NOTES ON ANTARCTIC LICHENS: VII. THE GENERA *Cetraria* Hoffm., *Hypogymnia* (Nyl.) Nyl., *Menegazzia* Massal., *Parmelia* Ach. AND *Platismatia* Culb. et Culb.

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ABSTRACT. The lichen family Parmeliaceae, as it occurs on South Georgia and in the Antarctic Peninsula region of the Antarctic botanical zone, is reviewed and nine species from five genera are described briefly. Some data are given on chemical composition and distribution. A new species, *Cetraria subscutata* D. C. Lindsay, is described from the Argentine Islands, and *Parmelia austrogeorgica* C. W. Dodge is reduced to synonymy with *Physcia caesia* (Hoffm.) Hampe.

ALTHOUGH *Parmelia* and its allies are fairly conspicuous foliose lichens, they have not been collected as frequently in Antarctic regions as other macrolichens. The first specimen of a *Parmelia* from Antarctica was obtained by Hooker (1847), who recorded *P. saxatilis* from Cockburn Island, off the east coast of Trinity Peninsula. Since the specimen was lost, Hooker (1847) expressed some doubt as to the correctness of his identification, but in view of the wide distribution of *P. saxatilis* in the Antarctic Peninsula region, the present author accepts Hooker's record. Vainio (1903) described a new species, *Parmelia antarctica*, from the Danco Coast from material collected by the Expédition Antarctique Belge of 1897–99, a species later re-named *P. gerlachei* by Zahlbruckner (1929). During the Swedish South-Polar Expedition of 1901–03, lichens were collected on South Georgia and the Antarctic Peninsula, and later Darbishire (1912) listed a number of Parmeliae from various localities, although none of them was new to science. From material collected from the Graham Coast by the Deuxième Expédition Antarctique Française of 1908–10, Hue (1915) described *Parmelia acervata* as new, but this was reduced to a form of *P. saxatilis* by Lamb (1948). Lamb (1964) showed that previous records of *Parmelia lanata* from the Antarctic referred to *Alectoria minuscula* (Nyl. ex Arnold) Degel.

Darbishire (1910) was the first to record a species of *Parmelia* from continental Antarctica, describing *P. quarta* as new to science from the McMurdo Sound area. Dodge and Baker (1938) transferred this species to *Omphalodium* Mey. et Flot. as *O. quartum* (Darb.) Dodge and Baker, placing this genus in the family Umbilicariaceae on account of its growth form. However, the genus *Omphalodium* is probably more correctly placed in the Parmeliaceae, since it possesses lecanorine apothecia, those in the Umbilicariaceae being lecideine.

Dodge and Baker (1938) described a new section of *Parmelia* to accommodate a number of new species described from Marie Byrd Land. This section, Physcioideae Dodge and Baker, contains four species, namely *P. coreyi* Dodge and Baker, *P. griseola* Dodge and Baker, *P. leucoblephara* Dodge and Baker and *P. variolosa* Dodge and Baker, which strongly resemble species of *Physcia*. These four species appear to be widely distributed in continental Antarctica from Marie Byrd Land to Dronning Maud Land (Dodge and Baker, 1938; Dodge, 1948; Filson, 1966; Kashiwadani, 1970). Dodge and Baker (1938) also recorded from Marie Byrd Land two new species of *Pannoparmelia* Darb., *P. delicata* Dodge and Baker and *P. pellucida* Dodge and Baker, neither of which has been reported since their description. Two other species of *Parmelia*, *P. johnstonii* and *P. starri*, have been described from continental Antarctica by Dodge (1948, 1968, respectively). One other genus in the Parmeliaceae, *Candelaria* Massal., has been recorded from continental Antarctica by Murray (1963).

Thus the Parmeliaceae of continental Antarctica appear to be unrelated to those of the Antarctic Peninsula region, some genera, such as *Omphalodium* and *Candelaria*, being unknown in the latter area. This paper deals with the family as it occurs on South Georgia, the South Orkney and South Shetland Islands, and the Antarctic Peninsula, where five genera have been recorded: *Cetraria*, *Hypogymnia*, *Menegazzia*, *Parmelia* and *Platismatia*. Of these, only *Parmelia* and *Cetraria* penetrate into the Antarctic botanical zone, South Georgia providing the southernmost localities for the other genera. As yet no Parmeliae have been recorded from the South Sandwich Islands.

The present study is based on material in the British Antarctic Survey herbarium. Distribution data for South Georgia are summarized by the 5 km. grid overprinted on the map

in Greene (1964), but records south of lat. 60° S. are summarized by island group or coast, the latter including all offshore islands. Field records are based on information in the data bank associated with the Survey's herbarium. The herbaria to which duplicates have been distributed are indicated according to the contractions recommended by Lanjouw and Stafleu (1964) and Greene (1973).

Chemical studies were carried out by thin-layer chromatography, using methods similar to those of Hawksworth and Moore (1969), and the results obtained confirm reports for each species compiled by Culberson (1969, 1970). Brief descriptions are given of each taxon, the colours being described by reference to the equivalent colour chips in Rayner (1970).

A key to the species of Parmeliae occurring in the Antarctic Peninsula–Scotia Ridge sector is provided below, but for ease of reference, the genera and species are treated alphabetically.

1. Thallus hollow .. 2
   Thallus solid .. 3
2. Thallus tubular, ascending or erect, irregularly branched, variegated grey and black; on moss banks and soil, occasionally rock .. ***Hypogymnia lugubris***
   Thallus, foliose, appressed to substratum, of radiating lobes perforated by numerous small holes, primrose yellow; on rocks and cushions of *Colobanthus* .. ***Menegazzia sanguinascens***
3. Thallus fruticose, strap-shaped, spinulose along margins; on moss banks and in *Festuca* grassland .. ***Cetraria islandica***
   Thallus foliose, never strap-shaped or spinulose .. 4
4. Thallus very sparingly rhizinose on lower surface, rhizonae occurring singly, ascending at margins, pale yellowish green; on moss banks .. ***Platismatia glauca***
   Thallus moderately to densely rhizinose on lower surface, rhizinae occurring in groups, rarely ascending at margins; on rock, soil, moss or wood .. 5
5. Thallus brown, upper surface shiny, without reticulations .. 6
   Thallus white to grey with slight brown tinge, green or yellowish, upper surface not shiny, with or without reticulations .. 7
6. Thallus dark brown, lower surface densely rhizinose; upper surface covered with small cylindrical isidia; on rock and wood .. ***Parmelia ushuaiensis***
   Thallus light to medium brown, lower surface sparsely rhizinose; upper surface without isidia; on rock .. ***Cetraria subscutata***
7. Thallus primrose yellow, upper surface without reticulations; sorediate; on rock and moss .. ***Parmelia gerlachei***
   Thallus white to grey, occasionally yellowish green, upper surface with reticulations; isidiate or sorediate .. 8
8. Thallus slightly to densely insidiate, isidia coralloid when fully developed, globose when young; on rock and moss .. ***Parmelia saxatalis***
   Thallus sorediate; on wood .. ***Parmelia sulcata***

Cetraria islandica (L.) Ach.

Thallus fruticose, erect, strap-shaped, loosely attached to substratum, varying in colour from chestnut at apices of branches to olivaceous to white at the base; upper part of thallus shining, lower part matt; up to 10 cm. tall, lobes 1·5–3·5 cm. broad by 0·6–0·8 mm. thick; branching dichotomous, branches equal or unequal, with crisped margins; margins densely spinulose, spines extending across lamina in plants from exposed situations; surface of thallus pitted and wrinkled, with scattered white pseudocyphellae; isidia and soredia absent.

Pycnidia and apothecia not seen in the material examined.

Medulla K–, C–, P+ red; containing fumarprotocetraric and protolichesterinic acids, corresponding to chemical strain I of Krog (1968).

C. islandica is widely distributed on South Georgia where it occurs either as small isolated thalli or large swards up to 25 cm. in diameter on *Chorisodontium* banks and soil in *Festuca* grassland, from sea-level up to 250 m. It appears to be a uniform species, both morphologically and chemically, little difference being found between specimens from various localities and altitudes.

Distribution. Cosmopolitan; South Georgia, but not extending southward into the Antarctic botanical zone.

Specimens examined

South Georgia 030 150 Lindsay 3031 (AAS). 040 150 Field record 1477. 050 135 Field record 4115. 050 140 Field record 4135. 050 155 Lindsay 3834 (AAS). 055 135 Field record 4066. 055 150 Lindsay 3865 (AAS). 060 150 Field record 4226. 065 135 Field record 4004. 065 140 Field record 3740. 070 125 R. Smith 1534 (AAS). 070 130 Field record 3783. 070 135 Field record 3863. 075 130 Field record 3968. 080 125 Greene 2721 (AAS, CHR, IAA, MEL). 100 140 Field record 1478. 130 120 Holdgate 462 (AAS, CHR, FH, IAA, MEL, PC, PRE), Lindsay 3249 (AAS, S), Lindsay 4313 (AAS), Longton 462 (AAS), J. Smith M219 (AAS, SGO). 130 125 Greene 1980 (AAS, TNS), Lindsay 3117 (AAS). 135 115 Lindsay 3485 (AAS, LE, US). 155 095 Lindsay 4143 (AAS), Greene 2228 (AAS, S, SGO, TNS). 160 090 Lindsay 3539 (AAS, BM).

Cetraria subscutata D. C. Lindsay, **sp. nov.**

Thallus foliaceus, ad 3·5 cm lata, sed plerumque minor, iteratim et irregulariter divisus; lobi imbricatae, assurgentibus, ad 6 mm. longae et 3 mm. latae, marginem inciso-laceratis; superne sepiaceus vel fusco-testaceus, nitidus, laevigatus vel leviter rugulosus; subtus albidus vel alutaceus, nitidus, rugulosus; rhizinae aggregatae, ad 1 mm. longae et 0·2 mm. in diametro, thallo concoloro, ramificans vel non ramificans; cortex superiore continuo, 25–35 μm. crasso, superne sordidescente, caeterum decolore, paraplectenchymatico, cellulis 5–8 μm. latis, rotundato-subangulosis; cortex inferiore 15–20 μm. crasso, paraplectenchymatico; thallus isidiis et sorediis destitutus.

Pycnidia globosa, atra, 0·1–0·2 mm. in diametro, sparsa, in marginem thallinum; pycnoconidia non visa. Apothecia desunt.

Thallus et medulla intrinsecus et extrinsecus reagentibus immutatibus, acido protolichesterinico continens.

Holotypus: Peninsula Antarctica, Insulae Argentinae, Insula Galindez, ad saxa cum *Usneae*, 30 m.s.m., 21.iv.1964, leg. R.W.M. Corner, Corner 514 (AAS, isotypi BM, O).

Thallus foliose, loosely attached to the rock substratum, up to 3·5 cm. broad, though usually much smaller; irregularly lobed and divided; lobes imbricate, ascending, up to 6 mm. long by 3 mm. broad, with ragged margins; dorsal surface of thallus sepia to dark brick, shining, smooth or slightly wrinkled; ventral surface white to alutaceous, shining, wrinkled, bearing scattered groups of rhizinae; rhizinae up to 1 mm. long by 0·2 mm. in diameter, concolorous with ventral surface of thallus, branched or unbranched; upper cortex continuous 25–35 μm. thick, the outermost layer brownish, the rest hyaline, paraplectenchymatous, hyphae 5–8 μm. in diameter, rounded to subangular; lower cortex 15–20 μm. thick, paraplectenchymatous; isidia and soredia absent.

Pycnidia globose, black, 0·1–0·2 mm. in diameter, immersed in margins of thallus or borne on very short stalks; pycnoconidia not seen in squash preparations. Apothecia absent.

Thallus and medulla K–, C–, P– and I–, containing protolichesterinic acid. Phycobiont trebouxioid, cells 15–18 μm. in diameter.

Holotype: Antarctic Peninsula, Argentine Islands, Galindez Island, on rocks with *Usnea*, 30 m. alt., 21.iv.1964, leg. R. W. M. Corner, Corner 514 (AAS, isotypes BM, O).

This species resembles *Cetraria scutata* (Wulf.) Poetsch (= *C. chlorophylla* (Willd.) Vain.) very closely, differing in the lack of soredia. It also resembles *C. antarctica* Zahlbr., a corticolous species known from Tierra del Fuego (Zahlbruckner, 1917), but it is distinguished from that species by the presence of rhizinae and the much darker thallus colour.

Distribution. This species is so far known only from coastal rocks of two islands in the Argentine Islands group, where it was found growing on rock or *Andreaea* in an *Usnea* community at altitudes of 6–30 m.

Specimens examined

Antarctic Peninsula (west coast) *Graham Coast:* Argentine Islands, Galindez Island, Corner 514 (AAS, BM, O), R. Smith 951 (AAS); Skua Island, Corner 559 (AAS).

Hypogymnia lugubris (Pers.) Krog

Thallus fruticose or ascending, hollow, loosely attached to substratum, forming tufts up to 15 cm. in diameter by 7 cm. tall; lobes fistulose, more or less cylindrical, dichotomously branched in one plane, up to 4 cm. long by 4 mm. in diameter; dorsal surface of lobes pale olivaceous grey to greyish sepia, variegated with black, slightly shining, smooth; ventral surface fuscous black, becoming alutaceous at the tips, matt, heavily wrinkled, without rhizinae; internal surface of lobes white, arachnoid.

Pycnidia abundant, appearing as small black dots up to 0·1 mm. in diameter spread unevenly over the dorsal surface of the thallus; pycnoconidia rod-shaped, hyaline, 3–4 μm. by 0·8–1·0 μm.

Apothecia absent.

Thallus K+ yellow, P+ yellow, C−; containing atranorin, physodalic acid and an unidentified compound.

This species is widely distributed on South Georgia, being found in a wide range of habitats ranging from near sea-level to over 300 m. It most commonly covers the surfaces of weathered non-nitrogenous boulders or cliffs in a distinct community co-dominant with *Sphaerophorus globosus* (Huds.) Vain., but it also occurs in lichen-rich *Festuca* grassland and on *Chorisodontium–Polytrichum* banks.

Distribution. Alaska, Asia, southern South America (Krog, 1968); South Georgia.

Specimens examined

South Georgia 020 150 Field record 1483. 030 150 Greene 354 (AAS), Lindsay 3038 (AAS, BM). 030 155 Lindsay 3046 (AAS). 035 155 Field record 1482. 040 150 Field record 1474. 050 135 Field record 4117. 050 140 Field record 4130. 050 150 Lindsay 3740 (AAS, US). 055 135 R. Smith 1349 (AAS). 055 140 Field record 4045. 055 145 Field record 3924. 055 150 Clarke and Greene CG28 (AAS). 060 135 Field record 4003. 065 140 Field record 3728. 070 120 Field record 3705. 070 125 Field record 3846. 070 130 Field record 3704. 070 135 Field record 3755. 075 130 Field record 3959. 075 135 Field record 3890. 080 125 Greene 2606 (AAS), J. Smith M210 (AAS), J. Smith M215 (AAS). 080 135 R. Smith 1532 (AAS). 090 145 Greene 1739 (AAS, CHR). 115 130 Lindsay 3594 (AAS). 115 135 Lindsay 1687 (AAS). 120 130 Greene 3034 (AAS, S). 130 120 Greene 1871 (AAS, FH, IAA, MEL, PRE), Lindsay 3149 (AAS, LE), Lindsay 3356 (AAS, SGO), Lindsay 3364 (AAS), 29.iv.1902, Skottsberg s.n. (S). 130 125 Greene 1972 (AAS, PC). 140 110 Field record 4200. 155 095 Greene 2213 (AAS). 160 100 Lindsay 4026 (AAS, TNS). 165 090 Lindsay 3556 (AAS). 170 065 Lindsay 3730 (AAS). 170 070 Lindsay 3690 (AAS).

Menegazzia sanguinascens (Räs.) R. Sant.

Syn. Parmelia sanguinascens Räs. (Räsänen, 1932, p. 18).
Parmelia dispora var. *alboffii* Zahlbr. (Zahlbruckner, 1917, p. 39) fide Santesson (1942, p. 28).

Thallus foliose, hollow, appressed to substratum, forming rosettes up to 8 cm. in diameter, perforated by numerous holes 0·3–0·7 mm. in diameter scattered irregularly over dorsal surface; lobes radiating, fistulose, dichotomously branched, up to 3 cm. long, 0·6–1·7 mm. wide, and 0·3–1·9 mm. thick; dorsal surface of thallus greyish yellow-green, smooth or wrinkled, slightly shining, with a faint network of pale patches towards the lobe tips, sorediate; soredia in globose soralia concolorous with thallus, soralia 0·2–1·3 mm. in diameter scattered irregularly over dorsal surface of thallus; ventral surface violaceous black, becoming alutaceous at the lobe tips, heavily wrinkled, shining, without rhizinae; internal surface of lobes white to olivaceous, arachnoid.

Pycnidia abundant, appearing as irregular black dots up to 0·1 mm. in diameter spread unevenly over the dorsal surface of the thallus; pycnoconidia rod-shaped, hyaline, 4 μm. by 0·3–0·4 μm. Apothecia absent.

Thallus K+ yellow, P+ yellow, C−; containing atranorin, constictic acid and stictic acid.

This species has been found in only two areas on South Georgia on the exposed south-

west coast, where it occurs on rock and over *Colobanthus* cushions at low altitudes near the shore in non-enriched habitats. It has not so far been recorded from the sheltered north-east coast, but this may be due to the lower precipitation this coast receives in contrast to the south-west coast. Santesson (1942) described this species as being corticolous.

Distribution. Previously only known from southern South America from Juan Fernandez to Fuegia (Santesson, 1942); South Georgia.

Specimens examined

South Georgia 050 135 R. Smith 1608 (AAS), R. Smith 1611 (AAS). 075 120 R. Smith 1348 (AAS).

Parmelia gerlachei Zahlbr.

Syn. Parmelia antarctica Vain. (Vainio, 1903, pp. 13–14) non *Parmelia antarctica* Bitt. (Bitter, 1901, p. 248).

Thallus foliose, appressed to substratum, forming rosettes up to 10 cm. in diameter, primrose, matt or slightly shining, occasionally eroded so that medulla is exposed; lobes radiating, 3–9 mm. broad by 0·4–0·7 mm. thick, dichotomously branched, sorediate towards centre of thallus; soredia in globose soralia, primrose, granular; lower surface of thallus fuscous black, chestnut towards tips of lobes, shining, densely rhizinose; rhizinae black, cylindrical, occasionally dichotomously branched, up to 0·8 mm. long.

Pycnidia abundant in South Georgian material, uncommon in material from the Antarctic Peninsula, appearing as minute black dots scattered unevenly over upper surface of thallus, *c.* 240 μm. in diameter; pycnoconidia rod-shaped, hyaline, 2·0–3·5 μm. by 0·8–1·0 μm. Apothecia absent in the material examined.

Medulla K+ yellow becoming red, C−, P−; containing physodalic and usnic acids.

P. gerlachei is found in a wide range of habitats, but is more typical of those with some degree of organic enrichment. It occurs on moss banks, on coastal cliffs and on rocks near gull nests. It appears to be fairly widespread on South Georgia, but is rarely a prominent component of lichen vegetation. At only one locality, Pirner Point in Royal Bay, was *P. gerlachei* found in abundance forming a pure stand over 10 m.^{2} of north-facing cliff.

Distribution. Chile (Klement, 1965), Argentina (Kurokawa, 1967), South Georgia, Antarctic Peninsula (east coast) (Kurokawa, 1967), Antarctic Peninsula (west coast). This species has not yet been recorded from the South Orkney or South Shetland Islands, where suitable habitats exist (Fig. 1).

Specimens examined

South Georgia 130 120 Lindsay 3333 (AAS), R. Smith 1108 (AAS). 130 125 Lindsay 4258 (AAS). 140 120 Greene 947 (AAS). 155 095 Field record 5431.

Antarctic Peninsula (west coast) *Graham Coast:* Argentine Islands, Galindez Island, BGLE 1163*c* (BM), BGLE 1163*l* (BM), BGLE 1255 (BM), R. Smith 943 (AAS, CHR, MEL).

Parmelia saxatilis (L.) Ach.

Syn. Parmelia acervata Hue.
Parmelia saxatilis (L.) Ach. f. *acervata* (Hue) M. Lamb.

Thallus foliose, up to 25 cm. in diameter; colour varying from dark sulphur yellow, buff, amber to dark brick, occasionally tinged with red; matt, infrequently shining at the lobe tips; lobes irregularly branched, 2–15 mm. broad by 0·3–0·9 mm. thick, radiating or imbricate; margins incised, ascending; dorsal surface smooth or wrinkled, covered with a network of white lines; isidia absent, present in small clusters or covering most of the dorsal surface in a thick layer, coralloid, up to 0·9 mm. tall, concolorous with thallus; ventral surface fuscous black, shining, occasionally becoming chestnut towards the lobe tips; rhizinae abundant, fuscous black, matt or shining, cylindrical or flattened, irregularly branched, up to 0·8 mm. long.

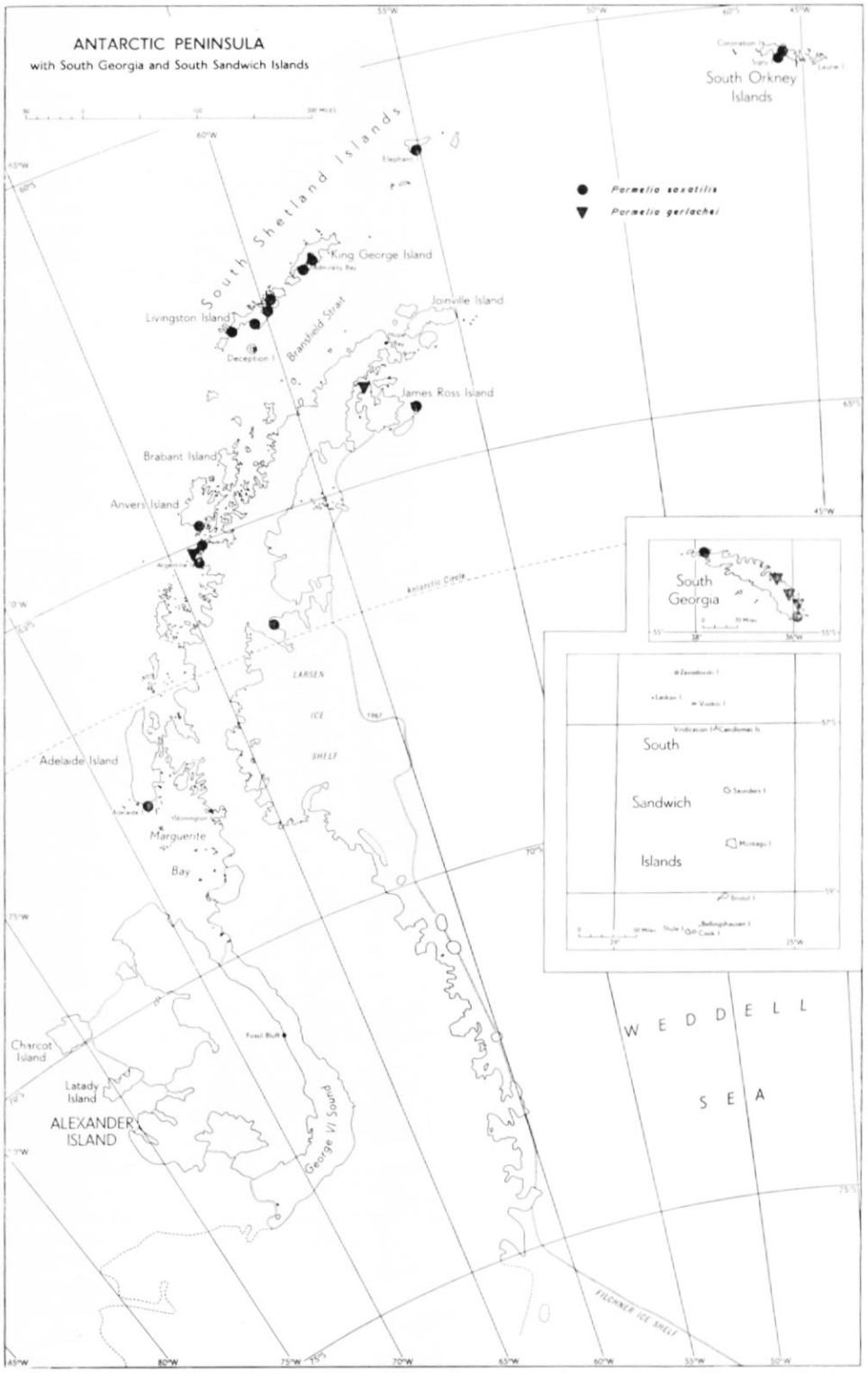

Fig. 1. The distribution of *Parmelia gerlachei* and *Parmelia saxatilis* along the Scotia Ridge and the Antarctic Peninsula.

Pycnidia and apothecia absent in the material examined.

Medulla K+ yellow, P−, C−, containing atranorin and salazinic acid.

P. saxatilis is an extremely variable plant in the Antarctic where it exhibits a wide ecological amplitude. It occurs in a range of habitats that are non-enriched, moderately sheltered and usually dry, growing on humus on rock ledges, small moss cushions such as those of *Andreaea* and *Tortula*, deep *Chorisodontium* banks, and a range of rock types, such as quartz-mica-schist, basalt, andesite and granite. Plants from localities well irrigated with melt water often have a reddish tinge, a similar effect to that noted for *P. saxatilis* in England by Hawksworth (1969), who attributed the coloration to the decomposition of atranorin. Some of the variations in this species appear to be correlated with latitude and thus severity of climate. With increase in latitude, the number of isidia decreases, so that those specimens from the east coast of the Antarctic Peninsula are sparsely or non-isidiate, the colour changes from dark brick to yellow and the size of the thallus decreases from a maximum of 25 cm. in the South Orkney Islands to only 4 cm. on the east coast of the peninsula. Its altitudinal range is usually from 3–50 m. but it has been found up to 550 m. on the east coast of the peninsula.

The first record of *P. saxatilis* from Antarctic regions was that of Hooker (1847, p. 533), who stated "what is believed to be this plant was seen at Cockburn Island, on the verge of Antarctic vegetation, but, as the specimens were lost previous to comparison, some doubt may be entertained as to the correctness of this habitat . . . the lobes of the thallus vary a good deal in size and colour, according to exposure". As stated earlier, in view of the known distribution of *P. saxatilis* in the Antarctic Peninsula region, the author accepts Hooker's record as being correct.

Hue (1915, p. 43) described a new species of *Parmelia*, *P. acervata*, from material collected on Cape Tuxen by members of the Deuxième Expédition Antarctique Française of 1908–10. This species was reduced to *P. saxatilis* f. *acervata* (Hue) M. Lamb by Lamb (1948, p. 241), who gave an extensive description of this form and suggested that it may only be an environmental modification of *P. saxatilis* being densely isidiate and corrugate. In view of the continuity of variation between isidiate and non-isidiate specimens, f. *acervata* appears to be the result of environmental modification and so does not deserve formal taxonomic recognition. Examination of the type specimen of *P. acervata* (Gain 190, PC; sur les rochers du Cap Tuxen, Terre de Graham, alt. 20 m., X^{e} excursion, 8.i.1909) showed it to be identical with material from the east coast of the Antarctic Peninsula. The massive production of isidia appears to be a response to the polar environment, f. *acervata* having been reported, for example, from Novaya Zemlya by Lamb (1948).

Distribution. Cosmopolitan; South Georgia, South Orkney and South Shetland Islands and both east and west coasts of the Antarctic Peninsula to approximately lat. 68° S. (Fig. 1.)

Specimens examined

South Georgia 040 155 R. Smith 1118 (AAS). 070 125 R. Smith 1347 (AAS).

South Orkney Islands *Coronation Island:* Lindsay 1026b (AAS), Lindsay 1035 (AAS), Lindsay 1036 (AAS). *Signy Island:* Holdgate 272f (AAS, TNS), Holdgate 274a (AAS), Lindsay 1142 (AAS), Lindsay 1204 (AAS), Lindsay 1206 (AAS), Lindsay 1207 (AAS, LE, US), Lindsay 1219 (AAS), Lindsay 1258 (AAS), R. Smith 1036 (AAS, CHR, FH), Taylor 404b (AAS).

South Shetland Islands *Elephant Island:* Allison 33a (AAS), Allison 50 (AAS). *King George Island:* Disc. Invest. 1481 (BM), Lindsay 724 (AAS), Lindsay 843 (AAS). *Greenwich Island:* Lindsay 643 (AAS). *Livingston Island:* Lindsay 79 (AAS, PC, S, SGO), Lindsay 117 (AAS), Lindsay 494 (AAS), Lindsay 500 (AAS).

Antarctic Peninsula (west coast) *Danco Coast:* Anvers Island, R. Smith 903 (AAS). Litchfield Island, Corner 367 (AAS). *Graham Coast:* Petermann Island, Corner 801 (AAS); Argentine Islands, Uruguay Island, R. Smith 947 (AAS); Galindez Island, BGLE 1307a (BM), Corner 492 (AAS), Corner 493 (AAS), Corner 515 (AAS, IAA); Skua Island, Corner 553 (AAS, MEL, PRE); Cape Tuxen, Gain 190 (Type of *P. acervata*, PC).

Antarctic Peninsula (east coast) *Foyn Coast:* Cabinet Inlet, Tindall 38b (AAS), Tindall 58 (AAS).

Parmelia sulcata Tayl.

Thallus foliose, up to 5 cm. in diameter, appressed to substratum; lobes 2–15 mm. broad by 0·5–0·9 mm. thick, dichotomously branched, white to very pale isabelline, matt, with

reticulate pattern, cracked, cracks dissolving into soredia towards centre of thallus; ventral surface fuscous black, becoming chestnut towards lobe tips, shining, densely rhizinose; rhizinae black, cylindrical, occasionally dichotomously branched, up to 1 mm. long. Soredia granular, white, developing along cracks towards centre of thallus.

Pycnidia and apothecia absent in the material examined.

Medulla K+ yellow becoming red, C−, P−; containing atranorin and salazinic acid.

Only one collection of this species is known from the area under consideration, having been collected from the wooden deck of the hulk *Louise* at Grytviken, South Georgia. It appears to have been introduced to South Georgia (Lindsay, 1973), since careful search did not reveal its presence elsewhere in the Grytviken area or around the island.

Distribution. Cosmopolitan; South Georgia but not extending southward into the Antarctic botanical zone.

Specimen examined

South Georgia 130 120 R. Smith 1354a (AAS).

Parmelia ushuaiensis Zahlbr.

Syn. Parmelia roivainenii Räs. fide Santesson (1944, p. 24).

Thallus foliose, sepia, chestnut to fuscous black, occasionally eroded so that the white medulla is exposed, 1–6 cm. in diameter, matt or slightly shining towards lobe tips; moderately or densely isidiate in centre, isidia cylindrical, frequently sub-dichotomously branched several times, up to 0·7 mm. tall; thallus lobes appressed to substratum, up to 5 mm. broad, unequal, thin, by 0·1–0·3 mm. thick, with slightly incised margins; ventral surface of thallus black, becoming sepia towards lobe tips, shining, moderately rhizinose; rhizinae black, cylindrical but occasionally flattened, unbranched, up to 0·9 mm. long.

Pycnidia and apothecia absent in the material examined. A description of apothecial characters has been given by Zahlbruckner (1917, p. 42).

Medulla K−, C− and P−; lichen substances not identified.

On South Georgia, this species is found in two habitats, on wood with *Usnea antarctica* Du Rietz and several crustose lichens and on rock, where it forms almost pure stands near sea-level but above the spray zone. However, in the South Orkney Islands *P. ushuaiensis* prefers enriched to non-enriched habitats, being found on moss (a species of *Tortula*) and on rock with *Caloplaca regalis* (Vain.) Zahlbr. and *Xanthoria candelaria* (L.) Th. Fr. f. *antarctica* (Vain.) Hillm. Its altitudinal range is from near sea-level to over 440 m. in the South Orkney Islands, but on South Georgia it has so far been found only near sea-level.

Distribution. Fuegia (Zahlbruckner, 1917); South Georgia, South Orkney Islands.

Specimens examined

South Georgia 130 125 Lindsay 3109 (AAS), Lindsay 3211 (AAS), 140 120 Lindsay 4197 (AAS).
South Orkney Islands *Coronation Island:* Field record 5432. *Signy Island:* Lindsay 1335 (AAS), R. Smith 1035 (AAS). *Thule Islands:* Lindsay 1149 (AAS), Lindsay 1155 (AAS).

Platismatia glauca (L.) Culb. et Culb.

Syn. Cetraria glauca (L.) Ach.

Thallus foliose, up to 8 cm. broad, marginal lobes inrolled, branching sub-dichotomously, ascending, up to 3 cm. tall by 8 mm. broad; dorsal surface glaucous, greenish glaucous or glaucous grey, matt, strongly reticulately wrinkled, ventral surface fuscous black, shining; margins of thallus incised, bearing small coralloid isidia; rhizinae rare, occurring singly on ventral surface.

Pycnidia and apothecia absent in the material examined.

Medulla K−, C− and P−; containing atranorin and caperitic acid.

This species is found on moss banks at low altitudes, between 60 and 180 m. on dry, moderately exposed slopes. It appears to be restricted to the northern end of South Georgia, a distribution pattern which is imperfectly understood, since suitable habitats occur elsewhere on the island. A full synonymy has been given by Culberson and Culberson (1968, p. 530).

Distribution. Europe, Greenland, North and South America, Africa (Culberson and Culberson, 1968); South Georgia.

Specimens examined

South Georgia 030 155 Lindsay 3048 (AAS), 035 145 R. Smith 1113 (AAS).

Excluded Species

Parmelia austrogeorgica C. W. Dodge

This species was described by Dodge (1970, p. 498) from material collected by Skottsberg at Maiviken, South Georgia in 1902. On examination, the type specimen in Stockholm was found to be *Physcia caesia* (Hoffm.) Hampe and so *P. austrogeorgica* is here reduced to synonymy with that species.

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