I. Mackenzie Lamb :

MONOGRAPH OF THE LICHEN GENUS

PLACOPSIS NYL.

(A CONTRIBUTION TO THE PHYTOGEOGRAPHY OF THE SOUTHERN HEMISPHERE)

THESIS

1942

TABLE OF CONTENTS

INTRODUCTION

THIS monograph is the outcome of several years' study of this predominantly subantarctic genus. The work was undertaken in the first place with a view to obtaining accurate determinations of the specimens in the British Museum Herbarium, and the recognition of the fact that this would necessarily involve the revision of all accessible material led to its expansion to a mono-graphic study of all the known species. As in many other genera of this neglected group of plants, the taxonomy was confused and uncertain, and reference to the original type specimens was necessary. Existing collections being relatively scanty (with the exception of P. gelida), I have in many cases been unable to test the uniformity and validity of the distinguishing charac-ters of many species, and have therefore made a point of giving in every case a detailed description of the type specimen. The purpose of this is twofold: firstly, although many of the minuter characters described have little or no bearing on the classification here proposed, it is realised that subsequent generations of workers with more refined methods and a greater amount of materi-al for comparison may find some of them of considerable taxonomic importance; and secondly, there are reasons for believing that several entities here classed as of subspecific rank may eventually be regarded as good pro-per species, and a full description of the types in this work will obviate the necessity of re-examining and fur-ther demolishing the already often sadly exiguous type

material. The type specimens always provide the nucleus of reference around which the circle of taxonomic dis--tinction, whether narrow or wide according to individual views, is drawn.

GENERAL ACCOUNT

History of the genus.--- The name Placopsis was first proposed by Nylander in Ann. Sci. nat., Bot., sér. 4, XV. 376 (1861) with reference to the two species P. gelida and P. rhodocarpa (= P. parellina var. rhodo--carpa), in the following words: "et thallus et apo--thecia typum peculiarem a Squamariis recedentem exhibent. Cephalodia thallina, paraphyses graciles, thecae cylind--ricae pariete apice vix vel non incrassato, gelatina hymenea iodo dilute (nec apice thecarum intensius) coerulescens typum hunc designant . . . . satisque deter--minant, forsan melius sicut sectionem peculiarem generis Lecanorae considerandum." Nylander was uncertain whether to regard Placopsis as of generic or of subgeneric rank, for in his next reference to it, in J. linn. Soc. (Bot.) IX. 251, footnote (1865), he classes it as Lecanora subgen. Placopsis, and in this has been followed by Hue (in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III. 58; 1891), Crombie (Mon. Lich. Brit. I. 355; 1894), and Harmand (in Bull. Soc. Sci. Nancy, sér. 2, XV. fasc. xxxii. 200; 1898). Müller Argoviensis regarded it as a section of Placodium (in Bot. Jb. V. 135; 1884), and Zahlbruckner as a section of Lecanora (apud Engler & Prantl, Nat. Pflanzenfam. I. Teil, Abt. 1*, 202; 1907). The latter (loc. cit.) describes its charac--ters as follows: "Lager am Rande gelappt, im Zentrum krustig, mit groszen, in das Lager versenkten Zephalodien,

welche blaugrüne Gonidien enthalten; Apothecien sitzend, Schläuche linearisch, Sporen einreihig angeordnet, Pyknokonidien fädlich, mäszig gekrümmt oder fast gerade." Vainio regarded Placopsis as a proper genus, and in Ann. Acad. Sci. fenn. ser. A, XIX. no. 15, 36 (1923) described it in these words: "Thallus crustaceus, arcte adnatus, areolis effiguratis, parathallis (cephalodiis) tuberculaeformibus, gonidia cyanophycea continentibus. Apothecia lecanorina aut zeorina. Paraphyses apice ramo--sae aut ramoso-connexae, ceterum laxe cohaerentes. Asci cylindrici. Sporae 8:nae, monostichae, mediocres, simplices. Gonidia dactylococcoidea aut pleurococcoidea." More recent authors who have accorded generic rank to Placopsis are Bouly de Lesdain (in Ann. Cryptog. exot. IV. 100; 1931) and Räsänen (in Ann. bot. Vanamo, II. 25; 1932).

My delimitation of the genus differs from that of previous authors in the inclusion in it, as a special section, of Aspiciliopsis (Müll. Arg.) (Syn. Placodium sect. Aspiciliopsis Müll. Arg. in Bot. Jb. V. 135; 1884; Lecanora sect. Aspiciliopsis Zahlbr. apud Engler & Prantl, Nat. Pflanzenfam. I. Teil, Abt. 1*, 203; 1907; Aspiciliopsis B. de Lesd. in Ann. Cryptog. exot. IV. 101; 1931), which is characterised by the immersed apothecia, and is analogous to the section Aspicilia of Lecanora; it is represented by a single species, P. macrophthalma (Tayl.) Nyl.

Affinity. -- Placopsis is very closely related to Lecanora, and, as mentioned above, is sometimes regarded as a subgenus or section of the latter. Different authors have held somewhat divergent views of the charac--ters upon which the segregation is based, but those quoted above all agree on two points, namely the presence

of cephalodia and the cylindrical asci. Examination of much material has shown that of these only the former criterion is of value for purposes of classification, for certain species of Placopsis (notably P. illita and P. subparellina) possess clavato-cylindric asci with the spores partly biseriately arranged. In view of the evi--dence on the nature of cephalodia reviewed in the follow--ing pages (pp. 12 - 14), there seems to be sufficient justification for the treatment of Placopsis as a proper genus on account of the constant presence of these bodies. Its nearest allies are the species of Lecanora possessing an effigurate thallus (sect. Placodium, sometimes known as Squamaria or Parmularia). There is however every indication that evolutionary divergence was accomplished from the latter at a very remote period, and no link of "bridging" affinities can now be traced.

It is almost certain that we have here a monophyletic genus derived from the phylogenetic efflorescence of probably a single original species, and this hypothesis is supported by certain features such as the anatomical structure and the almost constant positive $CaCl_2O_2$ reac--tion. The distribution of the species is interesting (see p. 38), and appears to indicate that the genus originated in the southern hemisphere.

Principles of classification. -- Of recent years taxo--nomic workers have for the most part realised the impor--tance of anatomical structure in the classification of lichens, and Magnusson, in his monograph of the crustaceous genus Acarospora (1929), has made full use of such characters as cell-size, relative depth of the various layers of the thallus, etc. Similar close attention was paid to anatomical detail in the present study. It was found, however, that considerable uniformity of structure

prevailed as regards the thallus and thalline investment of the apothecia, and apart from the shape and size of the spores the most useful microscopic criteria were afforded by the degree of development of the lower excipular stratum and the height of the thecium. In one species (P. baculigera) the peculiar form of the pycnoconidia is the most salient distinguishing character. It is possible that future study of the genus will reveal the importance and constancy of certain other anatomical features, and it is hoped that the descriptions of type specimens given here may then furnish the necessary data for comparative research.

As regards the external characters, experience has shown that the difference between the immersed apothecia of P. macrophthalma and the sessile fruit bodies met with in all other species of the genus is sufficiently important to justify the inclusion of the former type in a distinct section, Aspiciliopsis (Müll. Arg.) M. Lamb. Other characters found serviceable in the delimitation of species are (taken approximately in order of importance): the chemical constitution as elucidated by Asahina's "Diaminprobe" (p. 26), the presence or absence of isidia (p. 10), the morphology of the thallus -- whether squamulose, continuous, rimose, or areolate, plane or verruculose, effigurate or indeterminate (p. 9), the colour of the thallus (p. 10), and the morphology of the apothecia -- whether widened at the base or constricted-discoid (p. 17). The presence or absence of soredia, an important character in other groups, was found to be of relatively little taxonomic significance in Placopsis, because in the few species possessing them their occurrence tends to be somewhat inconstant. The cephalodia afford no basis for classification within the genus (see p. 13).

Time and further accumulation of material must show to what extent the classification here tentatively pro--posed holds good.

Mention should be made in this section of the view, which has gained ground in recent years, that lichens should not be regarded as belonging to a separate class, but should be interpolated in the taxonomic framework of the fungi. This view is based on three considerations: (a) the presence of symbionts is not regarded in other organisms (corals, etc.) as of any great systematic importance; (b) there is no hard and fast dividing line between lichens and fungi, because in certain genera (Biatorella for instance) the symbiosis appears in some cases to be of a facultative nature, thus giving rise to the artificial separation of closely related species (or even perhaps of different individuals of the same species) and their inclusion in different classes; and (c) a taxo--nomic epithet must be based upon a single organism, a unit, and cannot be applied to a combination of two or more distinct groups.

These three statements appear to be valid and imply therefore the necessity of a revision of the commonly held view that a lichen, although compounded of fungus and alga, is in some way a single organism and may be classified as such. This is clearly not so, as has been adequately pointed out by Sernander (1908) and Nannenga (1939), and hence it seems that, even if lichens are to retain their status as a separate class (and it seems relatively unimportant whether they do so or are regarded as "lichen-fungi" -- they are in most cases so distinct that it is a matter of change of name only), considerable modifications will have to be made in that part of their classification which is based on the nature of the algal symbionts. Attention has been drawn to the necessity of

this by Feldmann (1937).

Nicol (1940) considers the lichen species as "a sort of living monogram", "as if one were to add F to A and call the result L". This does express in a neat way the conception commonly held at the present time of the nature of species in lichens, but this conception is incompatible with the unquestionably valid arguments reproduced above, and hence will have to be abandoned.

In view of these considerations, it is pointed out that in this monograph the taxonomic epithets are regarded as applying to the fungal component only.

Thallus. -- All species of Placopsis possess a well-developed crustaceous thallus; no athalline species are known. The thallus is usually more or less distinctly lobed-effigurate at the circumference, with discrete or concrescent lobes, but in one species at least (P. effu--sa) it is indeterminate, and in two other cases (P. albida and P. parellina var. microphylla) is composed entirely of small, rounded or crenulate squamules. The central part of the thallus may be continuous (P. rhodo--phthalma), irregularly rimose (P. parellina), areolate (P. gelida and others), crowded-papillate (P. perrugo--sa), contortuplicate-verrucose (P. contortuplicata), or irregularly glebose-verrucose (P. terricola).

Attention should be paid to the distinction between the rimose and the areolate types of thallus, for the separa--tion of the P. parellina-group from P. gelida and allied species depends largely on this character. Theoretically the difference between the two types is one of degree only, depending upon whether or not the cracks in the thallus anastomose at their ends to delimit more or less regular areolae. Cracking and areolation of lichen thalli is almost certainly brought about by purely mecha-

-nical agencies; it is of interest in this connection to study Plate I, figs. 1 & 2 of Wulff's work "Botanische Beobachtungen aus Spitzbergen" (1902) in order to appre--ciate how closely the polygonal cracking of soil may simulate the areolation of lichen thalli. Nevertheless there appears to exist in Placopsis a definite boundary between the two types, and not much difficulty should be experienced in distinguishing one from the other; in rimose thalli the cracks, even if they show a limited tendency to anastomose, usually have sharp edges, whereas the cracks dividing the areolae of the second type are to a greater or less degree rounded off at the edges (ex--pressed in Latin by the word "limatus", i. e., filed down).

The colour of the thallus is usually dirty whitish, cream-coloured ("flori lactis concolor"), or pale buff; in specimens preserved for many years in herbaria a slight darkening, a brownish tinge, frequently manifests itself. Two species are noted for their oxydated thalli (P. bacu--ligera and P. bicolor), the colour, which varies from orange-yellow to deep ferruginous red, being due to the deposition of iron oxide in amorphous granules between the cells of the upper cortex. The surface of the thallus is nearly always matt, and may in some species be covered with a fine whitish pruina. All species have a white medulla.

Isidia occur on the thallus of the following species: P. cribellans, P. isidiophora, P. papillosa, and the f. subcribellans of P. parellina var. carnea. In the first of these they are peculiar in being very easily detachable, and leave after falling off small pit-like depressions which are characteristic of the species.

Soredia are found in two species, P. gelida and P. parellina var. rhodocarpa; as a rule they are circum-

-scribed (± orbicular or radially elongated), but in the f. argillacea of the latter they become confluent and cover the greater part of the surface of the thallus.

A vertical section through the thallus (Fig. 1) shows that it is bounded by an upper, paraplectenchymatic cor--tex of variable depth. The only exception to this rule is P. macrophthalma, in which the uppermost layer is formed by a palisade-like tissue of vertically parallel, conglutinated hyphae. The cortex itself is not infre--quently covered by a hyaline, almost structureless stra--tum derived from the disintegration of the outer cell-layers. The cortical cells are more or less isodiamet--ric, irregularly angulose or somewhat rounded, with thin walls usually between 0.7 and 1.0μ in thickness. Direct--ly below the cortex, and separating it from the medulla, occurs the zone of symbiotic algae (gonidia); these photosynthetic symbionts lie in a fairly even stratum of variable depth usually interrupted at intervals by bands of parallel, adnate, medullary hyphae running up--wards to join the cortex. The medulla is commonly compact, with few and small air cavities, but tends to be looser in the species of the P. perrugosa-group. It is formed of interwoven, branched, septate hyphae from 2 to 4μ thick, with usually thin walls (about 0.7μ), and running either irregularly in various directions, or with a tendency to lie in a predominantly horizontal or vertical plane. In certain rare instances, as in P. parellina var. rhodocarpa, parts of the medulla may be paraplectenchymatic in structure, like the cortex. Often the lower parts of the medulla, by which the thallus is anchored to the substratum, are brownish in colour by degeneration, but as a rule no proper hypothalline tissue is formed. P. albida and P. illita are exceptional in

this respect; they both possess a well developed hypo--thallus formed of densely compacted hyphae with darkened walls. Both cortex and medulla are commonly inspersed (nubilated) with minute, dull yellowish granules adher--ing to the cells, and are then somewhat opaque in sec--tion, as shown in Fig. 1.

Cephalodia. -- These are a conspicuous feature of all species of Placopsis. Out of hundreds of specimens examined, only two were destitute of cephalodia, and as these two plants (P. gelida) were obviously morbose individuals, such rare instances may well be considered as pathological abnormalities.

There has been some difference of opinion regarding the nature of cephalodia. Th. Fries (1866) and recent--ly Kaule (1931, 1934) regarded cephalodia as abnormal gall-like structures produced by the presence of a foreign alga. On the other hand, a considerable body of evidence has accumulated to show that they are more likely to be definite organs of the thallus fulfilling a metabolic function. Forssell (1884) considered this to be the case, and Cengia Sambo (1924, 1931) has shown that the Cyanophyceous algae of cephalodia are constantly associ--ated with nitrogen-fixing bacteria (Azotobacter); she considers the cephalodia to be organs of the lichen thal--lus comparable to the root nodules of the Leguminosae. Goebel (1926) arrived independently at the same con--clusion. Whether or not this be so, it seems certain that the presence of cephalodia is a genetically condit--ioned feature suitable for use at least as a generic character; Kaule (1931, p. 41) writes: "Wie jede Gallenbildung, setzt eben auch jedes Cephalodium eine Empfänglichkeit der befallenen Pflanze für den vom Gallenerreger ausgehenden Reiz voraus", and adds in a

footnote: "Wie die Hyphen auf diesen Reiz antworten, das ist natürlich eine Eigenschaft des Pilzes."

Johnson (1938), as a result of his statistical study of the various types of cephalodia occurring in the genus Stereocaulon, came to the conclusion that the form of these bodies is correlated with the morphology of the other parts of the lichen, and is hence important in the classification of the species. My investigation of hundreds of specimens of Placopsis has shown that in this genus there is no such correlation; it would have been fortunate had this been the case, but it was not so, at any rate in P. gelida, the only species of which suffi--cient material was studied to make possible a definite decision on this point. It is true that I have never come across different types of cephalodia occurring on the same thallus, but this can be explained by the fact that all the cephalodia on a fully grown specimen are derived from the single cephalodial fundament originally surrounded by the primary thallus (see Sernander's account, 1908). The fact, however, that individuals, obviously of the same species, and occurring in close proximity to each other -- I refer particularly to some Novaya Zemlya specimens of P. gelida collected by the Norwegian Expedition of 1921 -- may differ only in the form of the cephalodia which they bear, makes one doubt whether specific significance can be attributed to the morphology of the latter. A classification of species based on cephalodia would be completely unnatural, as we can see from the fact that P. cribellans, a most distinct species differing from all others in several conspicuous features, produces at least two distinct types of cepha--lodia. It seems more likely that the form of the cephalodia is conditioned by the nature of the Cyanophy-

-ceous algae accidentally met with and taken up as sym--bionts; in the case of the specimens of P. gelida from Novaya Zemlya mentioned above, one type of cephalodium was found to contain Nostocoid, the other Scytonemoid, algae.

The origin of the cephalodia in P. gelida was investi--gated by Sernander (1908), working with Swedish materi--al. He found that two types of initial thalli are developed, one with bright green, the other with blue-green, symbiotic algae. These start as independent thalli, but as soon as they come into contact, the thallus with Pleurococcoid symbionts, growing faster, surrounds and encloses the other, which is raised up into a central position on the developing thallus, and establishes com--munication with the latter by means of rhizoidal hyphae. Sernander attributes the origin of the small primary thalli to soredia, and that of the cephalodial fundaments to soredial hyphae commencing their growth among Cyano--phyceous algae.

From the morphological viewpoint, the cephalodia met with in Placopsis-species fall into seven types, between which, however, transitions sometimes occur. The first type (Fig. 2, a) is the commonest, and is found in many species; the cephalodia are sessile, closely adpressed to the thallus, flattened and more or less orbicular. There is marked effiguration due to the development of radiating folds and cracks. In some species, notably P. stenophylla, the cephalodia are similar, but without cracks (Fig. 2, c). The third type (Fig. 2, d) found in P. parellina and P. rhodophthalma, differs from the foregoing in the irregular nature of the superficial plication; such cephalodia are usually less flattened than the other radially effigurate types. Fig. 2, b

represents what is perhaps the simplest form, in which the cephalodia occur as simple, rounded tubercles; such are characteristic of P. contortuplicata, in some speci--mens at least. Fig. 2, e & f represent two hardly separable types in which the cephalodia are convex to subglobose, usually somewhat constricted at the point of attachment, and with a more or less distinctly verruculose surface; the former is occasionally found in P. gelida, and the latter minutely papillate type is known only in P. Amabilis, a somewhat problematical species from Mexico. Lastly, there is the completely immersed cephalodium of P. macrophthalma (Fig. 2, g); it is level with the thallus, and similar to the latter in its irregular crack--ing, and by superficial observation can be distinguished from the surrounding thalline tissue only by its somewhat deeper colour.

The anatomy of Placopsis-cephalodia is comparatively uniform, and Fig. 3, which represents a vertical section through a cephalodium of P. gelida, may be taken as an illustrative type. An outermost, hyaline, necrotic layer of variable thickness is often present; it is derived from the disintegration of the outer cortical cells, the faint outlines of which are usually visible. Below this is the paraplectenchymatic cortical tissue, commonly faintly yellow-brown or nubilated, and composed of more or less isodiametric, irregularly angular cells with thin or moderately thickened walls. The inner medullary tis--sue is hyaline, without air spaces, and formed of upward-striving, fairly thin-walled hyphae which are coalescent into a prosoplectenchymatic tissue; particularly towards the base of the cephalodium a tendency to form a paraplec--tenchymatic tissue of isodiametric cells is evident. The symbiotic Cyanophyceous algae lie in an ill-defined layer

of variable depth in the medullary tissue, and often fill the latter entirely; when they are Scytonemoid or Stigo--nemoid (as in the figure), they form separate nests (trichomes) separated by hyphal bands, but in the case of Nostocoid symbionts they are evenly dispersed and entangled in the medullary tissue.

Paracephalodia. -- The new term "paracephalodium" is here proposed as a designation for certain peculiar out--growths occurring on the thallus of two specimens of P. pycnotheca and P. parellina var. rhodocarpa. These out--growths have the colour and general appearance of cepha--lodia, but when sectioned prove to contain only Pleuro--coccoid symbiotic algae derived from the gonidial layer of the thallus. They are thus comparable to isidia, but are distinct from the latter in being differently coloured from the rest of the thallus, and may be defined as fol--lows: "paracephalodia: thalline outgrowths similar to cephalodia in form and colour, but containing the same bright green algal symbionts as the thallus". For a full description and figure of these bodies in P. pycno--theca, see p. 88 and Fig. 6 on p. ; a note on their occurrence in an Antarctic specimen of P. parellina var. rhodocarpa is given on p. 114. They do not appear to possess any taxonomic significance.

Apothecia. -- Apothecia are usually present in speci--mens of most species of Placopsis, but are rarely deve--loped in the common northern hemisphere species P. geli--da. The reason for this is obscure. Except in the case of species presenting well marked types either as regards thalline morphology or geographical distribution -- P. gelida for instance -- a study of the apothecial structure and spores is necessary for certain determina--tion.

As mentioned on p. 7 , the apothecia in this genus are of two main types: the immersed or aspicilioid, met with in sect. Aspiciliopsis, and the sessile, lecanorine type found in all other species (sect. Euplacopsis). In P. (Aspiciliopsis) macrophthalma the apothecia are level with the thallus, and the non-prominent thalline margin is not clearly delimited from the latter except by random circumscission. All the other species, grouped together in sect. Euplacopsis, have elevated, sessile, discoid apothecia. The size of such apothecia is fairly constant for each species, ranging from 0.6 - 0.8 mm. diam. in P. Lesdainii and P. Asahinae up to 3.5 mm. in P. contortuplicata. In the majority of species the apothecia are distinctly constricted below, but P. ampliata, from New Zealand, is characterised by the conical thalline margin sloping down gradually into the thallus. The apothecia always originate within the thallus itself, forming at first closed perithecia-like warts with an apical pore; soon, by expansion of the thecium and flattening, the discoid form of the mature fruit body is produced.

Seen from above under a hand lens, the lecanorine apothecia of species of the section Euplacopsis show two, or sometimes three, distinct parts, namely, thalline margin and disc, the third being the often absent proper margin or lateral excipulum. The outermost thalline margin is a continuation of the thallus, and resembles the latter in colour and structure; it is usually rounded and entire, rarely rugose or subcrenulate (in P. baculigera and P. rugosa), and is either persistently prominent or finally depressed and extenuated. In the extreme case of P. contortuplicata, the thalline margin may be excluded altogether, the apothecia then acquiring a lecideoid or biatoroid appearance. The disc is the

upper surface of the thecium, and is more or less plane and at first overhung by the thalline margin; it may be either smooth or minutely scabrid owing to inequalities in the epithecium, and rarely sparingly cracked (probably by mechanical contraction). The apothecial discs of most species are somewhat variable in colour, but this character, to which older workers attached considerable taxonomic importance (as is seen from the epithets "rhodocarpa", "rhodomma", and "rhodophthalma"), is of very limited value as a systematic criterion. This is due to the facts that age and degeneration often bring about a progressive darkening of the disc, and that the bright red colour, which is such a conspicuous feature of certain species in a comparatively fresh state, is derived from the presence of rose-pink oil guttules in the plasm of asci and spores, and suffers a change to a more dingy hue after a number of years in the herbarium. Certain species, however, such as P. Asahinae, P. baculigera, and P. papillosa, appear to have from the first dark brown or blackish apothecial discs. P. baculigera is peculiar, among other respects, in having a distinctly shining or nitidous disc; in all other known species the surface is matt. Not uncommonly a more or less plentiful whitish or ochraceous pruina may be present, tending to mask the genuine colour of the epithecium. The proper margin is the lateral rim-like termination of the excipulum, and is often visible in older apothecia as a thin, rounded, en-=tire ring between the thalline margin and the disc; it is always more or less concolorous with the latter, and may occasionally be slightly shining or, more rarely, pruinose.

Fig. 4 shows the appearance of part of a thin vertical section through an apothecium of P. gelida (Icelandic material). The cup-like structure is bounded at the

sides by a corticated, thalline margin possessing in all essential respects the same structure as the rest of the thallus, i. e., with a paraplectenchymatic cortex, a sub--cortical, rather interrupted zone of symbiotic algae, and nubilated, often reduced and densely compacted, medul--lary tissue. Within and adnate to this outer receptacle is the inner cup or excipulum, the structure of which appears to afford an important taxonomic criterion in this genus. Two types of excipulum may be distinguished: (a) the entire type, in which a continuous, paraplectenchymatic base is developed below the hypothecium, and (b) the di--midiate type, which is formed only at the sides, and is absent below. The first of these two types is by far the commonest in Placopsis, and the section shown in Fig. 4 belongs to this category. The basal stratum, when pre--sent, is conspicuous in vertical section on account of its paraplectenchymatic structure and almost constant nu--bilation by minute dull yellowish granules; it is sharp--ly differentiated from the hyaline hypothecium which it subtends. Its depth is variable, but probably fairly constant within each species, the most massive development being found in P. pycnotheca, in which it reaches a depth of 300μ. The cells of which the lower excipulum is com--posed are more or less isodiametric, irregularly angular or rounded in outline, usually from 5 to 7μ in diameter, and with thin or medium walls (up to 1μ). At the sides the paraplectenchyma goes over gradually or abruptly into a usually hyaline tissue of indistinctly prosoplectenchy--matic structure; this part consists of parallel, concre--scent, thin-walled hyphae about 1.5 - 3.0μ diam. running outwards and upwards in such a way as to form a wall of variable thickness separating the margins of hypothecium and thecium from the outer thalline covering. At the emergence of this lateral wall on the surface of the apo-

-thecium a protruding rim is often formed in older apo--thecia; this is the inner or proper margin mentioned above.

Inside the inner cup formed by the excipulum lie the remaining two layers of the fruit body: the hypothecium below, and the thecium, or hymenium, above.

The hypothecium is bowl-shaped or obconical in section, and consists of a mass of very compact tissue formed by adnate and intricately interwoven, thin-walled hyphae running either indiscriminately in various directions or with a predominantly vertically parallel arrangement. Commonly it is colourless and hyaline, but in some species a yellowish tinge is apparent in thick sections, and in one case (the type specimen of P. gelida var. canarien--sis) it is coloured dark reddish in the centre; it remains to be decided from the study of further material, however, whether this feature is sufficiently constant to be taxonomically important. The hyphae composing the hypothecium are sometimes very fine (1.0 - 1.5μ), the average thickness being 2 - 4μ. In the hypothecium of P. Räsänenii larger hyphae were observed in the midst of the ordinary tissue; they appeared to be the ascogenous elements which give rise to the spore-sacs (asci). It seems probable that the blue coloration of the hypothecium obtained with iodine in many specimens depends on the presence of such ascogenous hyphae or their remains. The depth of the hypothecium is fairly constant for each spe--cies, but by no means so much as that of the thecium.

The upper, spore-producing stratum of the fruit body is the thecium or hymenium. It consists of spore-sacs (asci) intermingled with, and held apart by, sterile hyphal filaments (paraphyses). The depth of this layer varies considerably from species to species; the lowest thecium occurs in P. illita (80 - 140μ), the highest in

P. subgelida (285 - 320μ). This feature is of great importance in distinguishing the species. In section, the thecium is seen to be colourless and hyaline except for an upper covering (epithecium), which commonly consists of minute, sordid yellowish granules or crystals, and which gives to the surface of the disc its character--istic colour when viewed macroscopically. In some cases the epithecial covering is provided by loose hyphal parti--cles abstricted, like conidia, from the tips of the para--physes.

Paraphyses are essentially space-filling elements in the thecium, and may also be assumed, in the light of recent research on their function in the saprophytic Asco--mycetes, to play an important role in the ejaculation of the spores. Except in length, they vary but little from species to species; each paraphysis is a single, simple or slightly branched, septate hypha about 1.5 - 2.0μ in thickness, not constricted at the septa except near the apex, where there may be either a slight, simple, clavate swelling or a series of constrictions separating monili--form particles which sometimes become abstricted, as explained above, to form an epithecial covering. In all species of Placopsis the paraphyses are thin-walled and entirely free from each other (discrete) when crushed out in water; mucilaginous conglutination of paraphyses is unknown in this genus.

The asci are morphologically the terminal cells of certain specialised hyphae which have emerged from the underlying hypothecial tissue. Each of them contains at maturity eight (sometimes by abortion six or seven) spores. In Placopsis the asci are commonly cylindrical with the spores in a single row (uniseriate or monosti--chous); less often, as in P. illita and P. subparelli-

-na, the spores show a tendency to group themselves in two rows (biseriate or distichous arrangement). The ascus-wall is moderate in thickness (1 - 2, rarely 3μ), often apparently thicker at the apex (up to 8μ, or more), but this thickening seems to be due, not to an increase in the size of the cell-wall itself, but to the presence of a plug of hyaline, gelatinous material probably func--tionally connected with the rupture of the ascus and the discharge of the spores. Immature asci are filled with a granular protoplasm containing numerous small oil-drop--lets; in species possessing bright red apothecial discs, e. g., P. rhodophthalma, these oil-guttules have, in fresh material, a delicate rose-pink colour.

The spores are as a rule abundantly developed in mature apothecia, and are soon delimited by cleavage of the cyto--plasm and subsequent wall-formation. At maturity they are simple, i. e., unicellular, and bounded by a smooth, even, colourless wall about 1μ in thickness. In certain species, notably P. bicolor, two apical vacuoles may be present in the protoplasm of the spores, giving the latter a spurious polari-bilocular appearance, but there is never any true septation. Both the size and the shape of the spores are important in the taxonomy of Placopsis, having been found to be subject to a strictly limited degree of variation. The smallest spores found in this genus measure between 12 and 17μ in length and 6 to 9μ in breadth, and occur in P. cribellans, P. illita, and P. Lesdainii; the largest are met with in P. subgelida, in which they reach a size of 30 by 21μ. As regards shape, the majority of species of Placopsis produce ellip--soid spores approximately twice as long as broad, but the following species are characterised by elongate-ellip--soid spores in which the length/breadth ratio is greater

than 2: Asahinae, pycnotheca, and subparellina. Placop--sis-spores are always equally rounded at both ends when mature.

Pycnidia. -- Pycnidia are known in twenty out of the thirty species of Placopsis. They are completely immersed, usually causing slight swellings, and irregularly dispersed over the more central parts of the thallus. Each pycni--dium when mature is provided with an apical ostiole visi--ble in most instances under a ×10 lens as a minute, point-like, brown or blackish spot up to 0.1 mm. in dia--meter and perforated in its centre by an extremely fine opening through which the pycnoconidia are extruded. In section, the pycnidia of most Placopsis-species are sim--ple, either spherical or flask-shaped, but in two species (P. baculigera and P. kerguelensis) the area of the sporiferous tissue is greatly increased by convolution of the perifulcrial wall, so that a number of chambers are formed communicating with the main channel which leads out by the ostiole.

The pycnidium is bounded at the sides by a colourless wall, or perifulcrium, formed of para- or prosoplecten--chymatic, often indistinct tissue. From the inner sides of this perifulcrium, and perpendicular to it, spring the closely packed conidiophores or fulcra. These are in Placopsis of the "Placodien-Typus" of Glück (1899), and belong to the exobasidial group in the classification of Steiner (1901). Their structure is simple: each con--sisting of a usually branched, septate hypha giving rise directly to single conidiospores at the ends of each of its branches. In many genera having pycnidia of this exobasidial type the conidia are borne on specialised, filamentous sterigmata, but this is not the case in Placo--psis. The conidiospores, or pycnoconidia, are, with the exception of a single species, almost identical in the

different species as regards shape and size, being thread-like, 15 to 29μ long and about 0.5μ thick, commonly slightly curved, sometimes almost straight. The single remarkable exception is the case of P. baculigera, in which they are shortly staff-shaped (bacillar), straight, truncate at the ends, and 6 to 10 by 0.8 to 1.0 μ.

When a pycnidium reaches maturity, vast numbers of pycnoconidia must be extruded from its ostiole in a colour-less or yellowish liquid. In the type specimen of P. parellina var. carnea I observed the dried and gelified remains of these extruded droplets still in position on the ostioles. One might suspect, from analogy with the Uredinales, that the secreted fluid might contain a sugary substance making it attractive to insects, but unfortuna-tely I have not had the opportunity of studying the exu-date in the fresh condition. Eventual discovery of a dispersal of these pycnoconidiospores by insects would open up the possibility of their being gametic bodies taking part in some sort of sexual fertilisation, but at the present time we possess no real evidence for the exi-stence of such a process in the lichens.[1)] Until such evidence comes to light, it seems advisable to use the terms "pycnidia" and "pycnoconidia" for these structures and the spores which they produce, rather than "spermogo-nia" and "spermatia" which have an exclusively sexual connotation.

Chemical reactions. -- The reactions given by lichens with potassium hydroxide and calcium hypochlorite, dis-covered by Nylander about 1867, have been generally accepted by lichenologists and acknowledged to be of value for the easy recognition of morphologically variable spe-cies. Nylander and others have described numerous "chemical species", i. e., species differing not on mor-

-phological, but only on chemical grounds, and recognis--able only by testing with one or other of these substan--ces. Of quite recent times a cleavage of opinion has occurred concerning the validity of such a procedure. On the one hand, Asahina, in his discussion of the taxonomic value of lichen products (1937), states quite definitely that when two morphologically closely related lichens contain chemically different substances, they must be regarded as distinct species. On the other hand, Dege--lius, in a recently published paper (1939, on p. 102), protests against this view, pointing out that such physio--logical differences are not considered taxonomically important in other groups of plants, and expressing the opinion that it is the ease with which certain chemical differences can be demonstrated by striking colour reac--tions that has led to their formulation as valuable sys--tematic criteria. He considers chemically different but morphologically indistinguishable individuals to be at most mere races of the same species, and adds: "Die Systematik musz sich jedoch in erster Linie auf die Morphologie stützen, nicht auf die Chemie".

My own view at present is that they are of considerable systematic importance and cannot properly be altogether neglected. Nevertheless, in view of the complex, physio--logical interrelationship between fungus and symbiotic alga, I am very doubtful whether the separation of species on purely chemical grounds is justified, and in the pre--sent study I have regarded chemical differences as speci--fic only when accompanied by rather important and appar--ently constant, morphological peculiarities. This view is in entire agreement with that put forward by Hillmann in his treatment of the central European Parmeliaceae (1936).

By far the most important discovery of recent years in the practical chemistry of lichens is the "Diamin-Probe" of Asahina (1934), the use of which enables one to recognise the presence of certain lichen acids known as depsidones by the coloured condensation products which they give with certain aromatic amines, notably paraphenylenediamine, $C_6H_4(NH_2)_2$. One of these depsidones, fumarprotocetraric acid, $C_{22}H_{16}O_{12}$, has been found in P. brachyloba, P. chilena, P. patagonica, P. stenophylla, P. subparellina, P. terricola, P. gelida var. subreagens, and P. parellina f. semireagens. In P. brachyloba and P. terricola its occurrance seems to be inconstant. It is usually localised in the medulla, but in P. parellina f. semireagens is produced in the cortex of the thallus. In all cases it gives a vivid reaction with paraphenylenediamine -- intense yellow quickly changing to bright vermilion or miniate red. Instructions for preparing and using this reagent are given on p.42. It is conventionally abbreviated in descriptions as "Pd". Occasionally in P. gelida, and in most specimens of P. cribellans, the surface of the thallus alone gives a faint flesh-pink coloration when moistened with this reagent. This effect is probably due to a very low concentration of fumarprotocetraric acid in the cortical tissues, and appears to be neither very constant nor systematically important.

A second type of substance present in Placopsis is that which gives the red reaction with calcium hypochlorite in the medulla and often also in the cortex of almost every species. Such substances are the depsides of the lecanoric acid group, comprising lecanoric acid, gyrophoric acid, olivetoric acid, anziaic acid, etc. They cannot be distinguished from each other by macroscopical means, but Asahina (1936) has elaborated a microchemical method

whereby they can be recognised by the form of the crystals to which they give rise after heating in a mixture of glycerin, alcohol, and water. By the use of this method with fragments of the thallus of a specimen of P. gelida from Norway, Kåfjord, I obtained crystals similar to those figured by Asahina (loc. cit.) for gyrophoric acid, $C_{24}H_{20}O_{11}$, and hence it seems justified to assume that it is the latter lichen acid which causes the red reaction with $CaCl_2O_2$ in species of Placopsis. This reaction, since it appears to be common to all species except those with an oxydated thallus (P. baculigera and P. bicolor),[2] is of very little importance in their classification.

Finally, it is necessary to refer to the reactions obtained in the thecium with iodine. The paraphyses are never affected by this reagent, but the ascus-walls com--monly take on a paler or deeper blue colour, which in certain species (P. fuscidula, P. gelida, and P. rhodoph--thalma) may give place within a few seconds to a faint wine-red tint. This difference in the iodine reaction appears to be due to the presence of distinct chemical substances in the ascus-wall: isolichenin, $C_6H_{10}O_5$, causing a persistently blue coloration, and glycogen, apparently an isomer of the latter with a structural difference in the molecule, giving the wine-red reaction. The iodine test has been found to be important in the classification of other groups of lichens (notably the Pyrenolichenes); whether it is an equally valuable character in the present case is a question which can be decided only by the study of more material at different stages of development. In no species of Placopsis does the medulla of the thallus react with iodine.

Symbiotic algae. -- Two kinds of algae live symbioti--cally with Placopsis-species: bright green (Pleurococ-

-coid) in the thallus, and blue-green (Cyanophyceous) in the cephalodia.

Those which occur in the thallus of all species of this genus are bright green and unicellular, corresponding to the type defined as Pleurococcus Näg. by Geitler (1938). They are rounded cells from 4 to 12μ in diameter, bounded by a colourless wall up to 1μ thick, and containing a green, parietal chromatophore adhering to the wall for its greater part. Sometimes a central pyrenoid is visible as a globose body about 2μ in diameter. The cells in--crease by transverse segmentation, never by internal sporulation as in Cystococcus.

The Cyanophyceous algae found in Placopsis-cephalodia belong to three types, probably identical with the genera Nostoc, Scytonema, and Stigonema, but which I prefer to call Nostocoid, Scytonemoid, and Stigonemoid respectively on account of the difficulty of referring such forms, much reduced by their mode of life, to the typically developed, free living genera. The Nostocoid type con--sists of small, rounded, blue-green cells not over 5μ in diameter, and arranged in chains; often these chains are much broken up in the cephalodium, so that the concatenate arrangement is not apparent. Very rarely a mucilaginous sheath surrounding the cells is visible; were it not for this, one might well regard the alga as an Anabaena, mem--bers of which genus occur in Azolla and in the root no--dules of Cycads. In the Scytonemoid type the cells are also singly united in chains, but are much larger (up to 12μ broad), and often strongly transversely flattened; their colour varies from blue-green to orange, and an investing, colourless slime-sheath is of not uncommon occurrence. Finally, there is the Stigonemoid type, in which a mucilaginous envelope is constantly present,

containing rounded or oblong, blue-green cells arranged in one or more rows side by side. In the section through a cephalodium shown in Fig. 3 the symbiotic algae are of this Stigonemoid type.

Some idea of the difficulties met with in attempting to classify reduced forms of Cyanophyceous algae as they occur in the body of the lichen may be obtained by reading Geitler's earlier account (1934). In one instance quoted by him, the symbiotic algae from Placynthium nig--rum, having very much of the appearance of the Scytone--moid chains described above as occurring in Placopsis-cephalodia, could on inspection in situ be referred to either Nostoc macrosporum or to one of the family Scyto--nemataceae. On culturing the organism, however, he found it to grow out into an entirely different form belonging to a distinct family (Rivulariaceae) !

Regarding recent views on the impracticability of using the nature of the symbiotic algae as a criterion in the classification of lichens, see p. 8 .

Ecology. -- Very little is known concerning the eco--logy of Placopsis-species in general, except that all (with the exception of P. isidiophora, which has been found on dead wood) are restricted to non-calcareous rocks or soil, and are not ornithocoprophilous; the remaining available data refer solely to the relatively common, northern hemisphere species P. gelida.

As explained in the following section, this species shows a marked peculiarity in its altitudinal distribu--tion, in that in the more southern and hyperoceanic part of its range in Europe it descends almost to sea-level. It may be found therefore in the company of either arctic or atlantic-temperate species, according to the climatic nature of the region where it occurs. Thus in the Arc-

-tic, in Spitsbergen, it is not uncommonly found growing together with Polyblastia Sommerfeltii Lynge (an exclusi--vely arctic species); in S. W. Sweden, on the island of Norra Skaftö, Degelius (1939) gathered it together with Stereocaulon pileatum, which is a subarctic-temperate species ranging from N. Norway (Tromsö) in the north to the northern borders of Italy in the south; and in Ire--land, Knowles (1929) found it with Pilophorus Cereolus, a species having much the same area of distribution as Stereocaulon pileatum and often confused with the latter, and Opegrapha zonata, a temperate species extending in latitude from southern Sweden to northern Italy.

My own observations on the ecology of this species were made in western Scotland (Argyll), where it is common in the vicinity of Loch Awe. In two cases I noted its occurrence on fairly large and even faces of rock, upon which I was able to mark out a given area and to estimate the relative degrees of population of the vari--ous species according to the phytosociological method used in Sweden and explained by Du Rietz (1932). In the other cases the substrata were so broken up (stone walls and moraines) that they did not lend themselves to a quantitative study of population. Although the two profiles observed are in themselves insufficient to throw much light on the question of relative constancy of the accompanying species, they are tabulated here in the hope that similar and directly comparable observations may eventually be forthcoming from other parts of this spec--ies' area. [Table on next page.]

	Species	Station I	Station II
Lichens	PLACOPSIS GELIDA	1	1
	Lecidea tumida[3)]	1	1 - 2
	Parmelia conspersa	-	2 - 3
	Parmelia fuliginosa	4	-
	Parmelia omphalodes	-	1
	Rhizocarpon obscuratum	-	1
	Stereocaulon evolutum	-	1
Bryophytes	Frullania fragilifolia	-	1
	Grimmia trichophylla	-	1
	Pterogonium gracile	-	1
	Rhacomitrium sudeticum	2	-

Station I: North Port Sonachan on Loch Awe, altit. circ. 35 m. s. m., on a gatepost of schis--tose rock by the roadside, about 15 m. from shore of lake. Surface investigated was facing S., and inclined at an angle of about 70° to the horizontal. Dry positi--on; moisture only from direct rainfall. A rectangle 60 × 40 cm. (= 24 $dm.^2$) was marked out on this surface.

Station II: North Port Sonachan on Loch Awe, altit. circ. 30 m. s. m., on large schistose rocks forming a low cliff at side of lake. Sur--face investigated facing S. E., and in--clined at an angle of about 30° to the horizontal; 3 m. above normal water level. Probably damp from trickling moisture in wet weather. A square with sides of 50

cm. (= 25 $dm.^2$) was marked out on this surface.

Signification of numerals (after Du Rietz, 1932): 1, up to 1/16 of area covered; 2, 1/16 - 1/8 of area covered; 3, 1/8 - 1/4 of area covered; 4, 1/4 - 1/2 of area covered.

Two other sociations may be mentioned here, although, as explained above, quantitative analyses were not possi--ble on account of the disjunct surface occupied by the synusiae:

Station III: North Port Sonachan on Loch Awe, altit. circ. 75 m. s. m., on a field wall of irregular, schistose blocks, about 100 m. away from shore of lake. Surface investigated was facing S., and almost vertical. Dry position; moisture only from direct rainfall. P. gelida in scattered patches on open faces of blocks (not in crevices). Accompanying species: Lecanora intricata (scattered patches), Lecidea fuscoatra (scattered patches), L. leucophaea (rare), L. macrocarpa (scat--tered patches), Ochrolechia tartarea (abundant), Parmelia omphalodes (abundant), P. physodes f. vitta--toides (common), P. saxatilis (abundant), Pertusaria corallina (common to abundant), Rhizocarpon Oederi (rare), Sphaerophorus globosus (common).

Station IV: North Port Sonachan on Loch Awe, altit. circ. 75 m. s. m., on small, rounded, schistose boulders forming a moraine in a field on the hillside, about 200 m. distant from shore of lake. Slope of moraine about 20° to the horizontal. Stones probably kept moist by trickling water after rain. P. gelida (f. neglecta) fairly common on exposed faces (not in crevices). Accompanying species: Lecidea lithophila (scattered patches), L. tumida (common), Stereocaulon coralloides

(common).

P. gelida is certainly a hygrophilous species; this fact was first noted by Withering (1812), who remarked that it occurs on "rocks in the Highland mountains, and on large stones, generally near water". In some circum--stances its tendency to seek moisture appears to be in--tensified, so that it may be regarded as a directly hy--drophilous species; thus Degelius (1939) mentions that on the island of Norra Skaftö it grows on rock sur--faces which are irrigated by trickling water (Sicker--wasserflächen), and Knowles (1929) records it on "damp shady rocks" in Ireland, stating that it may be found also on stones which are submerged for long periods on the shores of the Wicklow lakes. That this species shows the same peculiarity in the Arctic is seen from Zahlbruckner's remark on its occurrence in Novaya Zemlya (1928): "Lecanora gelida ist recht häufig auf den Steinen im Geröll am Fusze der Berge, besonders da, wo Wasser vorbeisickert". I have found it growing in quite dry situations, where water in the liquid state was ob--tainable only during and directly after rainfall (see the preceding paragraphs). Its constant proximity to water, however, impressed me in the field; it is useless to seek the species on open moors and mountainsides more than half a kilometer away from a torrent or a lake. Hence its hydrophily is obviously facultative, but its hygrophily certainly obligate.

P. gelida is not vague in the choice of its substratum, as many lichens are, but grows as a rule only on silice--ous rocks. Two irregular exceptions were seen by me in the case of specimens from Spitsbergen and Jan Mayen growing over tufts of moss.

Occasionally the thalli and more particularly the apo--thecial discs of Placopsis-species are damaged by ani-

-mals (slugs and snails). An interesting account of this ecological factor and its modifying effect on the morphology of various lichens are contained in a paper by Schade (1933). P. gelida does not seem to be much subject to such attacks, but some of the southern hemi--sphere species may be badly damaged, as in the instance of P. parellina f. semireagens, in the type specimen of which (from Tristan da Cunha) the upper cortex, in spite of its impregnation with the extremely bitter fumarproto--cetraric acid, had been almost entirely eroded, and appeared on casual inspection to be sorediate. The same type of erosion was seen in an indeterminable specimen from Chile in herb. Räsänen. Species with red apothecial discs seem to be particularly attractive to browsing gastropods, probably on account of the copious pink oil-droplets contained in the thecium; one sometimes finds specimens of P. parellina var. rhodocarpa with the apo--thecia entirely hollowed out, only the outer thalline cup being left.

Changes due to fungal parasites are discussed separate--ly (p. 166).

Distribution. -- As in all other groups of plants, the propagation of Placopsis-species takes place by means of diaspores, which according to the definition given by Sernander (1927), who introduced the term, consist of the reproductive germ or germs together with the accom--panying complex of organs which the plant may release for purposes of dissemination. Lichens being dual orga--nisms, their diaspores may be either simple (ascospores) or amphigenous, i. e., containing initials of both fungus and alga, in the form of isidia and soredia. All three types of diaspores are found in Placopsis.

Ascospores have been recorded for all species except

one, which is doubtful (P. Amabilis). The majority are entirely dependent upon ascospores for their propa--gation.

Degelius (1935) has drawn attention to the great importance of the amphigenous diaspores (isidia and sore--dia) in making possible quick, vegetative propagation in lichens, and it is of interest in the present connexion to note that the only two species of our genus in which soredia occur (P. gelida and P. parellina var. rhodocar--pa) are both characterised by a remarkably wide distri--bution in the northern and southern hemispheres respec--tively. None of the other, non-sorediate and non-isi--diate species colonises such large areas, and this is a very striking demonstration of the effectiveness of sore--dia in the dispersal of crustaceous species.

Isidia occur in four species of Placopsis (cribellans, isidiophora, papillosa, and the f. subcribellans of P. parellina var. carnea). In the first of these the isi--dial tubercles are apparently very easily detached, leaving the characteristic pock-like pittings ("cribella--tions") in the surface of the thallus, and probably as a result of this peculiarity the species in question has spread over a very wide area in both hemispheres of the globe (see Map 2). In the other three the isidia are firmly attached to the thallus, and this is perhaps the cause of their comparatively restricted distribution (Java and the Philippines; Fuegia and New Zealand).

A fourth method of propagation, that effected by frag--mentation of the thallus, is an important factor in the dispersal of many fruticose and foliose lichens, but for purely mechanical reasons can hardly play a significant role in crustaceous genera such as Placopsis.

Of the three species mentioned above as having a par-

-ticularly wide range of distribution, two, P. gelida and P. parellina (var. rhodocarpa), are extremely variable, their variability probably indicating incipient specia--tion. The third species, P. cribellans, however, shows entire morphological uniformity throughout the whole of its range (the f. tuberculifera not being a variation of any importance). Hence it is clear that wide distribu--tion, with the accompanying differences in climatic and edaphic conditions, does not necessarily imply a high degree of morphological variability.

Considerable interest has been focussed on the problem presented by plants having bipolar distribution. Epizoic dispersal on the plumage of migrating birds may account for this in cases where the diaspores are very small or are provided with clinging appendages, but gradual disper--sal overland is assumed also to have played a significant role. Du Rietz, who has made a study of this phenomenon in the lichens (1926, 1929) considers that land migra--tion from one hemisphere to the other may have been along two possible routes: along the high Andean mountain chain of S. America, and via the mountainous regions of S. E. Asia to Australia and New Zealand. The former route is a very likely one so far as Placopsis is concerned, for we know that the genus occurs in the Andes at least as far north as Bolivia (P. parellina var. rhodocarpa), and again in the Mexican highlands (P. Amabilis); possibly further collections will link up these occurrences with the N. American area of P. gelida (southwards as far as Oregon). The second route, that from N. Asia via the Himalayas, cannot have been used by Placo--psis on account of the inabili--ty of this genus to colonise continental regions (see p. 40). Du

Rietz was led to consider the possibility of the S. E. Asiatic route through finding in New Zealand certain li-chens, e. g., Solorina crocea, which are widely distri-buted in the northern hemisphere but apparently lacking altogether in S. America. So far as is known at present, the same holds good for Placopsis gelida,[4] and thus it does not seem necessary to postulate migration over S. E. Asia for species occurring in the northern hemisphere and New Zealand, but not in S. America. Further collections in the Magellan Straits region (such as that being made at the time of writing this by Dr. R. Santesson on the Swedish Magallanic Expedition) will probably prove that a good many of the species in question occur there also. Steffen (1939), who has developed an interesting hypo-thesis according to which plant migration between the hemispheres has been facilitated by displacement of the poles and consequently of the equatorial zone in Tertiary times, also considers the S. American path of dispersal to be the most probable. A third route between the hemi-spheres, and one almost certainly used by P. cribellans, is that along the coasts of the Pacific Ocean (see Map 2).

Du Rietz (1929), assuming the truth of the hypothesis that a genus has originated in the region of its present greatest differentiation, came to the conclusion that certain preponderantly southern hemisphere genera such as Sphaerophorus and Neuropogon might be regarded as having originated there and subsequently spread into the north-ern hemisphere. This view that a concentration of closely related forms in a particular region indicates that the group in question originated there is shared by Steffen (1939), who considers that such mainly southern hemisphere genera as Empetrum, Deschampsia, and Acaena may on these grounds be said to have had their original

homes in the subantarctic zone. Placopsis is a good example of such a southern group, which, if this hypothe-sis corresponds to fact, has succeeded in introducing its representatives into the northern hemisphere by two diffe-rent routes.

The following analysis of the distribution of all Pla-copsis-species is constructed on the lines of a key in order to make reference easier. It is of course only provisional, and alterations will be necessary as further material is collected and new distributional records come to light.

1. Species occurring in the northern hemisphere.
   2. Widely distributed in arctic and temperate oceanic Europe and N. America south to about 45° N. lat.; New Zealand; a variety in the Canary Islands and a chemically distinct form in Chile and Juan Fernan-dez . . . . . P. gelida (p. 136).
   2a. Confined to the Pacific coastline in the northern hemisphere: Alaska, Aleutian Islands, Japan, Korea, Formosa; New Zealand; Juan Fernandez; Galapagos Islands; [Tristan da Cunha[5]] . . P. cribellans (p. 70).
   2b. Mexico . . . . . P. Amabilis (p. 163).
   2c. Formosa . . . . . P. Asahinae (p. 90).
   2d. Philippine Islands; Java . . P. isidiophora (p. 77) and P. papillosa (p. 75).

1a. Species restricted to the southern hemisphere.
   3. Distribution bicentric, i. e., in both the S. Ameri-can and the Australian sectors of the tropical, temperate, or subantarctic zones[5] . . P. bicolor (p. 82), P. parellina (vars. rhodocarpa, micro-phylla, and carnea)(p. 106-119), P. perrugosa (p. 94), P. rhodophthalma (p. 121), and P. rugosa (p. 102).

3a. Distribution not bicentric.

4. Restricted to the S. American sector.[5)]

5. Temperate or subantarctic . . P. baculigera (p. 79), P. chilena (p. 61), P. effusa (p. 159), P. fuscidula (p. 131), P. parellina (typica and f. semireagens) (p. 106 & 119), P. patagonica (p. 65), P. pycnotheca (p. 87), P. Räsänenii (p. 104), P. stenophylla (p. 68), and P. terricola (p. 59).

5a. Antarctic . . . . P. contortuplicata (p. 99).

4a. Restricted to the Australian sector.[5)]

6. In tropical zone . . . . P. albida (p. 85).

6a. In temperate or subantarctic zone . . P. amp--liata (p. 127), P. brachyloba (p. 63), P. illita (p. 161), P. kerguelensis (p. 129), P. Lesdainii (p. 92), P. (Aspiciliopsis) mac--rophthalma (p. 55), P. subgelida (p. 125), and P. subparellina (p. 57).

It is a well known fact that a phytogeographical link exists between the S. American and the Australian sectors of the Subantarctic. Skottsberg (1915) has published a list of phanerogams of this bicentric type, and it is interesting to observe that several of the cases there mentioned can be matched almost exactly by the distribu--tion of some of the bicentric Placopsis-species listed above (see Map 1). The range of P. parellina var. microphylla, for example, is identical with that of Gera--nium sessiliflorum (S. America south to Fuegia; New Zealand; Tasmania). From the agreement thus shown it can be seen that lichens in their distribution are subject to the same influences as are the higher plants, and as phytogeographical indicators are not less valuable than

the latter. In some instances they may be even more so, as for example in deserts and polar regions where higher vegetation is almost or completely absent.

Placopsis as a genus is oceanic in its distribution. This can best be seen by comparing the range of the various species with the chart prepared by Rosenkranz (1936) showing the regions of equal "Ozeanitätsindex" throughout the world. This "Ozeanitätsindex" is the product of a formula in which rainfall, humidity, and temperature are the factors under consideration. Expressed in the terms of this formula, regions of very low oceanity have an index up to 25, those of moderate oceanity from 25 to 50, and those of high oceanity from 50 to 200. Tracing the distribution of the various Placopsis-species on this map, we find that they are conspicuously absent from the continental regions of the world in which the index of oceanity is 25 or lower.

The distribution of P. gelida in Europe (Map 3) is distinctly oceanic. In the distributional classification of oceanic plants given by Degelius (1935) it appears to come into the second, less extremely oceanic group, and in this group is intermediate between the "northern suboceanic element" and the "northern central European suboceanic element" of Degelius. It appears to find optimal conditions in the colder temperate and arctic regions. In the southern part of its range it occurs at higher altitudes in the few continental stations known, but in hyperoceanic western Europe, notably in S. W. Ireland, it is found down to sea level (Knowles, 1929). The same phenomenon has been observed with arctic-alpine phanerogams; Praeger (1934) cites as examples such species as Sedum roseum, Galium boreale, and Juniperus sibirica, which in the southwesternmost part of Ireland all descend

to within 20 m. of sea level.

It seems fairly clear that P. gelida may be classed with the group called by Hultén (1937) "Atlantic-Paci--fic plants". These are arctic circumpolar plants which are oceanic and have spread southwards along the coasts of the Pacific and Atlantic oceans. Leaving aside for the moment the question of whether P. gelida has spread north from the subantarctic regions or south from the Arctic, the known distribution of this species in the northern hemisphere corresponds very closely to the area indicated for this group by Hultén on Pl. 15 of his work. The same comparison leads one also to recall the apparent absence of P. gelida from the more eastern tracts of the Siberian Arctic, a fact which is rather surprising in view of its abundance in Novaya Zemlya. Several compre--hensive lichen collections have been made on the arctic coast in the Taimir region, but as far as I know P. gelida has never been collected there. One is led to assume that if it does occur in the Siberian eastern Arctic it must be rare there. Hultén quotes the case of two pha--nerogams the circumpolar distribution of which is broken in N. E. Siberia: Honckenya peploides and Mertensia maritima. They are supposed to have been exterminated in that region by the ice during the Glacial Epoch, and been unable subsequently to fill in the gap thus caused in their distributional area.

The altitudinal distribution of Placopsis-species is very imperfectly known at present. P. gelida in western Europe occurs indiscriminately at sea level and at higher altitudes, as in Britain, where it ascends to about 1340 m. (Ben Nevis, coll. Lauder Lindsay). The continental finds are for the most part from heights of some 1000 m. or over; the highest known record is that of 1900 m. from the German Ostmark, Schladmingertauern,

coll. Frey. The greatest altitude known to be reached by any species of Placopsis is 3100 m. (P. parellina var. rhodocarpa in the Bolivian Andes).

Technique of examination. -- Before using the key on p. 47 to determine the identity of a specimen of Placopsis, the following data additional to those apparent on super--ficial examination must be obtained: the chemical con--stitution of the thallus (presence or absence of fumar--protocetraric acid); the height of the thecium; and the size and shape of the spores. In certain cases other microscopic characters, such as the structure of the ex--cipulum or the form of the pycnoconidia, must be taken into account.

The presence or absence of fumarprotocetraric acid is determined by Asahina's diamine test (see p. 26). The paraphenylenediamine solution is prepared by dissolving 0.1 gm. of the pure crystalline substance in 5 c.c. of absolute alcohol; it decomposes rapidly, and for this reason should not be kept for longer than a few hours. With a sharp scalpel or razor blade a small cut is made in the thallus to expose the medulla, and a droplet of the solution applied on the end of a fine glass rod. If fumarprotocetraric acid is present, an intense yellow colour rapidly deepening to miniate- or vermilion-red instantaneously results.

For the determination of the height of the thecium it is necessary to cut a thin vertical section through a mature apothecium. This is best done by inserting the detached apothecium sideways into a cleft stick of Sam--bucus pith which has been kept in alcohol until thorough--ly impregnated, and cutting thin sections with a razor blade under a dissecting microscope or with the aid of a watchmaker's eyeglass. Satisfactory sections are removed

from the razor (which is kept constantly moistened with alcohol) by means of a fine hair brush, and deposited in a drop of water or mounting fluid on a glass slide. The measurements given in the following taxonomic account were made on material mounted in water; if it is desired to make permanent preparations of the sections, they can be transferred from water or spirit to a chloral hydrate medium made up according to the following formula:

Chloral hydrate	50 gm.
Gum arabic	25 gm.
Glycerine	20 gm.
Distilled water	50 c.c.

The gum arabic should be suspended in the solution in a muslin bag, and left for several days to become completely dissolved; if put directly into the liquid it would hard--ly dissolve at all. This medium, which is suitable only for unstained sections, dries quickly, requires no ring--ing, and appears to be reasonably permanent.

From thin sections obtained as described above the height of the thecium can be accurately measured, and the structure of the hypothecium and excipular layer also stu--died. By pressing on the cover slip the thecium can then be disintegrated, allowing the individual paraphyses to be observed, and causing the mature spores to be erup--ted from the asci. As the size and shape of the spores is an important character in classification, it is abso--lutely necessary to measure only those which are mature and floating freely in the medium. Measurement of imma--ture spores inside the ascus invariably gives rise to wrong and misleading results.

The reaction of the ascus-walls with iodine solution may sometimes be useful as a slight confirmatory test. The solution (iodine, 0.06 gm.; potassium iodide, 0.20

gm.; distilled water, 14 c.c.) is drawn under the cover slip on an aqueous preparation by placing a fragment of blotting paper on the opposite side.

List of herbaria consulted. -- Material in the herba--ria of the following institutions was examined:[6)]

Sectio Botanica Musei Nationalis Hungarici, Budapest (BP.); Farlow Herbarium, Cambridge, Mass. (FH.); Royal Botanic Garden, Edinburgh (E.); Institute de Botanique systématique de l'Université de Genève, Geneva (G.); Botaniska Trädgård, Göteborg (GB.); Helsingin Yliopiston Kasvitieteellinen Laitos, Helsinki (H.); Royal Botanic Gardens, Kew (K.); Rijksherbarium, Leiden (L.); British Museum (Natural History), London (BM.); Botanische Anstalten, München (M.); Universitetets Botaniske Museum, Oslo (O.); Laboratoire de Cryptogamie, Muséum d' Histoire Naturelle, Paris (PC.); Missouri Botanical Garden, St. Louis, Mo. (MO.); Naturhistoriska Riksmuseet, Bot. Avd., Stock--holm (S.); Turun Yliopiston Kasvitieteellinen Laitos, Turku (TUR.); Botanical Department, Dominion Museum, Wellington, New Zealand (WELT.); Botanische Abteilung des Naturhistorischen Museums, Wien (W.).

The following colleagues also placed their private collections at my disposal:

Prof. Y. Asahina, Tokyo (Asah.); Dr. Bouly de Les--dain, Dunkerque (B. de Lesd.); Dr. H. des Abbayes, Rennes (des Abb.); Dr. Ed. Frey, Bern (Frey); Dr. E. W. Jones, Oxford (Jones); Dr. V. Räsänen, Kurkijoki (Räs.); Dr. K. Redinger, Berlin (Redgr.); Dr. Ö. Szatala, Budapest (Szat.); Dr. W. Watson, Taunton (Wats.); Mr. E. C. Wallace, Sutton (Wallace).

Acknowledgments. -- I must firstly express my grati--tude to the Trustees of the British Museum (Natural

History) for a grant of money and special leave whereby I was enabled to visit Finland and to study the Placopsis-material in the herbaria of the Universities of Helsinki and Turku. To the authorities of the above-mentioned institutes I am grateful for the kindness with which they placed all necessary facilities at my disposal. I should also like to place on record my cordial thanks to all colleagues and directors of institutes mentioned in the foregoing list for the loan of specimens out of their herbaria. Mr. W. R. Sherrin, of the British Museum (Natural History), kindly determined the bryophytes mentioned in the ecological section. The distribution of P. gelida in Europe (Map 3) is plotted on an outline map supplied by Messrs. Stanford, London.

SYSTEMATIC ACCOUNT

Synonymy, generic description, and conspectus of sections. --

PLACOPSIS Nyl. in Ann. Sci. nat., Bot., sér. 4, XV, p. 376 (1861) emend. Nyl. apud Cromb. in J. Bot., Lond. XV, p. 106 (1877). Vain. in Ann. Acad. Sci. fenn. ser. A, XIX, no. 15, p. 36 (1923).

Synon. -- Lecanora subgen. Placopsis Nyl. in J. linn. Soc. Lond., Bot. IX, p. 251, footnote (1865); apud Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 58 (1891). Cromb. Mon. Lich. Brit. I, p. 355 (1894). Harm. in Bull. Soc. Sci. Nancy, sér. II, XV, fasc. xxxii, p. 200 (1898).

Generic description. -- Thallus crustaceus, superne modo corticatus, effiguratus effususve, areolatus vel rimosus vel continuus, laevigatus vel verrucosus vel verruculosus, vulgo albescens aut flori lactis concolor,

algas Pleurococcoideas continens; cephalodiatus, cepha--lodiis sessilibus vel (in sect. Aspiciliopsis) thallo immersis, discoideis subglobosisve, effiguratis vel irregulariter plicatis, continuis rimosisve, carneis vel rufescentibus vel rufofuscis. Apothecia sessilia aut (in sect. Aspiciliopsis) thallo immersa, discoidea, lecanorina, margine thallino ac proprio necnon disco munita varie colorato. Excipulum integrum dimidiatumve; hypothecium incoloratum (raro in medio rufescens); paraphyses discretae; asci elongato-cylindrici, cylindri--co-clavati, vel clavati; sporae in asco uniseriatae vel subbiseriatae, simplices, ellipsoideae vel elongato-ellipsoideae vel subfusiformae. Pycnidia thallo immersa, perifulcrio incolorato, integro contortove; fulcra exobasidialia; pycnoconidia filiformia (raro bacillaria), leviter curvata rectave.

Genolectotype of the genus:[7)] P. gelida.

The following two sections are distinguished:

1. Sect. Aspiciliopsis (Müll. Arg.) M. Lamb, comb. nov.

Synon. -- Placodium sect. Aspiciliopsis Müll. Arg. in Bot. Jb. V, p. 135 (1884). Lecanora sect. Aspiciliop--sis Zahlbr. apud Engler & Prantl, Nat. Pflanzenfam. I. Teil, Abt. 1*, p. 203 (1907). Aspiciliopsis B. de Lesd. in Ann. Cryptog. exot. IV, p. 101 (1931). Apothecia thallo immersa. -- Holotype of the section: P. macrophthalma.

2. Sect. Euplacopsis M. Lamb, sect. nov.

Synon. -- Placopsis Nyl. in Ann. Sci. nat., Bot. sér. 4, XV, p. 376 (1861). Lecanora sect. Placopsis Zahlbr. apud Engler & Prantl, Nat. Pflanzenfam. I. Teil, Abt. 1*, p. 202 (1907). Placodium sect. Placopsis Müll. Arg. in Bot. Jb. V, p. 135 (1884).

Apothecia supra thallum elevata. -- Holotype of the section: P. gelida.

Obs. -- Nylander's original description of the genus Placopsis was in the sense of my sect. Euplacopsis, and his circumscription remained thus until 1877, when (apud Crombie in J. Bot., Lond. XV, p. 106) he extended it to cover also P. macrophthalma.

Key to all known species (Clavis specierum omnium generis Placopseos hactenus cognitarum). --

1. Apothecia persistenter in thallo immersa, aspicilioi--dea (sect. Aspiciliopsis) . . P. macrophthalma (p.55)

1a. Apothecia supra thallum sessilia (sect. Euplacopsis).

2. Medulla Pd + flavescens deinque + celeriter minia--to- vel aurantiaco-rubescens.[8]

3. Sporae elongato-subfusiformae (ratione longit./ latit. circa 3.0 - 3.3) . . P. subparellina (p.57)

3a. Sporae ellipsoideae (ratione longit./latit. circa 1.7 - 2.0).

4. Thallus crassus, tartareus, verrucosus, ad peripheriam haud vel obsolete effiguratus.

5. Thallus in centro verrucosus, haud areolatus . . . . P. terricola (p. 59).

5a. Thallus in centro verrucoso-areolatus . . . . . P. chilena (p. 61).

4a. Thallus modice incrassatus vel subtenuis, in centro areolatus rimosusve, haud verrucosus, ad peripheriam plus minusve distincte effigu--ratus.

6. Apothecia primitus hemisphaerico-tumida, basi haud constricta, pertusarioidea, deinde plana discoideaque evadentia; laciniis

marginalibus brevissimis . . P. brachyloba
(p. 63)

6a. Apothecia ab initio plus minusve deplanata discoideaque.

7. Extremitates laciniarum ad peripheriam obscuriores (olivaceo-fuscescentes); thecium 175 - 225μ altum . . P. patagonica
(p. 65)

7a. Laciniae ad extremitates haud obscuratae; thecium ad 165μ altum.

8. Laciniae ad peripheriam eximie applanatae, substratum arctissime obducentes . . . . . P. stenophylla (p. 68)

8a. Laciniae ad peripheriam substrato plus minusve laxe affixae, leviter convexius-culae . . P. gelida var. subreagens
(p. 157)

2a. Medulla Pd - .

9. Thallus isidiatus[9] vel isidiis attritis quasi cicatricibus variolarum insignis.

10. Sporae 12.0 - 16.5 × 6 - 8μ; thecium 90 - 150μ altum . . . . . P. cribellans (p. 70)

10a. Sporae crassitie 8μ excedentes.

11. Isidia sparsa; sporae ad 18μ longae . . . . P. parellina var. carnea f. subcribellans
(p. 119)

11a. Isidia crebra; sporae 18 - 21μ longae.

12. Disci apotheciorum nigrescentes; thecium 120 - 180μ altum . . P. papillosa (p. 75)

12a. Disci apotheciorum fusco-carnei (tantum degeneratione nigrescentes); thecium 185 - 285μ altum . . P. isidiophora (p. 77)

9a. Thallus haud isidiatus.

13. Thallus saltem pro parte ferrugineo- vel flavo-oxydatus.

14. Thecium 240 - 285μ altum; pycnoconidia baculiformia, 6 - 10μ longa . . P. baculigera (p. 79)

14a. Thecium 165 - 240μ altum; pycnoconidia filiformia, plerumque arcuata, 18 - 24μ longa . . . . P. bicolor (p. 82)

13a. Thallus nulla parte oxydatus.[10]

15. Thallus omnino microphyllinus, i. e. omnibus partibus e squamulis constans contiguis vel plus minusve dispersis, adnatis, rotundatis elongatisve, interdum crenatis.[11]

16. Thallus sorediatus . . P. parellina var. microphylla (p. 109)

16a. Thallus haud sorediatus . . P. albida (p. 85)

15a. Thallus crustosus, nunquam microphyllinus.

17. Thallus in centro omnino verrucosus vel rugoso-verruculosus, continuus rimosusve.

18. Sporae elongato-ellipsoideae vel subfu--siformae (ratione longit./latit. circa 2.6 - 3.0).

19. Apotheciorum disci rufofusci, modo aetate fuscescentes vel fusconigres--centes; pars basalis excipuli eximie solida, ad 300μ crassa . . P. pycno--theca (p. 87)

19a. Apotheciorum disci ab initio nigres--centes vel fusconigrescentes; pars basalis excipuli haud insigniter in--crassata, ad circa 100μ crassa . . . . . P. Asahinae (p. 90)

18a. Sporae ellipsoideae (ratione longit./

latit. 2.5 non excedente).

20. Apothecia parva, ad 0.8 mm. diam.; excipulum dimidiatum, i. e. infra deficiens . . . P. Lesdainii (p. 92)

20a. Apothecia majora; excipulum paraplec-
-tenchymaticum infra evolutum.

21. Thallus in centro papillato-verrucu-
-losus vel contortuplicato-verruco-
-sus.

22. Thecium 114 - 200μ altum.

23. Thallus in centro papillato-ver-
-ruculosus; laciniae ad peri-
-pheriam discretae et pterygoi-
-deo-expansae; apothecia ad 1.5 mm. diam., margine thallino per-
-sistenter prominulo . . P. per-
-rugosa (p. 94)

23a. Thallus in centro contortupli-
-cato-verrucosus; laciniae ad peripheriam connatae vel modo leviter expansae; apothecia ad 2.5 (- 3.5) mm. diam., margine thallino cito depresso excluso-
-que . . P. contortuplicata (p. 99)

22a. Thecium 200 - 240μ altum; laciniae ad peripheriam discretae . . P. rugosa (p. 102)

21a. Thallus in centro irregulariter plicato-verruculosus, continuus vel rimosus vel areolatus.

24. Sporae ad 20μ longae.

25. Laciniae ad peripheriam connexae; thallus in centro rimoso-areola-

-tus, areolis verruculosis . . .
. . P. Räsänenii (p. 104)

25a. Laciniae ad peripheriam discretae vel interdum deficientes; thallus in centro continuus vel irregula-
-riter rimosus, haud rite areo-
-latus.

26. Thallus grosse et inaequaliter verrucosus, verrucis 0.8 - 2.0 mm. diam. . P. terricola (p. 59)

26a. Thallus tenuiter verruculosus, verruculis ad 0.5 mm. diam. . . P. parellina var. rhodocarpa (p. 110)

24a. Sporae majores, 20 - 28μ longae.

27. Thecium (150 -) 170 - 240μ altum.

28. Sporae 21 - 28 × 12 - 14μ; thal-
-lus nunquam sorediosus . . .
. . P. parellina (p. 106)

28a. Sporae 18 - 21 (- 24) × 9 - 11 (- 12)μ; thallus saepe so-
-rediosus . . P. parellina var. rhodocarpa (p. 110)

27a. Thecium 210 - 310μ altum; sporae 20 - 25 × 10.5 - 18.0μ . . . P. rhodophthalma (p. 121)

17a. Thallus in centro plus minusve laevigatus, nec verrucosus nec rugoso-verruculosus; continuus vel rimosus vel areolatus.

29. Sporae 25.5 - 30.0 × 12 - 21μ; thecium 285 - 320μ altum . . P. subgelida (p. 125)

29a. Sporae ad 25μ, raro ad 27μ longae.

30. Sporae elongato-ellipsoideae vel sub--fusiformae, 16 - 18 × 6 - 7μ (ratione longit./latit. circa 2.6 - 2.8) . . . . . P. Asahinae (p. 90)

30a. Sporae ellipsoideae (ratione longit./ latit. circa 1.5 - 2.2).

31. Apothecia infra haud constricta, ibi ampliora, hanc ob rem quasi pertusa--rioidea apparentia.

32. Laciniae ad peripheriam brevissimae (longitudine 1 mm. haud excedentes); thallus in centro areolatus, areolis planis vel leviter convexis; apothecia denique discoidea basique constricta evadentia; disci apotheciorum carneo-fuscescentes . . P. brachyloba (p. 63)

32a. Laciniae ad peripheriam bene evolutae (1 - 4 mm. longae); thallus in centro rimosus vel obsolete areolatus; apothecia basi persistenter expansa; disci apothecio--rum roseo-rubescentes . . . . . P. ampliata (p. 127)

31a. Apothecia basi bene constricta, discoidea.

33. Thallus bene areolatus.[12)]

34. Apotheciorum disci obscure pur--purascentes; thecium 195 - 245 μ altum; sporae 17.5 - 18.5 × 9 - 10μ . . P. kerguelensis (p. 129)

34a. Apotheciorum disci roseo-rubes-
-centes, carnei, rufofusci vel
fusci, haud purpurascentes.
35. Laciniae ad peripheriam bene
evolutae.
36. Thallus fuscidulus, sub lente
albopruinosus, haud sorediа-
-tus; thecium 140 - 210μ
altum; sporae 18.5 - 22.5 ×
10 - 12μ . . P. fuscidula
(p. 131)
36a. Thallus albidus, olivaceo-
albidus, flori lactis con-
-color, vel sordide alutace-
-us, fere semper epruinosus,
saepissime sorediatus.
37. Thecium (105 -) 114 - 165
(- 183)μ altum; hypothe-
-cium incoloratum . . . .
. . P. gelida (p. 136)
37a. Thecium 180 - 225μ altum;
hypothecium in medio rufo-
-fuscum . . P. gelida var.
canariensis (p. 156)
35a. Thallus ad peripheriam haud
laciniatus; thecium 140 -
165μ altum; sporae 17.5 -
21.0 × 9.0 - 12.5μ . . . . . .
. . . P. effusa (p. 159)
33a. Thallus continuus vel rimosus, sed
haud rite areolatus.
38. Thecium 80 - 140μ altum; thal-
-lus ad peripheriam haud vel
parum laciniatus, saepe hypotha-

-llo nigricante cinctus . . .
. . . P. illita (p. 161)

38a. Thecium altitudine 150μ excedens.

39. Apotheciorum disci obscure pur--purascentes; thecium 195 - 245μ altum; sporae 17.5 - 18.5 × 9 - 10μ . . P. kerguelen--sis (p. 129)

39a. Apotheciorum disci roseo-rubes--centes, carnei vel rufofusci, haud purpurascentes.

40. Thecium (150 -) 170 - 240μ altum.

41. Sporae 21 - 28 × 12 - 14μ; thallus esorediatus . . . . P. parellina (p. 106)

41a. Sporae minores.

42. Thallus nunquam sorediа--tus; sporae (15 -) 16.0 - 18.5 × (7.5 -) 9 - 11μ . . P. parellina var. carnea (p. 117)

42a. Thallus saepe sorediatus; sporae (17 -) 18 - 24 × 8 - 14μ . . P. parellina var. rhodocarpa (p. 110)

40a. Thecium 210 - 310μ altum; sporae 20 - 25 (- 27) × 10.5 - 18.0μ . . P. rhodoph--thalma (p. 121)

Description of the species, varieties, and forms. --

Sect. 1. ASPICILIOPSIS (Müll. Arg.) M. Lamb

1. PLACOPSIS MACROPHTHALMA (Tayl.) Nyl. apud Cromb. in J. Bot., Lond. XV, p. 106 (1877), cum descript.

Synon. -- Urceolaria macrophthalma Tayl. in Lond. J. Bot. III, p. 640 (1844), cum descript. Lecanora mac--rophthalma Nyl. in Mém. Soc. nat. Sci. Cherbourg, V, p. 336 (1857), in Flora, Regensburg, XLI, p. 499 (1858), in ibid. LXIX, p. 320 (1886), cum descript.; Tuckerm. in Bull. Torrey bot. Cl. VI, p. 58 (1875), cum descript.; Cromb. in J. linn. Soc. Lond., Bot. XV, p. 185 (1876); Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Zahlbr. in Deutsch. Südpolar-Exped. 1901 - 3, VIII, p. 48 (1906), Cat. Lich. Univ. V, p. 670 (1928). Placodium macrophthalmum Müll. Arg. in Bot. Jb. V, p. 135 (1884), Flechten in Forschungsreise S.M.S. "Gazelle", IV. Teil, p. 10 (1889), cum descript.; F. Wils. in Mém. Herb. Boissier, no. 18B, p. 87 (1900). Aspiciliopsis macrophtalma [sic] B. de Lesd. in Ann. Cryptog. exot. IV, p. 101 (1931).

Descr. -- Thallus determinatus, substrato arcte adna--tus, ad peripheriam laciniatus, in centro rimosus sed haud areolatus, 0.15 - 0.50 mm. crassus, sordide albidus vel flori lactis concolor, nec nitidus nec pruinosus, extus intusque KHO + sordide flavescens vel fuscescens, $CaCl_2O_2$ + roseo-rubescens, Pd + leviter roseo-carneus vel - , superficie laevigatus, rimis numerosis 0.05 - 0.10 mm. latis abrupte incisus. Laciniae marginales adnatae, planae, apice rotundatae, breves, 0.6 - 1.5 mm. latae, rimis separatae angustissimis vel indistinctis. Hypo--thallus nullus visibilis; isidia ac soredia desunt. -- Cephalodia i n t h a l l o i m m e r s a (i n n a t a) sordide sublutescentia vel leviter roseola, irregulariter rimosa, marginibus in thallum sensim abeuntia, a thallo tantum colore paulum obscuriore secernenda. -- Apothecia

in parte centrali thalli numerosa, o m n i n o i m m e r--s a (aspicilioidea), 1.0 - 1.5 mm. diam., margine thallino irregulariter abrupteque circumscisso, haud pro--minenti; margine proprio interdum visibili, angusto, thallo subconcolori; disco plano vel leviter concavo, thallum aequanti, obscure rufofusco, haud nitido nec prui--noso. Excipulum inferne leviter sordideque flavo-fus--cescens, paraplectenchymaticum; hypothecium incoloratum; thecium 195 - 300μ altum, superne nubilatum, ceterum in--coloratum. Paraphyses apice haud incrassatae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 22.5 - 26.0 × 14 - 16μ.

Icon. -- Pl. 4, fig. 16 (syntype specimen ex herb. Churchill Babington).

Hab. -- Rocks.

Distr. -- Apparently endemic to the islands of Kergu--elen and St. Paul in the southern Indian Ocean.

KERGUELEN. Exact locality not stated, coll. J. D. Hooker (syntype) (fert.) (H., BM.); Christmas Har--bour, coll. R. M'Cormick, 1840 (fert.) (BM.); Christ--mas Harbour, "on hills 1 - 700 ft.", coll. ? (fert.) (BM.); Swain's Bay, coll. A. Eaton (Venus Transit Exped.) (fert.) (H.).

ST. PAUL. "Sommet de l'ile", coll. Vélain (Expéd. astron. St.-Paul et Amsterdam, 1874 - 5) (ster.) (H.).

Obs. 1. -- In the British Museum syntype specimen, no visible hypothallus is present; thallus not corticate, the upper surface being formed of nubilated, closely ad--nate, vertically parallel, thin-walled hyphae 2 - 3μ thick, forming a layer 60 - 75μ deep; medulla nubilated, compact, of irregularly intertexted, thin-walled hyphae 3.5 - 5.0μ thick. Symbiotic algae 4 - 7μ diam., forming an interrupted stratum 180 - 215μ deep. Cephalodia with an upper, ± nubilated cortex 45 - 60μ deep, formed of ± isodiametric, thin-walled cells 3 - 6μ diam.; medullary tissue colourless, of conglutinated hyphae 4 - 6μ thick

running in various directions; symbiotic algae Scytone--moid, forming nests in the medullary tissue. Excipulum entire below hypothecium, pallid yellow-brown in section, composed of ± isodiametric, angular cells 4.5 - 6.0μ diam. with walls up to 1μ thick; hypothecium about 90μ deep, colourless or faintly nubilated, of densely compac--ted hyphae up to 2μ thick running in various directions. Paraphyses often submoniliform at tips, septate, with septa 5 - 12μ apart; asci cylindric-clavate, 150 - 200 × 14 - 27μ, with walls 1.5 - 3.0μ thick at sides, not thick--er at apex, persistently blue with iodine. [No pycni--dia seen; pycnoconidia, according to a drawing and manu--script note by Nylander with the Swain's Bay specimen (no. 23866 in herb. Nyl.), filiform, arcuate, 26 - 36 × 0.5μ; see also Obs. 3 below.]

Obs. 2. -- This species, occupying a section by itself, is analogous to the section Aspicilia of Lecanora.

Obs. 3. -- Zahlbruckner, apud Engler & Prantl, Nat. Pflanzenfam. I. Teil, Abt. 1*, p. 203 (1907), states that the pycnoconidia of this species are up to 60μ in length.

Sect. 2. EUPLACOPSIS M. Lamb

2. PLACOPSIS SUBPARELLINA Nyl.

apud Stizenb. in Flora, Marburg, LXXII, p. 367 (1889), cum descript., Lich. Ins. Guineens. p. 45 (1889), cum descript.

Synon. -- Lecanora subparellina Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Zahlbr. Cat. Lich. Univ. V, p. 670 (1928).

Descr. -- Thallus effusus, ut videtur indeterminatus, c o n t i n u u s, v e r r u c o s u s, leviter inae--qualis, 0.2 - 0.9 mm. crassus, glauco-albidus, eburneus, vel flori lactis concolor, opacus, epruinosus, extus in--tusque KHO + flavescens, $CaCl_2O_2$ + roseo-rubescens, Pd + m i n i a t o - r u b e s c e n s (superficie nonnun--quam maculatim reagens); verrucis thallinis subhemi--sphaericis aut varie tumidis, 0.3 - 1.0 mm. diam. Thal--lus isidiis carens atque sorediis; hypothallus nullus.--

Cephalodia sparsa, sessilia, arcte adpressa, formam valde irregularia, varie lobata plicataque, interdum leviter rimosa, 0.5 - 1.0 mm. lata, ad 0.4 mm. crassa, obscure flavido-carnea, opaca. -- Apothecia thallo supersparsa, sessilia, basi modice beneve constricta, discoidea, 1.0 - 2.5 (- 3.0) mm. diam.; margine thallino mediocri, pro--minenti, integro, tumido, opaco, saepe tenuissime albido--pruinoso, demum fere excluso; margine proprio in apothe--ciis majoribus evoluto, parum prominenti, integro, rufo--fusco, epruinoso; disco obscure rufofusco, plano vel leviter concavo, a l b i d o p r u i n o s o, aetate vulgo fissuris fracto. Excipulum sub hypothecio conti--nuum, circa 150μ crassum, paraplectenchymaticum, nubila--tum; hypothecium incoloratum; thecium 120 - 165μ altum, sursum nubilatum, ceterum hyalinum. Paraphyses apicibus haud vel parum incrassatae. Sporae 8nae, in asco biseri--atae, e l o n g a t o - e l l i p s o i d e a e a u t e l l i p s o i d e o - f u s i f o r m a e, (15 -) 17 - 21 (- 24) × 5 - 6 (- 7.5)μ. -- Pycnidia verrucis thallinis insidentia, ostiolo vulgo incolorato; omnino immersa, subsphaerica, ad 350μ lata, perifulcrio hyalino vel levissime nubilato, subparaplectenchymatico. Fulcra acuminata, ramosa, 10 - 18 × 1.3 - 2.0μ. Pycnoconidia filiformia, leviter arcuata aut subrecta, 18 - 24 × 0.5μ.

Icon. -- Pl. 4, fig. 18 (the scanty holotype specimen in herb. Nyl., no. 23869).

Hab. -- Seen only on soil.

Distr. -- Known to me only from New Zealand; see Obs. 4 below.

NEW ZEALAND. Exact locality not stated, coll. Colenso (no. 4731) (holotype) (fert.) (H.); exact locali--ty not stated, coll. Colenso (probably paratype)(fert.) (BM.); South Island: Canterbury Province, exact locali--ty not stated, coll. Haast (fert.) (K., W.).

Obs. 1. -- In the holotype specimen (no. 23869 in herb. Nyl.), the cortex of the thallus is 15 - 30μ deep, ± nubilated, paraplectenchymatic, of cells 4 - 6μ diam.; medulla compact, densely nubilated, of interwoven hyphae 3 - 6μ thick, brownish and more compacted below where it joins the substratum; symbiotic algae 4 - 10μ diam., bright green, forming a ± continuous stratum 45 - 90μ deep. Cephalodia with a dull yellowish, paraplectenchy--matic cortex 38 - 60μ deep composed of ± isodiametric, thin-walled cells 3 - 7μ diam.; inner medullary tissue hyaline, of para- or prosoplectenchymatic, fairly thin-walled cells 4 - 13×3 - 9μ; symbiotic algae Nostocoid, blue-green, forming a deep stratum in the medullary tis--sue. Paraphyses 1.3 - 1.6μ thick, often branched, ab--stricting nubilated, conidia-like, epithecial particles from their tips; septate with septa 5 - 12μ apart. Asci persistently blue with iodine.

Obs. 2. -- No good sections of apothecia were obtained from the above-mentioned holotype specimen, and the follo--wing details additional to the above description were obtained from a specimen in the British Museum Herbarium also collected by Colenso, and hence probably a paratype: paraplectenchyma of lower excipular stratum consisting of ± isodiametric, fairly thin-walled cells 6 - 11μ diam.; hypothecium about 160μ deep in centre, of compacted, closely interwoven hyphae 2 - 3μ thick running in various directions. Asci elongate-clavate, 90 - 120×12 - 17μ, with wall 1.0 - 1.5μ thick at sides, not thicker at apex, but apparently so on account of a plug of hyaline material on its inner side.

Obs. 3. -- P. subparellina appears to be a morphologi--cally constant species, easily recognisable by the verru--cose thallus, positive Pd reaction, and elongated spores.

Obs. 4. -- Hue, in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891), mentions the occurrence of this species in Java as well as in New Zealand. I have not come across any specimens of it from Java.

3. PLACOPSIS TERRICOLA (Cromb.) M. Lamb, comb. nov.

Synon. -- Lecanora gelida f. terricola Cromb. in J. linn. Soc. Lond., Bot. XV, p. 232 (1876), cum descript.; Zahlbr. Cat. Lich. Univ. V, p. 668 (1928).

Descr. -- Thallus plagas suborbiculares irregularesve ad 4.5 cm. latas vel majores formans, ambitu haud vel tantum indistincte effiguratus (leviter radiatim plica--tus); 0.25 - 1.00 mm. crassus, s u b c o n t i n u u s (rimis paucis ad 0.25 mm. latis), g r o s s e g l e - - b o s o - v e r r u c o s u s, verrucis irregularibus, 0.8 - 2.0 mm. diam., tumido-convexis; impure flavido-albicans vel flori lactis concolor, epruinosus, haud niti--dus; extus KHO - , $CaCl_2O_2$ ± roseo-rubescens, Pd ± ro--seus; intus KHO ± plus minusve flavescens, $CaCl_2O_2$ ± roseo-rubescens, Pd ± miniato-rubescens; nec isidiatus nec sorediatus; hypothallus deest.-- Cephalodia thallo supersparsa, deformia, 3 - 6 mm. diam., ad 0.7 mm. crassa, radiatim plicata rimosaque, flavido-carnea, haud nitida.-- Apothecia adpresso-sessilia, discoidea, basi leviter con--stricta, 1.2 - 1.6 mm. diam., margine thallino integro, haud vel parum nitido, haud prominulo; margine proprio interdum conspicuo, plus minusve prominulo, tenui, integ--ro, fuscocarneo, epruinoso, haud nitido; disco plano, obscure rufofusco, laevigato, nec nitido nec pruinoso. Pars basalis excipuli sub hypothecio 50 - 65μ crassa, paraplectenchymatica, inferne nubilata; hypothecium in--coloratum; thecium 155 - 200μ altum, superne zona 27 - 35μ lata indistincte flavidum, ceterum incoloratum. Para--physes apicibus haud incrassatae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 17 - 18$\times$8 - 11μ. -- Pycnidia verruculis thallinis 0.2 - 0.4 mm. diam. immersa, apicibus ostiolis minutis punctiformibus fuscis perforatis, plus minusve sphaerica, ad 390μ diam., perifulcrio hyalino, paraplectenchymatico; fulcris acuminatis, plerumque ra--mosis, 15 - 20$\times$1 - 2μ; pycnoconidiis filiformibus, arcuatis vel rarius fere rectis, 15 - 24$\times$0.5μ.

Icon. -- Pl. 4, fig. 19 (part of the syntype speci--men in the British Museum Herbarium).

Hab. -- The collector's original field note preserved with the Kew syntype reads: "Common on rocks at high-water mark forming rather large patches"; the material seen by me is on sandy soil, which presumably formed a soil-cap over the rocks mentioned.

Distr. -- Up till now known only from the Chilean is--land of Chiloe.

CHILE. Chiloe: Huite near Ancud, coll. R. Cunningham, 1868 (syntype) (fert.) (K., BM., W.).

Obs. 1. -- In the syntype specimen in the British Mu--seum Herbarium, the thalline cortex is 12 - 24μ deep, nubilated, paraplectenchymatic, of cells 3 - 6μ diam.; medulla compact, nubilated, of interwoven hyphae 3.0 - 4.2 μ thick and mainly upwards-striving; symbiotic algae 6 - 12μ diam.; the stratum formed by them slightly interrupt--ed, 60 - 120μ deep. Cephalodia with an outer, yellow-brownish, paraplectenchymatic cortex 15 - 30μ deep (of thin-walled, slightly flattened cells about 4.5μ diam.), and overlaid in most places by an outermost, hyaline layer 4 - 8μ deep derived from disintegrated cell layers; me--dullary tissue colourless, of densely interwoven, thin-walled hyphae 2 - 3μ thick, between which are entangled the symbiotic algae (Nostocoid, blue-green). Paraplec--tenchymatic basal part of excipulum composed of ± iso--diametric, thin-walled cells 5 - 7μ diam.; hypothecium 60 - 105μ deep, of compacted hyphae 2 - 3μ thick running in various directions. Paraphyses sometimes branched, septate with septa 7 - 15μ apart. Asci cylindric, 110 - 135×9 - 15μ, with wall about 1μ thick at sides and up to 6μ at apex, with iodine persistently blue.

Obs. 2. -- Apparently the paraphenylenediamine reac--tion of the medulla is fluctuating, and no great reliance should be placed upon it, for in the syntype specimen in the Vienna herbarium no red coloration could be obtained.

4. PLACOPSIS CHILENA M. Lamb, sp. nov.

Descr. -- Thallus determinatus, plagas efficiens 3 cm. diam. vel majores, ad peripheriam obsolete effigura--tus, laciniis marginalibus indistinctis, 1.5 - 3.0 mm. longis, 0.7 - 1.3 mm. latis, 0.3 - 0.5 mm. crassis, ad-

-natis, t u m i d i s, rimis ad 0.2 mm. latis separatis, apicibus rotundatis et saepe vage crenulatis; in centro v e r r u c o s o - a r e o l a t u s, areolis tumidis, irregulariter angulosis, 0.7 - 1.5 mm. diam., ad 0.8 mm. crassis, rimis profundis limatis acutisve 0.10 - 0.25 mm. latis separatis; flori lactis concolor vel eburneus, subtiliter albopruinosus (per vitrum ×10 !), haud niti--dus, extus KHO - , $CaCl_2O_2$ - , Pd - vel ± leviter roseus; intus KHO ± indistincte flavescens, $CaCl_2O_2$ ± roseo-rubes--cens, Pd ± r u b e s c e n s. Isidia sorediaque de--sunt; hypothallus haud evolutus. -- Cephalodia thallo insidentia, sessilia, discoideo-deplanata, 2 - 6 mm. diam., ad 0.6 mm. crassa, radiatim plicata rimosaque, sordide fuscoflavescentia, haud nitida. -- Apothecia irregulari--ter sparsa, sessilia, ab initio discoidea, basi modice beneve constricta, 1.0 - 1.3 mm. diam., margine thallino albopruinoso, integro, primum tumido, prominenti, demum depresso vel fere excluso; margine proprio in apotheciis vetustioribus bene visibili, prominenti, integro, carneo, haud pruinoso; disco plano, laevigato, obscure rufofusco, interdum leviter albopruinoso, haud nitido. Stratum paraplectenchymaticum excipulare sub hypothecio evolutum, nubilatum, ad 90μ crassum; hypothecium incoloratum; the--cium 180 - 220μ altum, superne zona 20 - 30μ lata sordide fuscoflavescens, ceterum incoloratum vel levissime roseum. Paraphyses apicibus vix incrassatae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 18 - 21 × 9 - 12μ.

Icon. -- Pl. 4, fig. 17 (the holotype specimen).

Hab. -- On granitic rock. "Sobre rocas graniticas, expuestas al sol" (collector's field note).

Distr. -- Chile.

CHILE. Valdivia: Corral, altit. 25 m., coll. H. Gun--ckel, 1935 (no. 5159) (holotype) (fert.) (Räs.).

Obs. 1. -- In the holotype specimen, the thallus has a shallow, paraplectenchymatic cortex 12 - 18μ deep, colourless and hyaline (degenerating) in outer 3 - 6μ, within nubilated, composed of cells 3 - 5μ diam. Medul--la fairly compact, nubilated, of intertexted hyphae about 3μ thick running in various directions; at its base the medulla is densely felted and brown by degeneration. Symbiotic algae 5 - 9μ diam., forming an interrupted stra--tum 65 - 95μ deep. Cephalodia with an outer, hyaline, paraplectenchymatic cortex 15 - 20μ deep, of ± isodiamet--ric cells 3 - 5μ diam., their walls 1.0 - 1.3μ thick; medullary tissue colourless, proso- or paraplectenchy--matic, with thin-walled cells 3.0 - 4.5μ wide. Symbio--tic algae Scytonemoid, reddish, dispersed in nests throughout the medullary tissue. Lower paraplectenchy--matic stratum of excipulum formed of ± isodiametric, thin-walled cells 4 - 6μ diam.; hypothecium of compacted hyphae 1.5 - 4.5μ thick running in various directions. Paraphyses often branched, septate with septa 8 - 18μ apart. Asci cylindric-clavate, 160 - 180 × 13 - 18μ, with wall about 2μ thick at sides, hardly thicker above, and blue (then becoming ± decolorised) with iodine. [No pycnidia seen.]

Obs. 2. -- This species differs from P. terricola in the areolate thallus, and from P. gelida var. subreagens in the verrucose areolae, higher thecium, and slightly larger spores.

5. PLACOPSIS BRACHYLOBA (Müll. Arg.) M. Lamb, comb. nov.

Synon. -- Placodium brachylobum Müll. Arg. in Bull. Herb. Boissier, IV, p. 93 (1896), cum descript. Leca--nora brachyloba Zahlbr. Cat. Lich. Univ. V, p. 665 (1928).

Descr. -- Thallus determinatus, ambitu obsolete effi--guratus, lobis vel areolis marginalibus haud elongatis, 0.4 - 0.9 mm. diam., substrato arcte adpressis, apicibus rotundatis vel indistincte crenulatis, circa 0.2 mm. crassis, haud vel parum nitidis, flori lactis concolori--bus; in centro concinne areolatus, ad 0.5 mm. crassus, areolis angulosis rotundatisve (rimis angustis separa--tis) 0.4 - 0.9 mm. diam., sordide ochraceis vel pallide

fuscoflavescentibus, pro parte leviter cinereo-pruinosis; extus KHO - , $CaCl_2O_2$ - vel (in lobis marginalibus dilu--tius coloratis) + rubescens, Pd - ; intus KHO + sordi--de flavofuscescens, $CaCl_2O_2$ + rubescens, P d + r u - - b e s c e n s (saltem in areolis fertilibus). Isi--dia sorediaque desunt; hypothallus ambitu haud visibi--lis, in centro evolutus, ferrugineus, 0.3 - 0.4 mm. cras--sus. -- Cephalodia thallo irregulariter supersparsa, sessilia, postremo discoideo-deplanata, ad 1.8 mm. diam., 0.6 mm. crassa, rimis radiantibus tangentialibusque fis--sa, fuscocarnea vel ochracea, haud pruinosa. -- Apothe--cia singulatim ex areolis oriunda, primum verrucoso-tumi--da et apice punctiformi-depressa, dein plana discoidea--que, basi constricta, sessilia, ad 1.3 mm. diam., margi--ne thallino crasso, prominenti, integro, flori lactis concolori; margine proprio haud visibili; disco margi--nem haud aequanti, carneo-fuscescenti, roseo- vel cine--reo-pruinoso. Excipulum sub hypothecio evolutum; para--plectenchymaticum, incoloratum. Hypothecium incolora--tum. Thecium 135 - 210μ altum, incolor, superne granu--lis flavofuscescentibus onustum. Paraphyses apicibus vix incrassatae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 21 - 24 × 10.5 - 15.0μ (aut 18 - 20 × 12μ, sec. Müll. Arg. descr. orig.).

Icon. -- Text-fig. 5 (part of the holotype specimen).

Hab. -- On dark basaltic rock.

Distr. -- Eastern Australia.

AUSTRALIA. Queensland: exact locality not stated, coll. Shirley, 1893 (holotype) (fert.) (G.).

Obs. -- In the holotype specimen, the thallus is bi--colorous, the peripheral areolae being cream-coloured and the inner part ochraceous brownish-yellow on account of a superficial deposit; this feature is perhaps a ran--dom variation. In section, the inner part of the thal--lus is covered with a dull brownish-yellow layer 4 - 9μ

deep, composed of indistinct, disintegrating cells; the underlying cortex is 9 - 24μ deep, colourless, paraplec--tenchymatic, of cells 3 - 5μ diam The medulla appears to be e n t i r e l y p a r a p l e c t e n c h y m a - - t i c, colourless, of cells similar to those of the cortex. Hypothalline layer made up of interwoven, col--ourless, thin-walled hyphae 2 - 3μ thick, entangling a copious, rusty-red, granular deposit. Symbiotic algae 6 - 13μ diam., forming a ± continuous stratum 15 - 57μ deep. Cephalodia with an outer, paraplectenchymatic, faintly brownish cortex 37 - 75μ deep, of ± isodiametric, thin-walled cells 3 - 5μ diam.; medullary tissue colour--less, of parallel-conglutinated, mainly upwards-striving, thin-walled hyphae about 3μ thick; symbiotic algae Scyto--nemoid, forming large clumps in the medullary tissue. Paraplectenchymatic, lower, excipular stratum mixed with symbiotic algae, 190 - 250μ deep, inspersed with air-bub--bles, formed of ± isodiametric, thin-walled cells 3 - 5μ diam.; hypothecium 60 - 90μ deep in centre, composed of compacted hyphae 2 - 3μ thick running in various directi--ons, staining blue-green with iodine. Paraphyses occa--sionally branched, 1.5 - 2.0μ thick, septate with septa 8 - 18μ apart. Asci cylindric-clavate, 120 - 170×12 - 20μ, with wall about 3μ thick, at apex thickened up to 9μ and persistently blue with iodine. [No pycnidia seen.]

6. PLACOPSIS PATAGONICA (Zahlbr.) M. Lamb, comb. nov.

Synon. -- Lecanora patagonica Zahlbr. in K. svenska VetenskAkad. Handl. LVII, no. 6, p. 35 (1917), cum descript., Cat. Lich. Univ. V, p. 668 (1928).

Descr. -- Thallus plagas plus minusve orbiculares, 1.0 - 4.5 cm. latas, confluentes formans, effiguratus, laciniis ad peripheriam contiguis, rimis angustis separa--tis, 1.5 - 3.0 mm. longis, expansis, deplanatis, tenuibus (circa 0.1 mm. crassis), s u b s t r a t u m a r c - - t i s s i m e o b d u c e n t i b u s, apicibus sub--rotundatis vel subcuneatis, i b i z o n a a n g u s - - t a o b s c u r i u s c o l o r a t i s (olivaceo-fuscescentibus); in centro laevigatus, rimosus (haud rite areolatus), rimis circa 0.1 mm. latis; ad 0.7 (- 1.0) mm. crassus, ochraceo-glaucescens vel sordide fla--vidoalbidus, opacus, epruinosus, extus intusque KHO + sordide lutescens (dein fuscescens), $CaCl_2O_2$ + roseo-

rubescens, P d + r o s e o - r u b e s c e n s; sore--diis isidiisque destitutus. Hypothallus nullus visibi--lis. -- Cephalodia irregulariter sparsa, suborbicularia, deplanata, sessilia, 1-4 mm. diam., 0.3 - 0.5 mm. crassa, radiatim rimoso-effigurata, flavidocarnea ferrugineo-fus--cave, haud nitida. -- Apothecia thallo supersparsa, ses--silia, basi bene vel modice constricta, rotundata vel passim mutua pressione angulata, 1.0 - 1.7 mm. diam., margine thallino mediocri, integro, haud nitido, epruino--so; margine proprio interdum visibili, tenui, integro, subolivaceo; disco rufofusco (aetate nigrescenti), leviter concavo planove, laevigato, opaco, haud pruinoso. Excipulum sub hypothecio evolutum, 60 - 100μ crassum, paraplectenchymaticum, dense nubilatum; hypothecium sub--incoloratum; thecium 175 - 225μ altum, superne pallide flavofuscescens, ceterum subincoloratum. Paraphyses apice haud incrassatae. Sporae 8nae, in asco uniseria--tae, ellipsoideae, 19 - 21 $\times$ 10 - 11μ. -- Pycnidia thallo immersa, haud vel parum prominula, extus ostiolo puncti--formi minutissimo thallo concolori indicata; sphaerica, ad 70μ diam., perifulcrio levissime flavidulo, paraplect--enchymatico; fulcris simplicibus ramosisve, acuminatis, 10 - 15μ longis, 0.7 - 1.0μ crassis; pycnoconidia fili--formia, leviter arcuata vel fere recta, 20 - 30 $\times$ circa 0.6μ.

Icon. -- Pl. 1, fig. 5 (lectotype specimen from Peel Inlet).

Hab. -- Igneous rock.

Distr. -- Subantarctic South America.

CHILE. Magallanes: Peel Inlet on south side of Chat--ham Island, coll. ? (Swedish Antarct. Exped.) (lecto--type) (fert.) (W.).

Obs. 1. -- In the lectotype specimen, the thallus has an upper, paraplectenchymatic cortex 15 - 25μ deep, pale

yellow-brownish in its outermost 6 - 10μ, within almost colourless, composed of cells 3 - 7μ diam.; medulla pale sordid yellowish or almost colourless, compact, of close-ly interwoven, chiefly ± horizontally running hyphae about 3μ thick, becoming gradually yellow-brown in its lower part where it joins the substratum. Symbiotic al-gae small (4 - 6μ diam.), pale green, forming an in-terrupted stratum 35 - 65μ deep. Cephalodia with an outer, in places orange-ferruginous, paraplectenchymatic cortex not well delimited from the inner medullary tissue, of ± isodiametric, thin-walled cells 3 - 5μ diam.; medul-lary tissue colourless, para- or prosoplectenchymatic, of conglutinated, thin-walled cells 5 - 18×3 - 5μ, the elongated cells ± vertically arranged; symbiotic algae Scytonemoid, blue-green to orange-yellow, forming vertical bands 18 - 45μ broad in the medullary tissue. Lower pa-raplectenchymatic stratum of excipulum of ± isodiametric, thin-walled cells 4 - 5μ diam.; hypothecium of compacted and interwoven hyphae 2.5 - 3.5μ thick running in various directions. Paraphyses 1.3 - 1.8μ thick, occasionally branched, septate with septa 10 - 25μ apart. Asci cylin-dric, 165 - 185×12 - 15μ, with wall about 1μ thick, at apex (in immature asci) thickened up to 6μ, and persis-tently blue with iodine.

Obs. 2. -- A somewhat striking species, easily recog-nisable by its very flattened marginal lobes, which are for the most part darker in colour (olive-brownish) on their outer edges. The positive paraphenylenediamine reaction is a useful confirmatory character.

Obs. 3. -- Zahlbruckner in his original description of this species mentions a second locality: Fuegia, Beagle Canal, Darwin Glacier. I have not seen this specimen.

Obs. 4. -- In his contribution to Skottsberg's "Natu-ral History of Juan Fernandez", II (1924), on p. 382, Zahlbruckner has published a form of this species as Lecanora patagonica f. sorediosula, and Köfaragó-Gyelnik has subsequently raised this form to specific rank as Lecanora sorediosula (Zahlbr.) Gyeln. in Acta Fauna Flora univ. ser. ii, I, p. 10 (1933). In the origin-al description two localities are mentioned, both in Juan Fernandez (Masafuera). I have seen these two specimens; one is a sterile sorediate thalline crust,

Pd = , not specifically determinable, but certainly not referable to P. patagonica; the other is non-sorediate, although in places with insect bites looking like soredi--a, Pd ∓ intense red, sterile, and is identical with P. gelida var. subreagens M. Lamb. As the latter is con--sidered as a variety, it is not necessary to use the prior but unsuitable epithet sorediosula.

7. PLACOPSIS STENOPHYLLA (Hue) M. Lamb, comb. nov.

Synon. -- Lecanora stenophylla Hue in Ann. mycol., Berl. XII, p. 523 (1914), cum descript.; Zahlbr. Cat. Lich. Univ. V, p. 670 (1928).

Descr. -- Thallus rosulas orbiculares ad 2.5 cm. diam. vel majores formans, ambitu pulchre laciniato-effiguratus, laciniis adnatis, rimis 0.1 - 0.2 mm. latis separatis, d e p l a n a t i s e t s u b s t r a t o a r c t i s--s i m e a d p r e s s i s, sublinearibus vel nonnihil cuneatis, 2 - 6 mm. longis, 0.7 - 1.5 mm. latis (apici--bus saepe expansis, rotundatis subcrenulatisve, 1 - 2 mm. latis), 0.1 - 0.4 mm. crassis, varie ramosis, cent--rum versus fissuris transversalibus ruptis; in centro ad 0.4 mm. crassus, rimosus aut subareolatus, rimis tenui--bus saepe anastomosantibus et areolas irregulariter an--gulosas, 0.3 - 1.0 mm. diam., planas tumidasve circum--secantibus; albidus aut eburneus, haud nitidus, eprui--nosus; extus intusque KHO - vel ± indistincte flavo--fuscescens, $CaCl_2O_2$ ± roseo-rubescens, P d ± m i n i--a t o - r u b e s c e n s (praecipue in medulla, thallo superne saepe Pd - vel modo maculatim rubescenti). Isidia sorediaque desunt; hypothallus haud evolutus (sed thallus saepe inferne et in rimis ferrugineo-con--spurcatus). -- Cephalodia sparsa, sessilia, adpressa, orbicularia, deplanata, 0.8 - 1.4 mm. diam., ad 0.4 mm. crassa, radiatim plicata et effigurata, haud rimosa,

obscure carnea, opaca subnitentiave. -- Apothecia irre-
-gulariter disposita, sessilia, ad basin bene constricta, discoidea, 1.0 - 1.6 mm. diam., margine thallino mediocri, prominulo vel demum subdepresso, integro, opaco, nudo; margine proprio interdum evoluto, tenui, integro, leviter prominenti, carneo, nec nitido nec pruinoso; disco plano, obscure fuscorufescenti (madefacto laetius rufescenti) vel rufofusco, opaco, nudo vel interdum subtiliter ochraceo-pruinoso. Excipulum basale sub hypothecio integrum, modice incrassatum, paraplectenchymaticum, nubilatum; hypothecium incoloratum; thecium 120 - 162μ altum, incoloratum, sed sursum pallide flavidum nubilatumve. Paraphyses apice leviter incrassatae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 14 - 20 × 7.5 - 11.0μ.

Icon. -- Pl. 5, fig. 20 (paratype specimen, no. 3640 in herb. Nyl.); fig. 21 (specimen from Chiloe in herb. Räsänen).

Hab. -- Schistose rocks.

Distr. -- Known only from Chile.

CHILE. Exact locality not stated, coll. Gay (paratype) (fert.) (H.); Chiloe: exact locality doubtful, coll. C. Junge, 1932 (Herb. Gunckel no. 6376) (fert.) (Räs.).

Obs. 1. -- In the paratype specimen studied (no. 3640 in herb. Nyl.), the thallus has an upper, nubilated, paraplectenchymatic cortex 17 - 24μ deep, composed of cells 3 - 6μ diam.; medulla compact, nubilated, of closely intertexted hyphae 1.7 - 3.0μ thick showing chiefly ± horizontally parallel arrangement; towards the base the hyphae are brownish by degeneration, and intermingled with fragments of the substratum; symbiotic algae 4.5 - 10.0μ diam., bright green , forming an even, slightly interrupted layer 35 - 75μ deep. Cephalodia covered by an outermost, hyaline, amorphous sheath 4 - 9μ deep; the underlying cortex 45 - 95μ deep, pale yellowish in outer part, otherwise colourless, paraplectenchymatic, of ± isodiametric, thin-walled cells 3 - 7μ diam.; inner medullary tissue hyaline, indistinctly paraplectenchyma-

-tic; symbiotic algae Scytonemoid, blue-green, scattered in clumps of various size throughout the medullary tissue. Lower paraplectenchymatic stratum of excipulum formed of ± isodiametric, thin-walled cells 3 - 6μ diam.; hypothe-cium of compacted, interwoven hypae 1.5 - 2.0μ thick running in various directions. Paraphyses 1 - 2μ thick (at tips up to 3μ), occasionally branched, abstricting conidia-like, rounded, epithecial particles at tips; sep-tate with cells 7 - 12μ long. Asci elongate-clavate, 90 - 110×12 - 15μ, with wall 1.0 - 1.3μ thick at sides (at apex thickened up to 4μ) and persistently pale blue with iodine. [Mature spores not found in the paratype specimen; according to Hue, descript. orig., 18 - 20 × 8 - 12μ, and in the Chiloe specimen in herb. Räsänen 14 - 20×7.5 - 11.0μ. No pycnidia seen.]

Obs. 2. -- A neat and habitually distinct species, differing from P. patagonica in the form of the thallus, higher thecium, etc., and from P. gelida var. subreagens in the very flattened and closely adpressed peripheral laciniae.

8. PLACOPSIS CRIBELLANS (Nyl.) Räs.
in J. Jap. Bot. XVI, p. 90 (1940).

Synon. -- Lecanora cribellans Nyl. Lich. Japon. p. 42 (1890), cum descript.; Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891), cum descript., in Ann. mycol., Berl. XII, p. 524 (1914), cum descript.; Zahlbr. Cat. Lich. Univ. V, p. 665 (1928). Placopsis pacifica Wain. in Bot. Mag. Tokyo, XXV, p. 53 (1921), cum descript. Lecanora iwashiroënsis Zahlbr. Cat. Lich. Univ. V, p. 668 (1928).

Descr. -- Thallus determinatus, effiguratus, plagas plus minusve orbiculares ac saepe confluentes efficiens, laciniis marginalibus substrato arcte adpressis, 0.6 - 2.5 mm. longis, 0.5 - 1.2 mm. latis, 0.1 - 0.2 mm. cras-sis, deplanatis, simplicibus vel irregulariter ramosis, adnatis, rimis angustissimis separatis, apicibus rotun-datis subcrenulatisve; in centro rimosus vel indistincte areolatus, ad 0.5 mm. crassus, rimis ad 0.1 mm. latis

passim areolas irregulariter angulosas 0.4 - 1.8 mm. diam. circumscribentibus, c r e b e r r i m e c r i b e l l a- - t o - p u n c t a t u s vel isidiis erosis minute confertimque defossulatus, foraminibus tantum per vitrum X 10 rite visibilibus, plus minusve rotundatis, ad 0.1 mm. diam., thalli superficie concoloribus, interdum margine tenuissimo et parum prominulo cinctis; eburneo-albidus, haud nitidus nec pruinosus, extus KHO ± indistincte fla--vescens vel - , $CaCl_2O_2$ ± roseo-rubescens (vel interdum -), Pd ± roseo-carneus; intus KHO ± indistincte flaves--cens vel - , $CaCl_2O_2$ ± roseo-rubescens, Pd - . Isidia (in forma typica speciei) desunt (omnino erosa); so--redia nulla; hypothallus haud evolutus. -- Cephalodia thallo sessilia, irregulariter sparsa, discoideo-deplana--ta vel tumido-depressa, 0.8 - 5.0 mm. diam., 0.4 - 0.8 mm. crassa, radiatim plicata rimosaque vel tantum effigu--rato-plicata, pallide sordideque flavidula vel carnea, haud nitida. -- Apothecia thallo irregulariter super--sparsa, sessilia, rotundata, basi constricta, 0.5 - 1.3 mm. diam., margine thallino mediocri, persistenter promi--nulo, integro vel demum levissime crenulato, haud nitido; margine proprio interdum visibili, tenuissimo, haud promi--nulo, subcarneo; disco plano vel leviter concavo, carneo vel rufofusco, raro fusconigrescenti, epruinoso vel inter--dum albido-pruinososuffuso, haud nitido. Excipulum sub hypothecio evolutum, paraplectenchymaticum, nubilatum; hypothecium incoloratum; thecium 90 - 180μ altum, superne leviter flavescens, ceterum incoloratum. Paraphyses apicibus nonnihil incrassatae. Sporae 8nae, in asco uni--seriatae vel subbiseriatae, ellipsoideae, 12.0 - 16.5 × 6 - 9μ. -- Pycnidia thallo immersa, leviter protuberan--tia, ostiolis minutissimis punctiformibus fuscescentibus extus indicata, sphaerica, circa 120μ diam., perifulcrio incolorato paraplectenchymatico ad 14μ crasso; fulcra

subulata, 9 - 13×1.0 -1.5μ; pycnoconidia filiformia, leviter arcuata vel fere recta, 21 - 29 ×circa 0.5μ.

Icon. -- Pl. 5, fig. 22 (the sterile syntype fragment in herb. Nyl., no. 23862); fig. 23 (a fertile specimen from New Zealand, no. 23846 in herb. Nyl.).

Hab. -- Rocks.

Distr. -- With the exception of the outlying Atlantic station in Tristan da Cunha, this species is confined to the coasts of the Pacific Ocean in both hemispheres: Alaska, Aleutian Islands, Japan, Korea, Formosa, New Zea--land, Juan Fernandez, and Galapagos Islands; see Map 2.

ALASKA. Seward Peninsula: Port Clarence, coll. W. Tre--lease & D. Saunders, 1899 (f. tuberculifera) (ster.) (MO.); Aleutian Islands: Unalaska, coll. Eyerdam, 1932 (f. tuberculifera) (ster.) (FH., S.).

JAPAN. Honshiu, Rikuchu: Morioka, Mt. Gansu, altit. 2000 m., coll. Faurie, 1898 (no. 755) (ster.) (BM., W.); Uzen: Ubayu, coll. Faurie, 1904 (no. 5845) (fert.) (W.); [Sado Island, coll. Faurie, 1898 (no. 949), recorded by Hué in Ann. mycol., Berl. XII, p. 525 (1914);[13)]] Iwashiro: Mt. Bandai, coll. A. Yasuda, 1916 (no. 164) (holotype of Placopsis pacifica Wain.) (fert.) (TUR.), coll. Faurie, 1898 (no. 966)(fert.) (B. de Lesd.); Kozuke: Mt. Nabewari, coll. A. Yasuda, 1920 (ster.) (Räs.); Etchu: Mt. Tateyama, coll. Y. Asahina, 1928 (fert.) (Asah.); Shinano: Matsumoto, coll. Faurie, 1905 (no. 6928) (holotype of f. tubercu--lifera M. Lamb) (ster.) (B. de Lesd.); Mt. Yatsu--gatake, coll. Faurie, 1903 (no. 5618) (ster.) (W.), coll. Y. Asahina, 1926 (f. tuberculifera) (ster.) (Asah.); Musashi: Mt. Chichibu, coll. Y. Asahina, 1933 (fert.) (Asah.); Sagami: Hakone, coll. Y. Asahina, 1925 (ster.) (Asah.), coll. Y. Asahina, 1930 (fert.)

(Asah.); Izu: Mt. Amagi, coll. Y. Asahina, 1930 (ster.) (Asah.); Suruga: Mt. Fujiyama, altit. circ. 2000 m., coll. E. Almquist, 1879 (syntype of the species) (ster.) (H.), ("Lecanora gelida" Nyl. Lich. Japon. p. 42; 1890) (fert.) (S.); Mt. Fujiyama, coll. Y. Asahina, 1924 (fert.) (Asah.); Kiushiu, Osumi: Yakushima Island, coll. F. Fujikawa, 1933 (ster.) (Asah.).

KOREA (CHOSEN). Quelpaert Island (Chedshu), Mt. Hallaisan, coll. Faurie, 1906 (no. 729) (ster.) (B. de Lesd.).

FORMOSA (TAIWAN). Tainan: Mt. Arisan, coll. Y. Asa--hina, 1925 (no. 143) (f. tuberculifera) (ster.) (Asah.).

NEW ZEALAND. Exact locality not stated, coll. C. Knight, 1867 (no. 325) (fert.) (H.), coll. C. Knight (f. tuberculifera) (ster.) (BM., W.), (fert.) (WELT.), coll. Jelinek (f. tuberculifera) (fert.) (M.); North Island, Hutt: near Wellington, coll. J. Buchanan (f. tuberculifera) (ster.) (BM.).

JUAN FERNANDEZ. Masatierra: near Tres Puntas, altit. 200 m., coll. C. & I. Skottsberg, 1917 (ster.) (GB.), coll. C. & I. Skottsberg, 1917 (f. tuberculifera)(ster.) (S., W.).

GALAPAGOS. Exact locality not stated, coll. ?, 1872 (Hassler Exped.) (f. tuberculifera) (ster.) (K.).

TRISTAN DA CUNHA. Above potato patches, altit. 200 m., coll. Y. Mejland, 1938 (no. 1653) (ster.) (O.); the crater, altit. 1950 m., coll. E. Christophersen & Y. Mej--land, 1938 (no. 761 pr. p.) (ster.) (O.).

Obs. 1. -- In the sterile syntype specimen in herb. Nyl. (no. 23862), the characteristic excavations in the thallus are very numerous and crowded, giving it a "pock marked" appearance. Thallus with a paraplectenchymatic cortex (faintly yellowish in section) of cells 3 - 5μ diam.; medulla colourless, $\pm$ compact, of interwoven hy--phae 2.5 - 4.5μ thick running in various directions, and

in the lower parts sometimes brown by degeneration. Sym--biotic algae 6 - 11μ diam., forming an interrupted layer 30 - 60μ deep. Cephalodia up to 1 mm. diam., dull yel--lowish, with obsolete, radial plication at periphery, not rimose; the cortex not differentiated from the inner medullary tissue, the whole structure being paraplecten--chymatic, of ± isodiametric cells 3.0 - 5.5μ diam. with walls 1.0 - 1.3μ thick; symbiotic algae Stigonemoid, with obvious slime-sheaths, occurring in clumps in the interi--or.

Obs. 2. -- In the fertile holotype specimen of "Pla--copsis pacifica" Wain. (no. 4152 in herb. Vain.), the lower paraplectenchymatic stratum of the excipulum is 23 - 60μ deep, of ± isodiametric, thin-walled cells 4 - 6μ diam.; hypothecium 195 - 270μ deep in centre, of compac--ted hyphae 2 - 3μ thick running chiefly upwards into the thecium; thecium 140 - 180μ high. Paraphyses often branched, 1.5 - 2.0μ thick, up to 3μ at tips. Asci cy--lindric or elongate-clavate, 95 - 130 × 7 - 13μ, with wall about 1μ thick at sides, at apex thickened up to 9μ in immature asci, and persistently blue with iodine. Spores 14 - 15 × 7 - 9μ.

Obs. 3. -- The pycnidia are described from a syntype specimen in herb. Nyl. (no. 23843).

Obs. 4. -- Nylander recorded "Lecanora gelida" from Japan in his Lich. Japon. p. 42 (1890), but the only Japanese specimen in his herbarium under this name is P. cribellans with the characteristic pittings sparingly present. These minute, crowded, pock-like pittings, which are derived from the erosion of isidia, enable one to recognise P. cribellans even in small and sterile examples. Wainio's description of a sorediate thallus in "Placopsis pacifica" was an error; it is easy to mis--take the eroded hollows in the thallus for the depres--sions left by worn-off soredia.

Obs. 5. -- The surface of the thallus in this species almost invariably gives a delicate, flesh-pink reaction with paraphenylenediamine, as mentioned on p.26. The same type of reaction is sometimes met with in P. gelida, and does not appear to have any taxonomic significance.

F. TUBERCULIFERA M. Lamb, f. nov.

Diagn. -- Thallus isidiis integris (haud erosis), verruculiformibus, subglobosis; ceterum sicut in forma typica speciei.

Obs. 1. -- Possibly a growth-stage of the species. Its distribution is included above together with that of the typical state.

Obs. 2. -- The holotype specimen from Japan, Matsu--moto, is similar both morphologically and anatomically to the primary form, but differs in the absence of "cri--bellations" and in the presence of numerous, subglobose, concolorous isidia 0.15 - 0.20 mm. diam. scattered over the surface of the thallus. In a few places, where they have been eroded, punctate depressions are visible and can be seen to have originated from the dropping out of the isidia.

In section of thallus, cortex pale yellowish, para--plectenchymatic, 18 - 24μ deep, of cells 3 - 5μ diam.; medulla compact, densely nubilated; symbiotic algae 6 - 12μ diam., forming an interrupted layer 30 - 60 (- 75)μ deep. The isidia have the same structure, containing algae. Thallus externally Pd + pale flesh-pink, inter--nally Pd - . Cephalodia as in the typical species, with Scytonemoid algae. [No apothecia present.]

9. PLACOPSIS PAPILLOSA Wain.

in Philipp. J. Sci. sect. C, VIII, p. 102 (1913), cum descript.

Synon. -- Lecanora papillosa Zahlbr. Cat. Lich. Univ. V, p. 668 (1928).

Descr. -- Thallus effusus vel vix determinatus, ambi--tu haud vel passim indistincte lobatus, laciniis parum evolutis, 0.5 - 1.0 mm. longis, 0.4 - 0.5 mm. latis, 0.1 - 0.2 mm. crassis, radiantibus aut irregulariter disposi--tis, planis aut leviter convexis, varie ramoso-divisis, apicibus rotundatis ac saepe obsolete crenulatis; in

centro subsquamulosus, (cum isidiis) ad 0.8 mm. crassus, irregulariter fissus, haud areolatus, eburneus vel flori lactis concolor, passim fuscidulo-conspurcatus, epruinosus, haud nitidus, extus intusque KHO - vel ± sordide fusces--cens, $CaCl_2O_2$ ± roseo-rubescens, Pd - ; c r e b r e i s i d i a t u s, isidiis congestis, subglobosis, 0.1 - 0.2 mm. diam., thallo concoloribus, ambitum vitantibus; soredia nulla; stratum hypothallinum ochraceum tenue pas--sim visibile. -- Cephalodia thallo irregulariter super--sparsa, irregularia, tuberculiformia vel nonnihil depla--nata, sessilia, ad 1 mm. lata et 0.5 mm. crassa, varie plicata rugosaque, semipellucida, obscure rufofusca ac dein (degeneratione) fusconigrescentia. -- Apothecia sparsa, sessilia, discoidea, basi bene constricta, ad 1.3 mm. diam., margine thallino mediocri crassiusculove, saepe crenulato, interdum leviter albido-pruinoso, haud nitido; disco nonnihil concavo planove, primum obscure rufofusco, m o x n i g r e s c e n t i (etiam madefacto), in apo--theciis novellis pruina albida vel pallide ochracea saepe obtecto. Excipulum sub hypothecio integrum, paraplecten--chymaticum, flavofuscidulum, nubilatum; hypothecium pallide flavofuscescens; thecium 120 - 180μ altum, super--ne flavofuscescens, ceterum incoloratum. Paraphyses apicibus haud incrassatae. Sporae 8nae, in asco uniseri--atae, ellipsoideae, 17.0 - 19.5 × 10 - 11μ.

Icon. -- Pl. 6, fig. 25 (the holotype specimen, no. 4151 in herb. Vain.).

Hab. -- "On rocks, earth, etc." (collector's field note); seen by me on rocks of often friable consistency.

Distr. -- Philippine Islands and Java, occurring appa--rently at high altitudes.

PHILIPPINE ISLANDS. Negros: Canlaon Volcano, altit. 1830 m., coll. E. Merrill, 1910 (no. 6866) (holotype) (fert.) (TUR.).

JAVA. Preanger: Mt. Gede, altit. circ. 3000 m., coll. W. Seifriz, 1920 (fert.) (W.).

Obs. In the holotype specimen, the thallus (and isi--dia) have an outer, colourless or faintly yellowish, indistinctly paraplectenchymatic cortex 8 - 17μ deep, of cells 3 - 5μ diam.; medulla colourless or faintly yellow--ish in section, compact, of interwoven hyphae 2.0 - 4.3μ thick running in various directions; hypothallus not dis--tinctly separated from medulla, spongy, of closely or loosely intertexted hyphae 2 - 5μ thick, with thin-walled, brownish cells; symbiotic algae 5 - 11μ diam., forming a somewhat diffuse, ± continuous stratum 30 - 78μ deep. Cephalodia covered by a pale brownish, indistinctly para--plectenchymatic cortex 20 - 45μ deep, of ± isodiametric, thin-walled cells 3 - 5μ diam.; medullary tissue colour--less, of closely-packed, thin-walled hyphae; symbiotic algae Stigonemoid, blue-green, in conspicuous, hyaline slime-sheaths. Lower paraplectenchymatic stratum of ex--cipulum of ± isodiametric, thin-walled cells 4 - 7μ diam.; hypothecium of compacted, intricated hyphae 1.3 - 2.0μ thick running in various directions. Paraphyses often branched, 1.0 - 1.7μ thick, the tips covered with minute, yellowish, epithecial granules. Asci cylindric, 100 - 170 × 10 - 14μ, with wall 1.0 - 1.3μ thick at sides, at apex (in immature asci) thickened up to 6μ, and pale blue with iodine. [No pycnidia seen.]

10. PLACOPSIS ISIDIOPHORA Wain.

in Philipp. J. Sci. sect. C, VIII, p. 102 (1913), cum descript.

Synon. -- Lecanora isidiophora Zahlbr. Cat. Lich. Univ. V, p. 668 (1928).

Descr. -- Thallus determinatus, ambitu effiguratus, substratum late tegens, laciniis ad peripheriam rimis separatis vel nonnihil discretis, 1.5 - 2.0 mm. longis, 0.5 - 1.0 mm. latis, 0.2 - 0.5 mm. crassis, tumido-con--vexis vel partim deplanatis, simplicibus vel irregulari--ter ramosis, apicibus rotundatis; in centro irregulari--ter rimosus (haud areolatus), rimis 0.1 - 0.3 mm. la--tis; ad 0.8 mm. crassus, subrugosus vel passim subsqua--mulosus, albidus vel flori lactis concolor, epruinosus, haud nitidus, extus intusque KHO ± indistincte flavescens,

$CaCl_2O_2$ + roseo-rubescens, Pd - , c r e b r e i s i d i- - a t u s, isidiis subglobosis, congestis et passim co--acervatis, 0.1 - 0.2 mm. diam., lacinias marginales vi--tantibus; soredia nulla; hypothallus nullus visibilis.-- Cephalodia thallo supersparsa, sessilia, deplanata, sub--discoidea, 0.9 - 2.0 mm. diam., ad 0.6 mm. crassa, obso--lete radiatim plicata, rarius rimosa, obscure flavidocar--nea, haud nitida. -- Apothecia in centro thalli sparsa, sessilia, rotundata, basi bene constricta, 0.8 - 1.5 mm. diam., margine thallino mediocri, integro vel obsolete crenulato, haud nitido et epruinoso; margine proprio in--terdum visibili, disco concolori, parum prominulo, tenui, haud nitido; disco obscure fuscocarneo flavidofuscove, in apotheciis vetustioribus degeneratione fusconigrescen--ti, plano aut leviter concavo, saepe primum ochraceo-pru--inoso, haud nitido. Excipulum integrum, sub hypothecio stratum paraplectenchymaticum pallide fuscidulum efficiens; hypothecium pallide flavofuscidulum vel fere incoloratum; thecium 185 - 285μ altum, superne flavofuscidulum, ceterum incoloratum. Paraphyses apicibus haud vel parum incras--satae; sporae 8nae, in asco uniseriatae, ellipsoideae, 18 - 24 $\times$ 9 - 12μ.

Icon. -- Pl. 6, fig. 24 (the holotype specimen, no. 4150 in herb. Vain.).

Hab. -- Apparently vague in its choice of substratum; the holotype occurs on dead wood, the Javan specimen on rock.

Distr. -- Philippine Islands and Java, occurring appa--rently at high altitudes.

PHILIPPINE ISLANDS. Negros: Canlaon Volcano, altit. 1830 m., coll. E. Merrill, 1910 (no. 6876) (holotype) (fert.) (TUR.).

JAVA. Preanger: Mt. Gede, altit. circ. 3000 m., coll. Schiffner, 1894 (fert.) (FH.).

Obs. 1. -- In the holotype specimen, the thallus has an upper, faintly nubilated, paraplectenchymatic cortex 13 - 23μ deep, of cells 4.5 - 6.0μ diam.; medulla slightly nubilated, ± compact, of interwoven hyphae 2.8 - 5.0μ running in various directions, or at the apices of the marginal lobes chiefly horizontally-parallel; symbiotic algae 5 - 10μ diam.; the stratum formed by them ± continuous, 24 - 54μ deep. Cephalodia with an outer, faintly yellowish, paraplectenchymatic cortex 12 - 21μ deep, of ± isodiametric, thin-walled cells 3 - 6μ diam.; medullary tissue para- or prosoplectenchymatic, colourless; symbiotic algae Scytonemoid, blue-green or yellow-green, forming a stratum in the upper medullary tissue. Lower, paraplectenchymatic excipulum formed of ± isodiametric, thin-walled cells 4 - 6μ diam.; hypothecium of compacted, pale yellowish or colourless hyphae 1.2 - 1.5μ thick running in various directions; thecium 200 - 285μ high. Paraphyses often branched, 1.3 - 2.0μ thick, septate with septa 7 - 12μ apart. Asci cylindric, 165 - 190×12 - 14 μ, with wall 1.0 - 1.3μ thick at sides, at apex (in immature asci) up to 8μ, blue then greenish-yellow with iodine. Spores 18 - 21×9 - 12μ. [No pycnidia seen.]

Obs. 2. -- This species and P. papillosa are very closely allied, and may even prove to be varieties of one and the same species. On the basis of the scanty material of both at present available for study their distinction as separate species seems to be justified.

11. PLACOPSIS BACULIGERA M. Lamb, sp. nov.

Descr. -- Thallus effiguratus, plagas ut videtur sat latas (ad circa 8 cm. diam., vel etiam majores ?) formans, laciniis ad peripheriam substrato arcte adpressis, tota longitudine adnatis, rimis angustissimis separatis, 4 - 10 mm. longis, 1 - 2 mm. latis, 0.2 - 0.5 mm. crassis, varie dichotome vel sympodialiter ramosis, tumido-convexis, tantum apicibus applanatis expansisque; in centro v e r r u c o s o - a r e o l a t u s, areolis tumidis, confertis, 0.5 - 1.0 (- 1.3) mm. diam., ad 1 mm. crassis, marginem versus sensim in lacinias marginales abeuntibus; o m n i n o a u r a n t i a c o - o c h r a c e u s (oxydatus), laevigatus, haud nitidus nec pru-

-inosus, extus intusque KHO - , $CaCl_2O_2$ - , Pd - . Hypo--thallus deest; isidia ac soredia nulla.-- Cephalodia thallo irregulariter supersparsa, sessilia, primum tumida, deinque leviter deplanata discoideaque, 1 - 3 mm. diam., 0.8 - 1.2 mm. crassa, inferne vix constricta, superficie irregulariter verruculoso-rugosa, haud effigurata, thallo concoloria, haud nitida. -- Apothecia thallo insidentia, irregulariter disposita, sessilia, basi bene constricta, 1.5 - 3.0 mm. diam., margine thallino crasso, prominenti, integro vel minute radiatim rugoso, introrsus incurvato, discum bene superan--ti; margo proprius nullus; discus subplanus, olivaceo-fuscus, nitidus, haud pruinosus. Excipulum in--ferne haud evolutum; hypothecium in--color; thecium 240 - 285μ altum, superne pallide viridi-flavescens, ceterum incoloratum. Paraphyses apicibus vix vel parum incrassatae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 24 - 29$\times$14 - 15 μ. -- Pycnidia verrucis thallinis immersa, extus ostio--lis punctiformibus, plus minusve impressis, rufofuscis, ad 0.3 mm. latis indicata; sphaerica, ad 570μ diam., nullo perifulcrio circumdata, lamina sporige--ra convoluta; fulcra simplicia, leviter at--tenuata, 12 - 21μ longa, circa 1μ crassa; pycnoconidia fulcrorum apicibus enata, baculiformia, recta, utroque truncata, 6 - 10$\times$0.8 - 1.0μ.

Icon. -- Pl. 1, fig. 3 (the holotype material).

Hab. -- Granitic rocks.

Distr. -- Fuegia.

CHILE. Magallanes: Isla Desolación, Puerto Angosto, altit. 400 - 700 m., coll. P. Dusén, 1896 (no. 197) (Nordenskjöld's Eldslandsexped.) (holotype) (fert.) (S.); Rio Azopardo, "in saxis alpinis", altit. 700 m.,

coll. P. Dusén, 1896 (no. 154) (Nordenskjöld's Elds-
-landsexped.) (fert.) (S.).

Obs. 1. -- In the holotype specimen the colour of the thallus corresponds to the colours "cinnamon-buff" (Pl. XXIX. 17″ b) and "tawny" (Pl. XV. 13′ i) in Ridgway's "Color Standards" (1912); in Séguy's "Code Universel" (1936) the nearest equivalent is Pl. XVII. nos. 247 -9. Thallus with an outer cortex 50 - 65μ deep; this cortex is paraplectenchymatic, in its outer 15 - 20μ yellow (due to amorphous pigment in the cell-walls), otherwise hya-
-line, of cells 5.5 - 9.0μ diam. Medulla hyaline, com-
-pact, of intertexted hyphae 3.0 - 4.5μ thick running in various directions. The verrucose thallus is anchored to the substratum by a ± continuous, lower layer of medul-
-lary hyphae, as in P. contortuplicata. Symbiotic algae 6 - 9 (- 11)μ diam., forming a ± even, slightly inter-
-rupted stratum 115 - 185μ deep. Cephalodia with an outer, paraplectenchymatic cortex 70 - 90μ deep, pale yellow in outermost 25 - 35μ, of ± isodiametric, thin-
walled cells 5 - 11μ diam.; medullary tissue hyaline, of strands of parallel-conglutinate, fairly thin-walled hy-
-phae 3 - 5μ thick; symbiotic algae Stigonemoid, in clumps throughout almost whole depth of cephalodium. No lower, paraplectenchymatic, excipular stratum is differen-
-tiated; the colourless hypothecium, composed of densely compacted hyphae 2.0 - 4.5μ thick running in various di-
-rections, rests directly on the scattered groups of sub-
-hypothecial algae. Paraphyses not constricted at sep-
-ta, which are 9 - 18μ apart; 1.5 - 2.5μ thick, occasio-
-nally branched, at apices sometimes slightly congluti-
-nated and yellow-greenish (due to pigment in the cell-
wall). Asci cylindric to cylindric-clavate, 195 - 220 × 17 - 21μ, with colourless, ± gelatinised walls 1.5 - 2.5μ thick at sides, at apex thickened up to 5μ; blue then paler blue with iodine.

Obs. 2. -- A very remarkable species, differing widely from all other members of the genus in the staff-shaped pycnoconidia and in the apothecia with their prominent, inflexed, thalline margin and smooth, shining disc. The greenish tinge of the epithecium also is not found in any other known species of Placopsis. Other distinctive features are the absence of any lower, paraplectenchyma-
-tic, excipular stratum, and the greatly convoluted walls of the pycnidia.

12. PLACOPSIS BICOLOR (Tuckerm.) B. de Lesd. in Ann. Cryptog. exot. IV, p. 100 (1931); Räs. in Ann. bot. Vanamo, II, p. 25 (1932).

Synon. -- Placodium bicolor Tuckerm. in Bull. Torrey bot. Cl. VI, p. 57 (1875), cum descript., in Proc. Amer. Acad. Arts Sci. XII, p. 184 (1877); Müll. Arg. in Bot. Jb. V, p. 135 (1884), cum descript., Flechten in For--schungsreise S.M.S. "Gazelle", IV. Teil, p. 10 (1889), cum descript. Lecanora bicolor Zahlbr. in Deutsch. Süd--polar-Exped. 1901 - 3, VIII, p. 48 (1906). Lecanora gelida var. β. vitellina Hook. f. & Tayl. apud Hook. Bot. Antarct. Voy. Erebus and Terror, I, Flora Antarctica, Part II, p. 535 (1847), cum descript. Placopsis gelida var. vitellina B. de Lesd. in Ann. Cryptog. exot. IV, p. 101 (1931). Squamaria lateritia Nyl. in Mém. Soc. nat. Sci. Cherbourg, V, p. 111 (1858) (nomen nudum), in Flora, Regensburg, XLIV, p. 718 (1861) (nomen nudum). Placopsis gelida f. lateritia Nyl. apud Cromb. in J. linn. Soc. Lond., Bot. XV, p. 184 (1876), cum descript.; Cromb. in J. Bot., Lond. XV, p. 106 (1877). Lecanora gelida f. lateritia Nyl. apud Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891).

Descr. -- Thallus determinatus, ambitu effiguratus (aut nonnunquam ut videtur haud rite lobatus), 0.3 - 1.0 mm. crassus, laciniis ad peripheriam adnatis, rimis limatis ad 0.1 mm. latis separatis, 3 - 5 mm. longis, 1.5 - 2.5 mm. latis, apicibus rotundatis, varie ramosis; in centro areolatus, areolis irregulariter angulosis, 1.0 - 2.5 mm. diam., planiusculis, rimis profundis ad 0.2 mm. latis se--paratis; omnino vel pro maxima parte o c h r a c e o - f l a v e s c e n s, a u r a n t i a c o - f l a v e s - - c e n s, v e l f e r r u g i n e o - r u f u s (oxy--datus), interdum pro parte decolor, i. e. impure albidus

vel flori lactis concolor; haud nitidus nec pruinosus; superne KHO - , $CaCl_2O_2$ - , Pd - ; stratum medullare KHO - vel + indistincte flavescens, $CaCl_2O_2$ - vel in partis albidis saepe + roseo-rubescens, Pd - . Hypothallus nullus; isidia ac soredia desunt. -- Cephalodia supra thallum sessilia, plus minusve orbicularia, 2 - 8 mm. diam., circa 1 mm. crassa, plicato-effigurata et radiatim fissa, ferrugineo-rufa vel rufofusca, interdum obscure carnea, haud nitida. -- Apothecia thallo irregulariter supersparsa, sessilia, basi bene constricta, discoidea, 1.2 - 2.3 mm. diam., margine thallino modice beneve in--crassato, integro vel saepe minute crebreque radiatim fisso, haud prominenti, thallo concolori vel dealbescenti, haud nitido; margine proprio nonnunquam visibili, prominu--lo, integro, rufo- vel purpureo-carneo; disco planius--culo, rufofusco vel purpureo-lateritio, laevigato vel scabrido, haud nitido, epruinoso. Stratum paraplecten--chymaticum excipuli sub hypothecio evolutum, 30 - 100μ crassum, hyalinum nubilatumve; hypothecium incoloratum; thecium 165 - 240μ altum, sursum pallide fuscoflavescens, ceterum levissime flavescens vel subincolor. Paraphyses apicibus submoniliformes et parum incrassatae. Sporae (6 -) 8nae, in asco uniseriatae, ellipsoideae, (19 -) 20 - 24 × 10.5 - 15.0μ. -- Pycnidia areolis immersa, saepe leviter protuberantia, ostiolis maculiformibus concavius--culis fuscis ad 0.2 mm. diam., plus minusve sphaerica vel ampullacea, ad 380μ diam., perifulcrio subincolorato para--plectenchymatico 6 - 18μ crasso; fulcris saepe ramosis, acuminatis, 9 - 14 × 1.0 - 2.5μ; pycnoconidiis filiformi--bus, arcuatis (interdum fere rectis), 18 - 24 × circa 0.6μ.

Icon. -- Pl. 1, fig. 1 (the holotype specimen); fig. 2 (holotype of "Placopsis gelida f. lateritia" Nyl.).

Hab. -- Rocks.

Distr. -- Bicentric, in Kerguelen and Fuegia; see Map 1.

KERGUELEN. Exact locality not stated, coll. ?, 1875 (U. S. Transit Exped.) (holotype) (ster.) (FH.); exact locality not stated, coll. ? (fert.) (K.), coll. Schimper (fert.) (W.), coll. ?, 1874 (Challenger Exped.) (fert.) (K., BM.); Swain's Bay, coll. Eaton (Venus Transit Exped.) (holotype of "Placopsis gelida f. lateritia") (fert.) (BM.); Cumberland Bay, coll. R. M'Cormick, 1840 (ster.) (K.); Stationsee, coll. Urbansky, 1902 (fert.) (W.); "au mont de l'Abri", coll. E. Aubert de la Rue, 1931 (fert.) (B. de Lesd.).

CHILE. Magallanes: Isla Desolación, Puerto Angosto, "in saxis litoralibus", coll. P. Dusén, 1896 (no. 199) (Nordenskjöld's Eldslandsexped.) (fert.) (S.).

Obs. 1. -- In the holotype specimen of "Placodium bicolor" no apothecia now remain; thallus well effigura-te at periphery; its cortex nubilated in outermost 6 - 11μ with small, orange-red granules, otherwise hyaline, in all 18 - 30μ deep, paraplectenchymatic, of cells 4 - 6μ diam. Medulla hyaline, compact, of hyphae 3 - 5μ diam. running in various directions, often predominantly ± vertically. Symbiotic algae 4.5 - 8.0μ diam., forming an interrupted layer 90 - 140μ deep. Cephalodia with an outer, paraplectenchymatic cortex 21 - 45μ deep, orange-yellow in section and composed of ± isodiametric, thin-walled cells 4.5 - 7.5μ diam. Medullary tissue hyaline, of parallel-conglutinated, thin-walled hyphae 3 - 5μ thick. Symbiotic algae in clumps throughout the medul-lary tissue, Scytonemoid.

Obs. 2. -- In the holotype specimen of "Placopsis ge-lida f. lateritia", no peripheral lobes are present (incomplete specimen ?); the lower paraplectenchymatic excipulum of the apothecia is 30 - 48μ deep, hyaline or faintly brownish, of ± isodiametric, thin-walled cells 4 - 6μ diam. Hypothecium hyaline, up to 120μ deep in centre, of compacted hyphae 2 - 3μ thick running in va-rious directions, chiefly ± vertically. Thecium 190 - 240μ high. Paraphyses 1.5 - 2.5μ thick, frequently branched, septate, the septa 10 - 22μ apart. Asci cy-lindric or cylindric-clavate, 150 - 210 × 12 - 23μ, with walls 1.0 - 2.5μ thick at sides, not or very slightly

thicker at apex, and stained blue then greenish-blue with iodine.

Obs. 3. -- P. bicolor seems to be a common lichen in Kerguelen. The Fuegian specimen does not differ in any appreciable respect. The degree of oxydation of the thallus is variable, some of the examples being partly cinereous-whitish or cream-coloured, and in these places a light red $CaCl_2O_2$ reaction of the medulla can be ob--tained.

Obs. 4. -- I have not seen an authentic specimen of the "Lecanora gelida var. β. vitellina"of Hooker & Taylor, but there is no doubt that it is identical with this spe--cies. Tuckerman in his original description of "Placo--dium bicolor" stated: "the infertile specimen called (notwithstanding the orange colour) Lecanora gelida by Taylor (herb.) appears to me to belong here".

Obs. 5. -- A specimen in the Kew herbarium from Ker--guelen, Cumberland Bay, shares the piece of rock upon which it was growing with Lecanora (Urceolina) kerguel--ensis (Tuckerm.) Cromb. and the doubtful "Placodium antarcticum" Müll. Arg. (= Lecanora sublateritia Zahlbr.; see p. 165).

Obs. 6. -- The two Kerguelen specimens collected by Aubert de la Rue have been recorded by Bouly de Lesdain in Ann. Cryptog. exot. IV, p. 100 & 101 (1931) as Pla--copsis bicolor and "Placopsis gelida var. vitellina" respectively.

Obs. 7. -- The records of this species from Fuegia by Räsänen in Ann. bot. Vanamo, II, p. 25 (1932) are not applicable to the true P. bicolor; one of the plants is P. Räsänenii and the other is P. parellina var. micro--phylla.

13. PLACOPSIS ALBIDA (Krphb.) M. Lamb, comb. nov.
Synon. -- Squamaria albida Krphb. apud Nyl. in Ann.

Sci. nat., Bot. sér. 4, XX,p. 277, footnote (1863), cum descript., Reise Oesterr. Fregatte Novara, Bot. Teil, I, p. 111 (1870), cum descript. Lecanora (subgen. Placo--psis) albida Nyl. in J. linn. Soc. Lond., Bot. IX, p. 251, footnote (1866), apud Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Forss. in Bih. svensk. VetenskAkad. Handl. VIII, no. 3, p. 55 (1883); Zahlbr. Cat. Lich. Univ. V, p. 665 (1928); Groenh. in Ned. kruidk. Arch. XLVI, p. 737 (1936).

Descr. -- Thallus o m n i n o l a c i n i a t u s, laciniis confertis, discretis vel imbricatis, varie ramo--sis, planis vel levissime convexis, apicibus rotundatis et obsolete crenulatis, 1 - 3 mm. longis, 0.4 - 1.0 mm. latis, 0.1 - 0.3 mm. crassis; albidus vel glauco-albidus, haud nitidus nec pruinosus, nec isidiatus nec sorediatus, KHO - vel + indistincte flavescens, $CaCl_2O_2$ + roseus, Pd - ; medulla KHO + flavescens, $CaCl_2O_2$ + rubescens, Pd - . Hypothallus evolutus, ochraceus, leviter spongiosus. -- Cephalodia e hypothallo oriunda, ochraceo-carnea, demum planata et radiatim laciniata, ad 2 mm. diam., 0.2 - 0.3 mm. crassa. -- Apothecia supra lacinias sessilia, discoidea, urceolata, ad 1.8 mm. diam., basi bene const--ricta, margine thallino thallo concolori, integro vel levissime crenato, mediocri; disco concavo planove, rufo--carneo fuscove, interdum ochraceo-pulverulento, haud ni--tido. Excipulum inferne evolutum, ibi paraplectenchy--maticum, pallide flavidum vel incoloratum; hypothecium leviter flavofuscidulum; thecium 175 - 235μ altum, su--perne sordide pallideque flavidum, ceterum incoloratum. Paraphyses apice haud vel parum incrassatae. Sporae 6 - 8nae, in asco uniseriatae, ellipsoideae, 21 - 25$\times$10.5 - 12.0μ. -- Pycnidia laciniis immersa, maculis minutis parum prominulis flavofuscis indicata, sphaerica, 120 - 250μ diam., perifulcrio incolori vel leviter flavido;

fulcris congestis, 8 - 15 × 1.0 - 1.5μ; pycnoconidiis filiformibus, arcuatis vel fere rectis, 15 - 25 × circa 0.5μ.

Icon. -- Pl. 6, fig. 27 (syntype specimen in herb. München). Further: Krphb. Reise Oesterr. Fregatte Novara, Bot. Teil, I, Tab. XII, fig. 3a, b, c, d, e (haud bona).

Hab. -- On decomposing rock.

Distr. -- Java.

JAVA. Exact locality not stated, coll. Jelinek (syn--type) (fert.) (M., W.).

Obs. 1. -- In the Vienna syntype, the thallus has an upper cortex 15 - 20μ deep composed of cells 3 - 6μ diam.; medulla of loosely interwoven, colourless hyphae 2.5 -5.0 μ thick running in various directions, and passing gradu--ally down into the chiefly horizontally contexted, yel--low-brown hyphae of the hypothallus. Symbiotic algae 5- 10μ diam., forming a continuous and ± even stratum 30 - 40μ deep. Cephalodia with an outer cortex 18 - 26μ deep, formed of ± isodiametric, thin-walled cells 3 - 5μ diam.; medullary tissue colourless, compact, of interwo--ven, thin-walled hyphae 3 - 4μ thick running chiefly ± vertically; symbiotic algae Nostocoid, in large clumps in the medullary tissue. Paraplectenchymatic cells of lower excipulum ± isodiametric, thin-walled, 5 - 9μ diam., staining blue with iodine; hypothecium up to 80μ deep, of compacted hyphae 1 - 2μ thick running in various di--rections, staining dirty green-blue with iodine. Para--physes septate, the septa 6 - 12μ apart; asci cylindri--cal, 150 - 200 × 9 - 18μ, with walls 1 - 3μ thick at sides, at apex thickened up to 7.5μ, persistently blue with iodine.

Obs. 2. -- P. albida is a small but elegant species, easily recognisable by its finely laciniate thallus. It is unfortunate that no records of exact locality or al--titude have been preserved.

14. PLACOPSIS PYCNOTHECA M. Lamb

apud Räs. in An. Soc. cient. argent. CXXVIII, p. 139 (1939), cum descript. (excl. synon.)

Descr. -- Thallus (effiguratus ? [14]) plagas ut vide--tur sat latas efficiens, 0.2 - 1.0 mm. crassus, haud rimosus, p l i c a t o - v e r r u c o s u s, verrucis irregularibus, subhemisphaericis vel subglobosis, 0.3 - 0.9 mm. diam., passim concrescentibus ac superficiem in--aequatam plicatamque formantibus; sordide eburneus vel fuscocinerascens, opacus, haud vel partim subtiliter al--bido-pruinosus, extus intusque KHO - , $CaCl_2O_2$ + rubes--cens, Pd - . Isidia ac soredia nulla; hypothallus deest. -- [Paracephalodia [15] saltem in specim. orig. evoluta; numerosa, thallo irregulariter supersparsa, sessilia, subglobosa, 0.40 - 0.75 mm. diam., laevigata, integra, basi bene constricta, sordide flavofuscescentia, opaca, epruinosa.] -- Cephalodia sessilia, sparsa, de--planato-discoidea, 1.0 - 2.5 mm. diam., ad 0.3 mm. cras--sa, radiatim plicato-effigurata, haud rimosa, paracepha--lodiis concoloria vel demum obscurioria (ferrugineo-fuscescentia), haud nitida. -- Apothecia thallo irregu--lariter supersparsa, sessilia, basi bene constricta, discoidea, 1.2 - 1.8 mm. diam., margine thallino primum prominulo, modice incrassato, integro, opaco, interdum leviter albo-pruinoso, dein fere excluso; margine prop--rio demum subprominenti, tenui, carneo-fusco, opaco, saepe pruina subtili alba superfuso; disco plano, laevi--gato, interdum rimosulo, obscure rufofusco vel aetate nigrofusco vel nigrescenti, opaco, nudo; s t r a t u m p a r a p l e c t e n c h y m a t i c u m b a s a l e e x c i p u l i p e r b e n e e v o l u t u m (225 - 300μ crassum), firmum, nubilatum; hypothecium incolora--tum; thecium 135 - 155μ altum, superne leviter flavo--fuscescens, ceterum incoloratum. Paraphyses apicibus haud incrassatae. Sporae 6 - 8nae, in asco uni- vel partim biseriatae, e l o n g a t o - e l l i p s o i - - d e a e vel rarius ellipsoideae, (15 -) 18 - 24 x

(6 -) 7 - 8 (- 8.5)μ. -- Pycnidia verrucis thallinis immersa, maculis fusconigrescentibus circa 0.1 mm. latis indicata; subpyriformia, ad 285μ diam., perifulcrio ob--solescenti, hyalino, indistincte paraplectenchymatico. Fulcra (copia visa pallide rosea) saepe ramosa, acumi--nata, 12 - 18μ longa, 1.0 - 1.2μ crassa. Pycnoconidia filiformia, leviter arcuata vel fere recta, 16 - 21 × circ--ca 0.5μ.

Icon. -- Text-fig. 6 (portion of the holotype speci--men).

Hab. -- On soil.

Distr. -- Chile.

CHILE. Llanquihue: Rio Manso, altit. circ. 850 m., coll. A. Donat, 1936 (no. 854) (holotype) (fert.) (Räs.).

Obs. 1. -- In the holotype specimen the thallus is in most places covered by a semi-amorphous, colourless stra--tum 4 - 8μ thick. Cortex 18 - 30μ deep, pallid brown--ish, not nubilated, paraplectenchymatic, of cells 4.5 - 8.0μ diam. Medulla compact or with a few small air spa--ces, nubilated, formed of interwoven hyphae 3 - 4μ thick running in various directions; towards the base this tis--sue is more compacted and brown by degeneration. Sym--biotic algae 8 - 12μ diam., bright green , forming an interrupted stratum 45 - 90μ deep. Paracephalodia not covered by any semi-amorphous layer; their cortex light brown, less distinctly paraplectenchymatic than that of the thallus, made up of compacted, shortly septate, thin-walled hyphae 3 - 5μ thick running in various directions; inner medullary tissue as in the thallus; directly below the cortex they contain a ± even layer 45 - 80μ deep of bright green thalline algae derived from upward invagina--tion of the gonidial layer of the thallus. Cephalodia covered by an outer, hyaline, semi-amorphous layer 8 - 20 μ deep; underlying cortex 12 - 25μ deep, yellow-brown (colourless in inner half), paraplectenchymatic, of ± isodiametric, thin-walled cells 3.5 - 5.0μ diam.; medul--lary tissue colourless, paraplectenchymatic, of ± isodia--metric or slightly elongated, thin-walled cells 4 - 6 (- 8)μ diam.; symbiotic algae Nostocoid, pale blue-green, orange-red, or almost colourless, filling up most of interior of cephalodium. Lower, paraplectenchymatic,

excipular layer composed of ± isodiametric, thin-walled cells 6 - 10μ diam.; hypothecium up to 120μ deep at centre, formed of compacted, interwoven hyphae 2 - 4μ thick running in various directions. Paraphyses 1.5 - 2.0μ thick, often branched, not moniliform at tips, septate with septa 8 - 18μ apart. Asci clavate or cylindric-clavate, 90 - 130 × 10 - 14μ, with colourless wall 1.0 - 1.2μ thick at sides, at apex not or only slightly thicker (up to 3μ), and blue (subsequently decolorised) with iodine.

Obs. 2. -- Distinct chiefly by reason of the massive, paraplectenchymatic excipulum and the elongated spores. The paracephalodia are perhaps not of constant occurrence.

15. PLACOPSIS ASAHINAE M. Lamb, sp. nov.

Descr. -- Thallus determinatus, effiguratus, plagas plus minusve orbiculares, saepe confluentes, substrato arcte adhaerentes, 0.5 - 2.0 cm. diam. efficiens; ad peripheriam lobatus, laciniis fere tota longitudine adnatis, plicis (nec rimis) separatis, 1.0 - 1.5 mm. longis, 0.8 - 1.0 mm. latis, 0.15 - 0.20 mm. crassis, irregulariter ramosis, apicibus rotundato-sinuatis vel lobatis; in centro subcontinuus, h a u d a r e o l a t u s, parce rimosus, ad 0.4 mm. crassus, tuberculis thallinis (pycnidia continentibus) subglobosis, 0.15 - 0.20 mm. diam. (apicibus ostiolis punctiformibus fuscescentibus munitis) creberrime obtectus; flori lactis concolor, nec nitidus nec pruinosus, extus intusque KHO -, $CaCl_2O_2$ + roseo-rubescens, Pd - ; hypothallus nullus visibilis; isidia et soredia desunt. -- Cephalodia in parte centrali plagarum minorum, in plagis majoribus irregulariter dispersa, sessilia, deplanata, plus minusve discoidea, 0.3 - 0.8 (- 1.25) mm. diam., ad 0.3 mm. crassa, obsolete effigurata, haud rimosa; carnea lateriave, haud nitida. -- Apothecia numerosa, irregulariter sparsa, sessilia, discoidea, basi bene constricta, 0.6 - 0.8 (- 1.0) mm. diam., margine thallino mediocri, integro, deinque depresso; margine proprio interdum visibili,

n i g r e s c e n t i, tenui, haud prominenti; disco plano vel leviter concavo, n i g r e s c e n t i f u s- - c o n i g r e s c e n t i v e, nec nitido nec pruinoso. Excipulum inferne evolutum, ibi paraplectenchymaticum, nubilatum; hypothecium incolor; thecium 98 - 156μ altum, sursum nubilatum, ceterum incoloratum. Paraphyses apici- -bus parum incrassatae. Sporae 8nae, in asco partim bi-, partim uniseriatae, e l o n g a t o - v e l f u s i - - f o r m i - e l l i p s o i d e a e, 16 - 18×6 - 7μ.-- Pycnidia extus verruculis indicata (vide supra), globo- -sa subpyriformiave, ad 210μ diam., perifulcrio nubilato, haud paraplectenchymatico, 15 - 20μ crasso; fulcris ra- -mosis, 10 - 15×1.0 - 1.5μ; pycnoconidiis filiformibus, leviter arcuatis vel fere rectis, 15 - 18×circa 0.5μ.

Icon. -- Pl. 8, fig. 35 (paratype specimen in Vienna herbarium).

Hab. -- On basaltic rock.

Distr. -- Formosa.

FORMOSA (TAIWAN). Tainan: Mt. Arisan, coll. Y. Asah- -ina, 1925 (holotype) (fert.) (Asah.), (paratype) (fert.) (W.).

Obs. 1. -- In the holotype specimen, the thallus is covered by an outermost, colourless, amorphous layer 4.5 - 8.0μ thick; cortex 12 - 15μ deep, nubilated, paraplec- -tenchymatic, of cells 4.5 - 6.0μ diam.; medulla partly nubilated, fairly compact, of interwoven hyphae 2.5 - 4.0 μ thick running in various directions. Symbiotic algae 6 - 11μ diam., forming a continuous and even stratum 35 - 50μ deep. Cephalodia with an outer, ± hyaline, para- -plectenchymatic cortex 40 - 45μ deep composed of ± iso- -diametric, thin-walled cells 5 - 8μ diam.; medullary tissue similar in structure to the cortex, but with smal- -ler and often vertically elongated cells; symbiotic al- -gae Scytonemoid, filling up almost entire inner part of cephalodium. Cells of lower excipular stratum ± isodia- -metric, thin-walled, 6 - 9μ diam.; hypothecium of com- -pacted, indistinct hyphae 1.5 - 2.0μ thick running in various directions. Paraphyses often branched, septate, the septa (visible on staining with iodine) 8 - 12μ

apart; asci clavate, 96 - 120×12 - 15μ, with walls about 1.5μ thick at sides, not or only slightly thickened at apex, and persistently pale blue with iodine.

Obs. 2. -- P. Asahinae bears a superficial resemblance to the f. tuberculifera of P. cribellans, on account of the very numerous tuberculate swellings in the central parts of the thallus, but on examination under a lens the pycnidial nature of the swellings is revealed by the brown ostioles at their apices. It is distinguished from P. parellina by its blackish apothecial discs, lower thecium, longer, narrower spores, etc.

Obs. 3. -- The paratype specimen of this species was recorded as "Lecanora gelida" by Zahlbruckner in Repert. nov. Spec. Regn. veg. XXXIII, p. 53 (1933).

16. PLACOPSIS LESDAINII M. Lamb, sp. nov.

Descr. -- Thallus determinatus, plagas plus minusve orbiculares 2.5 - 3.5 cm. latas efficiens, ambitu effi--guratus; laciniis ad peripheriam adnatis, 2.5 - 7.0 mm. longis, 0.8 - 2.0 mm. latis, rimis tenuibus separatis, irregulariter ramosis, t u m i d o - c o n v e x i s (apicibus deplanatis, substrato arcte adhaerentibus, rotundatis vel obsolete crenulatis); in centro inaequa--lis, parce et irregulariter rimosus, o m n i n o v e r- - r u c u l o s u s, 0.6 - 0.7 mm. crassus, verruculis congestis, 0.15 - 0.40 (- 0.6) mm. latis, plus minusve hemisphaericis vel etiam subglobosis, inferne in strato thallino continuo unitis; cinerascens vel flavidocinera--scens, opacus, haud pruinosus, extus intusque KHO - vel + obsolete flavescens, $CaCl_2O_2$ + roseo-rubescens (vel passim superne -), Pd - ; exisidiatus, esorediatus; hypothallus haud evolutus. -- Cephalodia thallo irregu--lariter supersparsa, primo varie tumida plicataque, dein deplanata, suborbicularia, parva (ad 1 mm. lata, 0.3 mm.

crassa), leviter plicato-effigurata, haud rimosa, car--neo-flavida, opaca. -- Apothecia sparsa, numerosa, ses--silia, discoidea, basi leviter vel bene constricta, p a r v a (0.6 - 0.8 mm. diam.); margine thallino in--tegro, prominulo vel demum nonnihil depresso; margine pròprio interdum visibili, tenuissimo, integro, haud pro--minenti, disco concolori, opaco; disco leviter concavo aut plano, flavidocarneo, opaco, epruinoso, haud rimoso sed saepe irregulariter sulcato. S t r a t u m i n--f e r i o r e x c i p u l i d e e s t; hypothecium incoloratum; thecium 135 - 165μ altum, superne nubilatum, ceterum incoloratum. Paraphyses apicibus haud incrassa--tae, ibi moniliformi-proliferentes. Sporae 8nae, in asco uniseriatae, ellipsoideae, 13.5 - 15.0 $\times$ 7 - 8μ.

Icon. -- Text-fig. 7 (portion of the holotype speci--men).

Hab. -- On basaltic rock.

Distr. -- S. E. Australia.

AUSTRALIA. Victoria, Evelyn: Yarra Bend, coll. F. Wilson (no. 296) (holotype) (fert.) (B. de Lesd.).

Obs. 1. -- In the holotype specimen, the thallus is in places covered by an outermost, hyaline, amorphous layer up to 6μ thick; the underlying cortex is 12 - 27μ deep, densely nubilated, paraplectenchymatic, of cells 3 - 5μ diam. Medulla fairly compact, but with small air-cavi--ties, nubilated, composed of interwoven hyphae 3.0 - 4.5 μ thick running in various directions. Symbiotic algae 5 - 9 (- 11)μ diam., bright or pale green, forming a slightly interrupted stratum 75 - 95μ deep. Cephalodia with an outer, pale yellowish, paraplectenchymatic cortex 21 - 36μ deep and formed of $\pm$ isodiametric, thin-walled cells 4 - 6μ diam.; inner medullary tissue colourless, $\pm$ paraplectenchymatic, of cells 4.5 - 6.0 $\times$ 3.0 - 4.5μ; symbiotic algae Scytonemoid, blue-green, forming a deep and $\pm$ even stratum extending through whole depth of cepha--lodium. Hypothecium rests directly on underlying medul--lary tissue of thallus, no basal excipular layer being present; obconical in section, composed of compacted and interwoven hyphae 3 - 4μ thick running in various direc-

-tions, but chiefly ± vertically (or obliquely upwards at sides); staining blue with iodine. Paraphyses 1.5 - 2.0μ thick, frequently branched, budding off copious, minute, conidia-like fragments, which form a nubilated epithecium; septate with septa 9 - 18μ apart. Asci cy--lindric or cylindric-clavate, 100 - 120×8 - 15μ, with wall 1.0 - 1.5μ thick at sides, at apex not or slightly thicker (up to 3μ); persistently blue with iodine. [No pycnidia seen.]

Obs. 2. -- This species evidently belongs to the P. perrugosa-group, as shown by the morphology of the thallus and the rather lax medulla. The absence of any basal, paraplectenchymatic, excipular layer below the hypotheci--um seems to be a constant character, for several apothe--cia were sectioned, and the same structure found in all of them.

17. PLACOPSIS PERRUGOSA (Nyl.) Nyl.
Lich. Nov. Zel. p. 57 (1888),[16] cum descript.

Synon. -- Lecanora perrugosa Nyl. in Flora, Regens--burg, XLVIII, p. 338 (1865), cum descript., in J. linn. Soc. Lond., Bot. IX, p. 250 (1866), cum descript.; Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Zahlbr. in K. svenska VetenskAkad. Handl. LVII, no. 6, p. 36 (1917), Cat. Lich. Univ. V, p. 669 (1928). Squamaria perrugosa Nyl. apud Kn. in Trans. Proc. N. Z. Inst. VII, p. 363 (1875), cum descript. Placodium perrugosum Müll. Arg. in Nuovo G. bot. ital. XXI, p. 40 (1889); Hellb. in Bih. svensk. VetenskAkad. Handl. XXI, afd. III, no. 13, p. 60 (1896). Squamaria thaumasta Stirt. in Ann. Rept. Trans. Soc. Field Natural., Glasgow, I, p. 17 (1873), cum descript., in Trans. Proc. N. Z. Inst. VI, p. 237 (1874), cum descript., in J. linn. Soc. Lond., Bot. XIV, p. 462 (1875), cum descript. Placodi--um thaumastum Müll. Arg. in Bull. Herb. Boissier, II, append. I, p. 47 (1894); Hellb. in Bih. svensk. Veten--skAkad. Handl. XXI, afd. III, no. 13, p. 60 (1896).

Descr. -- Thallus effiguratus, laciniis ad peripheri-
-am substrato arcte adnatis, d i s c r e t i s, p t e -
- r y g o i d e o - e x p a n s i s, 1.5 - 3.0 mm. lon-
-gis, 0.7 - 1.5 mm. latis, 0.2 - 0.4 mm. crassis, irregu-
-lariter subdichotome vel sympodialiter ramosis, apicibus
rotundatis subcuneatisve; in centro omnino p a p i l -
- l a t o - v e r r u c u l o s u s et saepissime rimo-
-sus, rimis hiantibus 0.2 - 0.3 mm. latis areolas vel
insulas angulosas 0.6 - 1.3 mm. latas circumscribentibus,
verruculis congestis hemisphaericis 0.2 - 0.5 mm. diam.,
substrato thallino enatis, apicibus saepe ostiolis soli-
-tariis nigrescentibus pycnidiorum munitis; 0.3 - 1.0
(- 2.0) mm. crassus, colorem haud paulum varians: flo-
-ri lactis concolor, flavidocinerascens, fuscocinerascens
vel olivaceo-fuscescens; opacus, haud vel interdum non-
-nihil albidopruinosus, extus KHO + leviter sordide fla-
-vescens vel - , $CaCl_2O_2$ + roseo-rubescens vel - , Pd - ,
intus KHO + indistincte flavescens vel - , $CaCl_2O_2$ + ro-
-seo-rubescens, Pd - . Isidia ac soredia desunt; hypo-
-thallus nullus visibilis. -- Cephalodia thallo sessilia,
irregulariter disposita, aut deplanata suborbicularia,
2 - 5 mm. diam., 0.4 - 0.7 mm. crassa, laciniato-effigu-
-rata vel radiatim rimosa, aut rotundato-tuberculiformia,
solitaria congestave, 1.0 - 2.8 mm. diam. et ad 1 mm.
crassa, aut (raro) verrucoso-glomerata, haud effigura-
-ta, 3 - 5 mm. diam., ad 2 mm. crassa; sordide flaves-
-centia, carnea, vel ferruginea, haud nitida. -- Apothe-
-cia thallo enata et irregulariter supersparsa, sessilia,
basi modice vel bene constricta, rotundata, 1.0 - 1.3 mm.
diam., margine thallino mediocri, prominulo, integro vel
leviter crenulato, opaco, haud pruinoso cincta; disco
plano, fuscocarneo fuscove (aetate fusconigrescenti),
opaco, nudo. Excipulum sub hypothecio evolutum, para-
-plectenchymaticum, pallide sordide flavescens, saepe

nubilatum. Hypothecium incoloratum vel subflavescens. Thecium (100 -) 120 - 190 (- 200)μ altum, superne pallide flavescens vel fuscoflavescens, praeterea incolo--ratum. Paraphyses apicibus parum vel modice incrassa--tae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 15 - 18 (- 21)×7 - 9 (- 10)μ. -- Pycnidia verrucu--lis thallinis immersa, vulgo numerosa, solitaria, extus ostiolis punctiformibus fusconigrescentibus 0.1 - 0.2 mm. diam. indicata; sphaerica vel ampullacea, 120 - 225μ diam., perifulcrio hyalino; fulcris acuminatis, 1.0 - 1.5 μ crassis; pycnoconidia filiformia, arcuata vel fere recta, 18 - 24×0.5μ.

Icon. -- Pl. 1, fig. 4 (the holotype specimen, nat. size); Pl. 10, fig. 41 (part of the same, magnified); fig. 42 (an abundantly fruiting specimen from Australia, Mount Macedon). Further: Kn. in Trans. Proc. N. Z. Inst. VII, tab. XXIII, fig. 19 (1875) (section of thal--lus and of apothecium, and an ascus with spores).

Exsicc. -- Lojka, Lich. Univ. 126 ("Lecanora perru--gosa") (K,M.).

Hab. -- Rocks.

Distr. -- Bicentric, or perhaps better expressed as circumpolar -- New Zealand, Tasmania, Australia, Tristan da Cunha, and southernmost S. America (with an equatori--al outlier in the Galapagos Islands); see Map 1.

NEW ZEALAND. Exact locality not stated, coll. Jelinek (fert.) (M.), coll. C. Knight (fert.) (H., M., WELT.), coll. C. Knight (Lojka, Lich. Univ. 126)(fert.) (K., M.); North Island, Coromandel: Stony Bay, coll. L. Cranwell, 1933 (fert.) (Redgr.); Hutt: Tararua Mts., altit. circ. 600 m., coll. E. Chamberlain, 1933 (no. 194) (fert.) (W.); near Wellington, coll. J. Buchanan, (holotype of "Squamaria thaumasta" Stirt.) (ster.) (BM.); South Island, Akaroa: Banks Peninsula,

Little River, coll. S. Berggren, 1874 - 5 (fert.) (S.); Waikouaiti: Lamb Hill near Dunedin, coll. J. Thomson, 1933 (fert.) (W., Redgr.); Ross Creek Reservoir near Dunedin, coll. J. Thomson, 1933 (fert.) (W.); Blue--skin Bay, coll. S. Berggren, 1874 (fert.) (S.); Dunedin, coll. Lauder Lindsay, 1861 (holotype) (fert.) (H.).

TASMANIA. Exact locality uncertain, coll. Archer (fert.) (K.).

AUSTRALIA. Victoria, Bourke (or Dalhousie ?): Mt. Macedon, coll. F. Wilson, 1889 (no. 296) (fert.) (B. de Lesd.); Victoria (or N. S. Wales ?): "Australian Alps", altit. circ. 460 m., coll. Haast (fert.) (K.).

CHILE. Magallanes: Basket Island, off Brecknock Penin--sula, coll. Spegazzini, 1882 (no. 52) (fert.) (H., W.); Peel Inlet, on south side of Chatham Island, coll. ?, (Swed. Antarct. Exped.) (fert.) (W.); Isla Desolación, Puerto Angosto, coll. P. Dusén, 1896 (nos. 198 & 201) (Nordenskjöld's Eldslandsexped.) (fert.) (S.); Llanquihue: Rio Aisen, altit. circ. 1500 m., coll. A. Donat, 1933 (no. 22) (ster.) (Räs.).

GALAPAGOS ISLANDS. Exact locality not stated, coll. ?, 1872 (Hassler Exped.) (fert.) (BM.).

TRISTAN DA CUNHA. East end of Inaccessible Plateau, altit. 350 m., coll. E. Christophersen, 1938 (no. 2512) (ster.) (O.); Cave Gulch, altit. 700 m., coll. Y. Mejland, 1938 (no. 1524) (fert.) (O.).

Obs. 1. -- In the holotype specimen (no. 23872 in herb. Nyl.), the thallus has an upper, nubilated, para--plectenchymatic cortex 12 - 20μ deep composed of cells 3 - 5μ diam. Medulla lax, nubilated in patches, of loosely interwoven hyphae 3 - 4μ thick running in various directions; towards the base of the thallus the medullary hyphae are more densely packed and yellowish or yellow-brown (by degeneration), thus forming the continuous hyphal layer upon which the thalline verruculae are borne.

Symbiotic algae 6 - 12μ diam., bright green, occurring only in the upper parts of the thalline verruculae as a layer 35 - 75μ deep. Cephalodia of the flattened, effi--gurate type, with an outer, paraplectenchymatic cortex 18 - 45μ deep (yellow-brown in outer 15 - 20μ) composed of ± isodiametric, fairly thin-walled cells 2.5 - 4.0μ diam.; medullary tissue colourless, para- or prosoplec--tenchymatic, of conglutinated, isodiametric or somewhat radiately elongated cells 6 - 12 × 6 - 9μ with walls 1.3 - 2.0μ thick; symbiotic algae Scytonemoid, blue-green, in irregularly distributed masses throughout almost whole depth of cephalodium. Lower paraplectenchymatic stratum of excipulum faintly brownish-yellow, of ± isodiametric, thin-walled cells 4 - 7μ diam.; hypothecium bowl-shaped, up to 270μ deep in centre, of compacted and interwoven hyphae 1.0 - 1.5μ thick running in various directions. Thecium 114 - 150μ high. Paraphyses 1 - 2μ thick, fre--quently branched, septate with septa 4 - 15μ apart. [No mature asci or spores seen in the holotype specimen.] Walls of immature asci persistently blue with iodine.

Obs. 2. -- Apparently a common species in the southern hemisphere, and most common in New Zealand. The tessel--ate-verruculose thallus and the discrete, flattened, ex--panded, peripheral lobes are very characteristic, and allow the species to be recognised without difficulty. P. rugosa, the only species which might be confused with it, is a coarser plant and has a much higher thecium. The thallus of P. perrugosa varies considerably in colour in different individuals, probably in response to the degree of exposure and illumination; in extreme cases it may be dark olive-brown, as in a specimen from Chile, Rio Aisen, coll. Donat, in which it corresponds to Pl. XL. 19‴ m or Pl. XLVI. 17⁗ k in Ridgway's "Color Standards" (1912). The spores are as a rule up to 18 × 9μ, but in a specimen from Tasmania, coll. Archer, they reach a size of 21 × 10μ.

Obs. 3. -- A specimen from S. Chile, Peel Inlet, col--lected by the Swedish Antarctic Expedition, was growing together with P. parellina var. carnea f. subcribellans, and one from Isla Desolación, coll. Dusén, was accompanied by P. rugosa, the habitual difference between these two

related species being well shown.

Obs. 4. -- C. Knight, in Trans. Proc. N. Z. Inst. VII, p. 364 (1875), published a new variety, "Squamaria per--rugosa var. neglecta", found by him in New Zealand, and said to differ from the typical species in thalline chara--cters and larger spores. It is listed as "Lecanora per--rugosa var. neglecta" in Zahlbr. Cat. Lich. Univ. V, p. 669 (1928). I have not succeeded in obtaining any type or authentic material of this variety, and as Knight's description is insufficient to allow of certain recog--nition, I propose to discard it as a doubtful entity, at any rate until such time as the original specimen may be found.

18. PLACOPSIS CONTORTUPLICATA M. Lamb, sp. nov.

Descr. -- Thallus plus minusve orbicularis, ad 13.5 cm. diam., sed plerumque ut videtur minor; ambitu effigu--ratus, lobis connatis vel leviter discretis, indetermi--natis, tumidis, verrucosis, apicibus haud vel parum di--latatis, 0.5 - 1.0 mm. latis, centrum versus sensim in verrucas thallinas abeuntibus; in centro omnino c o n - - t o r t u p l i c a t o - v e r r u c o s u s vel fere cerebriformis, verrucis substrato thallino (vel hypothal--lino ?) continuo enatis, congestis, 0.4 - 1.0 mm. diam., rotundatis, ad basin constrictis, varie contortis vel passim breviter intestiniformibus; 0.6 - 1.5 mm. cras--sus, albidocinerascens, opacus subnitidusve, haud prui--nosus, extus KHO - vel + sordide subflavescens, $CaCl_2O_2$ - , Pd - , intus KHO + obsolete flavescens, $CaCl_2O_2$ + roseo-rubescens, Pd - . Isidia ac soredia nulla. -- Cephalodia in thallis majoribus numerosa, subconcentrice dispersa, substrato continuo thallino (aut hypothallino ?) enata, verrucas thallinas haud vel parum superantia, plerumque simplicia, subglobosa, 0.8 - 1.6 (- 2.5) mm.

diam., basi constricta, aut interdum verrucoso-lobata; aurantiaco-rufescentia vel flavido-ferruginea, superficie laevigata, haud nitida. -- Apothecia sessilia, discoidea, d e m u m m a g n a (1.0 - 2.5, etiam 3.5 mm. diam.), basi bene constricta, margine thallino integro, haud pro--minulo, m o x e x c l u s o (ita faciem lecideinam simulanti); margine proprio plerumque evoluto, prominen--ti, integro, tenui, fusco nigrescentive (disco subcon--colori); disco plano vel leviter convexo, laevigato vel minute scabridulo, nigro,[17] opaco. Stratum paraplecten--chymaticum excipuli sub hypothecio bene evolutum, 150 - 240μ crassum, nubilatum; hypothecium leviter subflavesc--ens vel fere incoloratum; thecium 140 - 170μ altum, su--perne fuscidulum, ceterum hypothecio concolor. Paraphy--ses apicibus haud vel parum incrassatae. Sporae 8nae, in asco uniseriatae vel interdum partim biseriatae, ellip--soideae, 18 - 21 × 8.5 - 13.0μ. -- Pycnidia verrucis tha--llinis immersa, apicibus maculis minutis punctiformibus fuscidulis notata; sphaerica, ad 425μ diam., perifulcrio hyalino et indistincte paraplectenchymatico. Fulcra subulato-acuminata, ramosa, ad 30μ longa, 1.0 - 1.5μ crassa. Pycnoconidia filiformia, fere recta vel leviter arcuata, 21 - 25 × circa 0.5μ.

Icon. -- Pl. 3, fig. 15 (the holotype specimen); Pl. 10, fig. 44 (a portion of the same magnified); fig. 45 (apothecia of a specimen from the South Orkneys).

Hab. -- Rocks and stones. A collector's note attach--ed to the small fertile South Orkneys specimen states: "Found growing on little stones in the mud and water of sluggish streams on the scree slope".

Distr. -- The South Orkneys and South Shetlands, is--lands off the Graham Land promontory of Antarctica.

SOUTH ORKNEYS. Signy Island: Borge Bay, coll. ?,

1933 (no. 254) ("Discovery" Exped.) (fert.) (BM.).

SOUTH SHETLANDS. King George Island: Visca Anchorage, Martel Inlet, Admiralty Bay, coll. T. Hart, 1934 ("Dis--covery" Exped.) (holotype) (fert.) (BM.), (nos. 7 & 33) (ster.) (BM.); Admiralty Bay, E. side of Mackellar Inlet, "on level stoney ground a yard or two behind sea", coll. ?, 1937 ("Discovery" Exped.) (ster.) (BM.).

Obs. 1. -- In the holotype specimen, the thallus is covered by an outermost, hyaline, indistinctly stratified layer 6 - 10μ deep derived from degeneration of the upper, cortical cells; cortex 20 - 60μ deep, nubilated, para--plectenchymatic, of cells 3 - 6μ diam. Medulla lax, hyaline, composed of loosely interwoven hyphae 2.5 - 4.5μ thick running in various directions. The lower, continu--ous, hypothalline (?) layer is similar in structure to the medulla, but much more compact in texture. Symbiotic algae 4.5 - 10.0μ diam., bright green, forming an inter--rupted, uneven stratum, 40 - 120μ deep. Cephalodia with an outer, paraplectenchymatic cortex 25 - 45μ deep (or--ange-yellow in outer 9 - 16μ, otherwise colourless) of ± isodiametric, thin-walled cells 3 - 5μ diam.; inner medullary tissue colourless, prosoplectenchymatic, of thin-walled cells 3.0 - 4.5μ broad with parallel arrange--ment in strands running between the algal nests; symbi--otic algae Nostocoid, pale blue-green to orange-yellow, lying in rounded clumps throughout almost whole depth of cephalodium. Lower, paraplectenchymatic stratum of ex--cipulum consists of ± isodiametric, fairly thin-walled cells 4.5 - 7.0μ diam.; hypothecium up to about 300μ deep in centre, of compacted, interwoven hyphae 2.0 - 3.5 μ thick running in various directions. Paraphyses 1.3 - 2.0μ thick, sometimes branched, abstracting nubilated, conidia-like, epithecial particles from their tips; sep--tate, with septa 8 - 18μ apart. Asci cylindric-clavate, 110 - 150×15 - 18μ, with wall 1.5 - 2.5 (- 3)μ thick all round, and persistently light blue with iodine.

Obs. 2. -- In outward appearance this is the most stri--king species of the genus, and peculiar not only in mor--phological respects but also in its Euantarctic distri--bution. It must be a characteristic constituent of the lichen-vegetation of exposed rock faces in the South Ork--neys and Shetlands. The affinity to other members of

the P. perrugosa-group is unmistakable, but nevertheless by its remarkably plicate-verrucose thallus, large and finally almost immarginate apothecia, and other distinc--tive features it stands widely separated from all other species. Is it perhaps a relic of the ancestral type of the group, once widely distributed round the coasts of the Antarctic continent from which the bicentric species are by some considered to have had their origin ?

19. PLACOPSIS RUGOSA M. Lamb, sp. nov.

Synon. -- Lecanora perrugosa var. brevilobata Zahlbr. mscr. in herb.

Descr. -- Thallus determinatus, effiguratus, plagas circa 7 cm. latas formans, laciniis ad peripheriam a d - - n a t i s, rimis tenuibus separatis, substrato arcte vel laxe adhaerentibus, 2 - 13 mm. longis, 0.7 - 1.0 mm. latis, 0.25 - 0.50 mm. crassis, varie sympodialiter vel subdichotome ramosis, t u m i d i s (modo extremitatib--us deplanatis), laevigatis vel interdum transversim ± corrugatis, apicibus haud vel parum expansis, ibi rotun--datis; i n c e n t r o a r e o l a t o - p a p i l- - l o s u s (ut in P. perrugosa), ad 0.9 mm. crassus, areolis irregulariter angulosis 0.7 - 2.0 mm. diam. (ri--mis fere hiantibus ad 0.25 mm. latis separatis), super--ficie congesto-verruculosus (verruculis 0.3 - 0.7 mm. diam., saepe pycnidia continentibus); albido-eburneus vel flori lactis concolor, opacus, nudus, extus KHO - vel ± subflavescens, $CaCl_2O_2$ - , Pd - , intus KHO - , $CaCl_2O_2$ ± rubescens, Pd - . Isidia et soredia desunt; hypothal--lus nullus visibilis. -- Cephalodia numerosa, thallo irregulariter supersparsa, sessilia vel inter verruculas sita, demum rotundata, deplanata, radiatim plicato-effi--gurata, 1 - 5 mm. diam., ad 0.3 mm. crassa, carnea vel fuscorufescentia, opaca. -- Apothecia sparsa, sessilia, basi bene constricta, 1.0 - 1.5 mm. diam., discoidea,

margine thallino persistenti, crassiusculo, integro vel rugoso-crenulato, thallo concolori aut discum versus pal--lide rufescenti; margine proprio indistincto vel nullo; disco subconcavo planove, rufofuscescenti, haud nitido, interdum pallide ochraceo-pruinoso. Excipulum sub hypo--thecio evolutum, ad 120μ crassum, paraplectenchymaticum, dense nubilatum; hypothecium fere ejusdem crassitudinis, incoloratum; thecium 200 - 240μ altum, sursum nubilatum, ceterum incoloratum. Paraphyses apicibus leviter incras--satae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 20 - 23×10 - 13μ. -- Pycnidia verruculis thallinis im--mersa, extus ostiolis punctiformibus fuscis circa 0.1 mm. latis indicata; subsphaerica, ad 390μ diam., perifil--crio nubilato, paraplectenchymatico; fulcris acuminatis, plerumque ramosis, 10 - 18μ longis, 1.0 - 1.5μ crassis; pycnoconidiis filiformibus, arcuatis vel interdum fere rectis, 18 - 21×0.5μ.

Icon. -- Pl. 2, fig. 8 (specimen -- not type -- from Fuegia, Isla Desolación).

Hab. -- Rocks.

Distr. -- Bicentric: New Zealand and Fuegia.

NEW ZEALAND. South Island, Waikouaiti: Abbot's Hill near Dunedin, coll. J. Thomson, 1934 (holotype) (fert.) (W.).

CHILE. Magallanes: Isla Desolación, Puerto Angosto, "in saxis litoralibus", coll. P. Dusén, 1896 (no. 201*) (Nordenskjöld's Eldslandsexped.) (fert.) (S.).

Obs. 1. -- In the holotype specimen from New Zealand, the peripheral laciniae are not so well developed as in the Fuegian example, being only 1.5 - 2.5 mm. long; thallus covered in places by a colourless, semi-amorphous layer 4 - 9μ thick, derived from disintegration of corti--cal cells. Cortex 9 - 15μ deep, nubilated, paraplec--tenchymatic, of cells 4 - 5μ diam. Medulla lax, with numerous air-spaces, nubilated, of loosely interwoven hyphae 3 - 4μ thick running in various directions. No

distinctive hypothalline tissue developed. Symbiotic algae 8.5 - 14.0μ diam., bright green, forming an inter-rupted stratum 60 - 120 (- 150)μ deep. Cephalodia with an outer, orange-brown-nubilated, paraplectenchymatic cortex 20 - 30μ deep composed of ± isodiametric, thin-walled cells 4 - 5μ diam.; medullary tissue colourless, prosoplectenchymatic, of thin-walled cells 4 - 9 × 2 - 3μ; symbiotic algae Scytonemoid, orange-reddish, forming ir-regular clumps throughout the medullary tissue. Lower, paraplectenchymatic stratum of excipulum composed of ± isodiametric, thin-walled cells 4.5 - 6.0μ diam.; hypo-thecium of compacted hyphae 2 - 3μ thick running in vari-ous directions, but chiefly ± vertically. Paraphyses 1.5 - 2.5μ thick (up to 3μ at tips), often branched, septate with septa 8 - 18μ apart. Asci cylindric, 180 - 195 × 12 - 18μ, with wall 2 - 3μ thick all round, and per-sistently blue with iodine.

Obs. 2. -- This species, belonging to the P. perrugo-sa-group, is related to P. contortuplicata, from which it differs in the morphology of the thallus and the higher thecium.

20. PLACOPSIS RÄSÄNENII M. Lamb, sp. nov.[18)]

Descr. -- Thallus suborbicularis, ad 8 cm. diam., tar-tareus, 0.5 - 1.0 mm. crassus, ambitu zona 1.0 - 1.5 cm. lata p l i c a t o - e f f i g u r a t u s (haud vel parcissime rimosus, lobis distinctis haud evolutis), ibi c o n t i n u u s, ad peripheriam abrupte terminatus, plicis radiantibus irregularibus, 1 - 2 mm. latis; in centro rimosus vel rimoso-areolatus, areolis varie angu-losis, 1 - 2 mm. diam. (rimis 0.1 - 0.3 mm. latis sepa-ratis), subplanis vel s a e p e v e r r u c u l o s o - i n a e q u a l i b u s; glauco-albidus aut flori lac-tis concolor, opacus, epruinosus, extus intusque KHO - vel + sordide sublutescens, $CaCl_2O_2$ + roseo-rubescens, Pd - . Isidia sorediaque desunt; hypothallus nullus visibilis. -- Cephalodia irregulariter vel nonnihil con-centrice dispersa, deplanata, suborbicularia aut demum irregularia, 1 - 9 mm. lata, ad 1 mm. crassa, radiatim plicato-effigurata rimosaque, ochracea fuscescentiave,

haud nitida. -- Apothecia thallo irregulariter superspar-
-sa, sessilia, discoidea, 1.0 - 2.5 (- 3) mm. diam.,
margine thallino primum crassiusculo, prominulo, integro,
passim albidopruinoso, demum tenuiori saepeque nonnihil
crenulato; margine proprio raro visibili, leviter promi-
-nenti, carneo, integro, interdum subtiliter pruinoso;
disco plano (rarius aetate depresso-convexo), demum
subradiatim fisso, obscure carneo vel rufofusco, opaco,
vulgo pruina ochracea tenuiter obtecto. Stratum paraple-
-ctenchymaticum excipulare sub hypothecio evolutum, 90 -
120μ crassum, nubilatum; hypothecium incoloratum vel
lamina crassiori visum pallide flavidum; thecium 180 -
210μ altum, superne sordide roseo-flavidum (haud vel pa-
-rum nubilatum), ceterum hyalinum. Paraphyses apicibus
haud incrassatae, moniliformi-proliferentes. Sporae 8nae
in asco uniseriatae, ellipsoideae, 18.0 - 18.5$\times$9.0 - 10.5
μ. -- Pycnidia sparsa, verruculis thallinis innata, api-
-cibus ostiolis singulis punctiformibus carneis incolora-
-tisve ad 0.1 mm. latis; sphaerica, ad 435μ diam., peri-
-fulcrio paraplectenchymatico, nubilato. Fulcra ramosa,
acuminata, 10 - 15$\times$1.0 - 1.5μ. Pycnoconidia filiformia,
leviter arcuata vel fere recta, 18 - 24$\times$0.5μ.

Icon. -- Pl. 2, fig. 12 (the holotype specimen).

Hab. -- Sandy soil.

Distr. -- Fuegia.

ARGENTINA. Tierra del Fuego: Cabo San Pablo, coll.
H. Roivainen, 1929 (Expeditio Fennica) (holotype)
(fert.) (H.), (paratype) (fert.) (Räs.).

Obs. 1. -- In the holotype specimen, the thalline cor-
-tex is 18 - 36μ deep, nubilated in upper 10 - 20μ but
otherwise hyaline; paraplectenchymatic, of cells 3 - 6μ
diam. No outermost amorphous layer present. Medulla
fairly compact, nubilated, of interwoven hyphae 3.0 - 4.5
μ thick running in various directions. Symbiotic algae
6 - 12μ diam., bright green, forming an interrupted layer
65 - 120μ deep (with a few sporadic individuals deep
down in the medulla). Cephalodial cortex 32 - 60μ deep,

nubilated in outer 6 - 8μ, within hyaline; paraplecten-
-chymatic, of ± isodiametric, fairly thin-walled cells
3 - 5μ diam.; inner medullary tissue colourless, proso-
-plectenchymatic, of fairly thin-walled cells 6 - 12×3 -
4μ; symbiotic algae Scytonemoid, orange-reddish, scat-
-tered in irregular nests throughout whole depth of medul-
-lary tissue. Lower, paraplectenchymatic stratum of ex-
-cipulum formed of ± isodiametric, thin-walled cells 4 -
6μ diam.; hypothecium composed of compacted hyphae 1 - 2
μ thick running in various directions, here and there
with larger (ascogenous ?) hyphae up to 4.5μ thick.
Paraphyses 1.3 - 1.7μ thick, occasionally branched, sep-
-tate with septa 9 - 15μ apart. Asci cylindric-clavate,
120 - 130×9 - 14μ, with wall 1.3 - 1.5μ thick at sides
(at apex thickened up to 8μ), and pale-blue with iodine.

Obs. 2. -- In small specimens, such as the paratype in herb. Räsänen, the radiating, marginal plications may abut directly on the central, primary cephalodium, the verrucu-
-lose-areolate, inner part of the thallus not being shown. Even in such specimens, provided apothecia are present, the species can be recognised by the fused peripheral lobes.

Obs. 3. -- This species is based on one of the speci-
-mens recorded as "Placopsis bicolor" by Räsänen in Ann. bot. Vanamo, II, p. 25 (1932).

21. PLACOPSIS PARELLINA (Nyl.) M. Lamb
in Res. Norweg. Sci. Exped. Tristan da Cunha 1937 - 8, no. 3, p. 3 (1940).

Synon. -- Lecanora parellina Nyl. in Ann. Sci. nat., Bot. sér. 4, III, p. 157 (1855), cum descript.; Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Zahlbr. Cat. Lich. Univ. V, p. 668 (1928).

Descr.[19] Thallus effusus, haud (ut videtur) effi-
-guratus, o m n i n o v e r r u c u l o s o - r i m o -
- s u s v e l v e r r u c u l o s u s, crassitudine
0.4 - 0.6 mm., areolis seu verruculis convexis, interdum subplanis, plus minusve rotundatis aut varie angulosis, 0.3 - 0.9 mm. diam., aut confluentibus aut rimis tenuibus

(ad 0.1 mm.latis) separatis; flori lactis concolor, epruinosus vel passim subtiliter albidopruinosus, extus intusque KHO - vel ÷ indistincte flavescens, $CaCl_2O_2$ ÷ leviter roseo-rubescens, Pd - . Isidia sorediaque de--sunt; hypothallus nullus. -- Cephalodia irregulariter sparsa, sessilia, irregularia, varie rugosa, nec rimata nec effigurata, 0.6 - 1.5 mm. lata, ad 0.4 mm. crassa, carneo-fuscidula, haud nitida. -- Apothecia thallo su--persparsa, discoidea, sessilia, basi modice vel bene constricta, margine thallino prominulo, crasso, integro, thallo concolori vel subcarneo-tincto, haud parumve prui--noso, haud nitido; margine proprio interdum evoluto, tenui, subprominulo, integro, flavidocarneo; disco pla--no, rufo, rufofusco, vel fusco, primo nonnihil ochraceo-pruinoso, opaco. Excipulum sub hypothecio evolutum, paraplectenchymaticum, nubilatum. Hypothecium incolora--tum. Thecium 160 - 240μ altum, superne fuscoflavescens, ceterum incoloratum. Paraphyses apicibus haud vel parum incrassatae (ad 2.5μ). Sporae 8nae (interdum abortu 5 - 7nae), in asco uniseriatae, ellipsoideae, 21 - 28 × 12 - 14μ. -- Pycnidia thallo immersa, haud prominula, extus maculis minutis rufoflavescentibus indicata; sphae--rica irregulariave, ad 450μ diam., perifulcrio hyalino, 9 - 30μ crasso; fulcris subulato-acuminatis, saepe ramo--sis, 1 - 2μ crassis; pycnoconidiis filiformibus, arcua--tis vel rarius subrectis, 17 - 25×0.5μ.

Icon. -- Pl. 7, fig. 29 (part of the syntype speci--men, no. 23868 in herb. Nyl.).

Hab. -- On soil and rocks. A collector's note with a specimen from Chile, Corral, coll. Gunckel, states: "Sobre rocas en descomposición, socialmente, formando manchas".

Distr. -- Unlike its varieties, the typical species appears to have a restricted distribution confined to

Chile.

CHILE. Exact locality not stated, coll. ? (fert.) (W.), coll. Gay (syntype) (fert.) (H., PC.); Valdivia: exact locality not stated, coll. R. Rabenhorst, 1870 - 1 (fert.) (W., Frey); Corral, altit. 10 m., coll. H. Gunckel, 1935 (no. 5212) (fert.) (Räs.).

Obs. 1. -- In the Helsinki syntype (no. 23868 in herb. Nyl.), the thallus has an upper, slightly nubila--ted or almost hyaline, paraplectenchymatic cortex 17 - 30μ deep, of cells 3 - 5μ diam.; medulla hyaline or in places slightly nubilated, fairly compact, of interwoven hyphae 1.5 - 3.0μ thick running in various directions; in the lower part of the medulla the hyphal walls are yellow-brown by degeneration. Symbiotic algae 5 - 10μ diam., forming a continuous stratum 25 - 90μ deep. Cepha--lodia with an outer, faintly yellowish, paraplectenchyma--tic cortex 10 - 22μ deep, of ± isodiametric, thin-walled cells 3 - 5μ diam.; medullary tissue hyaline, para- or prosoplectenchymatic, of thin-walled, often radially elon--gated cells 3 - 5μ across; symbiotic algae Scytonemoid, blue-green, forming a well-defined stratum in the medulla--ry tissue. Lower, paraplectenchymatic excipulum com--posed of ± isodiametric, thin-walled cells 3 - 5μ diam.; hypothecium of compacted hyphae 1.0 - 1.5μ thick running in various directions. Paraphyses 1.0 - 1.8μ thick, sometimes branched, septate with septa 7 - 15μ apart. Asci cylindric-clavate, 120 - 160 × 14 - 18μ, with rather thick wall (2 - 3μ), often somewhat thicker at apex (up to 6μ), and persistently blue with iodine.

Obs. 2. -- By far the greater part of the material referable to the form-circle of this species belongs to the var. rhodocarpa, a variety which has succeeded in spreading over vast regions by means of its efficient soredial dissemination. The choice of the more local and lesser known form as the typical species rests solely on nomenclatural considerations, parellina being the earliest specific epithet within the group.

Key to the varieties and forms of P. parellina

1. Thallus omnino squamulosus, squamulis substrato ad--pressis, discretis vel contiguis . . var. microphyl--la.

1a. Thallus crustaceus, haud squamulosus.

2. Thallus superne Pd ± lateritio-rubescens . . . . f. semireagens.

2a. Thallus Pd - .

3. Sporae 21 - 28 × 12 - 14μ; thallus verruculosus vel verruculoso-rimosus, esorediatus, ambitu haud effiguratus . . . forma typica speciei.

3a. Sporae minores.

4. Thallus saepe sorediatus; sporae (17 -) 18 - 24 × 8 - 14μ.

5. Soredia sparsa, ± rotundata (aut interdum nulla) . . . . . var. rhodocarpa.

5a. Soredia late confluentia, maximam partem thalli tegentia . . var. rhodocarpa f. argillacea.

4a. Thallus nunquam sorediatus; sporae (15 -) 16 - 18.5 × (7.5 -) 9 - 11μ . . var. carnea, aut thallo isidiato, var. carnea f. subcribellans.

Var. MICROPHYLLA M. Lamb, var. nov.

Diagn. -- Dignoscitur thallo omnino interrupto-squamuloso (nec continuo).

Thallus effusus, ambitu haud distincte effiguratus, ubique inciso- vel crenulato-squamulosus, squamulis substrato arcte adpressis, 0.4 - 1.0 mm. latis, 0.1 - 0.7 mm. crassis, aut sparsis aut vulgo connatis ac rimis sinuosis separatis. Soredia sat numerosa, sparsa, rotunda-ta, 0.3 - 0.9 mm. diam., convexo-erumpentia aut demum ± erosa et saepe confluentia; thallo concoloria, pulverulenta. -- Ceteris notis cum var. rhodocarpa omnino congruens.

Icon. -- Pl. 9, fig. 40 (the holotype specimen).

Hab. -- On soil or rocks.

Distr. -- New Zealand, Tasmania, Chile, Fuegia.

NEW ZEALAND. Exact locality not stated, coll. Knight (fert.) (WELT.).

TASMANIA. Exact locality not stated, coll. Fitzgerald, 1895 (ster.) (H.).

CHILE. Valdivia: "prope coloniam Arique", coll. Lech-ler (fert.) (BM.).

ARGENTINA. Tierra del Fuego: Cabo San Pablo, coll. Roivainen, 1929 (Expeditio Fennica) (holotype) (ster.) (H.).

Obs. 1. -- In the sterile holotype specimen from Cabo San Pablo the thallus is glaucous-whitish, subtly white-prui-nose, matt, superficially and internally KHO - , $CaCl_2O_2$ ± light red, Pd - . The thalline cortex is 12 - 21μ deep, colourless and hyaline in outer 6 - 9μ, within nubi-lated; paraplectenchymatic, of cells 3 - 5μ diam.; medulla ± nubilated, compact, of hyphae 3 - 5μ thick run-ning in various directions, or in places almost paraplec-tenchymatic, with ± isodiametric cells 3 - 5μ diam.; symbiotic algae 6 - 11μ diam., bright green , forming a slightly interrupted layer 45 - 60 (- 75)μ deep. Cepha-lodia irregularly scattered over the thallus, 1.0 - 2.8 mm. diam., up to 0.8 mm. thick, pallid flesh-coloured, matt, at first irregularly tumid-verruculose, later show-ing ± distinct radiating plications; cephalodial cortex 85 - 120μ deep, slightly nubilated, paraplectenchymatic, of ± isodiametric, fairly thin-walled cells 4 - 8μ diam.; inner medullary tissue slightly nubilated, completely paraplectenchymatic, of cells similar to those of cortex but somewhat smaller (2 - 5μ diam.); symbiotic algae Scytonemoid, blue-green to orange-red.

Obs. 2. -- Subsequent examination of fertile specimens showed that the apothecia in this variety are externally and internally exactly similar to those of the var. rho-docarpa, the thecium being 165 - 200μ high and the spores 18 - 21 × 9 - 10μ.

Obs. 3. -- The holotype specimen of this variety is one of the two recorded by Räsänen in Ann. bot. Vanamo, II, p. 25 (1932), as "Placopsis bicolor".

Var. RHODOCARPA (Nyl.) M. Lamb

in Res. Norweg. Sci. Exped. Tristan da Cunha 1937 - 8, no. 3, p. 3 (1940).

Synon. -- Squamaria rhodocarpa Nyl. in Ann. Sci. nat., Bot. sér. 4, XV, p. 376 (1861), cum descript. Lecanora (subgen. Placopsis) rhodocarpa Nyl. in J. linn. Soc. Lond., Bot. IX, p. 251, footnote (1865); Forss. in Bih. svensk. VetenskAkad. Handl. VIII, no. 3, p. 54 (1883); Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); (sect. Placopsis) Zahlbr. Cat. Lich. Univ. V, p. 669 (1928). Placopsis rhodocarpa Nyl. Lich. Nov. Zel. p. 56 (1888), cum descript.; Wain. in Hedwigia, XXXVIII, p. (187) (1899), cum descript. Placodium rhodocarpum Müll. Arg. in Bull. Herb. Boissier, II, append. I, p. 46 (1894); Hellb. in Bih. svensk. VetenskAkad. Handl. XXI, Afd. III, no. 13, p. 59 (1896). Placopsis rhodomma Nyl. Lich. Nov. Zel. p. 56 (1888), cum descript. Lecanora rhodomma Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891). Placodi--um rhodomma Hellb. in Bih. svensk. VetenskAkad. Handl. XXI, Afd. III, no. 13, p. 59 (1896).

Diagn. -- Thallo plerumque sorediato, necnon sporis nonnihil minoribus: (17 -) 18 - 24 × 8 - 14μ, a forma typica differt.

Thallus effusus effiguratusve (lobis marginalibus si evolutis deplanatis, substrato arcte adpressis, adnatis, rimis tenuibus separatis, 1 - 6 mm. longis, 0.8 - 1.5 mm. latis, varie ramosis, apicibus rotundatis subcrenulatis--ve), continuus vel rimis paucis anastomosantibus incis--us (haud areolatus), irregulariter rugoso-verruculosus, saepe sorediatus: soredia sparsa, rotundata, subgloboso--erumpentia, ad 0.8 mm. diam., pulverulenta, thallo con--coloria, aut demum confluentia aut (in f. argillacea) totam superficiem thalli obducentia. Rarius etiam para--cephalodiis munitus. -- Ceterum ut in forma typica spe-

-ciei.

Icon. -- Pl. 7, fig. 30 (the holotype specimen); fig. 31 (saxicolous specimen from New Zealand, Ashburton, showing the development of peripheral laciniae); Pl. 2, fig. 10 (large saxicolous specimen from Tristan da Cun--ha, nat. size).

Hab. -- Soil and rocks.

Distr. -- Bicentric-antarctic-circumpolar -- the South Shetlands, S. America, Juan Fernandez, New Zealand, Java, Tristan da Cunha; see Map 1.

NEW ZEALAND. Exact locality not stated, coll. Knight, 1867 (lectotype of "Placopsis rhodomma" Nyl.) (fert.) (H.), coll. Knight, 1882 (fert.) (H.), coll. Knight (fert.) (M.), coll. Hooker (fert.) (K., BM.); North Island, Hutt: Wellington, coll. Berggren, 1874 (fert.) (S.), coll. Buchanan (fert.) (BM.); Maungaroa near Wellington, coll. Berggren, 1874 - 5 (fert.) (S.); East Taupo: Tapuaeharuru on S. shore of Lake Taupo, coll. Berggren, 1874 - 5 (fert.) (S.); Waima--rino: Raetihi near Ruapehu, on volcanic plateau, coll. J. Attwood, 1935 (fert.) (Redgr.); South Island, Grey: Greymouth, coll. Helms, 1886 (fert.) (H.); Ashburton: exact locality not stated, coll. H. Allen, 1920 (fert.) (BM.); Waikouaiti: Dunedin, coll. Berggren, 1874 (fert.) (S.); Ross Creek Reservoir near Dunedin, coll. J. Thomson, 1933 (fert.) (W.); Morrison's Creek near Dunedin, coll. J. Thomson, 1933 (fert.) (Redgr.).

JAVA. Preanger: Mt. Gede, altit. circ. 3000 m., coll. V. Schiffner, 1894 (no. 3397) (fert.) (BM., M.).

CHILE. Magallanes: Isla Desolación, Puerto Angosto, "in saxis litoralibus", coll. P. Dusén, 1896 (no. 199 pr. p.) (Nordenskjöld's Eldslandsexped.) (fert.) (S.);

Concepcion: exact locality not stated, coll. ?, 1896 (fert.) (TUR.).

JUAN FERNANDEZ. Exact locality not stated, coll. ? (Swedish Antarct. Exped.) (fert.) (W.); Masatierra: "stark erodierter Boden im unt. Teil des Kolonie-Tals", coll. C. & I. Skottsberg, 1916 (no. 328) (fert.) (BM.).[20)]

SOUTH SHETLANDS. Deception Island, above Whaler's Bay, altit. 150 m., "from stones on hillside", coll. C. Bertram & B. Roberts, 1936 (no. 1355) (Brit. Graham Land Exped.) (fert.) (BM.).

BOLIVIA. La Paz: Pocara near Sorata, altit. 3100 m., coll. Mandon (no. 1774) (holotype) (fert.) (H.), (paratype) (fert.) (BM., PC., W.).

TRISTAN DA CUNHA. Exact locality not stated, coll. H. Mosely, 1874 (Challenger Exped.) (fert.) (K., BM.); coll. Siggeson, 1934 (fert.) (O.)[21)]; above settle--ment, altit. 50 m., coll. E. Christophersen & Y. Mejland, 1937 (no. 411) (fert.) (O.); above settlement, altit. 250 m., coll. E. Christophersen & Y. Mejland, 1937 (no. 256) (fert.) (O.).

Obs. 1. -- In the holotype specimen from Bolivia (no. 23860 in herb. Nyl.), no marginal effiguration is pre--sent; thallus ± continuous, rugose-verruculose, up to 1 mm. thick, the irregular verruculae (0.4 - 1.2 mm. diam.) being due to folding in growth; soredia present, inconspicuous, rounded, slightly prominent, up to 0.6 mm. diam. Thallus glaucous whitish with a yellowish tinge, matt, not pruinose; surface and medulla KHO - or ± in--distinctly yellowish, $CaCl_2O_2$ ± reddish, Pd - . Cortex of thallus 30 - 60μ deep, faintly yellowish in outer 12 - 22μ, otherwise colourless; paraplectenchymatic, of cells 6 - 13μ diam.; medulla slightly nubilated, ± compact, of interwoven hyphae 2.0 - 4.6μ thick running in various directions, or in some places paraplectenchymatic, of ± isodiametric, thin-walled cells 4 - 12μ diam.; symbiotic algae 7.5 - 12.0μ diam., bright green, forming an inter--rupted layer 54 - 105μ deep. Cephalodia scattered over thallus, irregular, tumid-convex, up to 1.3 mm. diam.,

0.5 mm. thick, wrinkled, not effigurate, pale yellow-brownish, matt; their cortex 11 - 30μ deep, faintly yellowish in section, paraplectenchymatic, of ± isodia-metric, thin-walled cells 4 - 6μ diam.; inner medullary tissue colourless, packed with symbiotic algae (Nosto-coid, blue-green). Apothecia numerous, scattered, sessile, discoid, not or slightly constricted at base, 1.0 - 2.3 mm. diam.; thalline margin moderate, ± promi-nent, entire, matt, not pruinose; no proper margin de-veloped; disc plane, rosy-red, matt, in some apothecia with an ochraceous-whitish pruina. Lower, paraplecten-chymatic stratum of excipulum nubilated in section, formed of ± isodiametric, thin-walled cells 4 - 7μ diam.; hypothecium faintly yellowish or almost colourless in thin section, of compacted, intricated hyphae 1 - 2μ thick running in various directions; thecium 140 - 185μ high, colourless except in uppermost 9 - 34μ, where it is nubi-lated. Paraphyses 1 - 2μ thick, at apex swollen up to 4μ, often branched, septate with septa 7 - 15μ apart. Asci cylindric-clavate, 114 - 170×12 - 19μ, with wall 1.0 - 1.3μ thick at sides, at apex thickened up to 4.5μ; persistently blue with iodine. Spores 8, uniseriate or partly biseriate in ascus, immature (in the paratype specimen in the Vienna herbarium they are fully developed, ellipsoid, 18 - 22 (- 24)×(8 -) 9 - 11 (- 14)μ). [No pycnidia seen.]

Obs. 2. -- Pycnidia and pycnoconidia were found in specimens from Java, Tristam da Cunha, and Fuegia; they differ in no way from those of the typical species.

Obs. 3. -- The Antarctic specimen from Deception Is-land has scattered over its thallus numerous paracepha-lodia exactly similar to those described in P. pycnothe-ca (see p. 16 & 88). In this specimen transitions can be observed between the early stages of development, as yet concolorous with the rest of the thallus, and the characteristic, darker coloured, mature, cephalodium-like structures.

Obs. 4. -- This is a variety of wide range and great variability. On the basis of the fairly rich material which I have seen I believe that further taxonomic divis-ion is impracticable, but the final decision on this point must of course rest with those who have the oppor-

-tunity of studying whole populations in the field. One can evidently find every transition from the effuse type of thallus to one in which peripheral laciniae are very well developed, as in the specimen shown in Pl. 7, fig. 31, and also from sorediate to non-sorediate individuals. Like P. gelida, this variety may later prove to be a "Sammelart", composed of several incipient species under--going divergent evolution.

Obs. 5. -- The two high altitude tropical stations in Bolivia and Java are of great phytogeographical interest, for they show that the phenomenon of the occurrence of Arctic lichens on the summits of mountains in the tempe--rate zones of Europe and N. America has its parallel also in the southern hemisphere.

Obs. 6. -- In Zahlbruckner's Cat. Lich. Univ. V, p. 669 (1928) this lichen is listed as being identical with P. rhodophthalma, but the latter has been found to be quite a distinct species (see p. 123).

F. ARGILLACEA (Kn.) M. Lamb, comb. nov.

Synon. -- Placodium argillaceum Kn. in Trans. linn. Soc. Lond., Bot. ser. 2, I, p. 282 (1878), cum descr--ipt.; Lecanora argillacea Forss. in Bih. svensk. Vete--nskAkad. Handl. VIII, no. 3, p. 54 (1883); Stizbg. in Flora, Marburg, LXXII, p. 366 (1889); Lecanora rhodom--ma var. argillacea Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Lecanora rhodoph--thalma f. argillacea Zahlbr. Cat. Lich. Univ. V, p. 670 (1928).

Diagn. -- Est forma var. rhodocarpae thallo omnino sorediis farinosis obsito.

Icon. -- Kn. in Trans. linn. Soc. Lond., Bot. ser. 2, I, Pl. XXXVIII, fig. 14 (1878) (an ascus and spores).

Exsicc. -- Lojka, Lich. Univ. 127 ("Lecanora argil-

-lacea")(non vidi).

Distr. -- Seen only from New Zealand, but probably occurs everywhere where the var. rhodocarpa is present.

NEW ZEALAND. Exact locality not stated, coll. Knight (syntype) (fert.) (H., WELT., W.); North Island, Coromandel: exact locality not stated, coll. S. Berggren, 1874 (fert.) (S.); Wairoa: Kiwi, "on hillside in grassland", coll. E. Hodgson, 1933 (fert.) (W.); South Island, Waikouaiti: above Forbury Heads near Dune-din, coll. Lauder Lindsay, 1861 (ster.) (K., M.).

Obs. 1. -- In one of the syntype specimens labelled by Knight "Placodium argillaceum" (no. 3649 in herb. Nyl.), the thallus appears to be effuse and indetermi-nate; almost continuous, 0.3 - 0.8 mm. thick, glaucous whitish or cream-coloured; entirely granulose-pulverulent with effuse soredia; inside and outside KHO ± faintly yellowish or - , $CaCl_2O_2$ ± light red, Pd - . In section of thallus, cortex developed only in a few places between the protruding, soredial masses of algae and hyphae; 9 - 40μ deep, slightly nubilated, paraplectenchymatic, of cells 3 - 6μ diam.; medulla and symbiotic algae as in var. rhodocarpa. Cephalodia adpressed-sessile, orbicu-lar, flattened, 1.0 - 2.5 mm. diam., up to 0.5 mm. thick, plicate-effigurate but not cracked, dark flesh-coloured, matt; outer cortex 50 - 60μ deep, pale reddish-brown in outer 15 - 20μ, paraplectenchymatic, of ± isodiametric, thin-walled cells 4 - 7μ diam.; inner medullary tissue colourless, paraplectenchymatic, with cells similar to those of cortex; symbiotic algae Nostocoid, blue-green, forming a deep stratum. Apothecia not numerous, sessile, slightly constricted at base, discoid, 1.0 - 1.5 mm. diam., with ± irregular, persistent, granulose-pulveru-lent, thalline margin; no proper margin apparent; disc concave to plane, dull yellow-brown, matt, not pruinose. Internal structure of apothecia as in var. rhodocarpa [but the thecium was degenerated in the apothecium stu-died].

Obs. 2. -- In another of the syntype specimens label-led by Knight and preserved in the Vienna herbarium, the thecium is 150 - 175μ high; paraphyses 1.5 - 2.5μ thick, not or only slightly thicker at tips; asci cylindric-clavate, 102 - 120×12 - 15μ, with wall 1.0 - 1.3μ thick all round and persistently blue with iodine; spores 8, uniseriate, ellipsoid, 17 - 18×9μ. In other specimens

seen the thecium is from 180 to 216μ high, and the range of spore-size is 18 - 21 × 10 - 11μ.

Var. CARNEA (Räs.) M. Lamb
in Res. Norweg. Sci. Exped. Tristan da Cunha 1937 - 8, no. 3, p. 3 (1940).

Synon. -- Placopsis gelida var. carnea Räs. in Ann. bot. Vanamo, II, p. 25 (1932), cum descript.

Diagn. -- Var. rhodocarpae fere omnino similis, sporis autem minoribus: 16.0 - 18.5 × 8 - 11μ, et thallo nunquam sorediato.

Icon. -- Pl. 7, fig. 32 (part of a syntype specimen in the Helsinki herbarium); Pl. 2, fig. 9 (specimen from Tristan da Cunha, nat. size).

Hab. -- Rocks.

Distr. -- Fuegia, Tristan da Cunha, New Zealand; known from the latter country only in the f. subcribell--ans.

NEW ZEALAND. South Island, Waikouaiti: Port Chalmers near Dunedin, "on rock near sea", coll. J. Thomson, 1933 (f. subcribellans) (fert.) (W.).

CHILE. Magallanes: Brecknock Peninsula, Puerto Queta, coll. Roivainen, 1929 (Expeditio Fennica) (syntype) (fert.) (H., O., S., Räs.); (holotype of f. subcri--bellans) (fert.) (O.); (paratype of f. subcribel--lans) (fert.) (S.); Isla Desolación, Puerto Ango--sto, coll. P. Dusén, 1896 (no. 201) (Nordenskjöld's Eldslandsexped.) (f. subcribellans) (fert.) (S.); Peel Inlet on S. side of Chatham Island, coll. ? (Swedish Antarct. Exped.) (f. subcribellans) (fert.) (W.).

TRISTAN DA CUNHA. Inaccessible Island, altit. 350 m., coll. E. Christophersen, 1938 (no. 2490) (fert.)(O.).

Obs. 1. -- In the syntype of this variety preserved in the Helsinki herbarium, the thallus forms orbicular patches 0.5 - 2.5 cm. across, 0.2 - 0.5 mm. thick, well effigurate, with peripheral lobes reaching far in towards

the centre of the thallus, 0.8 - 2.0 mm. broad, variously branched, adnate, separated by cracks 0.1 - 0.2 mm. wide, at apices broader and very flattened; centre of thallus irregularly rimose (not areolate), plane, smooth; cream-whitish, matt, epruinose or in places slightly whitish-pruinose, outside and inside KHO - , $CaCl_2O_2$ + light red, Pd - . No isidia or soredia; no visible hypothallus. Thalline cortex 12 - 40μ deep, faintly yellowish in upper 12 - 20μ, otherwise hyaline, paraplec--tenchymatic with cells 5 - 9μ diam.; medulla compact, hyaline, of interwoven hyphae 2 - 4μ thick running chief--ly ± horizontally; symbiotic algae 4 - 8μ diam., for--ming an interrupted layer 40 - 70μ deep. Cephalodia irregularly scattered, sessile, subdiscoid, 1.5 - 3.0 mm. diam., 0.3 - 0.6 mm. thick, radiately cracked and plicate, pale flesh-coloured, matt; bounded by an outer, paraplec--tenchymatic, faintly yellowish cortex 40 - 60μ deep com--posed of ± isodiametric, thin-walled cells 3 - 6μ diam.; medullary tissue of parallel-conglutinate, thin-walled hyphae 2 - 3μ thick, running chiefly ± vertically; sym--biotic algae Nostocoid, pale blue-green, irregularly dispersed throughout the medullary tissue. Apothecia sessile, round, 1.8 - 2.0 mm. diam., not or slightly con--stricted at base, with moderate, entire, thalline margin and plane, light rosy-red, subtly whitish-pruinose disc. Excipular stratum below hypothecium pale yellowish, para--plectenchymatic, of ± isodiametric, thin-walled cells 5 - 7μ diam.; hypothecium colourless or faintly yellow--ish, 210 - 260μ deep in centre, of compacted, thin-walled hyphae 1.3 - 2.8μ thick running in various directions; thecium 170 - 210μ high, pallid yellowish in section, the epithecium indistinct. Paraphyses not thickened at tips, often branched, septate with septa 10 - 20μ apart. Asci cylindric, 135 - 180 × 9 - 12μ, with wall about 1μ thick all round and persistently pale blue with iodine. Spores 8, uniseriate, ellipsoid, 16 - 18 × 9 - 10μ. Pycnidia arranged approximately in a zone about 5 mm. in from the periphery, indicated externally by ± rounded, pink spots 0.10 - 0.25 mm. diam.; in section pyriform, up to 440μ diam., bounded by a faintly yellowish perifulcrium 15 - 45μ thick composed of tangentially adnate hyphae; fulcra 8 - 20μ long, 1.0 - 1.5μ thick, often branched, acuminate; pycnoconidia filiform, slightly bowed or almost straight, 18 - 25 × 0.5μ.

Obs. 2. -- Examination of other specimens has shown that apparently the only non-fluctuating distinguishing character between this variety and the var. rhodocarpa lies in the smaller spore-size. The extent of effigura-

-tion at the periphery is variable, but the interior of the thallus is always irregularly rimose, never areolate. The height of the thecium varies between 160 and 240μ. Var. carnea can be distinguished from non-sorediate indi--viduals of P. gelida by the non-areolate interior of the thallus and by the higher thecium (usually below 170μ in typical P. gelida).

F. SUBCRIBELLANS M. Lamb, f. nov.

Diagn. -- Thallus isidiatus, isidiis subglobosis 0.10 - 0.15 mm. diam., concoloribus, saepe erosis increbre ob--tectus; ceterum ut in var. carnea typica.

Distr. -- Recorded above together with that of var. carnea.

Obs. 1. -- In the holotype of this form preserved in the Oslo herbarium, the thallus is ± orbicular and effi--gurate, and apart from the presence of isidia is similar in all respects to that of the typical variety, with which it was growing together. Some of the isidia are eroded away, leaving shallow, pock-like depressions, which are not however so well defined as in P. cribellans. Apo--thecia 1.0 - 1.8 mm. diam., with the disc dull brown-pink, matt, ± ochraceous-pruinose.

Obs. 2. -- Other specimens of this form from Fuegia and New Zealand show good agreement with the type-speci--men; the surface of the thallus may give a very faint flesh-pink reaction with Pd. The height of the thecium varies between 180 and 240μ; the spores fall within the size-limits 15 - 18 × 7.5 - 9.0 (- 10)μ.

F. SEMIREAGENS (M. Lamb) M. Lamb, comb. nov.

Synon. -- Placopsis gelida f. semireagens M. Lamb in Res. Norweg. Sci. Exped. Tristan da Cunha 1937 - 8, no. 3, p. 2 (1940), cum descript.

Diagn. -- Thallus superne Pd + lateritio-rubescens (medulla immutata); sporae 15 - 19 × 9 - 11μ.

Icon. -- Pl. 8, fig. 34 (part of the holotype speci--men).

Hab. -- Volcanic rock.

Distr. -- Known only from Tristan da Cunha.

TRISTAN DA CUNHA. "Near potato patches", altit. 50 m., coll. E. Christophersen & Y. Mejland, 1937 (no. 189) (ster.) (O.); "above potato patches", altit. 100 m., coll. E. Christophersen & Y. Mejland, 1938 (no. 354) (holotype) (fert.) (O.); "above camp", altit. 50 m., coll. E. Christophersen & Y. Mejland, 1937 (no. 266) (fert.) (O.), 1938 (no. 1350) (ster.) (O.).

Obs. 1. -- In the holotype specimen, the thallus forms a patch up to 4 cm. diam., and is shortly lobed-effigurate at the circumference; laciniae 1.5 - 2.0 mm. long, 0.7 - 1.5 mm. broad, 0.10 - 0.13 mm. thick, flattened, rounded and sometimes indistinctly crenulate at apices, contiguous, separated by narrow cracks; thallus in centre rimose (not areolate), with numerous cracks 0.1 - 0.2 mm. wide, ± smooth, glaucous-whitish or cream-coloured, outside and inside KHO ± indistinctly yellowish, $CaCl_2O_2$ ± light red. No isidia or soredia (but numerous insect- or gastropod-bites are present, which at first sight look like soredia); no visible hypothallus. Thallus with an upper, paraplectenchymatic, nubilated cortex 15 - 24μ deep formed of cells 3.5 - 7.0μ diam.; medulla nubilated, compact, of interwoven hyphae 3 - 4μ thick running in various directions; symbiotic algae 8 - 12μ diam., forming an interrupted stratum 50 - 90μ deep. Cephalodia irregularly scattered, sessile, flattened-discoid, 1 - 3 mm. diam., up to 0.5 mm. thick, effigurate and radiately plicate, finally also cracked, flesh-coloured, matt; with an outer, paraplectenchymatic, faintly yellowish cortex 24 - 45μ deep formed of ± isodiametric, fairly thin-walled cells 5 - 8μ diam., and in most places with an outermost, amorphous, hyaline envelope 4 - 6μ thick; medullary tissue of upward-striving, parallel-conglutinate, thin-walled hyphae about 3μ thick; symbiotic algae Scytonemoid, blue-green to orange, dispersed throughout the medullary tissue. Apothecia irregularly scattered, sessile, well constricted at base, discoid, 1.0 - 1.6 mm. diam., with entire, matt, epruinose, thalline margin at first tumid, then ± depressed; proper margin thin-edged, raised, entire, subnitid, flesh-pink; disc plane, yellowish-carneous, matt, not pruinose. Excipular layer below hypothecium paraplectenchymatic, nubilated, of ± isodiametric, thin-walled cells 4.5 - 6.5μ diam.; hypothecium colourless, up to 210μ deep in centre, of compacted, thin-walled hyphae 1.3 - 2.0μ thick running in

various directions; thecium 150 - 195μ high, nubilated in upper 28 - 45μ, otherwise colourless. Paraphyses 1.0 - 1.2μ thick, often branched, not thickened at tips, sep--tate with septa 8 - 18μ apart. Asci cylindric-clavate, 115 - 145 × 11 - 15μ, with wall 1.5 - 2.0μ thick all round, and persistently pale blue with iodine. Spores 8, uni--seriate, ellipsoid, 15 - 19 × 9 - 11μ. [No pycnidia seen.]

Obs. 2. -- The deep brick-red reaction with Pd is ob--tained also on those parts of the thallus which are un--damaged by animal bites, and is hence not due to an ab--normal secretion due to irritation caused by the latter. The bitter fumarprotocetraric acid does not in this case give the lichen any immunity from lichen-eating organisms.

22. PLACOPSIS RHODOPHTHALMA (Müll. Arg.) Räs. in Ann. bot. Vanamo, II, p. 25 (1932) (lapsu "rhodoph--talma").[22)]

Synon. -- Lecanora rhodophthalma Müll. Arg. in Flora, Regensburg, LXII, p. 164 (1879), cum descript., in Bull. Herb. Boissier, II, append. I, p. 48 (1894), excl. syn--non.; Zahlbr. Cat. Lich. Univ. V, p. 669 (1928). Lecanora argillacea f. rhodophthalma Zahlbr. in K. sven--ska VetenskAkad. Handl. LVII, no. 6, p. 34 (1917), cum descript.

Descr. -- Thallus subdeterminatus effususve, interdum ambitu effiguratus, (laciniis si evolutis haud distincte separatis, 1 - 3 mm. longis), c o n t i n u u s v e l p a r c e r i m o s u s (nunquam areolatus), 0.15 - 0.25 mm. crassus, leviter rugoso- vel verruculoso-inae--qualis, rarius sublaevigatus; albidus, glauco-albidus, vel flori lactis concolor, opacus, epruinosus, extus KHO - , $CaCl_2O_2$ + rubescens, Pd - vel interdum + pallidissime carneus, intus KHO - vel + indistincte fuscescens, $CaCl_2O_2$ + rubescens, Pd - . Isidia ac soredia nulla; hypothal--lus haud evolutus. -- Cephalodia irregulariter sparsa, adpresso-sessilia, irregularia suborbiculariave, deplana-

-ta, 1 - 5 mm. diam., ad 0.3 mm. crassa, varie rugulosa aut radiatim plicato-effigurata, pallide flavido-carnea, haud nitida. -- Apothecia thallo supersparsa, sessilia, basi bene constricta, discoidea, 1.0 - 2.5 mm. diam., margine thallino crassiusculo, integro, opaco, epruinoso; margine próprio demum evoluto, subprominulo, mediocri, integro, carneo vel pallide fuscescenti, haud pruinoso; disco plano aut raro leviter convexo, laevigato, roseo-rubro, carneo, vel obscurius colorato (rufofusco), opaco, nudo vel albopruinoso. Excipulum paraplectenchy--maticum sub hypothecio evolutum, ad 180μ crassum, nubi--latum; hypothecium incoloratum; thecium s u b a l - - t u m (210 - 310μ), superne nubilatum, ceterum in--coloratum. Paraphyses apicibus haud vel modo levissime incrassatae. Sporae 8nae, in asco uniseriatae, v u l - - g o l a t e e l l i p s o i d e a e (rarius angus--tiores), 20 - 27× (9 -) 13 - 18μ. -- [Pycnidia in forma typica ignota; vide sub f. atlantica.]

Icon. -- Pl. 6, fig. 26 (the holotype specimen).

Hab. -- Soil or rocks.

Distr. -- New Zealand, Fuegia, Chile; a distinct form in Tristan da Cunha (f. atlantica).

NEW ZEALAND. Exact locality not stated, coll. Colenso (fert.) (K.); North Island, Egmont (or Taranaki or Stratford or Hawera ?): Mt. Egmont, "vertical cutting on track in forest", coll. L. Cranwell, 1934 (fert.) (W.); Hutt: Wellington, coll. J. Buchanan (fert.) (BM.); South Island, Grey: near Greymouth, coll. F. Müller, 1879 (holotype) (fert.) (G.).

CHILE. Magallanes: Isla Desolación, Puerto Angosto, "in saxis litoralibus", coll. P. Dusén, 1896 (no. 199 pr. p.) (Nordenskjöld's Eldslandsexped.) (fert.) (S.); Valdivia: Corral, "in rupibus litoralibus", coll. P. Dusén, 1896 (no. 66) (Nordenskjöld's Eldslandsex-

-ped.) (fert.) (S.).

TRISTAN DA CUNHA. Above settlement, altit. 250 m., coll. E. Christophersen & Y. Mejland, 1937 (no. 248) (holotype of f. atlantica) (fert.) (O.); altit. 1075 m., coll. E. Christophersen & Y. Mejland, 1937 (no. 30) (f. atlantica) (fert.) (O.).

Obs. 1. -- In the holotype specimen in herb. Müll. Arg., the thallus is indeterminate, Pd= ; its cortex overlaid in most places by a colourless, semi-amorphous layer 6 - 10μ deep derived from disintegration of cortical cells; underlying cortex 30 - 45μ deep, heavily nubila--ted, paraplectenchymatic, of cells 3 - 5 (- 6)μ diam. Medulla compact, nubilated, of interwoven hyphae 2.5 - 4.0μ thick running in various directions or in places ± vertically parallel. Symbiotic algae 7 - 11μ diam., bright green, forming an interrupted, uneven layer 50 - 110μ deep. Cephalodia irregularly wrinkled, not effigu--rate, covered by a paraplectenchymatic, superficially yellow-brown-granulate cortex 30 - 40μ deep, formed of ± isodiametric, thin-walled cells 3 - 5μ diam.; inner me--dullary tissue colourless, indistinctly paraplectenchy--matic, packed throughout with Nostocoid, pale blue-green, symbiotic algae. Paraplectenchymatic cells of basal ex--cipulum ± isodiametric, thin-walled, 4.5 - 7.5μ diam. Hypothecium up to 165μ deep, composed of compacted, intri--cated hyphae 1.5 - 2.0μ thick running in various direc--tions. Thecium 230 - 310μ high. Paraphyses 1.0 - 1.4 μ thick, often branched, budding off nubilated, conidia-like, epithecial fragments at tips, septate with septa 8 - 18μ apart. Asci cylindric-clavate, 156 - 210 × 15 - 18μ, with wall about 1.5μ thick at sides, at apex thick--ened up to 8μ; persistently deep blue with iodine. Spores 20.0 - 22.5 × 12 - 13μ.

Obs. 2. -- P. rhodophthalma is related to P. parelli--na, from which it is distinguished by the higher the--cium and larger, often very broadly ellipsoid spores. Peripheral effiguration of the thallus is not well marked, often entirely absent.

Obs. 3. -- In fresh material the spores often contain rose-pink oil droplets; this colour disappears after some years in herbarium specimens. Müller Arg., in his original description of this species, stated that the

spores are "hyphematoideo-involucratae (superficie pecu--liariter asperulae)". This is not so; in the holo--type and all other specimens which I have examined the spore-wall is perfectly smooth, as in all other species of the genus.

Obs. 4. -- Particularly in this species it is neces--sary to measure only mature spores already extruded from the asci, since measurement of immature spores inside the asci may give very misleading data as regards size and shape.

F. ATLANTICA M. Lamb
in Res. Norweg. Sci. Exped. Tristan da Cunha 1937 - 8, no. 3, p. 4 (1940), cum descript.

Diagn. -- "Thallus purpureo-albescens vel roseo-al--bescens (nec glauco-albidus vel flori lactis concolor ut in forma typica speciei)" (descr. orig., loc. cit.).

Icon. -- Pl. 2, fig. 6 (the holotype specimen, nat. size).

Hab. -- Seen only on volcanic rock.

Distr. -- Tristan da Cunha (records incorporated above with those of the typical species).

Obs. 1. -- In the holotype specimen the thallus is effigurate; marginal lobes short and broad, 2.0 - 4.5 mm. long, 1 - 2 mm. broad, adnate, slightly tumid, roun--ded or subcrenulate at apices. Thallus in centre 0.5 - 0.7 mm. thick, tartareous, ± even or in places irregular--ly verrucose, rimose with cracks up to 0.3 mm. wide, but not areolate; whitish with a distinct, faintly purple-pink tinge. Apothecial discs reddish flesh-coloured to dark red, not pruinose. Lower paraplectenchymatic stra--tum of excipulum poorly developed, 20 - 30μ deep, not nubilated; thecium 240 - 300μ high; spores more narrow--ly ellipsoid than is usual in the typical form of the species: 20 - 24 × 10.5 - 12.0μ. Walls of asci pale wine-red with iodine. In all other respects, external and internal, there is entire agreement with the typical P. rhodophthalma.

Obs. 2. -- Pycnidia were found in the holotype of this form; they are indicated by slight swellings of the thal-

-lus, each having at its apex a minute, punctate, yello--wish-pink ostiole; irregularly pyriform in section; up to 420μ deep and 245μ across; perifulcrium indistinct, almost absent. Fulcra branched, subulate-acuminate, 15 - 19×1.0 - 1.6μ. Pycnoconidia filiform, bowed, 15 - 18×0.5μ.

23. PLACOPSIS SUBGELIDA (Nyl.) Nyl.
Lich. Nov. Zel. p. 57 (1888), cum descript.

Synon. -- Lecanora subgelida Nyl. in C. R. Acad. Sci., Paris, LXXXIII, p. 89 (1876), cum descript.; Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Zahlbr. Cat. Lich. Univ. V, p. 670 (1928).

Descr. -- Thallus determinatus, suborbicularis, rosu--las effiguratas 2.5 cm. diam. vel majores formans; laci--niae ad peripheriam latae, planae, laevigatae, 1.5 - 5.0 mm. longae, 1.0 - 2.5 mm. latae, ad 0.4 mm. crassae, api--cibus tenuiores (0.1 - 0.2 mm. crassae); adnatae, rimis passim hiantibus 0.1 - 0.3 mm. latis separatae, subcuneatae, irregulariter ramosae, ad apices expansae et rotundatae vel subcrenulatae; centrum versus longe ret--rorsum productae, sese sensim in thallum laevigatum, i r r e g u l a r i t e r r i m o s u m (haud rite areolatum), circa 0.4 mm. crassum vertentes. Thallus eburneo-albidus, opacus, a l b o - p r u i n o s u s, extus intusque KHO - vel + indistincte flavescens, $CaCl_2O_2$ + roseo-rubescens, Pd - , sine isidiis sorediisque. Hypothallus distinctus nullus est evolutus. -- Cephalodia sparsa, thallo sessilia, suborbicularia vel irregularia, deplanata, 2 - 7 mm. diam., ad 0.9 mm. crassa, plicis rimisque radiantibus effigurata, obscure carnea vel palli--de fuscidula, haud nitida. -- Apothecia supra thallum irregulariter dispoita, discoidea, 1.5 - 2.0 mm. diam., ad basin bene vel modice constricta; margine thallino primo crasso, deinde mediocri, integro, rotundato, promi-

-nulo subdepressove, vulgo subtiliter albopruinoso; mar--gine proprio passim visibili, nonnihil elevato, mediocri, laevigato, carneo, opaco, nudo; disco plano aut leviter concavo, sordide rufescenti vel rufofusco, haud nitido, leviter albidopruinoso. Excipulum basale sub hypothecio modice incrassatum, paraplectenchymaticum, nubilatum; hypothecium incoloratum; thecium a l t i s s i m u m (285 - 320μ), omnino hyalinum, sursum crystallis sordi--de flavidis onustum. Paraphyses apicibus haud incras--satae. Sporae 8nae, in asco uniseriatae, ellipsoideae vel late ellipsoideae, m a g n a e : 25.5 - 30.0 × (12-) 15.5 - 21.0μ. -- Pycnidia immersa, thallum saepe levi--ter inflantia, apicibus punctis minutis nigricantibus notata, ampullacea, circa 300μ lata, perifulcrio nubilato indistincte paraplectenchymatico cincta. [Fulcra pyc--noconidiaque haud visa.]

Icon. -- Pl. 9, fig. 39 (the holotype specimen).

Hab. -- On rock; according to Nylander also on soil.

Distr. -- Campbell Island, south of New Zealand.

CAMPBELL ISLAND. Coll. Filhol, 1874 (holotype) (fert.) (H.).

Obs. 1. -- In the holotype specimen (no. 23861 in herb. Nyl.), the cortex of the thallus is in many places overlaid by a hyaline, semi-amorphous, necrotic layer up to 13μ deep; cortex 20 - 33μ deep, nubilated, paraplec--tenchymatic, of cells 3 - 6μ diam. Medulla slightly nubilated, compact, with few or no air-cavities, composed of chiefly horizontally-running, adnate hyphae 2.8 - 4.5μ thick with somewhat thick walls (1.0 - 1.3μ); in lower 1/4 of medulla the hyphal walls are brown by degeneration. Symbiotic algae 4 - 9μ diam., bright green, forming a slightly interrupted stratum 45 - 75μ deep. Cephalodia with an outer, paraplectenchymatic cortex 55 - 90μ deep, faintly yellowish in its outermost 20 - 30μ, otherwise colourless, and made up of ± isodiametric or slightly oblong cells 4 - 7μ diam. (their walls 1 - 2μ thick); inner medullary tissue hyaline, paraplectenchymatic like the cortex; symbiotic algae Nostocoid, blue-green, for--ming a deep layer in upper part of cephalodium. Lower, paraplectenchymatic stratum of excipulum 80 - 90μ deep,

composed of ± isodiametric, thin-walled cells 4 - 6μ diam. Hypothecium 160 - 180μ deep, of compacted, intri--cated hyphae 1.2 - 2.0μ thick running in various direc--tions. Peculiar crystals are present on top of the thecium and embedded in the lateral excipulum; they are discoid, flattened, 15 - 27μ diam., colourless or faintly yellowish, with a distinct radial lamellation; they dis--solve speedily in dilute HCl, but disintegrate only slightly in KHO. Paraphyses 1.3 - 2.0μ thick, often branched, budding off conidia-like, epithecial fragments from their tips; septate with septa 7 - 15μ apart. Asci cylindric-clavate, 200 - 275 × 16 - 27μ, with wall 1 - 2μ thick at sides, at apex not or slightly thicker (up to 4μ); persistently blue with iodine.

Obs. 2. -- This is the "giant" of the genus as regards internal structure, the thecium being the highest and the spores the largest known to occur in Placopsis. The the--cial features are very bold and distinct under the mic--roscope.

24. PLACOPSIS AMPLIATA M. Lamb, sp. nov.

Descr. -- Thallus effiguratus, plagas irregulares vel plus minusve orbiculares ad 2.5 cm. diam. formans, tenuis (ad 0.2 mm. crassus), lobis ad peripheriam deplanatis, substrato arcte adpressis, 1 - 2 mm. longis, 0.6 - 1.0 mm. latis, adnatis, rimis limatis angustissimis separatis, apicibus rotundatis vel obsolete crenulatis; in centro plus minusve laevigatus, rimosus, haud rite areolatus, rimis angustissimis (tantum per vitrum ×10 visibilibus) et irregulariter anastomosantibus incisus; extus KHO - vel ± indistincte flavescens, $CaCl_2O_2$ ± roseo-rubescens, Pd ± pallide flavido-carneus; intus KHO - , $CaCl_2O_2$ ± roseo-rubescens, Pd - . Isidia ac soredia nulla; hypo--thallus deest. -- Cephalodia numerosa, thallo irregu--lariter supersparsa, plus minusve orbicularia, thallo adpressa, 1.0 - 2.5 mm. diam., ad 0.3 mm. crassa, primum indistincte lobata, dein plicato-effigurata, haud fissa; carnea, opaca. -- Apothecia sessilia, rotundata, 0.8 - 1.4 mm. diam., b a s i h a u d c o n s t r i c t a,

sed t u m i d o - a m p l i a t a (subpertusarioidea apparentia), margine thallino crasso, o b t u s e s u b c o n i c o, prominenti, integro; [margine proprio non viso;] disco plano, marginem haud aequan--ti, laete roseo, saepissime pruina albida obtecto. Excipulum paraplectenchymaticum nubilatum sub hypothecio evolutum; hypothecium incoloratum; thecium 150 - 195μ altum, superne pallide flavidulum, ceterum incoloratum. Paraphyses apicibus haud incrassatae. Sporae 8nae, in asco uniseriatae, ellipsoideae, 20 - 22×11 - 12μ.

Icon. -- Pl. 8, fig. 36 (heautotype or possibly para--type specimen in the München herbarium).

Hab. -- On rocks and pebbles.

Distr. -- New Zealand.

NEW ZEALAND. Exact locality not stated, coll. Knight (holotype) (fert.) (H., no. 3644 in herb. Nyl.), (heautotype or possibly paratype) (fert.) (BM., M.).

Obs. 1. -- In the holotype specimen in herb. Nylander, where it was labelled by him as "Placopsis gelida", the thallus has an outer, paraplectenchymatic cortex 15 - 24μ deep and hyaline in its outer 3 - 6μ (cells dead and dis--integrating), in its inner part nubilated, composed of cells 4 - 6μ diam.; medulla partly nubilated, fairly com--pact, of interwoven hyphae 3 - 5μ thick running in vari--ous directions (in lowermost 25 - 45μ hyaline and ± horizontally parallel-conglutinated); symbiotic algae 4 - 8μ diam., forming an interrupted layer 45 - 60μ deep. Cephalodia with an outer, faintly yellowish, not nubila--ted, paraplectenchymatic cortex 12 - 20μ deep, of ± iso--diametric, fairly thin-walled cells 4 - 7μ diam.; medul--lary tissue colourless, of the same structure as the cor--tex; symbiotic algae Nostocoid, dispersed throughout the medullary tissue. Lower, paraplectenchymatic, ex--cipular layer of apothecium formed of ± isodiametric, thin-walled cells 4.5 - 7.0μ diam.; hypothecium of com--pacted hyphae 1.5 - 2.5μ thick running in various direc--tions. Paraphyses often branched, 1.0 - 1.5μ thick, septate with septa 7 - 10μ apart. Asci cylindric, 120 - 160×15 - 21μ, with wall 1.5 - 2.5μ thick at sides, at apex thickened up to 7μ; persistently blue with iodine. [No pycnidia seen.]

Obs. 2. -- The thalline margin of the apothecia, in--stead of being constricted at the base, is produced down--wards and outwards conically into the thallus. This character, together with that of the higher thecium, lar--ger spores etc., distinguishes this species clearly from P. gelida.

Obs. 3. -- The specimen in the München herbarium, photographed for the plate, occurred together with P. illita, some of which is also to be seen in the photo--graph.

25. PLACOPSIS KERGUELENSIS M. Lamb, sp. nov.

Descr. -- Thallus suborbicularis, ad circa 5 cm. diam., ambitu effiguratus, laciniis 2 - 5 mm. longis, 1.5 - 2.0 mm. latis, 0.20 - 0.25 mm. crassis, contiguis, rimis ad 0.1 mm. latis separatis, substrato arcte adpres--sis, subplanis vel leviter tumidis, apicibus rotundatis vel indistincte crenulatis; in centro irregulariter ri--mosus (haud rite areolatus), leviter verrucosus, ad 1 mm. crassus, eburneus vel flori lactis concolor, extus intusque KHO - vel ± indistincte flavescens, $CaCl_2O_2$ ± roseo-rubescens, Pd - , haud nitidus, epruinosus. Isidia ac soredia desunt; hypothallus nullus visibilis. -- Ce--phalodia irregulariter disposita, deplanato-discoidea, 2.5 - 8.0 mm. diam., ad 1 mm. crassa, sessilia adpressa--que, radiatim plicata et rimosa, rufofusca, haud nitida. -- Apothecia thallo irregulariter supersparsa, sessilia, rotundata, basi bene constricta, 1.5 - 2.0 mm. diam., margine thallino tumido, integro, epruinoso, demum tenui--ori ac nonnihil depresso; margine proprio interdum vi--sibili, subprominulo, obtuso, integro, pallide fuscidu--lo; disco leviter concavo aut plano, o b s c u r e p u r p u r e o, scabridulo, haud nitido, epruinoso. Stratum paraplectenchymaticum excipuli sub hypothecio evolutum, nubilatum; hypothecium incoloratum; thecium

195 - 245μ altum, d i m i d i o s u p e r i o r i l a e t e r o s e u m, inferne incoloratum. Paraphyses apicibus parum incrassatae. Sporae 8nae, in asco uni--seriatae, ellipsoideae, 17.5 - 18.5 × 9 - 10μ. -- Pycni--dia extus verruculis 0.3 - 0.4 mm. diam. indicata, api--cibus ostiolis punctiformibus olivaceis perforata; sub--sphaerica, circa 400μ diam., perifulcrio hyalino c o n - - t o r t o (lamina sporigera eximie convoluta); ful--cris acuminatis, ramosis, 15 - 24 × 1.3 - 2.0μ; pycnoco--nidiis filiformibus, leviter arcuatis vel fere rectis, 18 - 24 × 0.5μ.

Icon. -- Pl. 2, fig. 7 (the holotype specimen, nat. size).

Hab. -- Basaltic rock.

Distr. -- Kerguelen.

KERGUELEN. "Mont de l'Abri", coll. Aubert de la Rue, 1931 (no. 15) (holotype) (fert.) (B. de Lesd.).

Obs. 1. -- In the holotype specimen, the thallus has an upper, paraplectenchymatic, nubilated cortex 27 - 45μ deep composed of cells 5.0 - 7.5μ diam., and is in most places covered on the outside by a hyaline, amorphous layer 2 - 4μ deep; medulla partly nubilated, compact, of interwoven hyphae 4.5 - 6.0μ thick running in various directions, and in its lower part brownish by degenera--tion; symbiotic algae 5 - 9 (- 11)μ diam., forming a ± continuous layer 75 - 120μ deep. Cephalodia with an outer, paraplectenchymatic, scarcely nubilated cortex 45 - 60μ deep composed of ± isodiametric, thin-walled cells 4 - 6μ diam.; medullary tissue hyaline, prosoplec--tenchymatic, of adnate, fairly thin-walled, hyphal cells 3.0 - 4.5μ thick; symbiotic algae Scytonemoid, orange-reddish, scattered throughout the medullary tissue. Pa--raplectenchymatic exciple below hypothecium formed of ± isodiametric, thin-walled cells 4.5 - 8.0μ diam.; hypo--thecium of compacted hyphae 2 - 3μ thick running chiefly ± vertically. Paraphyses 1.5 - 2.5μ thick, occasionally branched, septate with septa 12 - 20μ apart. Asci cy--lindric-clavate, 130 - 150 × 11 - 17μ, with wall 2 - 3μ thick at sides, at apex slightly thicker (up to 4μ), pale blue then sordid greenish-blue with iodine.

Obs. 2. -- Differs from P. gelida in the rimose or

only imperfectly areolate thallus, purple-brown apotheci-
-al discs, and higher thecium which is distinctively rose
-pink in its upper half; from P. bicolor in the non-oxy-
-dated thallus and smaller spores; and from P. Räsänenii
in the divided lobes of the periphery, colour of upper
part of thecium, etc.

Obs. 3. -- The holotype of this species is one of the specimens recorded as "Placopsis gelida" by Bouly de Les-
-dain in Ann. Cryptog. exot. IV, p. 101 (1931).

26. PLACOPSIS FUSCIDULA M. Lamb
apud Räs. in An. Soc. cient. argent. CXXVIII, p. 138
(1939), cum descript.; M. Lamb in Res. Norweg. Sci.
Exped. Tristan da Cunha 1937 - 8, no. 3, p. 1 (1940),
cum descript.

Synon. -- Placopsis gelida var. pseudosorediosa Räs., loc. cit.

Descr. -- Thallus effiguratus, laciniis ad peripheri-
-am bene evolutis, 3 - 5 mm. longis, 0.8 - 1.4 mm. latis,
0.2 - 0.5 mm. crassis, varie ramoso-divisis, leviter tu-
-midis, tantum apicibus expansis substratoque arcte ad-
-pressis, ibi rotundato-lobatis vel obsolete crenulatis,
contiguis vel discretis; in centro r i m o s o - a r e -
- o l a t u s, ad 0.7 mm. crassus, areolis irregulariter
angulosis 0.8 - 2.2 mm. diam., planis vel leviter con-
-vexis, laevigatis, rimis limatis 0.1 - 0.2 mm. latis
separatis; f u s c o a l b i d u s v e l p a l l i d e
o l i v a c e o - f u s c e s c e n s, haud nitidus,
fere omnino s u b t i l i s s i m e a l b o p r u i -
- n o s u s, extus intusque KHO - vel + indistincte
flavescens, $CaCl_2O_2$ + roseo-rubescens, Pd - . Isidia
ac soredia nulla. Hypothallus nullus visibilis. --
Cephalodia numerosa, thallo irregulariter insidentia,
sessilia, discoidea, 1.0 - 2.5 mm. diam., ad 0.5 mm.

crassa, leviter plicato-effigurata, deinque insuper radia--tim fissa, carnea vel ferrugineo-carnea, haud nitida. -- Apothecia sessilia, basi bene constricta, rotundata, 1.0 - 1.7 mm. diam., margine thallino crasso (deinque tenuio--ri depressoque), integro, pruinoso; margine proprio nonnunquam visibili, tenui, integro, leviter prominulo, carneo, haud pruinoso; disco laete obscureve rubro, och--raceo-rubescenti, vel rufofusco, subplano, haud vel non--nihil pruinoso, haud vel parum nitenti. Excipulum para--plectenchymaticum sub hypothecio modice evolutum, ad 75μ crassum, hyalinum; hypothecium incoloratum; thecium 150 - 210μ altum, superne plus minusve nubilatum, ceterum in--coloratum vel levissime roseum. Paraphyses apicibus parum clavatae. Sporae 8nae, in asco uniseriatae, ellip--soideae, saepe guttulis roseis oleosis impletae, 18.5 - 22.5 $\times$ 10 - 12μ. -- Pycnidia areolis immersa, extus macu--lis minutis punctiformibus fusconigrescentibus indicata, pyriformia, circa 200μ diam.; perifulcrio hyalino, indi--stincte paraplectenchymatico, 15 - 23μ crasso; fulcris ramosis, acuminatis, 13 - 20 $\times$ 1 - 2μ; pycnoconidiis fili--formibus, leviter arcuatis vel fere rectis, 17 - 21 $\times$ 0.5 μ.

Icon. -- Pl. 2, fig. 11 (the holotype specimen, nat. size).

Hab. -- Volcanic rocks.

Distr. -- Southernmost S. America (incl. Juan Fernan--dez) and Tristan da Cunha.

ARGENTINA (or CHILE ?). Tierra del Fuego: exact lo--cality doubtful, coll. R. Cunningham (fert.) (K.).

CHILE. Llanquihue: Ventisquero Manso, altit. circ. 1000 m., "bloques de la morene finel", coll. A. Donat, 1936 (no. 88 pr. p.) (fert.) (Räs.).

JUAN FERNANDEZ. Masafuera: near Las Torres, altit. circ. 1350 m., coll. ? (ster.) (W.).

TRISTAN DA CUNHA. Stony Beach, altit. 300 m., coll. Y. Mejland, 1938 (no. 1780) (ster.) (O.); the cra--ter, altit. 1950 m., coll. E. Christophersen & Y. Mej--land, 1938 (no. 761) (holotype) (fert.) (O.), (no. 757) (fert.) (O.), (no. 758) (ster.) (O.); the peak, altit. 2000 m., coll. E. Christophersen & Y. Mejland, 1938 (no. 701) (ster.) (O.), (no. 703) (fert.) (O.), (no. 704) (ster.) (O.).

Obs. 1. -- In the holotype specimen, the thallus has an upper, nubilated, paraplectenchymatic cortex 30 - 50μ deep composed of cells 4.0 - 6.5μ diam. Medulla partly nubilated, compact, of interwoven hyphae about 3μ thick running in various directions. No special hypothalline tissue is differentiated. Symbiotic layer almost con--tinuous, 90 - 155μ deep, the algae 7 - 9 (- 12)μ diam. Cephalodia with an outer, non-nubilated, paraplectenchy--matic cortex 40 - 60μ deep composed of ± isodiametric, thin-walled cells 3 - 6μ diam., in outermost 6 - 11μ somewhat crushed and degenerated. Medullary tissue of cephalodium hyaline, of parallel-conglutinated, thin- or thickish-walled hyphae about 3μ thick; symbiotic algae Scytonemoid, lying in separate clumps throughout the me--dullary tissue. Cells of lower, paraplectenchymatic, excipular stratum not nubilated, thin-walled, 3 - 5μ diam., ± isodiametric. Hypothecium up to 215μ deep in centre, of compacted hyphae 1.5 - 2.0μ thick running in various directions. Paraphyses often branched, 1.3 - 2.0μ thick, septate with septa 8 - 18μ apart. Asci cy--lindric-clavate, 120 - 180 × 15 - 18μ, with walls up to 2μ thick at sides, at apex up to 4μ thick, and with iodine blue then pale wine-red.

Obs. 2. -- P. fuscidula seems to be allied to P. geli--da, differing from the latter in the pruinose, olivace--ous thallus and the slightly larger spores. These dif--ferences are constant in all the material which I have studied. The pruina gives the thallus a soft, velvety appearance under a X10 lens.

Obs. 3. -- A form of this species was described alre--ady in 1924 by Zahlbruckner under the name of "Lecanora gelida f. leprosula" (see below), and has been by some lichenologists considered to be identical with the typi-

-cal sorediate form of P. gelida (Magnusson, Lich. sel. Scand. exs. 272; Degelius in Acta Hort. gothoburg. XII, p. 125; 1937).

Obs. 4. -- "Placopsis gelida var. pseudosorediosa" was the name given by Räsänen to a partly eroded specimen of this species from Chile, Ventisquero Manso; the ero--sion was due to animal agencies (probably snails). The same appearance caused Zahlbruckner to apply the epithet "leprosula" to the material studied by him.

F. LEPROSULA (Zahlbr.) M. Lamb, comb. nov.

Synon. -- Lecanora gelida f. leprosula Zahlbr. apud Skottsberg, Nat. Hist. Juan Fernandez and Easter Island, II, p. 382 (1924), cum descript., Cat. Lich. Univ. V, p. 668 (1928).

Diagn. -- Sicut forma typica, sed strato paraplecten--chymatico excipulari sub hypothecio melius evoluto, et parietibus ascorum I + persistenter caerulescentibus.

Icon. -- Pl. 6, fig. 28 (part of the lectotype speci--men).

Hab. -- Rocks.

Distr. -- Seen only from Juan Fernandez.

JUAN FERNANDEZ. Masatierra: Valle Colonial, coll. C. & I. Skottsberg, 1916 (Svenska Pacificexpeditionen) (lectotype) (fert.) (GB.); near Tres Puntas, "stenig slutning", altit. 200 m., coll. C. & I. Skotts--berg, 1917 (fert.) (GB., BM., S., W.).

Obs. 1. -- In the lectotype specimen, the thallus is apparently incomplete, and does not show the periphery; it is pale olivaceous-brownish and white-pruinose as in the typical species, outside and inside KHO - , $CaCl_2O_2$ + light red, Pd - , 0.25 - 0.60 mm. thick, irregularly areolate with ± plane areolae 0.3 - 0.9 mm. diam. separa--ted by narrow cracks. The thallus is not sorediate; Zahlbruckner's observation to this effect was apparently based on a slight erosion of the cortex here and there visible (caused by snails ?). Cortex of thallus 11 -

21μ deep, nubilated, paraplectenchymatic, of cells 3 - 5μ diam.; in many places overlaid by an uneven, hyaline layer 5 - 9μ deep. Medulla ± compact, nubilated, of interwoven hyphae 2.7 - 4.0μ thick running in various directions. Symbiotic algae 6 - 10μ diam., forming a ± interrupted stratum 45 - 75μ deep. Cephalodia irregu--larly scattered, sessile, finally ± flattened and orbi--cular, up to 1 mm. diam. and 0.3 mm. thick, irregularly or radially plicate but not cracked, pale yellowish or brownish; covered with an outer, hyaline, amorphous layer 12 - 20μ deep; underlying cortex 7 - 20μ deep, dull yellowish in section, paraplectenchymatic, of ± isodiametric, thin-walled cells 3 - 5μ diam.; medullary tissue hyaline, of compacted, parallel-conglutinate, thin -walled hyphae 3.0 - 4.5μ thick; symbiotic algae Scyto--nemoid, orange-reddish, dispersed in nests throughout the medullary tissue. Apothecia fairly numerous, ses--sile, orbicular, 1.0 - 1.3 mm. diam., with tumid, ± entire, white-pruinose, finally somewhat depressed, thal--line margin; proper margin rarely developed as a thin, entire rim concolorous with the disc; disc plane, dull brown, matt, naked or white-pruinose. Lower, paraplec--tenchymatic stratum of excipulum 45 - 60μ deep, of ± isodiametric, thin-walled cells 4 - 7μ diam.; hypotheci--um colourless, of compacted hyphae 1.5 - 3.0μ thick run--ning in various directions; thecium 175 - 200μ high, pale, dull yellowish in upper 30 - 45μ, otherwise faintly yellowish or colourless. Paraphyses 1.2 - 1.7μ thick, at apices up to 2μ thick and there submoniliform (budding off conidia-like, rounded, epithecial fragments); fre--quently branched, septate with septa 9 - 15μ apart. Asci cylindric to cylindric-clavate, 125 - 168 × 10 - 18μ, with colourless wall up to 3μ thick at sides and up to 6μ thick at apex. Spores immature. [No pycnidia seen.]

Obs. 2. -- In the other, identical specimen mentioned in the original description (from Tres Puntas), mature spores are present, measuring 18 - 21 × 9 - 10μ.

Obs. 3. -- The Tres Puntas specimen contains an ad--mixture of P. cribellans f. tuberculifera.

Obs. 4. -- It is possible that the characters upon which this form is segregated will prove on examination of further material to be variable and taxonomically un--important.

27. PLACOPSIS GELIDA (L.) Nyl.
in Ann. Sci. nat., Bot. sér. 4, XV, p. 376 (1861).

Synon.[23] Lichen gelidus L. Mantissa, I, p. 133 (1767), cum descript. Parmelia gelida Ach. Meth. Lich. p. 188 (1803), cum descript. Lecanora gelida Ach. Lichenogr. Univ. p. 428 (1810), cum descript. Placo--dium gelidum Gray, Nat. Arr. Brit. Plants, I, p. 448 (1821), cum descript. Squamaria gelida Del. apud Duby apud De Candolle, Botanic. Gall. II, p. 659 (1830), cum descript. Patellaria gelida Trevis. in Rev. Lavor. Accad. Padova, I, p. 256 (1853). Psoroma gelidum Rabh. Krypt.-Fl. Sachsen, 2. Abt. p. 247 (1870), cum descript. Parmularia gelida Nils. Die Flechtenvegetation des Sarek--gebirges, apud Hamberg, Naturw. Unters. Sarekgeb. III, Lief. 1, p. 34 (1907). Lichen heclae Oed. Icon. Plant. Daniae, III, fasc. VIII, p. 8 (1770), cum descript. Lichen gelidus β. L. Heclae Retz. Fl. Scand. Prodr. ed. 2, p. 275 (1795). Lichen gelidus β. rubellus Retz. op. cit. ed. 1, p. 225 (1779). Placodium Pollinieri Del. ex Malbr. Cat. Lich. Normandie, p. 132 (1870), cum des--cript. Placodium gelidum var. obesum Körb. in S. B. Akad. Wiss. Wien, math.-naturw. Cl. LXXI, 1. Abt. p. 521 (1875), cum descript. Lecanora gelida var. obesa Zahlbr. Cat. Lich. Univ. V, p. 668 (1928). Lecanora gelida f. sorediata Zahlbr. Die Gattung Lecanora, in Rept. Sci. Res. Norweg. Exped. Novaya Zemlya, no. 44, p. 31 (1928), cum descript.

Descr. -- Thallus determinatus, e f f i g u r a t u s, plagas primum orbiculares deinque confluentes efficiens, crustam ad 6 cm. latam (vel etiam majorem) formans, laciniis ad peripheriam substrato arcte vel sublaxe ad--pressis, adnatis, rimis ad 0.1 mm. latis separatis, pla--nis vel tumidis, 1.5 - 2.5 mm. longis, vel saepe thalli centrum versus indefinite productis; 0.5 - 1.6 mm. latis,

0.2 - 0.4 mm. crassis, varie subdichotome sympodialiterve ramosis, apicibus leviter inaequalibus, rotundatis vel obsolete crenulatis, ambitu concoloribus vel interdum zona angustissima obscurius coloratis (olivaceo-fusces--centibus); i n c e n t r o r i m o s o - a r e o - - l a t u s, 0.3 - 1.5 mm. crassus, areolis irregulariter angulosis (saepe radiatim elongatis), planis vel tumi--dis, 0.6 - 2.0 mm. latis, rimis limatis ad 0.1 mm. latis separatis; glauco-albidus vel eburneus, saepe leviter olivaceo-fuscescens (vel interdum -- praecipue in speci--minibus islandicis -- parum subpurpureo-tinctus), epruinosus vel raro albido-pruinosus, laevigatus, haud nitidus, extus KHO - vel ± indistincte flavescens, $CaCl_2O_2$ ± roseo-rubescens vel - , Pd - vel ± pallide roseo-car--neus; intus KHO - vel ± indistincte flavescens, $CaCl_2O_2$ ± bene rubescens, Pd - . Isidia desunt; soredia p l e r u m q u e e v o l u t a, parte centrali thalli plus minusve crebre obsita, rotundata vel radiatim elon--gata, 0.3 - 1.0 mm. lata, erosa planave, saepe irregula--riter confluentia, pulveraceo-granulosa, olivaceo-vires--centia vel thallo subconcoloria (rarius albida). Hy--pothallus nullus visibilis. -- Cephalodia in thallis junioribus unica ac centralia, in thallis majoribus irre--gulariter sparsa, sessilia, 1.0 - 3.5 (- 8.0) mm. diam. et 0.4 - 1.6 mm. crassa, orbicularia, effigurata, radia--tim plicata rimosaque, vel interdum subglobosa et verru--culosa; flavofuscescentia, ferruginea vel rufofusca, haud nitida. -- Apothecia sat rara, thallo supersparsa, sessilia, discoidea, basi bene constricta, 0.8 - 1.4 (- 2.0) mm. diam., margine thallino crassiusculo, pro--minulo vel demum depresso, integro, epruinoso vel rarius albido-pruinoso, haud nitido; margine proprio interdum visibili, tenui, integro, carneo-fusco, nec nitido nec pruinoso; disco plano, laevigato vel scabridulo, obscure

carneo vel flavofusco vel rufofusco, saepe cinereo- vel albido-pruinoso, haud nitido. Excipulum paraplectenchy-matic um sub hypothecio bene evolutum, nubilatum; hypo-thecium incoloratum (rarius levissime roseum); theci-um (105 -) 115 - 165 (- 183)μ altum (vel in speci-minibus neozelandicis ad 200μ), superne pallide flavi-dum vel granuloso-nubilatum, ceterum incoloratum vel interdum leviter roseo-tinctum. Paraphyses apicibus vix vel parum incrassatae. Sporae 8nae, in asco uniseriatae subbiseriataeve, ellipsoideae, 12 - 19 (- 20)$\times$ 6 - 8 (- 13)μ. -- Pycnidia immersa, thallum leviter inflan-tia, extus maculis punctiformibus fusconigrescentibus ad 0.1 mm. diam. indicata, sphaerica, circa 330μ diam., peri-fulcrio paraplectenchymatico nubilato circumdata; fulcra saepe ramosa, acuminata, 1.0 - 1.5μ crassa; pycnoconidia filiformia, arcuata vel fere recta, 15 - 27 $\times$ 0.5μ.

Icon. -- Pl. 3, fig. 13 (a well-developed, fertile specimen from Norway, Voss, nat. size); fig. 14 (a dark form from British Columbia, Harrison Lake, nat. size); Pl. 7, fig. 33 (a young specimen from Iceland, Lake Meðalfellvatn). Further: Acharius, Lichenogr. Univ. Pl. VII, fig. 7 (1810) (sections of apothecia) (haud bona); Bastow, in Vict. Nat. XXX, Pl. IX, fig. 50 (1914) (haud bona, dubia); Crombie, Mon. Lich. Brit. I, p. 356 fig. 60 (1894) (algae from cephalodia, spores, fulcra and pycnidiospores); Forssell, in Bih. svensk. Vetensk-Akad. Handl. VIII, no. 3, Pl. I, figs. 1 & 2 (1883) (section of cephalodium and associated alga); Harmand, in Bull. Soc. Sci. Nancy, sér. II, XV, Pl. XV, fig. 48 (1898) (alga from cephalodium); Hedrick, in Pap. Mich. Acad. Sci. XXI, Pl. X, fig. 1 (1936) (good pho-tograph of typical form); Hepp, Abbild. u. Beschr. Sporen Flecht. Europ. IV, Pl. LXXXIX, fig. 773 (1867)

(spores); Keißler, in Rabh. Krypt.-Fl. ed. 2, Flecht--en, VIII, p. 404, fig. 78 (1930) (part of thallus parasitised by Discothecium squamarioides (Mudd)); Lindsay, in Trans. roy. Soc. Edinb. XXII, Pl. XV, figs. 18 & 19 (1859) (section of pycnidium, fulcra and pyc--noconidia); Migula, Krypt.-Fl. IV, 1. Teil, Pl. 29B, fig. 4 (1926) (spores); Nylander, Synops. Lich. II, Pl. I, fig. 39 (1888)[24] (spores and pycnoconidia); Oeder, Icon. Plant. Daniae, III, fasc. VIII, Pl. CCCCLXX, fig. 2 (1770); Sernander, in Svensk bot. Tidskr. I, p. 97 & 135, figs. 1 - 3, Pl. I, figs. 1 - 15, Pl. II, figs. 1 & 2 (1907); Smith, Lichens (Cambridge Bota--nical Handbook), p. 137, fig. 77 (1921) (part of thallus showing cephalodia, after Zopf); Smith & Sower--by, Engl. Bot. X, Pl. 699 (1800), ed. 2, XI, Pl. 2128 (1844) (bona); Zopf, in Nova Acta Leop. Carol. LXX, p. 114, fig. 14 (1897) (part of thallus parasitised by Sorothelia (= Discothecium) squamarioides (Mudd)).

Exsicc. -- Arn. Lich. exs. 430 ("Placodium gelidum") (H., K., M.) (f. neglecta); Des Abb. Lich. Armoric. spect. exs. 74 ("Squamaria gelida") (Des Abb.); Dicks. Hort. sicc. Brit. fasc. VII, 25 ("Lichen gelidus") (K., BM.) (f. neglecta); E. Fries, Lich. Suec. exs. 361 ("Parmelia gelida") (G., K., M., O.); Th. Fries, Lich. Scand. rarior. et critic. exs. 31 ("Placodium gelidum") (K., M., O.) (typic. in O., M.; f. neglec--ta in K.); Harm. Lich. in Loth. 447 ("Lecanora geli--da") (M.)[25]; Havaas, Lich. Norveg. exs. 42 ("Pla--codium gelidum") (H., O.); Hepp, Flecht. Europ. 773 ("Lecanora gelida") (G., K., S.); Larbal. Lich.-Herb. 50 ("Squamaria gelida") (K., BM.); H. Magn. Lich. sel. Scand. exs. 272 ("Lecanora gelida f. lepro--sula") (BM.); Malme, Lich. Suec. exs. 396 ("Leca--nora gelida") (non vidi); Picquenard, Lich. Finist.

116 ("Squamaria gelida") (non vidi); Salwey, Lich. Brit. III, 95 ("Squamaria gelida") (BM.); Zahlbr. Lich. rarior. exs. 54 ("Lecanora gelida") (BP.).

Hab. -- Rocks; very rarely over mosses.

Distr. -- Widely distributed in arctic and temperate oceanic Europe and N. America south to approximately 45 deg. N. lat.; in Europe the southernmost station known to me is in France: Cantal (about 45.15 deg. N. lat.), and the most continental (easterly) station recorded is in Moravia: Kahlenberg near Kunzendorf (16.29 deg. E. long.). The typical species occurs also in the south--ern hemisphere (New Zealand); a distinct variety is found in the Canary Islands, and a chemically distinct form in Chile and Juan Fernandez.

(A) HEMISPHAERIA SEPTENTRIONALIS

(1) A r c t i c a

JAN MAYEN. Exact locality not stated, coll. Dusén, 1899 (ster.) (S.); Nordlaguna, coll. B. Lynge, 1929 (ster.) (O.), coll. Iversen, 1930 (ster.) (O.); Scoresbykrateret, altit. 451 m., coll. J. Lid, 1930 (ster.) (O.); Vogtkrateret, coll. J. Lid, 1930 (ster.) (O.); Arnethkrateret, altit. 50 m., coll. J. Lid, 1930 (ster.) (O.); Ekerolddalen, coll. J. Lid, 1930 (ster.) (O.); Fishburn Valley, coll. Russell, 1938 (ster.) (BM.); Wallross Gat, coll. Russell, 1938 (ster.) (BM.); [Blytts Bjerg, recorded by Mathiesen in Dansk bot. Ark. IV, no. 5, p. 27 (1924)[13)]; stony plains between Mohns Bjerg and Wildberg, recorded by Mathiesen, loc. cit.; between the Austrian House and Nordlaguna, recorded by Lynge in Skr. Svalb. og Ishavet, no. 76, p. 38 (1939); Beerenberg, Mathumpen, altit. 1566 m., recorded by Lynge, loc. cit.]

ICELAND. Exact locality not stated, coll. Jardin, 1866 (ster.) (H.); exact locality doubtful, coll.

Steenstrup (ster.) (H.); Sudr Thingeyjar: Husavik, coll. B. Lynge, 1937 (ster.) (O.); Myra: Gråbrok, coll. B. Lynge, 1937 (ster.) (O.); Hreðavatn, coll. B. Lynge, 1937 (ster.) (O.); Borgar Fjardar: Lake Meðalfellvatn, coll. G. D. Magub, 1937 (no. 9 pr. p.) (ster.) (BM.); Borg, coll. B. Lynge, 1937 (f. typi--ca + f. neglecta) (ster.) (O.); Akrafjell, coll. B. Lynge, 1937 (ster.) (O.); Kjosar: Esja, coll. B. Lynge, 1937 (ster.) (O.); near Reykjavik, coll. B. Lynge, 1937 (f. neglecta) (ster.) (O.), coll. R. Rabenhorst, 1874 (fert.) (BP., W.); Gullbringu: Husfell, coll. B. Lynge, 1937 (fert.) (O.); [Krisu--vik, recorded by Th. Fries in Acta Soc. Sci. upsal. ser. III, III, p. 183 (1861); Hafnarfjordr, recorded by Grønlund in Bot. Tidsskr. IV, p. 162 (1870)]; Arnes: Reykir, coll. B. Lynge, 1937 (fert.) (O.); Langar--vatn, coll. B. Lynge, 1937 (ster.) (O.); Almannagja, coll. B. Lynge, 1937 (ster.) (O.); [Geysir, recorded by Grønlund, loc. cit.]; Rangar Valla: Siðumannaafrjet--tur, coll. Steindorsson, 1937 (ster.) (O.); Eyja--fjall, coll. Ingram, 1936 (ster.) (Jones).

SPITSBERGEN. Bellsund, coll. N. Polunin, 1933 (ster.) (O.); Bellsund, Kolfjellet, coll. B. Lynge, 1926 (ster.) (BM., O.); Bellsund, Van Mijenfjorden, coll. B. Lynge, 1926 (f. neglecta, muscicola !) (ster.) (O.); Isfjorden, Barentsburg, altit. 75 m., coll. J. Lid, 1924 (ster.) (O.); Isfjorden, Torvedalen, coll. O. Høeg, 1924 (ster.) (H., O.), coll. O. Høeg, 1924 (f. neglecta) (ster.) (H.), coll. J. Lid, 1924 (ster.) (O.); Isfjorden, Grønfjorden, coll. Th. Fries, 1868 (ster.) (O.); Sørkapp-Hornsund, Fisnes, coll. J. Lid, 1920 (ster.) (O.); Hopen, coll. Iversen & Koefoed, 1924 (ster.) (BM.), coll. Koefoed, 1929 (ster.) (O.); Hopen, Husodden, coll. Iversen & Koe-

-foed, 1924 (ster.) (O.); Hopen, Lyngefjellet, coll. Iversen, 1930 (ster.) (O.); [Hopen, Thorkelsens--kardet, recorded by Lynge in Norges Svalb. og Ishavs-Unders. no. 44, p. 10 (1939)].

BEAR ISLAND (BJÖRNØYA, BEEREN EILAND). Mt. Misery, Irrfärden, coll. Th. Fries, 1868 (ster.) (FH., H., O.); Tunheim, coll. J. Lid, 1924 (ster.) (O.).

[LAPPONIA KOLAËNSIS. Kola Peninsula, exact locality not stated, recorded by Nylander in Not. Sällsk. Fauna Flora fenn. Förh. n. s., V, p. 126 (1866); "Lapponia Rossica: pluribus locis ad Mare glaciale", recorded by Th. Fries, Lichenogr. Scand. I, p. 229 (1871)].

NOVAYA ZEMLYA. Matotchkin Shar, coll. B. Lynge, 1921 (f. neglecta) (ster.) (O.), coll. Höfer, 1872 (holotype of "Placodium gelidum var. obesum") (ster.) (L.); Matotchkin Shar, Mt. Lasareff, coll. B. Lynge, 1921 (ster.) (O.); Matotchkin Shar, Pomorskaya, coll. B. Lynge, 1921 (ster.) (O.), coll. B. Lynge, 1921 (lectotype of "Lecanora gelida f. sorediata") (ster.) (O.); [Matotchkin Shar, Saelhundsbugt, recorded by Th. Fries apud A. Blytt in Forh. VidenskSelsk. Krist. 1872, p. 15 (1873)]; Mashigin Fjord, Blomster Bay, coll. B. Lynge, 1921 (f. neglecta) (ster.)(O.); Mashigin Fjord, Dal Bay, coll. B. Lynge, 1921 (f. neg--lecta) (ster.) (O.); Mashigin Fjord, Sol Bay, coll. B. Lynge, 1921 (ster.) (O.); Mashigin Fjord, Strömsnes Bay, coll. B. Lynge, 1921 (ster.) (O.); Mashigin Fjord, Mt. Tveten, coll. B. Lynge, 1921 (ster.) (W.).

GREENLAND. [W. Greenland, Disko, recorded by Deich--mann Branth & Grønlund in Medd. Grønland, III, p. 476 (1887)]; W. Greenland, Disko, Blåfjell, coll. Th. Fries, 1871 (ster.) (O.); [S. W. Greenland, Igali--ko, recorded by Deichmann Branth & Grønlund, op. cit.

p. 475; S. W. Greenland, Julianehaab, recorded by Deich-
-mann Branth & Grønlund, loc. cit.; S. W. Greenland,
Tasermiut, recorded by Deichmann Branth & Grønlund, loc.
cit.; S. Greenland, Ikerasarsuak, recorded by Deichmann
Branth & Grønlund, loc. cit.]; S. E. Greenland, Kanger-
-dluluk, coll. J. Vahl (ster.) (H.); [S. E. Green-
-land, Kangerdlugsuatsiak, Møretun, recorded by Dahl,
Lynge & Scholander in Skr. Svalb. og Ishavet, no. 70, p.
53 (1937); S. E. Greenland, Kangerdluarak, recorded by
Deichmann Branth & Grønlund, loc. cit.; E. Greenland,
Drottning Augustas Dal, recorded by Malme in Ark. Bot.
XXIIA, no. 14, p. 5 (1929)].

(2) E u r o p a

SWEDEN. Exact locality not stated, coll. E. Fries
(ster.) (G., M., O.), coll. E. Fries (f. neglecta)
(fert.) (FH.); Torne Lappmark: near Lake Torneträsk,
coll. Zander, 1927 (ster.) (FH.); Jebrinsuolo in
Lake Torneträsk, coll. E. Vrang, 1919 (ster.) (W.);
[-Lule Lappmark: Nammats, recorded by Hellbom in Öfvers.
VetenskAkad. Förh., Stockh. no. 3, p. 53 (1875); Sarek
Mts., Alkavagge, recorded by Nilson, Die Flechtenvegeta-
-tion des Sarekgebirges, apud Hamberg, Naturw. Unters.
Sarekgeb. III, Lief. 1, p. 34 (1907); Sarek Mts.,
Mikkajokk, recorded by Nilson, loc. cit.; Sarek Mts.,
Tjågnårisjokotj, recorded by Nilson, loc. cit.];
Lycksele Lappmark: Björkfors, coll. Stenholm, 1924
(ster.) (FH.); Jämtland: Handöl, coll. G. Du Rietz,
1911 (ster.) (M.); Middagsfjell Mt., coll. Norman,
1865 (ster.) (O.); [Skurdalsport, recorded by Hell-
-bom in K. svenska VetenskAkad. Handl. XX, no. 8, p. 47
(1884); Åreskutan, recorded by Hellbom, loc. cit.;
Härjedalen: Funäsdalen, recorded by Hellbom, loc. cit.];
Dalsland: exact locality not stated, coll. Hulting, 1870

(f. neglecta) (ster.) (W.); [Ånimskog, recorded by Th. Fries, loc. cit.; Köppmannebro, recorded by Hulting in Bih. svensk. VetenskAkad. Handl. XXVI, Afd. III, no. 3, p. 50 (1900); Närke: Ullavi Klint, recorded by Th. Fries, loc. cit.; Bohuslän: Skaftö, recorded by Degelius in Uppsala Univ. Årsskr. no. 11, p. 163 (1939)]; Västergötland: Angered, coll. C. Stenholm, 1925 (fert.) (O.); Göteborg, coll. H. Magnusson, 1916 (ster.) (FH., BM., W., Frey); Högsbo, coll. H. Magnusson, 1925 (f. neglecta) (ster.) (Szat.); Hindås, coll. H. Magnusson, 1915 (ster.) (FH.); Ödenäs, coll. H. Mag--nusson, 1936 (ster.) (BM.); [Främmestad, recorded by Th. Fries, loc. cit.; Kviberg, recorded by Magnusson in Svensk bot. Tidskr. XIII, p. 87 (1919); Mölndal, recorded by Magnusson, loc. cit.; Ålleberg, Saleby, recor--ded by Magnusson in Acta Hort. gothoburg. XI, p. 56 (1936)]; Halland: Älvsåker, Hjälmared, coll. H. Mag--nusson, 1936 (ster.) (BM.); [Lindhult, recorded by Th. Fries, loc. cit.]; Småland: Femsjö, coll. Th. Fries, 1851 (fert.) (K.), 1857 (ster.) (W.), 1859 (fert.) (K., M., O.), 1859 (f. neglecta) (fert.) (K., M.), coll. Blomberg, 1859 (f. typica + f. neglecta) (pr. p. fert.) (M.), coll. Stenhammar (ster.) (M.); [Malmbäck, recorded by Th. Fries, loc. cit.; Svennarum, recorded by Th. Fries, loc. cit.].

NORWAY. Exact locality not stated, coll. Blytt, 1839 (ster.) (G.), coll. ? (ster.) (M.), coll. ? (fert.) (BM.); exact locality doubtful, coll. Blytt (ster.) (O.); Finnmark: Nordkapp, coll. Havaas, 1906 (ster.) (BM., O.); Altafjord, coll. Baur (ster.) (O.); Altafjord, Tverrelvadal, coll. Norman (ster.) (O.); Magerøy, coll. Havaas, 1906 (f. neglecta) (ster.) (O.); Seiland, coll. Norman (ster.) (O.); [Hammerfest, recorded by Th. Fries in Acta Soc. Sci.

upsal. ser. III, III, p. 183 (1861); Alta, Sakkobani, recorded by Degelius in Acta Hort. gothoburg. XII, p. 125 (1937)]; Troms: Tromsö, coll. J. Norman (ster.) (H.), coll. Th. Fries, 1867 (ster.) (O.), coll. B. Lynge, 1910 (ster.) (O.), 1914 (fert.) (O.); Lulle, coll. B. Lynge, 1911 (f. neglecta) (ster.) (FH., H., O., W.); Dividal, coll. J. Norman (ster.) (O.); Finnsnes, coll. B. Lynge, 1914 (fert.) (O.); Kåfjord, coll. Th. Fries, 1864 (f. typica ÷ f. neglecta) (ster.) (BM.), coll. J. Norman, 1866 (ster.) (O.); [Reinöy, recorded by Th. Fries, loc. cit.]; Nordland: Salten, exact locality doubtful, coll. ? (ster.) (M.); Gildeskål, coll. J. Norman (ster.) (O.); Saltdal, coll. Sommerfelt, 1820 (f. neglecta) (ster.) (O.); Bodö, coll. B. Lynge, 1911 (ster.) (O.); [Moskenes--öy, recorded by Degelius in Nyt Mag. Naturv. LXXVIII, p. 282 (1938)]; Sör-Tröndelag: Knutshö, coll. Th. Fries, 1863 (ster.) (H.), coll. B. Lynge, 1925 (f. neglec--ta)(ster.) (O.); Gaula, coll. B. Lunde, 1929 (fert.) (O.); Trondheim, coll. ?, 1828 (ster.) (K.); Möre og Romsdal: Ålesund, coll. J. Norman, 1877 (ster.) (O.), coll. Björlykke, 1930 (ster.) (O.); Romsdal, coll. Havaas (ster.) (O.); Sunnmöre, coll. Björlykke, 1929 (f. neglecta) (fert.) (O.); Sunn--dal, coll. Havaas, 1902 (ster.) (B. de Lesd.); [Sogn og Fjordane: Sognefjord, recorded by Th. Fries, Lichenogr. Scand. I, p. 228 (1871); Askvoll, recorded by Degelius in Bergens Mus. Aarb. naturvidensk. rekke, no. 3, p. 22 (1934); Eid, recorded by Degelius, loc. cit.; Flekke, recorded by Degelius, loc. cit.; Vågsöy, Revvik, recorded by Degelius, loc. cit.; Sandane, recor--ded by Degelius, loc. cit.; Öie Bakken, recorded by Degelius, loc. cit.]; Hordaland: Granvin, coll. Ha-

-vaas, 1900 (fert.) (H., O.), coll. B. Lynge, 1915 (fert.) (O.); Voss, coll. M. Blytt, 1833 (fert.) (O.), (ster.) (BP.), (f. typica + f. neglecta) (O., W.), coll. Havaas, 1927 (f. neglecta) (ster.) (O.), coll. J. Lid, 1923 (ster.) (O.); Samnanger--fjord, coll. Havaas, 1909 (fert.) (O.); Hardanger, coll. T. Lillefosse, 1920 (fert.) (O.), 1928 (ster.) (O.), 1916 (f. neglecta) (ster.) (O.); [Moster--havn, recorded by Havaas in Bergens Mus. Aarb. naturvi--densk. rekke, no. 2, p. 30 (1918)]; Rogaland: Suldal, coll. B. Lynge, 1906 (fert.) (FH.); Sogndal, coll. Havaas, 1905 (fert.) (O.); Mosteröy, coll. Havaas & Lynge, 1915 (f. typica + f. neglecta) (ster.) (O.); Bratlandsdal, coll. B. Lynge, 1906 (fert.) (O.); Vest-Agder: Kristiansand, coll. ? (ster.) (O.); Man--dal, coll. B. Lynge, 1918 (ster.) (O.); Opland: Dovre, coll. Sommerfelt, 1823 (ster.) (O.), coll. ?, 1828 (ster.) (O.), coll. Th. Fries, 1863 (ster.) (K.), coll. ? (fert.) (O.), coll. Schimper (f. ty--pica + f. neglecta) (ster.) (K.), coll. B. Lynge, 1916 (f. neglecta) (ster.) (O.); Fokstua, coll. B. Lynge, 1925 (ster.) (O.); Buskerud (or Vest-Agder?): Lyngdal, coll. Blytt, 1826 (fert.) (O.).

FAEROES. Strömö, near Thorshavn, coll. ?, 1821 (ster.) (K.), coll. ? (fert.) (K.), coll. Hartz & Ostenfeld, 1897 (fert.) (O., S.), (ster.) (FH., H., W.), coll. G. Rostrup, 1907 (ster.) (S.).

SCOTLAND. "Highlands of Scotland", exact locality not stated, coll. W. Withering (fert.) (K.); Caithness: Camster Cairns, coll. D. Lillie, 1906 (ster.) (B. de Lesd.); Ross and Cromarty: exact locality not stated, coll. T. Howse, 1873 (ster.) (BM.); Applecross, coll. J. Crombie, 1887 (ster.) (BM.); Inverness:

Fort Augustus, coll. Lauder Lindsay, 1856 (fert.) (K., BM.); Ben Nevis, by the lake, coll. J. Crombie(fert.) (BM.); Ben Nevis, altit. 1340 m., coll. Lauder Lindsay, 1856 (ster.) (K.); Rothiemurchus, coll. J. Crombie (ster.) (BM.); Skye, Sgurr nan Gillean, altit. 970 m., coll. Lauder Lindsay, 1856 (ster.) (M.); Skye, Sliga--chan, coll. Lauder Lindsay, 1856 (ster.) (M.); Skye, Quiraing, coll. Lauder Lindsay, 1856 (fert.) (K.); Barra Island, coll. ?, 1935 (Biol. Soc. Univ. Edinb. Exped.) (ster.) (E.); Argyll: Oban, coll. C. Babing--ton, 1838 (fert.) (BM.); Ben Cruachan, coll. C. Ba--bington, 1838 (fert.) (BM.); head of Loch Awe, coll. J. Crombie (fert.) (BM.); Loch Awe, North Port Sona--chan, altit. circ. 37 m., coll. M. Lamb, 1940 (no. 910) (ster.) (BM.), altit. circ. 76 m., coll. M. Lamb, 1940 (no. 970) (fert.) (BM.), (no. 1010) (f. neglecta) (ster.) (BM.); [Kilchurn Castle near Dalmally, recorded by Hooker, Fl. Scot. II, p. 50 (1821); Loch--goilhead, recorded by Stirton in Guide Book Brit. Ass. Glasgow Meeting, p. 102 (1876)]; Aberdeen: Braemar, coll. J. Crombie (ster.) (BM.); [Linn of Dee near Braemar, recorded by Leighton, Lich.-Fl. Gr. Brit. ed. 3, p. 160 (1879)]; Braemar, Glen Candlic, coll. J. Crom--bie (fert.) (BM.); Invercauld, coll. R. Brown, 1792 (fert.) (BM.); Forfar: exact locality not stated, coll. ? (fert.) (BM.); Caen Lochan, coll. J. Crombie (fert.) (BM.); Perth: exact locality doubtful, coll. Joshua, 1879 (fert.) (M.), coll. J. Wheldon & A. Wil--son, 1910 (ster.) (BM.); exact locality not stated, coll. J. Menzies, 1928 (ster.) (BM.); N. side of Ben Chalium, altit. 885 m., coll. A. Wilson, 1910 (ster.) (Wallace); Ben Lawers, coll. J. Crombie (fert.) (K., BM.), coll. Maingay, 1856 (ster.) (K.), coll. ?,

1842 (ster.) (BM.); summit of Ben Lawers, altit. 1226 m., coll. J. Lid, 1925 (ster.) (O.); Loch-na-Cat by Ben Lawers, coll. G. Davies, 1874 (fert.) (BM.); Finlarig, coll. W. Watson, 1929 (f. neglecta) (ster.) (Wats.); Killin, coll. ?, 1807(fert.) (K.); Craigchailliach near Killin, coll. J. Crombie (ster.) (BM.); Craig Tulloch, coll. J. Crombie (holotype of "Squamaria gelida f. dispersa") (ster.) (BM.); [Glen Falloch, recorded by Wheldon & Wilson in J. Bot., Lond. LIII, suppl., p. 35 (1915); near Loch Tummel, recorded by Wheldon & Wilson, loc. cit.; Sidlaw Hills, King's Seat, recorded by Wheldon & Wilson, loc. cit.; Pass of Leny, recorded by Hooker, loc. cit.; Kenmore, recorded by Leighton, loc. cit.; Breadalbane, recorded by Leighton, loc. cit.; Stirling: Ben Lomond, recorded by Hooker, loc. cit.]; Kirkcudbright: New Galloway, coll. J. McAndrew (ster.) (BM.).

ENGLAND. [Isle of Man: Sulby Glen, recorded by Wat--son in J. Bot., Lond. LXXI, p. 315 (1933)]; Cumber--land: Buttermere, coll ? (f. neglecta) (ster.) (K.); Westmorland: Red Screes, coll. J. Martindale, 1886 (f. neglecta) (ster.) (BM.); Scandale, coll. J. Martin--dale, 1887 (f. neglecta) (ster.) (BM.); Stavely, coll. J. Martindale, 1873 (fert.) (BM.); [Ambleside, recorded by Mudd, Man. Brit. Lich. p. 130 (1861)]; Durham: Teesdale, coll. W. Mudd, 1863 (fert.) (M.), (ster.) (BM.); Egglestone, coll. N. Winch (fert.) (BM.); [York: Cronkley Fell, recorded by Johnson in Nat. Hist. Trans. Newcastle, VIII, p. 313 (1889); Hol--wick, recorded by Leighton, Lich.-Fl. Gr. Brit. ed. 3, p. 160 (1879); Winch Bridge, recorded by Leighton, loc. cit.; Caldron Snout, recorded by Leighton, loc. cit.]; Carnarvon: Llanberis, coll. W. Watson, 1919 (ster.) (Wats.); Nant Ffrancon, coll. W. Leighton (ster.)

(BM.); Glyders, coll. ?, 1871 (ster.) (BM.); Moely-Gest, coll. W. Leighton, 1877 (fert.) (K.); [near Capel Curig, recorded by Withering, Arr. Brit. Plants, ed. 6, IV, p. 31 (1818); Cwm Idwell, recorded by Withe--ring, loc. cit.]; Merioneth: near Dolgelley, coll. H. Holl (ster.) (BM.); Llyn Bodlyn, coll. ? (ster.) (BM.); Talsarnau, coll. D. Jones, 1920 (fert.)(Wats.) coll. D. Jones & P. Rhodes, 1924 (fert.) (FH.); Arthog, coll. T. Salwey (fert.) (BM.); Cader Idris, coll. H. Holl (fert.) (BM.), coll. W. Leighton, 1866 (ster.) (K.), 1869 (ster.) (K.), coll. E. Price Evans, 1931 (ster.) (BM.); [Aran Mowddwy, recorded by Leighton, loc. cit.; Shropshire: Longmynd Hill, recor--ded by Leighton, loc. cit.; Stiperstones Hill, recorded by Leighton, loc. cit.; Devon: Bridford, recorded by Leighton, loc. cit.]; Cornwall: St. Austell, coll. R. Tellam, 1872 (fert.) (BM.).

IRELAND. Antrim: Carnlough, coll. Adm. Jones (ster.) (BM.); [Glenmakeeran, recorded by Knowles in Proc. R. Irish Acad. XXXVIII, sect. B, no. 12, p. 273 (1929); Fair Head, recorded by Knowles, loc. cit.; Tyrone: Cap--pagh, recorded by Knowles, loc. cit.]; Mayo: Clare Is--land, coll. A. L. Smith, 1910 (ster.) (BM.); [Wick--low: Glendalough, Lough Dan and Lough Tay, recorded by Knowles, loc. cit.; Lugnaquilla, recorded by Knowles, loc. cit.]; Galway: Connemara, exact locality not sta--ted, coll. C. Larbalestier, 1876 (fert.) (H.); Letterfrack, coll. C. Larbalestier (fert.) (K., BM.); Recess, coll. C. Larbalestier, 1875 (fert.) (BM.); Lough Muck, coll. C. Larbalestier (fert.) (K.); [Lough Inagh, recorded by Knowles, loc. cit.; Salrock, recorded by Knowles, loc. cit.; Waterford: Comeragh Mts., recorded by Knowles, loc. cit.]; Cork: Bantry Bay, Fairhead, "near the level of the sea", coll. T. Taylor,

1815 (f. neglecta) (fert.) (K.); [Glengariff, recorded by Knowles, loc. cit.; Pass of Keamaneigh, re--corded by Knowles, loc. cit.]; Kerry: Dingle, coll. I. Carroll (fert.) (K., BM.); Dunkerron, coll. T. Tay--lor (fert.) BM.); [Macgillycuddy's Reeks, recorded by Knowles, loc. cit.].

FRANCE. Calvados: Vire, coll. Delise, 1831 (fert.) (K., BM., M.), coll. Pelvet (fert.) (G., K., M., S.), coll. Pelvet (f. neglecta)(ster.) (FH.), coll. ? (fert.) (H.); [Orne: Châtellier, recorded by Har--mand, Lich. France, V, p. 939 (1913)]; Cotes-du-Nord: Bon Repos near Laniscat, coll. H. des Abbayes (fert.) (Des Abb.); Finisterre: Ergué-Gaberic Mts., coll. Pic--quenard, 1897 (fert.) (BM.); [Scaer, recorded by Harmand, loc. cit.; Quimper, recorded by Harmand, loc. cit.; Morbihan: Napoleonville (Pontivi), recorded by Cauvin in Congr. Sci. France, I, p. 49 (1833)]; Sarthe: St.-Georges-le-Gaultier, coll. E. Monguillon, 1907 (ster.) (M.); St.-Léonard-des-Bois, coll. E. Monguillon, 1898 (fert.) (BM.); Vendée: Nicachat, coll. J. Richard, 1884 (ster.) (W.); Puy de Dome: Mont Dore, coll. Brevière, 1898 (ster.) (B. de Lesd.); [Cantal: Le Croiset, near Aurillac, recorded by Harmand, loc. cit.; Haute Savoie: Glacier des Bois, recorded by Harmand, loc. cit.]; Vosges: Bussang, coll. Claudel, 1890 (ster.) (M.); [Gérardmer, recorded by Harmand, loc. cit.; Schlucht, recorded by Harmand, loc. cit.; Tête du Houssot, recorded by Harmand, loc. cit.; Bonne-Fontaine, near Tholy, recorded by Harmand, loc. cit.].

[BELGIUM. Luxembourg: Frahan, recorded by De Wildeman & Durand, Prodr. Fl. Belge, I, p. 492 (1898).].

[LUXEMBURG. Near Bivers, recorded by Koltz in Mém. Soc. bot. Luxemb. XIII, p. 191 (1897).].

GERMANY. [Anhalt: Ramberg, near Friedrichsbrunn,

recorded by Schwabe, Fl. Anhalt. II, p. 154 (1839); Sachsen: Zittau, recorded by Körber, Syst. Lich. German. p. 117 (1855)]; Schlesien: exact locality doubtful, coll. Schrader, 1802 (fert.) (BM.); "e Sudetis Siles.", coll. Ludewig, 1809 (ster.) (M.); Baden: Präg near Todtnau, coll. Lösch (ster.) (FH., MO., Szat.); Tirol: Obergurgl, coll. Arnold, 1878 (ster.) (M.); Pinzgau, Hollersbacher Tal, coll. Laurer, 1865 (ster.) (H.); Umhausen in the Oetztal, coll. Arnold, 1870 (f. neglecta) (ster.) (H., K., M., WELT., W.); [Kühtai, recorded by Dalla Torre & Sarnthein, Fl. Tirol, IV, p. 231 (1902); Windischmatrei, recorded by Olivier in Mém. Soc. nat. Sci. Cherbourg, XXXVII, p. 55 (1909)]; Steiermark: Schladmingertauern, altit. 1900 m., west ex--posure, coll. E. Frey, 1930 (ster.) (Frey).

[BOHEMIA. Parchen and Haida, recorded by Migula, Krypt.-Fl. IV, 1. Teil, p. 316 (1926).].

[MORAVIA. Kahlenberg, near Kunzendorf, recorded by Körber, Syst. Lich. German. p. 117 (1855).].

[(3) A f r i c a

MADEIRA. Castello da Paiva, recorded by Stizenberger in Ber. naturw. Ges. St. Gallen, 1888/89, p. 194(1890).].

(4) A s i a

[KAMTCHATKA. Awatchinskaja Sopka, recorded by Du Rietz in Ark. Bot. XXIIA, no. 13, p. 16 (1929).].

ALEUTIAN ISLANDS. [Amchitka Island, recorded by Degelius in Acta Hort. gothoburg. XII, p. 125 (1937); Kanaga Island, recorded by Degelius, loc. cit.; Carlisle Island, recorded by Degelius, loc. cit.]; Amlia Island, coll. Eyerdam, 1932 (ster.) (FH.); Unalaska Island, coll. Eyerdam, 1932 (ster.) (FH.); Unimak Island, False Pass, coll. Eyerdam, 1932 (ster.) (FH., S.).

(5) A m e r i c a

ALASKA. Exact locality not stated, coll. F. Hess, 1905 (ster.) (W.); [Cape Lisburne, recorded by Nylander in Bull. Soc. linn. Normandie, sér. 4, I, p. 281 (1887); Seward Peninsula, Port Clarence, recorded by Cummings in Harriman Alaska Exped. V, p. 109 (1904); Alaska Peninsula, Belkoffski, recorded by Cummings, loc. cit.; Prince William Sound, Port Wells, recorded by Cummings, loc. cit.; Yakutat Bay, recorded by Cummings, loc. cit.]; Glacier Bay, Muir Glacier, coll. W. Tre--lease & D. Saunders, 1899 (Harriman Alaska Exped.) (f. typica + f. neglecta) (fert.) (MO.); Alexander Archipelago, Baranoff Island, Hot Springs, coll. W. Tre--lease & D. Saunders, 1899 (Harriman Alaska Exped.) (f. neglecta) (ster.) (MO.); Alexander Archipela--go, Cape Fox, coll. W. Trelease & D. Saunders, 1899 (Harriman Alaska Exped.) (f. neglecta) (ster.) (MO.).

CANADA. British Columbia: [near Stuart Lake, recor--ded by Macoun, Cat. Canad. Plants, VII, p. 104 (1902)]; Vancouver Island, exact locality not stated, coll. J. Macoun, 1875 (fert.) (K.); Harrison Lake, coll. T. Bonser, 1907 (no. 22) (ster.) (B. de Lesd.).

UNITED STATES. Washington: exact locality not stated, coll. Suksdorf (ster.) (BM.); Kitsap, Orchard Point, coll. Piper, 1895 (f. neglecta) (ster.) (FH.); Mason (or Whatcom or Ferry ?), near Summit, "on exposed boulders of hills", coll. Foster, 1907 (ster.) (FH.); San Juan, Friday Harbor, coll. Trye, 1905 (f. neglecta) (fert.) (FH.); Oregon: Tillamook, Garibaldi, coll. A. Sweetser, 1899 (fert.) (FH.); [California: exact locality not stated, recorded by Fink, Lich. Fl. United States, p. 308 (1935)]; New Hampshire: White Mts., exact locality not stated, coll. E. Tuckerman

(ster.) (MO.).

(B) HEMISPHAERIA AUSTRALIS

NEW ZEALAND. Exact locality not stated, coll. Colen--so (fert.) (K., BM.), (ster.) (K.), coll. C. Knight (fert.) (WELT.); South Island, Grey: Grey--mouth, "on river-bed boulders near coast", coll. W. Mackay, 1935 (fert.) (W.).

Obs. 1. -- The type-specimen of P. gelida has been lost. The following supplementary description is based upon a specimen from Iceland, collected probably near to the type-locality by B. Lynge in 1937 (Arnes, Reykir), and preserved in the Oslo Museum: thallus well effigurate at periphery, irregularly areolate in centre, Pd - , so--rediate with eroded, pale glaucous-greenish, finally somewhat confluent soredia; corticate, the cortex 12 - 20μ deep, dull yellowish but hardly nubilated, paraplec--tenchymatic, of cells 3 - 5μ diam.; medulla compact, nubilated, of interwoven hyphae 2 - 3μ thick; symbiotic algae 7 - 9μ diam., forming an interrupted layer 45 - 75μ deep. Cephalodia up to 5 mm. diam., discoid, radiately split and effigurate, rusty-brown, with an outer, hyaline, paraplectenchymatic cortex of ± isodiametric cells 3 - 4μ diam. (their walls 1.0 - 1.3μ thick); symbiotic algae Scytonemoid, pale orange, dispersed in clumps throughout the medullary tissue. Lower, paraplectenchymatic, ex--cipular layer of apothecia formed of ± isodiametric, thin-walled cells 5.0 - 7.5μ diam. Hypothecium of com--pacted hyphae 2 - 4μ thick running in various directions. Thecium 150 - 165μ high. Paraphyses often branched, 1.3 - 1.6μ thick, septate with septa 9 - 20μ apart. Asci cylindric-clavate, 105 - 135 × 12 - 18μ, with wall 1.5 - 2.0μ thick at sides and up to 5μ at apex, coloured faint--ly red by iodine.[26] Spores 15 - 18 × 9 - 12μ.

Obs. 2. -- P. gelida is a polymorphic species, and appears to be in the process of breaking up into several new taxonomic entities. This process is however not sufficiently far advanced at the present stage to allow of reliable systematic differentiation. Statistical studies of a large number of individuals may show diffe--rential curves for various characters in material from widely separated areas. The New Zealand specimens seen, for instance, differ in being constantly esorediate and

in having a higher thecium (up to 200μ); there may be grounds for considering these as belonging to a distinct subspecies or variety, but having seen so little material I have refrained from segregating them for the present.

Obs. 3. -- There is no specimen of "Lichen gelidus" in the Linnaean herbarium. The original was collected by J. G. König during his trip to Iceland in 1765 - 6. Oeder's "Lichen heclae" seems to have been founded on part of the same gathering, and of this a rough but adequate figure is given in the "Flora Danica"; the reddish cen--tral cephalodium is clearly recognisable. Linné out--lined the salient features admirably in his short des--cription: "LICHEN crustaceus albicans, peltis tubercu--losis rugosis testaceis".

Obs. 4. -- The holotype of Körber's "Placodium gelidum var. obesum" is a typical, abundantly sorediate specimen, sterile. The same applies to the original material of Zahlbruckner's "Lecanora gelida f. sorediata"; ~~see photo--graph on Pl. 3, fig. 13, showing the development of so--redia in the typical condition.~~

Obs. 5. -- Schaerer, Enum. Crit. Lich. Europ. p. 60 (1850), published a "b. rufo-fusca" of this species, based on an unnamed condition described by E. Fries in his Lichenogr. Europ. reform. p. 104 (1831), and it has been taken up as "Lecanora gelida f. rufofusca" in Zahlbr. Cat. Lich. Univ. V, p. 668 (1928). Th. Fries, who saw the original specimen in his father's herbarium, tells us that it is a form of Lecidea (Biatora) coarctata (Lichenogr. Scand. I, p. 229; 1871).

Obs. 6. -- Zahlbruckner described a form: "Lecanora gelida f. nuda" from Juan Fernandez, Masatierra, apud Skottsberg, Nat. Hist. Juan Fernandez and Easter Island, II, p. 381 (1924). Subsequently the name was also applied to non-sorediate individuals of P. gelida from

Novaya Zemlya (Die Gattung Lecanora, in Rept. Sci. Res. Norweg. Exped. Novaya Zemlya, no. 44, p. 31; 1928). No type specimen has come to light, either in the Vienna herbarium or in Dr. Skottsberg's collections, and so it seems advisable to discard the epithet as nomen dubium.

Obs. 7. -- "Squamaria gelida f. dispersa" Cromb. in Grevillea, I, p. 171 (1873) (= Lecanora gelida f. dis--persa Cromb. Mon. Lich. Brit. p. 356; 1894) refers, according to the holotype from Scotland, Craig Tulloch, to a morbose and undeveloped condition brought about by the attack of a parasite, Didymosphaeria microstictica var. alboatrae; see p. 167.

Obs. 8. -- To Dr. O. Galløe (Copenhagen) I am in--debted for the information that P. gelida does not occur in Denmark. Dr. A. Schade (Dresden) kindly supplied me with data concerning its occurrence in Saxony: it ap--pears that no reliably authenticated specimen has been collected in that region, at any rate within living me--mory. The most easterly record in Europe is that from Moravia, Kunzendorf, given in Körber's Syst. Lich. German. Anders, in his paper on vanishing and extinct lichens in N. Bohemia (1935) states that P. gelida cannot be found in this region nowadays: "von L. RABENHORST als bei Haida und Parchen wachsend angegeben. Dieses Vorkommen konnte trotz eifrigen Suchens bisher nicht bestätigt werden". Pollini, Fl. Veronens. III, p. 443 (1824) recorded this species "in Cenisio et in contingentibus summis alpibus Pedemontii"; this is based on a statement by Bellardi in Mém. Acad. Roy. Sci. Turin, V, p. 265 (1793). Bellardi however gives a short description, from which it is obvious that the plant to which he re--fers cannot have been P. gelida.

Obs. 9. -- Zahlbruckner, in Rev. chil. Hist. nat. XXXVII, p. 167 (1933), records this species from Chile:

Rio Puelo (Boca), coll. Espinosa. I have not seen this specimen, but consider it probable that the record most likely refers to another species.

F. NEGLECTA (Degel.) M. Lamb, comb. nov.

Synon. -- Lecanora gelida f. neglecta Degel. in Acta Hort. gothoburg. XII, p. 125 (1937), cum descript.

Diagn. -- "Soredia elevata, semiglobosa, albida vel cinereoalbida" (Degel., loc. cit.).

Obs. -- I have not seen the holotype of this form, but have come across it in many collections; its distri--bution is enumerated above together with that of the ty--pical species. It is easily recognisable by its pulvi--nate, subglobose, pale coloured soredia (in the typical species the soredia are more or less eroded and usually darker, greenish to olivaceous-greenish).

Var. CANARIENSIS M. Lamb, var. nov.

Diagn. -- Thallus sorediatus, sicut in forma typica speciei; hypothecium in centro rufofuscum; thecium 180 - 225μ altum.

Hab. -- On igneous rock (lava).

Distr. -- Canary Islands.

CANARY ISLANDS. Palma, altit. 900 m., coll. Pitard (holotype) (fert.) (B. de Lesd.).

Obs. 1. -- In the holotype specimen, the thallus is effigurate, the marginal lobes being closely adnate to the substratum, 2.0 - 3.5 mm. long, 0.6 - 1.5 mm. broad, 0.3 - 0.5 mm. thick, separated by narrow cracks, slightly tumid, rounded or slightly crenulate at ends; in centre cracked-areolate, with obtuse-edged, radial and tangential cracks up to 0.15 mm. wide delimiting subrectangular or irregularly angulose, slightly convex areolae 1.0 - 2.5 mm. diam., up to 0.5 mm. thick; cream-coloured, matt, not pruinose, on surface KHO - , $CaCl_2O_2$ - or ± light red, Pd ± pale pink; medulla KHO - , $CaCl_2O_2$ ± rose-red, Pd - . No isidia. Soredia numerous in central part of thallus, level with the thallus or slightly erum--pent, granular-pulverulent, sordid-whitish to brownish-grey. No hypothallus visible. Thallus corticate; cor-

-tex 15 - 25μ deep, heavily nubilated, paraplectenchyma-
-tic, of cells 4 - 6μ diam.; medulla slightly nubilated, compact, of interwoven hyphae 3.0 - 4.5μ thick; symbio-
-tic algae 6 - 12μ diam., forming a ± continuous stratum 60 - 120μ deep. Cephalodia irregularly scattered over thallus, sessile, discoid, up to 4.5 mm. diam., up to 0.6 mm. thick, with radial cracks and folds, brownish flesh-coloured, matt. One apothecium present; 1 mm. diam., sessile, round, well constricted at base, with moderate, entire, matt, non-pruinose, thalline margin; no proper margin visible; disc minutely scabrid, plane, pink-brown, matt, not pruinose. Paraplectenchymatic, excipu-
-lar stratum present below hypothecium; nubilated, of ± isodiametric, thin-walled cells 4 - 6μ diam. Hypotheci-
-um colourless and hyaline at sides, but dark reddish or reddish-brown in centre; composed of compacted, thin-walled hyphae 1.5 - 2.0μ thick running in various direc-
-tions. Thecium dull yellowish or yellow-brown (nubi-
-lated) in upper 30 - 45μ, otherwise colourless. Para-
-physes 1 - 2μ thick, often branched, budding off at the apices rounded, conidia-like, hyphal fragments which form the epithecium; septate with septa 8 - 15μ apart. Asci cylindric or cylindric-clavate, 135 - 180 × 10 - 15μ, with wall everywhere not over 1.5μ thick, and persistently pale blue with iodine. Spores 8, uniseriate, ellipsoid, 14.5 - 19.0 × 8 - 9μ. [No pycnidia seen.]

Obs. 2. -- This variety appears to be distinct both as regards its morphology and its distribution, although the constancy of the hypothecial character must be con-
-firmed by further collections.

Var. SUBREAGENS M. Lamb, var. nov.

Diagn. -- Thallus esorediatus, in centro dupliciter rimosus (areolas duarum magnitudinum praebens), intus Pd ± rubescens.

Hab. -- Rocks.

Distr. -- Chile and Juan Fernandez.

CHILE. Exact locality not stated, coll. Gay (holo-
-type) (fert.) (H.); Valdivia: exact locality not stated, coll. Rabenhorst, 1869 - 70 (fert.) (M., W.); Lago Puyehue, altit. 220 m., coll. R. Hollermayer, 1936 (fert.) (Räs.).

JUAN FERNÁNDEZ. Masafuera: Las Torres, altit. 1370

m., coll. C. & I. Skottsberg, 1917 (ster.) (S.).

Obs. 1. -- In the holotype specimen (no. 23856 in herb. Nyl.), the thallus is 4 - 5 cm. diam., well effi-gurate at periphery, with slightly convex or flattened lobes 6 - 10 mm. long, 0.5 - 1.0 mm. broad, 0.15 - 0.20 mm. thick, contiguous, fairly closely applied to substra-tum, variously branched, separated by round-edged cracks about 0.1 mm. wide, at apices rounded and ± crenulate; in centre up to 0.5 mm. thick, doubly areolate, i. e. with a first series of gaping, anastomosing cracks 0.20 - 0.25 mm. wide, and a second series of inner, very fine, almost closed-up cracks hardly visible to the unaided eye, delimi-ting obtusely or acutely angulose, plane or slightly con-vex areolae 0.5 - 1.0 mm. diam.; pallid cream-coloured with a brownish tinge, matt, not pruinose, on surface KHO + indistinctly yellowish, $CaCl_2O_2$ + faintly reddish or - , Pd - ; medulla KHO + indistinctly yellowish, $CaCl_2O_2$ + rose-red, Pd + red. No isidia; no visible hypothallus. Thallus with an upper, nubilated, paraplectenchymatic cor-tex 12 - 17μ deep composed of cells 4 - 6μ diam.; medulla nubilated, compact, of interwoven hyphae 3 - 4μ thick run-ning in various directions; symbiotic algae 6 - 10μ diam., forming an interrupted layer 50 - 75μ deep. Ce-phalodia irregularly scattered, sessile, orbicular, 1.3 - 2.8 mm. diam., up to 0.4 mm. thick, radiately plicate-ef-figurate and cracked, rusty flesh-coloured, matt; with an outer, pale brown, paraplectenchymatic cortex 24 - 34μ deep composed of ± isodiametric, thin-walled cells 4 - 6μ diam.; medullary tissue nubilated, of parallel-congluti-nate, upward-striving hyphae 3.0 - 4.5μ thick (their walls 1.0 - 1.3μ thick); symbiotic algae Scytonemoid, blue-green, forming an irregular stratum in the medullary tissue. Apothecia irregularly disposed, sessile, slight-ly to well constricted at base, round, 1.0 - 1.2 mm. diam., with prominent, tumid, entire, matt or subnitid, non-pruinose, thalline margin; no proper margin differen-tiated; disc plane, dull flesh-coloured or light brown-red, matt, often slightly pruinose. Subhypothecial ex-cipulum nubilated, paraplectenchymatic, up to 75μ deep, of thin-walled cells 5 - 8μ diam.; hypothecium up to 140μ deep, colourless, of compacted, thin-walled hyphae 1.5 - 2.0μ thick running in various directions; thecium imma-ture; no asci or spores developed (Nylander saw spores and drew them, giving the measurements as 0.016 - 20 × 0.007 - 11 mm.).

Obs. 2. -- The peculiar, doubly areolate nature of the thallus appears in all the specimens examined, and thus seems to be a constant character. Apothecia may be up

to 1.8 mm. diam.; thecium 126 - 165μ high; paraphyses sometimes branched, about 1.5μ thick, at tips submonili-formly thickened up to 2.5μ, septate with septa 9 - 18μ apart; asci cylindric-clavate, 108 - 145 × 15 - 18μ, with wall about 2μ thick at sides and up to 5μ at apex, per-sistently pale blue with iodine; spores 8, uniseriate or partly biseriate, ellipsoid to broadly ellipsoid, 15 - 18 (- 21) × 8 - 12μ. [No pycnidia seen.]

Obs. 3. -- The material upon which Zahlbruckner based his "Lecanora patagonica f. sorediosula", apud Skotts-berg, Nat. Hist. Juan Fernandez and Easter Island, II, p. 382 (1924), belongs partly to this variety and part-ly to another, sterile, indeterminable specimen; see p. 67 .

Obs. 4. -- The specimen from Chile: Valdivia, Lago Puyehue, coll. Hollermayer, has been recorded by Räsänen in Rev. univ., Santiago, XXII, p. 200 (1937), under the name "Placopsis gelida".

28. PLACOPSIS EFFUSA M. Lamb, sp. nov.

Descr. -- Thallus e f f u s u s, i n d e t e r - - m i n a t u s, u n i f o r m i s, tenuis (ad 0.2 mm. crassus), plagas irregulares sparsas efficiens, o m - - n i n o a r e o l a t u s, areolis subplanis, 0.4 - 0.7 mm. diam., rimis tenuissimis separatis et varie an-gulosis aut passim dispersis et tunc subrotundatis; sordide eburneus vel flori lactis concolor, nec nitidus nec pruinosus, extus intusque KHO - , $CaCl_2O_2$ + roseo-rubescens, Pd - . Isidia ac soredia nulla. Hypothallus nullus visibilis. -- Cephalodia sparsa, parva (0.3 - 0.8 mm. diam., ad 0.4 mm. crassa), irregulariter tuber-culata, haud plicata nec effigurata, fuscoflavida vel rufofusca, opaca. -- Apothecia thallo irregulariter supersparsa, supra areolas sessilia, discoidea, basi bene constricta, 0.8 - 1.2 mm. diam.; margine thallino medi-

-ocri, integro, demum attenuato; margine proprio tenui, parum prominenti, integro, pallide carneo, opaco, eprui-
-noso; disco obscure fuscocarneo, planiusculo, laeviga-
-to, haud nitido, haud vel interdum levissime albido-prui-
-noso. Stratum excipulare sub hypothecio evolutum, para-
-plectenchymaticum, nubilatum, modice incrassatum; hypo-
-thecium incoloratum; thecium 140 - 165μ altum, hyalinum sed sursum pallide flavido-nubilatum. Paraphyses apici-
-bus saepe leviter incrassatae. Sporae 8nae, in asco partim uni- , partim biseriatae, ellipsoideae, 17.5 - 21.0 × 9.0 - 12.5μ. -- Pycnidia thallo immersa, ad apicem ostiolo minutissimo punctiformi fuscidulo notata, pyrifor-
-mia, circa 100μ lata, perifulcrio indistincte para- vel prosoplectenchymatico, nubilato. Fulcra gracilia, atte-
-nuata, saepe ramosa, 13 - 18 × 1.0 - 1.5μ. Pycnoconidia filiformia, leviter arcuata, interdum subrecta, 18 - 21 × 0.5μ.

Icon. -- Pl. 10, fig. 43 (part of the holotype speci-
-men).

Hab. -- Rocks.

Distr. -- Chile.

CHILE. Valdivia: exact locality not stated, coll. Krause, 1864 (holotype) (fert.) (M.).

Obs. 1. -- In the holotype specimen, the thallus is in some places covered by an outermost, hyaline, amorphous layer about 3μ deep; the underlying cortex is 15 - 24μ deep, ± nubilated, paraplectenchymatic, of cells 3 - 5μ diam.; medulla compact, nubilated, of closely interwoven hyphae 3 - 4μ thick, becoming towards the base of the thallus more compacted and brownish; symbiotic algae 7.5 - 9.0μ diam., pale green, forming a ± continuous and even stratum 35 - 60μ deep. Cephalodia covered by an outer, hyaline, semi-amorphous layer up to 9μ deep derived from disintegration of cortical cells; cortex faintly yellow-
-ish but not nubilated, 9 - 15μ deep, paraplectenchymatic, of ± isodiametric, thin-walled cells 3.0 - 4.5μ diam.; inner mass of medullary tissue hyaline, of conglutinated hyphae, entirely filled with Nostocoid, pale blue-green, symbiotic algae. Lower, paraplectenchymatic, excipular

stratum composed of ± isodiametric, fairly thin-walled cells 3 - 6μ diam.; hypothecium up to 210μ deep in cen--tre, formed of densely packed hyphae 1.5 - 3.0μ thick running in various directions. Paraphyses about 1.4μ thick, up to 2.0 or rarely 2.5μ thick at tips, occasional--ly branched, septate with cells 12 - 18μ long. Asci clavate, 80 - 120×18 - 21μ, with wall about 3μ thick at sides, at apex seemingly thickened up to 8μ, persistently blue with iodine.

Obs. 2. -- This species differs from P. gelida in its completely effuse and non-effigurate thallus, and from P. parellina in its distinctly areolate thallus, lower the--cium, etc.

29. PLACOPSIS ILLITA (Kn.) M. Lamb, comb. nov.

Synon. -- Placodium illitum Kn. in Trans. linn. Soc. Lond., Bot. ser. 2, I, p. 282 (1878), cum descript.; Lecanora illita Forss. in Bih. svensk. VetenskAkad. Handl. VIII, no. 3, p. 53 (1883).

Descr. -- Thallus plus minusve determinatus, plagas suborbiculares 1.5 - 2.5 cm. diam. efficiens, ambitu pas--sim h y p o t h a l l o f u s c o n i g r o, i n t e r--d u m f i m b r i a t o, z o n a m t e n u e m f o r m a n t i c i n c t u s, vel ibi rarius obsolete plicato-effiguratus (lobis minutis, concretis, plicatis); in centro irregulariter minuteque rimosus (haud rite areolatus), rimis angustissimis, tantum vitro ×10 visi--bilibus; tenuis (ad 0.2 mm. crassus), glauco-albidus vel flori lactis concolor, epruinosus, haud nitidus, ex--tus intusque KHO - vel ± indistincte flavescens, $CaCl_2O_2$ ± roseo-rubescens, Pd - . Isidia sorediaque desunt. -- Cephalodia thallo supersparsa, deplanato-discoidea, ses--silia, 2 - 3 mm. diam., ad 0.6 mm. crassa, radiatim pli--cato-effigurata ac nonnihil rimosa, flavido-carnea, haud nitida. -- Apothecia sessilia, thallo adpressa, discoi--dea, basi parum constricta, ad 1.3 mm. diam., margine thallino prominulo depressove, integro vel levissime

crenulato, epruinoso, haud nitido; margine proprio inter--dum visibili, tenui, integro, fuscocinerascenti; disco plano, o b s c u r e f u s c o v e l f u s c o n i g--r i c a n t i, nec nitido nec pruinoso. Stratum ex--cipulare sub hypothecio evolutum, paraplectenchymaticum, nubilatum; hypothecium incoloratum vel lamina crassiori visum leviter flavidum; thecium 80 - 140μ altum, superne flavofuscescens, ceterum incoloratum. Paraphyses apici--bus haud incrassatae; sporae 8nae, in asco biseriatae vel partim uniseriatae, ellipsoideae, 12 - 17 × 6.0 - 8.5μ.

Icon. -- Pl. 9, fig. 38 (the lectotype specimen, no. 23848 in herb. Nyl.); also shown on Pl. 8, fig. 36, where a specimen is seen growing together with P. amplia--ta. Further: Kn. in Trans. linn. Soc. Lond., Bot. ser. 2, I, Pl. XXXVIII, fig. 13 (ascus and spores).

Hab. -- On rocks and pebbles.

Distr. -- New Zealand.

NEW ZEALAND. Exact locality not stated, coll. C. Knight (lectotype) (fert.) (H., no. 23848 in herb. Nyl.), (paratype) (fert.) (H., nos. 3641, 3642, 3645, and 23847 in herb. Nyl.; BM., M., WELT.); South Island, Grey: Greymouth, coll. Helms (no. 251 pr. p.) (fert.) (W.).

Obs. 1. -- In the lectotype specimen, the thallus is not effigurate, but is bounded in most parts of its peri--phery by a somewhat fimbriate, thin, brown-black, hypo--thalline line. In section, its upper cortex is 7 - 30μ deep, colourless or faintly yellowish, of cells 3 - 5μ diam.; medulla hyaline or slightly nubilated, compact, of interwoven hyphae 1.5 - 4.0μ thick running in various di--rections; symbiotic algae 5 - 15μ diam., in a slightly interrupted, irregular, somewhat diffuse stratum 36 - 75μ deep. Cephalodia with a faintly yellowish, paraplecten--chymatic, outer cortex 10 - 30μ deep, formed of ± isodia--metric, thin-walled cells 2.5 - 5.0μ diam.; medullary tissue colourless, paraplectenchymatic, or almost so, of irregularly angulose, thin-walled cells 5 - 15μ diam.; symbiotic algae Nostocoid, blue-green, in short chains.

Lower, paraplectenchymatic stratum of excipulum composed of ± isodiametric, thin-walled cells 3 - 9μ diam.; hypo--thecium of compacted hyphae 1.3 - 2.0μ thick running in various directions, blue-green with iodine. Paraphyses often branched, capped by irregular, yellow-brown, epi--thecial granules, septate with septa 8 - 15μ apart. Asci cylindric-clavate, 110 - 120 × 9 - 15μ, with wall about 1μ thick at sides and (in younger asci) up to 9μ thick at apex, pale blue then faintly greenish with iodine. [No pycnidia seen.]

Obs. 2. -- This species is given as a synonym of P. gelida by Zahlbruckner in Cat. Lich. Univ. V, p. 667 (1928), but it is evidently a quite distinct species characterised chiefly by the thin, thalline patches usual--ly conspicuously bounded by a dark hypothalline edge; also by the brown or brown-black apothecial discs.

Obs. 3. -- The specimen from Greymouth collected by Helms is associated on the same stone with P. parellina var. rhodocarpa.

Excluded or doubtful species. --

1. PLACOPSIS AMABILIS B. de Lesd.
in Ann. Cryptog. exot. VI, p. 116 (1933), cum descript.

This species is known only from the type specimen, which is sterile, and therefore of uncertain systematic position. The following description is based on the holotype which Dr. Bouly de Lesdain kindly lent me for examination:

Thallus indeterminate, forming patches up to 5 cm. diam., not effigurate at circumference, up to 0.6 mm. thick, closely adnate to substratum, ± even, cracked-areo--late, with irregularly angular, plane or subverrucose areolae 0.5 - 1.5 mm. diam. separated by sharp-edged cracks 0.05 - 0.15 mm. wide; ash-grey with a faintly pinkish tinge, externally KHO - , $CaCl_2O_2$ - or ± faintly red, Pd ± faintly brownish flesh-coloured; medulla KHO - , $CaCl_2O_2$ ± light red, Pd - . No visible hypothallus, no isidia or soredia. Cephalodia few, widely scattered over surface of thallus, sessile, almost hemispherical, up to 2.5 mm. diam., not constricted at base, entirely

minutely granulose, concolorous with the thallus, matt. No apothecia developed, but numerous initial fundaments present in the form of minute craters 0.2 - 0.4 mm. diam., one to several in nearly every areola, finally each sur-rounded by a thin, thalline rim, with the rudimentary disc pallid pinkish-brown or whitish.[27] [No pycnidia seen.]

Thallus corticate, covered by an outer, colourless, semi-amorphous layer 6 - 30μ deep derived from disintegra-tion of the outer, cortical cells. Cortex dull yellow-ish-nubilated in upper 9 - 18μ, within colourless and hyaline; paraplectenchymatic, of ± isodiametric, thin-walled cells 3 - 5μ diam. Medulla colourless or in some places faintly dull yellowish, compact, of interwoven, thin-walled hyphae 2 - 3μ thick. Symbiotic algae glo-bose, bright green, 6 - 10μ diam., forming a ± continu-ous stratum 18 - 60μ deep. Cephalodia seen in section to be composed of a number of adnate, ramifying outgrowths whose ultimate, rounded ends form the externally visible granules; corticate, with a dull brown, paraplectenchy-matic cortex 8 - 18μ deep, composed of ± isodiametric, thin-walled cells 3 - 5μ diam. (The cortex is in places overlaid by a colourless, amorphous stratum 2 - 4μ deep.) Medullary tissue colourless, of compacted, short-celled, thin-walled hyphae 3 - 5μ thick running in various direc-tions, or in some places paraplectenchymatic. Symbiotic algae Microcystis (or Polycoccus), forming interrupted groups only in the upper parts of the cephalodium, direct-ly beneath the cortex; bright green, separate, round or oblong cells 4.0 - 7.5μ diam., with thin, non-gelatinous walls. The apothecial initials consist of spherical, perithecium-like bodies up to 190μ diam., immersed in the thallus and surrounded by an entire, pale brown, paraplec-tenchymatic wall; no traces of sporogenous organs visi-ble, and all parts merely yellowed by iodine.

Icon. -- Pl. 9, fig. 37 (part of the holotype specim-en).

Hab. -- On scoriaceous, volcanic rock.

Distr. -- Mexico.

MEXICO. Puebla: Coatzing (Cuautzin), altit. 3200 m., coll. Frère Amable, 1931 (no. 857) (holotype) (ster.) (B. de Lesd.).

Obs. -- This is the only instance known to me in which the alga Microcystis (or Polycoccus) occurs in cephalodia. The cells were compared with the gonidia

of Coriscium viride, and found to be exactly similar.

2. SQUAMARIA HIULCA Nyl.
in Ann. Sci. nat., Bot. sér. 4, III, p. 153 (1855), cum descript.

Synon. -- Lecanora (subgen. Placopsis) hiulca Nyl. in J. linn. Soc. Lond., Bot. IX, p. 251, footnote (1866); Hue in Nouv. Arch. Mus. Hist. nat., Paris, sér. 3, III, p. 59 (1891); Zahlbr. Cat. Lich. Univ. V, p. 668 (1928).

Nylander in his original description of this species (from Chile, coll. Gay) made no mention of cephalodia, but subsequently included it in a list of the species belonging to his subgenus Placopsis (J. linn. Soc. Lond., Bot. IX, p. 251; 1866). On locating the holotype (no. 28250 in herb. Nyl.), I found it to be a minute fragment less than a centimeter across, with half of an apothecium wrapped in paper beside it. No cephalodia were present. As it is impossible to determine the identity of a doubtful species with certainty from such a small fragment, and as Nylander's description fails to give a clear characterisation, I propose that this species be deleted as nomen dubium.

Jatta, in Malpighia, XX, p. 9 (1906), recorded this species from Chile: near the river Aconcagua. I have not seen the specimen upon which this record is based.

3. PLACODIUM ANTARCTICUM Müll. Arg.
in Bot. Jb. V, p. 136 (1884), cum descript.

Synon. -- Lecanora (Aspiciliopsis) sublateritia Zahlbr. Cat. Lich. Univ. V, p. 671 (1928).

This species was described by Müller Arg. on material collected by Naumann in 1883 in Kerguelen. Although placing it in the section Aspiciliopsis, he made no men-tion of cephalodia. I received the holotype specimen

on loan through the courtesy of the Director of the Gene--va Botanical Institute, and found that it was not a Pla--copsis. The apothecia are pertusarioid and the paraphy--ses branched and connected, and hence the plant would seem to belong to the family Pertusariaceae. Pertusaria itself is the only existing genus of this family to which it might belong, but I hesitate to include it here on account of the effigurate thallus and thin-walled spores.

4. PLACODIUM LECANORINUM Kn.
in Trans. linn. Soc. Lond., Bot. ser. 2, I, p. 282 (1878), cum descript.

Synon. -- Ricasolia lecanorina Müll. Arg. in Bull. Herb. Boissier, II, append. I, p. 47 (1894). Placole--cania lecanorina Zahlbr. apud Engler & Prantl, Nat. Pflanzenfam. I. Teil, Abt. 1* , p. 205 (1907). Soleno--psora lecanorina Zahlbr. Cat. Lich. Univ. V, p. 755 (1928).

In his original description of this species from New Zealand, Knight made mention of "cephalodia copiosa fusca v. fusco-atra madefacta indistincte radiatim rugosa". The spores are triseptate.

A specimen, probably syntype, is present in the British Museum Herbarium, and was investigated by me. The bodies described by Knight as "cephalodia" certainly contain blue-green algae, but I could not convince myself that they were true cephalodia. Their irregularity and colour seemed to indicate accidentally present Cyanophyceous colonies. However, the material was not good, and hence confirmation of this is desirable.

Appendix: parasites of Placopsis. --

Three of the specimens of Placopsis seen by me had been attacked by parasites, which in two cases produced a de--formation of the thallus.

The holotype specimen of Crombie's "Squamaria gelida f. dispersa" (see p. 155) owes its depauperated habit to the presence of Didymosphaeria microstictica var. albo--atrae Vouaux; the pale violet reaction of the hymenial gelatine which is characteristic of this variety was well marked, and prevented any confusion with Discothecium squamarioides (Mudd) Keißl., in which the iodine reac--tion is negative. The thallus of the host plant was not galled or swollen to any noticeable extent.

A specimen of P. gelida from Ireland, Connemara, coll. Larbalestier (in herb. Nylander) was also the host of Didymosphaeria microstictica var. alboatrae, the parasite in this case causing the formation of cephalodia-like galls (parathalli) which were 0.8 - 2.0 mm. diam., ir--regularly rugulose-verruculose, at first concolorous with the thallus, then becoming darker like true cephalodia. The ostioles of the parasitic perithecia were visible as minute, black spots on the surface of the galls.

The typical form of Didymosphaeria microstictica (hy--menial gelatine I + yellow then wine-red) was found on a specimen of P. contortuplicata from the South Shetlands, causing cephalodia-like galls 1.3 - 3.0 mm. diam. and up to 0.8 mm. thick, warted-granulate, concolorous with the thallus or somewhat paler. In section the structure of one of these parathalli was found to be similar to that of the rest of the thallus, and a stratum of thalline, symbiotic algal cells was also present. The parts of the parasite were generally somewhat larger than given by Keißler (1930) for this species, but the measurements seem to come within the limits of specific variability.

Neither D. microstictica not its variety alboatrae had previously been recorded on Placopsis, and the parasite is not known to produce galls on its other hosts (Acaro--spora fuscata and Buellia alboatra).

Other parasites recorded on Placopsis (P. gelida) are:

(1) Discothecium squamarioides (Mudd) Keißl. in Rabh. Krypt.-Fl. ed. 2, Flechten, VIII, p. 403 (1930).-- Syn. Sphaeria squamarioides Mudd, Man. Brit. Lich. p. 130 (1861).

(2) Didymosphaeria gelidaria (Mudd) A. L. Sm. in Trans. Brit. mycol. Soc. III, p. 176 (1910). -- Syn. Sphaeria gelidaria Mudd, loc. cit.

(3) Sphaeria cephalodiorum Rostr. in Bot. Tidsskr. IV, p. 98 (1871). This and the following were found on P. gelida in the Faeroes. Unfortunately the description does not mention the presence or absence of paraphyses, and hence it is doubtful whether the species should be referred to Phaeospora or to Leptosphaeria.

(4) Sphaeria ventosa Rostr. op. cit. p. 97. This may be a Physalospora, although in this genus the spores are usually hyaline.

(5) Harmand, in Bull. Soc. Sci. Nancy, sér. II, XV, p. 201 (1898), describes an unnamed parasite on cephalodia of P. gelida. It is not clear from his description to which genus it might be referable.

INDEX OF NAMES

(Synonyms are in italics. The number of the page upon which a description of the listed entity appears is in bold-faced type.)

BIBLIOGRAPHY

(Taxonomic works are cited in the text)

ANDERS, J. 1935. Im Verschwinden begriffene und ver--schwundene Flechtenarten in Nordböhmen, in Ber. dtsch. bot. Ges. LIII, p. 319.

ASAHINA, Y. 1934. Über die Reaktion von Flechten-Thal--lus, in Acta phytochim., Tokyo, VIII, p. 47.

---- 1936. Mikrochemischer Nachweis der Flechtenstoffe (I), in J. Jap. Bot. XII, p. 516.

---- 1937. Über den taxonomischen Wert der Flechten--stoffe, in Bot. Mag., Tokyo, LI, p. 759.

CENGIA SAMBO, MARIA 1924. Polisimbiosi nei Licheni a Cianoficee e Significato biologico dei Cefalodi, in Atti Soc. ital. Sci. nat. LXII, p. 226.

---- 1931. Biologie des Lichens. Les Substances carbo--hydratées dans les Lichens et la Fonction de Fixa--tion de l'Azote des Céphalodes, in Boll. Sez. ital. Soc. int. Microbiol. fasc. XI, p. 1.

DEGELIUS, G. 1935. Das Ozeanische Element der Strauch- und Laubflechtenflora von Skandinavien, in Acta phytogeogr. suec. VII, p. 1.

---- 1939. Die Flechten von Norra Skaftön, in Uppsala Univ. Årsskr. no. 11, p. 1.

DU RIETZ, G. E. 1926. Den subantarktiska florans bipolära Element i lichenologisk Belysning, in Svensk bot. Tidskr. XX, p. 299.

---- 1929. The Discovery of an Arctic Element in the Lichen-Flora of New Zealand and its plantgeographi--cal Consequences, in Rep. Aust. Ass. Adv. Sci., Hobart, 1928, p. 628.

---- 1932. Vegetationsforschung auf sozialanalytischer Grundlage, in Abderhalden, Handbuch der biologisch--en Arbeitsmethoden, Abt. XI, Teil 5, p. 293.

FELDMANN, J. 1937. Sur les Gonidies de quelques Artho--pyrenia marins, in Rev. bryol. X, p. 64.

FORSSELL, K. B. J. 1884. Lichenologische Untersuchungen. 1. Ueber die Cephalodien, in Flora, Regensburg, LXVII, p. 1, 33, 58, 177.

FRIES, TH. 1866. Beiträge zur Kenntnis der sog. Cepha--lodien bei den Flechten, in Flora, Regens--burg, XLIX, p. 17.

GEITLER, L. 1934. Beiträge zur Kenntnis der Flechten--symbiose. IV, V, in Arch. Protistenk. LXXXII, p. 51.

---- 1938. Beiträge zur Kenntnis der Flechtensymbiose. VII, in Arch. Protistenk. XC, p. 489.

GLÜCK, H. 1899. Entwurf zur einer vergleichenden Mor--phologie der Flechten-Spermogonien, in Verh. naturh.-med. Ver. Heidelberg, n. F., VI, p.81.

GOEBEL, K. 1926. Morphologische und biologische Stu--dien. VII, in Ann. Jard. bot. Buitenz. XXXVI, p. 1.

HILLMANN, J. 1936. Parmeliaceae, in Rabenhorsts Krypt.-Fl. Deutschl., Österr. u. d. Schweiz, IX, 5. Abt., 3. Teil, p. 1.

HULTÉN, E. 1937. Outline of the History of Arctic and Boreal Biota during the Quarternary Period. Stockholm.

JOHNSON, G. T. 1938. The taxonomic Importance and phylo--genetic Significance of the Cephalodia of Stereocaulon, in Ann. Mo. bot. Gdn. XXV, p. 729.

KAULE, A. 1931. Die Cephalodien der Flechten, in Flora, Jena, CXXVI, p. 1.

---- 1934. Über die Cephalodien der Flechten. (2. Bei--trag), in Flora, Jena, CXXVII, p. 345.

KEISZLER, K. 1930. Die Flechtenparasiten, in Rabenhorsts Krypt.-Fl. Deutschl., Österr. u. d. Schweiz, VIII, p. 1.

KNOWLES, MATILDA C. 1929. The Lichens of Ireland, in Proc. R. Irish Acad. XXXVIII, Sect. B, no. 12, p. 179.

LANJOUW, J. 1939. On the Standardization of Herbarium Abbreviations, in Chron. bot. V, p. 142.

MAGNUSSON, A. H. 1929. A Monograph of the Genus Acaro--spora, in K. svenska VetenskAkad. Handl. ser. 3, VII, no. 4, p. 1.

NANNENGA, E. T. 1939. The Importance of the Gonidia to the Classification of the Lichens, in Rec. Trav. bot. néerland. XXXVI, p. 538.

NICOL, H. 1940. Microbes by the Million. Ed. 2. ("Pelican" book published by Penguin Books Ltd., Harmondsworth, Middlesex, England.)

PRAEGER, R. LLOYD, 1934. The Botanist in Ireland. Dublin.

RIDGWAY, R. 1912. Color Standards and Color Nomencla--ture. Washington.

ROSENKRANZ, F. 1936. Klimacharakter und Pflanzendecke, in Öst. bot. Z. LXXXV, p. 183.

SCHADE, A. 1933. Flechtensystematik und Tierfraß, in Ber. dtsch. bot. Ges. LI, p. 168.

SCHUCHERT, C., & BUCKMAN, S. S. 1905. The Nomenclature of Types in Natural His--tory, in Ann. Mag. nat. Hist. ser. VII, XVI, p. 102.

SÉGUY, E. 1936. Code Universel des Couleurs, in Encycl. pratique du Naturaliste, XXX.

SERNANDER, R. 1908. Om några Former för Art- och Varie--tets-Bildning hos Lafvarna, in Svensk bot. Tidskr. I, p. 97 & 135.

---- 1927. Zur Morphologie und Biologie der Diasporen, in Nova Acta Soc. Sci. upsal. vol. extr. ord. ed. p. 1.

SKOTTSBERG, C. 1915. Notes on the Relations between the Floras of subantarctic America and New Zealand, in Plant World, XVIII, p. 129.

---- 1936. Antarctic Plants in Polynesia, in Goodspeed, Essays in Geobotany in Honor of William Albert Setchell, p. 291. Berkeley, California.

STEFFEN, H. 1939. Über die floristischen Beziehungen der beiden Polargebiete zueinander, in Beih. bot. Zbl. LIX, Abt. B, p. 531.

STEINER, J. 1901. Über die Function und den systematisch--en Wert der Pycnoconidien der Flechten, in Festschr. Feier zweihundertjähr. Best. Staatsgymn. Wiens (wiss. Beilage LI. Jahres--ber.), p. 119.

WITHERING, W. 1812. A systematic Arrangement of British Plants. Ed. 5, IV. Birmingham.

WULFF, T. 1902. Botanische Beobachtungen aus Spitzbergen. Lund.

ZAHLBRUCKNER, A. 1928. Die Gattung Lecanora, in Rept.

Sci. Res. Norweg. Exp. Novaya Zemlya, no. 44, p. 1.

EXPLANATION OF PLATES

PLATE 1. (All figures on this plate natural size). -- Fig. 1. P. bicolor (Tuckerm.) B. de Lesd.; the holo--type specimen. Fig. 2. P. bicolor (Tuckerm.) B. de Lesd.; the holotype of "Placopsis gelida f. lateritia" Nyl. Fig. 3. P. baculigera M. Lamb; the holotype speci--men. Fig. 4. P. perrugosa (Nyl.) Nyl.; the holotype specimen. Fig. 5. P. patagonica (Zahlbr.) M. Lamb; the lectotype specimen.

PLATE 2. (All figures on this plate natural size). -- Fig. 6. P. rhodophthalma (Müll. Arg.) Räs., f. atlanti--ca M. Lamb; the holotype specimen. Fig. 7. P. kergu--elensis M. Lamb; the holotype specimen. Fig. 8. P. rugosa M. Lamb; a specimen from Fuegia, Isla Desolación. Fig. 9. P. parellina (Nyl.) M. Lamb, var. carnea (Räs.) M. Lamb; a specimen from Tristan da Cunha. Fig. 10. P. parellina (Nyl.) M. Lamb, var. rhodocarpa (Nyl.) M. Lamb; a specimen from Tristan da Cunha. Fig. 11. P. fuscidula M. Lamb; the holotype specimen. Fig. 12. P. Räsänenii M. Lamb; the holotype specimen.

PLATE 3. (All figures on this plate natural size). -- Fig. 13. P. gelida (L.) Nyl.; a fertile specimen from Norway, Voss. Fig. 14. P. gelida (L.) Nyl.; a dark form from British Columbia, Harrison Lake. Fig. 15. P. contortuplicata M. Lamb; the holotype specimen.

PLATE 4. (All figures on this plate 3 times natural size). -- Fig. 16. P. (Aspiciliopsis) macrophthalma (Tayl.) Nyl.; a syntype specimen. Fig. 17. P. chi--lena M. Lamb; the holotype specimen. Fig. 18. P. sub--parellina Nyl.; the holotype specimen. Fig. 19. P. terricola (Cromb.) M. Lamb; part of a syntype specimen.

PLATE 5. (All figures on this plate 3 times natural size). -- Fig. 20. P. stenophylla (Hue) M. Lamb; three fragments of a paratype specimen in herb. Nylander. Fig. 21. P. stenophylla (Hue) M. Lamb; a specimen from Chile, Chiloe. Fig. 22. P. cribellans (Nyl.) Räs.; a syntype specimen in herb. Nylander. Fig. 23. P. cri--bellans (Nyl.) Räs.; a fertile specimen from New Zealand.

PLATE 6. (All figures on this plate 3 times natural size). -- Fig. 24. P. isidiophora Wain.; the holotype specimen. Fig. 25. P. papillosa Wain.; the holotype specimen. Fig. 26. P. rhodophthalma (Müll. Arg.) Räs.; the holotype specimen. Fig. 27. P. albida (Krphb.) M. Lamb; a syntype specimen in herb. München. Fig. 28. P. fuscidula M. Lamb, f. leprosula (Zahlbr.) M. Lamb; the lectotype specimen.

PLATE 7. (All figures on this plate 3 times natural size). -- Fig. 29. P. parellina (Nyl.) M. Lamb; two fragments constituting part of the syntype specimen in herb. Nylander. Fig. 30. P. parellina (Nyl.) M. Lamb, var. rhodocarpa (Nyl.) M. Lamb; three fragments constituting the holotype specimen. Fig. 31. P. parel--lina (Nyl.) M. Lamb, var. rhodocarpa (Nyl.) M. Lamb; a saxicolous specimen from New Zealand, Ashburton, show--ing peripheral effiguration. Fig. 32. P. parellina (Nyl.) M. Lamb, var. carnea (Räs.) M. Lamb; part of a syntype specimen in herb. Helsinki. Fig. 33. P. geli-

-da (L.) Nyl.; a young specimen from Iceland, Lake Meðalfellvatn.

PLATE 8. (All figures on this plate 3 times natural size). -- Fig. 34. P. parellina (Nyl.) M. Lamb, f. semireagens (M. Lamb) M. Lamb; part of the holotype specimen. Fig. 35. P. Asahinae M. Lamb; two pieces of a paratype specimen in herb. Wien. Fig. 36. P. amplia--ta M. Lamb; Heautotype or possibly paratype specimen in herb. München.

PLATE 9. (All figures on this plate 3 times natural size). -- Fig. 37. P. Amabilis B. de Lesd.; part of the holotype specimen. Fig. 38. P. illita (Kn.) M. Lamb; the lectotype specimen. Fig. 39. P. subgelida (Nyl.) Nyl.; the holotype specimen. Fig. 40. P. pa--rellina (Nyl.) M. Lamb, var. microphylla M. Lamb; the holotype specimen.

PLATE 10. (All figures on this plate 3 times natural size). -- Fig. 41. P. perrugosa (Nyl.) Nyl.; part of the holotype specimen. Fig. 42. P. perrugosa (Nyl.) Nyl.; a fertile specimen from Australia, Mount Macedon. Fig. 43. P. effusa M. Lamb; part of the holotype speci--men. Fig. 44. P. contortuplicata M. Lamb; part of the holotype specimen. Fig. 45. P. contortuplicata M. Lamb; specimen with apothecia from the South Orkneys.

FOOTNOTES

pertaining to the text

1) [p. 24] R. B. Stevens has recently described trichogynes in Dermatocarpon aquaticum (Amer. J. Bot. XXVIII, p. 59; 1941).

2) [p. 27] In individuals of P. bicolor which are only partly oxydated, the medulla in the non-oxydated portions is often $CaCl_2O_2$ + red.

3) [p. 31] This is the prior and correct name for L. sorediza Nyl.; see M. Lamb in J. Bot., Lond. LXXVI, p. 158 (1938).

4) [p. 37] The f. subreagens, found in Chile and Juan Fernandez, is not considered here because of the constant, chemical difference which would entitle it in the view of many lichenologists to consideration as a proper species.

5) [p. 38-9] Following the example of Skottsberg (1936) the islands of Tristan da Cunha and Kergue-len are regarded as outlying stations of the S. Ame-rican and Australian sectors respectively.

6) [p. 44] The abbreviations in brackets are those recommended by Lanjouw (1939), and are used through-out the following taxonomic text.

7) [p. 46] The nomenclature of the various types followed in this systematic account is that proposed by Schuchert & Buckman (1905).

8) [p. 47] In P. parellina f. semireagens the upper cortex, but not the medulla, stains deep brick-red with Pd, and this colour often spreads downwards by diffusion into the gonidial stratum.

9) [p. 48] The verruculose pycnidia found in certain other species should not be confused with isidia. -- P. Amabilis B. de Lesd., in which the apothecia are unknown, has small, crater-like depressions with raised rims on the surface of the thallus; they are undeveloped apothecial fundaments.

10) [p. 49] Sometimes in non-oxydated species a fer--ruginous coloration is visible in the cracks of the thallus.

11) [p. 49] In P. effusa the thallus is non-effigu--rate, entirely areolate, with the areolae crowded or dispersed, not to be confused with squamules.

12) [p. 52] See note on distinction between areolate and rimose types of thallus on p. 9 .

13) [p. 72 & 140] Here and elsewhere literary records unconfirmed by me are included, unless obviously untrustworthy, in square brackets.

14) [p. 88] The specimen is incomplete, and does not show the periphery.

15) [p. 88] See definition on p. 16 .

16) [p. 94] Nylander is commonly regarded as having made the combination Placopsis perrugosa in J. linn. Soc. Lond., Bot. IX, p. 251, footnote (1866), but examination of his statement there shows that he is regarding it as "Lecanora (subgen. Placopsis) perrugosa".

17) [p. 100] Collector's note with the copiously fer--tile, South Orkneys specimen states that the "fruc--tifications" are dirty pink in colour. But proba--bly the collector was referring to the cephalodia, which to one not acquainted with this genus would appear to be fructifications.

18) [p. 104] The formation of this name is intentio--nally not in accordance with the International Rules of Botanical Nomenclature, the diacritical markings having been retained by the express wish of Dr. Räsänen. Finnish not being a Germanic language, the modified vowel "ä" cannot be adequately expressed by the Latin dipthong "a͡e".

19) [p. 106] This description refers only to the pri--mary or typical form of the species.

20) [p. 113] This material was recorded by Zahlbruck--ner apud Skottsberg, Nat. Hist. Juan Fernandez and Easter Island, II, p. 382 (1924) as "Lecanora argillacea f. rhodophthalma".

21) [p. 113] This is the specimen referred to as "Le--canora gelida" by Lynge apud Christophersen in Sci. Res. Norweg. Antarct. Exped. 1927 - 1928 et sqq., no. 16, p. 13 (1937).

22) [p. 121] The actual specimen upon which this com--bination was made by Räsänen does not belong to this species, but is a morbose and indeterminable Placopsis.

23) [p. 136] Only the original authors of the combi--nations are quoted in this list; for a fuller bib--liography see Zahlbr. Cat. Lich. Univ. V, p. 665 - 7 (1928).

24) [p. 139] The unfinished vol. II of Nylander's "Synopsis Lichenum" was published in 1885, not in 1863 as is commonly supposed. The plate of illust--rations was not issued until 1888.

25) [p. 139] Harmand, in his Lich. de France, V, p. 939 (1913), lists as an exsiccat of this species: "HARM. Lich. Gall. rarior. n° 157". But apparently publication of this series ceased at no. 150.

26) [p. 153] The iodine reaction of the ascus-walls is fluctuating in this species; in European material I find it to be either negative or persistently blue.

27) [p. 164] These are the structures which are men--tioned as "soredia" by B. de Lesd. in his descrip--tion.