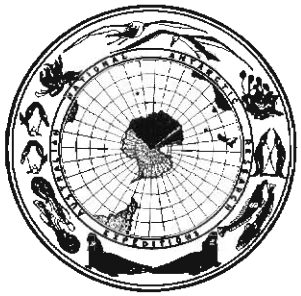
THE LICHENS AND MOSSES OF MAC.ROBERTSON LAND

By

REX B. FILSON



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ABSTRACT

The distribution of lichens and mosses in Mac.Robertson Land is recorded and discussed, and workable descriptions of all the known species in this region have been prepared. Descriptions are given of six new species and one new form of lichen, together with one new species of moss. A complete list of the present and previous collections in Mac.Robertson Land has been compiled and some comments have been offered.

The large amount of material collected during the 1962 Australian National Antarctic Research Expedition based on Mawson has clarified relationships between hitherto published species and subspecies, and has shown transitions between closely similar species. This latest examination of the flora has led to a reduction in the number of species formerly recognized.

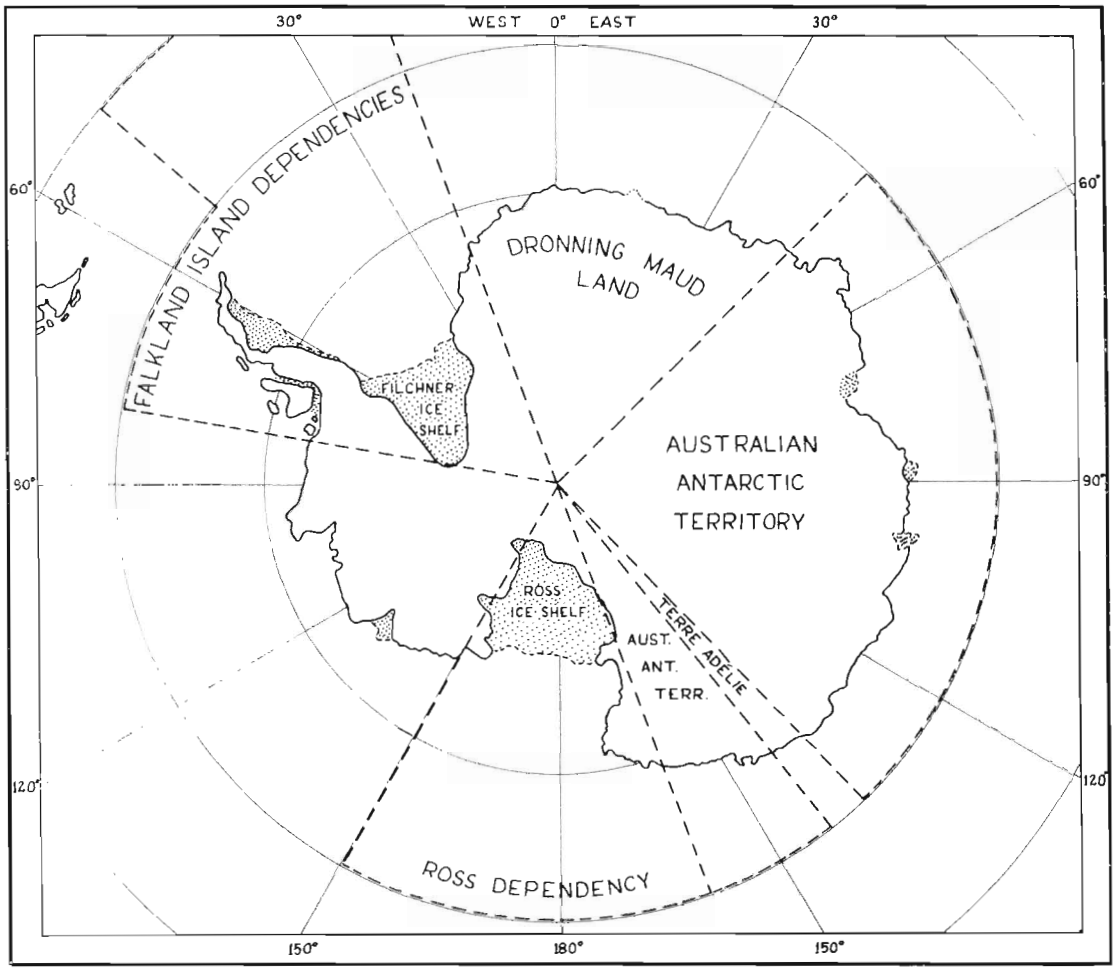


Fig. 3.—Map of the Antarctic Continent.

I. INTRODUCTION

Geographical limits. The Antarctic Continent embraces an area of about 14 million square kilometers and, of this, the sector known as Australian Antarctic Territory occupies 6 million square kilometres. The botanical survey described in this monograph was confined to Mac.Robertson Land which lies within Australian Antarctic Territory between longitude 60°E and 73°E, being flanked by the Amery Ice Shelf on the east and by Tilley Nunatak on the west. The coastline of Mac.Robertson Land extends over a distance of 550 kilometres. The field work for this study was based on Mawson (67°36′S, 62°53′E), a station controlled by Australian National Antarctic Research Expeditions (ANARE), where the author was a member of the 1962 expedition.

This botanical investigation describes lichens and mosses on the rocky coastal outcrops immediately east of Mawson (but excluding Scullin Monolith and Murray Monolith) and on all the coastal outcrops to the west of the station as far as Tilley Nunatak. Included in the inland features visited were Trost Rocks on the Amery Ice Shelf, Church Mountain, the Framnes Mountains, Depot Peak and the Anniversary Nunataks.

Specimens collected. In the collection of specimens of the plants described the author was aided by many of his ANARE colleagues at Mawson in 1962 (see Appendix III). Material was not collected for every known species which had been previously recorded for Mac.Robertson Land but, in the case of species for which specimens were not collected in 1962, reference was made to earlier collections housed at the National Herbarium, Melbourne. A list is given in Appendix I.

Geology. Notes on the geological environment appearing in Section II are based primarily on the western part of Australian Antarctic Territory (Crohn 1959) and on personal communications referred to under Section IV, Acknowledgements.

Wildlife. The wildlife of Mac.Robertson Land is confined to the coastal fringe. During the summer months, Weddell and Crabeater Seals are commonly seen, and Adélie Penguins inhabit the coastal islands and the plateau outcrops near the shore where numerous rookeries are to be found at this season. Emperor Penguin rookeries are located on floating ice or on rock-based ice connected to the sea. Antarctic Petrels, Snow Petrels and Skua Gulls also nest on the coastal islands and the adjacent inland outcrops of elevated rock. On no occasion, however, was any relationship found between the nesting sites and the botanical life examined by the author.

Previous work. The British and New Zealand Antarctic Research Expedition (BANZARE), led by Sir Douglas Mawson, made a collection at Cape Bruce (67°25′S, 60°49′E) where he established BANZARE Station 108 on 18 February 1931. At this point 17 lichens were collected and the results were published by Carroll W. Dodge in BANZARE Reports (Dodge 1948). Small collections were later made by ANARE expeditioners (Robert Dovers, John Béchervaise and John Bunt) which were forwarded to, and subsequently determined by, Dr. Dodge. During the summer of 1954 Dr. A. M. Gwynn collected specimens of 14 species, of which 7 were new to Mac.Robertson Land collections. These were sent to Dr. Dodge and the results were published in the Annals of the Missouri Botanical

Gardens (Dodge and Rudolph 1955). Throughout 1955 Dr. R. O. Summers made a small collection of 26 specimens and a special collection of Umbilicariaceae. The specimens of Umbilicariaceae were forwarded to Dr. George Llano who reported and described a new species (Llano 1956); the remaining specimens in this collection were determined by Dr. Dodge.

Method. A suitable method was found for the preparation of uniform sections 5-15 μ thick. The dried specimens were first softened in water to which a few drops of detergent were added to hasten the preparation. Once cut, the specimens were mounted in lacto-phenol. Acid fuchsin and cotton blue were added to the mounting medium for differential staining of the sections. The use of a Reichert freezing microtome OMP greatly reduced the time needed to section, stain and mount the specimens. Measurements expressed in millimetres and micra (μ) were made by inserting a micrometer disk into the 10x ocular of the microscope and calibrating for the various objectives of the instrument.

Colour tests. Colour reaction tests were made with the following reagents: potassium hydroxide (abbr. K); calcium hypochlorite (abbr. C); paraphenylenediamine (abbr. P); iodine (abbr.I). The reaction given when K is applied first, and then C, is abbreviated KC. Where information on the nature of the reaction is necessary for making a determination, this has been included in the text.

Morphology: the thallus. The fundamental part of the lichen is the vegative tissue or thallus. The thallus differs from moss and herb tissue in that it is of a composite structure. It consists of microscopic white fungal tissue and green algal cells growing together in a symbiotic relationship. The thallus may be erect, rising from the substratum; conspicuous or inconspicuous and flat; closely or loosely attached to the substratum. The lichens in the present study are mainly inconspicuous, flat and closely attached to the substratum.

The apothecia. Apothecia comprise the fruiting part of the fungal component in the thallus. The main features are the size, form and colour of the main body, and the colour and form of the disk. Apothecia are mostly saucer-shaped and the disk flat or slightly concave, sometimes becoming convex and thence hemispherical at maturity. The apothecia may be immersed, semi-immersed, sessile or pedicellate, and are made up of several layers of tissue (see Figure 42, Appendix IV). Further botanical features are defined in Appendix IV, Glossary of Terms Used.

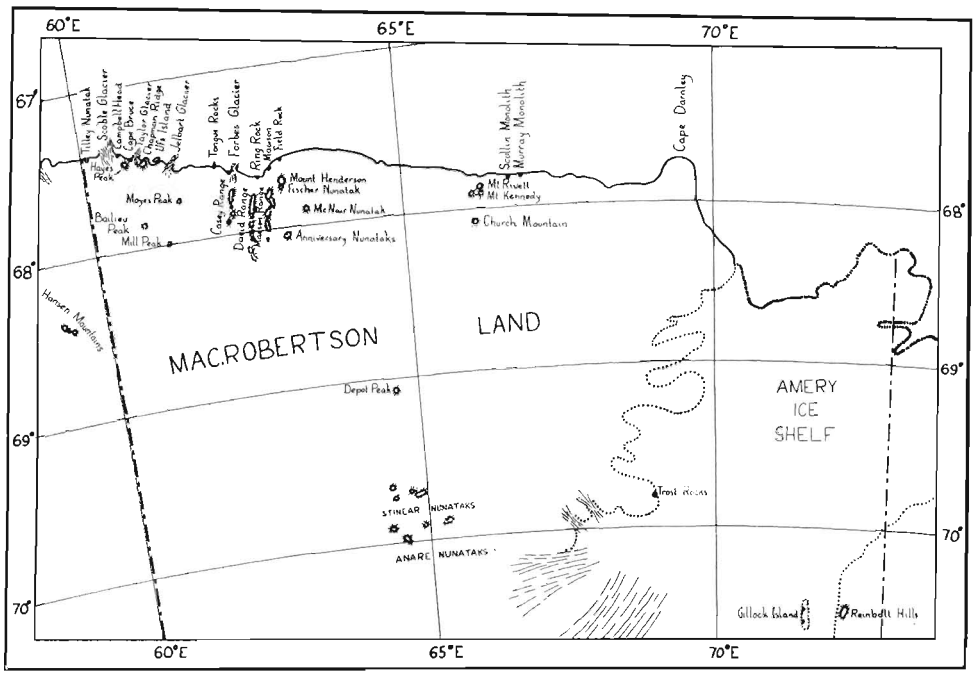


Fig. 4.—Map of Mac.Robertson Land, showing the rock outcrops.

II. SURVEY OF THE ROCK OUTCROPS IN MAC.ROBERTSON LAND

A. COASTAL

Off-shore islands along the coast

Most of these island groups along the shoreline were visited. They are low rocky islands mainly composed of "Mawson Granite" which is weathering rapidly; wind-blown salt spray crystallizes in all small crevices. This salt, together with the high rate of weathering, is responsible for the complete absence of flora.

Rouse Rocks

Rouse Rocks is a group of three islands and one continental outcrop. Neither area supports flora, even though the continental outcrop rises to approximately 40 metres above sea level and little salt is found crystallizing on its surfaces. A small free-growing alga was found in the wind scour to the east of the continental outcrop.

Field Rock

This continental outcrop, approximately 40 metres above sea level, is of Mawson Granite covered with moraine erratics and has a very prolific flora. Fifteen different lichens and one species of moss were recorded. Most of the species collected were growing in abundance, the most prolific being *Buellia frigida* with

Caloplaca elegans var. *pulvinata, Omphalodiscus decussatus* and *O. antarcticus* being very common. The largest specimen of the last named recorded for our area was found here.

Plants recorded for the area were:

LICHENAE

Acarospora gwynnii C*
Biatorella antarctica A
Buellia frigida A
Buellia grimmiae X
Caloplaca elegans var. *pulvinata* A
Protoblastenia citrina A
Heppia antarctica C
Lecanora rubina var. *melanophthalma* f. *exulans* A
Lecidea phillipsiana A
Rhizocarpon flavum R
Rhizocarpon flavum f. *subfoliosum* R
Parmelia coreyi A
Omphalodiscus antarcticus A
Omphalodiscus decussatus A
Alectoria minuscula A

MUSCI

Grimmia lawiana

Mawson

The rocky outcrop on which Mawson station is built rises to a height of 33 metres and is about one kilometre long and a little over half a kilometre wide. It is located at 67°36′S, 62°53′E. The main rocky area consists of porphyritic gneissic charnockitic granite and is known as "Mawson Granite". On the south-eastern corner of the main station area, close to the plateau, there is an extensive area covered with moraine erratics mostly of Mawson Granite. Included in the Mawson area is the horse-shoe-shaped harbour which is formed by two rocky arms projecting into the sea. The eastern arm is very weathered and salt-encrusted, and supports no flora. The western arm, though similar in weathering and salting to the eastern arm, nevertheless supports *Xanthoria mawsonii* in the rocky crevices up to halfway along it.

This area, though well trampled, has a very extensive flora of eighteen lichens and two mosses.

Plants recorded for the area were:

LICHENAE

Acarospora gwynnii A
Biatorella antarctica A
Buellia frigida A
Caloplaca elegans var. *pulvinata* A

* Roman letter indicates abundance: see Appendix III, page 164.

Pyrenodesmia mawsonii X
Protoblastenia citrina A
Heppia antarctica C
Lecanora rubina var. *melanophthalma* f. *exulans* A
Lecanora capsulata A
Lecidea phillipsiana A
Lecidea woodberryi R
Rhizocarpon flavum R
Rhizocarpon flavum f. *subfoliosum* R
Parmelia coreyi A
Xanthoria mawsonii A
Omphalodiscus antarcticus A
Omphalodiscus decussatus A
Alectoria minuscula A

MUSCI

Bryum antarcticum
Grimmia lawiana

Departure Rocks Group

This is a group of three islands and one plateau outcrop about five kilometres west of Mawson. The plateau outcrop is divided into two sections. The first, north of the main mass and divided from it by a small glacier, is of Mawson Granite, heavily weathered, and has no flora for the same reason as in the coastal islands. The second and largest mass which is set into the plateau ice is composed of Mawson Granite. Here is exposed a contact between the granite to the east and the hornfels to the west. This outcrop supports ten lichen species and one moss species growing both on the Mawson Granite and on the actual contact zone. On the contact zone the lichens grow right down to within six metres above sea level, *Caloplaca elegans* var. *pulvinata* being the closest. Just above this is a large patch of *Grimmia lawiana*. Small glacier erratics lying on top of this section support numerous lichens but only one small patch of *Grimmia* was found between them. The islands are devoid of flora.

Plants recorded for the area were:

LICHENAE

Acarospora gwynnii O
Buellia frigida A
Caloplaca elegans var. *pulvinata* A
Protoblastenia citrina C
Lecanora rubina var. *melanophthalma f. exulans* A
Lecidea phillipsiana A
Parmelia coreyi A
Xanthoria mawsonii C
Omphalodiscus antarcticus A
Omphalodiscus decussatus A

MUSCI

Grimmia lawiana

Ring Rock group

This group, consisting of two large plateau outcrops, one small plateau outcrop and a group of islands situated approximately eight kilometres west of Mawson, is known as the Ring Rocks group.

The islands, like the other coastal islands, are devoid of flora. The small plateau outcrop on the western side of the group, although covered with moraine boulders, supports no flora. It is composed of rock different from Mawson Granite which is weathering very readily, and the author supposes that the surface weathers completely before the lichens can become established. The large outcrop to the west and on the seaward side of the main mass is of Mawson Granite. This is close to the sea and is covered with salt spray which helps in the weathering process, with the result that no flora was found on it.

The main mass, consisting of a large rock mound with two arms enclosing a small harbour, has an abundance of lichens. From almost right down to sea level up to the southern moraine *Buellia frigida* is abundant. Perhaps the best specimens of *Acarospora gwynnii* in our area are to be found in the crevices in the rocks on the eastern side of the harbour.

In this area a total of nine lichens and one moss are to be found.

Plants recorded for the area were:

LICHENAE

Acarospora gwynnii A
Acarospora williamsii R
Biatorella antarctica O
Buellia frigida A
Caloplaca elegans var. *pulvinata* A
Protoblastenia citrina O
Rhizocarpon flavum X
Parmelia coreyi A
Xanthoria mawsonii A

MUSCI

Grimmia lawiana

To the south of the group is a large terminal moraine with a variety of different rock types, but lichens were found only on the Mawson Granite. *Buellia frigida* again predominated, with *Acarospora gwynnii, Caloplaca elegans* var. *pulvinata* and a few small fragments of other species.

From the flow lines feeding this moraine, rock flour was dug from the ice up to half a kilometre south of the outcrop and also from where the ice meets the terminal moraine. Lichen material and many diatoms were found in both samples.

Forbes Glacier outcrops

The Forbes Glacier enters the sea between two coastal rock outcrops. The eastern tongue is completely devoid of flora whilst the outcrop on the western side has a large variety.

This outcrop is approximately a square kilometre of rock again divided into two sections, one large, high outcrop of typical Mawson Granite supporting a lichen flora of nine species and one moss species. The dominating lichen in this high outcrop is *Xanthoria mawsonii*.

Plants recorded for this area were:

LICHENAE

Acarospora gwynnii O
Acarospora williamsii R
Buellia frigida A
Caloplaca elegans var. *pulvinata* A
Pyrenodesmia mawsonii O
Lecanora rubina var. *melanophthalma* f. *exulans* C
Rhizocarpon flavum O
Parmelia coreyi C
Xanthoria mawsonii A

MUSCI

Bryum antarcticum

The second section of this outcrop and by far the largest, although not as high, is composed of Mawson Granite containing many bands of pegmatite and aplite: it does not support lichen flora. A thorough search was made of the whole area but no trace could be found. Weathering is fairly pronounced and this may be the reason. However, in the small gully between these two outcrops along a pronounced melt water course is a large carpet of moss *Bryum antarcticum*.

Tongue Rock group

The Tongue Rock group is situated about thirty-eight kilometres west of Mawson and consists of one large plateau outcrop and several small islands. The dominant rocks in this group are composed of garnet-sillimanite gneiss.

This rock is basically quartz and feldspar, with considerable quantities of sillimanite with garnet, cordierite and biotite. The islands, as previously discussed, have no flora; neither has the plateau outcrop, although time did not permit going right into where the rock meets the ice. The seaward side of this outcrop is completely covered by Adélie penguin rookeries and this would account for the lack of flora in this part. The similarity in rock strata to other areas suggests that lichens may not propagate on these banded garnetiferous gneisses.

Jelbart Glacier outcrops

On the eastern side of the Jelbart Glacier tongue is Falla Bluff and adjacent coastal outcrops and islands; unfortunately we were unable to visit them during the year. On the western side is Ufs Island and adjacent coastal outcrops; these also were not visited. Ufs Island is very promising as it is the largest island in the area, reaching a height of almost 360 metres above sea level. This could possibly have a lichen flora if a method of propagation other than flow line dispersal is employed.

Taylor Glacier outcrops

Taylor Glacier tongue has a very large area of coastal outcrops both to the east and to the west.

Looking at the eastern side first, we see the many islands of the Colbeck Archipelago, the high range of Chapman Ridge, and the inland outcrops of Stump Mountain and Tschuffert Peak, as well as the many smaller hills on the coast nestled into the Glacier tongue.

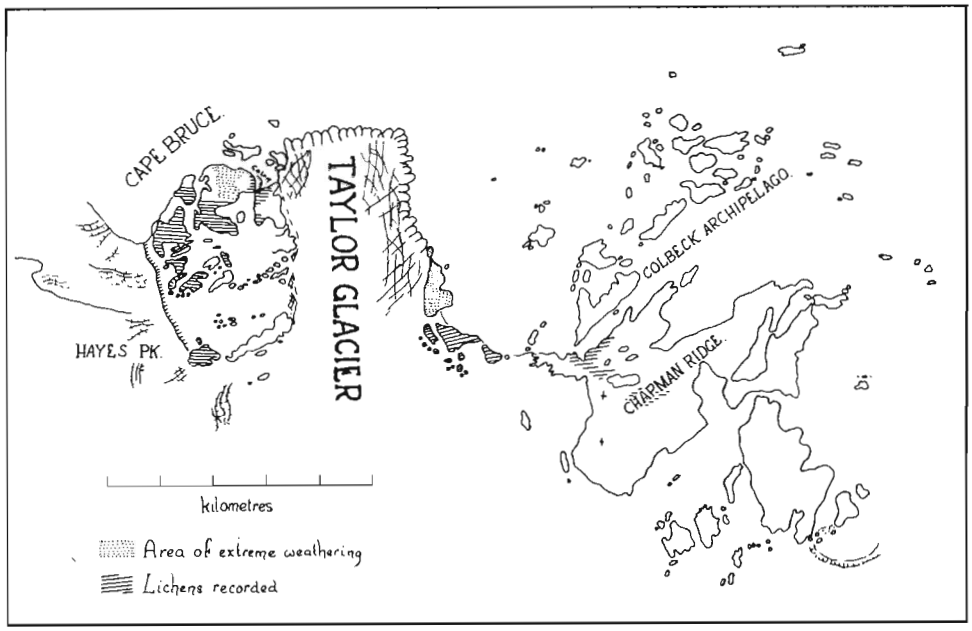


Fig. 5.—Map of Taylor Glacier and adjacent rock outcrops.

The closer inshore islands of the Colbeck Archipelago were visited and no plant life was recorded. The mainland outcrop, where protected by these islands, has an abundant flora right down to the water's edge. *Buellia frigida* again predominates. Behind the first row of outcrops and in the flat-bottomed valleys covered with moraine, *Caloplaca elegans* var. *pulvinata* predominates. These valleys are about forty-six metres above sea level and contain numerous melt lakes. In the small cracks and flat areas where melt water flows, *Bryum antarcticum* is abundant and, in places, patches up to one metre in diameter can be found.

Chapman Ridge was climbed on the north-western end, and on the flat area to the west of the summit, at a height of about 290 metres above sea level, nine lichens were recorded. The summit itself does not have such a great variety, although *Buellia frigida* is well established. On the southern end, in sheltered places, patches of *Biatorella antarctica* are numerous.

On the outcrop closer to the glacier tongue it was found that the lichens did not grow right down to the sea level owing to the lack of sheltering islands. However, these outcrops do have a flora in the sheltered cracks, up to thirty metres

above sea level on the northern faces. On the summits and southern faces of these peaks *Usnea antarctica* and *Lecidea woodberryi* are plentiful.

The hills around Taylor rookery are devoid of flora. They are of banded gneisses charactarized by the presence of garnet and abundant biotite, as mentioned in the Tongue Rock area, and are weathering fast. However, on the radio aerial hill immediately behind the ANARE caravan, one small specimen of *Protoblastenia citrina* was found. This suggests that the lack of any lichen is due to the weathering and not to the composition of the substratum.

Further back into the plateau lichens and moss are plentiful; again *Buellia frigida* predominates, with numerous indeterminate grey lichen thalli, which suggest a sterile form of *Buellia frigida*. Nineteen lichen species and two moss species were collected in this area. The complete list of plants collected on the eastern side of the tongue is as follows:

LICHENAE

Acarospora gwynnii O
Biatorella antarctica A
Buellia frigida A
Buellia lignoides X
Buellia aff. subpedicellata X
Caloplaca elegans var. *pulvinata* A
Pyrenodesmia mawsonii X
Protoblastenia citrina O
Lecanora rubina var. *melanophthalma* f. *exulans* A
Lecanora expectans O
Lecidea phillipsiana C
Lecidea woodberryi A
Rhizocarpon flavum C
Rhizocarpon flavum f. *subfoliosum* C
Parmelia coreyi A
Xanthoria mawsonii A
Omphalodiscus decussatus A
Alectoria minuscula A
Usnea antarctica A

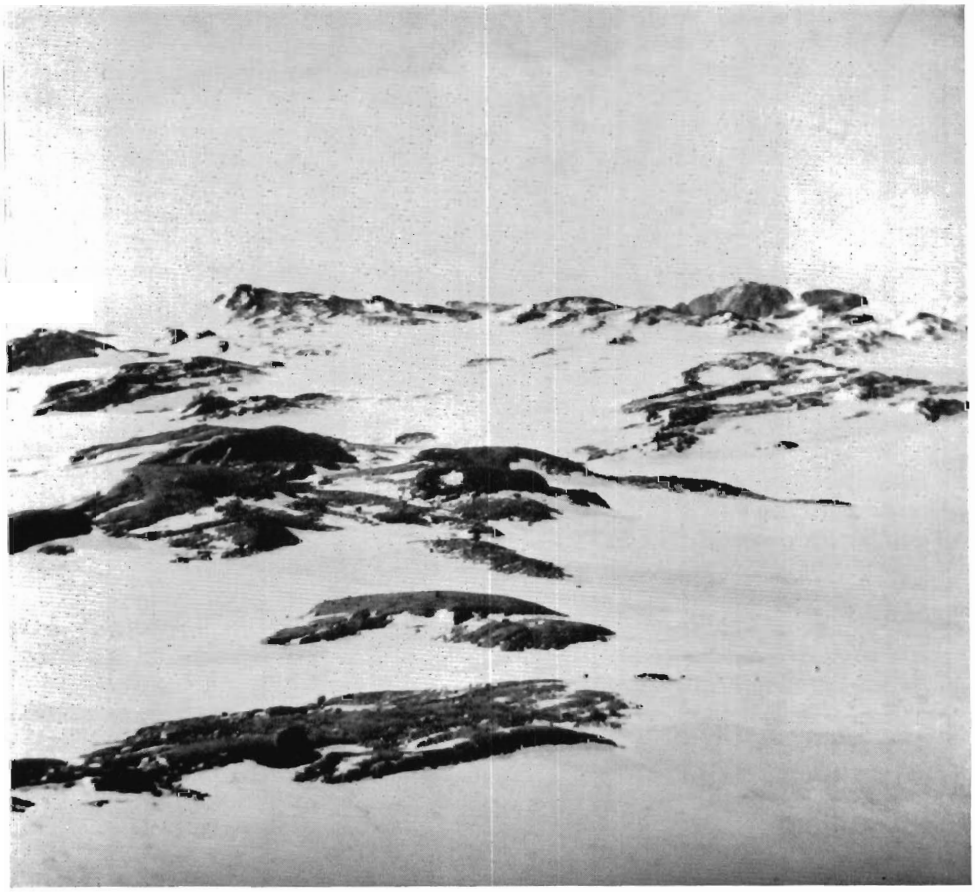
MUSCI

Bryum antarcticum
Grimmia lawiana

Immediately to the west of the Taylor Glacier tongue lies Cape Bruce, an area connected with Antarctic lichen history by the landing of Sir Douglas Mawson in February 1931, and is the type area for five of the seventeen species reported to have been found there.

The Cape Bruce group is situated at 67°26′S, 60°49′E and consists of four free islands, one island half-imbedded in the glacier tongue, and a large area of plateau outcrop. The free islands do not support flora. The half-imbedded island was not visited, but possibly it could support a flora on the eastern or south-eastern side. In the protected bay where Sir Douglas Mawson erected the

BANZARE cairn, lichens were found down to sea level, even growing on loose stones fallen down onto the shingle beach. The peak to the east of the cairn was climbed and lichens were found in abundance all the way to the summit. However, neither on the peak to the west, nor on any of the other sea coast peaks west of the BANZARE cairn were any lichens found.



ANARE photo Rex Filson

Fig. 6.—Looking north from the edge of the plateau, showing the many small outcrops in the Cape Bruce area.

Further inland nearly all of the outcrops in the western group were visited and most of the largest had a lichen flora. *Buellia frigida* predominated, with many *Omphalodiscus decussatus*. It was not until we were on practically the furthest inland outcrop that *Caloplaca elegans* var. *pulvinata* was recorded.

Hayes Peak, approximately 390 metres above sea level, was climbed and many lichens recorded for that area. *Omphalodiscus antarcticus* was found on the summit and down the eastern side, the only record of this lichen for the whole Taylor

Glacier area. Predominant on the melt water faces on the eastern side of Hayes Peak is *Rhizocarpon flavum*. Altogether sixteen species of lichen and one moss species were recorded.

LICHENAE

Acarospora gwynnii C
Biatorella antarctica A
Buellia frigida A
Buellia foecunda X
Caloplaca elegans var. *pulvinata* C
Pyrenodesmia mawsonii X
Protoblastenia citrina C
Lecanora rubina var. *melanophthalma f. exulans* A
Lecidea phillipsiana C
Rhizocarpon flavum A
Rhizocarpon flavum f. *subfoliosum* C
Parmelia coreyi R
Omphalodiscus antarcticus R
Omphalodiscus decussatus A
Alectoria minuscula A
Usnea antarctica C

MUSCI

Grimmia lawiana

Scoble Glacier outcrops

The Scoble Glacier stretches for some 49 kilometres along the coast of Mac.Robertson Land. Campbell Head, on its easternmost side, is just across Oom Bay, about five kilometres from Cape Bruce. It consists of a large area of plateau outcrop, with a few coastal islands.

The two most prominent islands, Blake and Oom, were not visited; however, the presence of a flora is doubtful as their development is inhibited by weathering and exposure to salt spray as on all other islands along the coast.

The inshore islands and the main area of plateau outcrop along the coast are devoid of flora, owing to the fast rate of weathering. This area is again similar to Tongue Rock in containing biotite, garnets, sillimanite and cordierite, in addition to quartz and feldspar, although sillimanite is far less abundant here than at Tongue Rock. So far, such rock has been found to be devoid of flora. Further inland the lichens are to be found only in isolated patches and in no place could they be called abundant. The area was very thoroughly investigated and we visited every prominent outcrop, including the small outcrop far back into the plateau.

The lichens recorded for the area are as follows:

LICHENAE

Acarospora gwynnii O
Biatorella antarctica O
Buellia frigida C
Buellia aff. *subpedicellata* X

Protoblastenia citrina O
Lecanora rubina var. *melanophthalma* f. *exulans* O
Lecanora expectans X
Lecidea phillipsiana C
Parmelia coreyi O
Xanthoria mawsonii C
Omphalodiscus decussatus C

On the western side of the Scoble Glacier is the isolated outcrop of Tilley Nunatak. This nunatak is situated only a few kilometres east of the Mac.Robertson Land border; it is the most western outcrop in our area.

The largest of the three peaks, which is situated to the west of the outcrop, is of granitic gneiss with pyroxene gneiss bands. This peak is weathering quickly on the seaward side and therefore has no flora. The summit is also weathering fast but a few sparse specimens of *Buellia frigida* were found between the boulders. The peak to the north-east of the outcrop is also of granite gneiss, with pyroxene gneiss bands, and is similar to the first. The other peak is of red quartzite with thin pyroxene gneiss bands. This peak is not weathering as readily and has an abundant flora. The eroded valley in the middle of the nunatak is of garnet gneiss, which is basically feldspar and quartz with considerable quantities of garnet. This itself does not support flora but on the in-valley sides of the three peaks a considerable quantity of lichen material is to be found. In all, seven species were collected.

LICHENAE

Buellia frigida A
Buellia grimmiae X
Caloplaca elegans var. *pulvinata* A
Pyrenodesmia mawsonii R
Lecanora rubina var. *melanophthalma* f. *exulans* C
Lecidea phillipsiana X
Omphalodiscus decussatus C

B. INLAND

Trost Rocks

Trost Rocks are two rocky outcrops situated on the western side of the Amery Ice Shelf and approximately 160 kilometres south of the coastline. They were visited first by members of the 1962 Amery Ice Shelf traverse party and found to have a very interesting and abundant flora, eight lichens being recorded for the area. Probably the most abundant lichen here is *Rhizocarpon flavum*. An interesting feature is that neither *Buellia frigida* nor *Caloplaca elegans* was collected. *Usnea antarctica* was collected, although it was not plentiful. This particular collection is also of interest as there is a gap between this locality and the Taylor Glacier outcrops where *Usnea antarctica* has not been found.

The lichens recorded for the area are as follows:

LICHENAE

Biatorella antarctica A
Buellia lignoides X
Lecidea phillipsiana A

Lecidea capsulata O
Rhizocarpon flavum A
Omphalodiscus decussatus A
Alectoria minuscula X
Usnea antarctica C

Church Mountain

The Church Mountain-Mount Rivett area was visited by a dog-sledging party soon after midwinter 1962 and the low temperatures hampered lichen collecting. It was reported that lichens in the area are not abundant but the following collections were made:

LICHENAE

Lecanora rubina var. *melanophthalma* f. *exulans* X
Alectoria minuscula X
Omphalodiscus decussatus X

ANARE photo Rex Filson

Fig. 7.—Looking towards Anniversary Nunataks from the west.

Depot Peak

This peak was reported previously by Dr. R. O. Summers in 1954 to be bare of lichens, but the 1962 party returning from the Amery Ice Shelf collected a few minute specimens. The outcrop, at 69°05′S, 64°43′E, is approximately 160 kilometres from the coast and rises to a height of approximately 1860 metres. This seems to be at the inland limit for lichens in our area. Trost Rocks, being farther south at 69°46′S, constitute a more southerly record, but as they are the same distance from the coastline as Depot Peak, mileage from the coast and altitude seem to be the important factors.

The Depot Peak rocks are dominantly gneissic; this may also be a reason why so few lichens are recorded there.

LICHENAE

Biatorella antarctica O
Lecanora rubina var. *melanophthalma* f. *exulans* O

McNair Nunatak

McNair Nunatak is situated about 40 kilometres south-east of Mawson and is approximately 855 metres high. It is composed of Mawson Granite and has a plentiful flora. Lichens were first recorded there by Dr. Summers on the 1954 inland traverse, the peak then being known as Nunatak I. Dr. Summers reports that "lichens and mosses were abundant". Although eight species of lichen were found there was no trace of any moss.

Lichens recorded for the area were:

LICHENAE

Biatorella antarctica R
Buellia frigida X
Caloplaca elegans var. *pulvinata* A
Protoblastenia citrina X
Lecanora rubina var. *melanophthalma* f. *exulans* X
Lecidea phillipsiana A
Omphalodiscus decussatus O
Omphalodiscus antarcticus C

Anniversary Nunataks

These nunataks were first visited by members of the 1962 party and are situated about 43 kilometres south of Mawson. They consist of four major outcroppings and two minor outcrops. The highest point is approximately 1350 metres above sea level. All outcrops were inspected but the lichen flora was not abundant. *Buellia frigida* again was not plentiful. This lichen seems to grow best in areas on or near the coast. *Caloplaca elegans* was represented by one very small specimen. Most lichens in the area were sterile. Those determined number nine species and are as follows:

LICHENAE

Acarospora gwynnii R
Biatorella antarctica A

Buellia frigida O
Buellia lignoides X
Caloplaca elegans var. *pulvinata* R
Lecanora rubina var. *melanophthalma* f. *exulans* O
Lecidea phillipsiana X
Lecidea capsulata X
Alectoria minuscula A

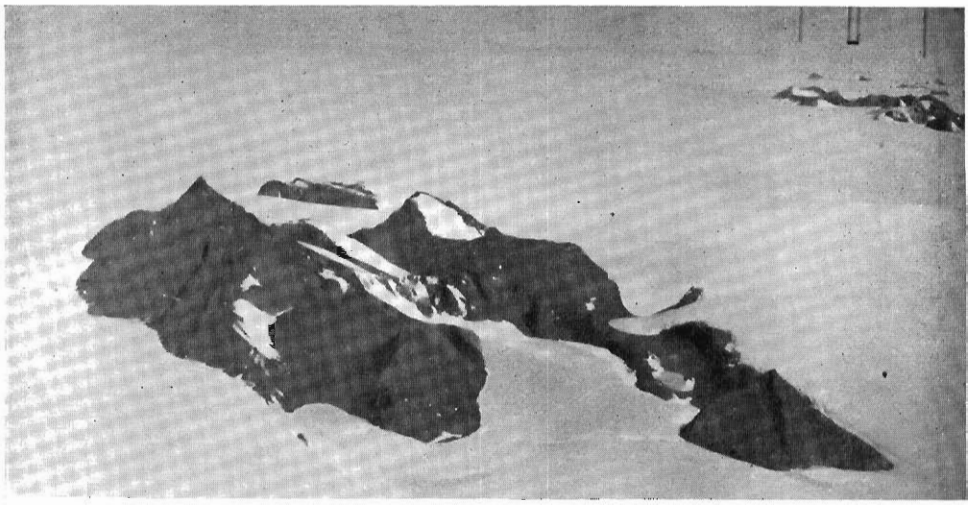
ANARE photo Rex Filson

Fig. 8.—A prominent peak in Anniversary Nunataks. Masson Range can be seen to the north on the left in the picture and Mount Henderson on the right.

Mount Henderson

Mount Henderson is situated about 13 kilometres south-south-east of Mawson. It is a large rocky massif occupying an area approximately 4 kilometres long by 2 kilometres wide, with ridges commencing below the plateau level and rising to an altitude of 970 metres above sea level. Between these ridges are large melt

lakes, large areas of moraine and moraine scree slopes. Towards the northern end these moraine and scree slopes are abundant in flora. Collections were made around the melt lakes, and up the scree slope to Goldsworthy Ridge at an altitude of approximately 522 metres above sea level. The most common is *Buellia frigida*, with large patches of *Caloplaca elegans*. Where *Buellia frigida* extends deeply into the sheltered crevices between the rocks, *Xanthoria mawsonii* and *Protoblastenia citrina* grow in association.



ANARE photo D. S. Trail

Fig. 9.—View of Mount Henderson from the air. Goldsworthy Ridge is on the left-hand range turning south from the bottom of the picture. The collections made at the southern end were on the small flat area at the base of the peak on the southern end of the right-hand range, and along the valley to the central saddle. Fischer Nunatak is to the south of the mass. In the top right-hand corner of the picture the North and South Masson Ranges can be seen.

Collections were made on the south-eastern corner and in these areas the lichen flora was found to be less abundant.

On the south-eastern corner the most prominent lichen is *Biatorella antarctica*. This lichen is abundant and forms dense cushions 3-4 cm × 1-2 cm on and amongst the rubble and scree along the small rock ledges in southerly aspects.

On the summit, *Biatorella antarctica, Buellia frigida* and *Caloplaca elegans* var. *pulvinata* are the most plentiful.

In the Mount Henderson area a total of thirteen lichen species and one moss species were collected.

LICHENAE

Acarospora gwynnii X
Biatorella antarctica A
Buellia frigida A
Buellia foecunda X
Caloplaca elegans var. *pulvinata* A

Pyrenodesmia mawsonii C
Protoblastenia citrina O
Lecanora rubina var. *melanophthalma* f. *exulans* X
Lecidea capsulata X
Lecidea woodberryi X
Parmelia coreyi A
Xanthoria mawsonii X
Omphalodiscus decussatus A

MUSCI

Grimmia lawiana

Fischer Nunatak

This nunatak lies about 1½ kilometres to the south of Mount Henderson. It is similar to Mount Henderson in geology but with a vastly different lichen flora. It consists of rock about one square kilometre rising to a height of approximately 750 metres above sea level. Lichens were collected from many aspects and again *Biatorella antarctica* is abundant on the southern side. *Buellia lignoides* and *Rhizocarpon flavum* are abundant on the western side and cover areas up to several square metres. Both of these lichens are absent from Mount Henderson collections. *Alectoria minuscula* is plentiful along the cracks in the rocks in summit aspects of the nunatak.

Grimmia lawiana was collected growing in the cracks on the summit of the knob immediately to the east of the ANARE meteorological caravan.

Altogether eight lichen species and one moss species were recorded for this small area.

LICHENAE

Acarospora gwynnii O
Biatorella antarctica A
Buellia lignoides A
Caloplaca elegans var. *pulvinata* O
Lecanora rubina var. *melanophthalma* f. *exulans* C
Rhizocarpon flavum A
Omphalodiscus decussatus A
Alectoria minuscula A

MUSCI

Grimmia lawiana

Masson Range

Masson Range is about 16 kilometres to the south of Mawson and stretches in a south-south-westerly direction for some 32 kilometres. It is divided into three separate groups: the North and Central Masson Ranges are large areas of peaks, whilst the South Massons are composed of several outlying groups of nunataks.

a. North Masson Range

This part of the range covers an area of 6½ kilometres by 3 kilometres, and rises to a height of 1030 metres above sea level at Mount Ward. The greater bulk

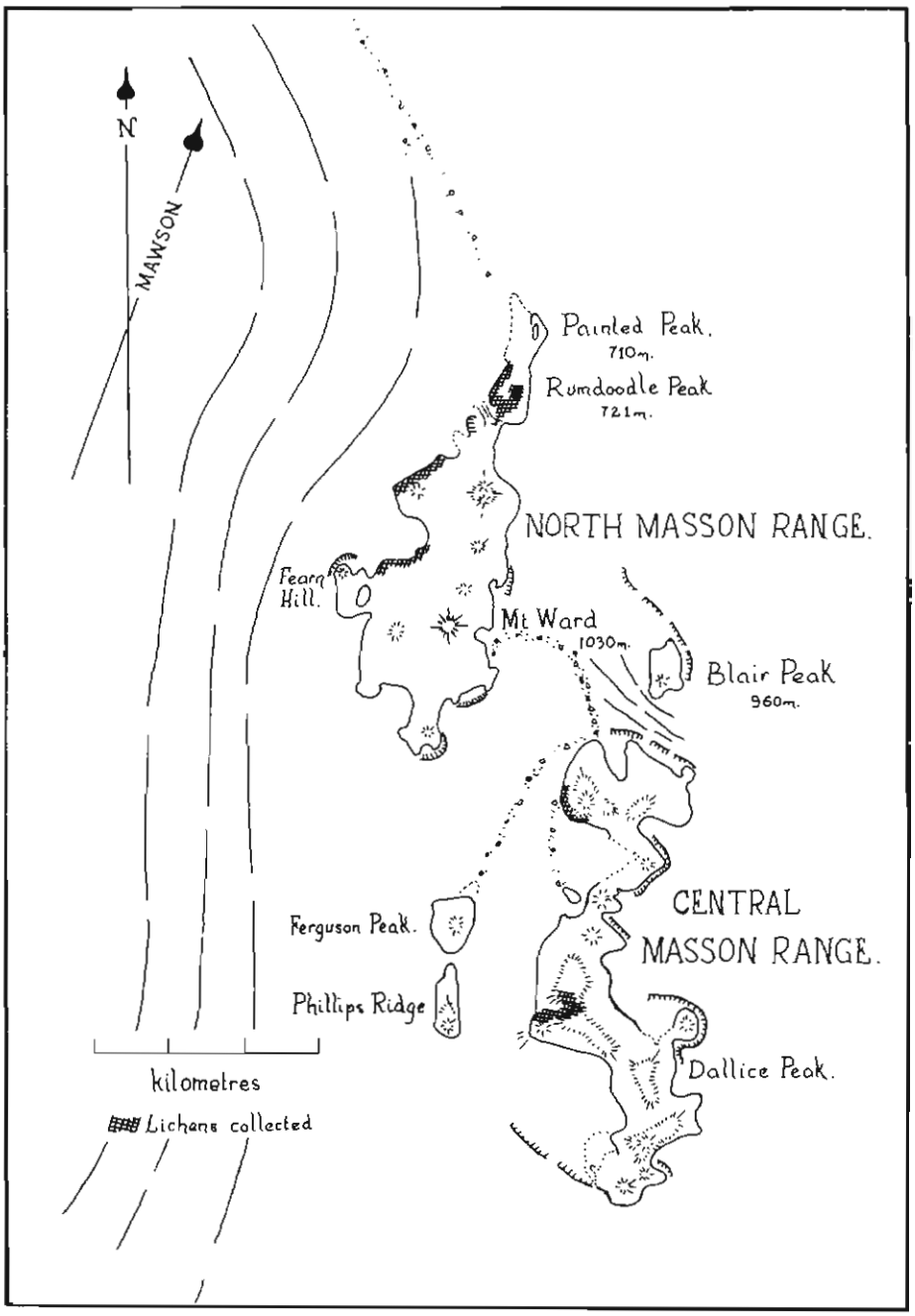


Fig. 10.—Map of North and Central Masson Range.

of the range is of rock similar to that at Mawson. The northernmost tip, however, is of metamorphosed sediments. The most striking feature on this northern part is Painted Peak, having its faces banded with the different layers of sediments. This peak is used as a tellurometer station and rises to a height of 721 metres above sea level. Because of its use by the surveyor it was visited many times, resulting in many collections being made. For this reason I have made a separate list of the flora from this peak.

Lichens are plentiful on the rest of the range; very large specimens of *Omphalodiscus antarcticus* can be found growing in the rock crevices right down to the surface of the melt lakes.

Moraine and scree slopes are to be found at the foot of the range, dividing the melt lakes and then forming a long line of moraine along the flow lines northwards towards the coast for five or six kilometres. All of these moraine boulders contain a wide variety of lichens although the boulders out on the plateau contain many that are dead, particularly *Omphalodiscus* species.

LICHENAE at Painted Peak

Acarospora gwynnii C
Acarospora williamsii R
Biatorella antarctica X
Buellia frigida A
Buellia aff. subpedicellata X
Protoblastenia citrina C
Lecanora rubina var. *melanophthalma* f. *exulans* O
Lecanora expectans X
Lecidea phillipsiana O
Rhizocarpon flavum A
Omphalodiscus decussatus A
Alectoria minuscula C

LICHENAE in North Masson Range area (including terminal moraines)

Acarospora gwynnii O
Acarospora williamsii R
Biatorella antarctica O
Buellia frigida A
Caloplaca elegans var. *pulvinata* A
Pyrenodesmia mawsonii X
Protoblastenia citrina X
Lecanora rubina var. *melanophthalma* f. *exulans* X
Lecidea phillipsiana A
Parmelia coreyi R
Xanthoria mawsonii X
Omphalodiscus antarcticus A
Omphalodiscus decussatus A
Alectoria minuscula

MUSCI

Grimmia lawiana

b. Central Masson Range

The central part of the Masson Range is to the east and immediately south of the North Masson Range. At its northernmost end a nunatak, Blair Peak (960 metres) is separate from the main mass. Collections were not made on this

ANARE photo Rex Filson

Fig. 11.—A prominent peak in Central Masson Range, showing the type of rock faces where lichens were collected.

peak but were made at two other stations, one on the northern tip of the main mass and the other about 3 kilometres south. The geology of this part is similar to the North Masson Range in structure and the lichens are fairly plentiful — *Rhizocarpon flavum* is very prominent. There were twelve species of lichens recorded for this area.

LICHENAE

Acarospora gwynnii A
Buellia frigida A
Caloplaca elegans var. *pulvinata* A
Protoblastenia citrina X
Lecanora rubina var. *melanophthalma* f. *exulans* X
Lecanora expectans R
Rhizocarpon flavum C
Parmelia coreyi A
Xanthoria mawsonii O
Omphalodiscus antarcticus A
Omphalodiscus decussatus X
Alectoria minuscula X

c. South Masson Range

The southern part of the Masson Range is completely different from the two northern parts. It consists of a series of separate nunataks rather than a continuous range. In all, there are about fifteen nunataks and one large group comprising Mount Burnett and the connecting ridge to Trost Peak.

Almost all the nunataks in this group were visited and, although there is not a great quantity of lichen material, the variety is great.

The most northern station was "1050 m peak" just to the south of Trost Peak. This is a long flat ridge with many lichens. *Omphalodiscus decussatus* is there in abundance covering areas up to metres in circumference. The individual thalli are small with very few over 1 cm in diameter. *Grimmia lawiana* was abundant on this peak and this constitutes the farthest inland record for a moss in our area. The most northerly of the two peaks to the south of the snow slope is of banded gneiss. This is weathering badly and supports no lichen flora. The other peak is similar to Mawson Granite with very large feldspar phenocrysts; this supports a wide flora with *Rhizocarpon flavum* and *Caloplaca elegans* var. *pulvinata* in abundance. This was the only time when we found this latter lichen in abundance on an inland peak. The connecting ridge round to Mount Burnett, approximately 1050 metres above sea level, and the moraine scree slopes on the northern side, have lichens widely distributed amongst the rocks. On Mount Burnett *Biatorella antarctica* is abundant but *Caloplaca elegans* var. *pulvinata* again is sparsely represented. The most abundant lichen here is an indeterminate sterile grey thallus (see note at end of Section III, under "Indeterminate Lichens").

The next peak south is Branson Nunatak which rises to an altitude of approximately 1170 metres above sea level. This nunatak consists of two major peaks and a collection of rock outcroppings on the plateau side of the wind scour. Collections were made on the eastern peak and the plateau outcrop. The flora here was again wide in variety, but not as abundant as on the northern peaks. *Caloplaca* is not represented on this peak but it does show again with one small specimen on Price Nunatak and Van Hulssen Nunatak.

Price Nunatak is approximately 1230 metres above sea level and is made up of two peaks separated by a deep wind scour. Only the northernmost peak was visited and it was found to have a variable flora.

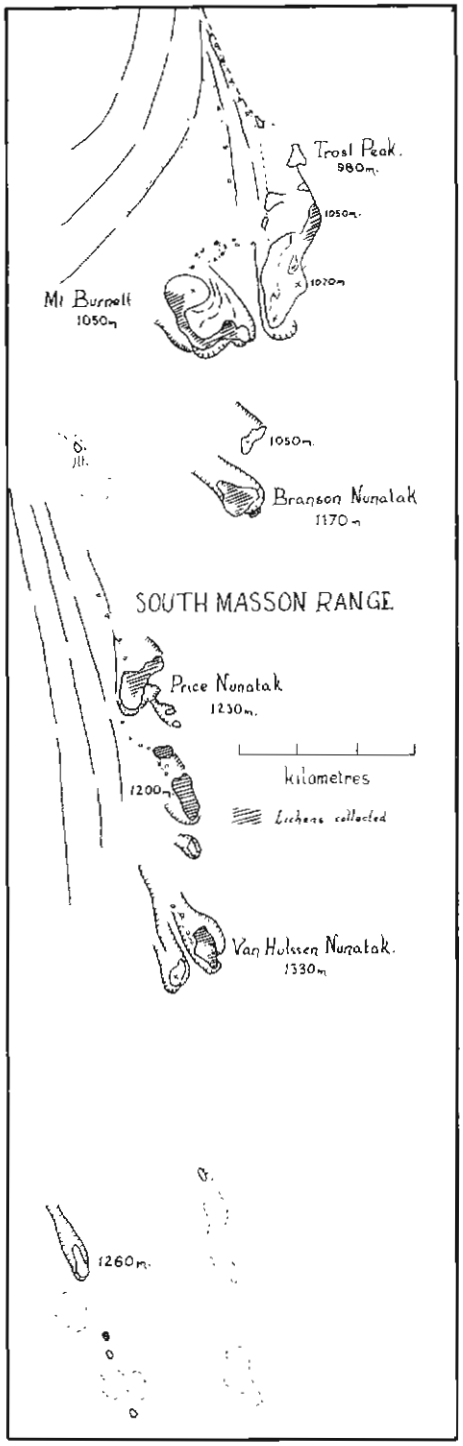
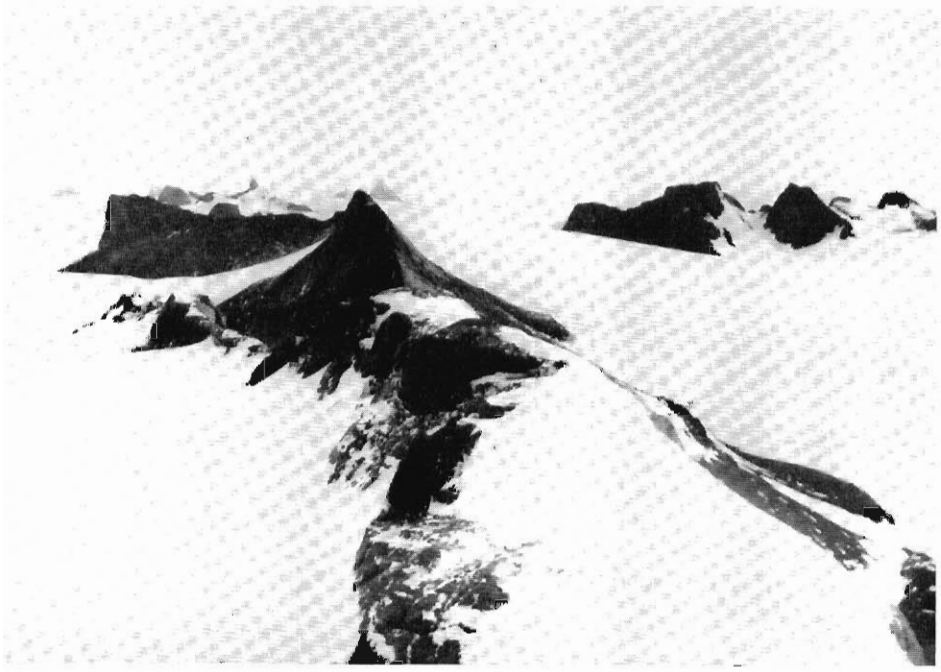


Fig. 12.—Map of South Masson Range.

Van Hulssen Nunatak, approximately 1330 metres above sea level, was climbed and extensive collections were made. Lichens were collected from this nunatak on the southern faces and the western scree slopes.

On the very southern tip of the range a small nunatak south of "1260 m Nunatak" was visited and found to have quite a varied flora. *Buellia lignoides* is there in abundance, covering large areas of rock surface. *Biatorella antarctica* is represented but is not as abundant as on other inland peaks.



ANARE photo John Williams

Fig. 13.—Looking south from 1050m peak south of Trost Peak. The peak immediately south is a 1070m peak; in the distance behind it is Price Nunatak; just out of the picture, on the right, lies Mount Burnett, and on the extreme left is Van Hulssen Nunatak.

The collected flora for this whole area is as follows:

LICHENAE

Acarospora gwynnii R
Acarospora williamsii O
Biatorella antarctica C
Buellia foecunda X
Buellia frigida C
Buellia grimmiae X
Buellia lignoides X
Buellia aff. *subpedicellata* X
Caloplaca elegans var. *pulvinata* C

Lecanora rubina var. *melanophthalma* f. *exulans* O
Lecanora expectans O
Lecidea phillipsiana C
Lecidea capsulata X
Rhizocarpon flavum A
Omphalodiscus antarcticus O
Omphalodiscus decussatus C
Alectoria minuscula O

MUSCI

Grimmia lawiana

David Range

The northern tip of the David Range is almost 10 kilometres due west of the northern tip of the Masson Range. This range is the largest in our area, stretching from 11 kilometres south of the coast for another 45 kilometres south and rising to its highest point at Mount Elliott, approximately 1300 metres above sea level.

Unfortunately, we were unable to visit the greater part of this range. The most northerly part visited was Mount Coates, approximately 1280 metres above sea level.

This peak is about 12 kilometres from the northern tip of the range. The collections from this area are inadequate, as our stay was short and did not allow us time to climb right to the summit or to make a really thorough search of the scree slopes. Only three species were collected but the author feels sure that the flora would be comparable with the Central Masson Range.

The most southerly area visited in the Frammes Mountains was Mount Twintop. This mountain is weathering badly and, although a thorough search was made, no flora was seen. Three kilometres north of Mount Twintop a small outcrop and moraine were visited. This outcrop rises above the ice surface for only 8 to 9 metres. Lichen material on it is very scarce. Very reduced specimens of *Biatorella antarctica, Acarospora gwynnii,* along with an indeterminable grey and black thallus, were located in the cracks between the rocks.

Five kilometres north-east of Mount Twintop another rocky outcrop and moraine was visited. This outcrop projects above the ice surface for approximately 9 metres and has a vastly different flora from the one previously visited. *Biatorella antarctica,* although greatly reduced, is abundant. The farthest inland record of *Acarospora williamsii* was made here and, altogether, a total of seven species were recorded.

LICHENAE from these southern outcrops (an asterisk marks the species found on Mount Coates)

Acarospora gwynnii R
Acarospora williamsii R
**Biatorella antarctica* O
Buellia lignoides X
**Lecanora rubina* var. *melanophthalma* f. *exulans* C
**Lecidea phillipsiana* X
Lecidea capsulata A

Casey Range

This range is about 30 kilometres south-west from Mawson. The group is about 9½ kilometres long and consists of a main northerly mass, about 4 kilometres long, rising to a height of approximately 950 metres above sea level, and a group of nunataks including Woodberry Nunataks and Lucas Ridge. These are separated from the main mass by about 2½ kilometres.

Only the northern mass was visited and, as with all these outcrops near the coast, *Buellia frigida* was most abundant. This is where the first collection of *Lecidea woodberryi* was made. Although a full day was spent here, many lichens which should have been represented were not recorded.

LICHENAE

Biatorella antarctica X
Buellia frigida X
Caloplaca elegans var. *pulvinata* X
Lecidea woodberryi X
Parmelia coreyi X

III. BOTANICAL DESCRIPTIONS OF THE SPECIES

A. LICHENAE

SYSTEMATIC ARRANGEMENT *

CLASS ASCOMYCETES [ASCOLICHENES]

1. Subclass LOCULOASCOMYCETES [ASCOLOCULARES]
2. Subclass ASCOMYCETES [ASCOHYMENIALES]
1. Order SPHAERIALES [PYRENOCARPEAE]
2. Order LECANORALES [GYMNOCARPEAE]

Acarosporaceae:	*Acarospora, Biatorella*
Buelliaceae:	*Buellia, Rinodina*
Caloplacaceae:	*Caloplaca, Protoblastenia, Pyrenodesmia*
Heppiaceae:	*Heppia*
Lecanoraceae:	*Lecanora*
Lecideaceae:	*Lecidea, Rhizocarpon*
Parmeliaceae:	*Parmelia*
Teloschistaceae:	*Xanthoria*
Umbilicariaceae:	*Omphalodiscus*
Usneaceae:	*Alectoria, Usnea*

Acarospora gwynnii Dodge & Rudolph

Acarospora (*Pachnolepia*) *Gwynnii* Dodge & Rudolph (1955). Ann. Miss. Bot. Gard. *42*: 144 pl. 15, 2).

Thallus of cerebriform squamules lemon yellow to yellow-green, in sheltered positions covering areas up to 3 cm, individual thalli up to 3 mm diam. attached at centre with margins free when on the surface of rock; but sometimes compressed into tight clusters of small areoles 1-1.5 mm diam., along cracks, with the lower cortical hyphae penetrating deep into the rock crystals. *Cortex* 25-30μ thick. *Algal layer* filling the thallus, cells 7-14μ diam. *Apothecia* numerous, scattered, 2 or 3 to each squamule, 0 3-0·5 mm diam., irregularly rotund through lateral pressure, immersed. *Disk* yellow-brown in centre to dark brown at edges, maturing dark brown throughout, margin concolourous with thallus, raised at first, disappearing, deeply fissured along the exciple causing the abscission of the hymenium intact. *Hymenium* 250-400μ tall, oviform. *Paraphyses* slender, much branched at the tips, apical cell only slightly thickened. Asci 70-100μ $\times$ 15-20μ. *Ascospores* many per ascus, hyaline, ellipsoid 3·5μ $\times$ 2μ.

Distribution

MAC.ROBERTSON LAND:

Mawson, RF† 4071; Field Rock, RF 4162; outcrop in Departure Rocks group, RF 4155; western outcrop, Forbes Glacier, RF 4399; Ring Rock, RF 4230; Taylor Glacier, RF & JW 4269; foot of Hayes Peak, RF & RN 4367; Cape Bruce, RF & JW 4319; Campbell Head, RF & JW 4303; Goldworthy Ridge, Mount Henderson,

* Adopted from Mason E. Hale, *Lichen Handbook*, 100-102 (1961)
† Abbreviations in small capitals refer to names of ANARE collectors: see Appendix III, page 164.

RF 4187; summit of Mount Henderson, JP & OB 4528; North Masson Range, BW 4090; Painted Peak, North Masson Range, JW 4123; Central Masson Range, RF & KM 4427; Mount Burnett, RF & JB 4516; Branson Nunatak, RF & JB 4471 a; Van Hulssen Nunatak, RF & JW 4573; north peak, Price Nunatak, RF & JB 4498; rocky outcrop 3 km north of Mount Twintop, David Range, RF 4537; Anniversary Nunataks, RF 4561.

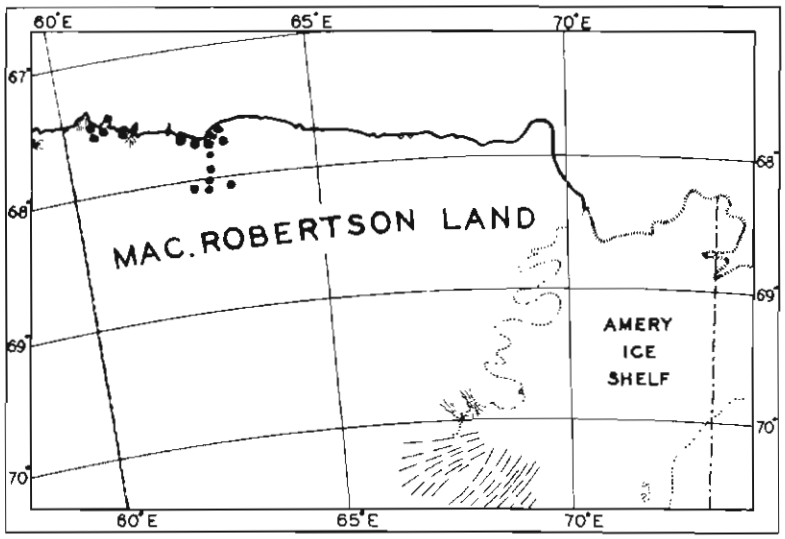


Fig. 14.—Distribution map for *Acarospora gwynnii*.

Other localities

SOUTH VICTORIA LAND:

Crater Cirque, 1600 ft, CROLL, FITZGERALD, HARRINGTON AND MCKELLAR—WELT 78 (pr.p.), WELT 79.

Dodge & Rudolph (1955) in the original description state: "thecium 230μ tall", and Murray (1963): "up to 250μ tall", whereas, in all of the mature apothecia sectioned by the author, the hymenium was over 250μ tall. Neither Dodge nor Murray draws attention to the deep fissures along the exciple which are most noticeable, even in specimens determined by Dodge and held in the National Herbarium, Melbourne.

Acarospora williamsii R. Filson spec. nov.

Species nova ab aliis speciebus Antarcticis generis differt sic: apothecii statura formaqua, fissurae profundae secus excipulum absentia, hymenii longitudine formaque atque ascorum statura.

Thallus ex areolis parvis planis vel subhemisphaericis (1·01-1·5 mm diam.) consistens, a pressu laterali irregulariter formatus, arenicoloratus vel obseure cinnamomeus, interdum pruinosus. *Cortex* 25-30μ crassitudine, a strate (15μ crassit.) cellularum tabitarum obtectus, cellulis extremis flavo-brunneis; algae cellulae 5-15μ diam., globosae, pertenuiter vaginatae, strato ponderosiore cortieem superum versus

sed per medullam aequaliter dispersae. *Medulla* ex hyphis (5μ diam.) septatis hyalinis anastomosis consistens. *Cortex inferus* circiter 25μ crassitudine, hyphas medullares simulans, ad medium areolae particulas arenae profunde penetrans (usque ad 1 cm). *Apothecia* 0·5-1·0 mm diam., irregularia, unum per areolam singulam. *Discus* fusco-brunneus vel niger, concavus vel planus, margine elevato, obscure cinnamomeo vel fusco-brunneo. *Hymenium* hyalinum, 125μ altum. *Paraphyses* ramosi vel simplices, 2-2·5μ diam., cellula apicali 6μ × 7μ. *Asci* 100-125μ × 15-25μ, late vel anguste clavati. *Ascosporae* parvae, numerosae, hyalinae, ellipsoideae, 4-4·5μ × 2-2·5μ. Specimina omnia ex plantis in arena crescentia.

Distribution

MAC.ROBERTSON LAND:

Mawson, RF & JW 4412; Ring Rock, RF 4232; western outcrop, Forbes Glacier tongue, RF & JW 4400 (HOLOTYPUS); Painted Peak, North Masson Range, JW 4122; North Masson Range, JW 4095; 1050m peak, South Masson Range, RF & JB 4480; outcrop and moraine 5 km north-east of Twintop, David Range, RF 4545.

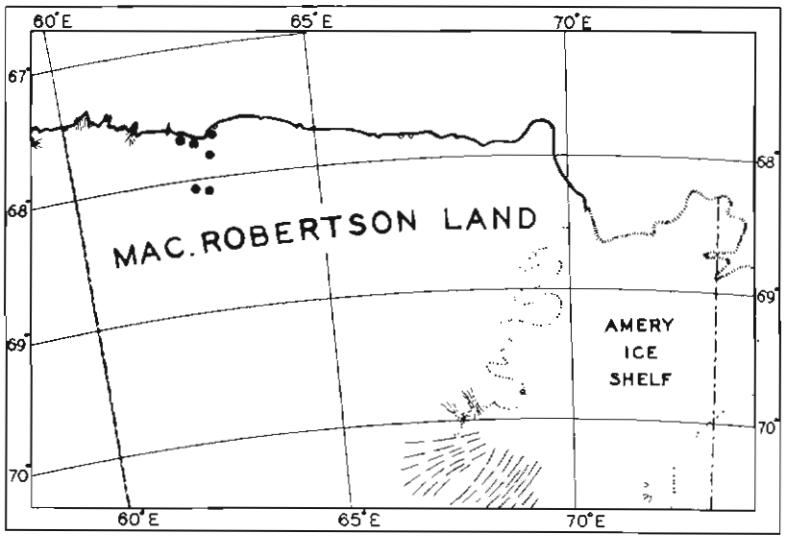


Fig. 15.—Distribution map for *Acarospora williamsii*.

Thallus of small flat to subhemispheric areoles 1.0-1.5 mm diam., irregularly shaped from pressure, varying in colour from sand to raw umber, sometimes pruinose. *Cortex* 25-30μ thick, outermost cells yellow-brown, giving thallus its colour, covered by a 15μ decomposed layer. *Algal cells* 5-15μ diam., globose with a very thin sheath, heavier near the upper cortex but then scattered evenly throughout the medulla. *Medulla* of hyaline anastomosing, septate, hyphae 5μ diam. *Lower Cortex* about 25μ thick, similar to the medullary hyphae; in the centre

of the areole the lower cortex deeply penetrates the sand crystals, up to a depth of 1 cm.

Apothecia 0·5-1·0 mm diam., one to each areole, irregular. *Disk* dark brown to black, concave to flat, margin elevated, raw umber to dark brown. *Hymenium* hyaline 125μ tall. *Paraphyses* branched or unbranched 2-2·5μ diam., apical cell 6μ × 7μ. *Asci* 100-125μ × 15-25μ, broad-narrow clavate. *Ascospores* small, numerous, 4-4·5μ × 2-2·25μ hyaline, ellipsoidal.

The author has great pleasure in naming this lichen after John S. M. Williams, assistant diesel mechanic, Mawson 1962, who found the first specimen in the North Masson Range and contributed greatly to the large collecting programme during the year.

Biatorella antarctica Murray

Biatorella antarctica Murray (1963). Trans. Royal. Soc. N.Z. 2: 60.

Thallus in cerebriform, humped areoles up to 3 cm diam., and up to 10 mm thick, bright sulphur-yellow, greenish in sheltered areas, held to the substratum by thin, white hyphae which sometimes penetrate deeply into the cracks in the rock. *Cortex* up to 50μ thick. *Algal cells* 8-13μ diam., forming scattered colonies throughout the medulla. *Medulla* of moderately woven hyaline branched hyphae 2·5-3·0μ diam. *Apothecia* up to 1·5 mm diam., convex to hemispheric margin visible at first, disappearing at maturity. *Disk* sulphur yellow or sometimes yellow-green, waxy. *Hymenium* hyaline 65-85μ tall including pale yellow epithecium, epithecium heavily encrusted with yellow crystals. *Paraphyses* regularly branched once or twice, near the tips 2μ diam., with the apical cell slightly thickened. *Asci* 50μ × 16μ broadly clavate, with over 150 spores. *Ascospores,* hyaline ellipsoidal, unicellular, 2-3μ × 2μ.

Distribution

MAC.ROBERTSON LAND:

Mawson, RF 4084; Field Rock, RF 4162; Ring Rock, RF 4230; Taylor Glacier, nunataks east of the tongue, RF & JW 4266; flat area to west of summit of Chapman Ridge, RF & JW 4278; Cape Bruce, RF & JW 4329; summit of Hayes Peak, RF & RN 4384; Campbell Head, RF & JW 4303; summit of Mount Henderson, JP & OB 4533; Mount Henderson, southern end, RF 4213; Fischer Nunatak, KM 4138; North Masson Range, BW 4086; eastern moraine, North Masson Range, RF 4105; Painted Peak, North Masson Range, JW 4135; Branson Nunatak, RF & JB 4466; north peak, Price Nunatak, RF & JW 4491; 1050 m peak, South Masson Range, RF & JB 4481; 1070 m peak, South Masson Range, RF & JB 4505; Mount Coates, David Range, RF & JF 4102; rocky outcrop 3 km north of Mount Twintop, RF 4535; rocky outcrop 16 km east of Mount Twintop, RF 4547; Casey Range, RF & IL 4118; Anniversary Nunataks, RF 4559; Depot Peak, PT 4451; McNair Nunatak, RF 4462; Trost Rocks, DC 4448.

Other Localities

VICTORIA LAND:

Felsite Island, GEOL. SURV. PETR. COLL. 21553; Football Mountain, 2700 ft, CROLL & FITZGERALD—WELT 138 (TYPE), WELT 134; Recce Hill 2,500 ft,

FITZGERALD—WELT 122, WELT 123; Mount Vernon Harcourt 5,300 ft, FITZGERALD —WELT 116.

The specimens from our area agree well with Murray's description, except for the asci and ascospores. Murray (1963) states, "asci 28μ × 18μ . . . with about 50 spores". Even though specimens found in our region have larger asci and more numerous spores, the author feels that they are referable to this species.

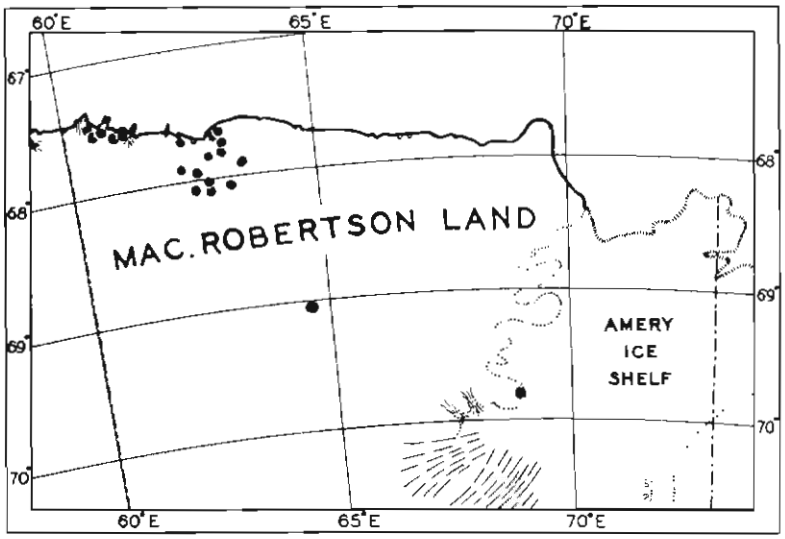


Fig. 16.—Distribution map for *Biatorella antarctica*.

Buellia foecunda R. Filson spec. nov.

Extrinsecus et contexta simillima *B. frigidae* Darbishire, sed hypothecio hyalino atque sporis paulum parvioribus differt.

Thallus areolatus, cinereus, crustam in saxo formans. *Areola* laevis vel a rugulis tenuibus nigris copiosa, 0·5-1·5 mm diam. *Hypothallus* parum clarus. *Cortex* fusco-brunneus vel nigrescens, ex hyphis verticalibus fastigiatis formatus, a strato informi crassitudine usque ad 40μ obtectus. *Gonidia* algensia 12-20μ diam. *Hyphae* medullares modice compactae, I-. *Apothecia* nigra, carbonacea, 0·3-0·7 mm diam., convexa vel hemisphaerica. *Hypothecium* hyalinum. *Hymenium* 65-75μ altum. *Paraphyses* hyalinae simplae vel ramos ferentes, crassitudine 2μ, cellula apicali ad 5μ expansa, fusco-brunneae vel nigrescentes, epithecium crassitudine 12μ formantes. *Asci* difficiliter discernendi, approx. 40-50 × 14-15μ. *Ascosporae* 8 per ascum, uniseptatae vel (raro) indivisae, 10-12(-14) × 4-6(-8)μ, fusco brunneae, interdum ad septum leviter constrictae.

Distribution

MAC.ROBERTSON LAND:

Cape Bruce, RF & JW 4346; Mount Henderson on the southern end, RF 4207; Mount Burnett, South Masson Range, RF & JB 4524; Van Hulssen Nunatak,

RF & JW 4574, (HOLO-TYPE); North Masson Range, RF 4421.
Thallus areolate, cinereous, forming a crust on the rock. *Areole* smooth or covered with fine black wrinkles, 0·5-1·5 mm diam. *Hypothallus* indistinct. *Cortex* of vertical fastigiate hyphae, dark brown to blackish covered with an amorphous layer up to 40μ thick. *Algal cells* 12-20μ diam. *Medullary hyphae* moderately compacted, I-.

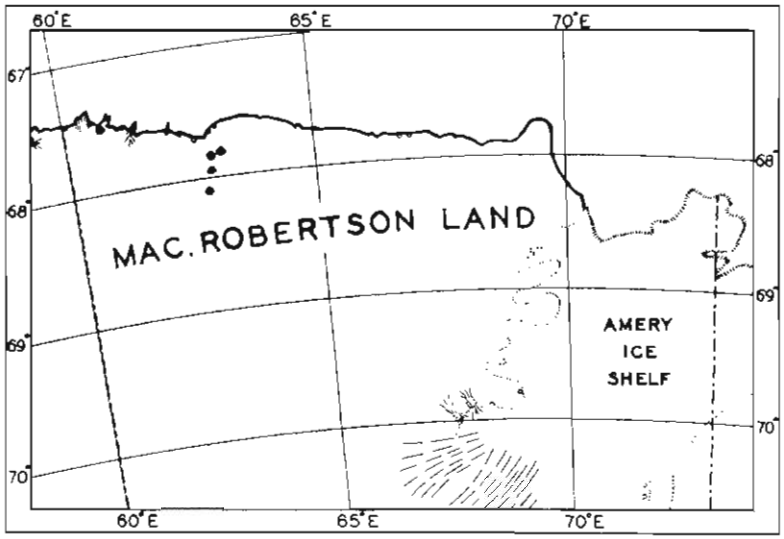


Fig. 17.—Distribution map for *Buellia foecunda*.

Apothecia black, carbonaceous, 0·3-0·7 mm diam., convex to hemispheric. *Hypothecium* hyaline. *Hymenium* 65-75μ tall. *Paraphyses* hyaline, simple or branched, 2μ thick, apical cell expanded to 5μ, dark brown to black, forming an epithecium 12μ thick. *Asci* difficult to discern, approximately 40-50 × 14-15μ. *Ascospores* 8 in ascus, uniseptate or rarely undivided, 10-12 (-14) × 4-6 (-8)μ, dark brown, occasionally slightly constricted at the septum.

Buellia foecunda internally resembles *B. frigida* Darb. except that the hypothecium is hyaline and the spores are slightly smaller; externally the thallus is greatly reduced, forming small scattered colonies of areolae which are copiously fertile. This state of fertility suggested the epithet *foecunda*.

Buellia frigida Darb.

Buellia frigida Darbishire (1910). Nat. Antarct. Exped. 5 (Lichens p. 7).
Rinodina frigida (Darb.) Dodge (1945). BANZ. Antarct. Res. Exped. Rep. 7: 259.

Thallus crustose, effigurate, up to 15 cm diam., variable, sometimes thick, sometimes very thin. Varying in colour from white to black, sometimes cream to buff in the centre with nearly always dark grey to black margin, deeply cut with cracks, the whole surface breaking up into angular areoles, marginal lobes 0·5-1·2 mm

long, 0·2-0·4 mm wide. *Cortex* 25-40μ thick of fastigiate hyphae capped by an upper cortex of greenish brown cells 5-7μ diam., and up to 12μ thick, covered by a hyaline decomposed layer 10-20μ thick. *Algal layer* 57-75μ thick, with cells 7-15μ diam. *Apothecia* black, dull, sometimes shining, sessile or subsessile, immersed, with the thallus forming a greyish margin. *Disk* flat, convex to hemispheric 0·6-0·8 mm diam. *Medulla* of loosely woven brown hyphae. *Hypothecium* 25-30μ thick faintly brownish. *Hymenium* 50-100μ tall. *Paraphyses* branched or unbranched with apical cells 5μ diam., forming a greenish brown epithecium. *Asci* clavate 12-20μ × 35-55μ. *Ascospores* 6-10μ × 8-15μ elliptical, slightly constricted or not constricted at the septum, uniseptate or rarely undivided, thin-walled, dark grey, becoming dark brown at maturity.

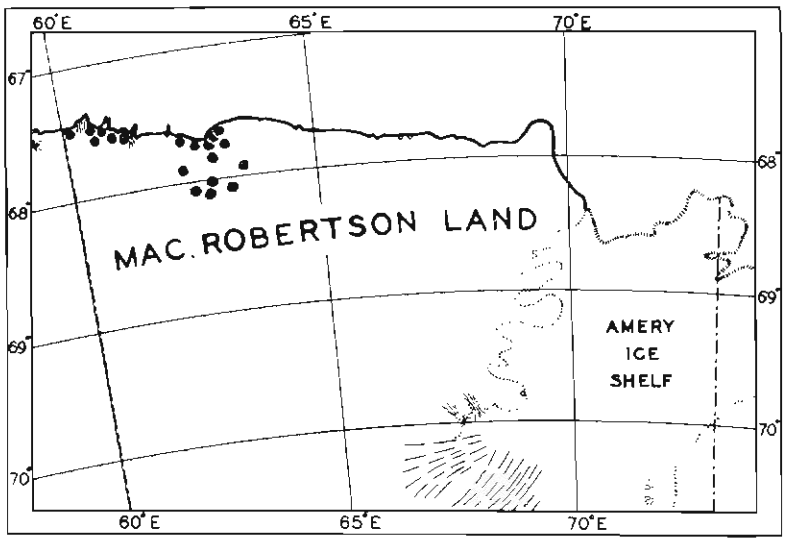


Fig. 18.—Distribution map for *Buellia frigida*.

Distribution

MAC.ROBERTSON LAND:

Field Rock, JF 4142; Mawson RF 4060; Departure Rocks group, RF 4147; Ring Rock, RF 4229; western outcrop, Forbes Glacier Tongue, RF & JW 4403; mountains north of Chapman Ridge, RF & JW 4291; outcrops east of Taylor Glacier Tongue, RF & JW 4249; Cape Bruce, RF & JW 4353; Hayes Peak, Cape Bruce, RF & RN 4368; Campbell Head, RF & JW 4302; Tilley Nunatak, RF & JW 4363; Anniversary Nunataks, RF 4555; McNair Nunatak, RF 4461; summit of Mount Henderson, JP & OB 4531; North Masson Range, RF 4093; moraine at the foot of Painted Peak, RF 4126; north peak Price Nunatak, RF 4490; 1050 m peak, South Masson Range, RF & JB 4482; Branson Nunatak, RF & JW 4473; Mount Burnett, South Masson Range, RF & JB 4521; Van Hulssen Nunatak, RF & JW 4569; rocky outcrop 16 km east of Twintop, David Range, RF 4552; Casey Range, RF & BW 4116.

Other Localities

VICTORIA LAND:

Cape Royds, D. MAWSON; Crater Cirque, Felsite Island, CROLL, FITZGERALD, HARRINGTON & MCKELLAR; Honeycomb Ridge, Tombstone Hill, Football Mountain, GEOL. SURV. PETR. COLL.

GEORGE V LAND:

Horn Bluff, A. L. MCLEAN; Cape Denison, AAE & BANZARE.

QUEEN MARY LAND:

Hippo Nunatak, C. T. HARRISSON.

BYRD LAND:

Edsel Ford Ranges, Skua Gull Peak, P. SIPLE & S. COREY; Mount Stancliff, P. SIPLE & S. COREY; Lichen Peak, P. SIPLE & S. COREY.

Buellia grimmiae R. Filson spec. nov.

B. foecundam (spec.nov.) simulans, sed ob commutationem medullae iodo, parathecium badium vel nigrum atque sporas majores recedit.

Thallus continuus, crustam per muscos formans, laevis, a rugulis tenuibus nigris in areolas divisus. *Cortex* crassitudine 10μ, sat fuliginosus. *Medulla* a hyphis badiis arte texta, I+ (intense violaceo-caerulea).

Apothecium sessile, 0·5-1·0 mm diam., primo concavum deinde planum vel leviter convexum. *Discus* niger, carbonaceus. *Margo* prominens, crenulatus, niger, fulgidus. *Hypothecium* hyalinum vel pallidissime brunneum, crassitudine 60-80μ. *Parathecium* badium vel nigrum. *Hymenium* usque ad 150μ altum. *Paraphyses* simplae vel ramos ferentes, crassitudine 2μ, ad apices usque ad 5μ expansae, cellulis 2 vel 3 extremis obscurantibus epithecium fuscum (crassitudine ad 20μ) formantibus. *Asci* 60-90 $\times$ 16-20μ, *Ascosporae* 15-25 $\times$ 10-12μ, primo griseae deinde mature badiae.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4456 (HOLO-TYPE); Tilley Nunatak, RF 4364; 1070m peak south of Trost Peak, South Masson Range, RF & JW 4510.

Thallus continuous, forming a crust over mosses, smooth, divided into areolae by fine black wrinkles. *Cortex* 10μ thick, blackish. *Medulla* of closely woven brownish hyphae, I+ intense violet-blue.

Apothecium sessile, 0.5-1.0 mm diam., at first concave becoming flat to slightly convex. *Disk* black, carbonaceous. *Margin* prominent, crenulate, black, shining. *Hypothecium* hyaline or faintly brownish 60-80μ thick. *Parathecium* brownish black. *Hymenium* up to 150μ tall. *Paraphyses* simple or branched, 2μ thick, expanded at the apices to 5μ, the last 2 or 3 cells darkening forming a dark epithecium up to 20μ thick. *Asci* 60-90 $\times$ 16-20μ. *Ascospores* 15-25 $\times$ 10-12μ, at first grey becoming brownish at maturity.

This species, when first collected, was thought to be a modification of *B. foecunda* spec.nov. growing over patches of *Grimmia lawiana* J. H. Willis, at Field Rock. In outward appearance it is similar, but differs considerably in its

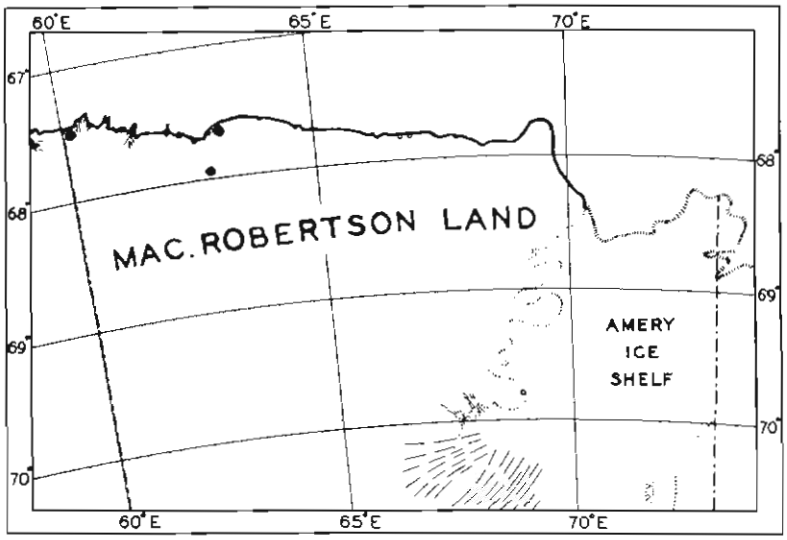


Fig. 19.—Distribution map for *Buellia grimmiae*.

chemical reaction with iodine, the brownish to black parathecium and the larger spores.

Colonies would seem to be invariably associated with the moss *Grimmia* and this habitat has suggested the specific epithet.

Buellia lignoides R. Filson spec. nov.

Externe interneque *B. moriopsem* (Mass.) Th.Fr. proxime accedit, sed ob commutationem medullae iodo intensius violaceo-caeruleam atque sporas parviores manifeste septatas distinguitur.

Thallus crustosus, in squamulis parvis (0·5-0·1 mm) consistens, albidus vel cinereus et niger. *Hypothallus* late expansus, niger, confervoideus, aperte reticulatus vel interdum plus minus continuus. *Cortex* crassitudine 15μ. *Medulla* spisse contexta, I+ (intense violaceo-caerulea).

Apothecia usque ad 0.5 mm diam., parva, subglobosa vel tenuiter complanata, immersa, aliquando areolam omnino velantia, nigra, carbonacea. *Hypothecium* ad medium crassitudinem usque ad 100μ attingens, hyalinum vel pallide brunneo-tinctum. *Hymenium* 75-100μ altum (epithecium nubilum comprehendens), crassitudine 10-15μ. *Paraphyses* crassitudine 1·5-2μ, in capita 5μ diam. expandentes. *Asci* 35-40 × 13-16μ, clavati, sporis 8. *Ascosporae* bicellulatae, 12-15 × 8-10μ, muris tenuibus, ad septum paulum constrictae, primum griseae deinde rufo-brunneae.

Distribution

MAC.ROBERTSON LAND:

Outcrops north of Chapman Ridge, RF & JW 4295; flat area to the west of Chapman Ridge, RF & JW 4275; Trost Rocks, west side of the Amery Ice Shelf,

DC 4442; Anniversary Nunataks, RF 4554; north peak, Price Nunatak, South Masson Range, RF & JB 4490; 1070 m peak, south of Trost Peak, South Masson Range, RF & JW 4508; 1050 m peak, South Masson Range, RF & JW 4480; rocky outcrop 16 km east of Mount Twintop, David Range, RF 4552 (HOLO-TYPE). *Thallus* crustose, of small squamules 0·5 mm-1·0 mm diam., varying in colour from dull white to dark grey and black. *Hypothallus* extensive, black, confervoid, openly reticulate or sometimes more or less continuous. *Cortex* 15μ thick of large dark spherical cells. *Algal cells* scattered 10-15μ diam. with a sheath. *Medulla* thickly woven, I+ intense violet-blue.

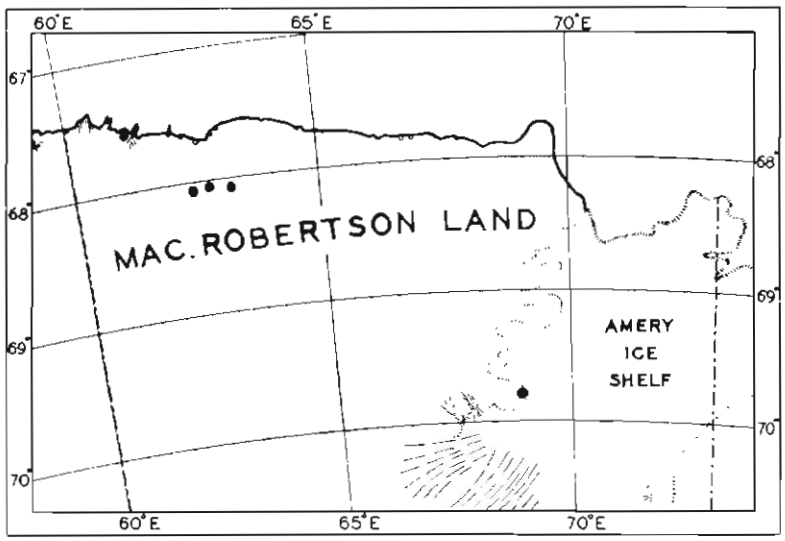


Fig. 20.—Distribution map for *Buellia lignoides*.

Apothecia up to 0.5 mm diam., small, subspherical to slightly flattened, immersed, sometimes covering the whole areole, black, carbonaceous, sometimes appearing pruinose from a layer of dead cells over the disk. *Hypothecium* up to 100μ thick in the centre, hyaline or faintly tinged with brown. *Hymenium* 75-100μ tall including the dark epithecium, 10-15μ thiek. *Paraphyses* 1.5-2μ thick expanding into heads of 5μ diam. *Asci* 35-40 × 13-16μ, clavate, with 8 spores. *Ascospores* 2-celled, 12-15 × 8-10μ, thin-walled, slightly constricted at the septum, at first grey becoming reddish brown.

The author at first considered this population to be a modification of *B. pycnogonoides* Darb. He found the former to be very variable as the hypothallus is sometimes dendritic and very thinly effused over the substratum, or sometimes much thicker and then nearly continuous, the edges then being confervoid. In all cases the overall appearance is uniform and the individual strands are identical.

The assimilated thallus is very variable, also: sometimes it is continuous and at others the areolae are scattered widely on the hypothallus. Sometimes, where found growing amongst rock crystals, the hypothallus is hardly visible, being practically covered by the assimilated areole. It is felt that small differences in colour,

size and thickness of the thallus have very little significance in the determination of material from antarctic regions.

In correspondence with the author, Dr. Ian MacKenzie Lamb, of Farlow Herbarium, Harvard University (U.S.A.), wrote that this species is definitely not *B. pycnogonoides* and that it closely resembles *B. moriopsis* Th.Fr. both externally and internally, differing in the more intense violet-blue reaction of the medulla with iodine and in the smaller, distinctly septate spores.

The invariable sooty appearance of the lichen suggested the epithet *lignoides*.

Buellia aff. ***subpedicellata*** (Hue) Darb.

?*Buellia subpedicellata* (Hue) Darbishire (1923). Brit. Antarct. ("Terra Nova") Exped. 1910 (Botany (3), Lichens, p. 62).
?*Lecidea subpedicellata* Hue (1915). Deux. Exped. Antarct. Franc. (1908-1910) Charcot (Lichens, p. 140).

Thallus areolate, pulvinate, reddish white, white to grey in old eroded specimens, sometimes with fine black hypothallus. *Areolae* up to 3 mm diam., warty, loosely attached to the substratum. *Cortex* up to 15μ thick. Amorphous layer discontinuous up to 25μ thick. *Algal cells* 10-20μ diam., with a thin sheath, forming a layer under the cortex, a layer varying in thickness, in places up to 150μ thick. *Medullary hyphae* moderately compacted, branched, septate 3-4μ diam. I + bright blue immediately on application.

Apothecia black, at first flat with a prominent margin, later becoming convex, up to 1 mm diam. *Hypothecium* dark brown to black. *Hymenium* 80-100μ tall. *Paraphyses* hyaline, branched, 3μ thick, apical cell expanded to 6μ, dark brown forming a dark epithecium. *Asci* 60-70 × 16-20μ. *Ascospores* 8, uniseptate, 16-18 × 8-10μ (and up to 25 × 8μ) dark brown, sometimes slightly constricted at the septum and sometimes reniform.

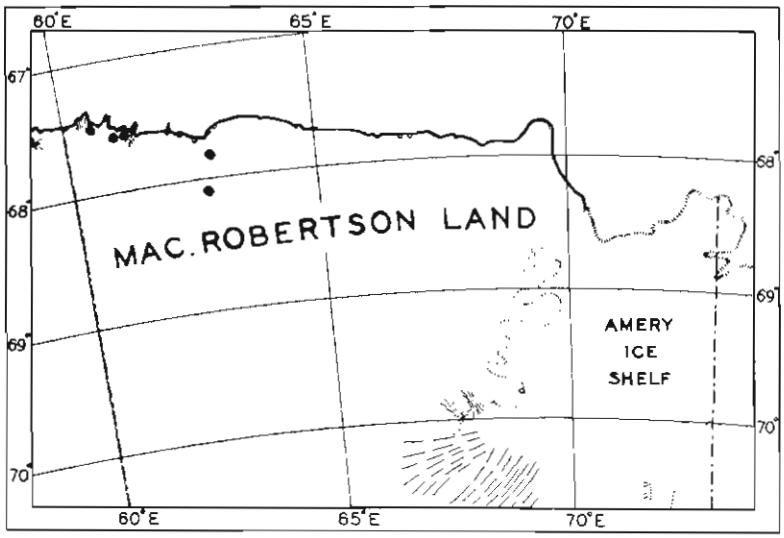


Fig. 21.—Distribution map for *Buellia* aff. *subpedicellata*.

Distribution

MAC.ROBERTSON LAND:

Flat area to the west of summit of Chapman Ridge, RF & JW 4280; Taylor Glacier, nunataks east of the tongue, RF & JW 4271; Campbell Head, RF & JW 4312; Painted Peak, North Masson Range, RF & JW 4418; Branson Nunatak, South Masson Range, RF & JW 4476.

The specimens from Mac.Robertson Land agree well with Hue's type description in every way, with the sole exception of the chemical reaction with K. and C. Hue's specimens are K+ yellow and C+ reddish orange, whereas our specimens are K— and C—. As time does not permit further investigation, the author prefers to ally this entity with *B. subpedicellata* and to express some doubt as to absolute identity.

Rinodina archaeoides H. Magn.

Rinodina archaeoides H. Magn. (1947). Medd. från Göteborgs Bot. Trädg. *17*: 278.

Thallus subsquamulose, olive brown to dark brown, with thick amorphous layer covering the outside, sometimes giving the whole plant a white gelified appearance, covering areas up to 12 cm in diam., spreading over mosses or amongst loose gravels.

Apothecia abundant, irregularly shaped by pressure, up to 1·2 mm in diam. *Margin* crenulate, concolorous with the thallus or slightly lighter. *Disk* dark brown to black. *Cortex* 25-40μ thick, continuous and of the same structure as the thallus. *Algal* cells up to 12μ diam. continuing under the hymenium. *Hypothecium* thin hyaline. *Hymenium* 80-100μ tall. *Paraphyses* thin, branched, apical cell slightly expanded. *Asci* 60-90μ × 16-20μ, clavate 8-spored. *Ascospores* 22-24μ × 9-12μ, 2-celled, dark brown.

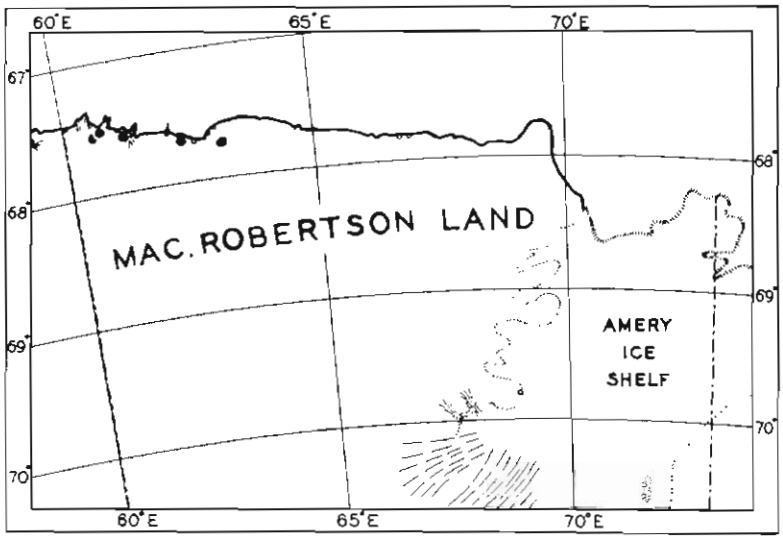


Fig. 22.—Distribution map for *Rinodina archaeoides.*

Distribution

MAC.ROBERTSON LAND:

Western outcrop, Forbes Glacier tongue, RF 4404; outcrops south of Chapman Ridge, RF & JW 4284; Cape Bruce, RF & JW 4334; Hayes Peak, Cape Bruce, RF & JW 4372; Goldsworthy Ridge, Mount Henderson, RF 4190.

This species is common in the localities mentioned above and the author at first determined it as *Rinodina olivaceobrunnea* Dodge & Baker. He has since corresponded with Dr. I. MacKenzie Lamb, of Farlow Herbarium, Harvard University (U.S.A.), who has identified it with *R. archaeoides* H. Magn., by comparison with authentic specimens from Europe in Magnusson's Herbarium. If these two species do subsequently prove to be inseparable, then the former name must take precedence.

Caloplaca elegans var. ***pulvinata*** (Dodge & Baker) Murray

Caloplaca elegans (Link.) T. Fries var. *pulvinata* (Dodge & Baker) Murray (1963). Trans. Royal Soc. NZ. *2*: 64.
Polycauliona pulvinata Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 628.
Polycauliona sparsa Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 629.
Gasparrinia Harrissoni Dodge (1948). BANZ. Antarct. Res. Exped. Rep. 7: 234.
Placodium elegans (Th. Fr.) Darbishire (1910). Nat. Antarct. Exped. *5* (Lichens 4).
Placodium murorum (D.C.) Darbishire (1910). Nat. Antarct. Exped. *5* (Lichens 4).
Caloplaca sparsa var. *latespora* Murray (1963). Trans. Royal Soc. NZ. *2*: 65.

Thallus bright orange-red to yellow-chrome in shaded portions, up to 11 cm in diam., of radiating appressed or imbricate lobes, sometimes forming clumps up to 2 cm high, lobes hollow or filled with loosely woven hyaline thin-walled hyphae. *Cortex* 25-30μ thick, heavily encrusted with yellowish crystals in the outer 10-20μ. *Algal layer* evenly distributed around the lobes varying in thickness up to 100μ. *Algal cells* spherical 8-20μ in diam. *Lower cortex* 25μ thick of subspherical cells 5-7μ in diam., the lower 5-10μ yellowish.
Apothecia up to 2 mm diam., at first concave later becoming flat or moderately convex. *Margins* smooth or slightly crenulate, concolorous with the thallus, disk deep orange-red. *Hymenium* 60-75μ tall. *Asci* 50-65μ $\times$ 14-20μ, clavate becoming long ellipsoid. *Ascospores* ellipsoid, hyaline, polaribilocular canal mostly present in mature spores, very variable in size 7-10μ x 11-16μ.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4158; Mawson RF 4067; Departure Rocks group, RF 4152; western outcrop, Forbes Glacier tongue, RF & JW 4395; Ring Rocks, RF & JB 4228; Cape Bruce, RF & JW 4332; foot of Hayes Peak, RF & RN 4369; Tilley Nunatak, RF 4358; Goldsworthy Ridge, Mount Henderson, RF 4189; summit of Mount Henderson, JP & OB 4530; Fischer Nunatak, RF 4181; North Masson Range, MH 4063; eastern moraine, North Masson Range, RF 4109; Central Masson Range, RF & KM 4432; Mount Burnett, South Masson Range, RF & JW 4520; 1070 m peak south of Trost

Peak, RF & JB 4507; 1050 m peak south of Masson Range, RF & JW 4479; Price Nunatak, RF & JW 4494; Van Hulssen Nunatak, RF & JW 4568; Casey Range, RF & BW 4113.

Other Localities

GEORGE V LAND:

Horn Bluff, A. L. MCLEAN A.A.E. 31-2. 33; Cape Denison, A.A.E. 1053.

QUEEN MARY LAND:

Possession Nunatak, C. T. HARRISSON A.A.E. 77 (type, *Gasparrinia harrissoni*).

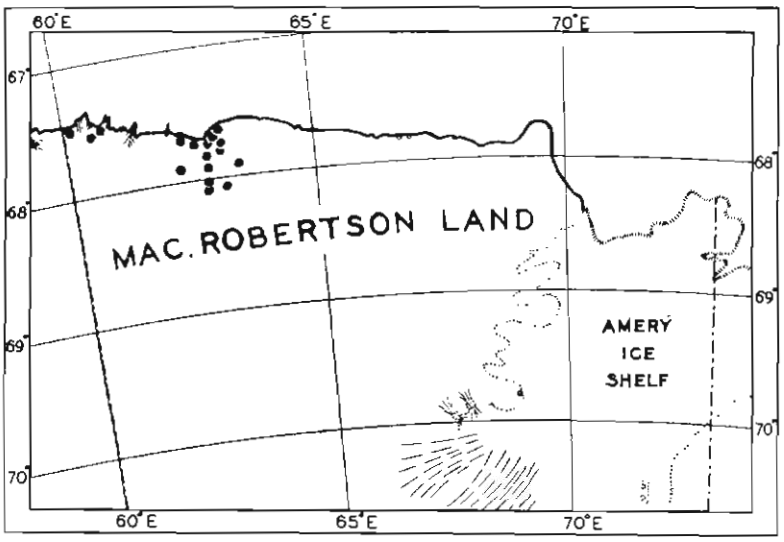


Fig. 23.—Distribution map for *Caloplaca elegans* var. *pulvinata*.

VICTORIA LAND:

Crater Cirque, 1,600 ft, CROLL, FITZGERALD, HARRINGTON & MCKELLAR; Felsite Island, 1,200 ft, CROLL, FITZGERALD; Tucker Glacier, GEOL. SURV. PETR. COLL. 21,557.

PRINCESS RAGNHILD COAST:

Summit of "Petrel Egg Nunatak", approx. 1500 m, T. VAN AUTENBOER.

This species is extremely variable in shape, size and colour. Our collections show very wide environmental differences. Those growing in exposed positions are deep orange to flame red, whilst those in the shade are yellow-ehrome to greenish; even on the sheltered underside of those growing in the open, yellow-greenish parts can be found.

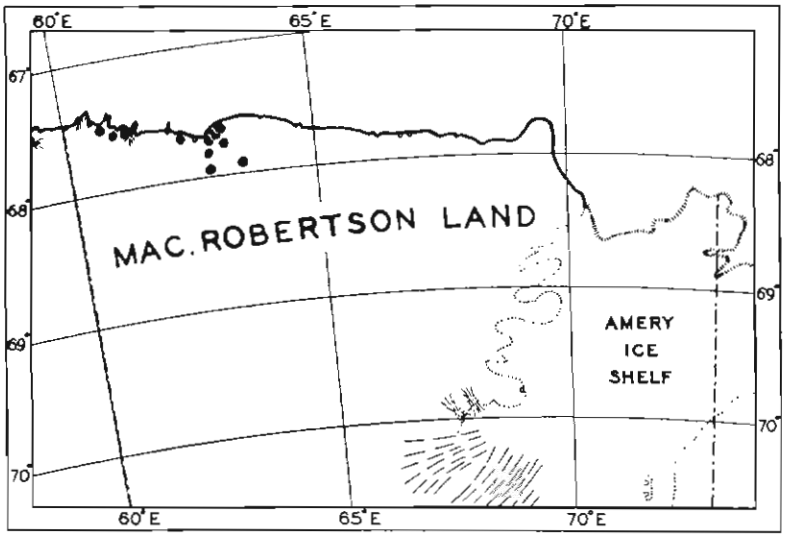
In specimens from the inland areas, where growth is very slow. the areolae are scattered and smaller; the apothecia are smaller in the overall dimensions but microscopically fall into the range of the larger apothecial structures. *Caloplaca*

sparsa (Dodge & Baker) Murray was collected on Football Mountain, which is 25 km from the coast, at an altitude of 820 m. This suggests that growth here would be slower and would indicate that it is a different species to *C. elegans* var. *pulvinata* where, in fact, it is only a modification resulting from its environment.

Protoblastenia citrina Dodge

Protoblastenia citrina Dodge (1948). BANZ. Antarct. Res. Exped. Rep. 7: 222.

Thallus granular, composed of spherical granules in clumps up to 5 mm diam., lemon-yellow to yellow-orange, granules up to 100μ diam., ecorticate, K—. *Algal cells* 8-12μ diam., scattered throughout the medulla. *Medulla* loosely packed, containing granules, K+ rose. *Apothecia* up to 0·4 mm diam. concolorous with the thallus. *Disk* convex, yellow-orange. *Margin* thin, not elevated. *Hymenium* up to 65μ tall. *Paraphyses* slender 2μ diam., simple or branched, tips slightly thickened and encrusted with yellowish crystals. *Asci* clavate sometimes inflated, 50-65μ × 12-16μ. *Ascospores* unicellular, hyaline, ellipsoidal, 18 × 6μ.



Filg. 24.—Distribution map for *Protoblastenia citrina*.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4168; Mawson, RF 4219; outcrop in the Departure Rocks group, RF 4150; Ring Rock, RF & JW 4236; outcrops south of Chapman Ridge, RF & JW 4281; outcrops north of Chapman Ridge, RF & JW 4294; Taylor Glacier, RF & JW 4247; Cape Bruce, RF & JW 4325; Campbell Head, RF & JW 4304; McNair Nunatak, RF 4465; Goldsworthy Ridge, Mount Henderson, RF 4193; North Masson Range, MH 4061; Painted Peak, North Masson Range, RF 4416; Central Masson Range, RF & JW 4430.

Other Localities

GEORGE V LAND:

Cape Denison, BANZARE.

QUEEN MARY LAND:

Alligator Island, (type); Possession Rocks; David Island; Hippo Island, C. T. HARRISSON, A.A.E.

Although the majority of specimens in our area were sterile, collections made on the outcrops to the north of Chapman Ridge were fertile, with many apothecia. The apothecia sectioned contained mature asci and ascospores. The sizes of these are much larger than specified in the type description, but the discrepancy is probably to be accounted for by the fact that the type material was sparingly fertile and contained few mature ascospores. The hymenium in our specimens is also much higher than in those described by Dodge (1948).

This species is very easily confused with granular forms of *Pyrenodesmia mawsonii* Dodge, but can easily be separated by KOH applied direct to the thallus. *Protoblastenia citrina* appears to have little or no reaction, whilst *Pyrenodesmia mawsonii* immediately colours deep crimson to purple.

Pyrenodesmia mawsonii Dodge

Pyrenodesmia mawsonii Dodge (1948). BANZ. Antarct. Res. Exped. Rep. 7: 232.

Thallus squamulose, up to 1 cm diam., growing over the tops of mosses or in pulvinate clumps on rock. *Squamules* up to 1 mm diam., florida gold to yellow-orange, smooth becoming sorediose until squamule is completely enveloped in yellow-green soredia. *Cortex* up to 35μ thick, K+ crimson. *Algal cells* up to 20μ diam., scattered throughout the medulla. *Medulla* of thin-walled hyphae 4μ diam. *Apothecia* not seen.

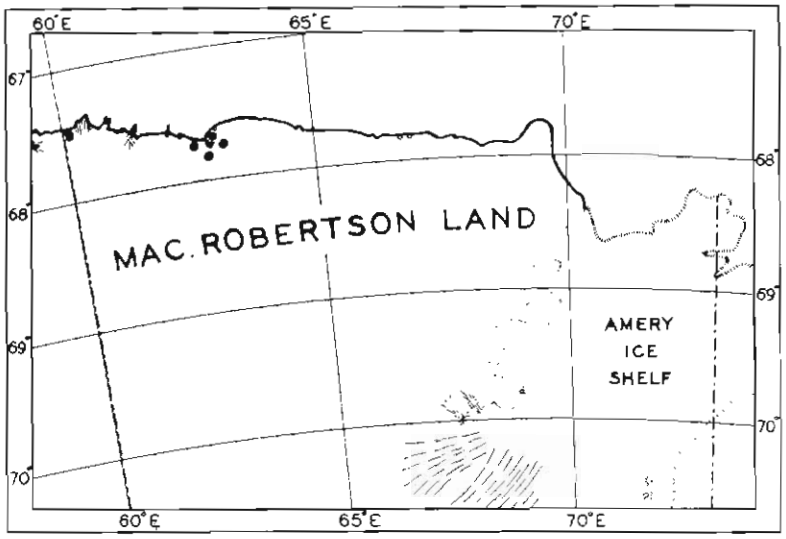


Fig. 25.—Distribution map for *Pyrenodesmia mawsonii*.

Distribution

MAC.ROBERTSON LAND:

Mawson, RF & JW 4411; outcrop in the Departure Rocks group, RF 4144; western outcrop, Forbes Glacier, RF & JW 4318; Cape Bruce, BANZARE; Tilley Nunatak, DW 4361; summit of Mount Henderson, JP & OB 4526; North Masson Range, RF 4101.

Other Localities

PRINCESS ELIZABETH LAND:

Vestfold Hills, MH 4047.

The position of this genus is not at all clear to the author. In his key, Dodge (1948) separates it from *Caloplaca* (*Gasparrinia*) by the "thallus indeterminate, usually ecorticate". *Pyrenodesmia mawsonii* has a cortex 35μ thick. The only difference in Dodge's type description of these two genera is in the cortex of *Gasparrinia*.

The author's material has been referred for the present to *Pyrenodesmia mawsonii*. In its barren and sorediose condition it certainly appears totally different from *Caloplaca elegans* var. *pulvinata*.

Heppia antarctica Dodge

Heppia antarctica Dodge (1948). BANZ. Antarct. Res. Exped. Rep. 7: 71.

"Thallus covering areas up to 2 cm in diameter, hypothallus cartridge buff in shaded areas, shading to brownish olive in exposed portions, margin smooth, determinate, fibrous, assimilative areoles 0·1-0·2 mm, subspherical and somewhat scattered near the margin, to 0·5 mm, somewhat flattened and cerebriform, densely crowded in the centre, cream buff to chamois in shaded portions, brown olive in exposed portions; Hypothallus about 100μ thick, of conglutinate dark brown, thick-walled hyphae, about 4μ in diameter in interwoven strands, agglutinate to the substrate below, the outer hyphae somewhat lighter; assimilative areoles corticate with a single layer of isodiametric cells when young (as in *Leptogium*), disappearing at maturity; algae filling the areole when young, the colonies separated by narrow plates of slender, hyaline, medullary hyphae, forming a layer about 15μ thick at the surface, of hyaline, thin-walled, more or less isodiametric cells; colonies variable in size and shape, evidently *Stigonema*, but filaments short in the larger colonies, with only a few cells in the smaller colonies; filaments about 15μ in diameter, cells of varying length in the older portions, much smaller in the rapidly growing younger portions.

"Apothecia immersed in the assimilative areoles, disc concolorous (the single fertile areole looks like a convex biatorine apothecium) amphithecium and parathecium not differentiated; hypothecium scarcely differentiated, of hyaline, subvertical hyphae, continuous with the medullary hyphae, resting on algal colonies; thecium about 35μ tall; paraphyses slender, closely septate, about twice dichotomous above the asci, branches submoniliform, imbedded in the thecal gel; asci clavate, tips slightly thickened and protoplasts mammillate when young, about 30 $\times$ 8μ, 8-spored; ascospores hyaline, long ellipsoidal, about 8 $\times$ 3μ."

The above description is quoted verbatim from Dodge (1948). A common

lichen at Field Rock and Mawson, though sterile, agrees well with the thallus description of *Heppia antarctica*.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF & JW 4167; Mawson, RF 4412; Cape Bruce, BANZARE B 108-2, B 108-3 (TYPE).

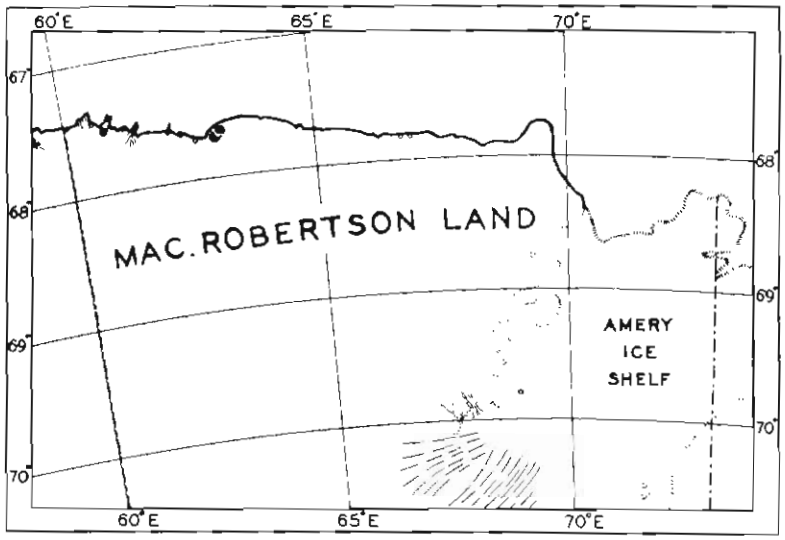


Fig. 26.—Distribution map for *Heppia antarctica*.

Other localities

GEORGE V LAND:

Cape Denison, AAE & BANZARE.

Lecanora expectans Darb.

Lecanora expectans Darbishire (1910). Nat. Antarct. Exped. *5* (Lichens 5). *Lecanora griseomarginata* Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 572.

Thallus formed of small granules run together into rugose chunky areoles, in areas up to 5 mm diam., greyish white, cinereous, ecorticate. *Algae* up to 25μ diam. densely packed and forming a layer below the apothecia. *Apothecia* up to 1·2 mm diam., round to irregular, pruinose, disk reddish brown to black. *Margin* concolorous with the thallus, crenulate, pruinose, inrolled at first, expanding but remaining elevated well above the disk. *Cortex* continuous with the thallus, up to 30μ thick. *Hymenium* 50-65μ tall including the brownish epithecium. *Paraphyses* straight, septate, simple, apical cell slightly expanded and covered by a large, dark, gelatinous sheath 7μ diam., and 10μ long. *Ascus* 30-60μ $\times$ 12-16μ clavate, 8-spored. *Ascospores* 12-17μ $\times$ 5-7μ ellipsoid, slightly reniform, hyaline.

Distribution

MAC.ROBERTSON LAND:

Mawson, IL 4198; mountains north of Chapman Ridge, RF & JW 4297; Campbell Head, RF & JW 4315; Painted Peak. North Masson Range, RF 4422; Central Masson Range, RF & JW 4439b; rocky outcrop 16 km east of Mount Twintop, David Range, RF & JW 4551a.

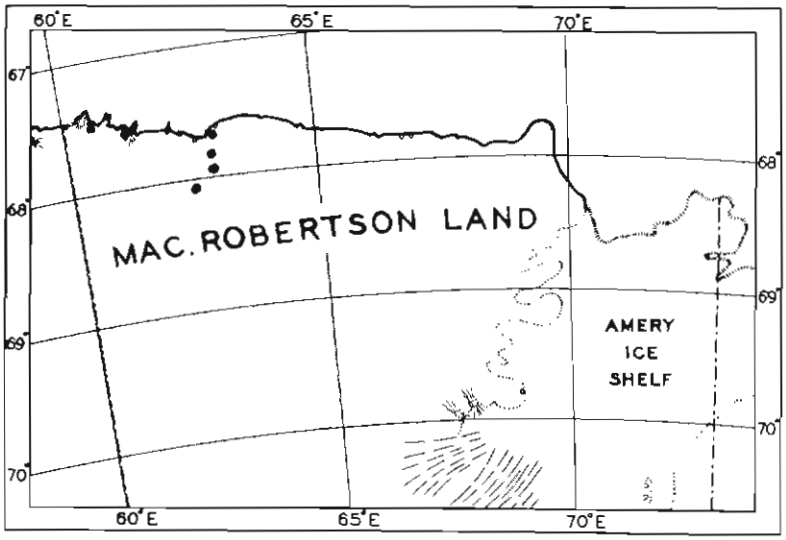


Fig. 27.—Distribution map for *Lecanora expectans*.

Other localities

BYRD LAND:

Edsel Ford Range, Mt. Donald Woodward, P. SIPLE, F. A. WADE, S. COREY, O.D. STANCLIFF, DW.I (type *L. griseomarginata*) D.W. 3; Skua Gull Peak, Lichen Island, P. SIPLE & S. COREY 72W, 73-3 etc.

VICTORIA LAND:

Crater Cirque, CROLL, FITZGERALD, HARRINGTON & MCKELLAR—WELT 60; Felsite Island, CROLL & FITZGERALD—WELT 55; Winter ("Harbour") Quarters Bay, DISCOVERY (TYPE).

This species has been found to be variable in form and thickness. In the key to *Lecanora,* Dodge (1938) separates *L. griseomarginata* from *L. expectans* by "Thallus white thin, tartareous, to obsolete", in *L. expectans,* as against "Thallus grey, granular rugose" and (in the text) "quite inconspicuous". Darbishire (1910), in his original description, says that the thallus can be white or cinereous. The apothecial colour and measurements agree favourably in both descriptions. The author has examined material from Cape Hallet area, determined as *L. expectans* by the late Dr. J. Murray, University of Otago, New Zealand, and finds that these specimens agree in all details with material in the National Herbarium, Melbourne, determined by Dr. C. W. Dodge as *L. griseomarginata.*

Lecanora rubina var. ***melanophthalma*** f. ***exulans*** (Th. Fr.) Zahl.

Lecanora rubina Ach. var. *melanophthalma* (Ram.) Zahlbr. f. *exulans* (Th.Fr.) Zahlbruckner (1928). Cat. Lichen. Univ. *5*: 660.

Squamaria chrysoleuca (Sm.) Ach. var. *melanophthalma* (Ram) Th.Fr.f. *exulans* Th.Fr. (1902). Nytt Mag. Naturvidensk. *40*: 208.

Lecanora exulans (Th.Fr.) Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 570.

Lecanora exulans (Th.Fr.) Dodge f. *minor* Dodge (1948). BANZ. Antarct. Res. Exped. Rep. *7*: 172.

Thallus composed of more or less round-lobed irregular and elongated, frequently imbricated squamules, 0·3-0·6 mm × 0 2-0 5 mm, covering areas up to 6 cm in diam., variable, light ochraceous bluff to greenish grey, practically concealed by developing apothecia. *Cortex* 25-30μ thick. *Algal layer* up to 200μ thick, cells 6-10μ diam. *Apothecia* 0.5-4 mm diam., ochraceous bluff, nickel green to greenish black, concave, the margin light ochraceous bluff to greenish grey, concolorous with the thallus, smooth, crenulate and irregular, becoming folded into cerebriform masses. *Hymenium* 75-100μ tall. *Algal colonies* well developed, sometimes forming a continuous layer below the parathecium. *Paraphyses* simple or rarely branched. *Asci* clavate 60-75μ × 10-17μ. *Ascospores* ellipsoid, hyaline 12-15μ × 4-6μ; sometimes there is the appearance of a single septum, but this is possibly due to refraction, as it is not noticeable in every spore.

MAC.ROBERTSON LAND:

Field Rock, RF 4166; Mawson, RF 4217; outcrop in the Departure Rocks group, RF 4147; Ring Rock, RF & JW 4248; outcrops north of Chapman Ridge, RF & JW 4301; Cape Bruce, RF & JW 4350; foot Hayes Peak, RF & RN 4376; Campbell Head, RF & JW 4305; Tilley Nunatak, RF & JW 4362; Church Mountain, DC 4240; Anniversary Nunataks, RF 4560; Depot Peak, PT 4453; Goldsworthy Ridge, Mount

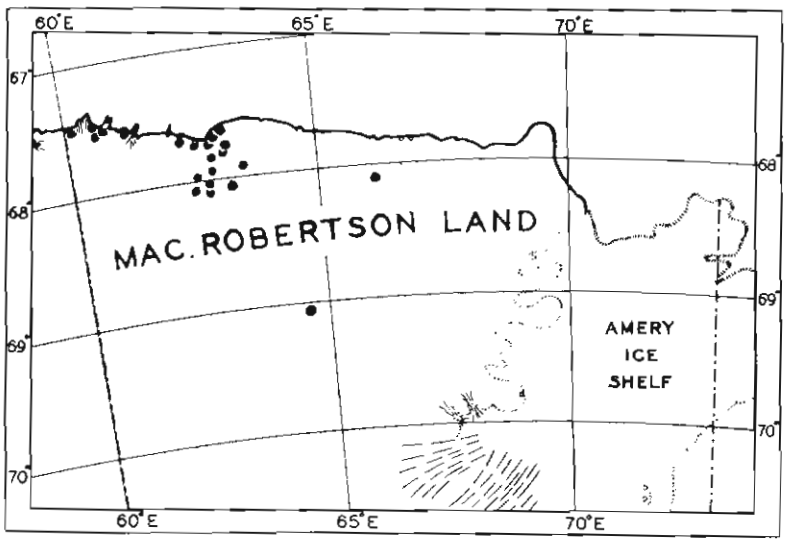


Fig. 28.—Distribution map for *Lecanora rubina* var. *melanophthalma* f. *exulans*.

Henderson, RF 4188; summit of Mount Henderson, JP & OB 4527; Fischer Nunatak, RF 4178; McNair Nunatak, RF 4464; Painted Peak, North Masson Range, JW 4134; eastern moraine North Masson Range, RF 4111; Central Masson Range, RF 4433; Mount Burnett, RF & JW 4519; 1050 m peak, South Masson Range, RF & JB 4420; 1070 m peak, south of Trost Peak, South Masson Range, RF & JB 4511; Branson Nunatak, RF & JB 4468; north peak of Price Nunatak, RF & JW 4489; Van Hulssen Nunatak, RF & JW 4575; outcrop and moraine 5 km north-east of Mount Twintop, David Range, RF & JW 4536; rocky outcrop 16 km east of Mount Twintop, RF & DC 4549.

Other localities

VICTORIA LAND:

Crater Cirque, CROLL, FITZGERALD, HARRINGTON & MCKELLAR—WELT 77; Survey Point II, CROLL—WELT 112; Tombstone Hill, CROLL & FITZGERALD—WELT 142.

GEORGE V LAND:

Horn Bluff, A. L. MCLEAN AAE. 13; Cape Denison, AAE. 23; BANZARE 536-1, 536-6.

PRINCESS RAGNHILD COAST:

"Petrel Egg Nunatak," T. VAN AUTENBOER, Ia, Ib, If, I.

This lichen is abundant in our area and the individual thalli differ greatly in size and colour. At times the thallus is almost absent and completely covered by large apothecia appressed together. The apothecia also vary in size and colour, with perhaps three distinct colour combinations being found in the same colony. They are mostly dull but specimens found growing on *Bryum antarcticum* were vernicose. Although the specimens examined varied greatly macroscopically, microscopically they were identical.

Lecidea capsulata Dodge & Baker

Lecidea capsulata. Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 533.

Thallus in scattered areoles or irregularly continuous, covering areas up to 2 cm diam., white to buff. *Upper cortex* is of isodiametric light brown cells up to 5μ diam., not continuous, covered by a layer of hyaline decomposed tissue up to 30μ thick. *Algal layer*, up to 75μ thick, of cells 10-15μ diam. *Medulla* of hyphae 3μ diam., moderately packed. *Lower cortex* not differentiated. *Apothecia* up to 0·3 mm diam., irregularly circular, flat or concave, black shining, margin prominently crenulate. *Parathecium* highly developed, up to 100μ thick, of large, dark, thick-walled cells continuing to the margin, forming a cortex of black vertical hyphae 5μ diam. *Hypothecium* up to 30μ thick, thinning towards the margin, of dark brownish subvertical hyphae. *Hymenium* 60μ tall, slightly blue-greenish turning bright green in KOH. *Paraphyses* 1·5μ diam., branched, slightly thickened at tips. *Asci* 40 $\times$ 15μ broadly clavate. *Ascospores* 13 $\times$ 5μ hyaline ellipsoid with a conspicuous sheath.

Distribution

MAC.ROBERTSON LAND:

Mount Henderson, RF 4209; north peak, Price Nunatak, RF 4496; Anniversary Nunataks, RF 4556; outcrops and moraine 5 km north-east of Mount Twintop, RF 4539; Trost Rocks, DC 4447; Branson Nunatak, RF & JB 4474.

Other localities

BYRD LAND:

Edsel Ford Range, Mt. Donald Woodward, P. SIPLE, F. A. WADE, S. COREY & O. D. STANCLIFF, DW. 3, DW. 5; Mt. Stancliff, P. SIPLE & S. COREY 72A1, 72A2 (TYPE); Lichen Peak, P. SIPLE & S. COREY 73-10; Chester Mountains, P. SIPLE & S. COREY 97A3; Mt. Rea Cooper, P. SIPLE, F. A. WADE, S. COREY & O. D. STANCLIFF R.7.

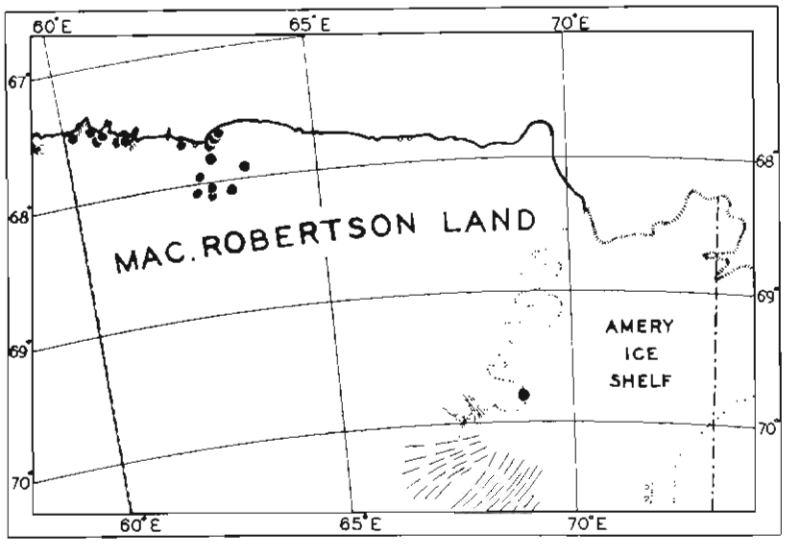


Fig. 29.—Distribution map for *Lecidea capsulata.*

Lecidea phillipsiana R. Filson spec. nov.

> Species nova ab aliis speciebus Antarcticis *Lecideae,* sectionis hypothecium brunneum habentis, differt sic: thallo plane formato (quandocumque in rupibus crescit), hymenio viridi-diaphano atque ascosporis majoribus.

Thallus granulosus, fusco-brunneus, interdum pruinosus, deinde griseoalbidus (specimina vetusta areolata erosaque apparentia). *Cortex superus* 10-12μ (-40μ) crassitudine, eius cellulae brunneo-grisseae hyphas medullae terminantes, intertexti hyalini marcidi strato externo 10-20μ crassit. (passim usque ad 80μ) praeditus. *Stratum gonidiale* 60-100μ crassit., eius cellulae 10-15μ diam. *Medulla* ex hyphis (1-2μ diam.) arcte textis formata. *Cortex inferus* griseicans, 15μ crassit., ex hyphis (usque ad 5μ diam.) ramificatis septatis consistens. *Apothecia* nigra carbonacea, usque ad 1·5 mm diam., ad basin constricta ob emersum extremitatum tumidarum paraphysium punctata apparentia. *Hypothecium* 75μ crassitudine, ex cellulis fusco-brunneis 2-2·5μ diam. consistens, in medullam irregulariter extendens. *Hymenium* 60-100μ altitudine, viridi-diaphanum. *Paraphyses* 2μ diam., ramificati vel simplices, muris crassis, septati, in capitula (usque ad 6μ diam., a fragmentis carbonaceis incrustata) expandentes. *Asci* clavati, 40 $\times$ 10μ, octospori. *Ascosporae* 12-12·5μ $\times$ 2-3μ, hyalinae, extremitate una interdum cuspidata.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4159; Mawson, Departure Rocks, RF 4151; Ring Rocks, RF 4234; Taylor Glacier, RF & JW 4252; mountains north of Chapman Ridge, RF & JW 4296; RF & JW 4300 (HOLO-TYPE); Cape Bruce, RF & JW 4339; foot of Hayes Peak, RF & RN 4374; summit of Hayes Peak, RF & RN 4380; Campbell Head, RF & JW 4308; Tilley Nunatak, RF 4365; McNair Nunatak, RF 4460; moraine foot of North Masson Range, RF 4127; North Masson Range, BW 4089; Painted Peak, RF 4423; Anniversary Nunataks, RF 4553; Mount Coates, David Range, RF & JF 4103; Mount Burnett, RF & JB 4522; Price Nunatak, RF & JW 4497; Van Hulssen Nunatak, RF & JW 4570; Trost Rocks, DC 4441; rocky outcrop and moraine 16 km east of Mount Twintop, David Range, RF & JW 4551b.

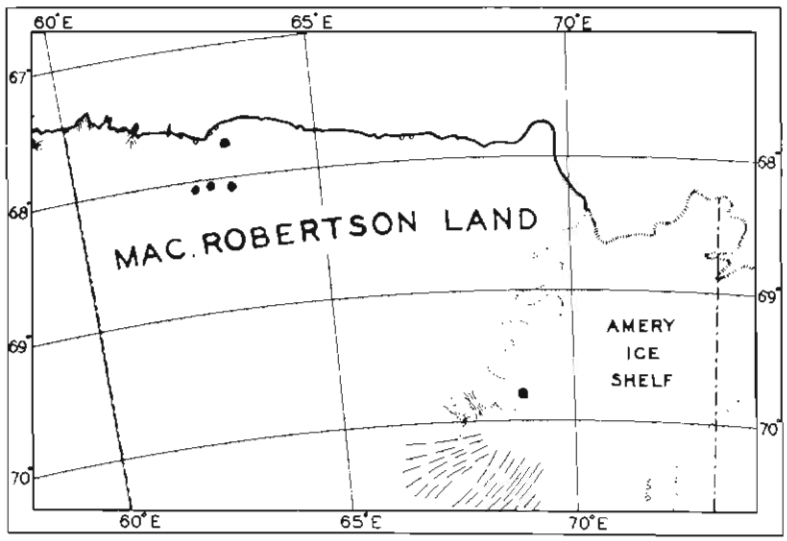


Fig. 30.—Distribution map for *Lecidea phillipsiana*.

Thallus granulose, drab brown, sometimes pruinose, becoming greyish white, irregularly areolate when eroded by weathering. Often developing below the surface crystals, so that the apothecia appear to fill the cracks. *Upper cortex* 10-12μ (-40μ) thick, of brownish grey cells which terminate the hyphae of the medulla, with a covering layer of hyaline decomposed tissue 10-20μ thick and up to 80μ in places. *Algal layer* 60-100μ thick, cells 10-15μ diam. *Medulla* of closely woven hyphae 1-2μ diam. *Lower cortex* greyish, 15μ thick, of branched septate hyphae, a continuation of the medulla but thickening to 5μ diam. *Apothecia* black carbonaceous, up to 1·5 mm diam., constricted at the base, appearing dotted by the emergence of the swollen ends of the paraphyses. *Hypothecium,* 75μ thiek, of dark brown cells 2-2·5μ diam. extending irregularly into the medulla. *Hymenium* 60-100μ tall, green-diaphanous. *Paraphyses* 2μ diam., branched or unbranched, thick-walled, septate, expanding into heads up to 6μ diam., which are encrusted with carbona-

ceous fragments. *Asci* 40 × 10μ, 8-spored, slender clavate. *Ascospores* 12-12·5μ × 2-3μ, hyaline, one end sometimes pointed.

Dr. C. W. Dodge, in "Lichens and Lichen Parasites" (1948), expressed uncertainty in assigning lichens in the Cape Bruce collections to *Lecidea cancriformis*. He noted that the thallus was better developed, with some verrucae as large as the smaller apothecia, and that they had a brownish tinge. He said that the species seems to be abundant, but he had been unable to find mature asci and ascospores.

Amongst the collections made by the 1962 party were many specimens referable to this species. Most of these were very well developed and sections show mature asci and ascospores.

In *L. cancriformis* the thallus is described as 'greyish white, usually in long strands, small and inconspicuous' whereas in *L. phillipsiana* the thallus is thick, drab brown and mostly well developed.

The apothecial measurements differ to some extent, the hymenium of *L. cancriformis* is described as hyaline, giving a greenish tint with the application of KOH. The hymenium of *L. phillipsiana* is distinctly greenish and has no colour reaction with KOH. The paraphyses in our specimens are 1·5μ diam. expanding into heads 6·0μ diam., as against 1·5μ expanding into heads 3·0-4·0μ diam. The ascospores are much larger, 12·0-12·5μ × 2·0-3·0μ as against 6·5-7·5μ × 1·7-2·5μ in *L. cancriformis*.

The author has much pleasure in naming this lichen after John Phillips, cosmic ray physicist, Mawson, 1962, who assisted in the large collecting programme.

Lecidea woodberryi R. Filson spec. nov.

Species nova ab aliis speciebus Antarcticis Lecideae, sectionis hypothecium hyalinum habentis, differt sic: thallo margine effigurato, hymenio alto atque epithecio percrasso.

Thallus continuus usque ad 3 cm diametro, effiguratus, tenuis, pallide flavidus vel flavido-virescens. Stratum gonidiale usque ad 100μ crassitudine, eius cellulae 9-17μ diam. vagina praeditae. *Apothecia* 0·6-1·2 mm diam., sessilia, a spissatione thalli interdum stipitata esse videtur. *Excipulum* 10-15μ crassum, ex cellulis tenebrosis fastigiatis consistens. *Hypothecium* hyalinum, ad centrum usque 100μ crassitudine, margines versus tenuatum. *Hymenium* 100μ altitudine, hyalinum. *Paraphyses* septati, super ascum ramosi, 1·5-2·0μ diam., eorum cellula apicalis a vagina (6μ diam.) crassa tenebrosa circumsepta. *Epithecium* usque ad 30μ crassum. *Asci* late clavati, 60 × 16μ, octospori. *Ascosporae* 8-11μ × 4-7μ, hyalinae, unicellulares.

Distribution

MAC.ROBERTSON LAND:

Taylor Glacier, on nunataks east of the tongue, RF & JW 4268, HOLO- & PARATYPE IN MEL; north end of Mount Henderson, RF 4186; Casey Range, RF & BW 4114; Mawson, *sine collect.*

Thallus effigurate, thin, creamy yellow to greenish yellow, up to 3 cm diam.,

continuous; broken up into areolae 0·2 mm-0·4 mm diam., waxy. *Cortex* represented by one or two grey cells terminating the medullary hyphae. *Algal layer* up to 100μ thick; cells 9-17μ diam. with a sheath. *Medulla* difficult to interpret, owing to heavy encrustations of yellowish crystals.

Apothecia 0·6-1·2 mm diam., at first flat with margin becoming convex finally disappearing, black, carbonaceous, sometimes appearing stipitate by the thickening of the thallus below; exciple 10-15μ of dark fastigiate cells. *Hypothecium* hyaline, up to 100μ thick in the centre thinning towards the edges. *Hymenium* 100μ tall, hyaline. *Paraphyses* septate, branched many times above the ascus, 1·5-2μ diam., apical cell surrounded by thick dark sheath 6μ diam., these forming dark epithecium up to 30μ thick. *Asci* broadly clavate 60 × 16μ, 8-spored. *Ascospores* 8-11μ × 4-7μ hyaline, unicellular, broadly ellipsoid to ovoid.

The author is pleased to bestow on this lichen the name of its first collector, Barry Woodberry, who was radio physicist at Mawson, 1962.

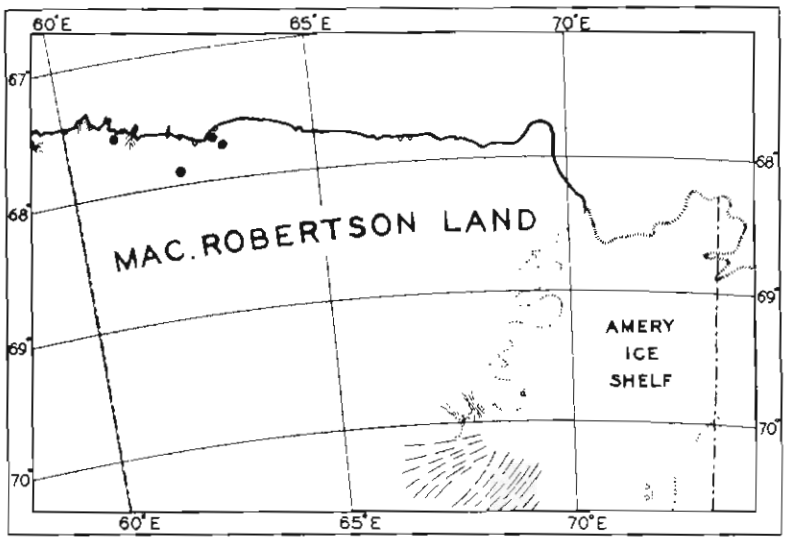


Fig. 31.—Distribution map for *Lecidea woodberryi*.

Rhizocarpon flavum Dodge & Baker

Rhizocarpon flavum Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 552 (pl. 43).

Thallus thin to moderately thick, sometimes of scattered areoles, sometimes continuous, on a thin black hypothallus. *Areoles* greenish yellow to bright yellow, smooth to minutely rugulose, sometimes pruinose, ecorticate, the outer 25-35μ being composed of medullary hyphae almost vertical. *Algal cells* 10-15μ diam., scattered evenly throughout the areole. *Medulla* I+ purple, of closely woven hyphae 5μ thick. *Apothecia* immersed, black, dull, sometimes appearing slightly pruinose by covering layer of dead cells, up to 0·6 mm diam., flat to convex,

margin varying in thickness. *Hypothecium* not clearly differentiated. *Hymenium* 150-200μ tall, K+ red. *Paraphyses* 2μ diam., branched, tips slightly thickened. Asci 50-70μ $\times$ 22-24μ. *Ascospores* ellipsoid, at first uniseptate, becoming triseptate and finally muriform 26-35μ $\times$ 12-15μ, light grey at first, becoming dark brown at maturity.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4165; Mawson, RF 4413; flat area to west of summit Chapman Ridge, RF & JW 4276; Cape Bruce, RF & JW 4341; foot of Hayes Peak, Cape Bruce, RF & RN 4370; Trost Rocks, MS 4446; Central Masson Range, RF & JW 4424; peak 1070 m south of Trost Peak, South Masson Range, RF & JB 4506; 1050 m peak, South Masson Range, RF & JW 4478; Van Hulssen Nunatak, RF & JW 4572; Fischer Nunatak, RF 4203; Painted Peak, RF & JW 4415a.

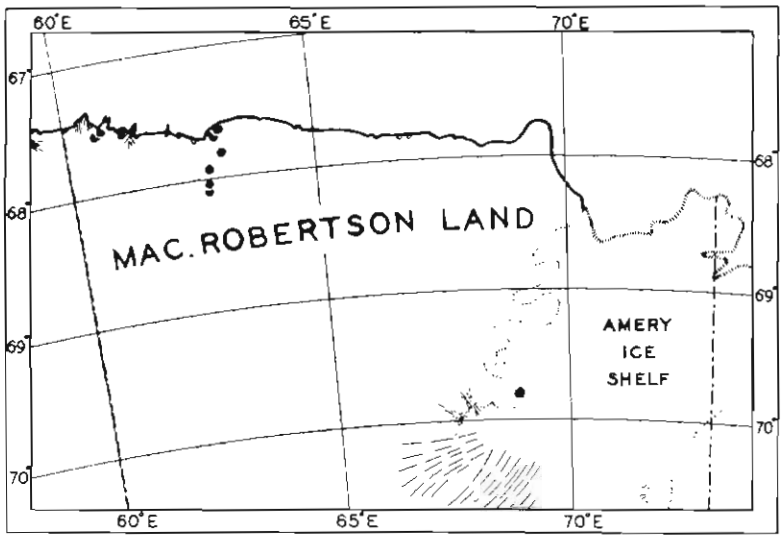


Fig. 32.—Distribution map for *Rhizocarpon flavum*.

Other localities

MARIE BYRD LAND:

Edsel Ford Range, Mount McDonald Woodward, P. SIPLE, F. A. WADE, S. COREY & O. D. STANCLIFF; Lichen Peak, P. SIPLE & S. COREY; Mount Stancliff, P. SIPLE & S. COREY (TYPE).

Rhizocarpon flavum Dodge & Baker f. ***subfoliosum*** R. Filson forma nov.

A forma typica recedit areolis magnis (usque ad 3 mm latis atque 5 mm altis) erectis subfoliosisque.

Areolae large up to 3 mm wide and 5 mm tall, erect and subfoliose.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4165a; Mawson, RF 4413a; flat area to west of Summit Chapman Ridge, Taylor Glacier, RF & JW 4276a; Cape Bruce, RF & JW 4341a (TYPE); Van Hulssen Nunatak, RF & JW 4572a.

In all localities the form *subfoliosum* was found growing with the species.

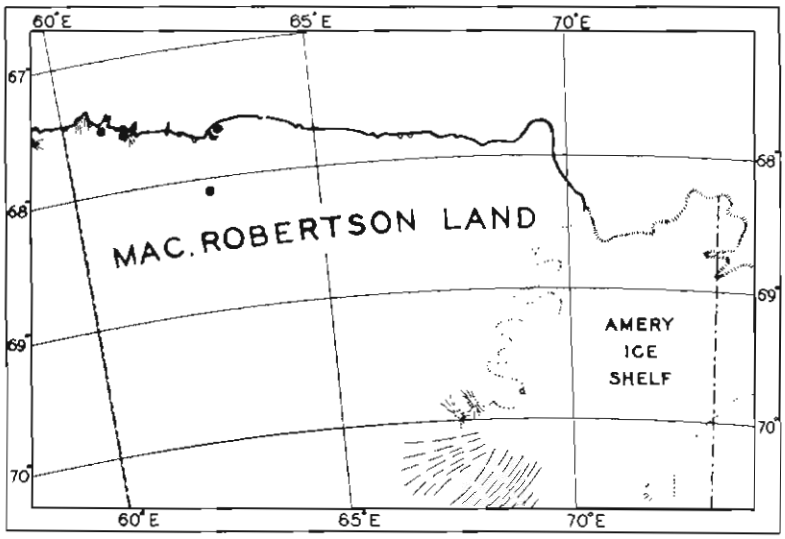


Fig. 33.—Distribution map for *Rhizocarpon flavum* f. *subfoliosum*.

Parmelia coreyi Dodge & Baker

Parmelia coreyi Dodge & Baker (1938). Ann. Miss. Bot. Gard. 25: 595.

Thallus of narrow, branching, imbricate lobes 140-260μ thick and 0·5-3 mm broad, smooth becoming verrucose, light grey to grey; *older portion* heavily sorediose and becoming dark grey; *underside* buff, darkening to nearly black with scattered tufts of branched rhizinae, varying in colour from light buff to dark brownish. *Cortex* 15-20μ (-70μ) thick. *Algal layer* 50-80μ thick, extending to top of cortex in places and occasionally odd cells embedded in the medulla. *Algal cells* up to 20μ diam. *Medulla* up to 125μ thick of hyphae not too tigbtly packed, hyaline to brownish. *Lower cortex,* 25-60μ thick, of compactly woven thick-walled hyphae, hyaline with the outer 10μ darkening, rhizinae outgrowing from these hyphae. *Rhizinae* formed of compactly woven, thick, dark-walled hyphae 50-100μ diam., cells elongate 7-15μ $\times$ 4μ. *Apothecia* not seen.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4172; Mawson, RF 4078; Departure Rocks group, RF 4156; Ring Rocks, RF & JW 4233; western outcrop, Forbes Glacier tongue, RF & JW 4392;

Eastern Nunataks, Taylor Glacier, RF & JW 4251; mountains north of Chapman Ridge, RF & JW 4287; Cape Bruce, RF & JW 4324; foot Hayes Peak, RF & RN 4376; Campbell Head, RF & JW 4313; Goldsworthy Ridge, Mount Henderson, RF 4195; North Masson Range, MH 4064; Central Masson Range, RF & JW 4439a; Casey Range, RF & IL 4112.

Other localities

BYRD LAND:

Edsel Ford Range, Lichen Peak, P. SIPLE & S. COREY 73-1; Skua Gull Peak, P. SIPLE & S. COREY 72W-2, 72W3, (TYPE) ETC.

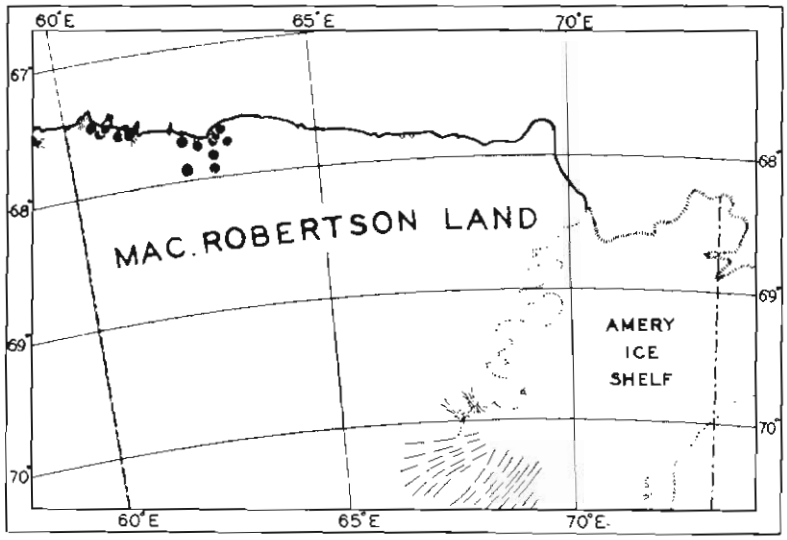


Fig. 34.—Distribution map for *Parmelia coreyi*.

SOUTH VICTORIA LAND:

Crater Cirque, CROLL, FITZGERALD, HARRINGTON & MCKELLAR—WELT 60 ETC.

Here, again, there is some confusion, three *Parmelia* spp. being recorded for Mac.Robertson Land: *Parmelia johnstoni* Dodge, *P. leucoblephara* Dodge & Baker and *P. variolosa* Dodge & Baker.

P. variolosa is recorded for Cape Bruce, yet members of our party who spent two days in this area did not locate any specimens of it. It is described by Dodge as "up to 2 cm in diam., 0·6-0·8 mm broad, dichotomously branched, smooth pruinose, primuline yellow rarely greying".

Numerous specimens were collected in our area and at first determined as *P. johnstoni*. Subsequently the author has examined material collected from Cape Hallett and referred by the late Dr. James Murray to *P. coreyi*. Going back over our specimens the author found that they agree microscopically with the Cape Hallett collections and broadly fit into the descriptions of both *P. leucoblephora* and *P. johnstoni*. As the type material of *P. leucoblephara* is sterile, and the

apothecial measurements for *P. johnstoni* are based on an old eroded apothecium, it is felt that these two species may eventually prove to be conspecific with *P. coreyi*.

Xanthoria mawsonii Dodge

Xanthoria mawsonii Dodge (1948). BANZ Antarct. Res. Exped. Rep. 7: 236.

Thallus in pulvinate tufts up to 2 cm diam. and up to 1 cm tall, lobes irregularly palmate, 0·1 mm-1·0 mm wide and up to 2 mm long, florida gold in exposed portions, greenish buff in sheltered positions, attached to the substratum by small holdfasts, with or without rhizinae. *Upper cortex* up to 20μ thick, outer 8μ heavily encrusted with yellowish brown crystals. K+ purple. *Algal layer* discontinuous, of cells up to 25μ diam., scattered or in small colonies throughout the medulla. *Medulla* of loosely-woven branched and anastomosing hyphae. *Lower cortex* similar in thickness and structure to the upper cortex. *Apothecia* not seen.

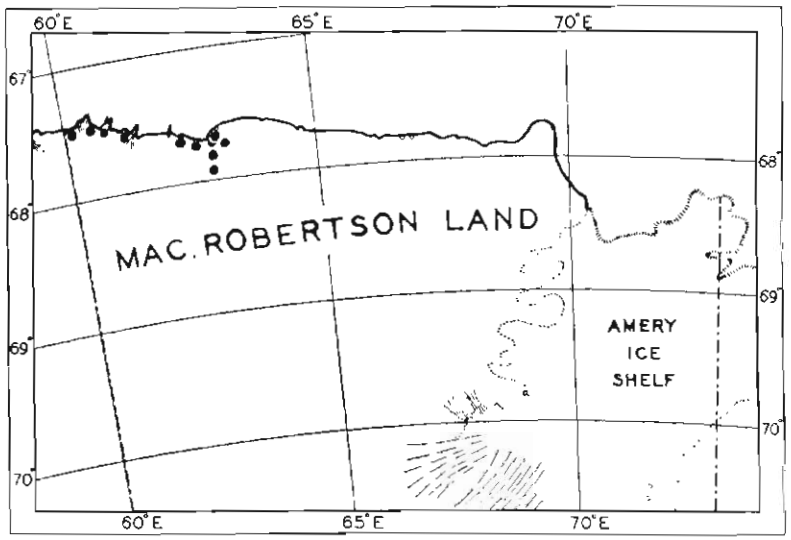


Fig. 35.—Distribution map for *Xanthoria mawsonii*.

Distribution

MAC.ROBERTSON LAND:

Mawson, RF 4070; Departure Rocks group, RF 4150; western outcrop, Forbes Glacier Tongue, RF & JW 4394; Ring Rocks group, RF & JB 4226; outcrops north of Chapman Ridge, RF & JW 4289; Campbell Head, RF & JW 4306; Tilley Nunatak, DW 4361; Goldsworthy Ridge, Mount Henderson, RF 4183; North Masson Range, RF 4094; Central Masson Range, RF & KM 4434; Cape Bruce, BANZARE.

Other localities

KING GEORGE V. LAND:

Cape Denison, BANZARE.

QUEEN MARY LAND:

Hippo Island, David Island, Alligator Island, C. T. HARRISSON.

PRINCESS RAGNHILD COAST:

Petrel Egg Nunatak, T. VAN AUTENBOER.

The specimens in our area agree well with Dodge's description of *Xanthoria mawsonii* and microscopically agree with specimens from Cape Hallett determined by Murray as *Xanthoria candelaria* Kickx. f. *antarctica* (Wainio) Hillm. Macroscopically the Cape Hallett specimens are deeper red and appear to have a rimose surface. As the author did not have access to the description of *X. candelaria* f. *antarctica*, he has referred our material to *X. mawsonii* although feeling sure that this will prove to be only a modification of the former.

Omphalodiscus antarcticus (Frey & Lamb) Llano

Omphalodiscus antarcticus (Frey & Lamb) Llano (1950). Mon. Umb. Westn. Hemis. 77.

Umbilicaria antarctica Frey & Lamb (1939). Trans. Brit. Mycol. Soc. 22: 270-271. (pl. 18).

Umbilicaria rufidula Hue (1915). Deux. Exped. Antarct. Franc. (1908-1910) Charcot (Lichens p. 52).

Charcotia rufidula Hue (1915). Deux. Exped. Antarct. Franc. (1908-1910) Charcot (Lichens p. 185).

Thallus 0·5-10 cm diam., monophyllous, very variable, from small rosulate thalli tightly compressed into cerebriform colonies to single foliate thalli up to 10 cm diam. in sheltered positions; surface smooth or deeply reticulate rugose, sometimes rimose areolate; *upper surface* light buff to mummy brown, grey to almost black; *lower surface* sepia to sooty brown. *Rhizinae* moderate to dense, thinning round the umbilicus, sparingly branched cylindric, commonly flat, darker towards the thallus, becoming lighter towards the tips, or occasionally even-coloured, light or dark almost black. *Upper cortex* 15-30μ thick very uneven, cells very thick-walled, up to 6μ diam. hyaline to light brown, occasionally outermost cells dark brown; decomposed layer 8-12μ thick discontinuous. *Algal layer* 80-120μ (-140μ) thick, of cells 8-16μ diam. *Medulla,* loose, of hyaline branched, septate hyphae 4μ diam., up to 160μ thick. *Lower cortex* 28-50μ thick, hyaline the outermost 12μ light brown. *Apothecia* not seen.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4160; Mawson, AB 4066; Departure Rocks RF 4154; Ring Rock, RF & JB 4227; summit of Hayes Peak, RN 4386; McNair Nunatak, RF 4457; North Masson Range, BW 4091; Central Masson Range, RF 4426; Mount Burnett, RF & JB 4517; Van Hulssen Nunatak, RF & JW 4571; Casey Range, IL & RF 4177.

Other localities

PRINCESS ELIZABETH LAND:

Opposite 68 m feature south of remote station Platcha, 24 km from Davis, Vestfold Hills, NL 4054.

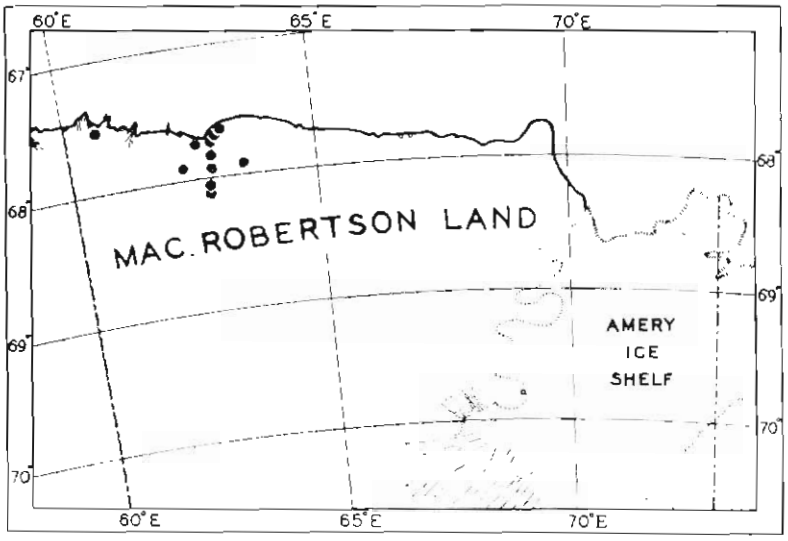


Fig. 36.—Distribution map for *Omphalodiscus antarcticus*.

ANTARCTIC PENINSULA:

Louis Philippe Coast, Kap Flora, CARL SKOTTSBERG; Melchior Archipelago, Lysted Island, P. SIPLE 358; Lambda Island, J. E. PERKINS, P. SIPLE, FRAZIER & D. BAILEY 382; Strait de Gerlache, Ile Cavelier de Cuverville, Terre de Danco, E. G. RACOVITZA; Ile Petermann, LIOUVILLE 139.

VICTORIA LAND:

Granite Harbour, BRIT. ANT. "TERRA NOVA" EXP. 1910; Evans Cove, BRIT. ANT. "TERRA NOVA" EXPED. 1910.

In regard to the limited amount of material previously collected in our area, there has been some confusion over the systematic position of this lichen. Dodge has determined many collections as *Umbilicaria spongiosa* Dodge & Baker, as well as *U. spongiosa* var. *subvirginis* (Frey & Lamb) Dodge. The thalline measurements given above refer to one typical specimen and they vary throughout the given ranges purporting to separate *Omphalodiscus spongiosa* (Dodge & Baker) Llano from *O. antarcticus*.

According to the description in Llano (1950), the colour of the thallus in both species is similar. Features of the dorsal surface vary greatly: the present author has specimens, found growing side by side, that fit the descriptions of one or the other whilst, within the same area, intermediate stages between these two have been noted.

The algal layer is discontinuous here but, in a section made from the same thallus, it was continuous (it was here that the thickness of 140μ was measured). The only conflicting dimension was the thickness of the medullary hyphae which was constant at 4μ diam. As the author has not examined authenticated material of *O. antarcticus*, and Llano does not give measurements for *O. spongiosus*, it is

not known whether he regards these two lichens as having hyphae of different thicknesses. However, the author does not think that this feature *per se* is a sufficient basis on which to describe a new species, and with this in mind he has referred all of our material to *Omphalodiscus antarcticus*.

Fruiting bodies of *Scutula* were found on one thallus from the Central Masson Range.

Omphalodiscus decussatus (Vill.) Schol.

Omphalodiscus decussatus (Vill.) Schol. (1934). Nyt. Mag. Naturvid. *75*: 23.
Lichen decussatus Vill. (1789). Hist. Plant. Dauphine. *3*: 964 (pl. 55).
Umbilicaria rugosa Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 561.
Umbilicaria pateriformis Dodge & Baker (1938). Ann. Miss. Bot. Gard. *25*: 564.
Umbilicaria Hunteri Dodge (1948). BANZ. Antarct. Res. Exped. Rep. *7*: 146.

Thallus monophyllous, sometimes polyphyllous, 0·5-5 cm diam., variable, rugose to cerebriform and deeply folded, rugi elevated into a fine reticulate pattern or broadly or laterally compressed into strongly formed ridges; *upper surface* rimose areolate, pruinose, dull, varying in colour from light grey olive, wood brown to grey and black; *lower surface* brown to sooty black, dull, without rhizinae. *Decomposed layer* discontinuous, hyaline, up to 25μ thick. *Upper cortex* 20-40μ thick, of large light brown thick-walled cells. *Algal layer* 60-80μ thick continuous, hyphae 6μ diam., very loosely packed. *Lower cortex* 40-115μ thick, with outermost layer dark brown. *Apothecia* not seen.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4173; Mawson, RF 4224; Departure Rocks group, RF 4153; mountains to the north of Chapman Ridge, RF & JW 4293; flat area to the west of the summit of Chapman Ridge, RF & JW 4279; Taylor Glacier on the nunataks east of the tongue, RF & JW 4244; Cape Bruce, RF & JW 4372; foot of Hayes Peak, RF & RN 4377; summit of Hayes Peak, RF & RN 4383; Campbell Head, RF & JW 4307; Tilley Nunatak, RF 4360; Trost Rocks, DC 4445; Church Mountain, KM 4243; Goldsworthy Ridge, Mount Henderson, RF 4184; southern end of Mount Henderson, RF 4208; summit of Mount Henderson, JP & OB 4532; Fischer Nunatak, BW 4077; McNair Nunatak, RF 4459; eastern moraine North Masson Range, RF 4106; North Masson Range, RF 4124; Painted Peak, North Masson Range, JW 4137; Central Masson Range, RF & KM 4435; peak 1070 m South Masson Range, RF & JB 4504; north peak Price Nunatak, RF & JW 4493.

Other localities

PRINCESS ELIZABETH LAND:

Head of Ellis Fjord, 22 km south Davis, Vestfold Hills, MH 4048.

ANTARCTIC PENINSULA:

Snow Hill, basalt tappen, J. M. SOBRAL; "Sodra Ishavet", Paulet I., CARL SKOTTSBERG; Booth Island, GAIN ET LIOUVILLE NO. 142; Marguerite Bay, GAIN ET LIOUVILLE NO. 228; "East Base", Millerand Island; "Nunatak," C. R. EKLUND NO. 47; George VI Sound, C. R. EKLUND NOS. 85, 86, 95; Refuge Island, H. M.

BRYANT, NOS. 32, 33, 38. Skua Gull Peak, Mt. Grace McKinley; Mt. Franklin; Mt. Marujupu; Haines Mountains; Rockefeller Mountains; Mt. Helen Washington; Mt. Breckinridge; Mt. Marguerite Wade; Mt. Patterson; Mt. Nilsen: VARIOUS COLLECTORS.

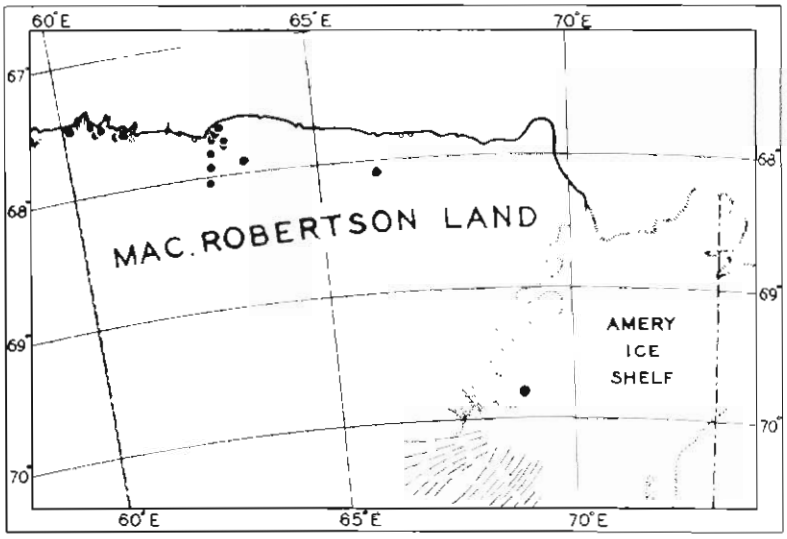


Fig. 37.—Distribution map for *Omphalodiscus decussatus*.

VICTORIA LAND:

Mt. Terror, E. A. WILSON; Cape Royd, H.T.F.; Cape Adare & Evans Cove, BRIT. ANTARCT. "TERRA NOVA" EXPED. (1910).

GEORGE V LAND:

Madigan Nunatak, C. F. LASERON NO. 22; Knox Coast, "Island Station B.", L. O. SMITH.

QUEEN MARY LAND:

Hippo Island, HARRISSON NO. 64; David Island, HARRISSON NO. 57.

This species seems very hard to interpret; Dodge (1938) divides it into three distinct species, *Umbilicaria rugosa, U. pateriformis* and *U. hunteri*. Whilst Llano (1956) synonomises these three under *Omphalodiscus decussatus*, he makes *Umbilicaria cerebriformis* Dodge & Baker a variety of *O. decussatus*, and synonomises under it *U. subcerebriformis* Dodge and *Charcotia cerebriformis* (Dodge & Baker) Dodge. Llano also raises a new variety *tortuosus* collected in our area in 1954 (see Appendix I).

The 35 collections made from nearly as many different localities by the 1962 party grade into one another so closely that it would be impossible for the author to say where one variety merged with another. The thalline characteristics compare favourably with specimens of *Omphalodiscus decussatus* collected in Victoria,

Australia. All specimens found were sterile, so apothecial measurements have not been given in the description.

Mature apothecia of *Scutula* Tul. were found on one specimen from Field Rock. A specimen from Hayes Peak in the Cape Bruce area had pycnidia of the same fungus. *Scutula* is a non-lichenized discomycete in the family Lecideaceae and is found parasitic on *Umbilicaria, Lecanora, Lecidea, Catillaria* and *Biatorina*. (see Plate 39).

Alectoria minuscula (Nyl.) Degelius

Alectoria minuscula (Nyl.) Degelius, Nytt Mag. Naturv., *78*: 286.

Alectoria minuscula Nyl. f. *congesta* (Zahlbr.) Lamb (1948). Lilloa. *14*: 243.

Parmelia pubescens var. *congesta* Zahlbr. (1906). Deutsche Sudpolar. Exp. *8*: 52.

Alectoria congesta (Zahlbr.) Dodge (1948). BANZ Antarct. Res. Exped. Rep. *7*: 195.

Thallus forming intricately branched, dense, flat tufts up to 3 cm diam., sometimes radiating, sometimes scattered over large areas or completely filling cracks between rocks, particularly where melt water is prevalant. In ageing thalli the filaments tend to fuse together and form large cerebriform, vernicose masses [*Alectoria minuscula* f. *crustacea* (Lynge et Schol.) Degel.]

Filaments up to 0·2 mm diam. varying in colour from isabelline to black, sooty to glossy. *Cortex* 20μ thick of longitudinal hyphae, outermost 5μ greenish brown. *Medulla* of loosely-woven hyphae with numerous air spaces. *Algal colonies* scattered mostly immediately next to the cortex. *Algal cells* 10-12μ diam., with gelified sheath. *Apothecia* not seen.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4161; Mawson, JW 4576a; outcrops to north of Chapman Ridge, RF & JW 4292; flat area to west of summit of Chapman Ridge, RF & JW 4274; outcrops to east of Taylor Glacier, RF & JW 4257; Cape Bruce, BANZARE B108-9; summit Hayes Peak, RF & RN 4382; Trost Rocks, DC 4449; Church Mountains, RH 4241; Anniversary Nunataks, RF 4562; Fischer Nunatak, RF 4177; eastern moraine, North Masson Range, RF 4108; Painted Peak, North Masson Range, RF 4414; Central Masson Range, RF & KM 4429; peak 1070 m South Masson Range, RF & JW 4514.

Other localities

VICTORIA LAND:

Crater Cirque, CROLL, FITZGERALD, HARRINGTON & MCKELLAR—WELT 108; south wall of Tucker Glacier, FITZGERALD—WELT 146.

GEORGE V LAND:

Cape Denison, AAE 50-2 ETC.; Madigan Nunatak. C. F. LASERON AAE 62-2.

QUEEN MARY LAND:

Possession Rocks, C. T. HARRISSON, AAE. 36; Hippo Island, C. T. HARRISSON AAE. 65-2.

The specimens in our area vary considerably in size, form and colour. In the same collections they grade evenly from one form into another and, for this reason, no attempt has been made to distinguish between infra-specific groups.

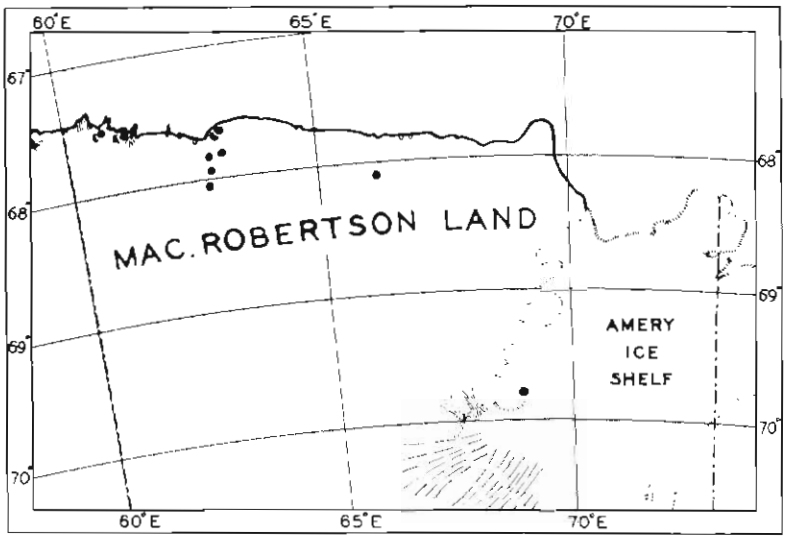


Fig. 38.—Distribution map for *Alectoria minuscula*.

Usnea antarctica Du Rietz

Usnea antarctica Du Rietz (1926). Svensk. Bot. Tidskr. *20*: 93.

Neuropogon antarcticus (Du Rietz) M. Lamb (1939). Journ. Linn. Soc. Lond. Bot. *52*: 210.

Thallus erect or prostrate, 1-5 cm tall, irregularly branched, rigid, verrucose, rugose, slightly foveolate, straw colour to pale yellow-green, up to 1 5 mm thick at the base, at times somewhat constricted to attachment. Tips of the branches black or with black bands, smooth, shining; in old specimens sometimes black, dull and slightly foveolate. *Cortex* 60μ thick. *Algal cells* up to 8μ diam. scattered in small colonies throughout the medulla. *Medulla* up to 160μ thick, white, dense against the cortex becoming looser near the axis. *Axis* 45-150μ, composed of longitudinal, conglutinate hyphae 1μ in diam.

Apothecia not seen.

Distribution

MAC.ROBERTSON LAND:

Outcrops at Taylor Glacier, RF & JW 4263; outcrops north of Chapman Ridge, RF & JW 4290; outcrop south of Chapman Ridge, RF & JW 4283; Cape Bruce, RF & JW 4236; Hayes Peak, RF & RN 4371; Trost Rocks, DC 4444.

Other localities

BYRD LAND:

Edsel Ford Ranges, P. SIPLE, F. A. WADE, S. COREY and O. D. STANCLIFF.

EDWARD VII LAND:

Rockefeller Mountains, P. SIPLE, F. A. WADE, S. COREY and O. D. STANCLIFF.

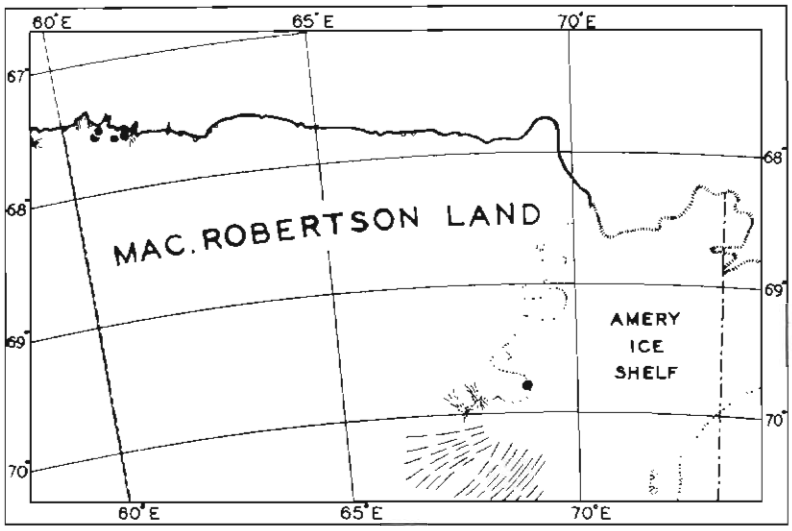


Fig. 39.—Distribution map for *Usnea antarctica*.

VICTORIA LAND:

Geike Ridge, Admiralty Range, C. E. BORCHGREVINK; Cape Adare, SCOTT; Cape Sastrugi, Evans Cove, BRIT. ANTARCTIC. "TERRA NOVA" EXPED., SCOTT; Mt. Terror, NAT. ANTARCT. "DISCOVERY" EXPED., E. A. WILSON; Cape Royds, H.T.F.; Crater Cirque, CROLL AND FITZGERALD, HARRINGTON & MCKELLAR; Football Mountain, CROLL AND FITZGERALD; Cape Irizar, D. MAWSON.

GEORGE V LAND:

Penguin Point, A. L. MCLEAN.

INDETERMINATE LICHENS

There are many specimens amongst collections brought back from field trips which were either too old and weathered, or where there was unsufficient material to make their determination possible.

The most common was a cerebriform thallus up to 2 cm diam., in pulvinate clumps up to 1 cm high, growing in rock crevices and between small gravels. *Thallus lobes* up to 1 mm broad, occasionally subfoliose but mostly appressed, imbricate, white to grey, with dark grey to black warts. *Cortex* 20-35μ thick, heavily encrusted with hyaline crystals in the outer layer. *Algal layer* up to 80μ

thick of scattered cells 8-12μ diam. *Medulla* loosely woven of hyaline, branched, septate hyphae 3μ thick.

When the weathering of the thallus has been extensive the regeneration is sometimes coralline and carbonaceous.

Specimens of *Lecidea* and *Buellia* were common, with apothecia which were too weathered to make the determination certain; in every case similar specimens with determinable features have been found nearby. In these cases, both specimens have been assumed as identical and the weathered specimens referred to as "indeterminate lichens".

From the inland areas of Trost Rocks and Depot Peak many collections of a white, amorphous lichen were brought back. These specimens were too gelified even to discern algal cells. One specimen from Depot Peak had a very old apothecia which contained a few free hyaline spores (ca. 12μ × 8μ) but the thallus was too weathered to make any further determination.

Specimens included in this section are:

Western outcrop, Forbes Glacier Tongue, RF & JW 4401, 4409; flat area west of the summit of Chapman Ridge, RF & JW 4277; outcrops east of Taylor Glacier Tongue, RF & JW 4246, 4264; Cape Bruce, RF & JW 4330, 4337; summit Hayes Peak, RF & JW 4381, 4385; Campbell Head, RF & JW 4309, 4310; Tilley Nunatak, RF 4357, 4366; McNair Nunatak, RF 4463; North Masson Range, JW 4119, 4120; Painted Peak, RF & JW 4419; Central Masson Range, RF & JW 4436, 4437; 1070 m peak south of Trost Peak, South Masson Range, RF & JW 4509; Branson Nunatak, RF & JB 4469, 4470, 4486, 4488; Mount Burnett, RF & JW 4525; Depot Peak, MS 4452, PT 4454; outcrop and moraine 5 km north-east Twintop, David Range, RF 4541.

PLATES 1-39: LICHENS

PLATE 1

a–b. *Acarospora gwynnii* Dodge & Rudolph

a. Typical specimen from North Masson Ranges

b. Enlarged portion of thallus showing immersed apothecium

c–e. *Acarospora williamsii* spec. nov.

c. Type specimen from west side of Forbes Glacier tongue

d. Enlarged portion showing areole with apothecium

e. Pale-coloured areole and apothecia from sheltered position

f–g. *Biatorella antarctica* Murray

f. Typical specimen from summit of Hayes Peak in Cape Bruce area

g. Enlarged portion of thallus showing biatorine apothecium

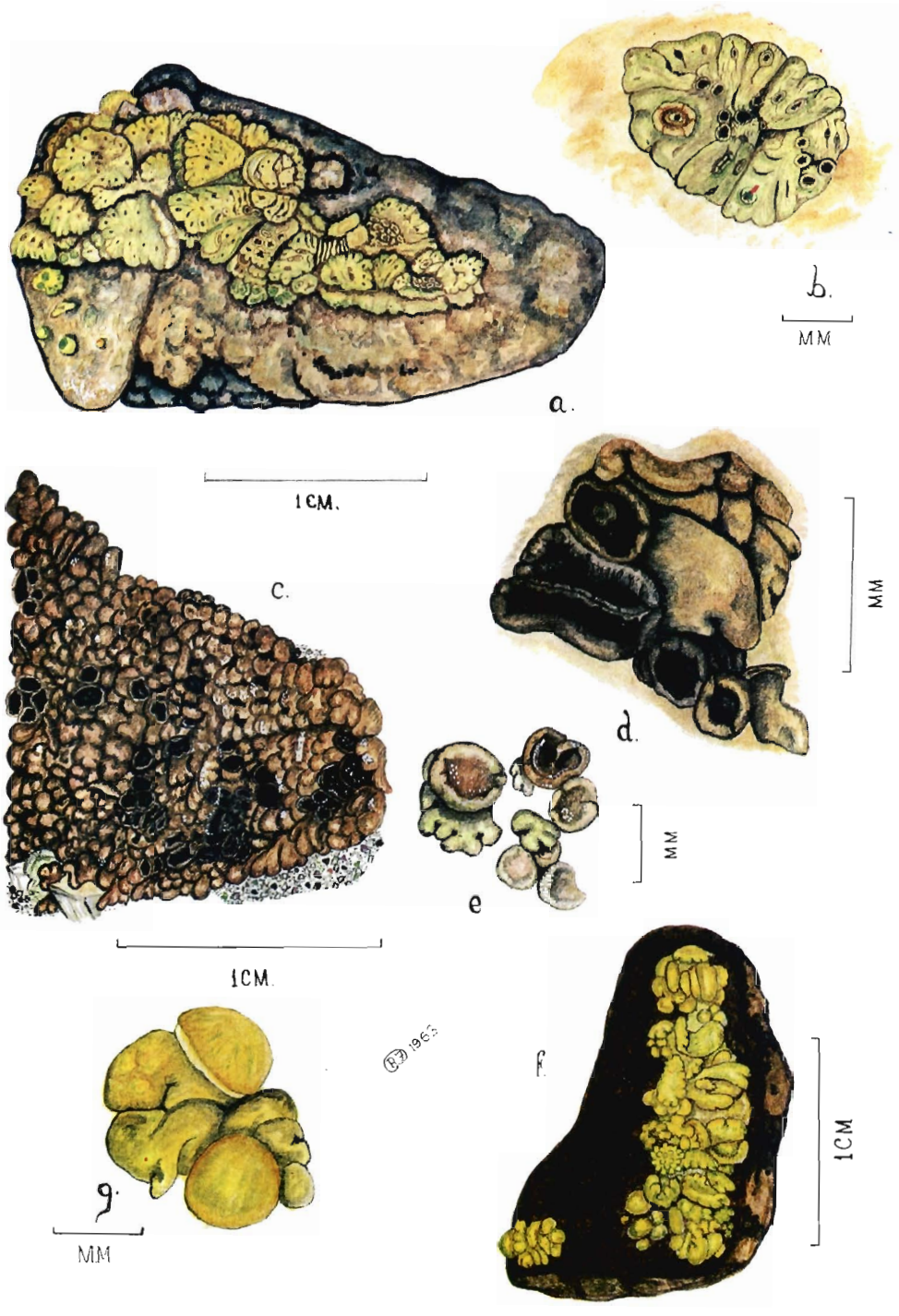

a.
b.
MM
1CM.
c.
d.
MM
e
MM
1CM.
9.
MM
f.
1CM

PLATE 2

Acarospora gwynnii Dodge & Rudolph

a. Section through fertile areole from outcrop on west side of Forbes Glacier tongue

b. Developing ascus

c. Mature ascus

d. Branched paraphysis

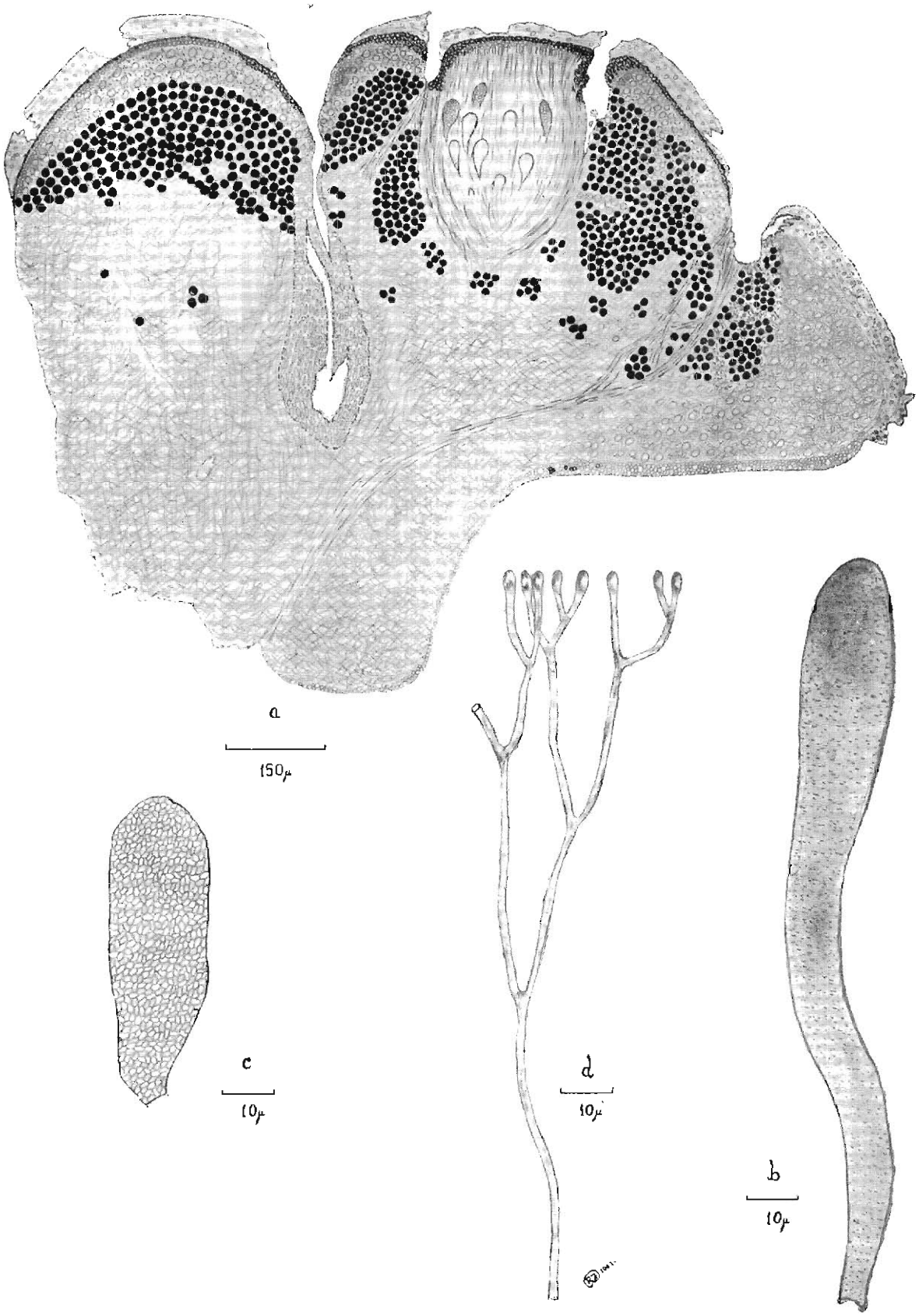

a
150μ
c
10μ
d
10μ
b
10μ

PLATE 3

Acarospora williamsii R. Filson

a. Section through fertile areole from type specimen collected on west side of Forbes Glacier tongue

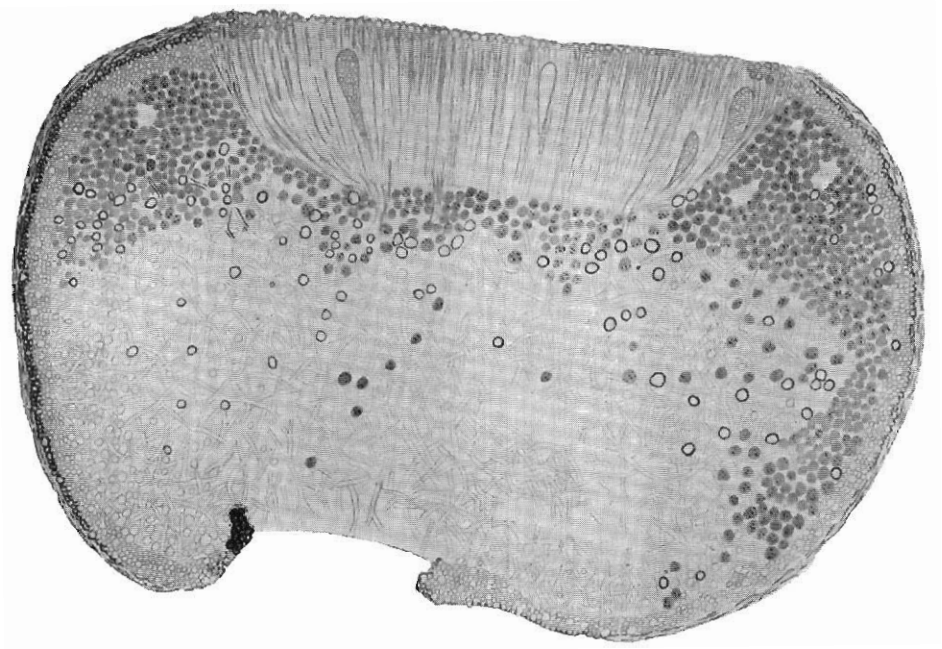
b. Mature ascus

c. Ripe spore

d. Branched and unbranched paraphyses

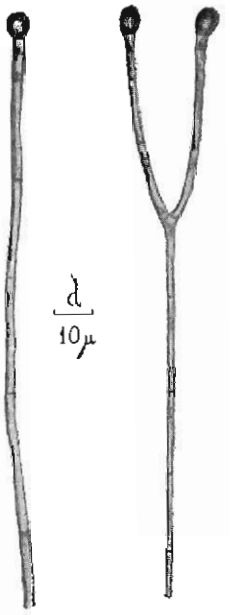
e. Section through thallus

f. Fungal hyphae and cells from algal layer



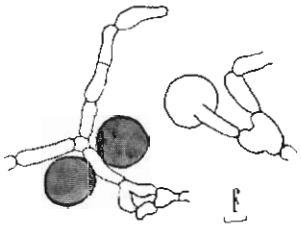
a
100μ

b
10μ

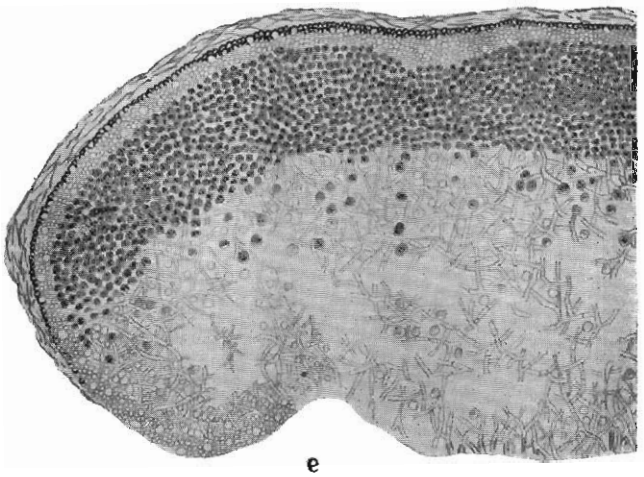


d
10μ

c
4μ



f
3μ



e
100μ

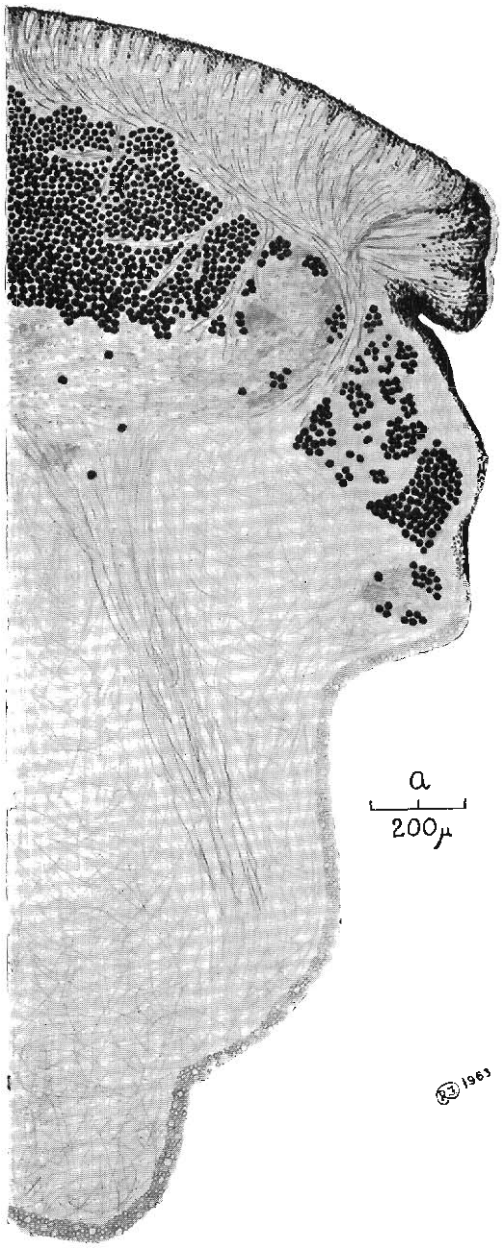
PLATE 4

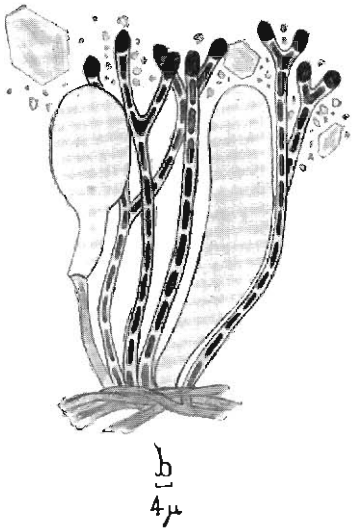
Biatorella antarctica Murray

a. Section through apothecium from Trost Rocks on west side of Amery Ice Shelf

b. Asci and paraphyses from hymenium

c. Mature ascus


a
200μ


b
4μ

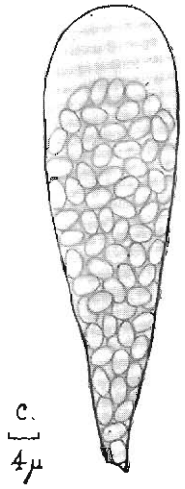

c
4μ

PLATE 5

a–c. *Buellia frigida* Darb.

a. Typical specimen from Mawson

b. Hemispherical apothecia from (a)

c. Flat apothecia from specimen collected in North Masson Range

d. *Buellia foecunda* R. Filson

Enlargement of apothecium from specimen collected in North Masson Range; a few lobes of *Caloplaca elegans* var. *pulvinata* are seen on left

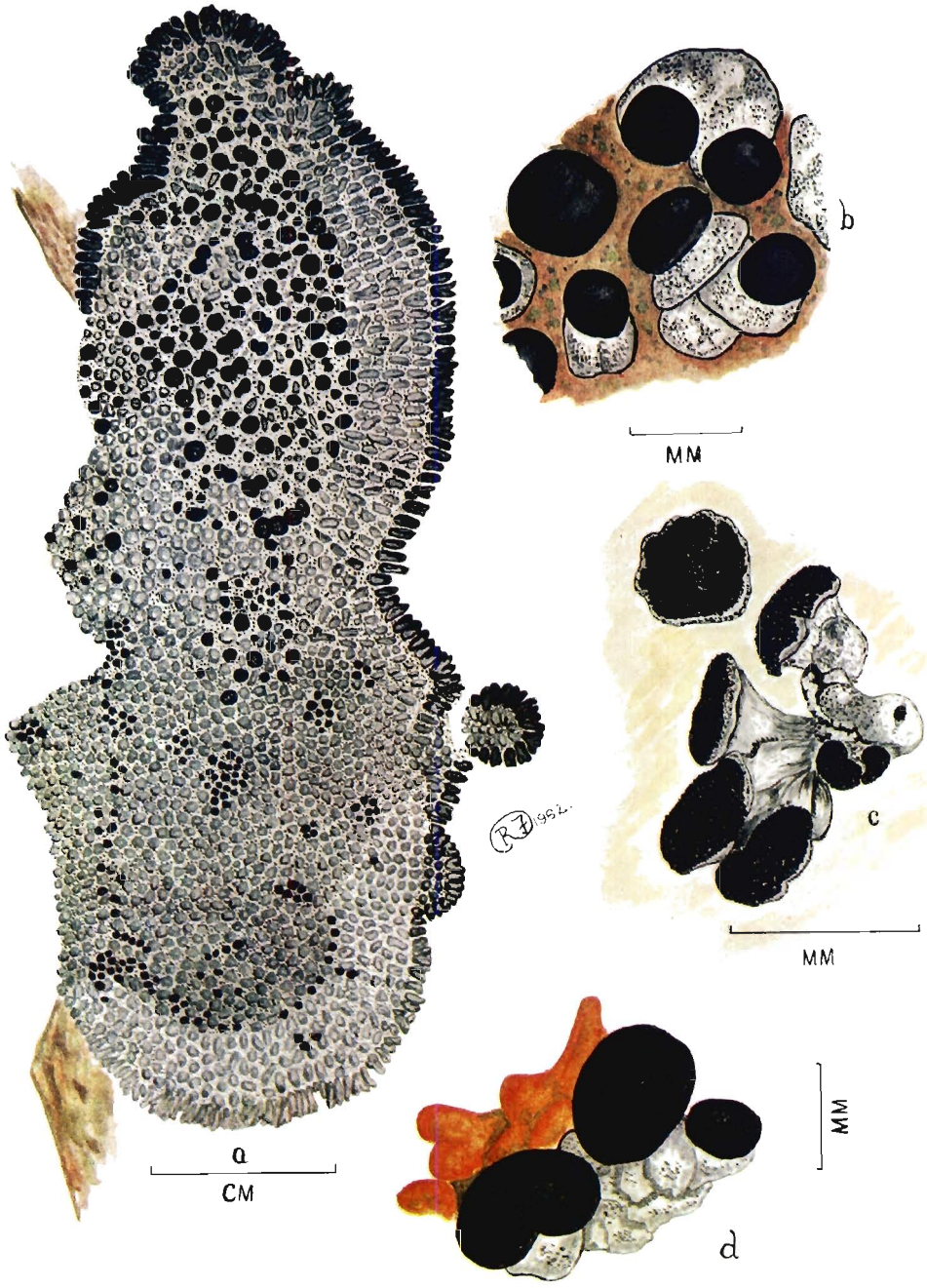
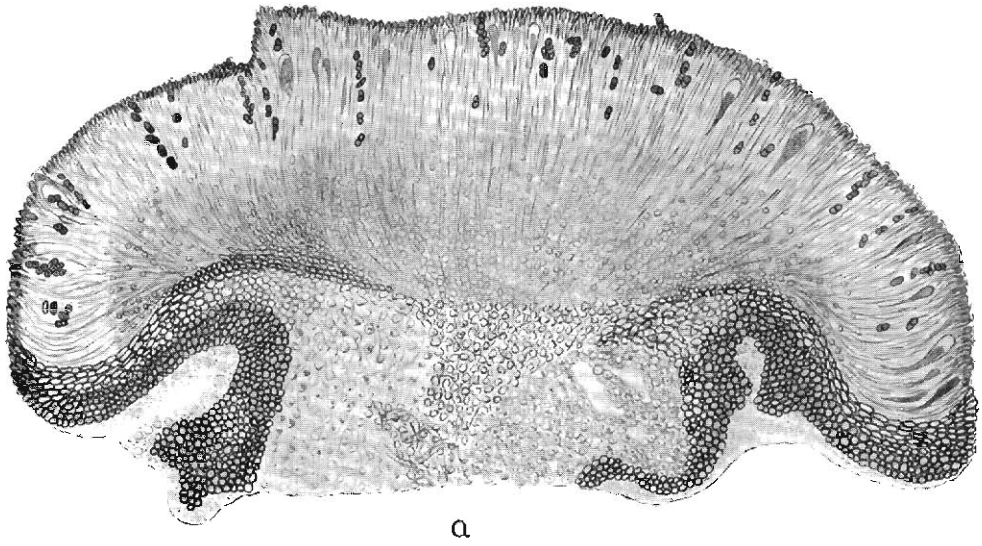

a
CM
b
MM
c
MM
d
MM

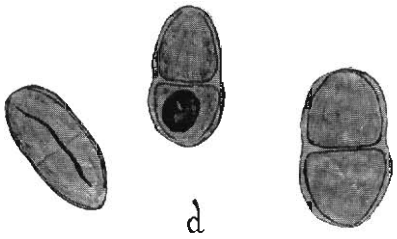
Plate 6

Buellia frigida Darb.

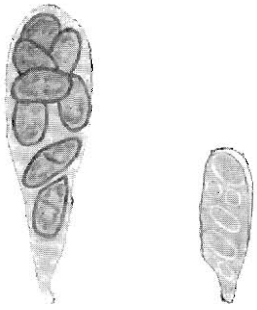
a. Section through apothecium of specimen from Mawson
b. Two stages in the development of an ascus
c. Vertical section through thallus
d. Ripe spores
e. Paraphyses



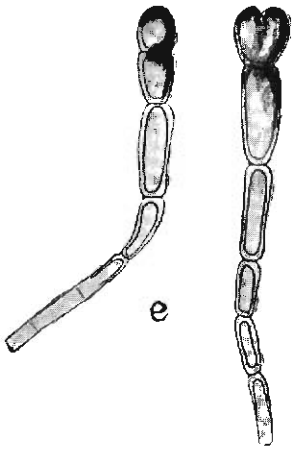
a



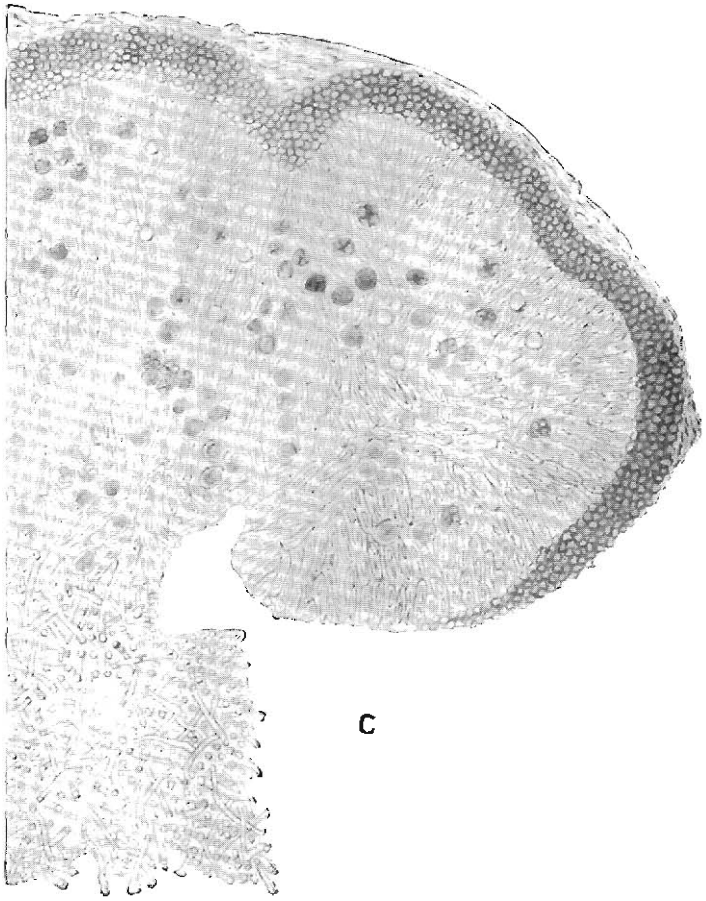
d



b



e



c

PLATE 7

a–b. *Buellia foecunda* R. Filson

a. Typical specimen from Mount Burnett, South Masson Range

b. Enlargement of thallus with apothecia from (a); for an enlargement of the apothecia see Plate 5 (d)

c–d. *Buellia grimmiae* R. Filson

c. Typical specimen growing over *Grimmia lawiana* from Field Rock

d. Enlargement of thallus from (c)

e–g. *Buellia lignoides* R. Filson

e. Typical specimen from Trost Rocks on west side of Amery Ice Shelf

f. Enlargement of thalline areole and apothecia from (e)

g. Specimen from outcrop and moraine 16 km north-east of Mount Twintop

h–i. *Buellia* aff. *subpedicellata* (Hue) Darb.

h. Typical specimen from Painted Peak, North Masson Range

i. Enlargement of thallus and apothecia from the above specimen

j–k. *Rinodina archaeoides* H. Magn.

j. Typical specimen from outcrops on east side of Taylor Glacier tongue

k. Enlargement of apothecia from (j)

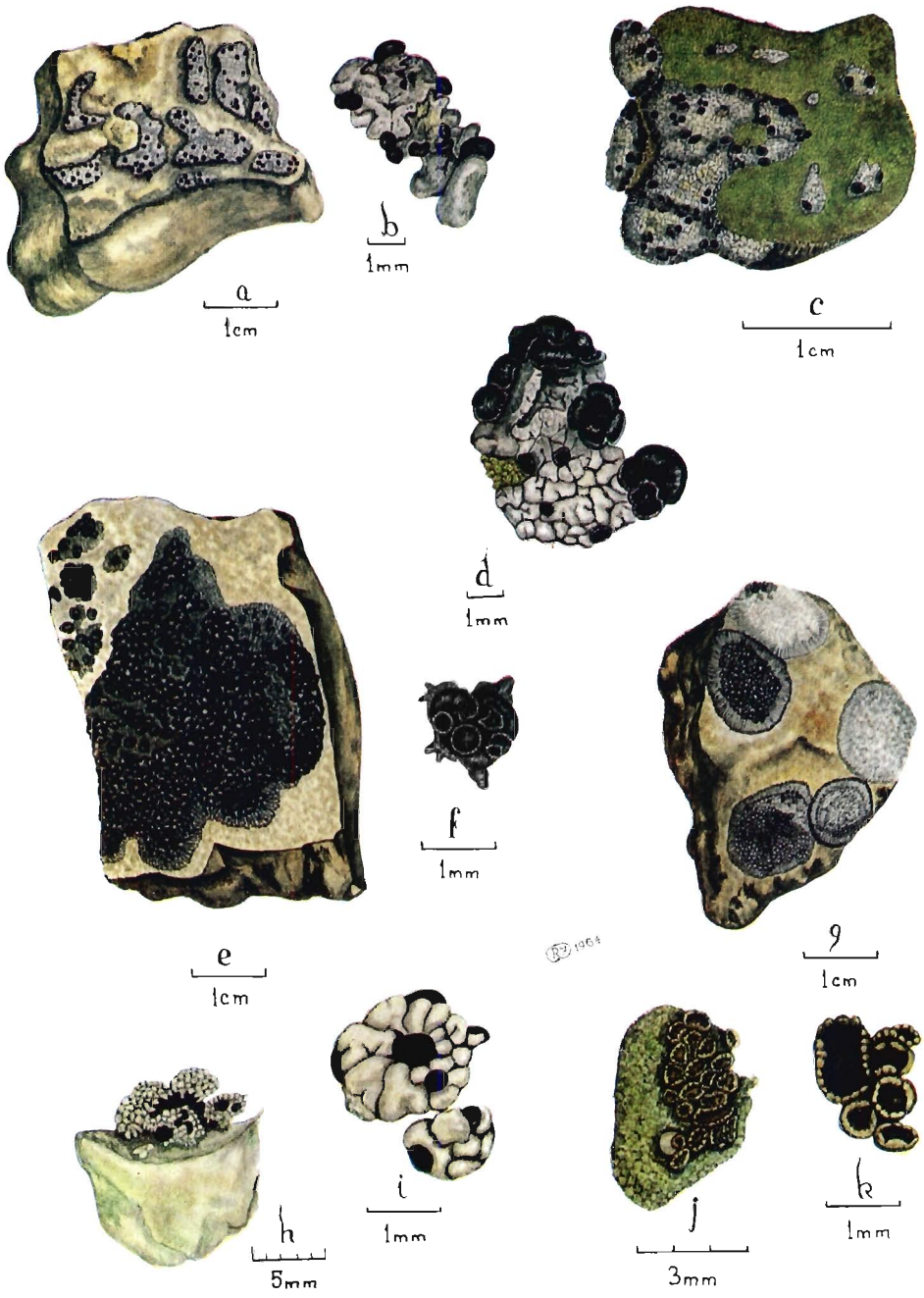

a
1cm
b
1mm
c
1cm
d
1mm
e
1cm
f
1mm
g
1cm
h
5mm
i
1mm
j
3mm
k
1mm

PLATE 8

Buellia foecunda R. Filson

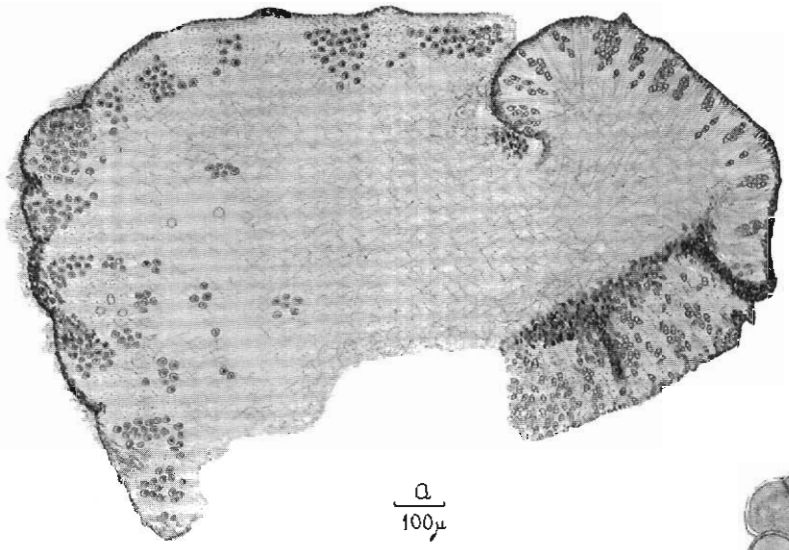
a. Section through areole with apothecium, growing on rock from south end of Mount Henderson

b. Enlargement of edge of hymenium of (a)

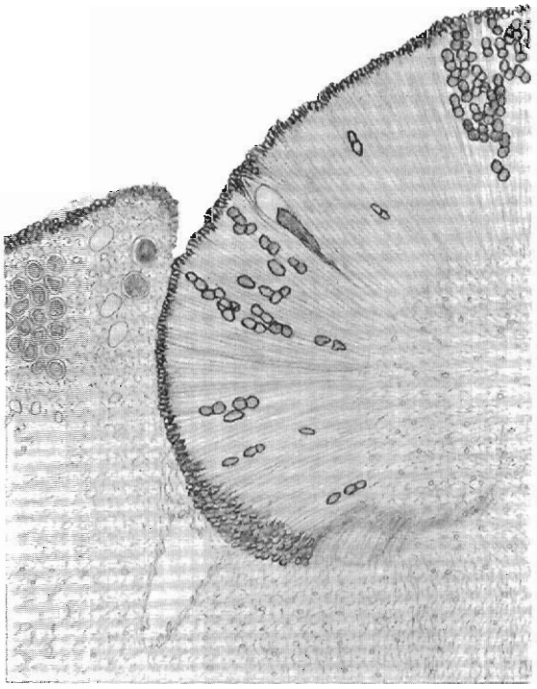
c. Ascus and spores in various stages of development

d. Mature spores

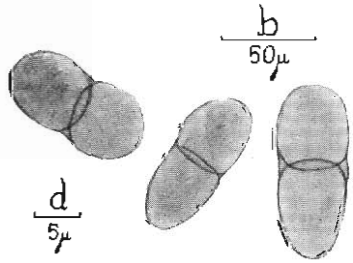
e. Tips of branched and unbranched paraphyses



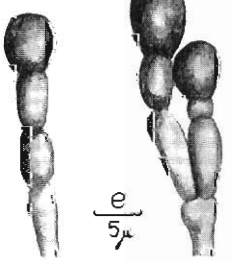
a
100μ



b
50μ



d
5μ



e
5μ

c
5μ

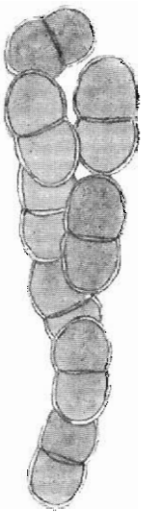


PLATE 9

Buellia grimmiae R. Filson

a. Section through fertile areole from type specimen (RF 4456) collected at Field Rock

b. Enlargement of edge of apothecia from (a)

c. Asci in various stages of development

d. Mature spores

e. A branched paraphysis

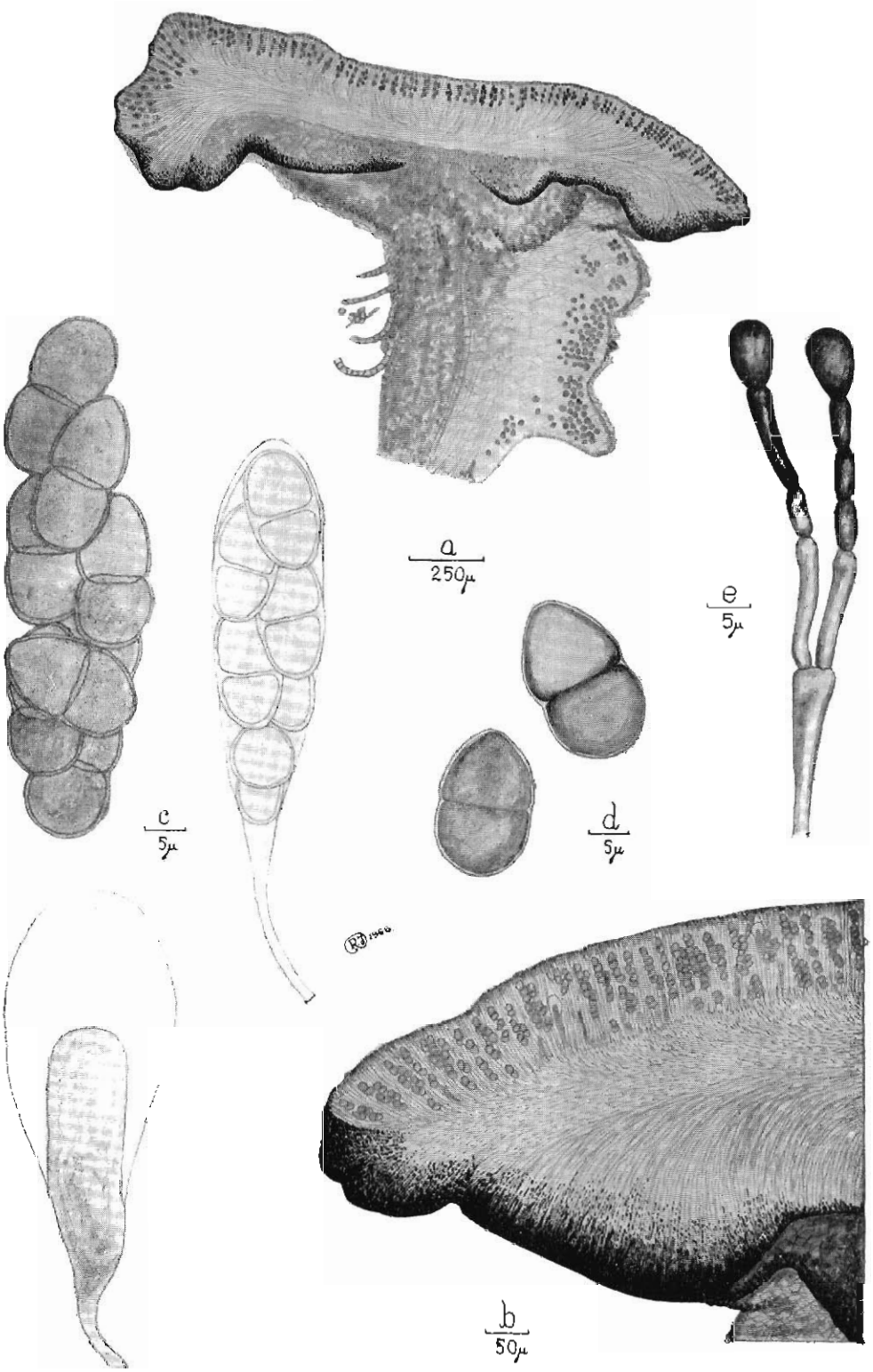

a
250μ
b
50μ
c
5μ
d
5μ
e
5μ

PLATE 10

Buellia lignoides R. Filson

a. Section through apothecium immersed in a areole from Trost Rocks on the west side of the Amery Ice Shelf

b. Two asci in stages of development: in mature specimen on right, spores have been cross-sectioned

c. Mature spores

d. A branched paraphysis

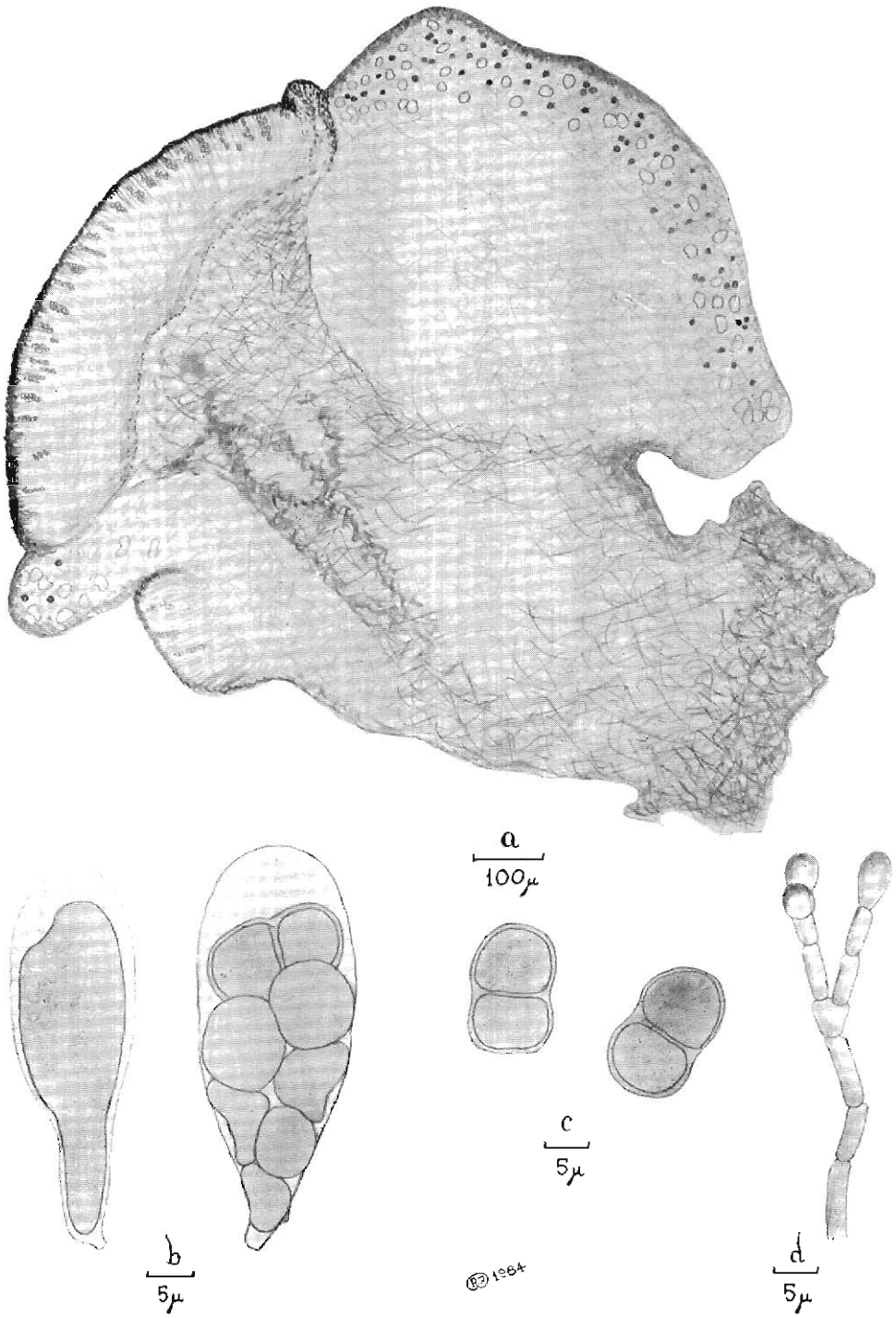

a
100μ
b
5μ
c
5μ
d
5μ

PLATE 11

Buellia aff. *subpedicellata* (Hue) Darb.

a. Areole containing small apothecium; specimen from flat area to west of summit of Chapman Ridge

b. Margin of apothecium

c. Asci in various stages of development

d. A branched paraphysis

e. Mature spores

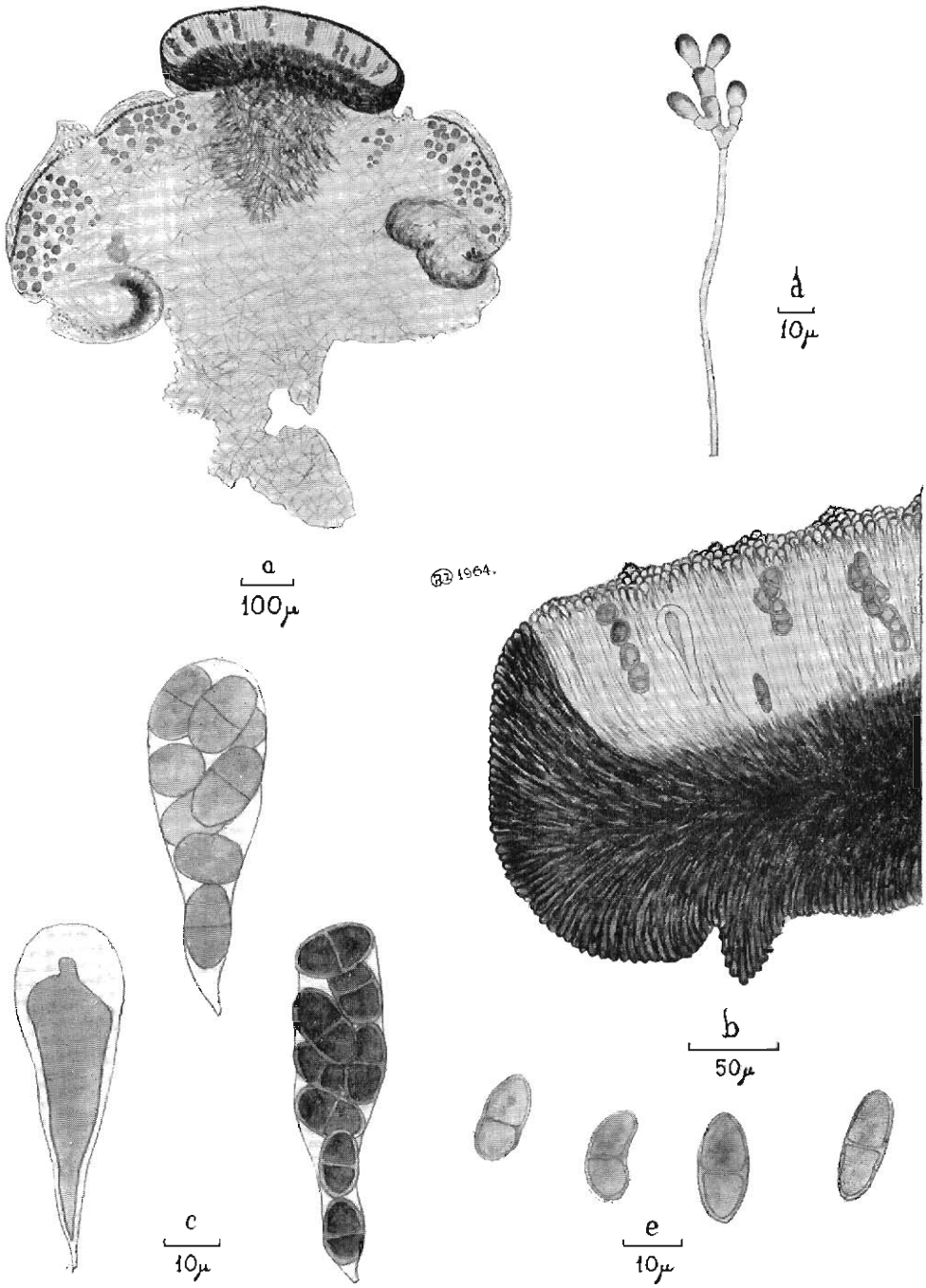

a
100μ
d
10μ
© 1964.
b
50μ
c
10μ
e
10μ

PLATE 12

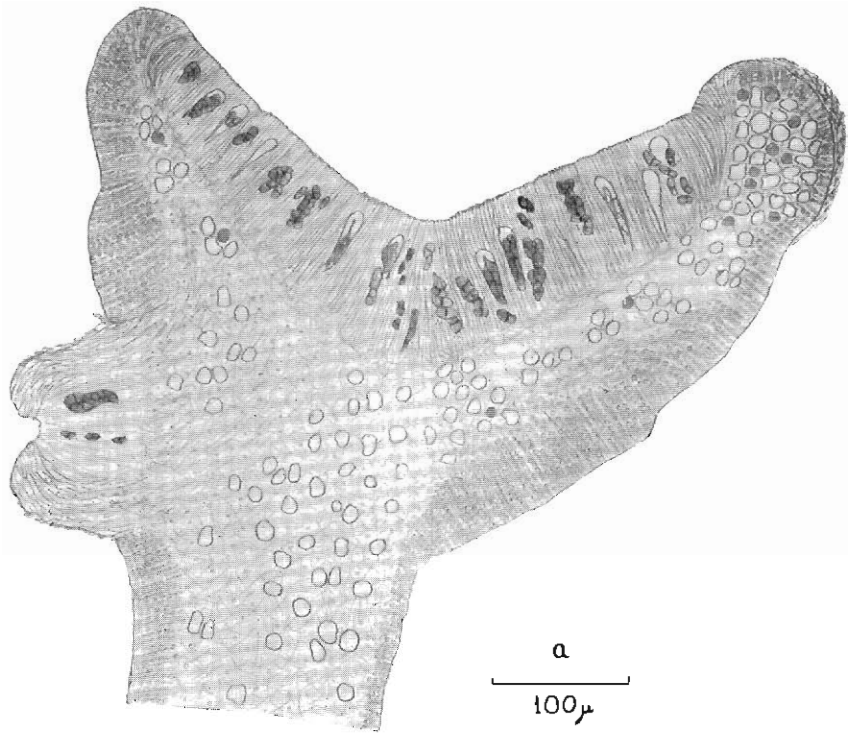
Rinodina archaeoides H.Magn.

a. Section through apothecium

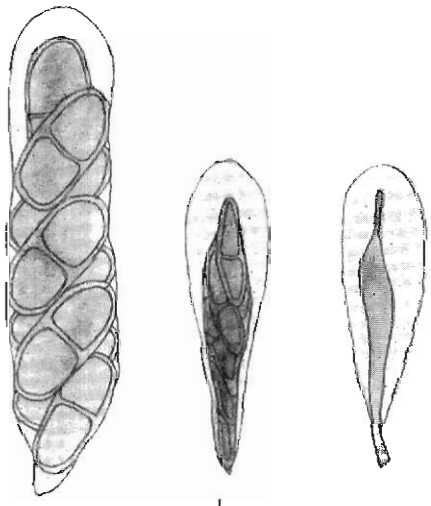
b. Three asci in stages of development

c. A branched paraphysis

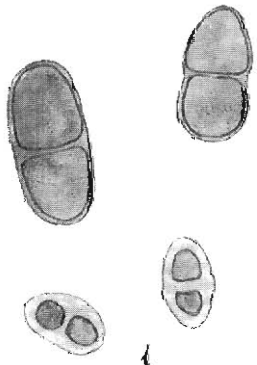
d. Upper: two mature spores; lower: two immature spores



a
100μ



b
5μ



d
5μ

c
5μ

PLATE 13

Caloplaca elegans var. *pulvinata* (Dodge & Baker) Murray

a–b. Apothecia

c. Typical specimen growing on rock from Mawson

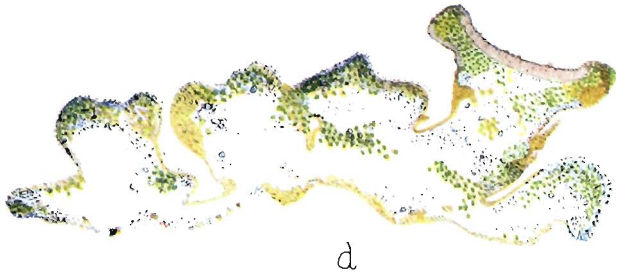
d. Section through thallus lobe and apothecium

c

1mm

a

1mm



d

1mm

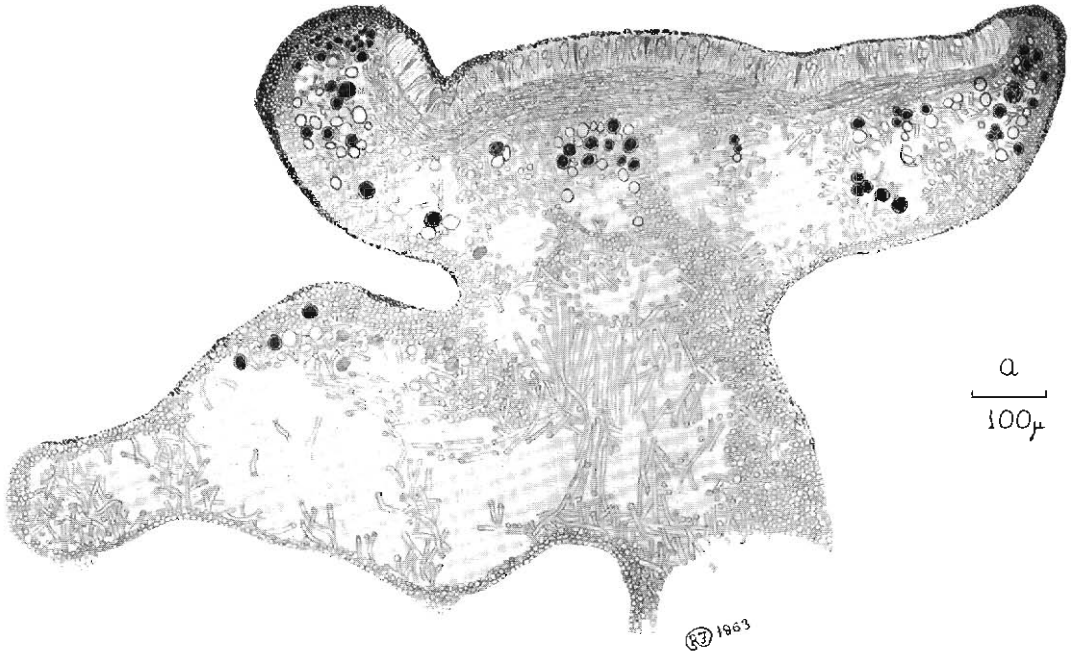
b

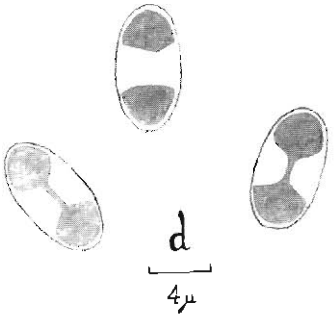
1mm

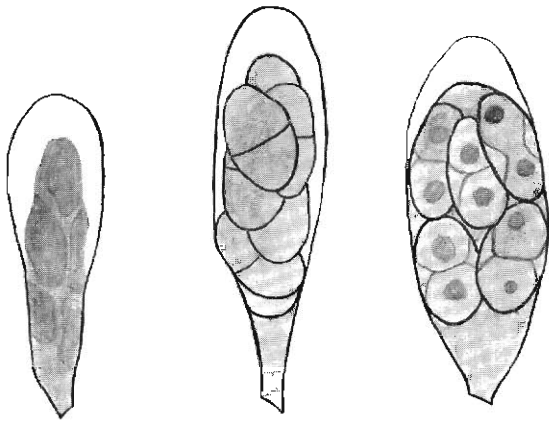
PLATE 14

Caloplaca elegans var. *pulvinata* (Dodge & Baker) Murray

a. Section through apothecium from Field Rock
b. Section through thallus lobe from Goldsworthy Ridge, Mount Henderson
c. Three asci in various stages of development
d. Mature spores
e. Branched and unbranched paraphyses


a
100μ
1963


d
4μ


c
4μ


b
100μ

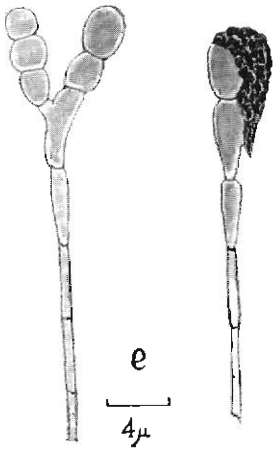

e
4μ

PLATE 15

a–c. *Xanthoria mawsonii* Dodge

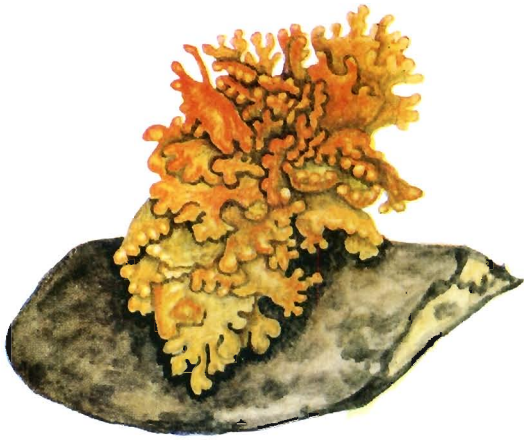
a. A small pulvinate thallus from Ring Rock

b. Underside of a thallus lobe

c. Thallus lobe

d. *Protoblastenia citrina* Dodge
Thallus scattered over *Grimmia lawiana.*

e. *Pyrenodesmia mawsonii* Dodge
Thallus from outcrops east of Taylor Glacier
On left is a soridiose areole

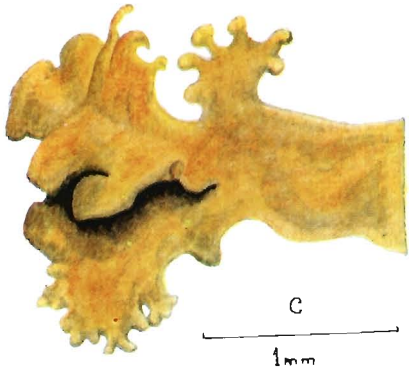


a

1mm

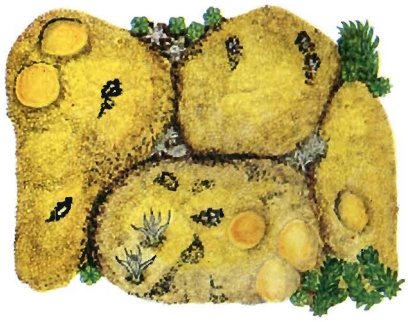
b

1mm



c

1mm



d

1mm

e

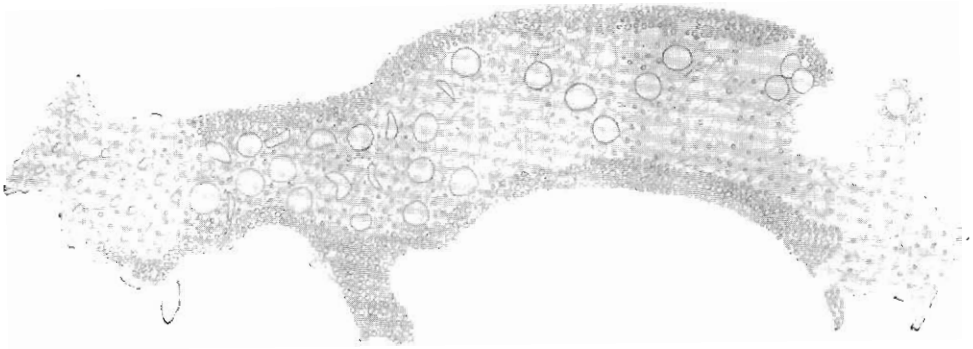
1mm

PLATE 16

Xanthoria mawsonii Dodge

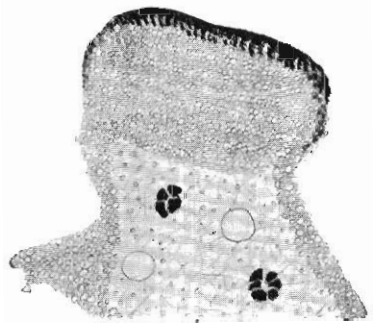
a. Section through thallus showing upper cortex, scattered algal cells; lower cortex with small rhizinae

b. Section through one of the small lobes at tip of thallus lobe



a

100μ



b

100μ

PLATE 17

Protoblastenia citrina Dodge

a. Section through apothecium; cells of *Grimmia lawiana,* over which it was growing, can be seen in lower portion

b. Two asci in stages of development

c. A branched paraphysis

d. Ripe ascospores

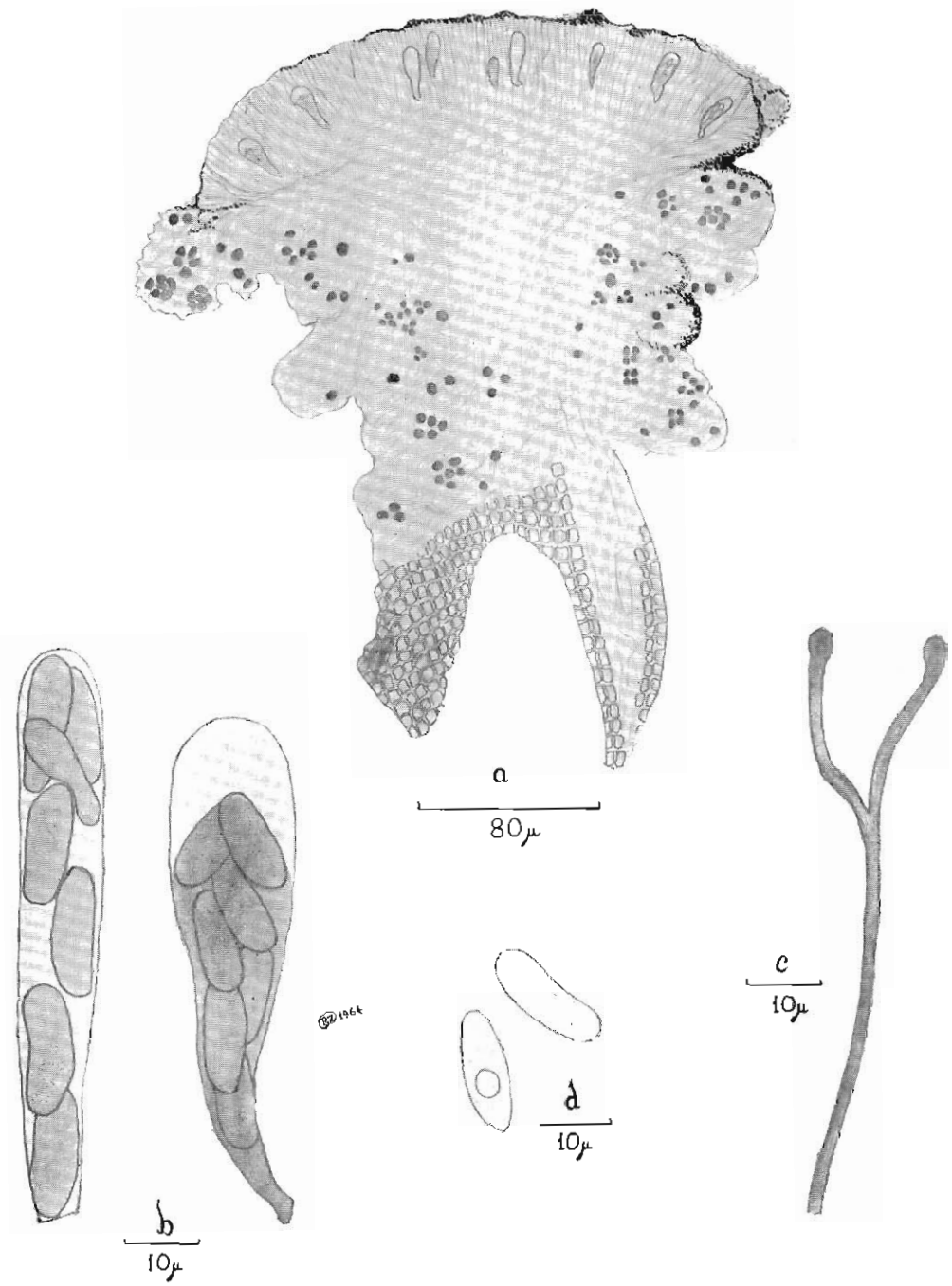
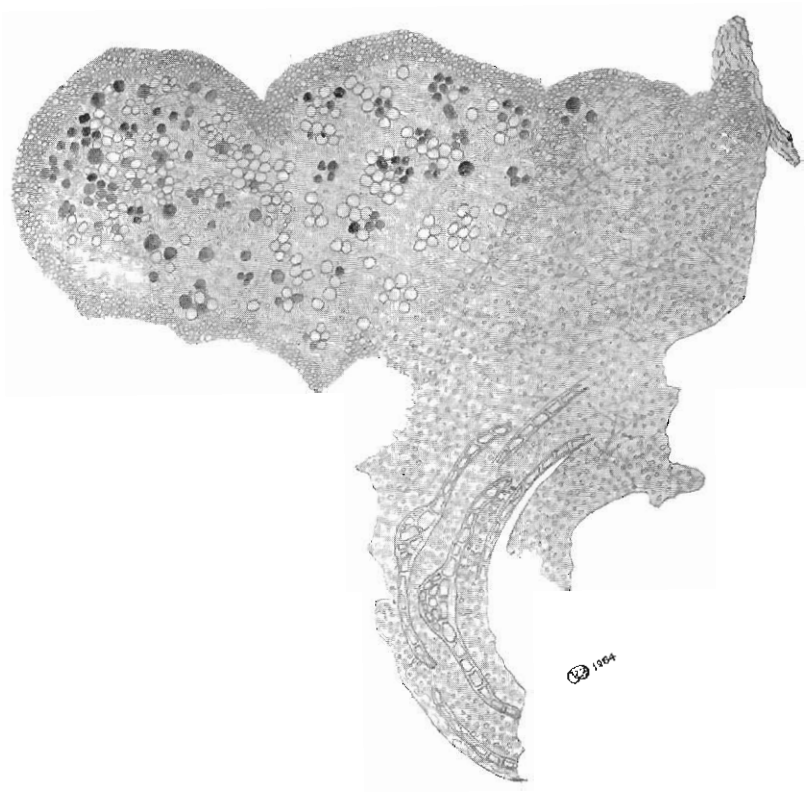

a
80μ
b
10μ
c
10μ
d
10μ

PLATE 18

Pyrenodesmia mawsonii Dodge
Section through thallus lobe growing over *Grimmia lawiana*



100μ

PLATE 19

a–f. *Lecanora rubina* var. *melanophthalma* f. *exulans* (Th. Fr.) Zahl.

a, b, c, d, e. Various thalli drawn to same scale to show wide range of colours and sizes of apothecia

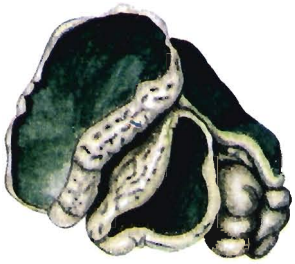
f. Specimen from Campbell Head growing with algae and *Pyrenodesmia mawsonii* on feather of gull

g–h. *Lecanora expectans* Darb.

g. Thallus with many congested apothecia growing over moss with *Pyrenodesmia mawsonii*

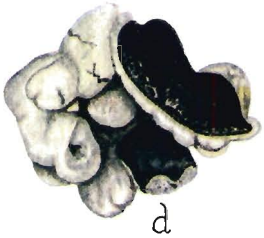
h. Two apothecia from same specimen as in (g) showing colour differences

a



b

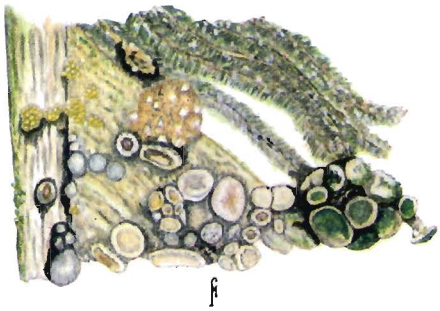
c



d

e

1mm

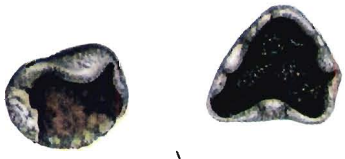


f

1mm

g

1mm



h

1mm

PLATE 20

Lecanora rubina var. *melanophthalma* f. *exulans* (Th.Fr.) Zahl.

a. Section through apothecium
b. Development of ascus
c. A branched paraphysis
d. Cells from algal layer
e. Mature ascospores

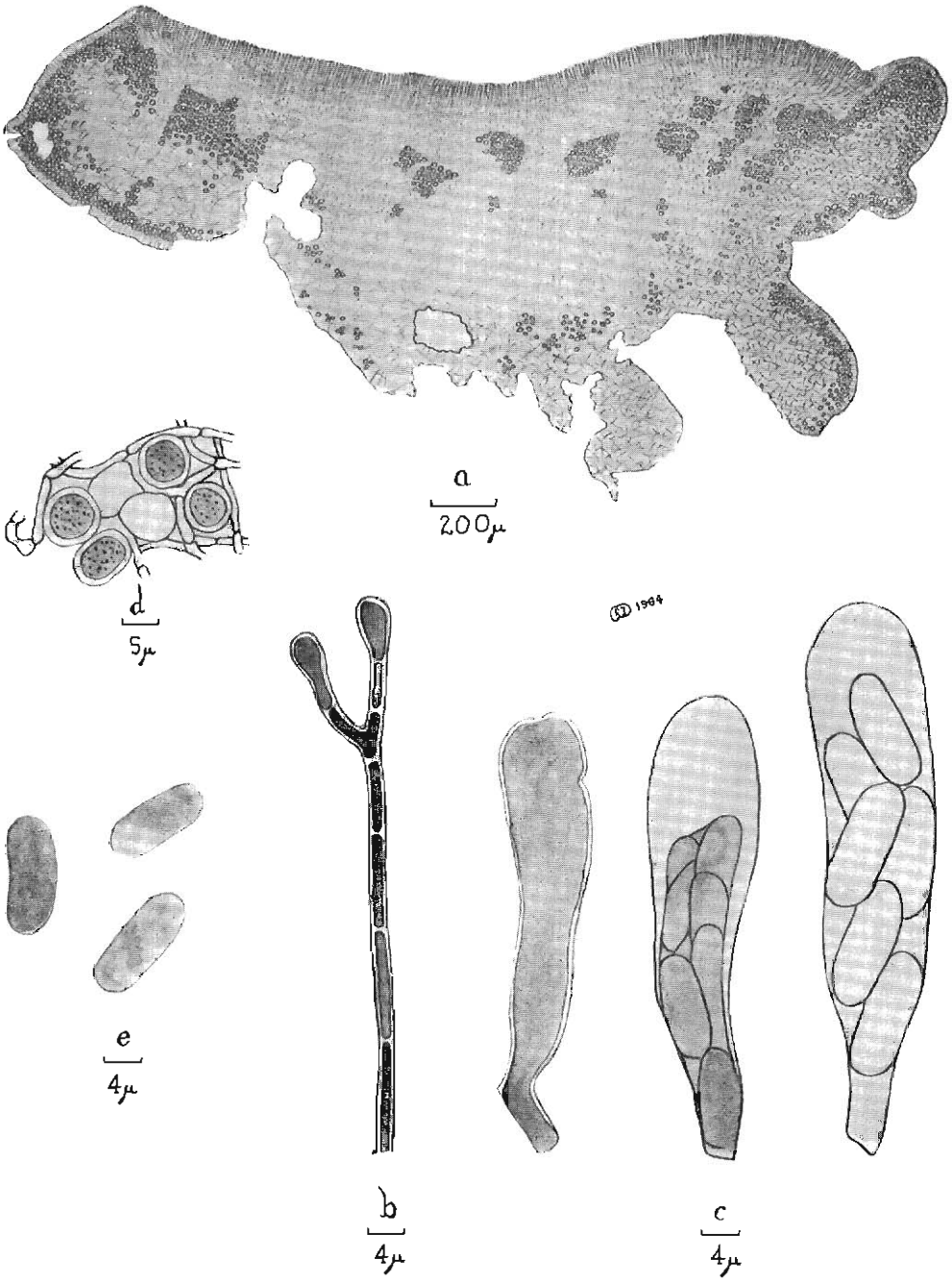

a
200μ
d
5μ
e
4μ
b
4μ
c
4μ

PLATE 21

Lecanora expectans Darb.

a. Section through apothecium from the Central Masson Range

b. Section through hymenium showing asci in various stages of development, and simple paraphyses

c. A branched paraphysis

d. Mature spores free from ascus

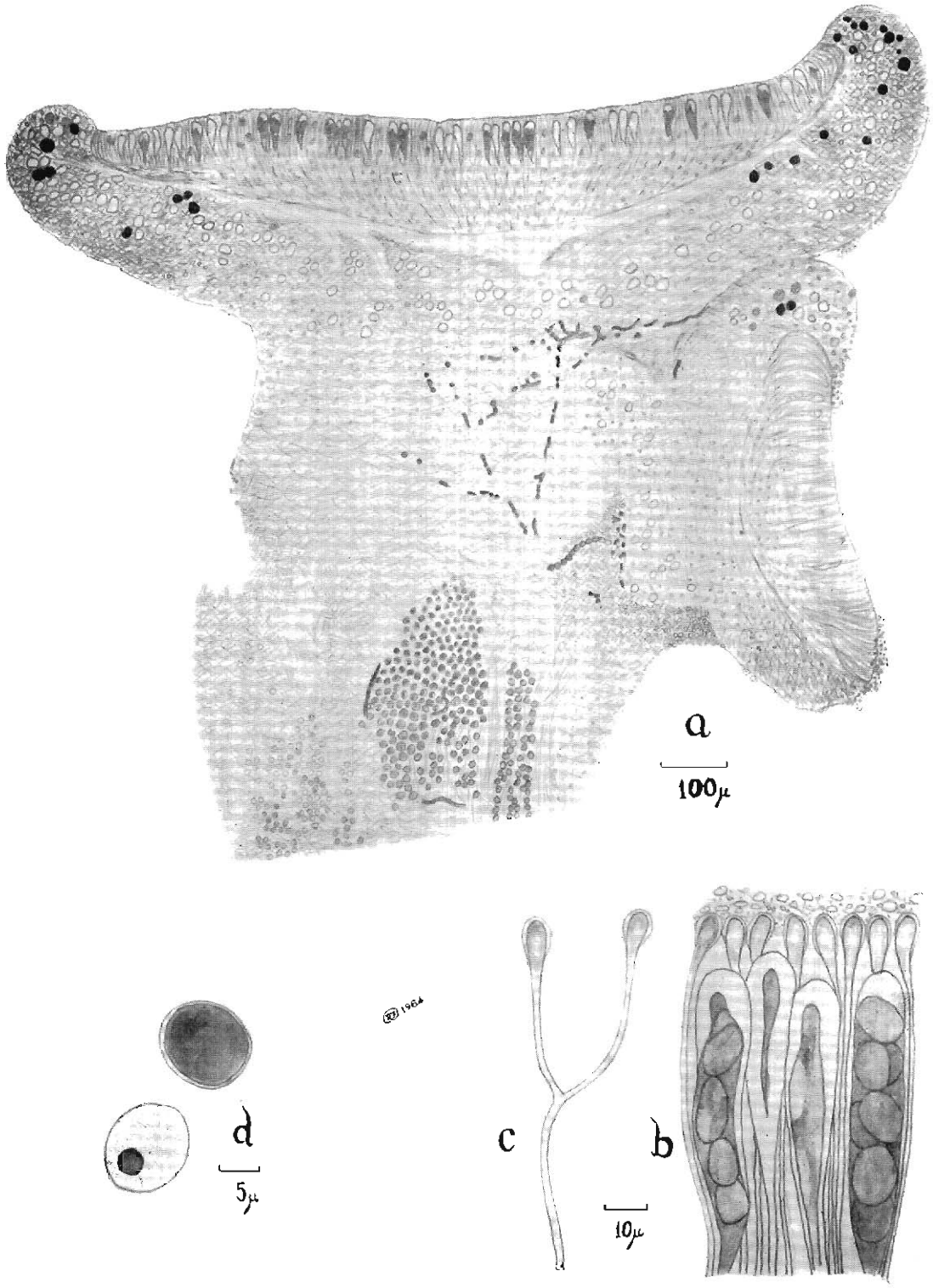

a
100μ
d
5μ
c
b
10μ

PLATE 22

a–d. *Lecidea phillipsiana* R. Filson

a. Typical eroded thallus covered with apothecia from North Masson Range

b. Apothecia from specimen (a)

c. Portion of thallus from mountains north of Chapman Ridge

d. Bleached and eroded thallus lobes next to non-eroded areole from same specimen as (c)

e–f. *Lecidea woodberryi* R. Filson

e. Typical thallus from nunataks east of Taylor Glacier tongue

f. Apothecia from the same thallus showing thickening of thallus

g–h. *Lecidea capsulata* Dodge & Baker

g. Typical thallus from South Masson Range

h. Apothecia from the same specimen as in (g)

a

1cm

b

1mm

c

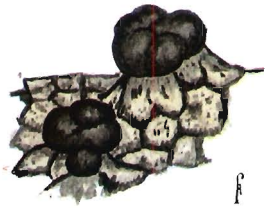
1mm

d

1mm

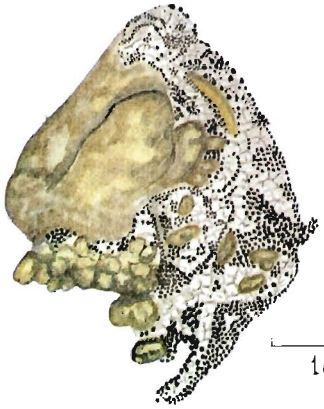
e

1cm



f

1mm



g

1cm

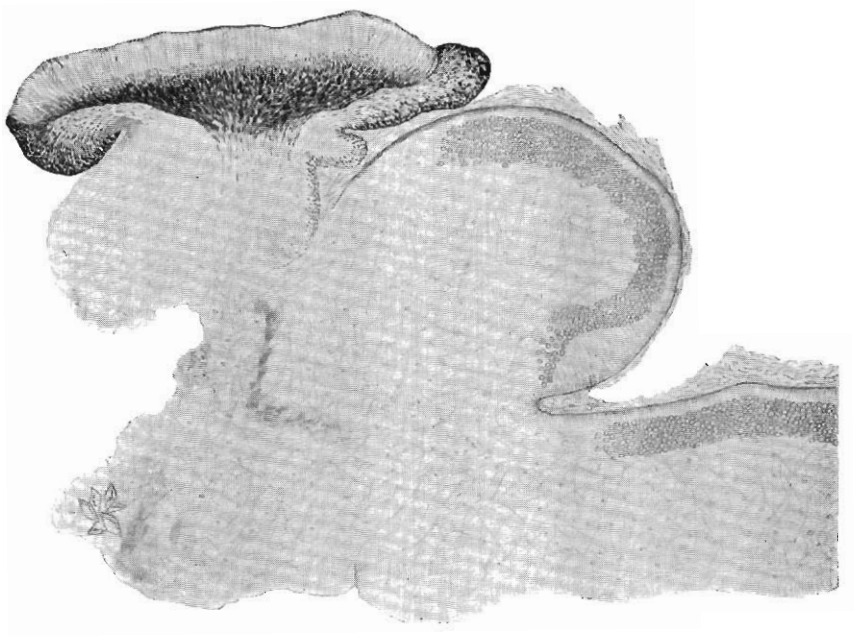
h

1mm

PLATE 23

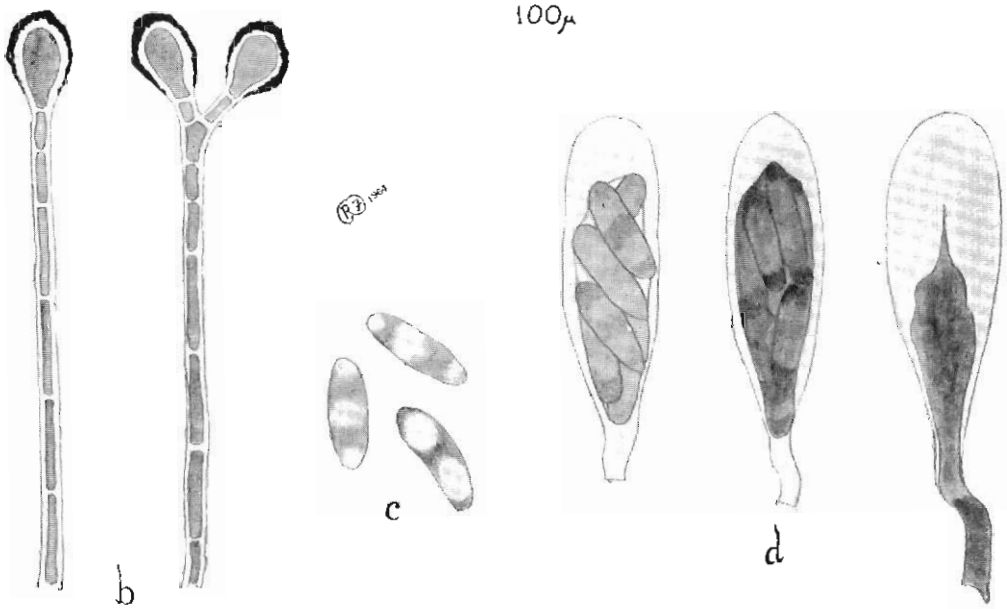
Lecidea phillipsiana R. Filson

a. Section through areole with an apothecium
b. Branched and unbranched paraphyses
c. Ripe ascospores
d. Three stages in the development of the ascus



a

100μ



b

c

d

10μ

PLATE 24

Lecidea woodberryi R. Filson

a. Section through apothecium

b. Paraphyses slightly expanded and showing thick dark sheath

c. Three stages in the development of the ascus

d. Mature ascospores

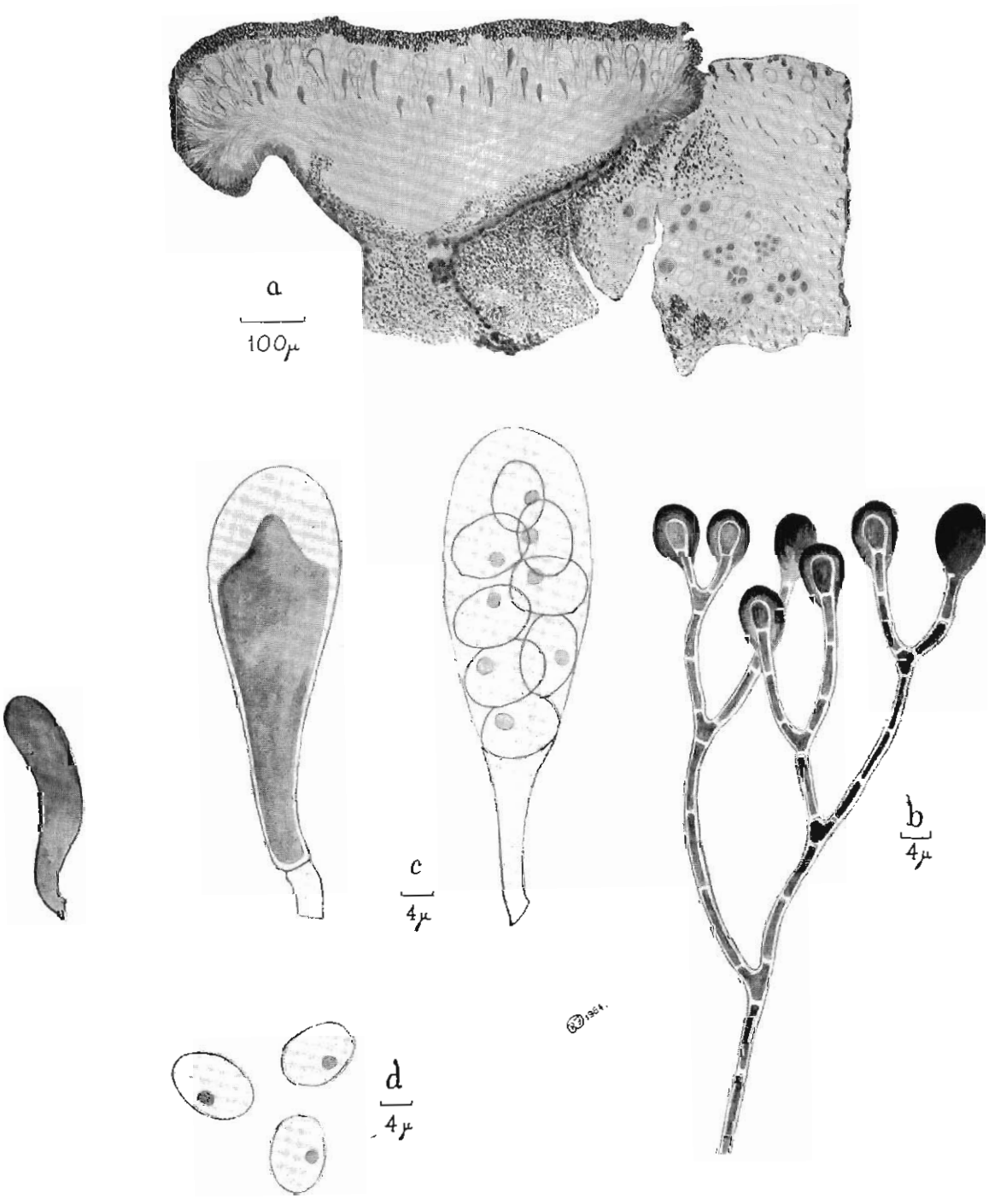

a
100μ
c
4μ
b
4μ
d
4μ

PLATE 25

Lecidea capsulata Dodge & Baker

a. Two apothecia; apothecium on right is cut very close to the outside and shows marginal cortex across top of hymenium

b. A branched paraphysis

c. Mature ascospores

d. Two stages in the development of an ascus

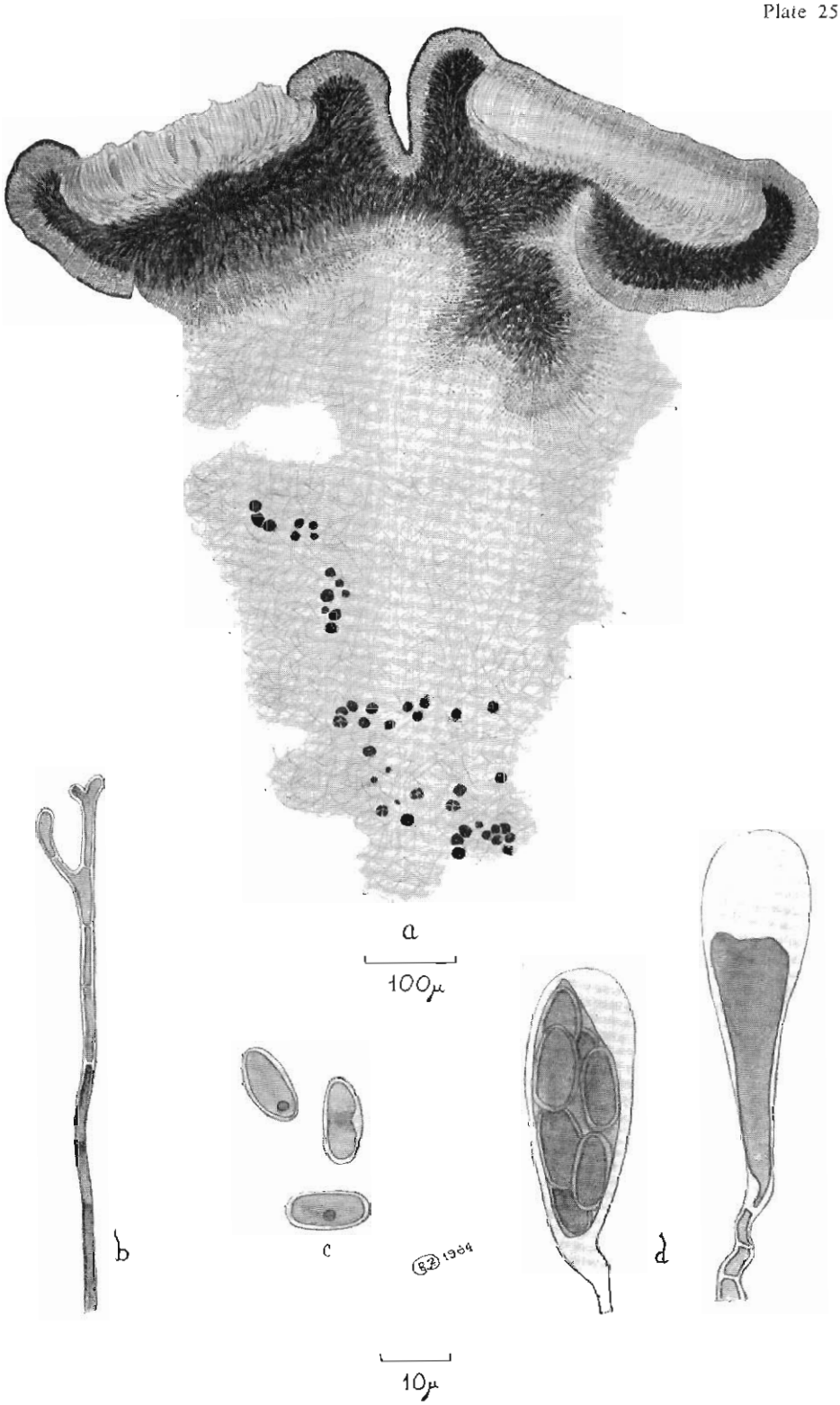
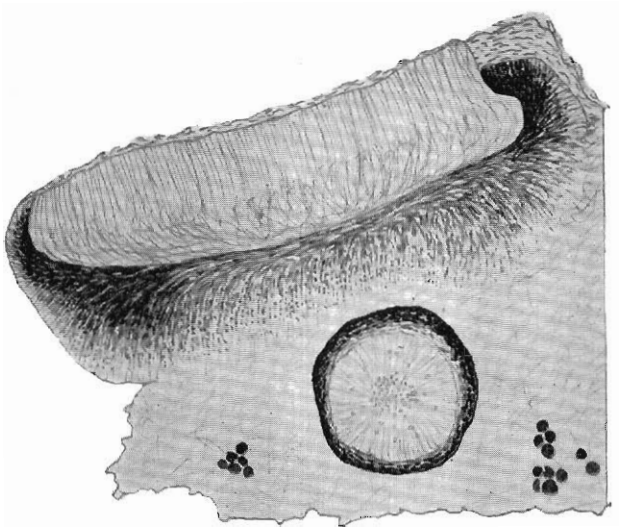

a
100μ
b
c
d
1984
10μ

PLATE 26

Lecidea capsulata Dodge & Baker

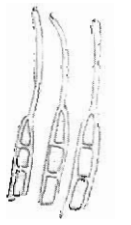
a. Eroded apothecium with pycnide forming below it

b. Isolated microconidia-bearing hyphae



a

100μ



b

10μ

PLATE 27

Rhizocarpon flavum Dodge & Baker

a. Typical specimen from Field Rock

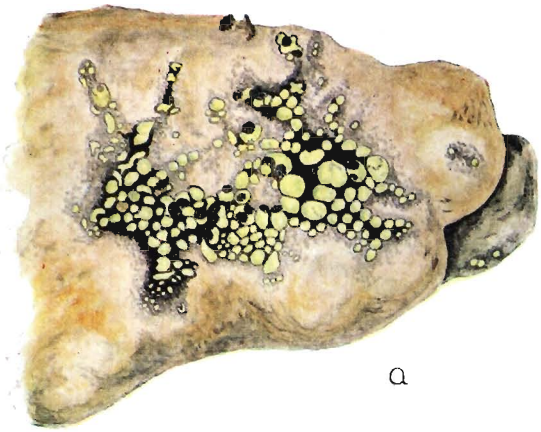
b. Specimen from Cape Bruce

d. Specimen from foot of Hayes Peak, Cape Bruce

Rhizocarpon flavum f. *subfoliosum* R. Filson

c. Specimen from Cape Bruce

e. Apothecia from specimens collected from summit of Chapman Ridge



a

1cm

b

c

1mm

d

1mm

e

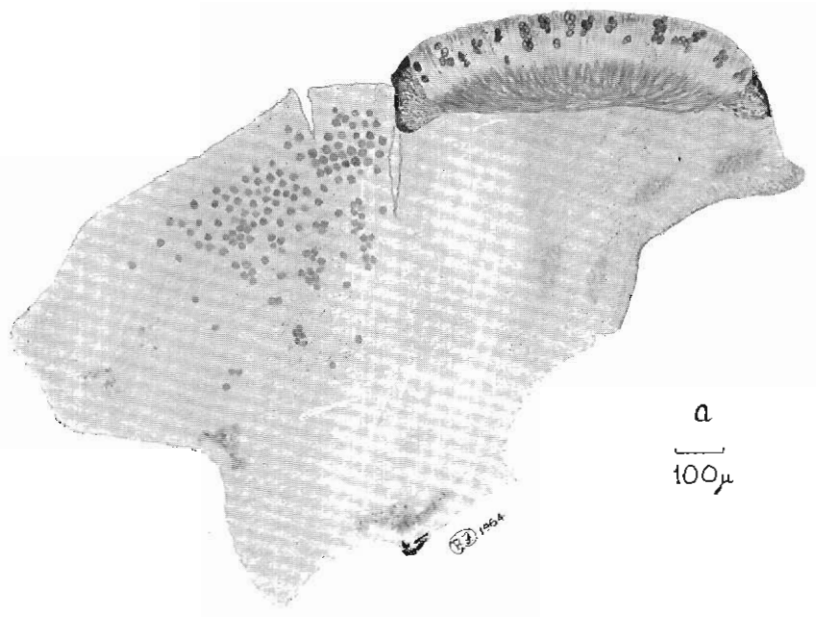
1mm

PLATE 28

Rhizocarpon flavum Dodge & Baker

a. Typical areole with an apothecium

b. Three stages in the development of an ascus; for ripe spores see Plate 29



a

100μ

b

10μ

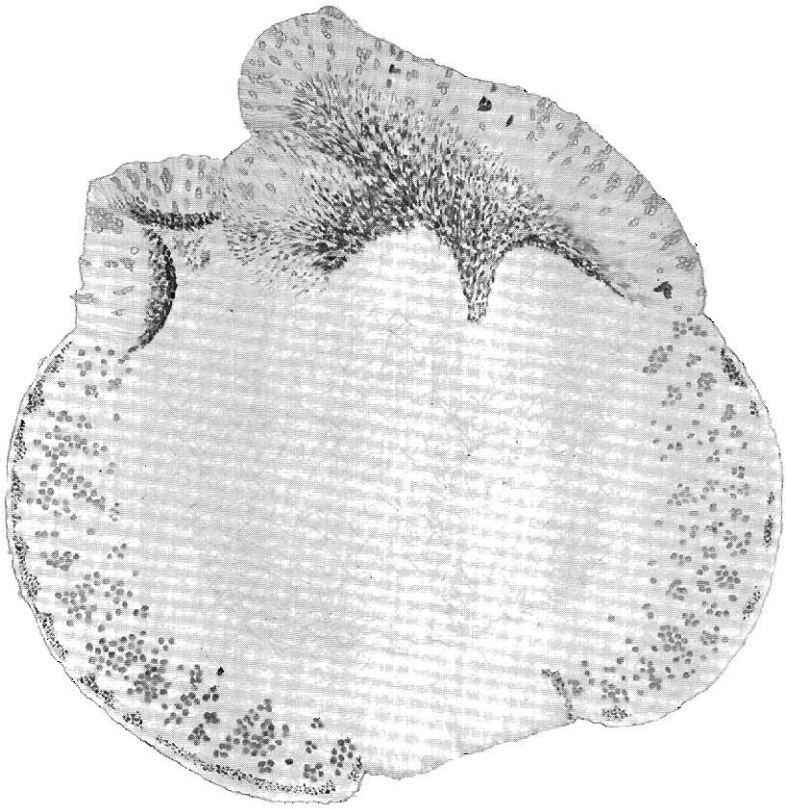
PLATE 29

Rhizocarpon flavum Dodge & Baker

a. Transverse section through hemispherical areole, showing several mature apothecia at top and one immature apothecium below

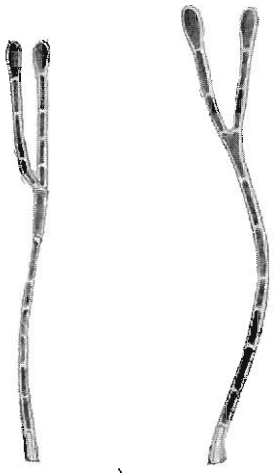
b. Paraphyses

c. Spores in various stages of septation



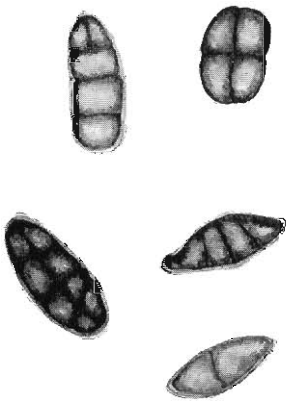
a

100μ



b

10μ



c

10μ

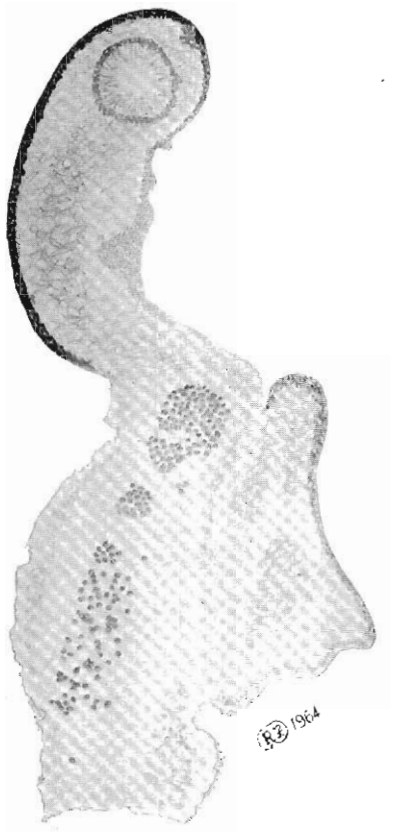
PLATE 30

Rhizocarpon flavum f. *subfoliosum* R. Filson

a. Section through foliose portion of thallus showing pycnide

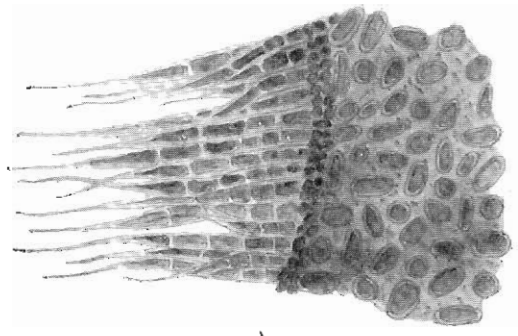
b. Section through pycnide

c. Microconidia—bearing hyphae from pycnide



a
100μ

c
10μ



b
10μ

PLATE 31

Parmelia coreyi Dodge & Baker

a. Portion of specimen from Mawson

b. Enlargement of thallus lobe from same specimen as in (a)

c. Thallus lobe from specimen more finely divided, also collected at Mawson

d. Portion of thallus showing soredia on old part of thallus

e. Thallus lobe showing underside and rhizinae, see Plate 32 for enlargement of rhizine

a

1cm

b

1mm

c

1mm

d

1mm

e

1mm

PLATE 32

Parmelia coreyi Dodge & Baker

a. Section through thallus lobe

b. Section through older part of thallus showing sorediose portion as in top right-hand corner of specimen (d) of Plate 31

c. Enlargement of branched rhizine

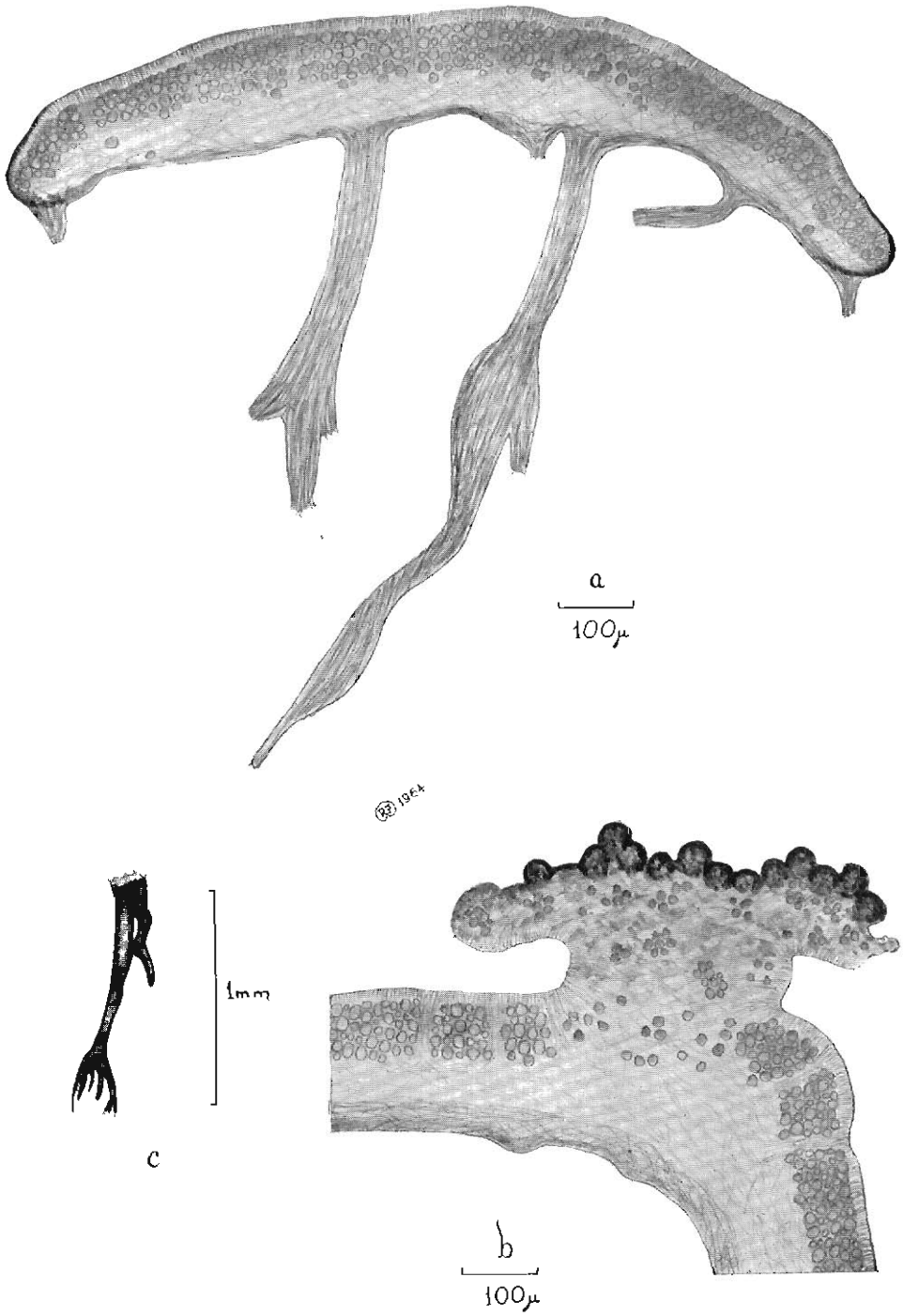

a
100μ
1mm
c
b
100μ

PLATE 33

a–b. *Omphalodiscus decussatus* (Vill.) Schol.

a. Dorsal surface of thallus from Mawson

b. Ventral surface showing the holdfast

c–d. *Omphalodiscus antarcticus* (Frey & Lamb) Llano

c. Dorsal surface of thallus from Mawson

d. Ventral surface showing the holdfast

a

1cm

b

1cm

c

1cm

d

1cm

PLATE 34

Omphalodiscus decussatus (Vill.) Schol.
Section through edge of thallus lobe

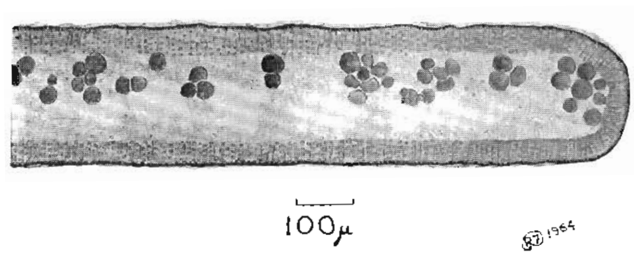

100μ

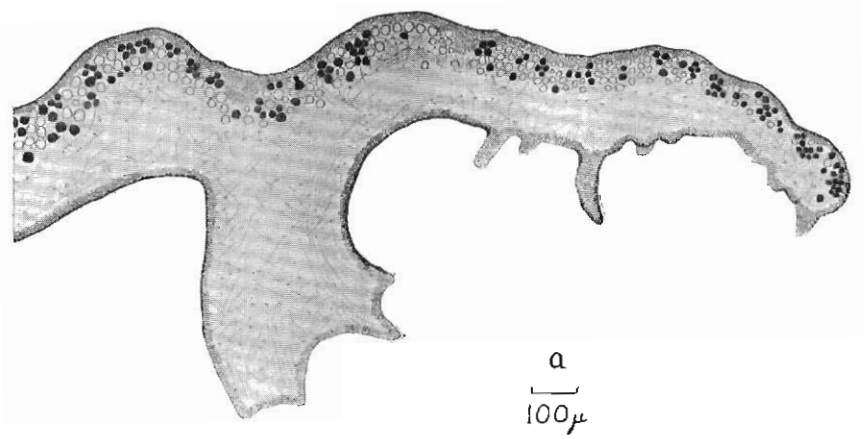
PLATE 35

Omphalodiscus antarcticus (Frey & Lamb) Llano

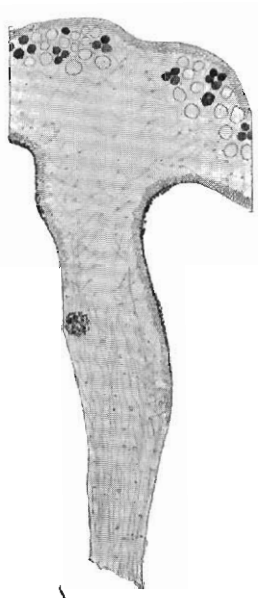
a. Section through thallus showing thicker part of a branched rhizine

b. Section through thallus showing an unbranched rhizine

c. Branched rhizine from underside of thallus of specimen from McNair Nunatak



a
100μ



c
1mm

b
100μ

PLATE 36

Usnea antarctica Du Rietz

a. Thallus from Cape Bruce

b. A single portion of (a)

c. Portion of an older thallus showing soredia

d. Portion of an older thallus showing lower part and holdfast

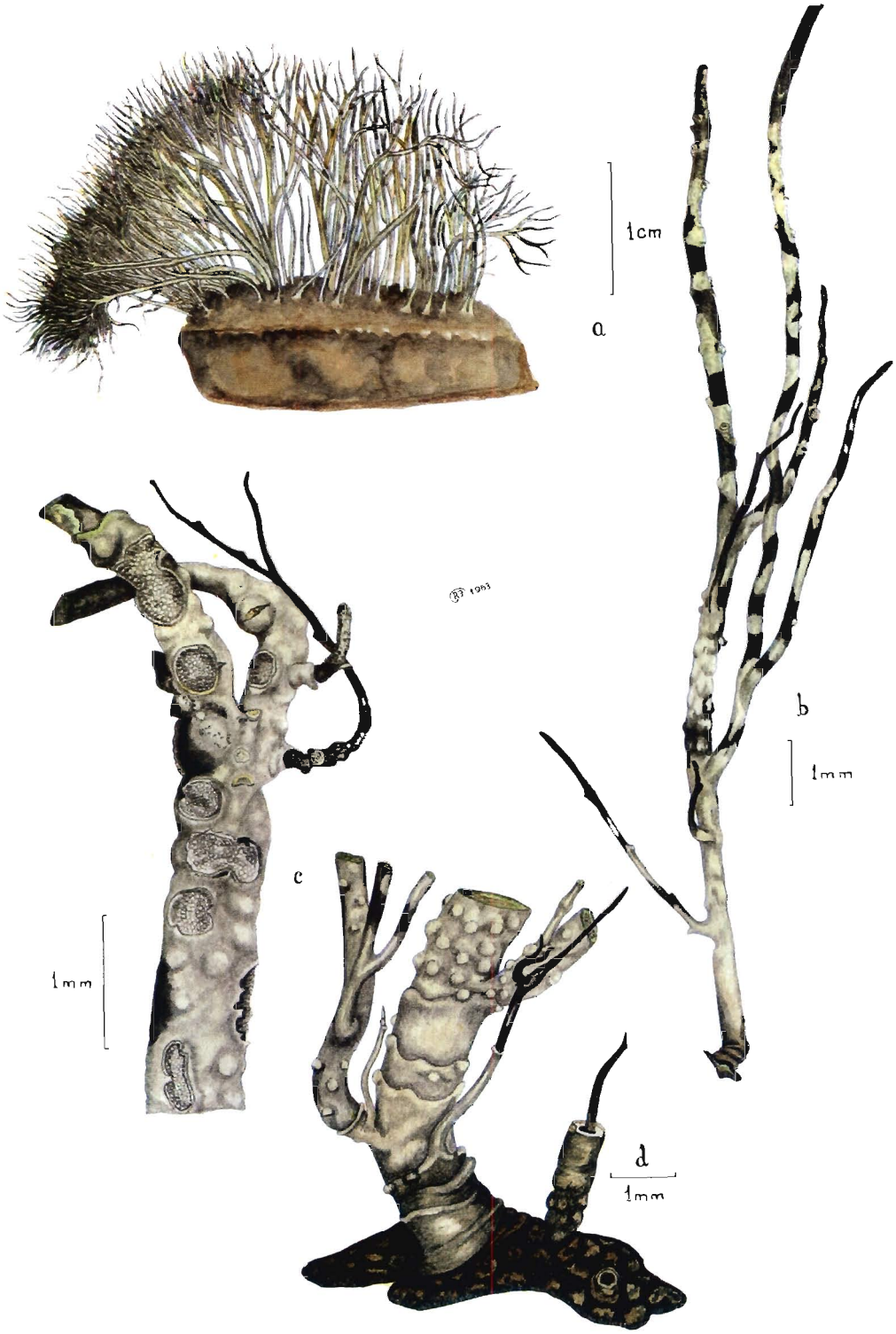
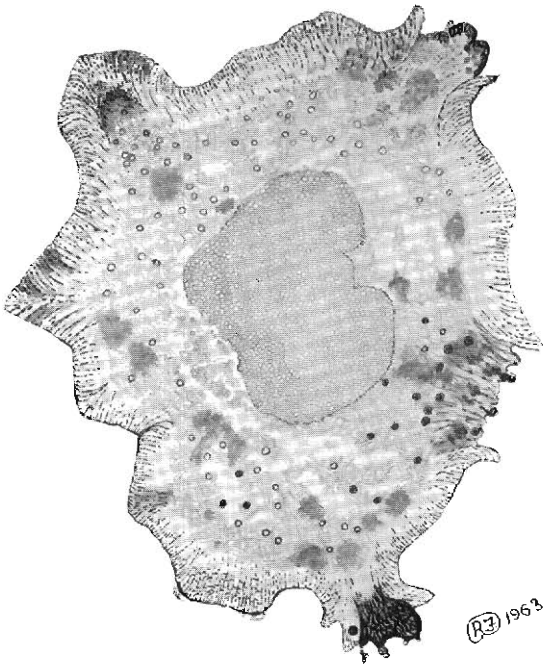

1cm
a
b
1mm
c
1mm
d
1mm

PLATE 37

Usnea antarctica Du Rietz

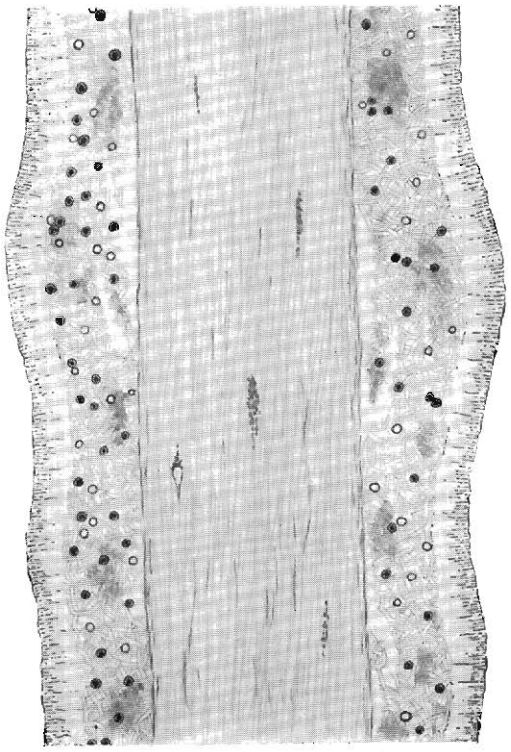
a. Transverse section of thallus

b. Longitudinal section of thallus



a

150μ



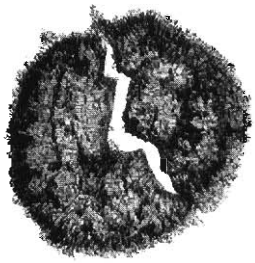
b

150μ

PLATE 38

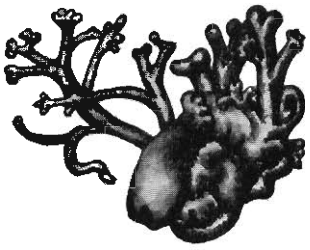
Alectoria minuscula Nyl.

a. Typical pulvinate thallus growing flat on rock surface from Field Rock
b. Fused vernicose thallus lobes on specimen from Fischer Nunatak
c. Typical thalline filament from specimen (a)
d. Transverse section of thalline filament
e. Longitudinal section of filament near tip



a

1CM

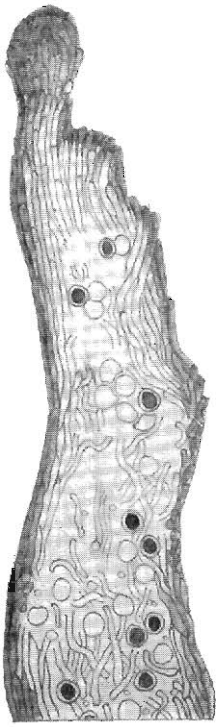


b

1MM

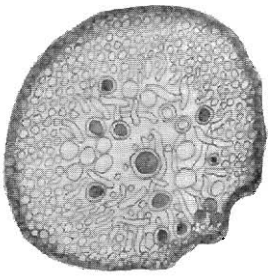
c

1MM



e

100μ



d

100μ

PLATE 39

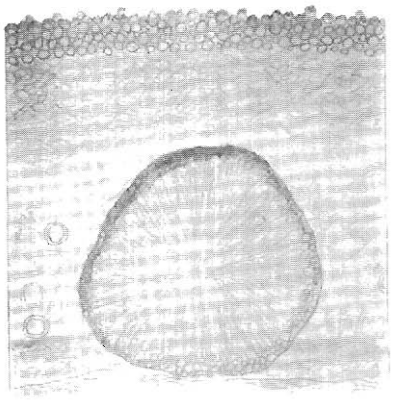
Scutula sp. Tul.

a. Section through apothecium on *Omphalodiscus decussatus* from Field Rocks

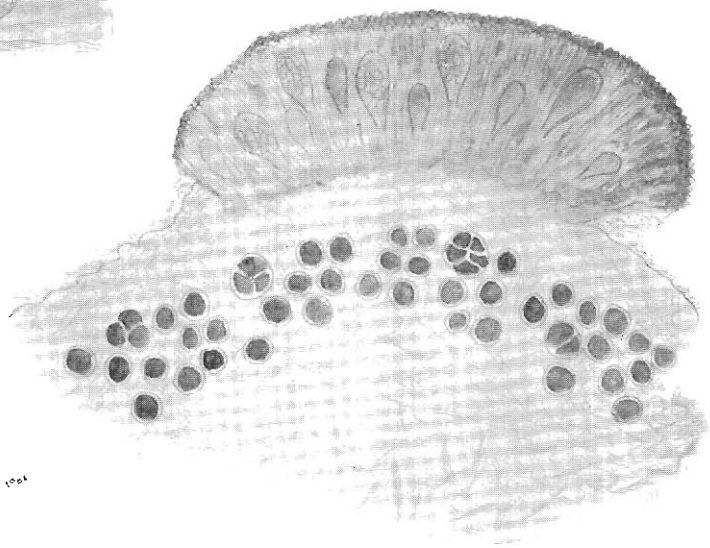
b. Pycnide from same thallus as in (a)

c. Two stages in the development of an ascus

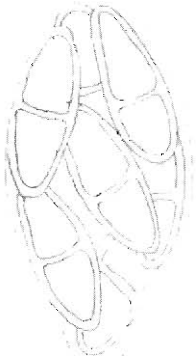
d. Apothecia on thallus of *Omphalodiscus decussatus*

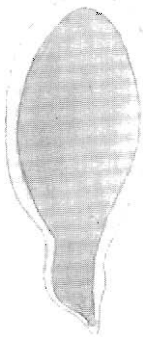


b
100μ

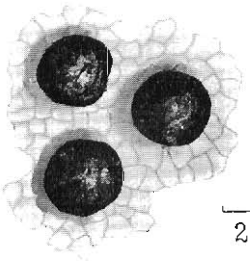


a
100μ





c
10μ



d
2mm

B. MUSCI

Bryum antarcticum Hook fil. et Wils.

Bryum antarcticum Hook. fil. et Wils. (1845). Crypt. Bot. Antarct. Voy. Erebus and Terror (p. 414, pl. 153 f6).

Plants densely tufted into cushions up to 6 cm high, growing in fine sand and rock flour, in cracks, and along melt water courses, on and between the rocks. *Stems* up to 2·5 cm high 50μ to 65μ thick, reddish-brown, matted together with reddish-brown radicles, simple or sparingly branched. *Leaves* erect, oblong, oblanceolate, long-acuminate, concave, yellow-green to green, becoming reddish towards the base, margin entire, 0·9 to 1·2 mm long, 0·2 mm wide. *Nerve* strong, reddish-brown, 35μ wide at the base excurrent. Cells 50-75μ long and 10-25μ wide, irregularly rhomboid to rhomboid-hexagonal.

Patches of this moss were kept under close observation right throughout the summer period and although growth was very extensive no sign was found of any fruiting bodies.

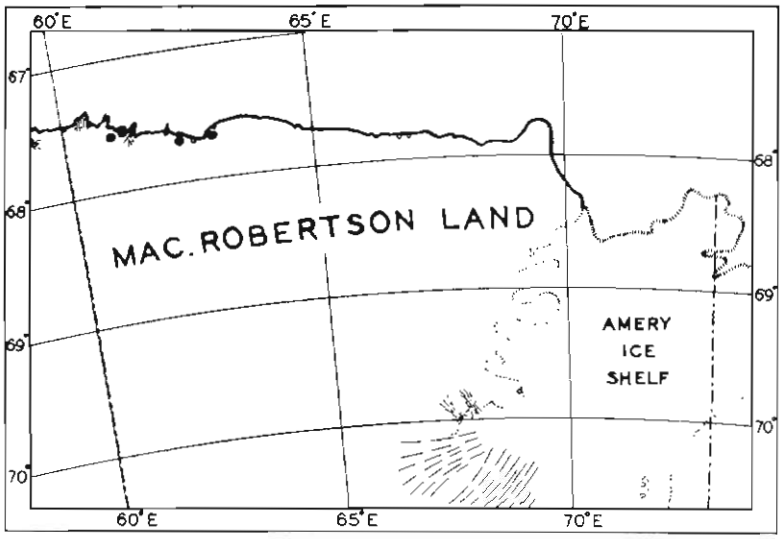


Fig. 40.—Distribution map for *Bryum antarcticum*.

Distribution

MAC.ROBERTSON LAND:

Mawson, growing behind Rymill hut, RF 4057; on the coast east of Taylor Glacier, DT 4058; coastal ridges north of Chapman Ridge, RF & JW 4288; western outcrop, Forbes Glacier tongue, RF 4410.

Other localities

PRINCESS ELIZABETH LAND:

Head of Ellis Fjord, Vestfold Hills, MH 4046.

TERRE ADELIE:

O. BAUER (1912).

MARIE BYRD LAND:

Edsel Ford Range, Skua Gull Peak, P. SIPLE & S. COREY.

ANTARCTIC PENINSULA:

Gerlache Strait, Danco Coast, RACOUITZA; Cockburn Island, J. D. HOOKER; Lysted Island, P. SIPLE; Lambda Island, P. SIPLE; Anchorage Island, P. SIPLE.

QUEEN MARY LAND:

Haswell Island, S. E. JONES; Hippo Island, C. T. HARRISSON.

WILLIAM II LAND:

Gaussberg, VANHUFFEN.

VICTORIA LAND:

Islet in McMurdo Sound, "DISCOVERY" EXPEDITION.

Grimmia lawiana J. H. Willis, spec. nov.

Plantae videtur steriles, pulvinos densos in solo atque rupibus formantes.

Caules graciles, semel vel bis egerminati, usque ad 1 cm alta.

Folia superiora pallide viridia, erecto-patentia (statu sicco arcte imbricata), late lanceolata, 0·8-1·2 mm longa, 0 2-0·5 mm lata (ad basin), profunde concava, apicem versus validius carinata. *Arista* usque ad 0 3 mm longa (sed usitate brevior), valida, hyalina, perobscure denticulata. *Margines* basin versus plani, deinde ad partes apicales manifeste incurvi.

Costa percurrens vel subter apicem evanescens, valida, ad basin circiter 45μ lata, eius cellulis infimis anguste rectangularibus (20-30 $\times$ 6-10μ); costae sectio transversa cellulas 10-15 irregulares ("deuter") exhibens.

Cellulae esinuosae, nunquam protrudentes, omnino subquadratae, folii apicem versus 5-7μ longae bistratosae incrassatae chlorophyllosae obscuraeque, ad basin latum clarae leniter oblongae et longitudine 8-15μ. Caetera ignota.

HOLOTYPE: Ring Rocks, Mac.Robertson Land, Antarctica, *leg.* R. Filson No. 4225, 16 September 1962 (MEL).

ISOTYPES: MEL, NSW, WELT, K, BM, P, S, H, US, NY.

Plants apparently always barren, forming extensive dense cushions (to 1 cm high) on soil or rock. *Stems* slender, once or twice branched. *Upper leaves* pale green, erecto-patent (closely imbricate when dry), broadly lanceolate, 0·8-1·2 mm long 0·2-0·5 mm wide at base, deeply concave, only slightly keeled below but more strongly towards apex which is prolonged into a stout, very obscurely denticulate, hyaline arista to 0 3 mm long (but usually much less). *Margins* plane below, becoming manifestly incurved in apical portion. *Nerve* percurrent or vanishing just below apex, stout, $\pm$ 45μ wide at base where its cells are narrowly rectangular (20-30 $\times$ 6-10μ). In transverse section showing 10-15 irregular "deuter" cells

but no "stereids". *Cells* with non-sinuous walls, never projecting above surface subquadrate throughout, 5-7μ long toward leaf-apex (where bistratose, incrassated, chlorophyllose and obscure), increasing in size and clarity towards the broad base where 8-15μ long and slightly oblong. Sporophyte unknown.

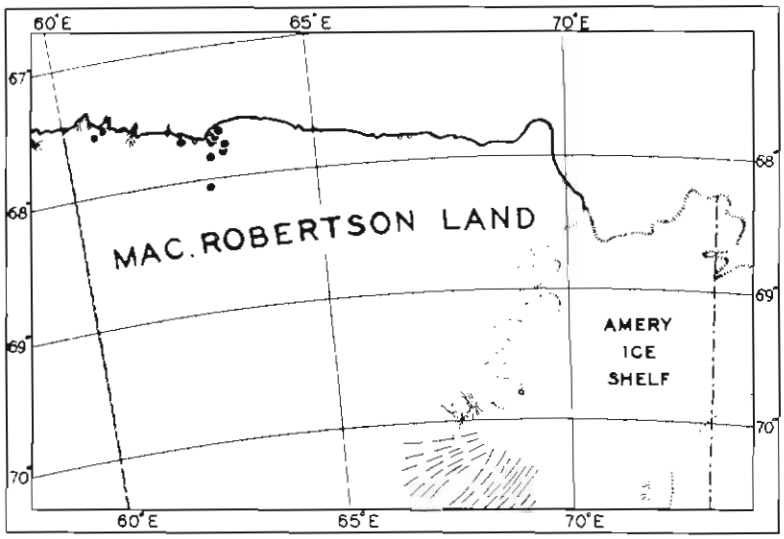


Fig. 41.—Distribution map for *Grimmia lawiana*.

Distribution

MAC.ROBERTSON LAND:

Field Rock, RF 4171; Mawson, RF 4069; Mawson, A. M. GWYNN AB/54/LI, 46; Departure Rocks group, RF 4157; Ring Rocks, RF 4225, (TYPE); Cape Bruce, RF & JW 4335; foot of Hayes Peak, Cape Bruce, RF & RN 4378; summit of Hayes Peak, RF & RN 4389; Goldsworthy Ridge, Mount Henderson, RF 4185; Fischer Nunatak, RF 4182; North Masson Range, RF 4092; peak 1070 m south of Trost Peak, South Masson Range, RF & JW 4503.

Commentary

The first known collection of *Grimmia lawiana* was made by Dr. A. M. Gwynn at Mawson (Mac.Robertson Land) in February 1954. This material was communicated a few months later to the author of the name, who attempted to identify it with one of the seven *Grimmia* species previously recorded from the coasts and off-shore islands of Antarctica—*G. antarctica, G. apocarpa, G. alpicola, G. doniana, G. fastigata, G. plagiopoda* and *G. stolonifera*. But none of the descriptions (or specimens) then available matched the combination of characters to be found in leaves of the Mawson plant, viz. involute margins and small non-sinuose cells that are subquadrate from apex to base (where only slightly larger than at apex). A portion was sent to Pennsylvania for examination by Mr. E. B. Bartram, a world authority on *Musci*. He reported (7.X.1954) as follows:

> "No. 268W. Although sterile, as far as I have seen, this is probably *Grimmia fastigata* Card. described and figured in *La Flore Bryologique des Terres*

> *Magellaniques* and listed in the publication cited below [viz. *Scientific Reports of the Australasian Antarctic Expedition 1911-14*. Series C—Zoology and Botany 7: 6 (September 1918)]. I know of nothing else from Antarctica with which it might be compared".

Immediately another sample was dispatched to Paris for careful comparison with the type of Cardot's *Grimmia fastigata* (from Ushuaia, on the south coast of Tierra del Fuego). Professor Roger Heim very kindly donated a fragment of this type and made the following reply (26.X.1954):

> "Votre échantillon est stérile . . . . Madame Jovet a cherché avec soin dans nos collections, mais n'a rien trouvé de semblable".

It is quite clear that *G. lawiana* is in no way closely related to *G. fastigata* which differs in its revolute leaf-margins and conspicuously sinuose cells (linear and 30-50μ long at base). Comparisons were also made with another unknown, but superficially similar, species of *Grimmia* from the summit of Mount Kosciusko, New South Wales, Australia, but the latter has dark green, narrowly lanceolate leaves and much larger cells (8-12μ long and mamillately protruding above, 30-50μ long and narrowly rectangular at the base), its arista being manifestly denticulate.

Finally, on 20.IV.1964, a specimen was submitted to Dr. W. C. Steere at the New York Botanical Garden. Mr. Mulford Martin inspected it and commented (*in lit.*, 29.VI.1964): "I have studied the *Grimmia* specimen from Mac.Robertson Land, Antarctica, ... but I have been unable to identify it."

No sporophytes have been found in any collection yet made of *G. lawiana* and, in their absence, the true affinities of this little moss must remain in doubt. But one is convinced that its distinctiveness fully justifies recognition as an eighth *Grimmia* for Antarctica, and the author takes pleasure in naming it as a tribute to Dr. Phillip G. Law, Director of the Antarctic Division and of ANARE scientific projects since their inception in 1947.

PLATES 40-41: MOSSES

PLATE 40

Bryum antarcticum Hook. f. & Wils.

Top left, typical plants removed from a cushion

a. Average leaf from front

b. Average leaf from the side

c. Plants with young seta (after W. Fitch, Flora Antarctica (J. D. Hooker))

d. Cell structure at apex of leaf

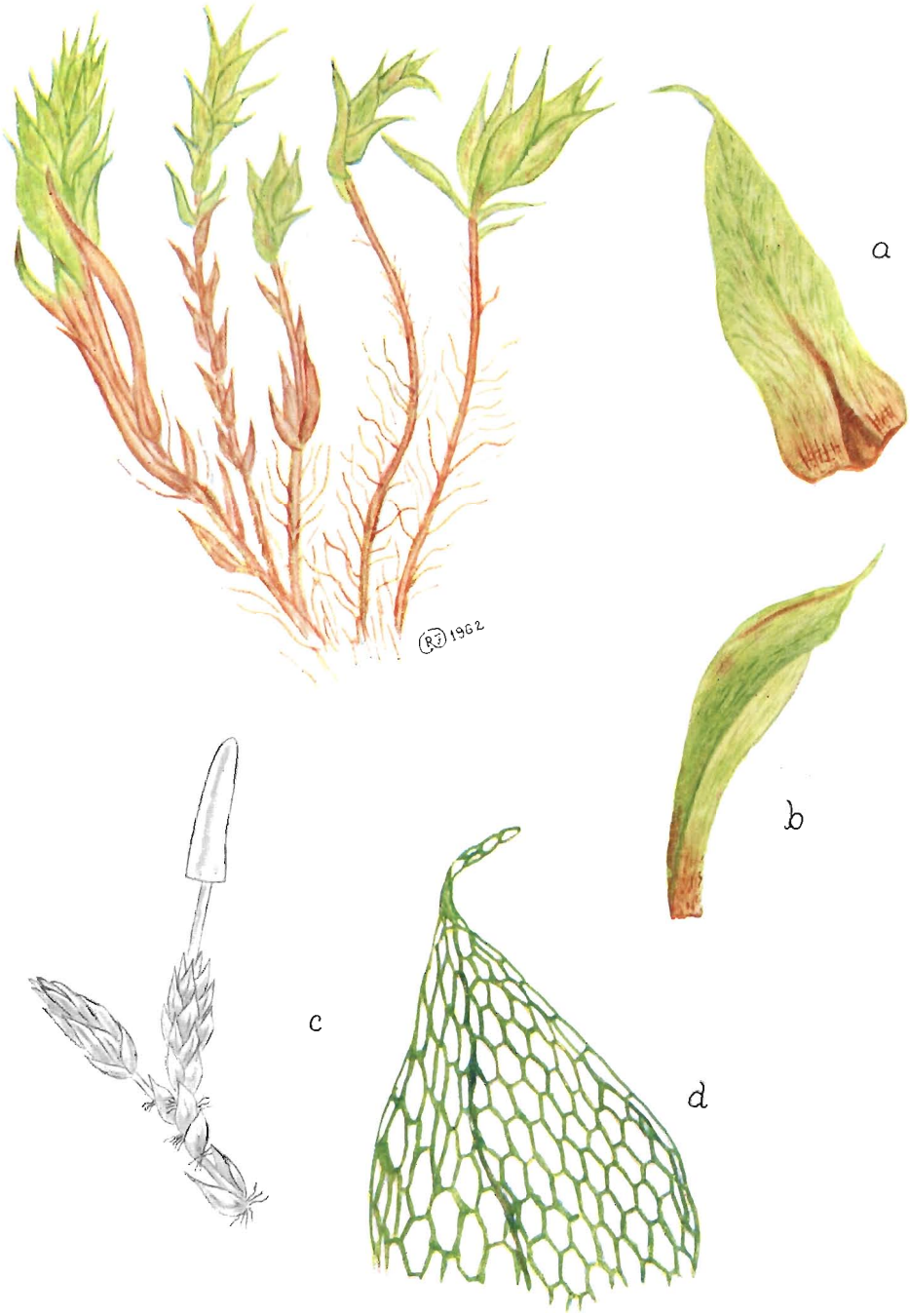

a
b
c
d
RJ 1962

PLATE 41

Grimmia lawiana J. H. Willis

a. Typical plant from type specimen collected at Ring Rock

b. Enlargement of uppermost portion of plant

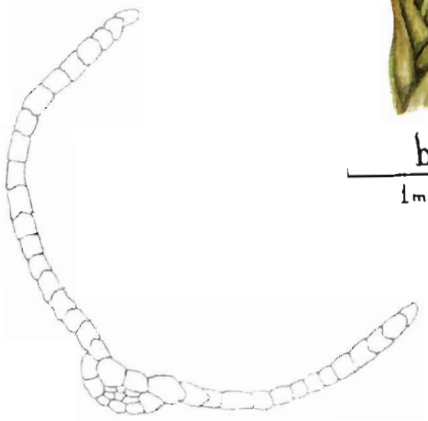
c. Average single leaf

d, e. Areolation (enlarged)

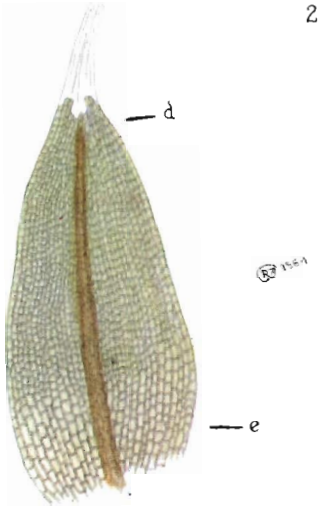
f. Transverse section of an average leaf

a
1mm

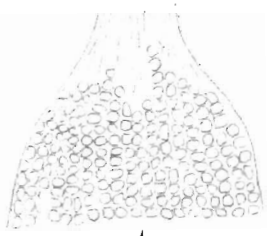
b
1mm



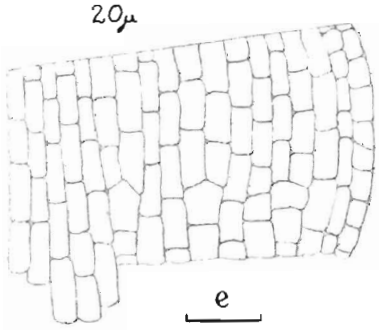
f
20μ



c
100μ



d
20μ



e
20μ

IV. ACKNOWLEDGEMENTS

I wish to express my appreciation to Dr. Phillip Law, Director of the Antarctic Division of the Department of External Affairs, for his encouragement and generosity in allowing me to continue my investigations, after my return from Antarctica to Australia, at the National Herbarium, Melbourne, where I was able to refer to the lichen collection. I am also greatly indebted to Mr. R. T. M. Pescott, Director and Government Botanist, Royal Botanic Gardens and National Herbarium, Melbourne, for allotting me space to work in the already crowded Herbarium building and for permission to use the botanical library. I am most grateful to Mr. J. H. Willis, Assistant Government Botanist at the Herbarium, for his very generous help and advice in all botanical matters relating to this work and for translating the descriptions of the new species into botanical Latin. I also wish to acknowledge helpful geological advice made available by Mr. D. S. Trail, geologist at Mawson in 1961, and Mr. J. C. Branson, geophysicist at Mawson, 1962. Finally, I also wish to thank Miss J. Skurrie who typed the manuscript, and Mr. J. Phillips, physicist at Mawson, 1962, who made many helpful suggestions for improving the original text.

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* This list includes some publications not directly referred to in the text, but which were consulted by the author in the course of his research and might be of interest to the reader. Taxonomic bibliographies precede the description of each species where not newly described.

APPENDIX I

LICHEN SPECIMENS RECORDED FOR MAC.ROBERTSON LAND

The first column is a complete list, arranged systematically, of all the lichens collected in Mac.Robertson Land. A denotes those collected by the British and New Zealand Antarctic Research Expedition; B, by Dr. A. M. Gwynn; C, by Dr. R. O. Summers; and D, by the 1962 Australian National Antarctic Research Expedition.

The second column is the synonymic name under which that lichen is discussed in this paper, and the reference numbers refer to further discussion at the end of this chapter.

Mastodia mawsonii[1] A	
Acarospora gwynnii B C D	*Acarospora gwynnii*
Acarospora williamsii D	*Acarospora williamsii*
Biatorella antarctica D	*Biatorella antarctica*
Buellia foecunda D	*Buellia foecunda*
Rinodina frigida A B C D	*Buellia frigida*
Buellia grimmiae D	*Buellia grimmiae*
Buellia lignoides D	*Buellia lignoides*
Buellia aff. *subpedicellata* D	*Buellia* aff. *subpedicellata*
Buellia johnstonii[2] B	
Rinodina archaeoides D	*Rinodina archaeoides*
Gasparinnia citrina[3] C	
Gasparinnia harrissonii B C D	*Caloplaca elegans* var. *pulvinata*
Polycauliona johnstonii[4] A C	
Protoblastenia citrina A B C D	*Protoblastenia citrina*
Pyrenodesmia mawsonii A C D	*Pyrenodesmia mawsonii*
Heppia antarctica A B C D	*Heppia antarctica*
Lecanora exulans A B C D	*Lecanora rubina* var. *melanopthalma* f. *exulans*
Lecanora griseomarginata B D	*Lecanora expectans*
Lecanora johnstonii[5] C	
Lecidea cancriformis A D	*Lecidea phillipsiana*
Lecidea capsulata D	*Lecidea capsulata*
Lecidea harrissonii[6] B	
Lecidea woodberryi D	*Lecidea woodberryi*
Catillaria cremea[7] A	
Toninia johnstonii[8] A	
Rhizocarpon flavum D	*Rhizocarpon flavum*
Rhizocarpon flavum f. *subfoliosa* D	*Rhizocarpon flavum* f. *subfoliosa*
Parmelia johnstonii A B C D	*Parmelia coreyi*
Parmelia leucoblephara[9] A	
Parmelia variolosa[9] A	
Xanthoria mawsonii A B C D	*Xanthoria mawsonii*
Umbilicaria spongiosa var. *subvirginis* B D	*Omphalodiscus antarcticus*

Umbilicaria subcerebriformis B D	*Omphalodiscus decussatus*
Omphalodiscus decussatus var. *cerebriformis* C	
Omphalodiscus decussatus var. *tortuosus* C	
Alectoria congesta A B D	*Alectoria minuscula*
Usnea antarctica D	*Usnea antarctica*

1. ***Mastodia mawsonii***

This species is represented by a small fragment floated out from a tuft of mosses, and has not been located since. Dodge (1948) describes it as follows:

"Thallus foliose, probably umbilicate but attachment not seen, growing over mosses, more or less circular in outline, lobes rounded and crisped, in some individuals, the upper surface microphylline probably from the germination of akinetes in situ; marginal cells elongate, 11-12μ × 3-4μ, arranged in a palisade, other cells in tetrads arranged in rows near the margin, more irregular within, 3·5-4·5μ in diameter, with spaces between the tetrads somewhat variable, the whole imbedded in a gel; medulla between the upper and lower layers of tetrads of very slender hyaline hyphae. Soredia of subspherical tetrads 8-12μ in diameter, with a thick sheath and a few hyphal filaments; akinetes of the alga long ellipsoid or subfusiform, about 25 × 10μ of 4-8 cylindric cells, 4μ long and 8μ in diameter, without hyphae in the sheath.

"Perithecia subspherical, immersed, with a light brown wall, too old and disintegrated to see contents clearly, but apparently with clavate asci and ellipsoidal unicellular spores.

"Spermogonia flattened, irregular, wall very thin, palisade of spermatiophores 18-20μ tall; spermatia ellipsoidal, 2-3 × 1μ."

2. ***Buellia johnstonii***

This lichen was not located amongst our material, it is also absent from collections held in the National Herbarium, Melbourne. It is described by Dodge (1948) as follows:

"Thallus ambiguous, cortex not differentiated, the outermost algal cells protected by one to a few layers of medullary hyphae; algae cystococcoid, up to 12μ in diameter, mostly solitary and relatively few; medulla of closely woven, hyaline, thick-walled hyphae about 4μ in diameter, forming a cushion under the apothecium. Below what seems to be the thallus proper of the Buellia, apparently, the thallus of the host has been stimulated to elongation of the medullary hyphae, forming a thick reticulate layer, about 60μ thick, without algal cells, covered by a thin cortex, 10μ thick, of disintegrating fastigiate hyphae, and a lower medullary layer of anastomosing subvertical hyhae, thin-walled, about 6μ in diameter. Dark brown hyphae from the base of the parathecium, about 5μ in diameter, singly or in loose strands, penetrate the medulla of the host thallus.

"Apothecia black, 0·3-0·4 mm in diameter, sessile, flat or slightly convex, margin black, not prominent; parathecium 40μ thick below, thinning to 30μ at the sides, dark brown, of thin-walled periclinal hyphae, closely septate below and appearing almost pseudoparenchymatous, slightly inrolled above, but not extending above the thecium; hypothecium scarcely differentiated; thecium 55-60μ

thick; paraphyses slender, dichotomously branched above the asci; terminal cells spherical dark brown, about 4μ in diameter, forming a dark brown epithecium about 8μ thick; asci clavate, wall and tip thickened, protoblast truncate, broadly mammillate, becoming thin-walled, about 35 $\times$ 8μ, 8-spored; ascospores obliquely monostichous to distichous, dark brown, bilocular, ellipsoid or flattened on one side, moderately thick-walled, not constricted at the septum, 10-12μ $\times$ 5-6μ."

3. ***Gasparinnia citrina***

Duplicates of this collection in the National Herbarium, Melbourne, have been examined; except for the lighter colour, no specific difference can be observed between this species and *Caloplaca elegans* var. *pulvinata* (syn. *Gasparinnia harrissonii*). The colour difference is only a modification brought about by the plant growing in a sheltered position amongth the rocks. Many of our specimens have remarkable colour differences where they grow deep down in crevices away from the harsh weather.

4. ***Polycauliona johnstonii***

In the description this species differs only slightly from *Gasparinnia harrissonii*. There is a specimen in the National Herbarium, Melbourne, collected by Dr. R. O. Summers, labelled *"Gasparinnia harrissonii and Polycauliona johnstonii."* The latter is represented by a small thallus, lighter in colour and not so weathered on the under surface of the specimen. Microscopically the two are identical and one fails to see why this is not just a modification caused by it growing in a sheltered position.

5. ***Lecanora johnstonii***

We did not find any specimens fitting the description of this lichen in our area. One small specimen collected by Dr. Summers, and determined as *Lecanora johnstonii*, appears to be conspecific with *Lecanora rubina* var. *melanopthalma* f. *exulans*.

6. ***Lecidea harrissonii***

This species was not amongst the original collection from Cape Bruce, but was reported to be in Dr. A. M. Gwynn's collection from Mawson. A duplicate of this collection is in the National Herbarium Melbourne. The specimen referred to as *Lecidea harrissonii* is a small inconspicuous thallus on the side of a stone on which *Alectoria minuscula* is growing. In this inconspicuous thallus, two lichens are represented, *Acarospora williamsii* and a few sterile areolae on a black dendritic hypothallus which suggests *Buellia lignoides*.

7. ***Catillaria cremea***

We did not find any specimens which fit the description of this lichen. The only record for our area is a few small fragmentary specimens from Cape Bruce. Dodge, in the BANZARE Report, says that they were in poor condition for identification and that the characteristics that were observable suggested this species. *Lecidea woodberryi* is abundant in the Taylor Glacier area and it is considered that the previous collection possibly belongs here.

8. ***Toninia johnstonii***

Cape Bruce is the type area for this lichen and, though many hours were spent in this area, we failed to relocate it. Dodge describes it in the BANZARE report as follows:

"Thallus areolate, margin effigurate, marginal lobes forked, white, rather thick, often mostly developed below surface crystals (quartz) of the rock, with only the small areola and relatively large apothecium showing at the surface between the crystals; cortex about 55μ thick, apparently fastigiate, soon largely gelified, especially the outer 30μ; algal layer 50-70μ thick, protococcoid, cells up to 10μ in diameter, arranged in more or less vertical rows and angular from mutual pressure; medulla spongy, of very loosely woven, slender, thick-walled, anastomosing hyphae with large air spaces.

"Apothecia 0·5-0·6 (-0·9) mm in diameter, black, disc plane at first with slightly elevated black margin, then very convex to hemispherical or subspherical; amphithecium absent; parathecium about 50μ thick, of periclinal, very slender, thick-walled, hyaline hyphae next the thecium and hypothecium, spreading flabellately, so that the outer 35μ are nearly perpendicular to the surface, and very dark brown; hypothecium obconic, capped by a spherical segment becoming a hemisphere or greater, of subvertical, coarse brown hyphae, more loosely woven and not gelified, about 4μ in diameter, becoming a close palisade above and merging into the thecium; thecium about 75μ tall; paraphyses slender, hyaline, about twice dichotomous above the asci, forming a blue-black epithecium about 10μ thick, terminal cells clavate; asci linear to clavate, tips not conspicuously thickened, 8-spored, 35-40μ $\times$ 7-8μ; ascospores hyaline, acicular, fastigiate, more or less helically coiled in the ascus, 10-14μ $\times$2 5μ, at least three-celled."

9. ***Parmelia leucoblephara*** and ***Parmelia variolosa***

These are discussed in the paragraph at the end of the description of *Parmelia coreyi*.

APPENDIX II

ADDITIONAL COLLECTION, 1964-65

The 1964-65 geological survey of the Mac.Robertson Land and adjacent land masses westward supplemented the collections dealt with in this report. Collections were made on an outcrop (Norris Island) to the north of Chapman Ridge by I. R. McLeod, in the Casey Range by P. J. Cook and G. Wallis, and on the south side of Stump Mountain by D. Trail.

The collections made on the Casey Range certainly confirm the author's belief that this range should possess a wider lichen flora than that collected by the 1962-63 expedition. The 1964-65 survey collected six species not previously recorded in that area.

The lichen flora of Stump Mountain does not differ in any way from the adjacent area of Chapman Ridge but they do provide interesting locality records.

In the following list of collections the number after each author citation is that of the National Herbarium, Melbourne, where the specimens have been lodged.

Casey Range

LICHENAE

Buellia foecunda R. Filson MEL9101
Pyrenodesmia mawsonii Dodge MEL9109
Protoblastenia citrina Dodge MEL9110
Lecidea capsulata Dodge & Baker MEL 9104
Rhizocarpon flavum Dodge & Baker MEL9103
Omphalodiscus decussatus (Vill.) Schol. MEL9107

Norris Island

LICHENAE

Buellia foecunda R. Filson MEL9106

Stump Mountain

LICHENAE

Buellia frigida Darb. MEL9098
Rinodina archaeoides H.Magn. MEL9095
Caloplaca elegans var. *pulvinata* (Dodge & Baker) Murray MEL9097
Omphalodiscus antarcticus (Frey & Lamb) Llano MEL9096
Omphalodiscus decussatus (Vill.) Schol. MEL9099
Usnea antarctica DuReitz MEL9100

MUSCI

Grimmia lawiana J. H. Willis

APPENDIX III

CITATION OF SPECIMENS

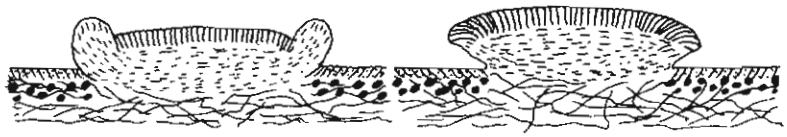
In Section II, where distribution of species are cited, the following abbreviations are used: A = abundant; C = common; O = occasional; R = rare. X denotes that no record of the distribution was made.

In Section III, where specimens are cited, the locality is given, followed by the author's herbarium number. The initials prefixing each number denote the collector's name. A list of abbreviations of collectors' names appears below:

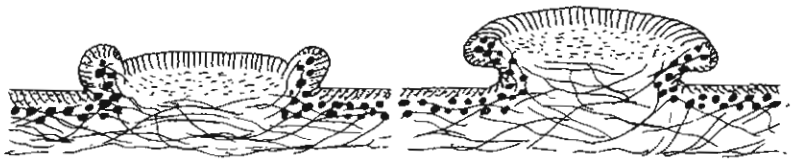
AB	Alex Brown
BW	Barry Woodberry
DC	David Carstens
DT	David Trail
DW	David Wigg
IL	Ian Landon-Smith
JB	John Branson
JF	John Freeman
JP	John Phillips
JW	John Williams
KM	Kevin Miller
MH	Malcolm Hay
MS	Mark Single
NL	Nils Lied
OB	Ortwin Bode
OF	Oscar Ferguson
PT	Peter Trost
RF	Rex Filson
RH	Ross Harvey
RN	Robert Nelson

Types representing the six new species and one new form of Lichenae and one new species of Musci described herein have been lodged in the National Herbarium of Victoria, Melbourne (MEL).

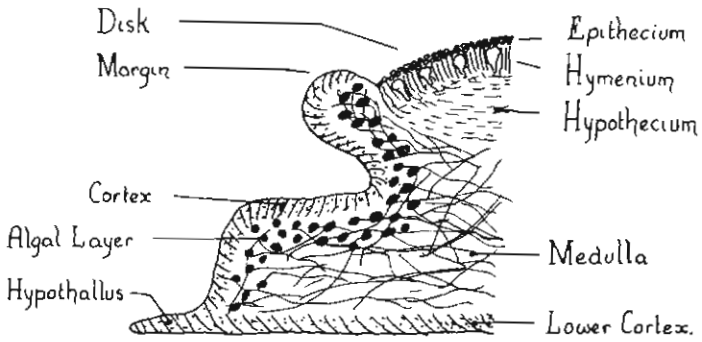
APPENDIX IV
Glossary of terms used



a. Lecideine Apothecium



b. Lecanorine Apothecium



c. Vertical section through Apothecium

Fig. 42.—Details of the fruiting structures.

APPENDIX IV

GLOSSARY OF TERMS USED

acicular	needle-like
adnate	as applied to the apothecium attached to the thallus by the whole lower side
algal layer	see Figure 42c
amorphous	having no determinate shape—without definite structure
amphithecium	a layer of tissue continuing upwards from the hypothecium in some angiocarpic lichens, nearly surrounding the hymenium
anastomosing	junction by insertion, hence applied generally to hyphae when passing one into the other
apothecium	open fruit (see Figs. 42a and 42b)
appressed	lying close to the substratum
arachnoid	covered by, or formed of, cobweb-like hairs or fibres
areole	a small polygonal area of lichen thallus separated from other similar areas by small cracks
ascus	sac containing fungal spores
bacciform	berry-shaped
bacilliform	rod-shaped
biatorine	lecideine, waxy but not carbonaceous apothecium, exciple pale
calcareous	of the nature of lime
carbonaceous	black and brittle
caudate	having an appendage resembling a tail
caudiform	tail-shaped
cerebriform	shaped and involuted like the human brain
cilia	marginal hairlike structures
ciliate	provided with cilia
cinereous	ashen coloured
clavate	club-shaped
confervoid	composed of threads resembling the genus *Conferva*
conglutinate	gelatinous and more or less fused
cordiform	heart-shaped
coriaceous	resembling leather in texture, appearance etc.
cortex	(see Fig. 42c)
corticate	possessing a cortex
crustose	thallus forming a crust closely adhering to and usually partly incorporated into the substratum
decomposed	(of cortex) composed of gelatinous and therefore indistinct hyphae
ecorticate	lacking a cortex, hence with the medulla directly exposed
effigurate	having a distinct form
ellipsoid	the solid formed by rotating an ellipse about its major axis
epithecium	more or less coloured or granular layer formed by the tips of the paraphyses

epispore	the outer membrane of the spore
erumpent	breaking forth, bursting out
evanescent	quickly vanishing—of impermanent parts of a plant
excipulum	proper margin
fascicular	arranged in a fascicle
fascicle	a bunch or bundle, rows of cells occurring in bunches, bundles or tufts
fastigiate	having branches whose extremities form a conelike outline, or forming a horizontal surface at the top, as in an umbel
floccose	furnished with a tuft or tufts of woolly hair
foliose	thallus leaf-like
fovea	a pit or depression
foveolate	marked with foveae
fusiform	narrowed at both ends
gelatinized	transformed into a jelly-like mass
gyrose	curved alternately backwards and forwards
hyaline	transparent and colourless
hymenium	layer above the hypothecium containing asci and paraphyses
hyphae	the structural element of the thallus of fungi consisting of long, slender, branched filaments, usually having transverse septa and together constituting the mycelium
hypothallus	the fibrous or filamentary substratum on which the thallus of lichens is developed
hypothecium	the dense hyphal or plechtenchymatous tissue below the hymenium
I±	giving (+) or not giving (—) a blue or red colouration with aqueous iodine solution
imbricate	arranged like overlapping shingles
immarginate	lacking a margin
innate	sunk into the thallus—immersed
invaginate	sheathed—turned into a sheath—to turn a tubular sheath back within itself
K±	giving or not giving a colour reaction with KOH solution
lecanorine	of apothecia, having a thalloid exciple, margin contains algae (see Fig. 42b)
lecideine	of apothecia, having a proper exciple only—no algae (see Fig. 4a)
lumen	a cavity or space enclosed by walls of a tube or cell
mammillate	having rounded protuberances—covered with mammiform excrescences
medulla	the network of hyphae in the interior of a well developed thallus (see Fig. 42b)
microconidia	pycnospores, pycnidiospores, conidiospores or spermatia, spores contained in a pycnidium
moniliform	of the form of a necklace—consisting of protuberances suggesting a string of beads
moribund	at the point of death—in a dying state

muricate	furnished with sharp points studded with short, hard excrescences
muriform	applied to cellular tissue suggesting resemblances to courses of bricks in a wall
mycelium	the vegetative part of the thallus of fungi consisting of white filamentous tubes (hyphae)
nubilated	clouded, obscured, rendered less clear or transparent
obconic	inversely conic
papilla	a small, fleshy projection upon any part of a plant
paraphyses	sterile filaments accompanying the reproductive organs—present in the hymenium
parenchyma	tissue consisting of cells of about equal length and breadth placed side by side, usually succulent
plicate	folded or pleated
polarilocular	cells joined by a canal (polaribilocular)
pruinose	covered with white bloom or appearing frosty
pustule	a small wart or swelling
pustulate	furnished with, or having, pustules—to form into pustules
pycnidium	rounded tubercle in thallus containing minute male "spores", pycnidiospores or microconidia
reniform	kidney-shaped—having the form of a kidney
reticulate	to divide so as to form a network or something having that appearance
rhizinae	root-like strands from the under surface of the thallus
rimose	divided by clefts into arcolae, having chinks or cracks
rugose	covered with or thrown into wrinkles
rugulose	somewhat wrinkled
septate	containing or divided by a septum or septa
septum	the division wall of a cell—a partition in a compound spore
soredia	granular or powdery masses of algae and fungi
sessile	as applied to apothecia, meaning attached to thallus by the central portion of the lower side, stalkless
stipe	a foot or stalk
squamulose	thallus of small squamules, appressed or raised
tetrad	a group of four cells or spores
thallus	the vegetative portion of any lichen
umbo	the boss in or near the centre of a shield, sometimes pointed
umbonate	having an umbo
vernicose	varnished—shiny as though varnished
verrucae	wart-like elevations of a lichen thallus
verrucose	covered with verrucae