

A REVIEW OF THE GENERA *TELOSCHISTES* AND *XANTHORIA* IN THE LICHEN FAMILY *TELOSCHISTACEAE* IN AUSTRALIA

by

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SUMMARY

The Australian representatives of *Teloschistes* and *Xanthoria* are reviewed. Keys and descriptions are given for the ten species and two forms.

One new form is described, *Teloschistes spinosus* forma *subteres*, and two new combinations are made, *Xanthoria ectanea* and *Teloschistes velifer* forma *nodulosa*.

Distribution is fully discussed and maps have been provided with particular emphasis on Victorian occurrences.

INTRODUCTION

In reviewing the Australian species of *Teloschistaceae* the author has been confused by the utmost variance between authors regarding the systematic position of certain species. For instance, *Teloschistes spinosus* (Hook. f. & Tayl.) J. Murray has received the following treatment:

The late Dr. James Murray formerly of the Dominion Museum, New Zealand, made his new combination *Teloschistes spinosus* (Murray, 1960: p. 205) based on *Parmelia spinosa* Hook. f. & Tayl. (Hooker & Taylor, 1844: p. 644), including *T. sieberianus* (Laur.) Hillm. (Hillman, 1930: p. 315) in synonymy. Hillman's species was based on *Parmelia sieberiana* Laur., described in 1827 (Laurer, 1827: p. 38). Dr. J. Müller of Argau had previously taken up this epithet in varietal status under *Teloschistes chrysophthalmus* (L.) Th. Fr. in 1883 (Müller J., 1883). Dr. Du Rietz bases his *Xanthoria spinulosa* (Du Rietz, 1922: p. 211) on *Physcia parietina* var. *spinulosa* Krphhb. (Krempelhuber, 1868: p. 322). Krempelhuber described this variety from material collected in Van Diemens Land by Hügel. Specimens in the National Herbarium Melbourne originally labelled *Parmelia spinosa* Hook. f. & Tayl. have been redetermined and annotated *Physcia spinosa* (Hook. f. & Tayl.) Krphhb., by Krempelhuber. This is apparently an unpublished combination made by Krempelhuber, and on reviewing his determination later, he made it a variety of *Physcia parietina*.

Dr. A. Zahlbrückner in his *Catalogue Lichenum Universalis* (Vol. 7, p. 318) follows J. Müller in retaining *Sieberianus* as a variety of *chrysophthalmus*, under which he synonymises *Parmelia sieberiana* Laur., *Parmelia spinosa* Hook. f. & Tayl., *Physcia Sieberiana* (Laur.)

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Mass. (Massalongo, 1853: p. 44), *Blasteniospora Sieberiana* Trevis. (Trevisan, 1853: p. 2), *Physcia chrysophthalma* Shirley (Shirley, 1890: p. 193) and *Teloschistes Sieberianus* Hillm. Yet, on page 307, he also upholds *Xanthoria spinosa* Du Rietz which was certainly based on *Parmelia spinosa* Hook. f. & Tayl. Under *X. spinosa* Zahlbrückner synonymised *Physcia parietina* var. *spinulosa* Krphlb., *Teloschistes velifer* Wilson (Wilson, 1889: p. 69), *Xanthoria parietina* var. *spinulosa* Müll. Arg. (J. Müller, 1894: p. 40) and *Xanthoria spinulosa* Hillm. Dr. Zahlbrückner apparently overlooked the fact that he had *Parmelia spinosa* synonymised with both species!

A specimen that was collected on rocks on Deal Island, Kent Group, Bass Strait by Robert Brown in December 1803, was determined by Dr. Nylander as *Physcia subexilis* Nyl. (Crombie, 1879: p. 396), this taxon was later relegated to a variety of *Teloschistes flavicans* (Sw.) Norm. by Rev. F. R. M. Wilson (Wilson, 1892: p. 176).

The present author has reviewed the type specimens of *Parmelia spinosa* Hook. f. & Tayl. and *Physcia subexilis* Nyl. and has found them to be, in the main parts, identical with each other and to fit into a group that we shall call the "Teloschistes chrysophthalmus complex".

This whole group is a very confusing one, the species being so variable as to suggest that they are all just forms of the one entity. *T. chrysophthalmus* and *T. xanthoroides* J. Murray (Murray, 1960: p. 209) are at the extreme ends of the "chrysophthalmus complex" whilst *sieberianus*, *spinosus* and *fasciculatus* grade evenly between them.

T. spinosus forma *subteres* appears to occupy an intermediate position between *T. sieberianus* and *T. spinosus*; owing to the lack of soredia the affinities seem closer to the former species, but as the whole group is so flexible the author has ascribed it to *spinosus* because of the fineness of the thalline filaments. It is most often found forming flat rosettes but occasionally it forms pulvinate clumps, specimens from Wilson's Promontory illustrate this variation.

All of these forms grade into one another so evenly that it is impossible to draw a line of demarcation between them.

The author has examined the New Zealand type of *Teloschistes flavicans* var. *compressus* J. Murray (Murray, 1960: p. 206), and has found this species to occupy an intermediate position between *T. spinosus* forma *subteres* and *T. flavicans* (Sw.) Norm. (Norman, 1853: p. 229).

Concerning *T. chrysophthalmus*, many forms and varieties have already been recorded for Australian localities. These are var. *leucoblepharis* Müll. Arg. (J. Müller, 1883: p. 77), var. *leucoloma* Müll. Arg. (J. Müller, 1883: p. 77), var. *fornicatus* Müll. Arg. (J. Müller, 1896: p. 89), var. *depressus* Müll. Arg.*, var. *alatus* (Wils.) Shirley (Shirley, 1892: p. 133), var. *denudatus* Müll. Arg. (J. Müller,

* *Teloschistes chrysophthalmus* var. *depressus* Müll. Arg. is apparently an unpublished Ms name.

1883: p. 265), var. *subinermis* Müll. Arg. (J. Müller, 1880: p. 265), var. *expallens* Müll. Arg. (J. Müller, 1883: p. 78). In the National Herbarium Melbourne there is a duplicate of the type of var. *leucoloma* and specimens authenticated by Müll. Arg. of var. *leucoblephora*, and var. *depressus*. On examination of this material the author feels that their macroscopic differences do not warrant varietal rank, and that they fit evenly into the gradient of the "chrysophthalmus complex". The fact that most of them are sterile is quite unimportant, since all Australian representatives of *Teloschistes* are microscopically identical. A specimen of var. *fornicatus* authenticated by Müll. Arg. agrees with his description and appears to be conspecific with *T. velifer* Wilson. Of the others, var. *alatus*, var. *subinermis*, and var. *expallens*, seem from the descriptions to be colour forms. Variation in colour in the Teloschistaceae, depends primarily on the light intensity of the habitat, for example, when *Xanthoria parietina* is observed on tree trunks, it assumes a grey-green colour where the light intensity is relatively low, but is flame-orange in the open sunlight. The colour of the margin to the apothecium is also variable, sometimes being concolorous with the thallus, sometimes much lighter and sometimes coloured the same as the apothecial disk.

Teloschistes flavicans (Sw.) Norm. and varieties, viz. *acromelus* (Nyl.) Müll. Arg. (J. Müller, 1879: p. 168), *croceus* (Ach.) Müll. Arg. (J. Müller, 1888: p. 493) and *subexilis* Wilson are recorded as having been collected from various localities in the Commonwealth, representatives of some of these collections are however absent from Australia's Herbaria. The only collections known, are housed in the National Herbarium Melbourne where there are only two specimens from authentic Australian localities. These are *Physcia flavicans* Australia and *Physcia acromela* Nyl., determinavit on both labels is written by Krempelhüber. The latter specimen was collected in New South Wales by Ludwig Leichhardt and is fertile, and forms the basis for the apothecial descriptions in the following texts.

The author considers *T. flavicans* to be an elastic species and such differences as black tipped or concolorous fibrils are not specific, as specimens are found with mixed coloured fibrils. Some authors have chosen to divide *T. flavicans* into subspecies based on the occurrence of soredia; but the present author believes that soredial development in this species is merely a factor of environment and has no real taxonomic significance.

Dr. Zahlbrückner (1931: p. 307) synonymised *T. velifer* Wilson under *Xanthoria spinosa*, but this species characteristically belongs with *Teloschistes* and may be distinguished from *T. chrysophthalmus* by the mature thallus-lobes which are slightly hooded and beset with soredia under the open ends.

The late Dr. James Murray (1960: p. 208) in his discussion on this species, incorrectly states that Wilson in his type description "gives details of the apothecia despite the statement that the specimens were

sterile!". Murray also makes the note (p. 209) that "fruiting specimens must be very rare and have not certainly been reported before". Dr. Murray accepted Wilson's report of the lichens collected on his Tasmanian trip (Wilson, 1892: p. 176) to be the type description, whereas in fact Wilson described the species three years previously from specimens collected at Maffra, Victoria, March 1889, and this collection is copiously fertile. In his report of his Tasmanian trip, Wilson merely repeated his type description of the species and added that the specimens here cited were sterile.

Dr. Murray (1960: p. 206) described a new variety, *T. fasciculatus* var. *nodulosa* as being an alpine form of a subalpine species. In similar forms from the alpine regions of south-eastern Australia the presence of broad-hooded and sometimes contorted lobes was evident. The author examined Murray's material and located similar lobes to those found in the Australian specimens. As these lobes are characteristic of *T. velifer* the author feels that this form rightly belongs to that species and has accordingly made the combination.

Murray points out (1960: p. 208) that juvenile specimens are very hard to separate at the specific level. This form is also difficult to place in its correct category if the broad lobes are not present.

In a similar manner to *Teloschistes*, *Xanthoria* has been divided and subdivided. All of the Australian material has been included under *Xanthoria parietina* or one of its subspecies. The late Dr. J. Murray has placed all but one of the New Zealand specimens in this group also. In Zahlbrückner's Catalogue some 40 varieties and forms are listed for *X. parietina* and more have been described since.

The author believes that the typical form of *X. parietina* has been introduced into this country as it is rarely seen far from the settled areas. Dr. Murray (1960: p. 199) also makes this observation for New Zealand forms of the species. In Australia it certainly seems to favour the exotic trees.

The type description of *Parmelia parietina* var. *ectanea* Ach. is very brief, and apart from the statement that the lobes are narrower makes very little distinction between this and the typical variety. The type specimen is very fragmentary and comprises only one or two lobes barely 4 mm. square. Since the author is unable to establish any significant differences between the species native to Australia and the original concept of *Xanthoria parietina* var. *ectanea*, he prefers to apply the name *X. ectanea* to the Australian entity which he believes warrants specific rank. If subsequent research reveals that var. *ectanea* is only a coastal modification of *X. parietina* var. *parietina* as suggested by Richardson (1967: p. 391) then a new name will be required for the Australian species.

MORPHOLOGICAL CHARACTERS

The morphological characters most likely to cause confusion in the determination of species in the genus *Teloschistes* are the presence of cilia and rhizines.

Rhizines are formed on the under surface and are a continuation of the lower cortex; they can be simple or branched.

Cilia are hair-like fibrils arising from the upper cortex or extending from the margin of the thallus. When determining the source of these structures it is important to examine the youngest marginal lobes and not the old contorted central portions of the plant. Observation of the contorted lobes can give a false impression, since it is sometimes hard to distinguish between margin and upper or lower surface.

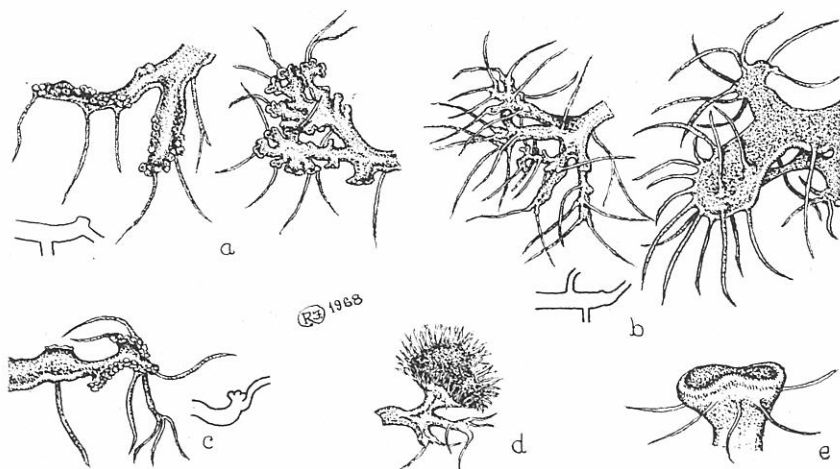


Fig. 35. *a.* Portion of the thallus showing position of rhizines on the under-surface; *b.* portion of the thallus showing cilia on the margins and upper surface, as well as rhizines on the lower; *c.* a contorted lobe showing how rhizines can be confused with marginal cilia; *d.* an apothecium with marginal cilia; *e.* an apothecium with naked margin, showing cilia on the underside.

CHEMISTRY

The chemistry of all species of the Teloschistaceae represented in Australia is similar. Parietin which gives a blood-red reaction with potassium hydroxide (K^+ blood-red to purple) is present in the cortex. The species have a negative reaction with calcium hypochlorite (C^-) and para-phenylene diamine (P^-).

METHOD

The dried specimens were first softened in water to which a few drops of detergent were added to hasten the penetration. The use of a Reichart freezing microtome OMP greatly reduced the time needed to section,

stain and mount the specimens. 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.

Measurements expressed in millimetres and microns (μ) were made by inserting a micrometer disk into the 10x ocular of the microscope and calibrating for the various objectives of the instruments used.

The colours expressed in the botanical descriptions in this work were made by comparison with the plates in *A Dictionary of Colour*, Maerz and Paul (1930).

KEY TO AUSTRALIAN *TELOSCHISTES* AND *XANTHORIA*

- 1a Laciniae narrow and ramulose, lobes beset with fine rhizines or cilia
 - 2a Major lobes of the thallus narrow terete
 - 3a Lobes with soredia or isidia-like grains on the margins, up to 0.5 to 1 mm. thick in usnea-like strands up to 3 cm. long.....*T. flavicans*
 - 3b Lobes without soredia or isidia-like patches on the margins.....*T. spinosus* f. *subteres*
 - 2b Major lobes of the thallus flat
 - 4a Lobes beset with cilia on the margins and occasionally on the upper surface, rhizines on the lower surface
 - 5a Mature lobes broad slightly hooded with soredia on the lower surface, under open ends
 - 6a Older lobes thick twisted, extremely sorediose, rhizines reduced to a few short fibrils.....*T. velifer* f. *nodulosa*
 - 6b Older lobes not thick or twisted and not extremely sorediose.....*T. velifer*
 - 5b Mature lobes not slightly hooded
 - 7a Thallus lobes beset with isidia-like nodules or soredia on the margins.....*T. spinosus*
 - 7b Thallus lobes not beset with isidia-like nodules or soredia on the margins
 - 8a Apothecia mostly pedicellate, margin beset with long fine cilia....*T. chrysophthalmus*
 - 8b Apothecia numerous mostly sessile or rarely raised up by the thickening of the thallus, margin naked (cilia occasionally on the underside).....*T. sieberianus*
 - 4b Lobes not beset with cilia on the margins or on the upper surface, rhizines on the lower surface
 - 9a Lobes beset with isidia-like grains or sorediose on the margins.....*T. fasciculatus*
 - 9b Lobes not beset with isidia-like grains or sorediose on the margins.....*T. xanthoroides*

- 1b Laciniae broadly flattened, subfoliose, lobes not beset with fine rhizines or marginal cilia
 - 10a Lobes ascending, large slightly hooded, soredia on the lower surface under open ends.....*T. velifer*
 - 10b Lobes adpressed to the substratum, neither hooded nor sorediate.
 - 11a Thallus lobes thin, rugulose, ultimate lobes concave with raised flexuose margins.....*X. parietina*
 - 11b Thallus lobes thick, smooth, ultimate lobes slightly convex and deflexed.....*X. ectanea*

Teloschistes chrysophthalmus (L.) Th. Fries Gen. Heterolichen. eur. recogn. 51 (1861).

Lichen chrysophthalmus L. Mant. Plant. 311 (1771).
Physcia chrysophthalma (L.) D.C. apud Lam. et D.C. Flor. franc. ed. 3, 2: 401 (1805).

Thallus in small fruticose to sub-foliose clumps 2 cm. (–4 cm.) diam., and 0.5–2 cm. high: *Lobes* initially small 0.5–1 mm. wide with long spinulose marginal fibrils, french grey in shaded positions to nugget-bronze yellow in sunlit; developing to erect rigid dorsiventral lobes up to 2.5 mm. wide, sometimes submonophyllous: *Cortex* up to 40 (–60) μ thick: *Rhizinae* 80–100 μ thick being a continuation of the lower cortex.

Apothecia terminal or on the margins of the lobes 1–6 mm. wide deeply convex: *Disk* light chrome-yellow to orange-peel: *Cortex* concolorous with the thallus: *Margin* slightly elevated with numerous spinulose fibrils 0.2–2 mm. long: *Hypothecium* 20–40 μ thick: *Hymenium* up to 80 μ tall: *Asci* 50–65 μ x 12–16 μ : *Ascospores* hyaline polaribilocular, canal mostly present, apparently disappearing, 15–16 μ x 7–8 μ .

SPECIMENS EXAMINED

VICTORIA—Warrnambool, *F. R. M. Wilson*, Nov. 1886 (NSW.L676): Camperdown, *F. R. M. Wilson*, Jan. 1888 (NSW.L677): Geelong, *F. R. M. Wilson*, Jan. 1888 (NSW.L674): Black Rock, *R. A. Bastow* 26.12.1899 (MEL7413): Mordialloc, *R. A. Bastow*, 2.1.1900 (MEL7410): Frankston, *R. A. Bastow*, 3.3.1900 (MEL7416): Camperdown, *Murdoch*, ca. 1900 (MEL7401): Sorrento, *R. A. Bastow*, April 1900 (MEL7414): Sandringham, *R. A. Bastow*, 26.5.1900 (MEL7415): Thurla near Mildura, *J. H. Willis*, Sept. 1940 (MEL7460): Kulkyne National Park, *A. C. Beaglehole* 1162, Late Sept. 1948 (MEL11299): Beeac, *A. C. Beaglehole* 3744, 8.2.1952 (MEL10183): "Rock Ravine", *Drik Drik*, *A. C. Beaglehole* 3263, 24.2.1952 (MEL11294): Anglesea, *E. Packe*, 14.6.1953 (MEL7495): Rye, *Rex Filson* 4010, 27.11.1961 (MEL22639): Emu Creek near Sunbury, *Rex Filson* 4836, 20.5.1963 (MEL22640): Coliban River Falls, 4 miles SW. Redesdale, *Rex Filson* 5091, 10.8.1963 (MEL22641): Cape Patterson, *Rex Filson* 5188, 7.9.1963 (MEL22642): Along the cliffs at Portsea, *John Williams*, 21.5.1964 (MEL22396): 7½ miles

NNE. Yea, *Rex Filson 6645a*, 8.11.1964 (MEL22643): Mt. Cottrell, *Mary Todd*, 2.2.1965 (MEL7614): Beech Forest, *G. C. Bratt 2069a*, 8.3.1965 (MEL9341): 1 mile north of Anthony's Cutting, Great Western Highway, *Rex Filson 7164*, 29.4.1965 (MEL9385): Calder Highway ca. 10 miles west of Melbourne, *Bruce Fuhrer*, April 1965 (MEL16602): Portland, *Rex Filson 7270*, 22.5.1965 (MEL10161): Jones's Cliffs, Lower Glenelg River, *Rex Filson 7283*, 22.5.1965 (MEL10158): Ettrick, near bridge at the Bessiebelle turnoff, 4 miles from Tyrendarra, *Bruce Fuhrer*, 13.6.1965 (MEL16600): Red Cliffs, *Marie Allender*, 2.8.1965 (MEL11232): 21 miles north of Linga on the road to sunset tank, *Rex Filson 7356*, 7.8.1965 (MEL11288): Cope Cope, \pm 8 miles SSE. of Donald, *J. H. Willis*, 16.10.1966 (MEL18295): Tongue Point, western coast of Wilsons Promontory, *J. H. Willis*, 13.1.1967 (MEL22397): Mount Misery (Mt. Kororoit), 5 miles north of Rockbank, *J. H. Willis*, 28.5.1967 (MEL22394).

TASMANIA—Cataract Gorge, *A. Bastow*, July 1892 (MEL7409): Cape Deslacs near South Arm, *Joe Cashin*, 5.5.1963 (MEL9346): Red Bill Beach near Bicheno, *R. G. Spencer*, Jan. 1965 (MEL9355): The Nut, Stanley, *J. H. Willis*, 29.1.1965 (MEL7587): Cape Deslacs, *G. C. Bratt*, 17.7.1965 (MEL18274): Prime Seal Point, Prime Seal Island, Furneaux Group, Bass Strait, *John Whinray*, 1.8.1966 (MEL17351): Roden Island, Furneaux Group, Bass Strait, *John Whinray*, 7.3.1966 (MEL16031): Little Green Island, Furneaux Group, Bass Strait, *John Whinray*, 27.3.1966 (MEL16040): Great Dog Island, Furneaux Group, Bass Strait, *John Whinray*, 27.4.1966 (MEL16035): Little Dog Island, Furneaux Group, Bass Strait, *John Whinray*, 28.4.1966 (MEL16599): West Sister Island, Furneaux Group, Bass Strait, *John Whinray*, 14.8.1966 (MEL18293): Sentinel Island, Furneaux Group, Bass Strait, *John Whinray*, 27.8.1966 (MEL18265): 400 yards east of Settlement Point turnoff, Flinders Island, Bass Strait, *John Whinray*, 27.9.1966 (MEL18268).

NEW SOUTH WALES—Mount Dromedary, *Mary H. Bate*, 1881 (MEL7392): Penshurst, *E. Cheel*, April 1901 (NSW.L697).

QUEENSLAND—Emu Vale near Tannymorel, *F. R. M. Wilson*, ?1889 (MEL7391).

SOUTH AUSTRALIA—Gawler Range, *Tietkens*, ca. 1880 (MEL7395): Flinders Range, *Ferd. Mueller*, Oct. 1851 (MEL7405): Cookes Plains, ca. 105km SE. Adelaide, Anon. 4.1.1887 (AD): Eyre Island, *Wood Jones*, 1921 (AD): Colona Station, near Fowlers Bay, *J. H. Willis*, 27.8.1947 (MEL7400): Warbla Cave region, *D. S. Kemsley*, 14.1.1952 (MEL7468): Cowell road, ca. 11 km. south of Iron Duke, Middleback Range, *E. Shaw*, Mar. 1962 (AD): Bool Lagoon, ca. 20 km south of Naracoorte, *D. Hunt*, Mar. 1962 (AD): Naracoorte District, *D. Hunt*, June-July 1962 (AD): Murray Bridge, *Lindley D. Williams 1920*, 12.7.1964: Waterfall Gully, Mount Lofty Ranges, *A. C. Beaglehole 15072*, 30.9.1965 (MEL23027): Menengie, *Lindley D. Williams 2747*, 16.2.1966: Stuart Highway 24 miles north of Port Augusta, *J. H. Willis*, 3.8.1966 (MEL17313): Near Salt Creek, Princes Highway, *G. C. Bratt 67127*, 30.9.1967.

WESTERN AUSTRALIA—Eucla, *J. Oliver*, 1882 (MEL7397): Fraser Range, *R. Helms*, Oct. 1891 (MEL7391): Forrest, *A. M. Baird*, Aug. 1930 (MEL7486): Pinjarra, *Hans Gloe*, Sept. 1946 (MEL7491): Pallinup River, 5 miles south of Borden, *J. H. Willis*, 4.9.1947 (MEL7459): Harvey, *R. D. Royce*, 15.7.1949 (PERTH): Hithergreen, SE. Busselton, *R. D. Royce*, 12.10.1949 (PERTH): Busselton, *R. D. Royce*, 18.10.1949 (PERTH): Boxer Island, Recherche Archipelago, *J. H. Willis*, 9.11.1950 (MEL7453): Mondrain Island, Recherche Archipelago, *R. D. Royce*, 5.2.1960 (PERTH): Dundas Rocks, South of Norseman, *A. C. Beaglehole 14800*, 18.9.1965 (MEL14328): 10 miles north of Chester Pass, *R. T. M. Pescott*, 8.10.1965 (MEL17322): On plain north of the Stirling Ranges, *N. N. Donner*, 13.10.1965 (MEL16195): 20 miles north of Arrino, *Rex Filson 8515*, 3.9.1966 (MEL18261): 7 miles north of the Murchison River Bridge on the Northwest Coastal Highway, *Rex Filson 8568*, 6.9.1966 (MEL18260): Northwest Coastal Highway at the Murchison River Bridge, *Rex*

Filson 8628, 7.9.1966 (MEL18245): 10 miles south of Northampton, *Rex Filson* 8674, 9.9.1966 (MEL18249): Geraldton to Mount Magnet road, 15 miles east of Wurarga, *Rex Filson* 8714, 10.9.1966 (MEL18241): 7 miles west of Burracoppin, *Rex Filson* 8945, and *A. S. George*, 19.9.1966 (MEL18240): 18 miles east of Gnowangerup, *Rex Filson* 8975, 27.9.1966 (MEL18262): Saddle between Nancy's Peak and the Devil's Slide, Porongorup Range, *Rex Filson* 9050, 29.9.1966 (MEL18242): Bremer Bay, *Rex Filson* 9103, 1.10.1966 (MEL18291): Jerramungup to Ravensthorpe road at the Phillips River crossing, *Rex Filson* 9165, 3.10.1966 (MEL18239): Dumbleyung to Wagin road, 6 miles west of Dumbleyung, *Rex Filson* 9390, 12.10.1966 (MEL18246): \pm 100 miles northwest of Reid, *A. S. George* 8489, 14.10.1966 (MEL18357): Twilight Cove, *A. S. George* 8556, 16.10.1966 (MEL18350): 24 miles west of Balladonia, Eyre Highway, *A. S. George* 8602, 18.10.1966 (MEL18371): 3½ miles east of Kitchener, *A. S. George* 8620, 20.10.1966 (MEL18361): 68 miles W Caiguna, Eyre Highway, *G. C. Bratt* 67252, 6.10.1967: Lake Cowan, near Norseman, *G. C. Bratt* 67279, 6.10.1967: Wave Rock, 3 miles east of Hyden, *G. C. Bratt* 67337, 9.10.1967.

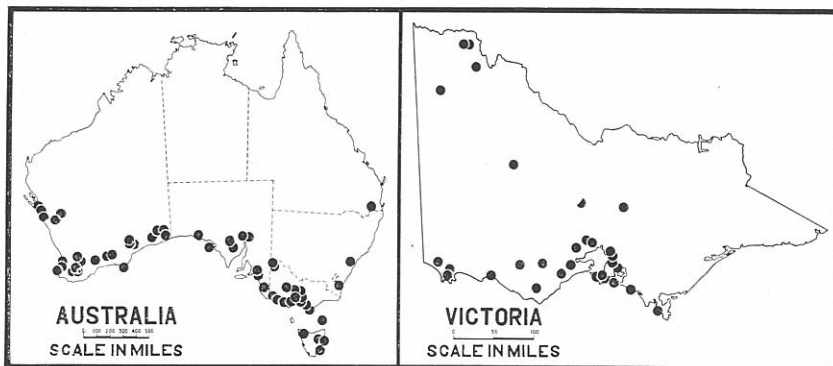


Fig. 36. Distribution map for *Teloschistes chrysophthalmus* (L.) Th. Fries.

Teloschistes fasciculatus Hillm. in *Reprim* nov. Spec. Regni veg. 49: 176 (1938).

Thallus forming pulvinate clumps up to 4 cm. diam. and up to 2 cm. high: *Lobes* narrow prostrate becoming erect 0.1–0.75 mm. wide and up to 3 mm. long, dichotomously branched, wax-yellow to nugget-bronze-yellow, margins and upper surface bare, whitish to concolorous rhizines on the lower surface: *Cortex* 40 μ thick, outer 16 μ heavily encrusted with yellowish crystals, lower cortex 60–80 μ thick: *Algal layer* discontinuous in scattered colonies throughout the medulla, cells 9–16 μ diam.: *Medulla* loosely woven.

Apothecia not seen.

SPECIMENS EXAMINED

VICTORIA—Mount Buffalo, *P. N. S. Bibby*, 25.1.1946 (MEL10131): Head of Middle Creek, Bogong High Plains, *J. H. Willis*, Jan. 1946 (MEL7423): South side of ridge, South of Wallace's Hut, Bogong High Plains, *Coryl I. Skewes*,

25.1.1952 (MEL7487): Mount Buffalo, *Rex Filson* 3977, 24.9.1961 (MEL21957): Mount Nelse, Bogong High Plains, *Rex Filson* 8139, 20.1.1966 (MEL17326): Small hill to west of Wallace's Gap, Bogong High Plains, *Rex Filson* 8202, 22.1.1966 (MEL17312): Twin Knobs, The Razorback, *Rex Filson* 9891, 18.2.1967 (MEL22405): Northern Granite Knobs, Mount Cobberas, *Rex Filson* 10000, 21.2.1967 (MEL22404): Mount Fainter South, Bogong High Plains, *Rex Filson* 9604, 26.1.1967 (MEL22411).

NEW SOUTH WALES—Summit of Mount Kosciusko, *J. C. Singleton*, Feb. 1954 (MEL7475): Hill behind Kosciusko Chalet, *Rex Filson* 7952, 2.12.1965, (MEL16604).

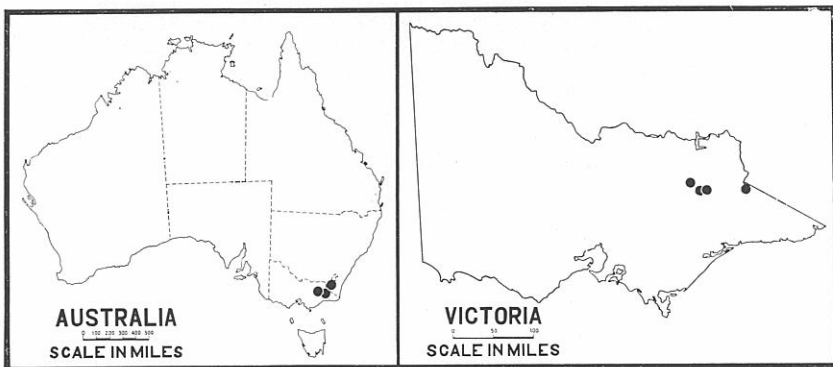


Fig. 37. Distribution map for *Teloschistes fasciculatus* Hillm.

***Teloschistes flavicans* (Sw.) Norm. in Nyt Mag. Naturvid. 7 : 229 (1853).**

Lichen flavicans Sw. Nov. Gen. & Spec. 147 (1788).

Physcia flavicans (Sw.) DC. apud Lam. et DC. Flor. franc. ed. 3, 2: 189 (1805).

Teloschistes flavicans f. *glaber* Wainio in Acta Soc. Fauna Flora fenn. 7: 114 (1890).

Physcia acromela Nyl. Synops. Lichen 1: 407 (1860).

Teloschistes flavicans var. *acromela* (Nyl.) Müll. Arg. in Revue mycol. 1: 168 (1878).

Thallus composed of terete or slightly flattened, angled laciniae, in loose clumps up to 8 cm. diam. and from 2–4 cm. high: *Lobes* 0.1–0.8 mm. diam. dichotomously branched, wax-yellow to nugget-bronze yellow, beset with scattered concolorous or black tipped fibrils up to 1 mm. long, when sorediate, sometimes erumpent or in patches loosely scattered on the cortex: *Cortex* 40–80 μ thick, the outermost 8–20 μ encrusted with yellowish crystals: *Algal cells* 7–13 μ diam. in scattered colonies immediately below the cortex, forming a discontinuous layer up to 40 μ thick, occasional colonies scattered throughout the medulla: *Medulla* of loosely compacted hyphae 4 μ thick.

Apothecia sessile, or slightly raised up on a thickening of the thallus, up to 4 mm. diam. plain to convex (to hemispheric): *Disk* orange-rufous: *Margin* slightly elevated, crenulate, concolorous with the thallus: *Hypothecium* 40 μ thick: *Hymenium* up to 80 μ tall: *Epithecium* up to

12μ heavily encrusted with yellow crystals: *Paraphyses* branched $1.5-2.0\mu$ thick, apical cell expanded to 4μ : *Asci* $60\mu \times 16-20\mu$: *Ascospores* $13-16 (-18)\mu \times 8-12\mu$ polaribilocular, canal mostly present.

SPECIMENS EXAMINED

NEW SOUTH WALES—Locality unknown, presumed to be in the far north-east, *L. Leichhardt* (MEL6351).

QUEENSLAND—Western side of Mount Huntley, Great Dividing Range, *A. B. Cribb*, 13.6.1965 (MEL10239): Mouth of Pine River, *A. B. Cribb*, 7.8.1965 (MEL14307): Mount Cordeaux, Cunningham's Gap National Park, *Rex Filson* 7788, 2.11.1965 (MEL14106): Between Millaa Millaa and Ravenshoe, *D. N. McVean* 63121: Binna-Burra region, Lamington National Park, *Marie Allender*, Oct. 1966 (MEL22410).

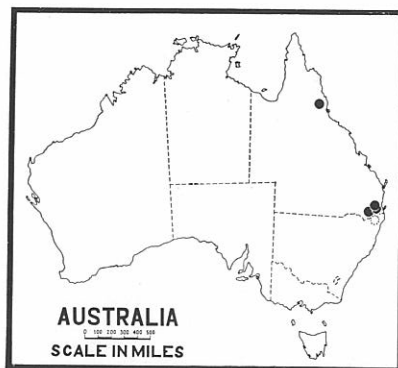


Fig 38. Distribution map for *Teloschistes flavicans* (Sw.) Norm.

***Teloschistes sieberianus* (Laur.) Hillm. in Hedwigia 69 : 315 (1930).**

Parmelia Sieberiana Laur. in Linnaea 2: 38 (1827).

Blasteniospora Sieberianus (Laur.) Trevis. Tornabenia et Blasteniospora 2 (1853).

Physcia Sieberiana (Laur.) Mass. Mem. Lichenogr. 44 (1853).

Teloschistes chrysophthalmus var. *sieberianus* (Laur.) Müll. Arg. in Flora, Jena 66: 78 (1883).

Physcia chrysophthalmus var. *Sieberianus* (Laur.) Shirley The Lichen Flora of Queens. part IV. p. 193 (1890).

Thallus usually composed of flat, radiate, appressed to ascending lobes, up to 6 cm. diam. or forming a complete mat on the small branches, 2-5 mm. high: *Lobes* small 0.3-1 mm. wide, yolk-yellow to nugget-bronze-yellow, matt or vernicose, margins beset with concolorous fibrils up to 3 mm. long, occasional fibrils rising from the upper cortex and a few whitish rhizines from the lower cortex: *Cortex* $20-40\mu$ thick, the lower cortex being similar, both giving rise to cilia and rhizines of the same structure: *Algal layer* discontinuous, algal cells $7-16\mu$ diam.

Apothecia sessile rarely raised up on a thickening of the thallus, constricted at the base, up to 5 mm. diam. at first concave becoming convex at maturity: *Disk* nugget-bronze-yellow to orange-rufous: *Margin* slightly elevated, naked, but occasionally with a few small fibrils on the lower surface: *Hypothecium* 20–40 (-80μ in the centre) thick: *Hymenium* 60–90 (-100μ) tall including the yellow, heavily encrusted granular epithecium: *Paraphyses* simple or branched: *Asci* 50–60 μ x 12–18 μ clavate: *Ascospores* hyaline, polaribilocular, canal mostly present though tending to disappear at maturity, 12–16 μ x 7–9 μ .

SPECIMENS EXAMINED

VICTORIA—Emu Creek, Sunbury, *Rex Filson* 4837, 20.5.1963 (MEL22653): Barmah State Forest, *Rex Filson* 4889, 10.6.1963 (MEL22652): Reilly's Creek Gorge, Brisbane Ranges, *Rex Filson* 4938, 29.6.1963 (MEL22651): Blackwood, *Rex Filson* 5172, 1.9.1963 (MEL22650): 1 mile north of Anthony's Cutting, Great Western Highway, *Rex Filson* 7170, 29.4.1965 (MEL9388): Jackson's Creek, Sydenham, *Robert F. Steel* 60, 2.11.1965 (MEL15702): Hill to the north of South Peak, Wilsons Promontory, *Rex Filson* 8213, 31.1.1966 (MEL14333): Suggan Buggan, *Rex Filson* 8310, 7.3.1966 (MEL15671): McKillop's Bridge, on the Snowy River, 18 miles east of Wulgulmerang, *Rex Filson* 8327, (MEL15670): Near the mouth of Werribee Gorge, 6 miles west of Bacchus Marsh, *John R. Brownlie*, 2.7.1967 (MEL22421).

NEW SOUTH WALES—Norwood, Sydney, *F. R. M. Wilson* (MEL7394): Beaudesert Hills, Guntawang, *A. G. Hamilton*, 20.8.1885 (NSW.L724 & L725): East Maitland Reserve *W. W. Watts*: Jenolan Caves, *F. R. M. Wilson*, Sept. 1897 (MEL7396): Parramatta, *Woolls* (MEL7398): Murray River, *Charles French*, (MEL7424): Penhurst, *E. Cheel*, May 1900 (NSW.L693): Kingsgrove Road, Penhurst, *E. Cheel*, July 1900 (NSW.L746): Centennial Park, *E. Cheel*, July 1900 (NSW.L684): Centennial Park, *E. Cheel*, 28.7.1900 (NSW.L685): Tempe near Sydney, collector unknown 14, 19.9.1900 (BRI058755): Mosman, *Allen*, 5.8.1901 (NSW.L690): Young, *W. W. Watts*, 8.8.1904 (NSW.L740 & L743): Concord, *M. Flockton*, Aug. 1906 (NSW.L737 & L738): Hurstville, *E. Cheel*, Aug. 1906 (NSW.L739): Bowen Park, Orange, *W. Blakley*, Oct. 1906 (NSW.L745): Barren Jack, *Mrs. E. Cheel*, July 1909 (NSW. L749): Riverstone, *A. A. Hamilton*, 2.8.1909 (NSW.L750): Uriarra Crossing, Murrumbidgee River, ACT, *N. T. Burbidge*, 24.10.1947 (CANB93936): Jerilderie to Narrandera road, 19 miles SW. of Narrandera, *Rex Filson* 5424, (MEL10175): Narrandera to West Wyalong road, 19 miles north of Grong Grong, *Rex Filson* 5434, 13.10.1963 (MEL22654): Mt. Stromlo, *G. C. Bratt* 1019, 19.1.1964 (MEL18289): Black Mountain, A.C.T., *H. S. McKee* 11531, 11.7.1964 (CANB140427): Ardglen Gap, Liverpool Range, 5 miles north of Murrurundi, *Rex Filson* 7574, 28.10.1965 (MEL17334): Narrabri to Coonabarabran road, 1 mile north of Coonabarabran, *Rex Filson* 7832, 3.11.1965 (MEL17331): Summit of Bluff Mountain, Warrumbungles, *Rex Filson* 7868, 4.11.1965 (MEL14107): Nuada Rocks, Warrumbungles, *Rex Filson* 7873, 4.11.1965 (MEL15705): "The Creel" 5 miles west of Jindabyne on bank of Thredbo River, *Rex Filson* 7906, 2.12.1965 (MEL16566): North of Jacobs River Bridge, 12 miles south of Ingebyra, *Rex Filson* 7965, 3.12.1965 (MEL17332): 15 miles south of Narrandera, approx. midway between Narrandera and Boree Creek, *Helen I. Aston*, 16.9.1966 (MEL18301): Warrumbungle Ranges, *H. Alan Morrison*, 19.9.1966 (MEL18259): Mount Galore, 9 miles north-east of Lockhart, *J. H. Willis*, 27.8.1967 (MEL26381).

TASMANIA—Van Diemensland, *Charles Stuart*, (MEL7424): Coles Bay, East coast, *G. C. Bratt* 1892, 30.1.1965 (MEL9345): Western side of Killiecrankie Bay, Flinders Island, Furneaux Group, Bass Strait, *John Whinray*, 14.5.1966 (MEL16565): Cape Deslac, *G. C. Bratt* 2463, 17.7.1965 (MEL18275): Kingston, near Hobart, *G. C. Bratt* 2962, 12.12.1965 (MEL18278).

SOUTH AUSTRALIA—East Payneham, ca. 6 km north-east of Adelaide
J. G. O. Tepper 28.1.1893 (AD): Wilpena Pound, Flinders Range, *Roy G. Gray*,
 31.8.1952 (MEL7452): Yourambulla Peak, Flinders Range, *N. N. Donner* 1341,
 4.5.1965 (MEL16553): Mount Lofty Range, ca. 37 km north-east Adelaide,
N. N. Donner 1323, 5.6.1965 (MEL16552).

WESTERN AUSTRALIA—Christmas Island, Recherche Archipelago, *J. H. Willis*,
 28.11.1950 (MEL7454).

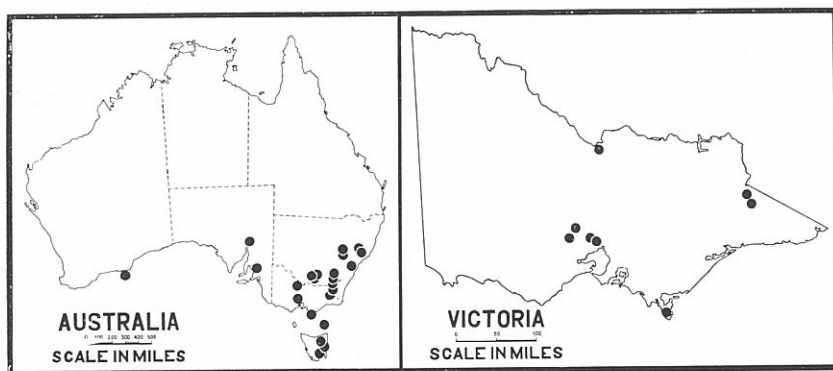


Fig. 39. Distribution map for *Teloschistes sieberianus* (Laur.) Hillm.

Teloschistes spinosus (Hook. f. & Tayl.) J. Murray in Trans. R. Soc. N.Z. 88 : 205 (1960).

Parmelia spinosa Hook. f. & Tayl. in Lond. J. Bot. 3: 644 (1844).
Physcia parietina var. *spinulosa* Krplhb. in Verh. zool.-bot. Ges. Wien
 18: 322, t.4 fig. 4 (1868).

Physcia subexilis Nyl. in Cromb. in J. Linn. Soc. (Bot.) 17: 396
 (1879).

Teloschistes flavicans var. *subexilis* (Nyl.) F. Wilson in Pap. Proc.
 R. Soc. Tasm. 1892-93: 176 (1893).

Xanthoria parietina var. *spinulosa* (Krplhb.) Müll. Arg. in Bull. Herb.
 Boissier 2, append. 1: 40 (1894).

Xanthoria spinulosa (Krplhb.) Hillm. in Annls mycol. 18: 10 (1920).

Teleoschistes exilis var. *subexilis* (Nyl.) Hillm. in Hedwigia 69 : 336
 (1930).

Thallus usually composed of flat radiately appressed to ascending lobes up to 3 cm. diam. sometimes clustered into small cushions: *Lobes* small 0.3–0.8 mm. wide and up to 200 μ thick, brass to nugget-bronze-yellow, beset with fine fibrils on the upper surfaces, rhizines on the lower surface simple or branched, margins of the lobes granular sorediose or erumpent also beset with fine fibrils: *Cortex* 25–40 μ thick, uppermost cells encrusted with yellowish crystals, lower cortex up to 60 μ in places: *Algal layer* discontinuous, up to 60 μ thick, occasionally a second layer forms above the lower cortex, this layer when present, up to 30 μ thick: *Medulla* loosely woven.

Apothecia sessile, semi-immersed amongst the crowded filaments of the thallus, up to 4 mm. diam. concave at first becoming flat to slightly convex: *Disk* orange-rufous: *Margin* crenulate, persistent, slightly elevated, concolorous with the thallus: *Hypothecium* 80μ in the centre: *Hymenium* up to 90μ tall, epithecium thick up to 20μ : *Asci* approx. $55\mu \times 16\mu$: *Ascospores* hyaline polaribilocular, canal mostly present $12-16\mu \times 8-9\mu$: *Pycnidia* spherical in concolorous to slightly darker warts.

SPECIMENS EXAMINED

VICTORIA—Wilsons Promontory, *Ferd. Mueller*, May 1853 (MEL7427): Mount Arapiles, *F. M. Reader*, 24.8.1896 (MEL7407): Head of Middle Creek, Bogong High Plains, *J. H. Willis*, 17.1.1947 (MEL7458): Mount Arapiles, *A. C. Beauglehole* 1216, (MEL11298): Plateau near Wilkinson Lodge, Bogong High Plains, *Rex Filson* 4807, 11.5.1963 (MEL22636): Hollow Mountain, Victoria Range, *Rex Filson* 5282, 15.9.1963 (MEL22638): Mount Korong, 8 miles ESE. Wedderburn, *Rex Filson* 6588, 31.10.1964 (MEL22644): Melville Caves Park, 7 miles north of Rheola, *Rex Filson* 6628, 1.11.1964 (MEL22637): North end of Mount Vereker Range, Wilsons Promontory, *J. R. Brownlie*, 13.11.1966 (MEL18247): Summit of Mount Oberon, Wilsons Promontory, *J. H. Willis*, 14.1.1967 (MEL22401).

TASMANIA—Cat Island, Furneaux Group, Bass Strait, *John Warham*, Feb. 1958 (MEL7465): East Risdon near Hobart, *G. C. Bratt* 407, 4.8.1963 (MEL9351): Hill to the south of Killiecrankie Bay, Flinders Island, Furneaux Group, Bass Strait, *Rex Filson* 7075, 16.4.1965 (MEL9363): Great Dog Island, Furneaux Group, Bass Strait, *John Whinray*, 16.4.1965 (MEL16561): Cape Deslacs, *G. C. Bratt* 2460, 17.7.1965 (MEL18277): Bowen Park near Hobart, *G. C. Bratt* 2872, 27.11.1965 (MEL18281): Risdon Brock near Hobart, *G. C. Bratt* 2883, 27.11.1965 (MEL18276): Tin Kettle Island, Furneaux Group, Bass Strait, *John Whinray*, 2.4.1966 (MEL16033): Eastern end of Great Dog Island, Furneaux Group, Bass Strait, *John Whinray*, 27.4.1966 (MEL16036): Little Dog Island, Furneaux Group, Bass Strait, *John Whinray*, 28.4.1966 (MEL16029): Eastern side of small granite hill on south western side of Killiecrankie Bay, Flinders Island, Furneaux Group, Bass Strait, *John Whinray*, 28.5.1966 (MEL16564): Killiecrankie Bay, Flinders Island, Furneaux Group, Bass Strait, *John Whinray*, 29.7.1966 (MEL17358): West Sister Island, Furneaux Group, Bass Strait, *John Whinray*, 14.8.1966 (MEL18294): Flinders Island, Furneaux Group, Bass Strait, *John Whinray*, 30.8.1966 (MEL18267):

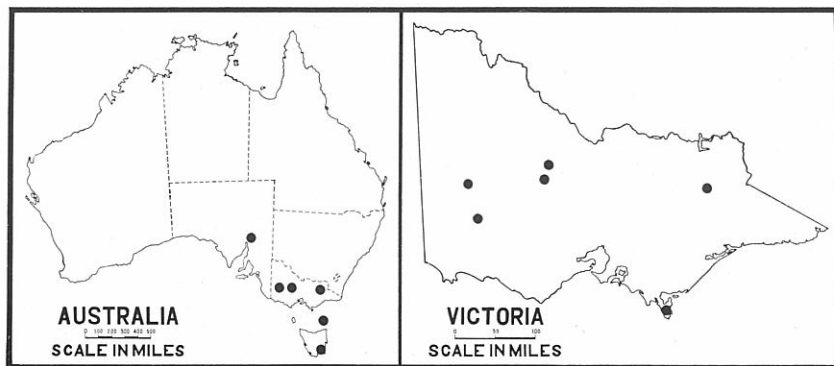


Fig. 40. Distribution map for *Teloschistes spinosus* (Hook. f. & Tayl.) J. Murray.

Teloschistes spinosus (Hook. f. & Tayl.) J. Murray forma **subteres**
R. Filson forma nov.

A forma typica speciei differt laciniis majoribus manifeste subteretibus.

Thallus composed of subterete dichotomously branched filaments, 0.1–0.4 mm. thick, brass to nugget-bronze-yellow, margins, lower and upper cortex beset with concolorous fibrils: *Pycnidia* in small concolorous to slightly darker warts.

SPECIMENS EXAMINED

VICTORIA—Wilsons Promontory, *Ferd. Mueller*, May 1853 (MEL7426): Sealers Cove, Wilsons Promontory, *Rex Filson* 5384, 29.9.1963 (MEL26129): Adam and Eve Rocks, Wilsons Promontory, *John R. Brownlie*, 1.1.1967 (MEL22416): Tongue Point, western coast of Wilsons Promontory, *J. H. Willis*, 13.1.1967 (MEL22402).

TASMANIA—Killiecrankie Bay, Flinders Island, Furneaux Group, Bass Strait, *John Whinray*, 16.4.1965 (MEL9365): Western end of Little Green Island, Furneaux Group, Bass Strait, *John Whinray*, 27.3.1966 (MEL16038): Table Cape near Wynyard, NW. coast, *J. H. Willis*, 6.1.1967 (MEL22399).

NEW SOUTH WALES—Rylstone to Mount Corricudgerie road, 21 miles E. Rylstone, *Rex Filson* 6500, 14.10.1963 TYPE (MEL16606).



Fig. 41. Distribution map for *Teloschistes spinosus* forma *subteres* R. Filson.

Teloschistes velifer F. Wilson in Victorian Nat. 6 : 69 (1889).

Teloschistes chrysoptalmus var. *fornicatus* Müll. Arg. in Bull. Herb. Boissier 4: 89 (1896).

Xanthoria spinulosa (Krpshb.) Hillm. Ann. Mycolog. p. 10 (1920).

Thallus subfruticose, individual plants from 3–10 mm. diam. and up to 1 cm. high, at times single and at others tightly clustered together completely encircling small branchlets: *Lobes* in the juvenile state form small rosettes, stellate radiate 0.2–0.8 mm. wide, when mature are ascending up to 5 mm. wide, slightly hooded at the apex, open underneath; the open part thus exposed, ecorticate, soresiose; varying in colour from lime-yellow to nugget-bronze-yellow: *Cortex* 30–40 μ thick,

outermost 10μ heavily encrusted with yellowish crystals, lower cortex $40\text{--}60\mu$ thick hyaline: *Algal layer* in scattered colonies, cells $7\text{--}16\mu$ diam.: *Medulla* loosely woven of hyphae 3μ diam.

Apothecia up to 3 mm. diam. concave at first becoming convex at maturity: *Disk* orange-rufous: *Margin* slightly elevated, crenulate, concolorous with the thallus: *Hypothecium* 30μ thick in the centre: *Hymenium* 60μ tall including the granular epithecium: *Paraphyses* simple or branched: *Asci* $50\text{--}60\mu \times 12\text{--}15\mu$ clavate: *Ascospores* hyaline, polaribilocular, canal mostly present $12\text{--}16\mu \times 6\text{--}8$ (-10) μ .

SPECIMENS EXAMINED

VICTORIA—Yarra River bank near Heidelberg, *F. M. Reader*, 8.6.1884 (MEL7386): Ovens River, *Walter*, ca. 1867 (MEL7419): Maffra, *F. R. M. Wilson*, Mar. 1889 TYPE (MEL7384): Kew, *R. A. Bastow*, 3.11.1900 (MEL7412): Fernshaw, *R. A. Bastow*, 11.11.1900 (MEL7387): Bealiba, *C. Jenkins*, 20.11.1901 (MEL7388): Tooradin, *H. Reeves*, July 1939 (MEL7383): Cobberas Mountains, *J. H. Willis*, Feb. 1946 (MEL7494): Upper Gellibrand River Falls, *A. C. Beaglehole* 3191, 11.2.1952 (MEL11295): Hills east of Trafalgar, *Rex Filson* 3985, 29.10.1961 (MEL22646): Coliban River Falls, *Rex Filson* 5072, 10.8.1963 (MEL22647): Blackwood, *Marie Allender*, 18.8.1963 (MEL22648): Bright, *G. C. Bratt* 1657, 15.1.1964 (MEL9359): Bingenwarri, 11 miles east of Alberton, *John Williams*, Aug. 1964 (MEL9122): Coopers Creek, *G. C. Bratt* 1657, 10.10.1964 (MEL9360): $7\frac{1}{2}$ miles NNE. Yea, *Rex Filson* 6645, 8.11.1964 (MEL22649): Mushroom Rocks on the south side of Mount Erica, *Rex Filson* 7001, 1.2.1965 (MEL22645): Ettrick, near the bridge at the Bessie Belle turnoff, 4 miles from Tyrendarra, *Bruce Fuhrer*, 13.6.1965 (MEL16041): In local garden, Acheron, *G. A. Chrichton*, 30.8.1965 (MEL11223): Holmes Plain above Shaws Creek and below Kelly's Hut, Benison Plains, *Robert F. Steel* 55, 27.12.1965 (MEL15699): Junction on Towonga-Harrietteville road, 4 miles east of Bright, *Rex Filson* 8054, 18.1.1966 (MEL17324): The peak on the northern end of Mount Wombargo, *Rex Filson* 8258, 5.3.1966 (MEL15668): Mount Stradbroke, north-west of Suggan Buggan, *Rex Filson* 8306, 6.3.1966 (MEL17329): Muddy Creek Gorge at Kooroocheang, near Smeaton, *J. H. Willis*, 12.4.1966 (MEL15667): Upper Buffalo River, *Robert F. Steel* 61, 21.5.1966 (MEL22423).

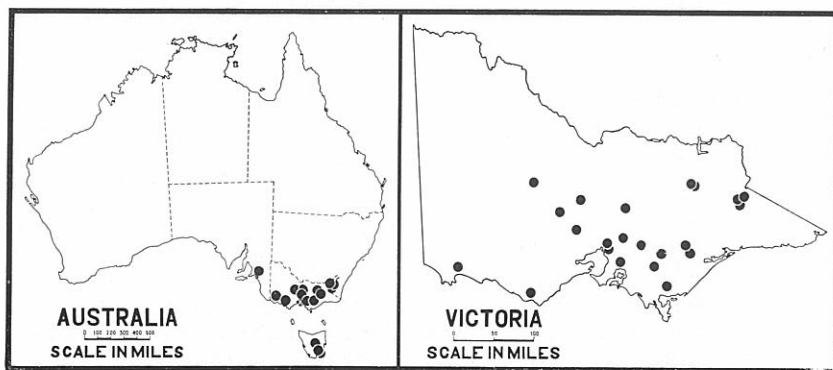


Fig. 42. Distribution map for *Teloschistes velifer* F. Wilson.

TASMANIA—Constitution Hill near Oatlands, *G. C. Bratt* 3105, 29.1.1966 (MEL18284); Jordan River near Brighton, *G. C. Bratt* 3262, 6.2.1966 (MEL18273); 16 miles from Campbelltown on the road to Cressy, *J. A. Cashin*, 11.6.1966 (MEL22476); Sorell-Nugent road, *G. C. Bratt* 4107, 12.7.1967 (MEL22478).

NEW SOUTH WALES—Cooleran Plain in the northern extremity of the Kosciusko State Park, *J. H. Willis*, 21.2.1961 (MEL7480); 9 miles east of Cooma, on the Numerella road, *Rex Filson* 7877, 2.12.1965 (MEL16569); "The Creel" 5 miles west of Jindabyne on the banks of the Thredbo River, *Rex Filson* 7904, 2.12.1965 (MEL16605); Kybean, 14 miles north-east of Nimmitabel, *John Williams*, 13.10.1966 (MEL18263).

SOUTH AUSTRALIA—Murray Bridge, ca. 70 km south-east Adelaide, collector unknown 13.11.1881 (AD).

Teloschistes velifer F. Wilson forma ***nodulosa*** (J. Murray) R. Filson comb. & stat. nov.

Teloschistes fasciculatus Hillm. var. *nodulosa* J. Murray in Trans. R. Soc. N.Z. 88: 206 (1960).

Thallus in pulvinate clusters up to 4 cm. diam.: *Lobes* ascending 0.5–2 mm. broad and up to 7 mm. long, margins extremely sorediose, rhizines reduced to a few stunted threads.

SPECIMENS EXAMINED

VICTORIA—Cobberas Mountains, *Ferd. Mueller*, Jan-Feb. 1854 (MEL7429); Right-hand spur above Middle Creek, below the Scout Hut, Bogong High Plains, *Coryl I. Skewes*, 19.1.1952 (MEL7488); Rocky Valley, Bogong High Plains, *Coryl I. Skewes*, 22.1.1952 (MEL9494); Mount Buller, *J. Ross Garnet*, Jan. 1956 (MEL7422); Behind Wilkinson Memorial Lodge, Bogong High Plains, *Rex Filson* 6381, 27.4.1964 (MEL14167); Holmes Plain, near Kelly's Hut, *Robert F. Steel* 58, 27.12.1965 (MEL15701); Mount Cope, Bogong High Plains, *Rex Filson* 8104, 19.1.1966 (MEL17325); Buckety Plain, Bogong High Plains, *Rex Filson* 8180, 21.1.1966 (MEL17330); Twin Knobs, The Razorback, NE. Alps, *J. H. Willis*, 13.2.1966 (MEL15672); The Peak at the northern end of Mount Wombargo, *Rex Filson* 8258a, 5.3.1966 (MEL15669); The Sentinels, Mount Wellington area, *J. H. Willis*, 12.3.1966 (MEL15666); Spion Kopje

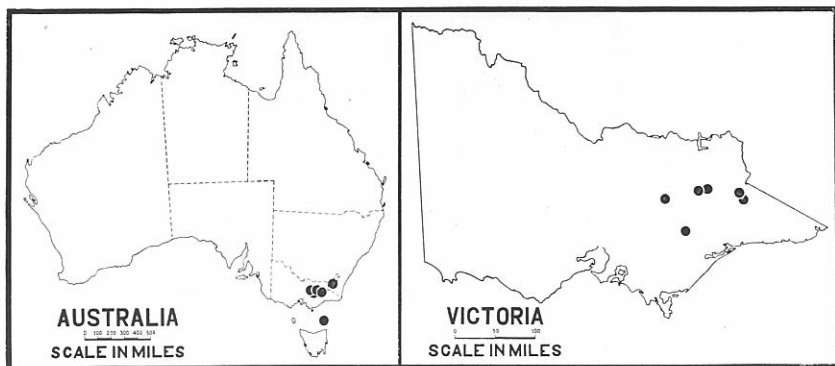


Fig. 43. Distribution map for *Teloschistes velifer* forma *nodulosa*.
(J. Murray) R. Filson

Ridge, $\frac{1}{2}$ mile west of Mount Nelse North, Bogong High Plains, *Rex Filson* 9533, 23.1.1967 (MEL19697): Peak due east from Pretty Valley Pond, Bogong High Plains, *Rex Filson* 9559, 24.1.1967 (MEL22412): Mount Jim, Bogong High Plains, *Rex Filson* 9629, 27.1.1967 (MEL22413): Mount McKay, Bogong High Plains, *Rex Filson* 9650, 28.1.1967 (MEL22515): Mount Loch, *Rex Filson* 9818, 16.2.1967 (MEL22403): 50 feet below the summit of Mount Feathertop on the eastern side, in the vicinity of Hellfire Gully, *Rex Filson* 9858, 17.2.1967 (MEL22407): Summit of the Cobberas Mountains, *Rex Filson* 10017, 21.2.1967 (MEL22406).

TASMANIA—Sentinel Island, Furneaux Group, Bass Strait, *John Whinray*, 27.8.1966 (MEL18266).

NEW SOUTH WALES—Vicinity of the Tin Mine, Kosciusko Region, *Selby Alley*, Dec. 1963 (MEL22398): Mount Kosciusko, *G. C. Bratt* 1017, 16.1.1964 (MEL9340): Charlottes Pass on the Kosciusko road, *Rex Filson* 7923, 2.12.1965 (MEL14292): Vicinity of the Ramshead Range, Kosciusko High Plains, *John Williams*, 15.10.1966 (MEL18258): The Pilot, Great Dividing Range, 6 miles north of the Victorian Border, *Rex Filson* 9954, 20.2.1967 (MEL22409).

Teloschistes xanthoroides J. Murray in Trans. R. Soc. N.Z. 88 : 209 (1960).

Thallus in small irregular clumps up to 1.5 cm. diam. and 5 mm. high, the central portion nearly obscured by crowded apothecia: *Lobes* small 0.5–1 mm. long and 0.15–1 mm. wide, french-grey to wax-yellow, fibrils absent from the margins and upper surface, scattered simple rhizines on the lower surface: *Cortex* 30–40 μ thick, the uppermost part encrusted with yellow crystals: *Algal layer* discontinuous up to 120 μ thick with cells scattered through the medulla, cells up to 16 μ diam.: *Medulla* loosely compacted of hyphae 4 μ diam.

Apothecia shortly pedicellate, 1–2 mm. diam., concave: *Disk* brass: *Margin* elevated, entire to crenulate, grey to yellowish-grey, naked or sometimes extended in places to connect it to the margin of the adjoining apothecium: *Hypothecium* hyaline up to 30 μ thick in the centre:



Fig. 44. Distribution map for *Teloschistes xanthoroides*. J. Murray.

Hymenium 80 μ tall: *Paraphyses* 4 μ diam., mainly simple, occasionally the slightly expanded apical cell furcate: *Asci* clavate 45 x 20 μ : *Ascospores* hyaline, polaribilocular, canal disappearing on maturity, 14–17 μ x 9–12 μ .

SPECIMENS EXAMINED

NEW SOUTH WALES—Dorrigo National Park, on the eastern side of Dorrigo Mountain, 24 miles west of Bellingen, *Rex Filson* 7646, 29.10.1965 (MEL17333).

Xanthoria ectanea (Ach.) Räs. ex R. Filson comb. nov.

Xanthoria ectanea (Ach.) Räs. in An. Soc. cient. arg. Secc. S Fé 131: 103 (1941)—*Nomen nudum*.

Parmelia parietina var. *ectanea* Ach. Lichen. Univ. 464 (1810).

Xanthoria parietina var. *ectanea* (Ach.) Kickx. Flor. Cryptog. Flandres, 2: 228 (1867).

Thallus foliose up to 8 cm. diam.: *Lobes* more or less radiate, up to 2.5 mm. wide and 4–6 mm. long, ultimate lobes 1.0–1.75 mm. wide, mostly convex, smooth, the margins slightly raised then deflexed, lime-yellow to nugget-bronze-yellow: *Cortex* 30–40 (–80) μ thick, heavily encrusted with yellow crystals, sometimes only in the outer layers and then sometimes extending right through and into the algal layer, lower cortex 20–30 μ thick, similar in structure to the upper cortex: *Algal layer* continuous or discontinuous 40–80 (–100) μ thick of cells 6–16 μ diam.: *Medulla* loosely woven of hyphae 4 μ diam.

Apothecia clustered on the older portion of the thallus 0.6–2.25 mm. diam., concave, becoming convex occasionally hemispheric: *Disk* usually darker than the thallus ranging from yellow-ochre through orange to raw-sienna: *Margin* thin, concolorous with the thallus or a little darker, prominent, sometimes disappearing: *Hypothecium* 40–60 μ thick, hyaline: *Hymenium* 65–80 μ tall including the granular epithecium: *Paraphyses* simple, 4 μ diam., apical cell expanded to 6 μ : *Asci* 40 x 14 μ : *Ascospores* hyaline, polaribilocular, canal sometimes absent 14–16 (–20) μ x 6–8 μ : *Pycnidia* immersed in the thallus, spherical up to 160 μ diam.

SPECIMENS EXAMINED

VICTORIA—East Gippsland, *Charles Walter*, 1869 (MEL7430): Loutitt Bay, *Luehmann*, ca. 1893 (MEL7433): Black Rock, *R. A. Bastow*, 26.12.1899 (MEL7448): Heidelberg, *R. A. Bastow*, 29.12.1899 (MEL7447): Frankston, *R. A. Bastow*, 3.3.1900 (MEL7417): Kew, *R. A. Bastow*, 3.3.1900 (MEL7442): Mortlake, *Murdock*, Sept. 1900 (MEL7443): Williamstown, *R. A. Bastow*, 23.12.1900 (MEL7445): Queenscliff, *R. A. Bastow*, 4.1.1902 (MEL7444): Portsea, *Yerdally*, 9.1.1902 (MEL7446): Creswick, *J. H. Willis*, 29.5.1935 (MEL7470): Thurla near Mildura, *J. H. Willis*, Sept. 1940 (MEL7489): Williamstown, *P. Bibby*, Sept. 1942 (MEL7441): Mud Island, *J. H. Willis*, 30.11.1945 (MEL7481): Beecac, *A. C. Beaglehole* 3243, 8.2.1952 (MEL10181): Two miles west of Pirron Yallock, *A. C. Beaglehole* 3158, (MEL10182): "Rock Ravine", *Drik Drik*, *A. C. Beaglehole* 3264, 24.2.1952 (MEL11293): Anglesea, *E. Packe*, 24.1.1953 (MEL7496): Emu Creek near Sunbury, *Rex Filson* 4838, 20.5.1963 (MEL22435): Coliban River Falls, 4 miles SW. Redesdale,

Rex Filson 5073, 10.8.1963 (MEL22437): Oberon Bay, Wilsons Promontory, *Rex Filson* 5375, 29.9.1963 (MEL22436): Mount Cottrell, 11 miles from Werribee, *Mary Todd*, 1964 (MEL7615): Point Danger, Portland, *Rex Filson* 7307, 23.5.1965 (MEL10162): 21 miles north of Linga on the road to Sunset Tank, *Rex Filson* 7365, 7.8.1965 (MEL11289): Lara, 9 miles NNE. Geelong, *R. C. Weeks*, Jan. 1966 (MEL18288): Hill to the north of South Peak, Wilsons Promontory, *Rex Filson* 8214, 31.1.1966 (MEL14332): Cape Liptrap, *H. Alan Morrison*, 5.4.1967 (MEL22420): Fish Creek to Yanakie road 1.9 miles north of Yanakie, *H. Alan Morrison*, 7.4.1967 (MEL22419): $\frac{1}{2}$ mile east from Seal Rocks, Phillip Island, *John Williams*, 15.7.1967 (MEL22434).

TASMANIA—Van Diemens Land, *Ch. Stuart* 1020, 1850 (MEL7440): Billerina, *R. A. Bastow*, 25.7.1887 (MEL7450): King Island, *Charles French Jr.*, Nov. 1887 (MEL7439): Deal Island, Kent Group, Bass Strait, *Colin A. Garreau*, 7.7.1957 (MEL7457): Cat Island, Bass Strait, *John Warham*, Feb. 1958 (MEL7461): Cape Deslacs, near South Arm, *G. C. Bratt* 126, 5.5.1963 (MEL9350): Taroon Beach near Hobart, *Rex Filson* 6674, 4.1.1965 (MEL18618): The Nut, Stanley, *J. H. Willis*, 27.1.1965 (MEL7586): Palana, Flinders Island, Furneaux Group, Bass Strait, *Rex Filson* 7076, 16.4.1965 (MEL9364): Killiecrankie Bay, Flinders Island, Furneaux Group, Bass Strait, *Rex Filson* 7047, 16.4.1965 (MEL9366): Bridgewater near Hobart, *G. C. Bratt* 2870, 27.11.1965 (MEL18279): Risdon Brook, near Hobart, *G. C. Bratt* 2884, 27.11.1965 (MEL18287): Kingston near Hobart, *G. C. Bratt* 2961, 12.12.1965 (MEL18282): Seal Rocks road, ca. $\frac{1}{2}$ miles west of Surprise Bay, SW. sector of King Island, *J. H. Willis*, 5.3.1966 (MEL15700): Roden Island, Furneaux Group, Bass Strait, *John Whinray*, 7.3.1966 (MEL16030): Western end of Little Green Island, Furneaux Group, Bass Strait, *John Whinray*, 27.3.1966 (MEL16037): Eastern end of Great Dog Island, Furneaux Group, Bass Strait, *John Whinray*, 27.4.1966 (MEL16032): Little Dog Island, Furneaux Group, Bass Strait, *John Whinray*, 28.4.1966 (MEL16028): Small Islet off Killiecrankie Bay, Flinders Island, Bass Strait, *John Whinray*, 19.5.1966 (MEL17360): Killiecrankie Bay, Flinders Island, Furneaux Group, Bass Strait, *John Whinray*, 29.7.1966 (MEL17359): Prime Seal Point, Hummock Island, Furneaux Group, Bass Strait, *John Whinray*, 1.8.1966 (MEL17349): 200 yards SE. of the Mamana turnoff at Emita, Flinders Island, Furneaux Group, Bass Strait, *John Whinray*, 3.8.1966 (MEL17356): Sentinel Island, Furneaux Group, Bass Strait, *John Whinray*, 6.8.1966 (MEL17353): West Sister Island, Furneaux Group, Bass Strait, *John Whinray*, 14.8.1966 (MEL18292): The Nut, Stanley, *J. H. Willis*, 3.1.1967 (MEL22400).

NEW SOUTH WALES—Parramatta, *Woolfs*, ca. 1900 (MEL7432): Rocks at Morna Point, 3 miles south of Nelsons Bay, *Rex Filson* 4767, 20.4.1963 (MEL10156): Montagu Island, *J. Cassell*, July 1964 (MEL7473): 9 miles east of Cooma on the Numeralla road, *Rex Filson* 7881, 2.12.1965 (MEL16570).

SOUTH AUSTRALIA—Colona Station near Fowlers Bay, *J. H. Willis*, 27.8.1947 (MEL7435): Nullarbor Station, Nullarbor Region, *D. S. Kemsley*, 6.1.1952 (MEL7469): Koonalda Station, Nullarbor Region, *D. S. Kemsley*, 9.1.1952 (MEL7462): Near Knowles Cave, 25 miles NW. Nullarbor HS., *D. S. Kemsley*, 9.1.1952 (MEL7492): Middle River, North Coast of Kangaroo Island, *S. J. Edmonds*, ca. 1952 (MEL7490): Koomooloobooka Cave, Nullarbor Region, *D. S. Kemsley*, 13.1.1952 (MEL7466): Shed Tanks, 26 miles west of Koonalda, *J. H. Willis*, 5.9.1963 (MEL7471): Near Nundroo, Nullarbor Region, *R. T. M. Pescott*, 17.10.1965 (MEL16770): Kings Beach Cliffs near Victor Harbor, *R. W. Rogers*, 31.1.1966 (MEL16196): Stuart Highway 24 miles NW. of Port Augusta, *J. H. Willis*, 3.8.1966 (MEL17314): Adelaide road 11 miles south from Port Wakefield, *J. H. Willis*, 3.8.1966 (MEL17316).

WESTERN AUSTRALIA—New Holland, *Preiss*, ca. 1839 (MEL9147): Frasers Range, *R. Helms*, 20.9.1891 (MEL7436): Boxer Island, Recherche Archipelago, *J. H. Willis*, 9.11.1950 (MEL7476): Garden Island, off Perth, *G. G. Smith*, ca. 1960 (MEL7483): 8 miles east of Mundrabilla, Eyre Highway, *R. T. M. Pescott*, 16.9.1965 (MEL11325): Dundas Rocks, south of Norseman, *A. C. Beaglehole*

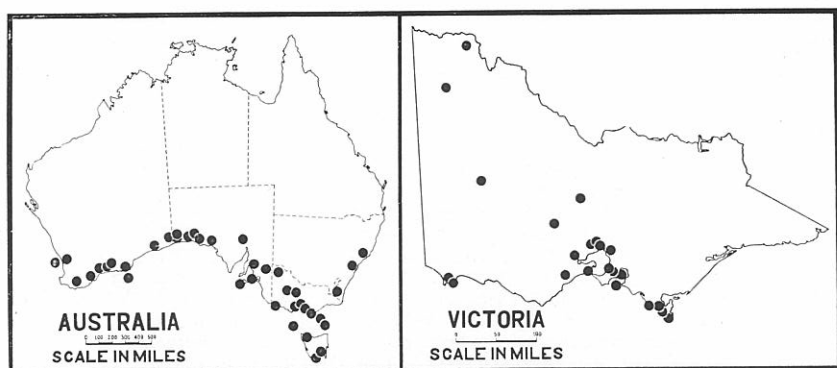


Fig. 45. Distribution map for *Xanthoria ectanea* (Act.) Räs. ex R. Filson

14799, 18.9.1965 (MEL14329): 11 miles west of Mundrabilla, 370 miles east of Norseman, A. C. Beauglehole 14855, 23.9.1965 (MEL14335): Cape le Grand, 32 km south-east of Esperance, N. N. Donner, 18.10.1965 (MEL16197): Road from Norseman to Esperance 64 km SSW of Norseman, N. N. Donner, 19.10.1965 (MEL16554): Saddle between Nancys Peak and the Devils Slide, Porongorup Range, Rex Filson 9051, 29.9.1966 (MEL18248): Bremer Bay, Rex Filson 9088, 1.10.1966 (MEL18272): Culham Inlet, 6 miles west of Hopetoun, Rex Filson 9206, 5.10.1966 (MEL18257): Mount Le Grand, 30 miles SE. of Esperance, Rex Filson 9251, 7.10.1966 (MEL18256): Thistle Bay, Cape Le Grand, 37 miles east of Esperance, Rex Filson 9275, 8.10.1966 (MEL 18244): 33 miles north of Eucla Motel on the road to Reid, Alex. S. George 8499, 14.10.1966 (MEL18359): Twilight Cove, Great Australian Bight, Alex. S. George 8556b, 16.10.1966 (MEL18352).

***Xanthoria parietina* (L.) Beltr.** Lichen. Bassan. 102 (1858).

Lichen parietinus L. Spec. Plant. 1143 (1753).

Parmelia parietina (L.) Ach. Method. Lichen. 213 (1803).

Phycia parietina (L.) DeNot. in Giorn. Bot. Ital. 2: 197 (1847).

Teloschistes parietina (L.) Norm. in Nyt Mag. Naturvid. 7: 229 (1853).

Thallus foliose up to 10 cm. diam., but usually smaller: *Lobes* 0.5–5 mm. wide, radiate, concave, rugulose, the margins slightly raised and flexuose, wax-yellow to nugget-bronze-yellow in exposed positions, french-grey to mustard in shaded: *Lower surface* white to pinkish, yellowing towards the margins of the lobes: *Cortex* 30–50 μ thick, uneven, lower cortex similar: *Algal layer* up to 60 μ thick of cells 7–16 μ diam.: *Medulla* of loosely woven hyphae 3 μ diam.

Apothecia clustered on the older portions of the thallus, slightly constricted at the base, up to 3 mm. diam., irregularly circular, concave, becoming convex: *Disk* usually darker than the thallus: *Margin* thin, naked, sometimes crenulate, concolorous with the thallus: *Hypothecium* 20–40 μ thick: *Hymenium* up to 80 μ tall including the granular epithecium: *Paraphyses* simple, branched, apical cell slightly thickened:

Asci 40–65 (–75) μ x 13–16 μ : Ascospores hyaline, polaribilocular, canal mostly present (9–) 12–15 μ x (5–) 7–10 μ : Pycnidia spherical, up to 170 μ diam.

SPECIMENS EXAMINED

VICTORIA—Mordialloc, *R. A. Bastow*, 3.3.1900 (MEL7411): Upper Gellibrand River Falls, *A. C. Beaglehole* 3190, 11.2.1952 (MEL11296): Seaholme, Port Phillip Bay, *T. B. Muir* 788, 16.8.1959 (MEL7474): Creswick, *J. H. Willis*, 13.1.1963 (MEL9121): Rye, Mornington Peninsula, *Rex Filson* 4011, 27.11.1961 (MEL26157): Cape Patterson, *Rex Filson* 5191, 7.9.1963 (MEL26160): Lady Julia Percy Island, *Geoff Carr*, Dec. 1963: 7½ miles NNE. Yea, *Rex Filson* 6646, 8.11.1964 (MEL26161): Jeffrey turnoff on the Caveat road, ca. 10 miles NW. of Alexandra, *George Crichton*, 9.11.1964 (MEL10155): Woodend to Trentham road, 4 miles west of Woodend, *Rex Filson* 7045, 28.3.1965 (MEL26158): Korweinguboora Springs, near Spargo Creek between Daylesford and Ballarat, *Marie Allender*, 16.5.1965 (MEL16603): Portland, *Rex Filson* 7269, 22.5.1965 (MEL10163): Triodia Hill, Lower Glenelg River, *Rex Filson* 7289, 22.5.1965 (MEL10160): Jones's Cliffs, Lower Gleneg River, *Rex Filson* 7281, 22.5.1965 (MEL10159).

TASMANIA—Sorell-Nugent road, *G. C. Bratt* 1401, 26.7.1964 (MEL9343): Constitution Hill near Oatlands, *G. C. Bratt*, 29.1.1966 (MEL18283): Tin Kettle Island, Furneaux Group, Bass Strait, *John Whinray*, 2.4.1966 (MEL16039): Prime Seal Point, Hummock Island, Furneaux Group, Bass Strait, *John Whinray*, 1.8.1966 (MEL17350).

SOUTH AUSTRALIA—Houghton, Mt. Lofty Ranges, *R. L. Specht*, ca. 1950 (MEL7464): Adelaide Hills near Inglewood, *J. G. Tracey*, Oct. 1952 (MEL7434): Naracoorte, *D. Hunt*, June–July 1962 (MEL16211): Hahndorf, Adelaide Hills, *Rex Filson* 4917, 18.6.1963 (MEL26159): River Torrens Gorge ca. 20 km NE. of Adelaide, *N. N. Donner* 1307, 13.3.1965 (MEL9117): Princes Highway, 7 miles east of Murray Bridge, *R. T. M. Pescott*, 29.6.1966 (MEL17335).

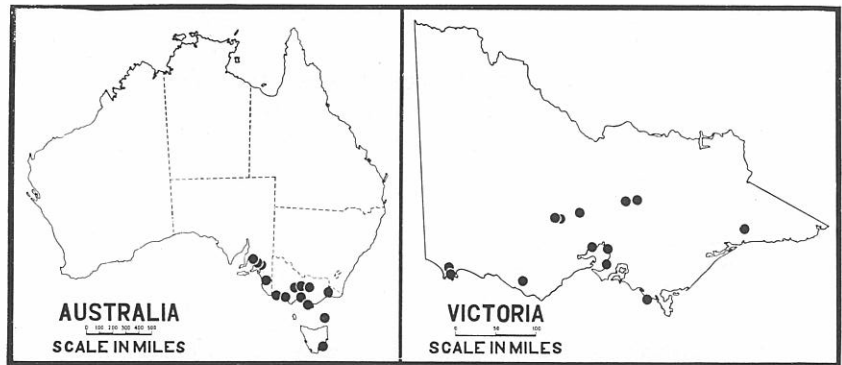


Fig. 46. Distribution map for *Xanthoria parietina* (L.) Beltr.

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PLATE 3

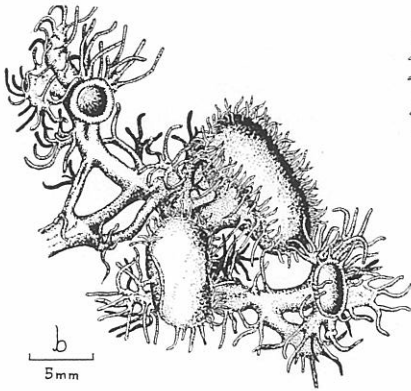
Teloschistes chrysophthalmus (L.) Th. Fries

- a. Typical narrow-lobed thallus growing on a small branch
- b. Enlargement of portion of the thallus showing apothecia in various stages of development
- c. Enlargement of portion of the thallus showing underside of apothecia
- d. Section through portion of apothecium
- e. Two stages in development of ascus
- f. Mature spores
- g. Section through portion of thallus

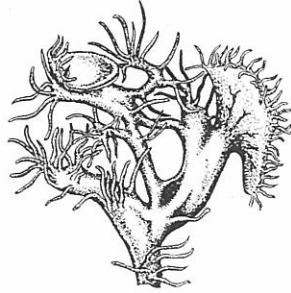
PLATE 3



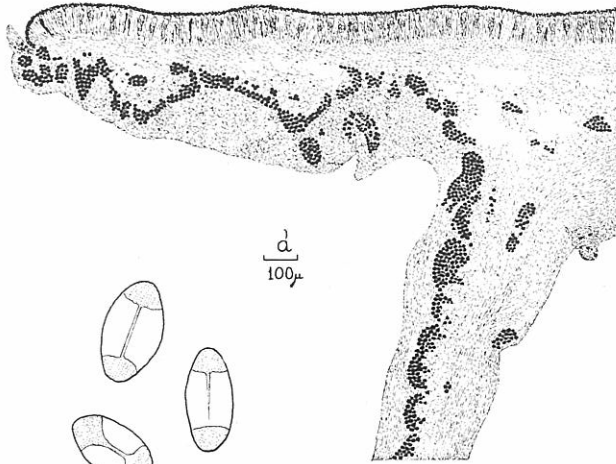
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b
5 mm



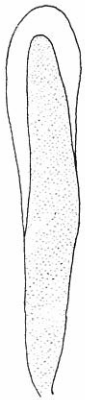
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d
100 μ

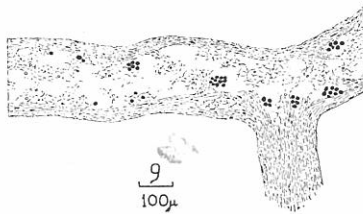


e
5 μ



f
5 μ

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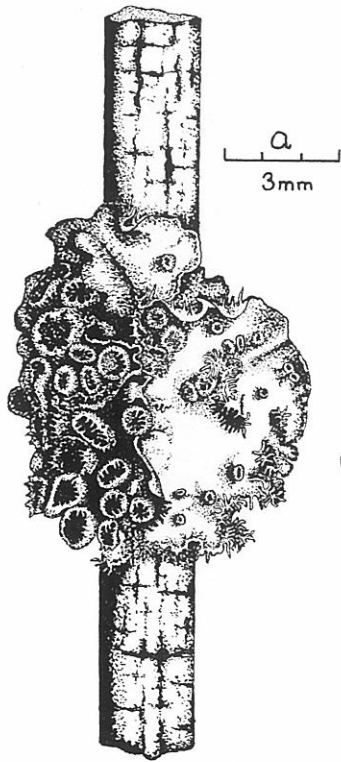
g
100 μ

PLATE 4

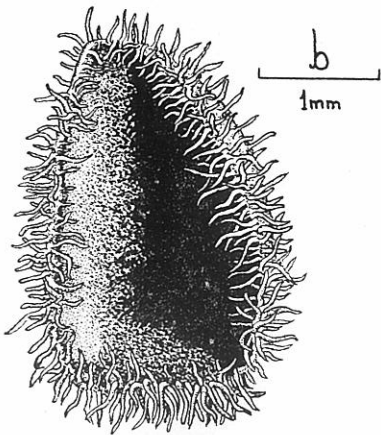
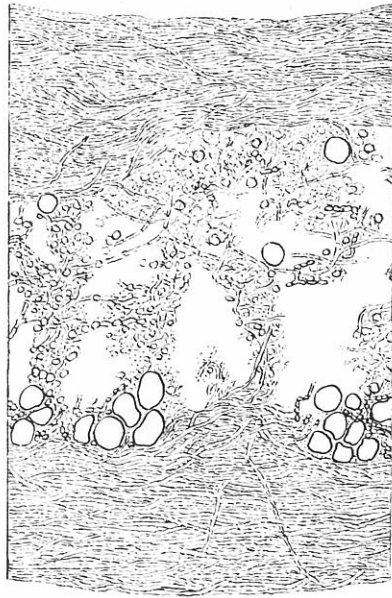
Teloschistes chrysophthalmus (L.) Th. Fries

- a. Typical broad-lobed thallus growing on a small branch
- b. Enlargement of apothecium
- c. Section through portion of thallus showing structure of upper and lower cortex
- d. Section through portion of apothecium

PLATE 4



© 1965



d
50μ

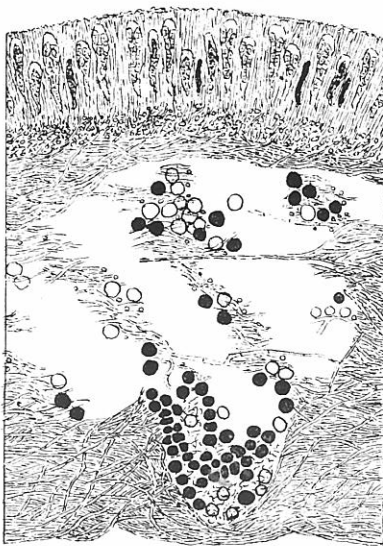
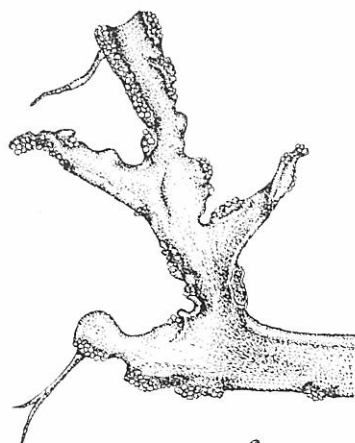
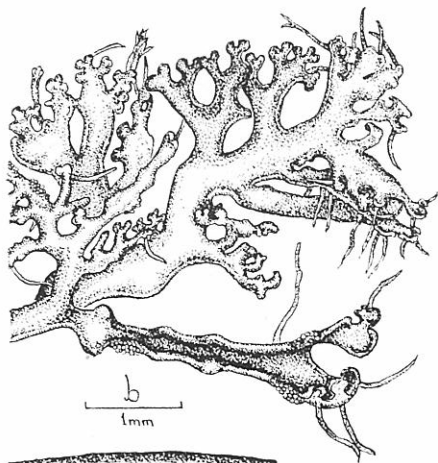


PLATE 5

Teloschistes fasciculatus Hillm.

- a. Typical thallus growing amongst foliage of *Podocarpus lawrencei* Hook. f.
- b. Enlargement of portion of thallus
- c. Enlargement of thallus lobe showing soredia on margins
- d. Section through portion of thallus
- e. Enlargement of section through thallus

PLATE 5



© 1967

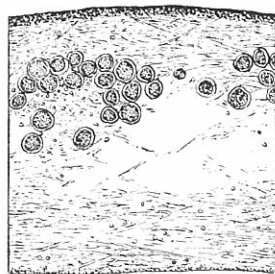


PLATE 6

Teloschistes flavicans (Sw.) Norm.

- a. Typical thallus growing over branches of *Rhodamnia argentea*
- b. Enlargement of thallus lobe showing soralia
- c. Enlargement of thallus lobe showing apothecia
- d. Section through apothecium
- e. A branched paraphysis from hymenium
- f. Two stages in development of ascus
- g. Two mature spores
- h. Longitudinal section through portion of thallus
- i. Cross section through portion of thallus

PLATE 6

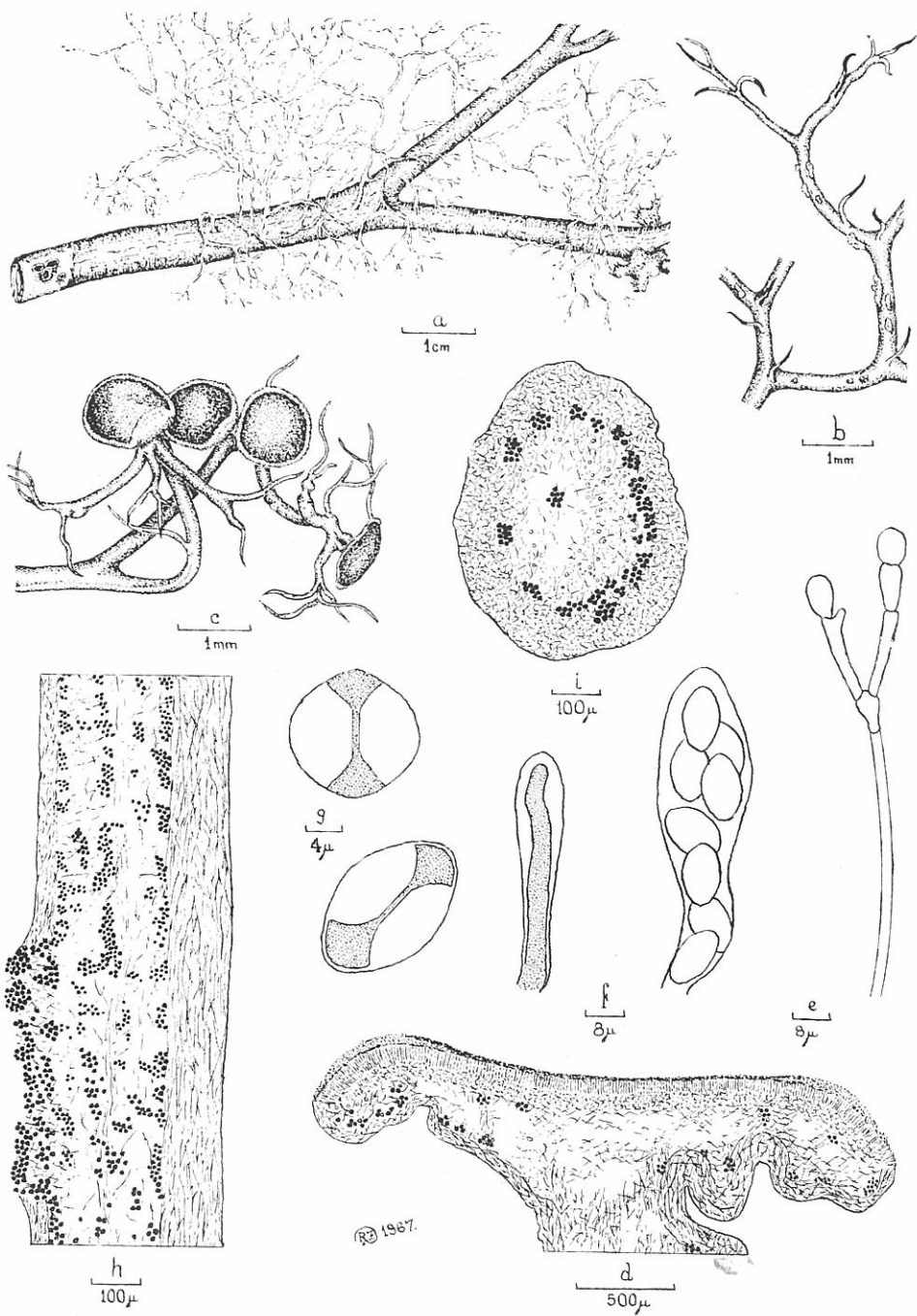


PLATE 7

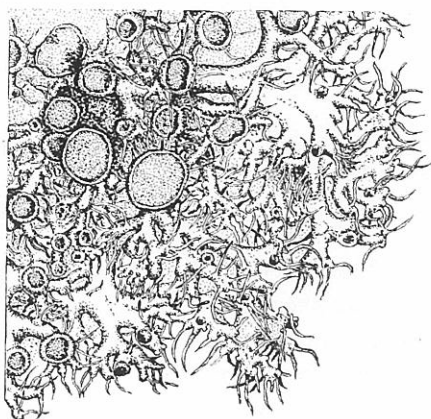
Teloschistes sieberianus (Laur.) Hillm.

- a. Typical thallus growing on a branch of small tree
- b. Enlargement of portion of thallus
- c. Enlargement of apothecia showing naked margins and cilia which is occasionally found on the lower apothecial cortex
- d. Enlargement of thallus lobe showing pycnidia
- e. Section of portion of thallus lobe showing pycnidia
- f. Section through apothecium
- g. Enlargement of section of apothecium
- h. Three stages in development of ascus

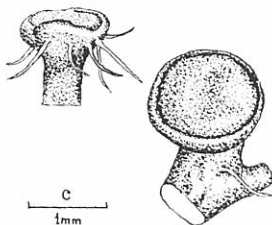
PLATE 7



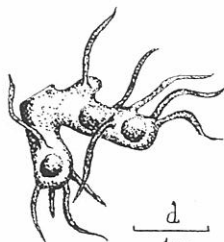
a
1cm



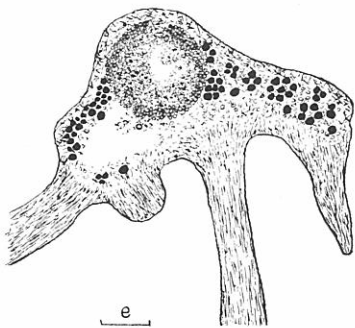
b
1mm



c
1mm

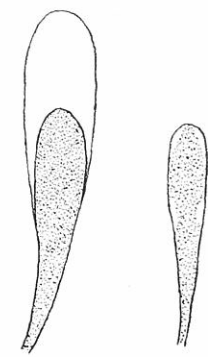


d
1mm



e
100μ

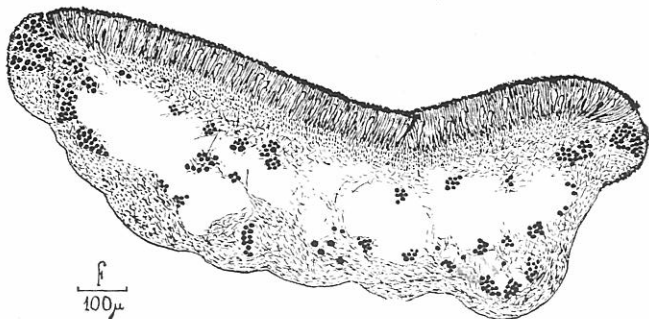
© 1965



h
10μ



g
100μ



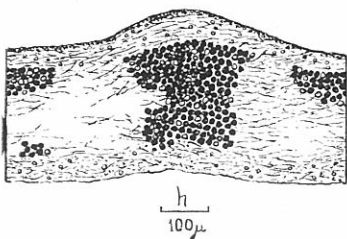
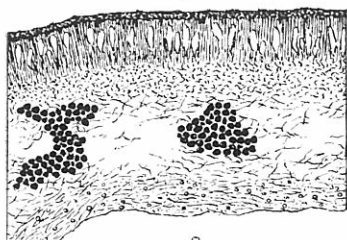
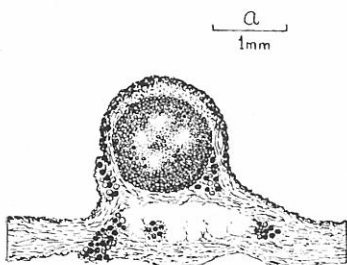
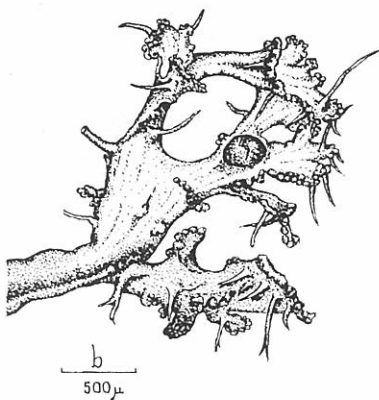
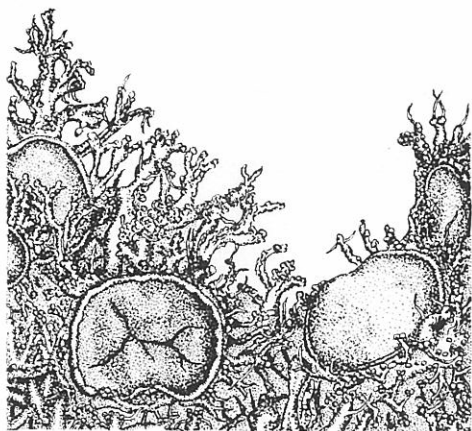
f
100μ

PLATE 8

Teloschistes spinosus (Hook. f. & Tayl.) J. Murray

- a. Typical thallus growing over rocks on Cat Island, Furneaux Group, Bass Strait
- b. Enlargement of thallus lobe showing pycnidia and granular soredia
- c. Section through portion of thallus lobe showing pycnidia
- d. Enlargement of apothecium
- e. Enlargement of section through apothecium
- f. Two stages in development of ascus
- g. Mature spore
- h. Enlargement of longitudinal section through thallus lobe
- i. Enlargement of cross section of thallus lobe (excluding marginal cilium)

PLATE 8



© 1967

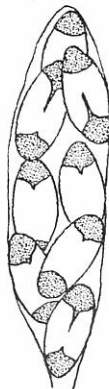
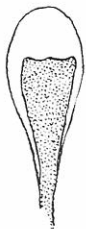
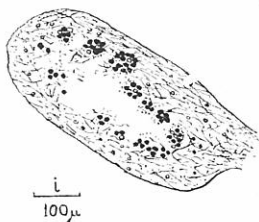
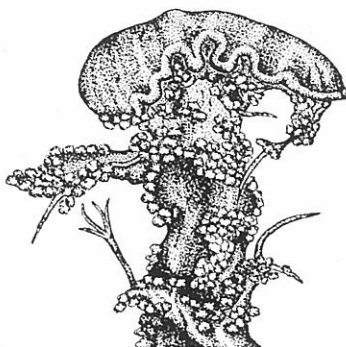
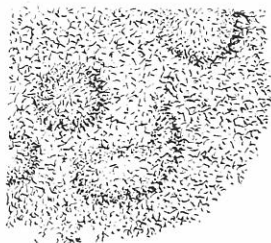


PLATE 9

Teloschistes spinosus forma *subteres* R. Filson

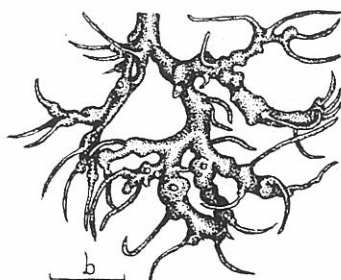
- a. Typical fine intricately branched thallus growing over rocks
- b. Enlargement of thallus lobes

PLATE 9



a
1cm

© 1967



b
1mm

PLATE 10

Teloschistes velifer Wilson

- a. Typical thallus growing over *Hymenanchera gentata*
- b. Thallus lobe showing development of apothecium
- c. Thallus lobe showing mature apothecium
- d. Undersurface of thallus lobe showing open-hooded ends with soredia
- e. Section through end of thallus lobe showing soredia on undersurface under open-hooded-ends
- f. Section through an apothecium
- g. Paraphyses from hymenium
- h. Stages in development of ascus
- i. Mature spores

PLATE 10

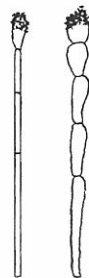
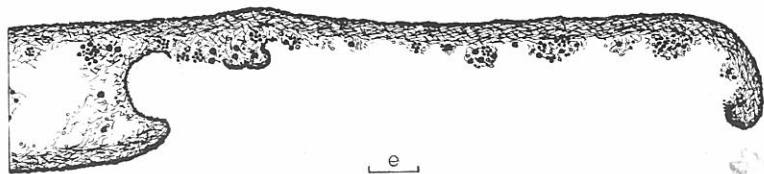
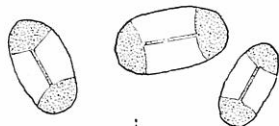
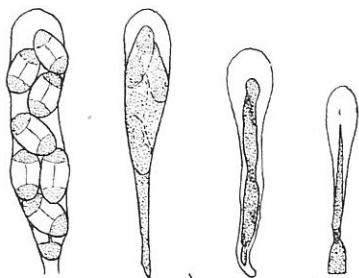
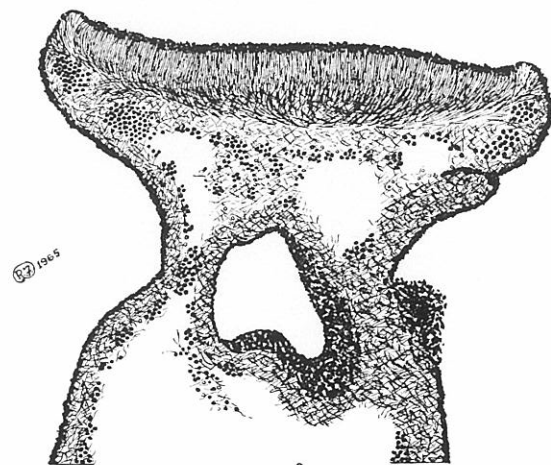
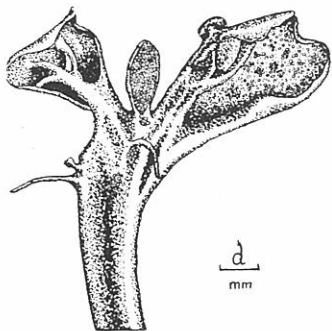
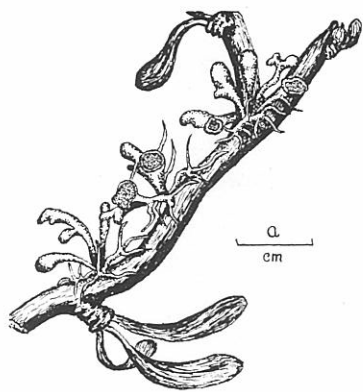


PLATE 11

Teloschistes velifer forma *nodulosa* (J. Murray) R. Filson

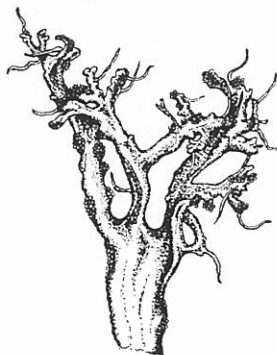
- a. Typical thallus growing in rock crevices
- b. Enlargement of contorted thallus lobes showing soredia

PLATE 11



© 1967

$\frac{a}{0.5\text{cm}}$



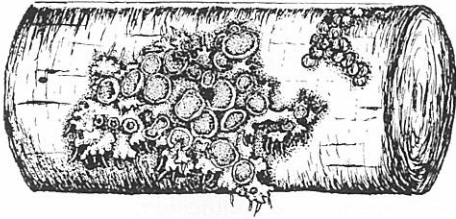
$\frac{b}{1\text{mm}}$

PLATE 12

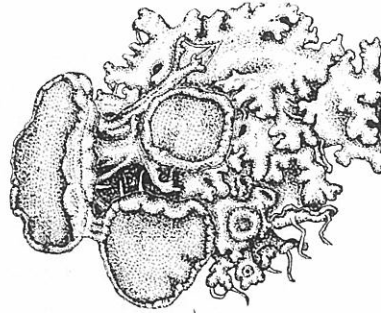
Teloschistes xanthoroides J. Murray

- a. Typical thallus growing on small branches
- b. Enlargement of thallus lobe showing apothecia
- c. Section through apothecium
- d. Showing development of ascus
- e. Mature spores
- f. Section through portion of thallus

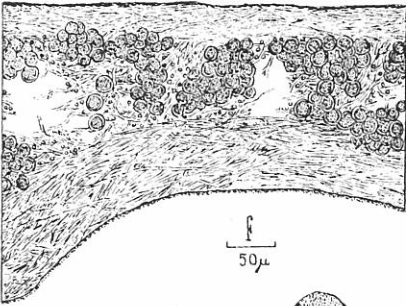
PLATE 12



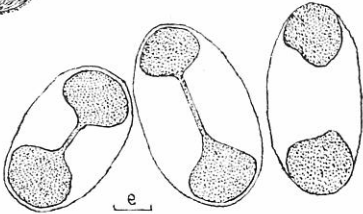
a
5mm



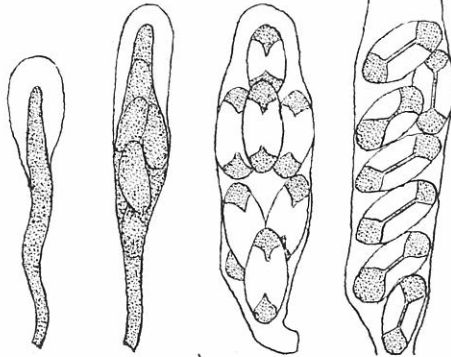
b
1mm



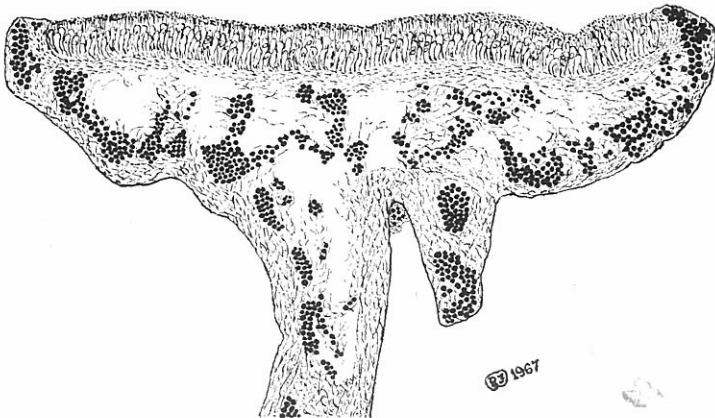
f
50μ



e
4μ



d
8μ



c
100μ

1967

PLATE 13

Xanthoria ectanea (Ach.) Räs. ex R. Filson

- a. Typical thallus growing over rocks
- b. Portion of thallus lobe showing developing apothecium
- c. Enlargement of thallus lobe showing mature apothecium
- d. Section through portion of apothecium
- e. Showing development of ascus
- f. A branched and unbranched paraphysis showing granules in
epithecium
- g. Mature spores

PLATE 13

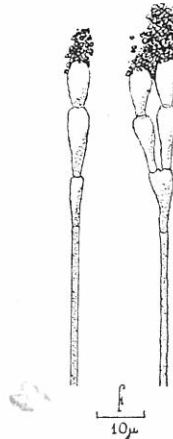
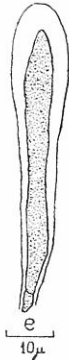
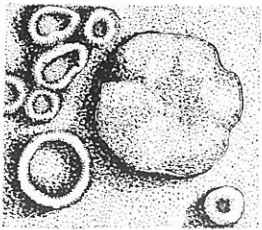
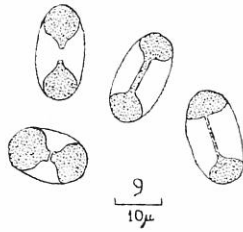
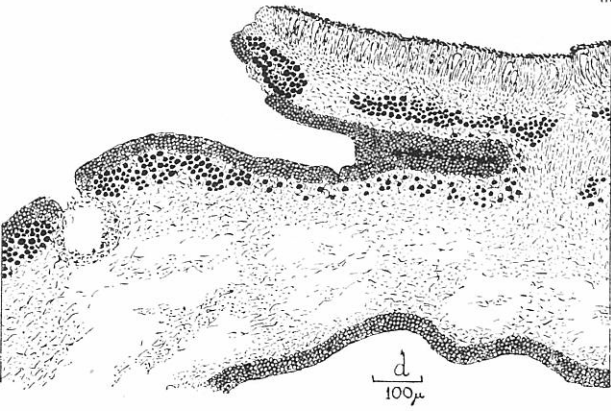
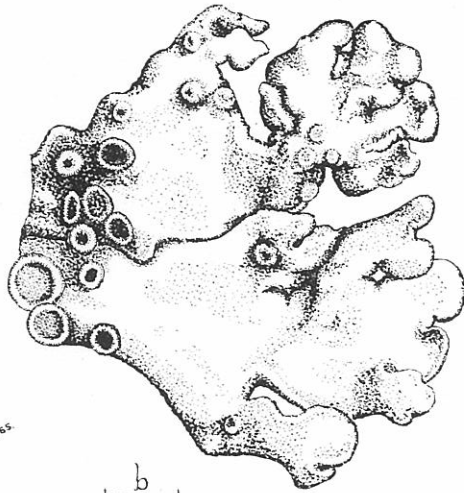
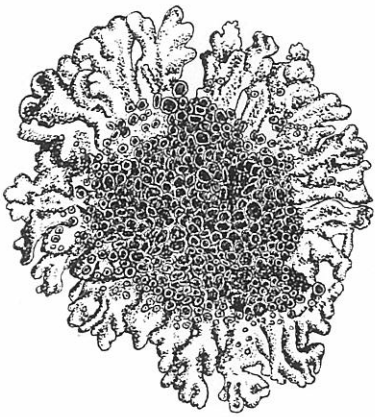


PLATE 14

Xanthoria ectanea (Ach.) Räs. ex R. Filson

- a. Section through end of thallus lobe showing pycnidia
- b. Enlargement of hyphae from pycnidia
- c. Enlargement of section of thallus showing structure of lower and upper cortex
- d. Enlargement of section of apothecium

PLATE 14

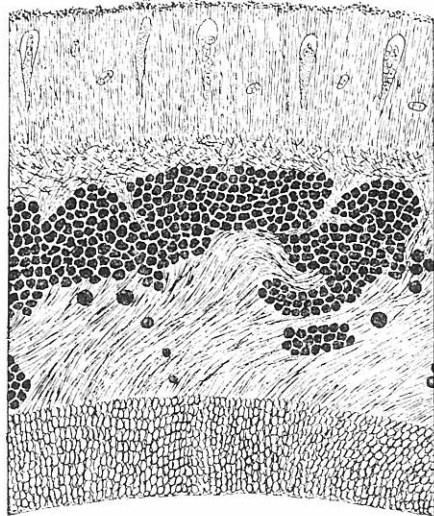
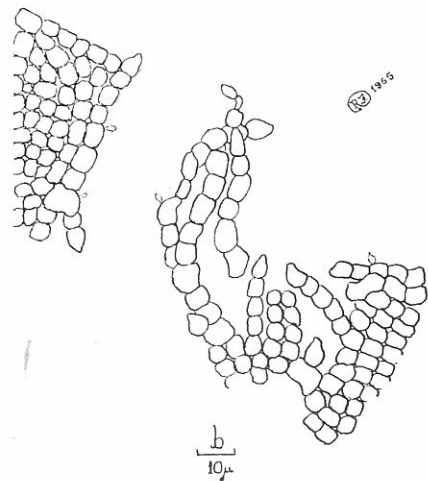
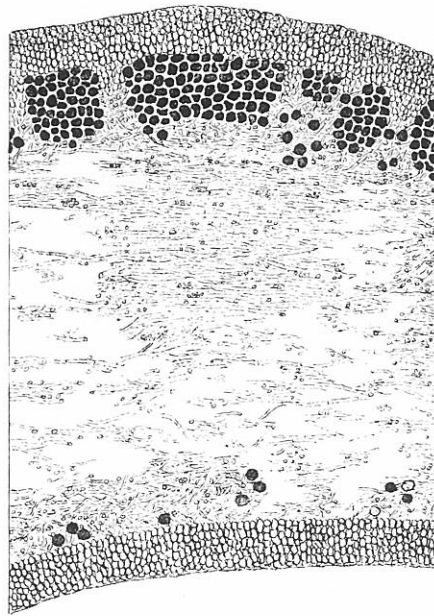
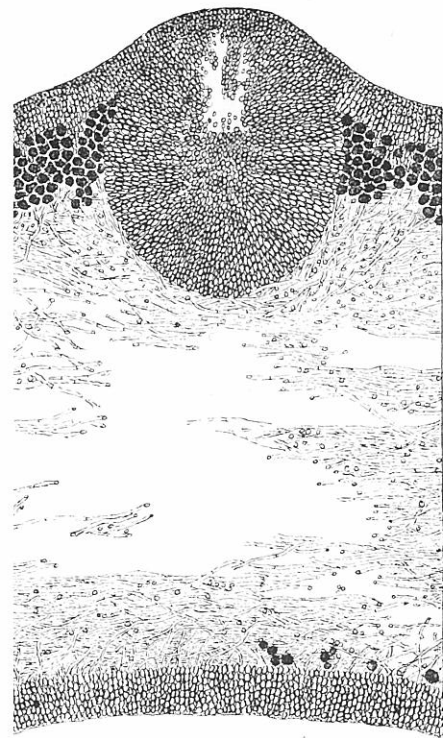
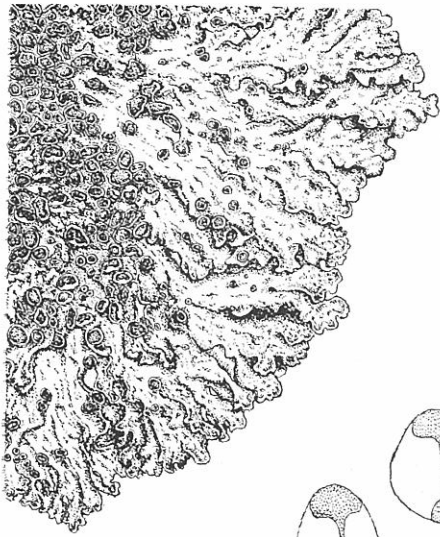


PLATE 15

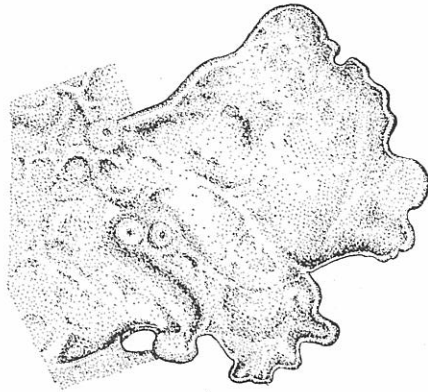
Xanthoria parietina (L.) Beltr.

- a. Portion of thallus growing on tree trunk
- b. Enlargement of thallus lobe
- c. Section through portion of thallus lobe
- d. Enlargement of apothecium
- e. Section through portion of apothecium
- f. Two stages in development of ascus
- g. Mature spores
- h. Branched paraphysis from hymenium

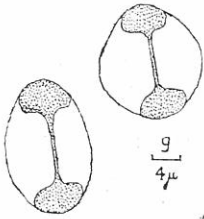
PLATE 15



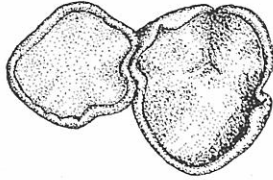
a
0.5 cm



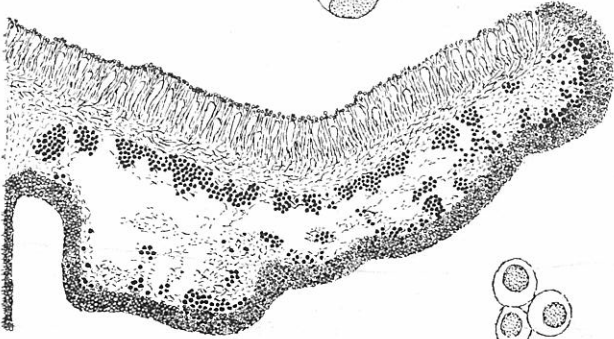
b
1 mm



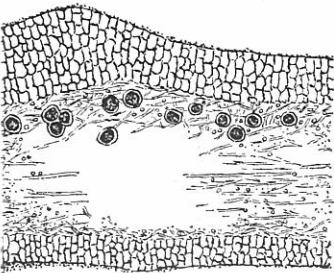
g
4 μ



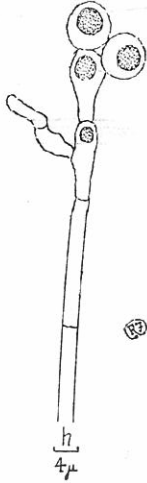
d
1 mm



e
100 μ

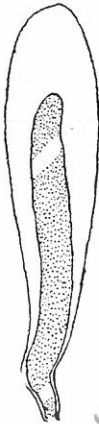


c
50 μ

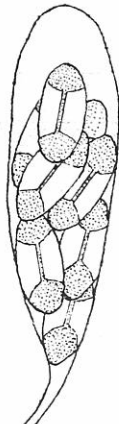


h
4 μ

1967



i
4 μ



f
4 μ