	21 Nov. 1945	FIDS D2778 *pr. p.*	BM	I. M. Lamb

TABLE Va (*continued*)

East Graham Land—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
JAMES ROSS I., Cape Lachman (1 mi. S.E. of cape)	63°47′	57°47′	*c.*100	*c.*30	On gentle, stony slope around snow-melt-water pond. Common on erratics	21 Nov. 1945	FIDS D2677 *pr. p.*	BM	I. M. Lamb
JAMES ROSS I., Hidden Lake	64°02′	58°18′	70–300	20–90	On moraine and talus	18 Dec. 1945	FIDS D2698	BM	I. M. Lamb
JAMES ROSS I., Cape Gage	64°10′	57°04′	20	6	On talus	29 Nov. 1945	FIDS D2843	BM	I. M. Lamb
JAMES ROSS I., Röhss Bay	64°12′	58°16′	50–100	15–30	On rocky point	20 Dec. 1945	FIDS D2689	BM	I. M. Lamb
SNOW HILL I.	64°27′	57°13′	—	—	Basalt summit	20 Oct. 1902 1903	SAE* SAE*	S S	J. M. Sobral E. Ekelöf
CAPE LONGING	64°33′	58°50′	630	190	On loose stones at top of cliff on N.E. side	23 Aug. 1945	FIDS D2470	BM	D. P. James
SEAL NUNATAKS, Evensen Nunatak	64°59′	60°25′	400	120	From snow-free rock	17 Nov. 1947	FIDS D746–1	BM	M. A. Choyce
Unnamed nunatak	69°59′	63°15′	3,500–4,000	1,080–1,230	—	2 Dec. 1936	BGLE 1548	BM	BGLE
CAPE BRYANT	71°12′	60°55′	150	45	On diorite	23 Jan. 1948	FIDS E1234b	BM	K. S. P. Butler and B. Stonehouse
Near CAPE BRYANT	72°19′	60°40′	150	45	On scree	23 Jan. 1948	FIDS E1228	BM	K. S. P. Butler and B. Stonehouse

* No number.

TABLE Vb

Usnea sulphurea

Active phase (K+ faint red or —, PD+ yellow)

West Graham Land

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
WIENCKE I., hill E. of Wall Range	64°49′	63°22′	1,200	360	On N.-facing rocky slope	8 Oct. 1944	FIDS A1323 *pr. p.*	BM	I. M. Lamb
MARGUERITE BAY, small unnamed island	—	—	—	—	—	Jan. 1909	FAE 1908–10/269 *pr. p.*	PC	FAE 1908–10
MARGUERITE BAY, Bourgeois Fjord	67°40′	67°05′	—	—	On E. side of fjord	1 Aug. 1936	BGLE 1485	BM	BGLE
MARGUERITE BAY, Camp Point	67°58′	67°19′	—	—	—	27 Oct. 1949	FIDS E627a	BM	B. Stonehouse
MARGUERITE BAY, Ridge I.	67°42′	67°06′	—	—	On boulder beach in N.W. of island	4 Aug. 1936	BGLE 1484 *pr. p.*	BM	BGLE
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	130	40	On summit	7 Dec. 1947	FIDS E1116a	BM	B. Stonehouse
MARGUERITE BAY, Neny Fjord (Red Rock Ridge)	68°18′	67°05′	40	12	On moraine on S. side	19 Jan. 1948	FIDS E1176	BM	B. Stonehouse
MARGUERITE BAY, Terra Firma Is.	68°42′	67°33′	—	—	—	21 Jun. 1936	BGLE 1482	BM	BGLE

East Graham Land

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
TABARIN PENINSULA, Cone Nunatak	63°37′	57°01′	1,250	385	On tuff agglomerate of N.E. face	27 Mar. 1946	FIDS D109–6a	BM	J. D. Andrew
MT. CARDINALL	63°27′	57°10′	750	230	On S.W. spur	14 Dec. 1946	FIDS D115–12b	BM	J. D. Andrew
DUSE BAY, View Point	63°33′	57°22′	—	—	—	13 Nov. 1945	FIDS D2632	BM	G. Davies
DUSE BAY, View Point	63°33′	57°22′	*c.*50	*c.*15	On N. side of point on rock outcrop. N. exposure	10 Nov. 1945	FIDS D2622 *pr. p.*	BM	I. M. Lamb
EGG I.	63°41′	57°42′	400	120	On E. sides of erratics on summit	11 Nov. 1945	FIDS D2756 *pr. p.*	BM	I. M. Lamb
CHURCH POINT	63°41′	57°54′	250	75	—	10 Dec. 1946	FIDS D114–2 FIDS D114–3	BM	J. D. Andrew
JAMES ROSS I., Cape Lachman (1 mi. S.E. of cape)	63°47′	57°47′	*c.*100	*c.*30	On gentle, stony slope around snow-melt-water pond. Common on erratics	21 Nov. 1945	FIDS D2677 *pr. p.*	BM	I. M. Lamb
JAMES ROSS I., Cape Lachman	63°47′	57°47′	60–200	18–60	Frequent on lee-sides of erratics on isthmus behind cape	21 Nov. 1945	FIDS D2778 *pr. p.*	BM	I. M. Lamb
RUSSELL E. GLACIER	63°44′	58°17′	800	245	At foot of glacier	14 Dec. 1946	FIDS D369–8a	BM	A. Reece

TABLE VI
Ramalina terebrata

South Shetland Islands

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
KING GEORGE I., Martins Head	62°11′	58°13′	(near sea-level)		On columnar basalt	7 Jan. 1937	DI 1936–37/1950–1	BM	DI 1936–37
KING GEORGE I., Ardley I.	62°12′	58°56′	—	—	—	2 Jan. 1954	AE 35010	BASB	O. Kühnemann
KING GEORGE I., Admiralty Bay	62°07′	58°27′	990–1,090	300–330	Abundant on nunatak	*Material not seen but recorded by Hue (1915, p. 33)*			
FILDES STRAIT	62°14′	58°59′	—	—	At base of low crags near foreshore	21 Dec. 1934	DI 1934–35/1483–6, 7	BM	DI 1934–35
NELSON I., Harmony Cove	62°19′	59°11′	—	—	—	14 Dec. 1934 4 Jan. 1935	DI 1934–35/1480–5 DI 1934–35/1486–7	BM	DI 1934–35
DECEPTION I.	62°57′	60°38′	200–600	60–180	—	1913–14	*	BM	A. G. Bennett
DECEPTION I., Baily Head	62°58′	60°30′	*c.*300	*c.*90	On tuff cliffs above penguin rookery	10 Jan. 1936	BGLE 1362	BM	BGLE
DECEPTION I., Baily Head	62°58′	60°30′	—	—	On tuff peninsula by penguin rookery	16 Jan. 1936	BGLE 1381–1	BM	BGLE
DECEPTION I., E. side of Whalers Bay	62°59′	60°32′	200	60	On vertical weathered agglomerate cliff	6 Feb. 1944	FIDS B1128	BM	I. M. Lamb
DECEPTION I., Whalers Bay	62°59′	60°33′	100–400	30–120	Abundant on vertical W.-facing agglomerate cliffs	6 Feb. 1945	FIDS B2310	BM	I. M. Lamb
DECEPTION I., Whalers Bay	63°00′	60°34′	—	—	On landward side of conglomerate cliffs in gullies and on lower slopes	24 Dec. 1934	DI 1934–35/1484–13	BM	DI 1934–35
DECEPTION I., Fildes Point	63°00′	60°34′	—	—	—	13 Feb. 1944	FIDS B118b FIDS B119a	BM	N. F. Layther

West Graham Land

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
AUGUSTE I.	64°03′	61°36′	—	—	On vertical rock face	1897–99	BAE 163 BAE 207	TUR	E. Racovitza

East Graham Land

Locality	*Position* lat. S.	long. W.	*Altitude* ft.	m.	*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
PAULET I.	63°35′	55°47′	—	—	—	Oct. 1903	SAE*	S	C. Skottsberg

* No number.

TABLE VII

Himantormia lugubris

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
LAURIE I., Cape Geddes	60°42′	44°35′	100–200	30–60	On steep slopes on rocks above general level of snow-covered ground	8 Apr. 1946	FIDS C3–1001a	BM	*fert.*	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	—	—	—	3 Oct. 1946	FIDS C8–1003–2a	BM	*sparingly fert.*	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	—	—	—	3 Jan. 1947	FIDS C44–1015b	BM	*fert.*	FIDS
SIGNY I.	60°43′	45°38′	—	—	—	16 Mar. 1915	*	BM	*partly fert.*	A. G. Bennett
SIGNY I., near Berry Head	60°42′	45°36′	50	15	300 yd. from Berry Head	13 Jan. 1948	FIDS H80–1a	BM	*fert.*	P. E. Biggs
SIGNY I., near Berry Head	60°42′	45°36′	100	30	Hill near Berry Head	13 Jan. 1948	FIDS H81–1a	BM	ster.	P. E. Biggs
SIGNY I., Gourlay Point	60°44′	45°35′	80	25	—	15 Jan. 1948	FIDS H82–1a	BM	*fert.*	P. E. Biggs
SIGNY I., Gneiss Hills	60°44′	45°39′	800	245	On southernmost hill	18 Dec. 1947	FIDS H73–1b	BM	*partly fert.*	P. E. Biggs

South Shetland Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
KING GEORGE I., Ardley I.	62°12′	58°56′	—	—	Among moss	2 Jan. 1954	AE 35013 AE 35025 AE 35040	BASB	ster.	O. Kühnemann
KING GEORGE I., Potter Cove	62°13′	58°42′	—	—	—	10 Jan. 1955	AE 35055 AE 35057 AE 35065 AE 35066	BASB	*fert.*	O. Kühnemann
HALF MOON I.	62°35′	59°55′	200	60	—	10 Jan. 1958	590	FH	*sparingly fert.*	M. Neushul

* No number.

TABLE VII (*continued*)

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
2 mi. N.N.W. of MT. JACQUINOT	63°21′	57°53′	630	190	Common	18 Oct. 1946	FIDS D362–3a	BM	ster.	A. Reece
BRIALMONT COVE, Spring Point	64°17′	61°04′	—	—	—	14 Jan. 1954	AE 35086	BASB	ster.	O. Kühnemann
WIENCKE I., Noble Peak	64°48′	63°25′	775	236	On rock projecting through snow on N. buttress. N. exposure	15 Oct. 1944	FIDS A1305 FIDS A1313	BM BM	ster. *fert.*	I. M. Lamb I. M. Lamb
WIENCKE I., Noble Peak	64°48′	63°25′	445	135	N.E. exposure on N.E. buttress rock outcrop. Common; often associated with *Neuropogon*	19 Nov. 1944	FIDS A1752 FIDS A1755	BM	*fert.*	I. M. Lamb
PETERMANN I.	65°11′	64°11′	395	120	—	14 Mar. 1909	FAE 1908–10/286†	PC	*fert.*	FAE 1908–10

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
HOPE BAY, Mt. Flora	63°25′	57°01′	1,865	570	On summit	1946	FIDS D2858	BM	ster.	D. P. James and V. I. Russell
HOPE BAY, The Pyramid	63°26′	57°01′	1,370	420	On N.W. ridge	1945	FIDS D2562	BM	*sparingly fert.*	E. H. Back
SUMMIT PASS	63°27′	57°02′	1,485	457	—	1945	FIDS D2567	BM	ster.	E. H. Back
DUSE BAY, Cairn Hill	63°30′	57°04′	1,200	360	On scree	23 Mar. 1946	FIDS D108–1	BM	*fert.*	J. D. Andrew
DUSE BAY, near Cairn Hill	63°30′	57°04′	1,150	345	Common on N. face of igneous rock. Large discoidal fruiting colony	28 Mar. 1946	FIDS D110–1	BM	ster.‡	J. D. Andrew

† Type specimen.
‡ Fertile according to collector.

TABLE VIII

Alectoria nigricans

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
LAURIE I., Cape Geddes	60°42′	44°35′	100	30	—	28 Nov. 1946	FIDS C24–1008a	BM	ster.	FIDS
SIGNY I.	60°43′	45°38′	(near sea-level)		150 yd. inland among mosses	18 Dec. 1947	FIDS H74–1d	BM	ster.	P. E. Biggs
SIGNY I., Jebsen Point	60°43′	45°40′	40	12	At N. end of point	16 Jan. 1948	FIDS H84–1b	BM	ster.	P. E. Biggs
SIGNY I., near Jebsen Point	60°43′	45°40′	600	180	—	16 Jan. 1948	FIDS H85–1b	BM	ster.	P. E. Biggs
SIGNY I., Gneiss Hills	60°44′	45°39′	800	245	On southernmost hill	18 Dec. 1947	FIDS H73–1e	BM	ster.	P. E. Biggs

TABLE IX

Alectoria chalybeiformis

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
LAURIE I., Cape Geddes	60°42′	44°35′	100–200	30–60	From rocks and crevices on slope facing N.W.	3 Dec. 1946	FIDS C8–1003a	BM	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	100	30	From N.W. slope	28 Nov. 1946	FIDS C24–1008d	BM	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	150–300	45–90	From W. to N.W. slope	29 Nov. 1946	FIDS C26–1009b	BM	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	100–250	30–75	From boulders and rock faces on N.W. side of cape	22 Dec. 1946	FIDS C42–1014b	BM	FIDS
LAURIE I., Cape Geddes	60°42′	44°35′	—	—	On steep slopes at higher levels	3 Jan. 1947	FIDS C44–1015f	BM	FIDS
SIGNY I.	60°43′	45°38′	(near sea-level)		150 yd. inland among mosses	18 Dec. 1947	FIDS H74–1f	BM	P. E. Biggs
SIGNY I., near North Point	60°41′	45°38′	80	25	—	16 Jan. 1948	FIDS H83–1b	BM	P. E. Biggs

TABLE X

Alectoria pubescens

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
SIGNY I., near Jebsen Point	60°43′	45°40′	600	180	—	16 Jan. 1948	FIDS H85–1a	BM	P. E. Biggs

South Shetland Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
KING GEORGE I., Martel Inlet (Visca Anchorage)	62°03′	58°23′	500	150	—	18 Dec. 1934	DI 1934–35/1481 *pr. p.*	BM	DI 1934–35
KING GEORGE I., Potter Cove	62°13′	58°42′	—	—	—	10 Jan. 1955	AE 35061	BASB	O. Kühnemann

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
Near CAPE ROQUEMAUREL	63°33′	58°56′	500	150	2 mi. S.E. of cape	3 Sep. 1946	FIDS D338–8a	BM	J. D. Andrew
WIENCKE I., Noble Peak	64°48′	63°25′	*c.*700	*c.*215	On detritus in rock cleft in N.W. buttress. N. exposure	15 Oct. 1944	FIDS A1319	BM	I. M. Lamb
WIENCKE I., Noble Peak	64°48′	63°25′	400	120	N.E. exposure on N.E. buttress	19 Nov. 1944	FIDS A1749	BM	I. M. Lamb
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	On near-vertical low sea cliff	31 Mar. 1935	BGLE 1116 *pr. p.*	BM	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	On rock slopes facing N.W. a few yards from sea	31 Mar. 1935	BGLE 1118 *pr. p.*	BM	BGLE
ARGENTINE IS., Galindez I.	65°15′	64°15′	—	—	From damp places on N.-facing lower cliffs	14 Dec. 1935	BGLE 1306 *pr. p.*	BM	BGLE
CAPE TUXEN	65°16′	64°08′	0–65	0–20	—	8 Jan. 1909	FAE 1908–10/190†	PC	FAE 1908–10
BERTHELOT IS.	65°19′	64°10′	—	—	—	—	BGLE*	BM	BGLE
BERTHELOT IS., Green I.	65°19′	64°10′	—	—	On N.-facing inland cliff	18 Mar. 1935	BGLE 1081 *pr. p.* BGLE 1086 *pr. p.*	BM	BGLE
MARGUERITE BAY, Léonie Is. (Lagoon I.)	67°36′	68°15′	—	—	—	26 Feb. 1936	BGLE 1449 *pr. p.*	BM	BGLE
MARGUERITE BAY, Bourgeois Fjord	67°40′	67°05′	—	—	On S. side of fjord	15 Dec. 1936	BGLE 1518 *pr. p.*	BM	BGLE
MARGUERITE BAY, Camp Point	67°58′	67°19′	—	—	—	27 Oct. 1949	FIDS E627b	BM	B. Stonehouse

* No number.

TABLE X (*continued*)

West Graham Land—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	30	9	From exposed situation	7 Dec. 1947	FIDS E1112	BM	B. Stonehouse
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	130	40	From summit	7 Dec. 1947	FIDS E1116b	BM	B. Stonehouse
MARGUERITE BAY, Debenham Is. (Barbara I.)	68°08′	67°07′	—	—	On granite end	5 Jan. 1937	BGLE 1541 *pr. p.*	BM	BGLE
MARGUERITE BAY, Debenham Is. (Barry I.)	68°08′	67°07′	—	—	—	26 Nov. 1936	BGLE 1498 *pr. p.*	BM	BGLE

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
SUMMIT PASS	63°27′	57°02′	1,300–1,400	400–430	On ridge S.E. of pass	9 Nov. 1945	FIDS D2568	BM	E. H. Back
DUSE BAY, View Point	63°33′	57°22′	*c.*50	*c.*15	Associated with *A. minuscula* on schistose scree and rock outcrop. N. exposure	10 Nov. 1945	FIDS D2615b	BM	I. M. Lamb
DUSE BAY, Bald Head	63°38′	57°36′	200–500	60–150	On loose stones	18 Nov. 1945	FIDS D2800	BM	I. M. Lamb
BEAK I.	63°37′	57°20′	30	9	On loose stones on col running across island	28 Dec. 1945	FIDS D2709	BM	I. M. Lamb
RUSSELL E. GLACIER	63°44′	58°17′	50	15	At foot of glacier on metamorphic rock close to shore	30 Jul. 1946	FIDS D335–7	BM	J. D. Andrew
PRINCE GUSTAV CHANNEL, Pitt Point	63°51′	58°22′	*c.*100	*c.*30	—	17 Aug. 1945	FIDS D2455a	BM	I. M. Lamb

TABLE XI

Alectoria minuscula f. *minuscula*

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
WIENCKE I., Noble Peak	64°48′	63°25′	700	215	On rock projecting through snow on N. buttress. N. exposure	15 Oct. 1944	FIDS A1300	BM	I. M. Lamb
WIENCKE I., hill E. of Wall Range	64°49′	63°22′	1,200	360	On N.-facing rocky slope	8 Oct. 1944	FIDS A1324	BM	I. M. Lamb
ARGENTINE Is., Galindez I.	65°15′	64°15′	—	—	With *Colobanthus* plants on low N.-facing cliff in sheltered position	29 Dec. 1935	BGLE 1333 *pr. p.*	BM	BGLE
BERTHELOT Is., Green I.	65°19′	64°10′	—	—	On N.-facing inland cliff	18 Mar. 1935	BGLE 1081 *pr. p.*	BM	BGLE
MARGUERITE BAY, The Narrows	67°36′	67°12′	—	—	On boulders on beach at W. end	25 Jul. 1936	BGLE 1488 *pr. p.*	BM	BGLE
MARGUERITE BAY, Jenny I.	67°44′	68°25′	808	245	—	15 Jan. 1909	FAE 1908–10/229 *pr. p.*	PC	FAE 1908–10
MARGUERITE BAY, Jenny I.	67°44′	68°25′	30	9	On N.E. side of island above beach	17 Oct. 1948	FIDS E466–2	BM	B. Stonehouse and V. E. Fuchs
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	45	14	On rock face	7 Dec. 1947	FIDS E1135a	BM	B. Stonehouse
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	90	28	S.E. exposure	7 Dec. 1947	FIDS E1104a	BM	B. Stonehouse
MARGUERITE BAY, Debenham Is. (Barbara I.)	68°08′	67°06′	—	—	At granite end	5 Jan. 1937	BGLE 1541 *pr. p.*	BM	BGLE
MARGUERITE BAY, Terra Firma Is.	68°42′	67°33′	—	—	—	21 Jun. 1936	BGLE 1482 *pr. p.*	BM	BGLE
MARGUERITE BAY, Terra Firma Is.	68°42′	67°33′	40	12	From N.-facing cliff	20 Aug. 1936	BGLE 1490a	BM	BGLE
ALEXANDER I., Ablation Point	70°48′	68°22′	—	—	—	26 Oct. 1936	BGLE 1497 *pr. p.*	BM	BGLE

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
MT. CARDINALL	63°27′	57°10′	750	230	On S.W. spur	14 Dec. 1946	FIDS D115–10 FIDS D115–11	BM	J. D. Andrew
BEAK I.	63°37′	57°20′	30	9	On loose stones on low col	28 Dec. 1945	FIDS D2711	BM	I. M. Lamb
EGG I.	63°41′	57°42′	*c.*400	*c.*120	On erratic boulder	11 Nov. 1945	FIDS D2757	BM	I. M. Lamb

TABLE XI (*continued*)

East Graham Land—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
RUSSELL E. GLACIER	63°44′	58°17′	50	15	On metamorphic rock close to shore	30 Jul. 1946	FIDS D335–5, 6a	BM	J. D. Andrew
RUSSELL E. GLACIER	63°44′	58°17′	1,300	400	On moraine	17 Dec. 1946	FIDS D371–4b	BM	A. Reece
VEGA I., False I. Point	63°55′	57°20′	20–60	6–18	On stony isthmus	5 Dec. 1945	FIDS 2716a	BM	I. M. Lamb
ALECTORIA I.	63°59′	58°37′	100–200	30–60	On rocks and stones—the dominant lichen on this island	18 Aug. 1945	FIDS D2459a FIDS D2467 *pr. p.* FIDS D2468	BM	I. M. Lamb
CAPE BRYANT	71°12′	60°55′	150	45	On diorite	23 Jan. 1948	FIDS E1234a	BM	K. S. P. Butler and B. Stonehouse

TABLE XII

Alectoria minuscula* f. *applanata

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	20	6	N. exposure	7 Dec. 1947	FIDS E1115a	BM	B. Stonehouse
MARGUERITE BAY, Neny Fjord (Red Rock Ridge)	68°18′	67°05′	40	12	On moraine on S. side	19 Jan. 1948	FIDS E1175	BM	B. Stonehouse
MARGUERITE BAY, Terra Firma Is.	68°42′	67°33′	—	—	On N.-facing rocks	21 Jun. 1936	BGLE 1482 *pr. p.*	BM	BGLE

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
TABARIN PENINSULA, isolated nunatak 3 mi. S.W. of Summit Pass	63°29′	57°06′	700	215	—	5 Nov. 1945	FIDS D2557	BM	L. Ashton

TABLE XIII
Alectoria minuscula f. *biformis*

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
BRABANT I.	64°15′	62°20′	990–1,750	300–530	On isolated rock in middle of glacier	1897–99	BAE 246† *pr. p.*	TUR	E. Racovitza
WIENCKE I., Port Lockroy	64°49′	63°30′	15	4	On granodiorite boulder near penguin rookery. N. exposure	30 Dec. 1944	FIDS A2154	BM	I. M. Lamb
DOUMER I.	64°51′	63°35′	*c.*150	*c.*45	On granodiorite rock. N. exposure	12 Dec. 1944	FIDS A1901	BM	I. M. Lamb
BERTHELOT Is.	65°19′	64°10′	—	—	—	—	BGLE*	BM	BGLE
BERTHELOT Is., Green I.	65°19′	64°10′	—	—	On N.-facing inland cliff	18 Mar. 1935	BGLE 1081 *pr. p.* BGLE 1092	BM	BGLE
MARGUERITE BAY, small unnamed island	—	—	—	—	—	24 Jan. 1909	FAE 1908–10/269‡ *pr. p.*	PC	FAE 1908–10
MARGUERITE BAY, Léonie Is. (Lagoon I.)	67°36′	68°15′	—	—	—	26 Feb. 1936	BGLE 1449 *pr. p.*	BM	BGLE
MARGUERITE BAY, Léonie Is. (Lagoon I.)	67°36′	68°15′	—	—	From extreme edge of lichen area	16 Feb. 1937	BGLE 1563 *pr. p.*	BM	BGLE
MARGUERITE BAY, Bourgeois Fjord	67°40′	67°05′	—	—	From S. side of fjord	15 Dec. 1936	BGLE 1518 *pr. p.*	BM	BGLE
MARGUERITE BAY, Jenny I.	67°44′	68°25′	—	—	On beach rocks on W. side of island	17 Oct. 1948	FIDS E466–4	BM	B. Stonehouse and V. E. Fuchs
MARGUERITE BAY, Guébriant Is.	67°48′	68°24′	—	—	Abundant above 100 ft. (30 m.)	13 Oct. 1948	FIDS E465	BM	B. Stonehouse and V. E. Fuchs
MARGUERITE BAY, Horseshoe I.	67°51′	67°12′	—	—	On beach pebbles on S.W. side of island facing N.W.	24 Jul. 1936	BGLE 1486 *pr. p.*	BM	BGLE
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	110	33	—	7 Dec. 1947	FIDS E1106	BM	B. Stonehouse
MARGUERITE BAY, Debenham Is.	68°08′	67°07′	80	25	On dry N. exposure	7 Dec. 1947	FIDS 1134	BM	B. Stonehouse
MARGUERITE BAY, Debenham Is. (Barbara I.)	68°08′	67°06′	—	—	From granite end of island where it is the most abundant sp.	5 Jan. 1937	BGLE 1540	BM	BGLE

* No number.
† Lectotype of f. *biformis*.
‡ Type specimen of *Alectoria intricata* Hue.

TABLE XIII (*continued*)

West Graham Land—cont.

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
MARGUERITE BAY, Debenham Is. (Barbara I.)	68°08′	67°06′	—	—	At gneiss end of island	5 Jan. 1937	BGLE 1542 *pr. p.*	BM	BGLE
MARGUERITE BAY, Roman Four Promontory	68°13′	66°58′	90	28	On exposed rock	8 Dec. 1947	FIDS E1073a	BM	B. Stonehouse
MARGUERITE BAY, Neny Fjord	68°16′	66°50′	50	15	On exposed rock	18 Aug. 1947	FIDS 1062	BM	B. Stonehouse
MARGUERITE BAY, Terra Firma Is.	68°42′	67°33′	—	—	—	21 Jun. 1936	BGLE 1482 *pr. p.*	BM	BGLE

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
HOPE BAY, Scar Hills	63°25′	57°01′	*c.*300	*c.*90	On rocks and stones	25 Nov. 1945	FIDS D2501	BM	I. M. Lamb
MT. CARREL	63°26′	57°03′	1,800	550	—	26 Oct. 1945	FIDS D2541	BM	E. H. Back
TABARIN PENINSULA, nunatak 3 mi. S.W. of Summit Pass	63°29′	57°06′	700	215	—	5 Nov. 1945	FIDS D2559	BM	L. Ashton
DUSE BAY, View Point	63°33′	57°22′	50	15	On scree and rock outcrop. N. exposure	10 Nov. 1945	FIDS D2615a	BM	I. M. Lamb
3 mi. N.E. of CHURCH POINT	63°39′	57°51′	10–50	3–15	—	26 Dec. 1945	FIDS D2648	BM	V. I. Russell
LONG I.	63°46′	58°12′	60	18	On rock outcrop at S.W. end	17 Aug. 1945	FIDS D2441 *pr. p.*	BM	I. M. Lamb

TABLE XIV

Alectoria minuscula f. *congesta*

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
MARGUERITE BAY, Debenham Is. (Barry I.)	68°08′	67°07′	—	—	—	26 Nov. 1936	BGLE 1498 *pr. p.*	BM	BGLE
MARGUERITE BAY, Northstar I.	68°11′	67°07′	20	6	On schist	8 Nov. 1946	FIDS E1008–3	BM	J. R. F. Joyce

TABLE XV

Cornicularia aculeata

South Orkney Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
SIGNY I.	60°43′	45°38′	—	—	150 yd. inland near sea-level	18 Dec. 1947	FIDS H74–1e	BM	P. E. Biggs
SIGNY I., 600 yd. from Gourlay Point	60°44′	45°35′	80	25	—	15 Jan. 1948	FIDS H82–1c	BM	P. E. Biggs

South Shetland Islands

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
KING GEORGE I., Ardley I.	62°12′	58°56′	—	—	—	2 Jan. 1954 9 Jan. 1954	AE 35032 AE 35012	BASB	O. Kühnemann

TABLE XV (*continued*)

West Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
BRIALMONT COVE, Spring Point	64°17′	61°04′	—	—	—	13 Jan. 1954	AE 35088	BASB	O. Kühnemann

East Graham Land

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.					
DUSE BAY, Bald Head	63°38′	57°36′	200–500	60–150	Between loose stones	18 Nov. 1945	FIDS D2802	BM	I. M. Lamb

TABLE XVI

Cornicularia epiphorella

Locality	*Position*		*Altitude*		*Collecting Notes*	*Date of Collection*	*Specimen Number*	*Herbarium*	*Fertile or Sterile*	*Collector or Expedition*
	lat. S.	long. W.	ft.	m.						
S. ORKNEY Is., Laurie I.	60°42′	44°35′	—	—	On steep slopes on higher levels of C. Geddes	3 Jan. 1947	FIDS C44–1015c	BM	ster.	FIDS
Unverified: E. GRAHAM LAND, Mt. Bransfield	63°17′	57°06′	—	—	*According to Skottsberg (Du Rietz, 1926c, p.34) this specimen was lost*					SAE 1901–03

APPENDIX II

PLACE-NAMES

As this report will also be published by the Instituto Antartico Argentino, the Argentine equivalents of British Antarctic place-names are listed below:

Ablation Point	punta Ablación
Adelaide Island	isla Adelaida
Adélie, Terre	Tierra Adelia
Admiralty Bay	bahía Lasserre
Alectoria Island	islote Alectoria
Alexander Island	isla Alejandro
Anna, Cape	cabo Ana
Antarctica	Antártida
Anvers Island	isla Amberes
Ardley Island	península Ardley
Argentine Islands	islas Argentinas
Auguste Island	islote Augusto
Baily Head	punta Rancho
Bald Head	punta Pelada
Barbara Island	islote Bárbara
Barry Island	islote Barry
Beak Island	isla Pico
Berry Head	punta Mora
Berthelot Islands	islotes Berthelot
Boeckella, Lake	lago Boeckella
Booth Island	isla Booth
Borge Bay	bahía Factoría
Bourgeois Fjord	fiordo Bourgeois
Brabant Island	isla Brabante
Bransfield Mount	monte Bransfield
Bransfield Strait	mar de la Flota
Brialmont Cove	caleta Brialmont
Brown Bluff	morro Marrón
Bryant, Cape	cabo Briant
Buttress Nunataks	nunataks Puntal
Cairn Hill	cerro del Hito
Camp Point	punta Campamento
Cardinall, Mount	monte Cardenal
Carrell, Mount	monte Rincón
Charcot Island	isla Charcot
Church Point	punta Iglesia
Cone Nunatak	nunatak Cónico
Coppermine Cove	caleta Mina de Cobre
Debenham Islands	islotes Debenham
Deception Island	isla Decepción
Desolation Island	isla Desolación
Devil Island	isla del Diablo
Doumer Island	isla Doumer
Dundas, Cape	cabo Dundas
D'Urville, Mount	monte D'Urville
Duse Bay	bahía Duse
Eagle Island	isla Aguila
East Antarctica	Antártida Oriental
Egg Island	isla Huevo
Eklund Islands	islas Eklund
Elephant Island	isla Elefante
Esther Harbour	puerto Esther
Evans Cove	ensenada Evans
Evensen Nunatak	nunatak Evensen
False Island Point	punta Falsa Isla
Filchner Ice Shelf	barrera de Filchner
Fildes Point	punta Balcarce
Fildes Strait	estrecho Fildes
Flora, Mount	monte Flora
Fredriksen Island	isla Fredriksen
Gage, Cape	cabo Gage
Galindez Island	isla Galíndez
Geddes, Cape	punta Geddes
Geikie Ridge	dorsal Geikie
George VI Sound	canal Presidente Sarmiento
Gneiss Hills	cerros Gneiss
Goudier Island	islote Goudier
Gourlay Point	punta Gourlay
Graham Land	península Antártica
Green Island	islote Verde
Greenwich Island	isla Greenwich
Guébriant Islands	islotes Roca
Half Moon Island	isla Media Luna
Hallett, Cape	cabo Hallett
Harmony Cove	caleta Armonía
Heard Island	isla Heard
Herbert Sound	estrecho Azopardo
Hidden Lake	lago Escondido
Hope Bay	bahía Esperanza
Horseshoe Island	isla Herradura
Hovgaard Island	isla Hovgaard
Jacquinot, Mount	monte Jacquinot
James Ross Island	isla James Ross
Jebsen Point	punta Jebsen
Jenny Island	isla Juanita
Joinville Island	isla Joinville
Keller Peninsula	península Keller
Kerguelen, Îles de	islas Kerguelén
King Edward VII Land	Tierra del Rey Eduardo VII
King George Island	isla 25 de Mayo
Lachman, Cape	cabo Lachman
Lagoon Island	islote Laguna
Lagotellerie Island	isla Lagotellerie
Larsen Ice Shelf	barrera de Larsen
Latady Island	isla Latady
Laubeuf Fjord	fiordo Laubeuf
Laurie Island	isla Laurie
Léonie Islands	islas Léonie
Lockroy, Port	puerto Lockroy
Long Island	isla Larga
Longing, Cape	cabo Longing
Louis-Philippe Plateau	Plateau de Luis-Felipe
Mackellar Inlet	ensenada Mackellar
Margerie, Cap de	cabo de Margerie
Marguerite Bay	bahía Margarita
Marie Byrd Land	Tierra de Marie Byrd
Martel Inlet	ensenada Martel
Martins Head	punta Martins
Melchior Islands	islas Melchior (archipiélago Melchior)
Mikkelsen Bay	bahía Mikkelsen
Mineral Hill	cerro Mineral
Moraine Cove	caleta de la Morena
Narrows, The	La Angostura
Nelson Island	isla Nelson
Neny Fjord	fiordo Neny
Neptune's Bellows	Fuelle de Neptuno
Noble Peak	pico Noble

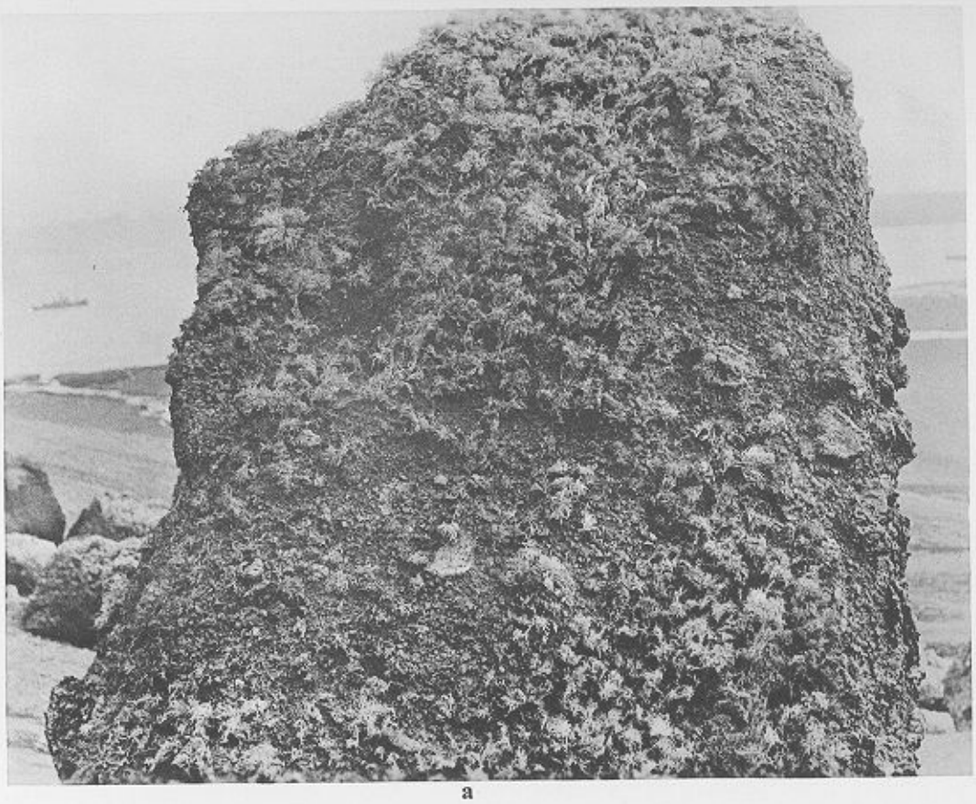
North Point	punta Norte
Northstar Island	isla Estrella del Norte
Omega Island	isla Sobral
Palmer Archipelago ...	archipiélago Palmer
Paulet Island	isla Paulet
Petermann Island	isla Petermann
Pitt Point	punta Pitt
Potter Cove	caleta Potter
Powell Island	isla Powell
Prince Gustav Channel ...	canal Príncipe Gustavo
Pyramid, The	La Pirámide
Queen Mary Land	Tierra de la Reina María
Queen Mary Coast ...	costa de la Reina María
Rasmussen Island	isla Rasmussen
Red Rock Ridge	promontorio Roca Roja
Reece, Mount	monte Reece
Renard, Cape	cabo Renard
Ridge Island	isla Caballete
Robert Island	isla Robert
Röhss Bay	bahía Röhss
Roman Four Promontory	promontorio Cuatro Romano
Ronald Hill	cerro Ronaldo
Roquemaurel, Cape ...	cabo Roquemaurel
Russell East Glacier ...	glacier Russell Este
Sastrugi, Cape	cabo Sástrugi
Scar Hills	cerros de la Cicatriz
Scotia Bay	bahía Scotia
Seal Nunataks	nunataks Foca
Signy Island	isla Signy
Snow Hill Island	isla Colina Nevada
Snow Island	isla Nevada
South Georgia	isla Georgia del Sur
South Orkney Islands ...	islas Orcadas del Sur
South Shetland Islands ...	islas Shetland del Sur
Spring Point	cabo Primavera
Square Bay	bahía Cuadrada
Steeple, The	El Campanario
Stephenson Nunatak ...	nunatak Stephenson
Summit Pass	paso de la Cima
Tabarin Peninsula	península Tabarín
Terra Firma Islands ...	islotes Tierra Firme
Theodolite Hill	cerro Teodolito
Tuxen, Cape	cabo Tuxen
Vega Island	isla Vega
Victoria Land	Tierra Victoria
Victory Glacier	glaciar Victoria
View Point	punta Visión
Visca Anchorage	fondeadero Visca
Wall Range	sierra del Muro
Weddell Sea	mar de Weddell
Webb Island	islote Webb
Whalers Bay	caleta Balleneros
Wiencke Island	isla Wiencke
Wordie Ice Shelf	barrera de Wordie
Yankee Harbour	puerto Yanqui

PLATES

PLATE I

a. Growth of *Usnea antarctica* DR. on large agglomerate block on hillside above the harbour, Deception Island, South Shetland Islands. (Photo: I. M. Lamb, February 1945.)

b. Growth of *Usnea fasciata* Torrey on rocks recently free of snow on north buttress of Noble Peak, Wiencke Island, west Graham Land. (Photo: I. M. Lamb, November 1944.)



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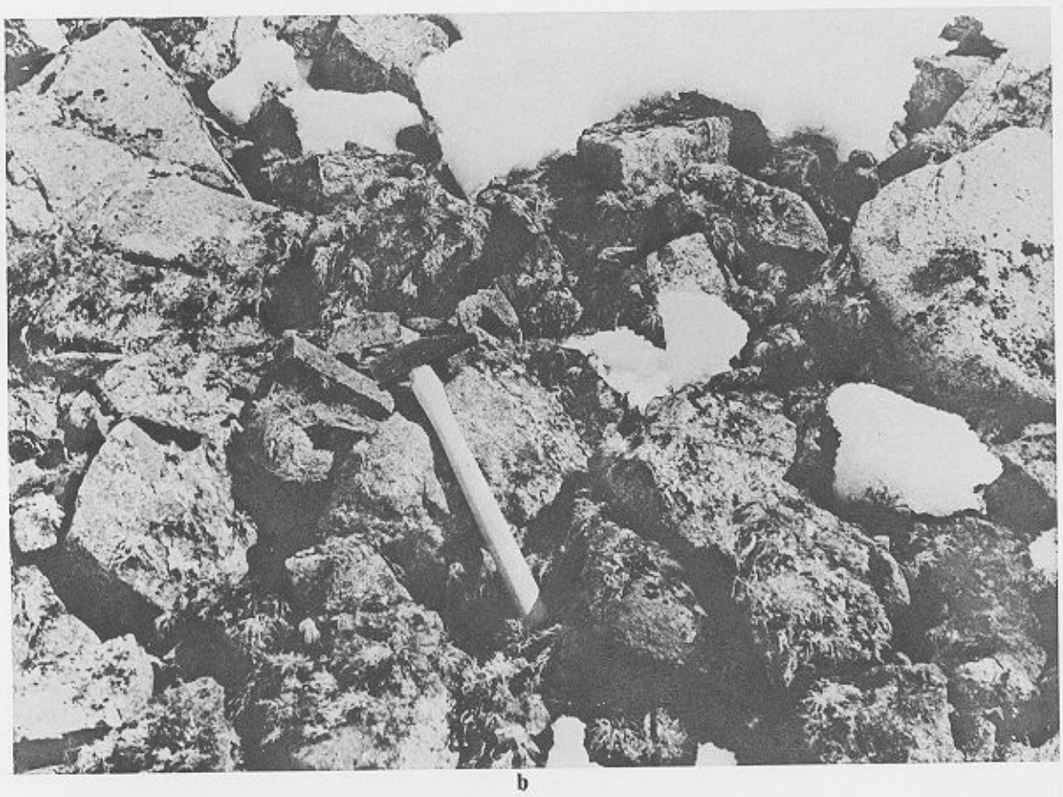

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PLATE II

(Natural size)

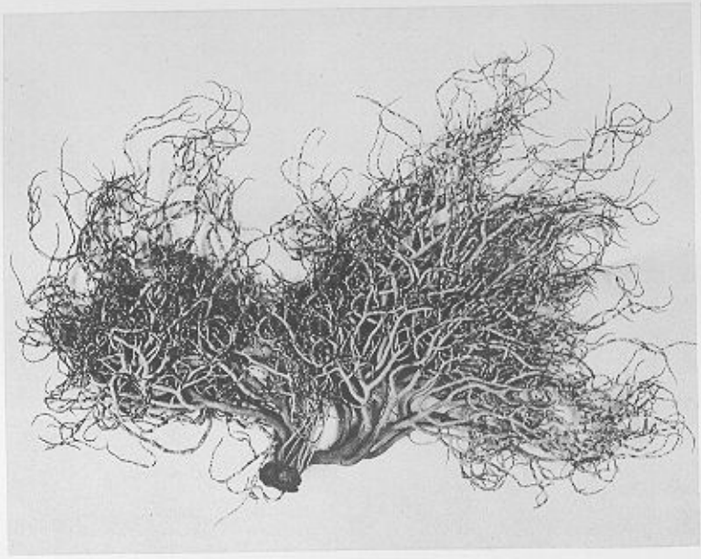
a. *Usnea antarctica* DR. Specimen from Deception Island, South Shetland Islands, FIDS No. B1119.

b. *Usnea fasciata* Torrey. Specimen from Galindez Island, Argentine Islands, west Graham Land, BGLE No. 1340 *pr. p.*

c. *Usnea antarctica* DR. Specimen from Wiencke Island, west Graham Land, FIDS No. A1745.

d. *Usnea fasciata* Torrey. Specimen from King George Island, South Shetland Islands, AE No. 35054.

e. *Usnea fasciata* Torrey. Specimen from Signy Island, South Orkney Islands, FIDS No. H73–1d, showing black gall-like outgrowths ("carpoids").



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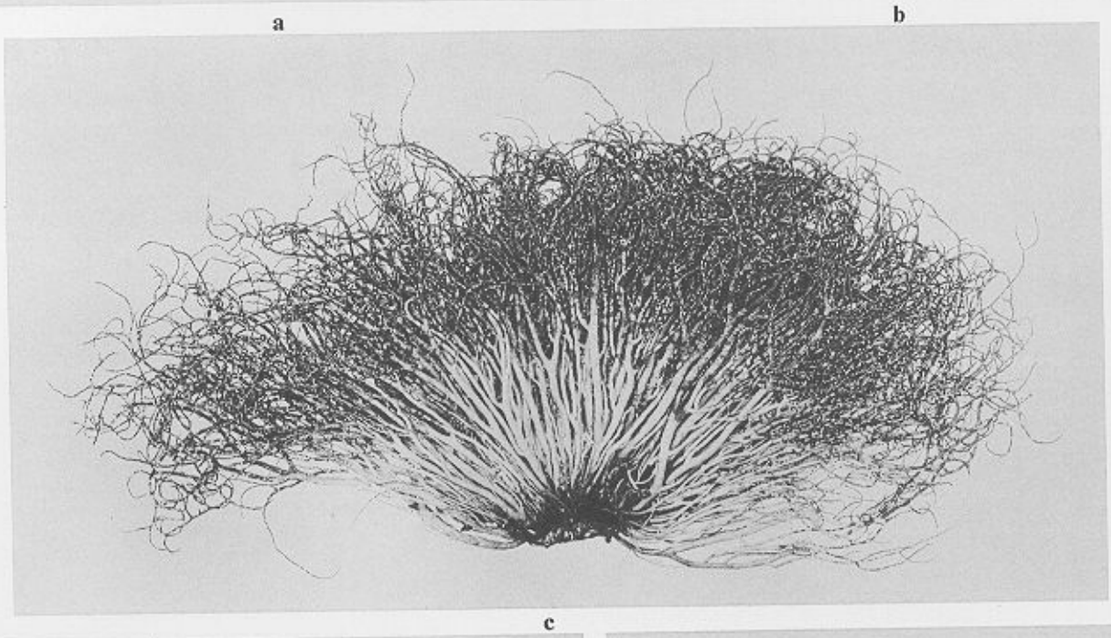

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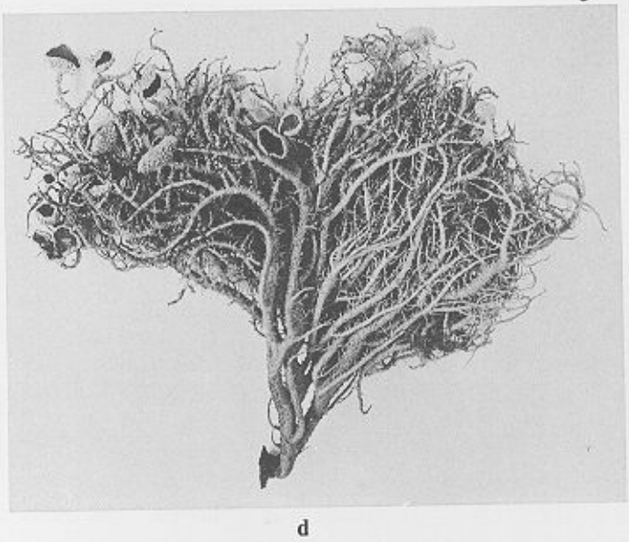

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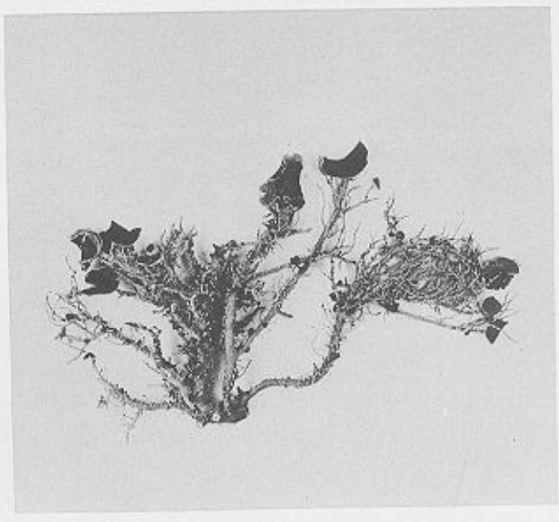
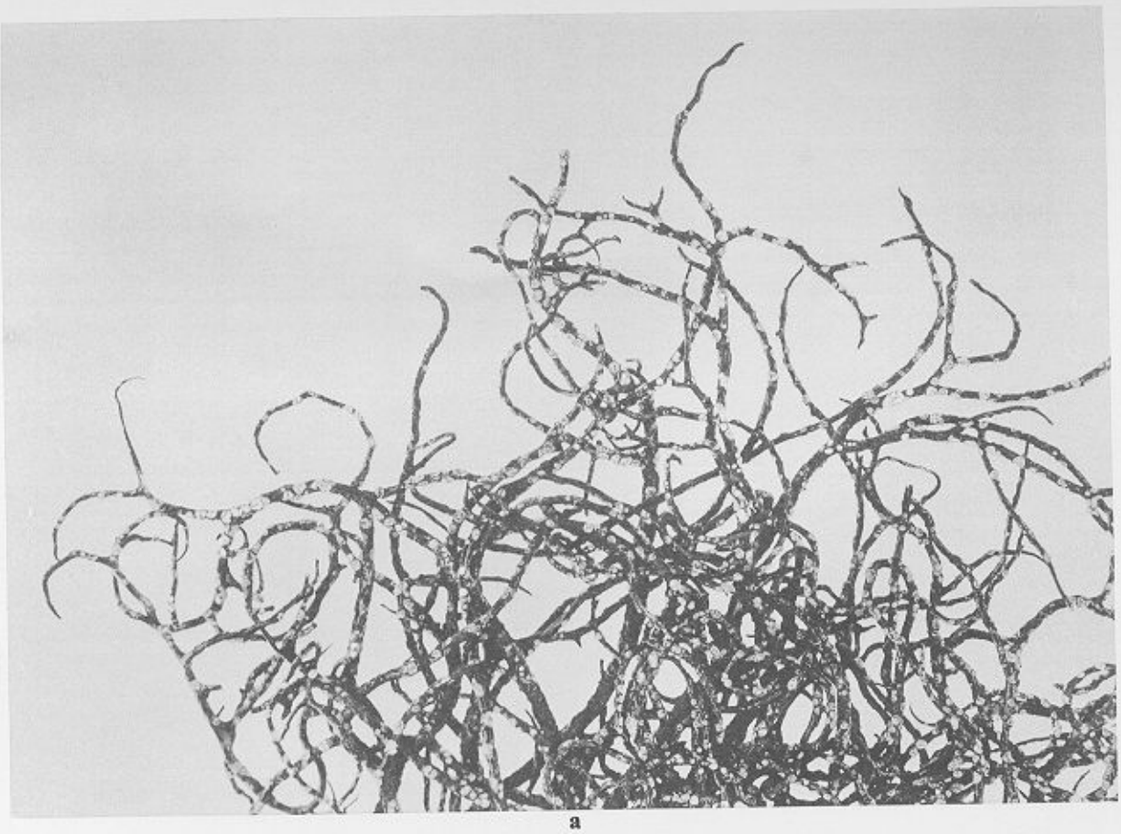


e

PLATE III

a. *Usnea antarctica* DR. Part of specimen from Wiencke Island, west Graham Land (same as Plate IIc); ×4.

b. *Usnea sulphurea* (Koen.) Th. Fr. Specimen from Egg Island, east Graham Land, FIDS No. D2756; ×4.



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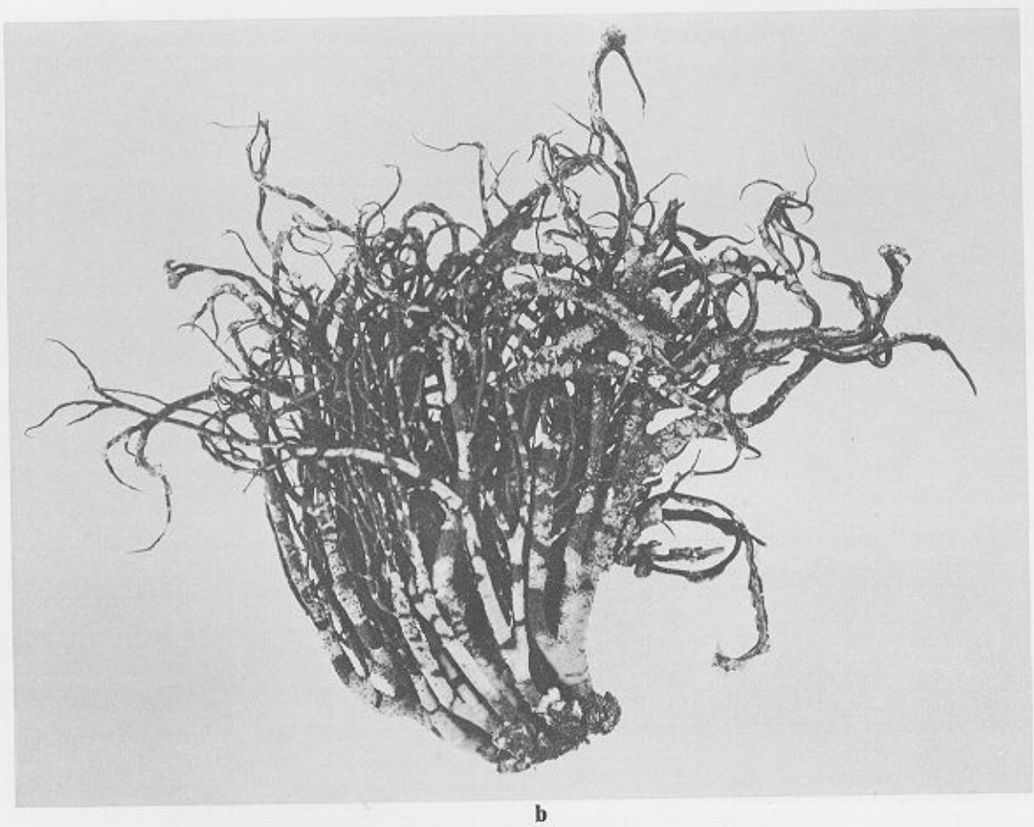

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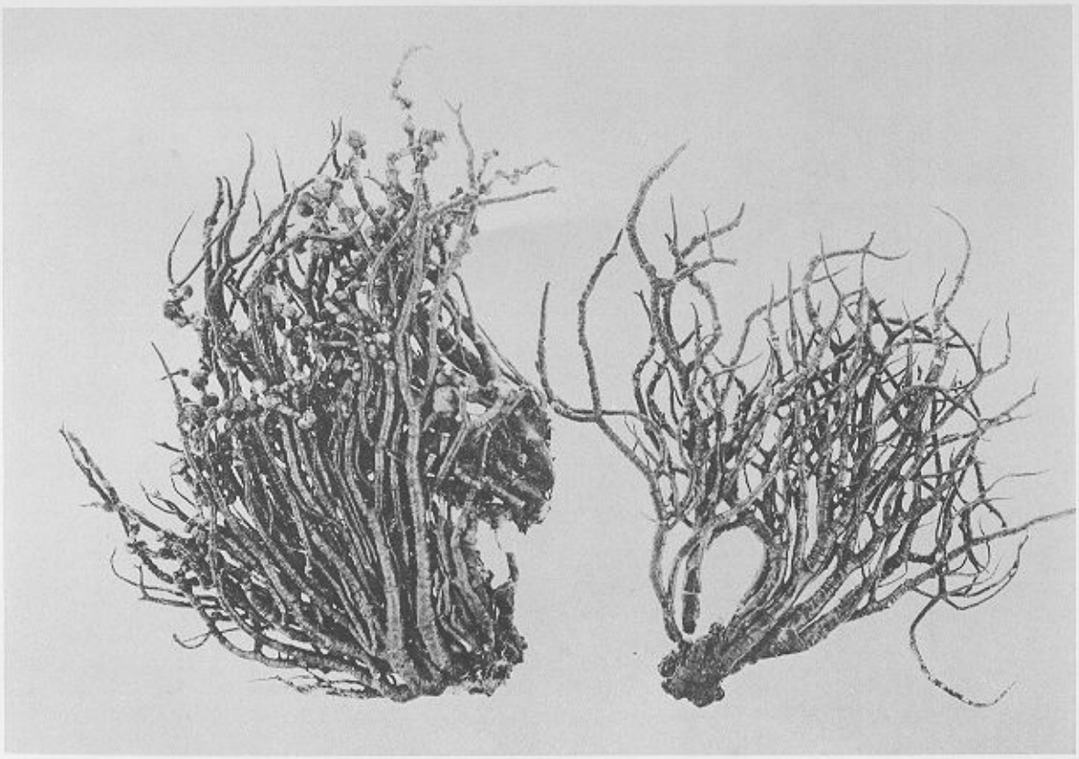
PLATE IV

a. *Usnea acromelana* var. *decipiens* (M. Lamb) M. Lamb. The type material from Tasmania, R. Brown No. 523 *pr. p.*, in BM; ×4.

b. *Usnea acromelana* var. *decipiens* (M. Lamb) M. Lamb. Specimen from Brabant Island, west Graham Land, BAE No. 249, *pr. p.*, in TUR; ×4.



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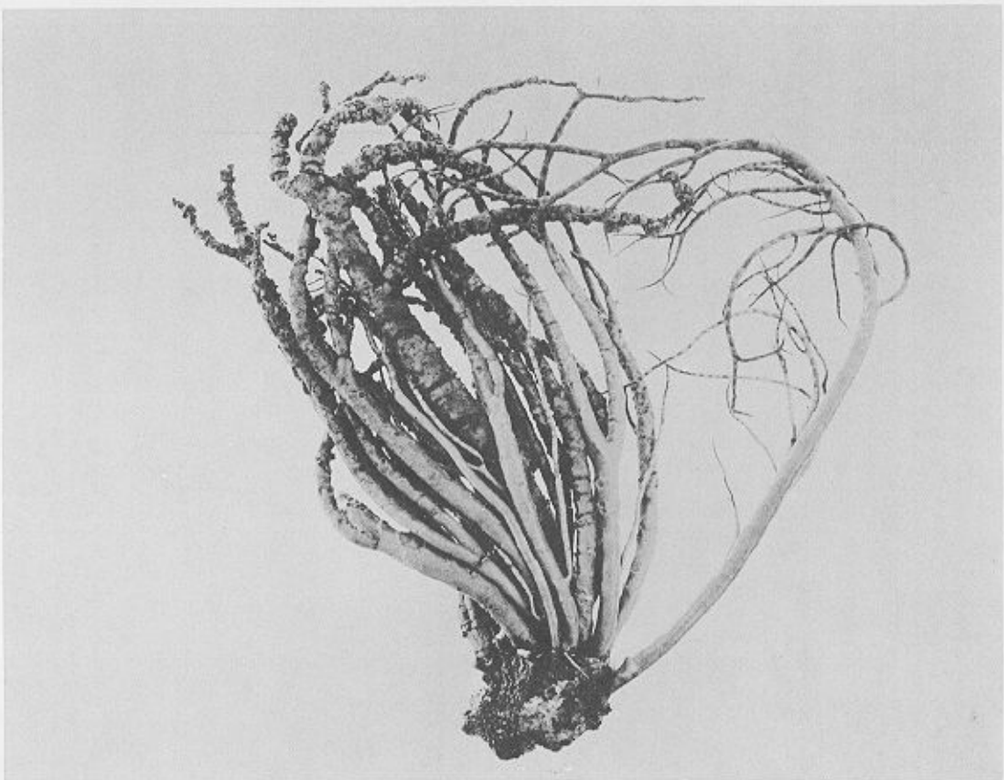


b

PLATE V

a. Extensive growth of *Usnea sulphurea* (Koen.) Th. Fr. on morainic hill at Cape Lachman, James Ross Island, east Graham Land. (Photo: I. M. Lamb, December 1945.)

b. *Ramalina terebrata* Hook. et Tayl. Specimen from Deception Island, South Shetland Islands, FIDS No. B.2310; ×1.

c. *Ramalina terebrata* Hook. et Tayl. Specimen from Deception Island, South Shetland Islands, FIDS No. B.1128; ×1.

d. *Ramalina terebrata* Hook. et Tayl. Portion of a well developed fertile specimen from Inner Tussock Island, Port William, Falkland Islands, A. G. Bennett, 1934, in BM; ×1.

a

b

c

d

PLATE VI

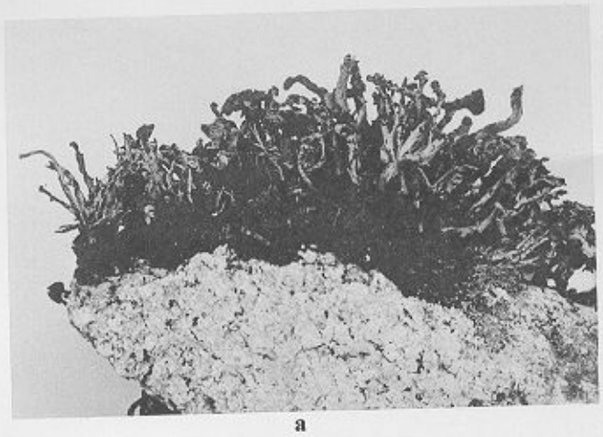
a. *Himantormia lugubris* (Hue) M. Lamb. The type specimen from Petermann Island, west Graham Land, in PC, seen from below; ×1.

b. The same, seen from above; ×1.

c. *Himantormia lugubris* (Hue) M. Lamb. Basal portion of specimen from Mt. Flora, Hope Bay, east Graham Land, FIDS No. D2858, showing protothallus; ×5.

d. *Himantormia lugubris* (Hue) M. Lamb. Section of an apothecium from the type specimen.

e. *Alectoria minuscula* (Nyl. ex Arn.) Degel. Specimen forming rosettes on stone from Alectoria Island, east Graham Land, FIDS No. 2468; ×1.



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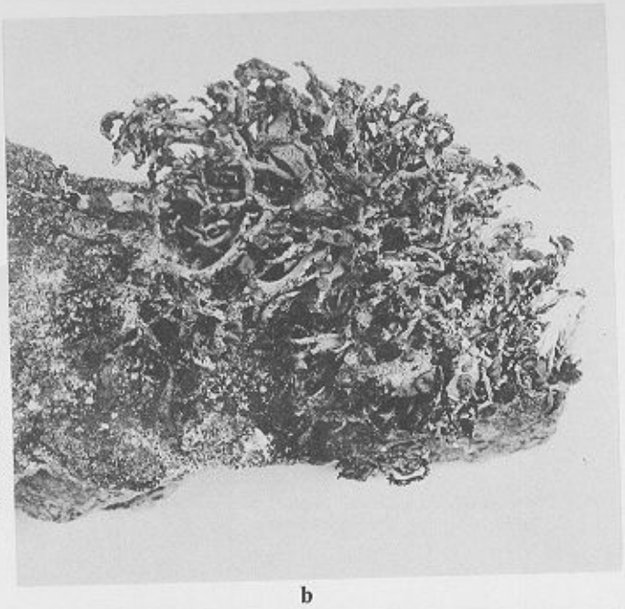

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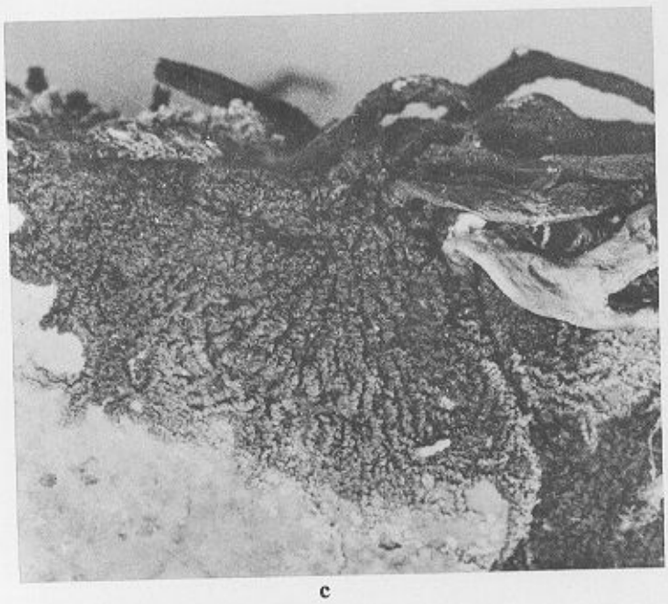

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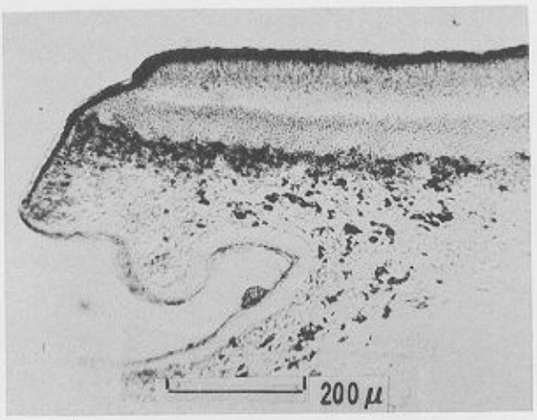

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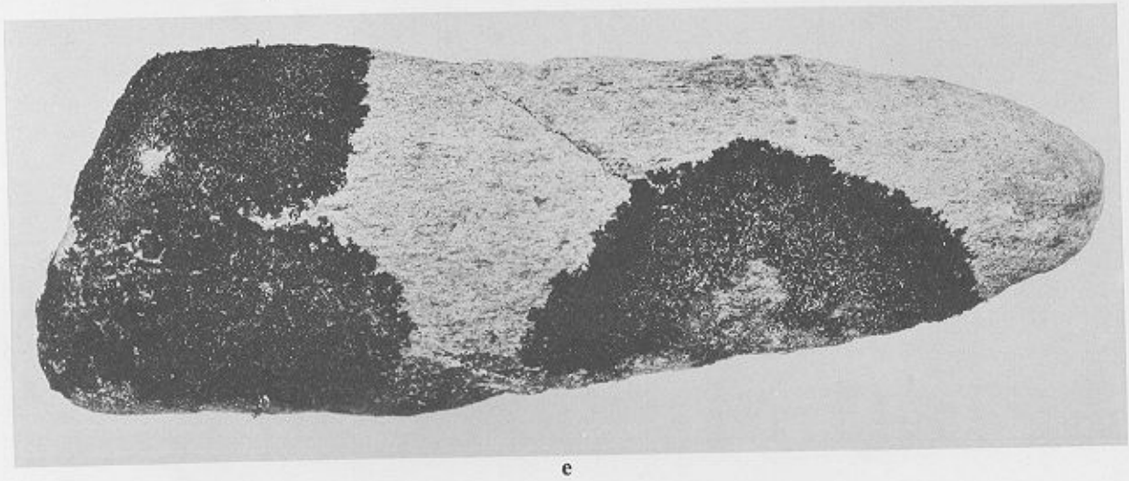


e

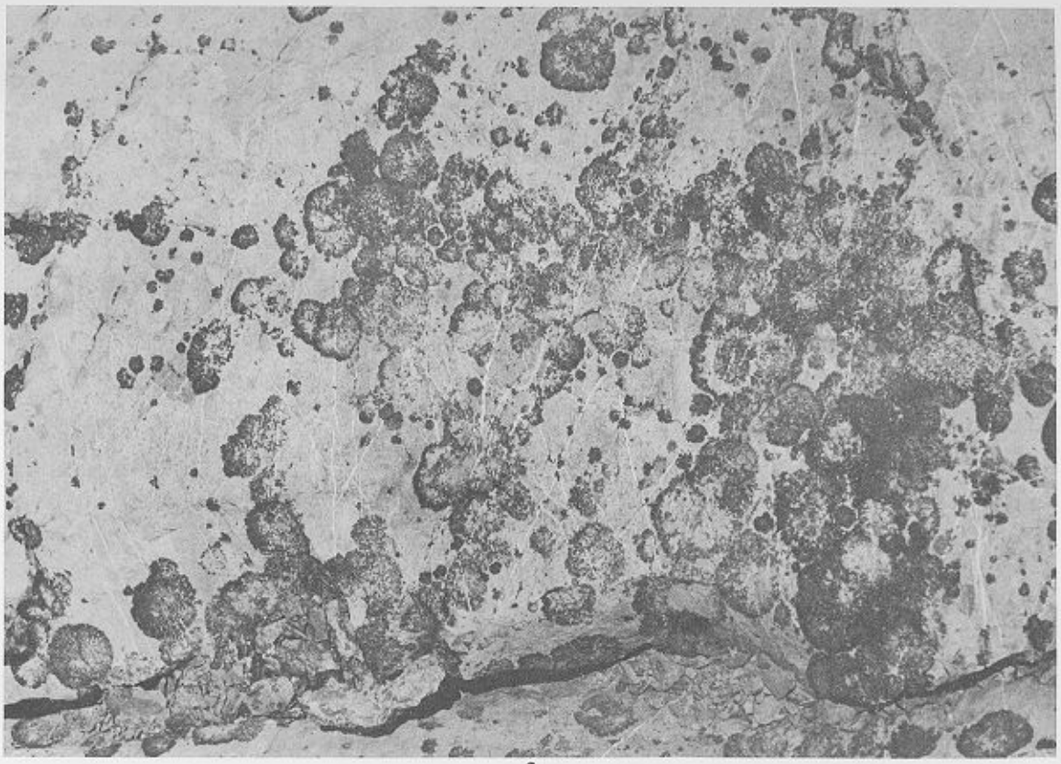
PLATE VII

a. *Alectoria minuscula* (Nyl. ex Arn.) Degel. Colonies on sloping rock face at View Point, east Graham Land. (Photo: I. M. Lamb, November 1945.)

b. *Alectoria minuscula* (Nyl. ex Arn.) Degel. f. *miniscula*. Portion of specimen from Egg Island, east Graham Land, FIDS No. D2757; ×4.

c. *Alectoria minuscula* (Nyl. ex Arn.) Degel. f. *biformis* (Vain.) M. Lamb. Portion of specimen from View Point, Duse Bay, east Graham Land, FIDS No. D2615 *pr. p.*; ×4.

d. *Alectoria minuscula* (Nyl. ex Arn.) Degel. f. *applanata* (Lynge) M. Lamb. Portion of specimen from between Hope Bay and Duse Bay, east Graham Land, FIDS No. D2557; ×4.



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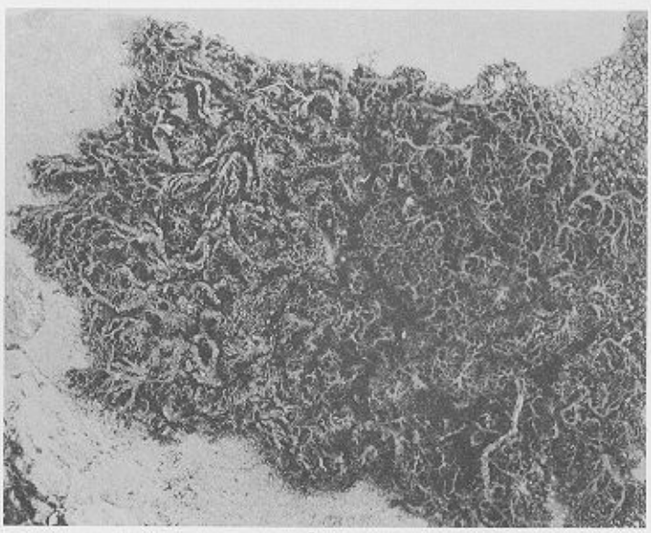

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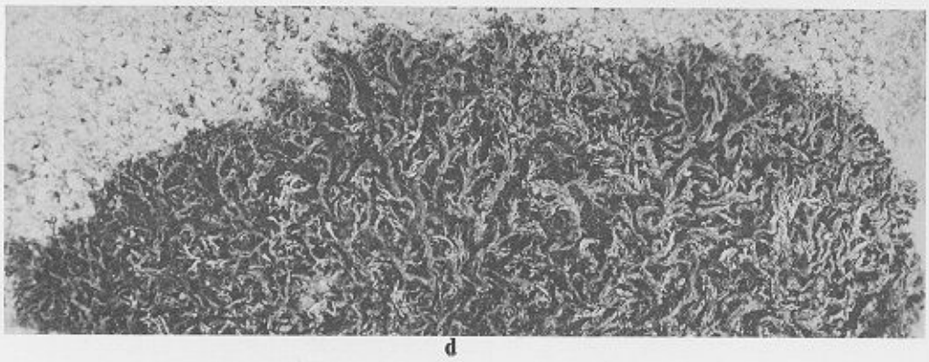

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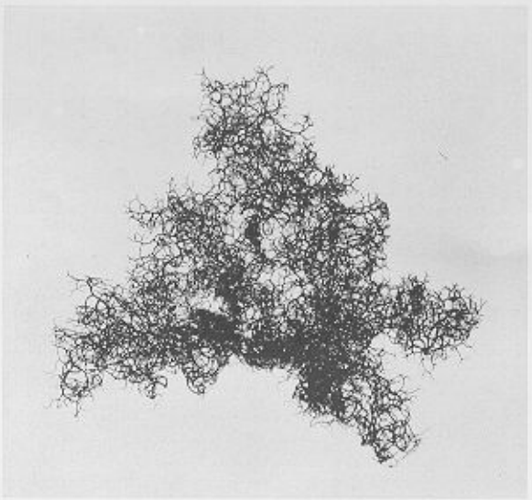
PLATE VIII

a. *Alectoria pubescens* (L.) Howe jr. Specimen from Wiencke Island, west Graham Land, FIDS No. A1749; ×1.

b. Portion of same specimen magnified; ×4.

c. *Alectoria chalybeiformis* (L.) S. Gray. Specimen from Signy Island, South Orkney Islands, FIDS No. H74–1f; ×1.

d. Portion of same specimen magnified; ×4.



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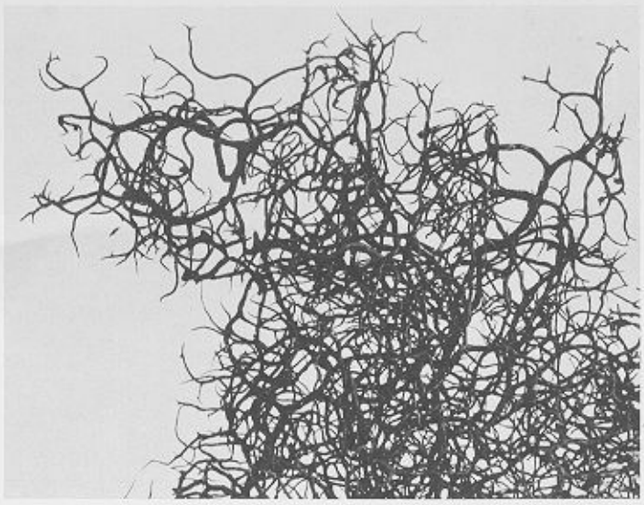

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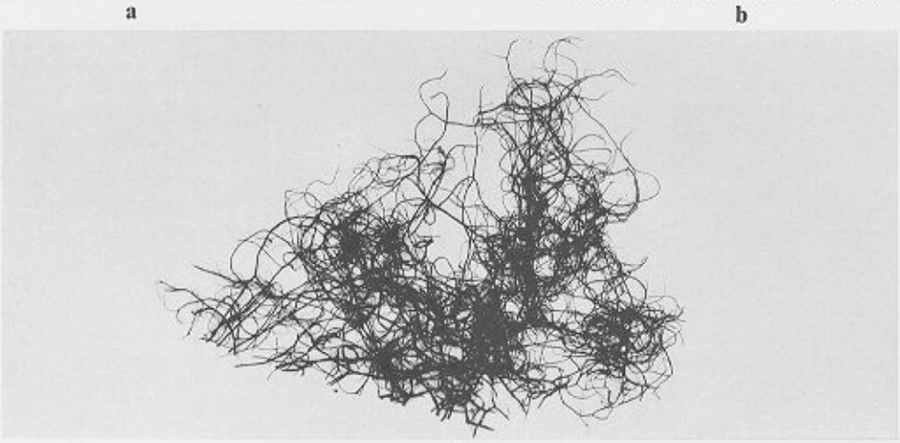

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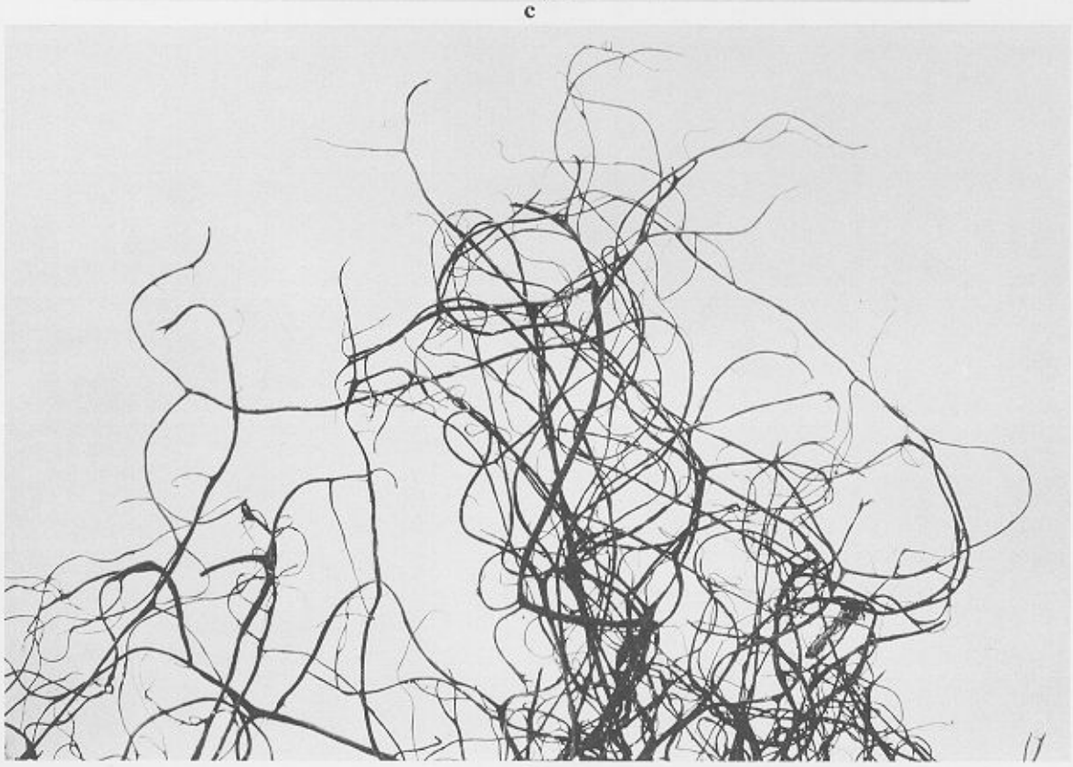

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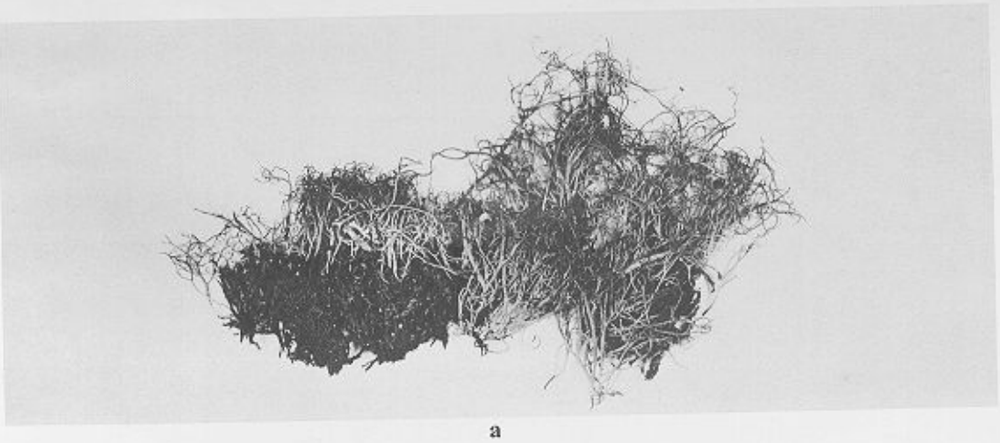
PLATE IX

a. *Alectoria nigricans* (Ach.) Nyl. Specimen from Signy Island, South Orkney Islands, FIDS No. H73–1e; ×1.

b. *Cornicularia aculeata* (Schreb.) Ach. Specimen from King George Island, South Shetland Islands, AE No. 35032; ×1.

c. *Alectoria miniscula* (Nyl. ex Arn.) Degel. f. *congesta* (Zahlbr.) M. Lamb. Portion of specimen from the Debenham Islands, BGLE No. 1498 *pr. p.*; ×4.



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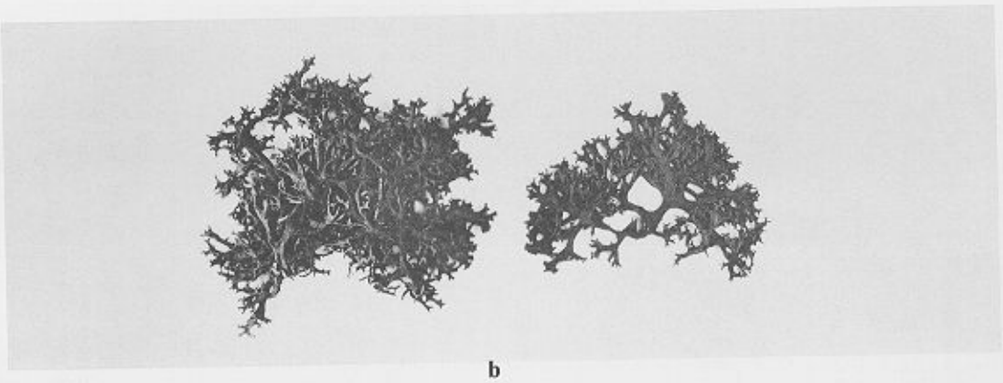

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