# Studies of some South African Resupinate Hymenomycetes.*

*By*

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Resupinate Hymenomycetes do not form a closely integrated group, and it must be borne in mind that the term " resupinate " is ambiguous, being used both morphologically and as a colloquial name for the large, non-taxonomic group of lower Basidiomycetes whose members are characterised by a fructification lying flat on the substratum with the hymenium on the outer side. While the taxonomic work which follows has been limited to South African species, fungi from other regions are mentioned in comparison.

Collectors in South Africa, with the notable exception of Mr. W. G. Rump of the Natal Museum, have paid little attention to resupinate Basidiomycetes, as the collections cited in the subsequent pages will testify. These fungi are seldom of striking appearance, which may be one reason why they were so poorly represented in the famous early collections. The data in Table I are presented in illustration of this point. The table also summarises the more important early literature references to South African fungi. These records mostly lack descriptions, or if descriptions are given then they are generally totally inadequate by present standards.

TABLE 1.

Table indicating how very few Resupinate Hymenomycetes were listed or described from collections of fungi made by famous early collectors in South Africa.

| Collector. | Collections Examined By. | Gross Number of Species in Collection. | Number of Resupinate Hymenomycetes Represented. |
|---|---|---|---|
| Zeyher..... | Berkeley (1843. a)..... | 31 | Nil |
| Burke and Zeyher | Berkeley (1843. b)..... | 2 | Nil |
| Drège..... | Léveille (1846)..... | 11 | Nil |
| | Montagne (1847)..... | 32 | 3 |
| Wahlberg..... | Fries (1848)..... | 40 | 2 |
| MacOwan..... | de Thümen (1875–78)..... | 127 | 2 |
| | Kalchbrenner and Cooke (1880)..... | 108 | Nil |
| | Kalchbrenner (1881, a; 1881, b; 1882).... | 322 | 14 |
| | Winter (1884–1885)..... | 19 | Nil |
| Eaton..... | Berkeley (1876)..... | 31 | 1 |
| J. Medley Wood | Bottomley (1917)..... | 527 | 5 |
| | Cooke (1879, 1881)..... | 248 | Nil |
| | Kalchbrenner and Cooke (1880)..... | 108 | Nil |
| | Kalchbrenner and Cooke (1881)..... | 39 | 1 |
| | Sydow (1899)..... | 41 | Nil |
| Schlechter..... | P. Hennings (1895, 1898)..... | 24 | Nil |

Even in recent years the tendency has been to overlook resupinates. For example, Phillips (1931) lists 127 species of fungi from Knysna forests, of which only two are resupinate Hymenomycetes. None at all are found in Miss Pegler's collection of seventy-nine species from Kentani (Pole Evans and Bottomley, 1917). Miss Wakefield's

* Most of this work was prepared while the author occupied the post of South African Assistant at the Herbarium of the Royal Botanic Gardens, Kew, and he is deeply indebted to the several authorities responsible for this arrangement. At Kew, he was singularly fortunate in receiving the guidance of Miss E. M. Wakefield and Dr. B. Barnes of Chelsea Polytechnic, whose interest and unstinted help is gratefully acknowledged.

examination of Höeg's collections of African fungi resulted in the listing of five resupinates among a total of fifty-five species (Wakefield, 1936). Simpson and Talbot (1946) list only five resupinates out of a total of fifty-four species from Qudeni forest.

Without adequate collections, and facilities for comparison of material with types in overseas herbaria, taxonomic work in this group has never progressed beyond the pioneer works of van der Byl (1929, 1934) where about forty species are described. The present paper is an attempt to extend and modify van der Byl's work on the basis of new collections which have accumulated in the herbaria. However, there are still insufficient good collections of certain species, for this country is strangely lacking in those amateur naturalists on whom so much has depended in other countries for the advance of mycology.

## DISTRIBUTION, NATURAL HABITATS, AND SUBSTRATA.

The relative paucity of collections makes it impossible to obtain a clear picture of the distribution of the different species within South Africa, but it is likely that they are widespread throughout all parts of the country where the same type of natural habitat occurs. The physical configuration of the Union is responsible for a great variety of natural habitats and conditions of localised occurrence, only a few of which are suitable for the growth and development of resupinate Hymenomycetes. Undoubtedly the optimum conditions of moisture, temperature and rotting vegetation are found in the indigenous forests and bush, and to a lesser extent in the artificial plantations of *Eucalyptus* spp. or *Acacia mollissima* and *A. decurrens*. In the Thornveld, subjected to periodic hot winds from the north, a limited water supply and recurring grass fires which prevent the tree formation from closing in so that moist, shady conditions do not obtain (Bews, 1912 p. 309; 1913, p. 497), resupinates are rare except near stream banks. The ravages of termites on fallen sticks and branches in the Thornveld without doubt limits the amount of rotting vegetation available for the support of saprophytes.

It is suggested that the same species of fungi are likely to be widespread in scattered indigenous forest formations which owe their existence to the Great Escarpment (A. W. Rogers, 1922) of South Africa. Such forests occur chiefly in the botanical region known as the " Steppe and Forest Province " (Pole Evans, 1922), that is, on the south-east slopes of the escarpment and subsidiary mountains facing moisture-laden winds from the Indian Ocean, and sheltered from the hot north winds. Forest formations dependent in this way on topography are fully discussed by Bews (1912, 1913), Henkel *et alia* (1936), and Phillips (1931), who conclude that their phanerogamic constitution varies only slightly in different localities. The coastal forests of Natal are closely allied to tropical East African bush (Bews), 1912, while those of Knysna further south (Phillips, 1931) are composed of species derived from tropical ones; they are, however, climatically and constitutionally more temperate in nature than those of Natal, the Eastern Cape and the Transvaal.

Marloth (1903, 1905) has shown how effectively the vegetation is able to precipitate the moisture carried by the S.E. winds at the Cape, in the absence of actual rain. On the other hand, Bayer and Coutts (1938) draw attention to the remarkably frequent occurrence of very low relative humidity in the Thornveld (less than 50 per cent. at midday on 174 days in the year, and as low as 7 per cent. at 8.30 a.m. when the " Berg " winds are blowing); this in itself would almost exclude saprophytic fungi from flourishing in such a habitat at most seasons.

The above ecological evidence supports the suggestion that the same species of resupinate fungi might well be widespread in all natural forests in the Union, and that our fungus flora is likely to include many elements derived from, or at least common to, the more central African territories. Here an analysis of the distribution of forty-five

species, described in this paper, is of interest. The analysis is based on collections which the author examined in Kew Herbarium. Although the number is small it at least forms a random sample of the known South African resupinates. Of the forty-five species—

13 are recorded only from South Africa;

5 are truly cosmopolitan;

7 are of mixed tropical and temperate affinity, but not fully cosmopolitan;

9 are associated only with Europe and/or North America;

11 are associated only with the tropics of the Far East, Africa or America.

These figures will change with the inclusion of new records in the future. The likelihood is that the fungi now appearing as peculiar to South Africa will eventually be linked with tropical ones rather than temperate species, for until now the tropics, especially in Africa, have received less attention from collectors than the temperate regions. It cannot be too strongly emphasised that resupinate Hymenomycetes are far more abundant in South Africa than might be supposed from a list of the species described in this paper. But much work is necessary before the value of new collections which the author is making can be assessed.

A highly specialised habitat is the gold mines of the Transvaal. They are rich in fungi growing on underground timbers and textiles (Brown, 1937), but such fungi have largely been excluded from this study. They frequently vary astonishingly from the normal in this unnatural habitat, and their place of origin is often uncertain, for much timber is imported.

It is seldom possible to record in this paper the substratum with which the described fungi are associated. This aspect of collecting has almost always been neglected, and it is not always possible to be sure of the identity of a fallen stick or branch lying under such a mixed canopy as is usually found in our forests.

## MATERIALS AND METHODS OF EXAMINATION

Most material used in these studies consisted of dried herbarium specimens. Wherever possible, these were implemented by the author's own collections of fresh material of the same species, and by specimens from other sources in Kew Herbarium. But in describing and citing collections, reference is made only to South African material, unless otherwise stated.

The techniques used in microscopic work were based on those of Overholts (1929), Martin (1934) and Burt (1914–1926; 1929). In interpreting the nature of the various accessory organs and minute hyphal characters, the work of Overholts (1929) and Pilát (1926) have been closely followed, and their definitions apply here. The terms " generative " and " skeletal " hyphae are used in the sense of Corner (1932 a; 1932 b).

The principal reagents used in mounting and staining sections or crush preparations were: (1) 5 per cent. potassium hydroxide solution, with or without the addition of a very small amount of aqueous 1 per cent. phloxine solution; (2) lactophenol for species which darken too much in KOH, or whose cystidia are soluble in KOH; (3) Melzer's iodine-chloral hydrate for staining conducting vessels and for testing the amyloid reaction of spores; (4) alcohol for removing the air bubbles from tissues; (5) sepia solution, to give a dark-ground effect for detecting a mucilaginous investment of spores; (6) dilute hydrochloric acid for dissolving obstructive mineral inclusions. In general it was not attempted to make permanent preparations. Semi-permanent preparations are made fairly satisfactorily by ringing lactophenol mounts with gold size, Noyer or Krönig cements. These cements all have some or other disadvantage. Polyvinyl alcohol-lactophenol is a good mountant for all but the most delicate resupinates;

this medium may also be used as a ringing agent for lactophenol mounts, but the ring slowly becomes dissolved from the inside and needs renewing after about eight months. When solution of the ring occurs, no obstructive suspension is formed in the mounting fluid. The advantage of this medium as a ringer is that it is fluid, easy to apply, sets clean and transparent within a few hours, and does not chip or crack.

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## TAXONOMIC

In essentials the classification adopted here is that of Bourdot and Galzin in " Hymenomycetes de France " (1928). The genera are grouped thus:—

HETEROBASIDIOMYCETAE

AURICULARIACEAE (*Auricularia*; *Helicobasidium*; *Septobasidium*).
TREMELLACEAE (*Sebacina*; *Heterochaete*).

HOMOBASIDIOMYCETAE–APHYLLOPHORALES

EXOBASIDIACEAE (*Exobasidium*).
POROHYDNACEAE

1) **Corticieae**

Corticinae (*Corticium*; *Peniophora*; *Punctularia*; *Aleurodiscus*).
Merulinae (*Phlebia*; *Merulius*; *Coniophora*).
Stereinae (*Stereum*; *Duportella*; *Hymenochaete*).
Asterostromellinae (*Asterostromella*).

2) **Asterostromeae** (*Asterostroma*).

3) **Hydneae** (*Mycoleptodon*; *Lopharia*; *Acia*; *Grammothele*; *Grandinia*; *Odontia*; *Hydnum*; *Radulum*).

4) **Phylacterieae** (*Thelephora*; *Tomentella*).

5) **Poreae** (*Thelepora*).

NOTE.—In the taxonomic section, an exclamation mark (!) after a specific epithet indicates that the type, or authentic material, of that species has been examined.

Except when otherwise stated, herbarium numbers of specimens quoted in this work refer to the collections housed in the Mycological Herbarium of the Union Department of Agriculture in Pretoria, designated in abbreviation as Herb. Pretoriae.

## HETEROBASIDIOMYCETAE

Basidia transversely, longitudinally or vertically septate, or deeply divided, or differentiated into probasidia or hypo- and epibasidia; producing spores which on germination develop secondary spores from which the mycelium arises; or if the basidium is undivided, then the characters of spore germination still subsist.

There are relatively few heterobasidiomycetes recorded from South Africa, and of these extremely few are resupinate in habit. This is partly due to the lack of adequate collections, but may eventually prove to be a characteristic of the flora dependent on the climate. Further observation can alone decide. Descriptions and notes on the resupinate species so far recorded follow on the succeeding pages. Where there are several species in one genus, a key to species is provided.

## AURICULARIA Bull. ex Fries.

1. **Auricularia mesenterica** (Dicks. ex Fries) Fries, Epicr. (1838) 555, Hym. Eur. (1874) 646; Berkeley, Outlines of Brit. Fung. (1860) 272; Saccardo Syll. Fung. 6 (1888) 762; Lloyd, Myc. Writ. 5 (1919) 873; Bourdot and Galzin, Hym. de Fr. (1928) 15; Rea, Brit. Basid. (1922) 727.

   *Helvella mesenterica* Dicks., Crypt. Fasc. 1 (1785) 20; Bolton, Hist. of Fung. Growing about Halifax 3 (1791) Tab. 172.

   *Auricularia corrugata* Sowerby, Eng. Fung. 3 (1803) Tab. 290.

   *Thelephora mesenterica* (Dicks.) Pers., Syn. Fung. (1801) 571.

   *Phlebia mesenterica* (Dicks. ex Fr.) Fries, Elench. 1 (1828) 154.

   *Auricularia tremelloides* Bulliard, Champ. de la Fr. (? 1780) Tab. 290; Quélet, Fl. Myc. de Fr. (1888) 24.

   *Illustrations*: Lloyd Myc. Writ. 5 (1919) f. 1490; Rolland, Atlas des Champ. de Fr. (1910) 92, Pl. 106, f. 242; Hussey, Illustr. Brit. Myc. 2 (1855) Pl. 6; Ramsbottom, Handbk. of Larger Brit. Fungi (1923) 156, f. 95.

PLATE 1.

Effused over a wide area, resupinate with narrow reflexed margin, thick, gelatinous-coriaceous, in section up to 1,000 $\mu$ thick excluding the tomentum; drying thin and horny, brittle. Hymenium covered by reticulate, plicate ridges up to 1 mm. in height, light reddish brown when fresh, drying livid purplish (dark vinaceous drab to deep quaker drab—Ridgway) with a greyish pruina. Margin thickly tomentose on abhymenial surface, imperfectly zoned greyish and brownish.

Basidia: 4–6·6 × 60–73 $\mu$, divided by three transverse septa into four cells, each capable of bearing a lateral sterigma, 2–2·5 × 21 $\mu$.

Spores: hyaline, smooth, cylindric-curved, or ellipsoid with one side depressed, 10–15 × 4–5·5 $\mu$.

Paraphyses: filamentous, simple or branched, separating the basidia.

Hyphae: gelatinised, 1–2 $\mu$ diam., loosely woven in centre of trama but compacted into a darker bordering layer adjacent to the tomentum. Probably only the lumen is seen.

Hairs of the abhymenium: pale coloured, 2–3 $\mu$ diam., thickly intertwined, with a very narrow lumen.

Mineral inclusions: found in the hymenium between and beneath the basidia.

Specimens examined: 28495, *Rump* (251), Town Bush, Maritzburg, Oct. 1934.

The specimen on which this description is based occupied an area of 7 × 33 inches on an old stump, and the reflexed portion was in most parts only a few millimetres wide. Most European specimens have a widely reflexed part on which the zonation of the hairy surface is quite distinct. Probably when more specimens are found in South Africa it will be discovered that they are not always almost entirely resupinate. The spore size in this specimen is at the lower end of the range recorded for France by Bourdot and Galzin.

2. **Auricularia mesenterica** var. **lobata** (Sommerf.) Quél., Sommerf. in Mag. Nat. Vidensk. (1827); Fries, Elench. 2 (1828) 34, Hym. Eur. (1874) 646; Berkeley, Outl. of Brit. Fung. (1860) 272, Pl. 18, f. 1; Bourdot and Galzin, Hym. de Fr. (1928) 15; Rea, Brit. Basid. (1922) 727; v. d. Byl in Ann. Univ. Stellenbosch *1:* A: 3 (1923) 10, f. 7.

Differs from the species *A. mesenterica* by the possession of a lobed margin to the pileus, and zones which are glabrous, velutinous or hispid. v. d. Byl (l.c.) records *A. lobata* from the Victoria Falls and I have also seen a specimen, 23373, *Eyles* (1312), Apr. 1981, from the same locality in Rhodesia. This specimen was small and sterile, not resupinate, showing a distinctly lobate margin, but otherwise would be taken for *A. mesenterica* with a rather browner hymenium than usual. In practice is is difficult to maintain *A. lobata* even as a variety.

## HELICOBASIDIUM Patouillard.

1. **Helicobasidium compactum** (Boedijn) Boedijn ! in Archief Theecultuur 4 (1930) 41; Boedijn and Steinmann in Bull. Jard. Bot. Buitenzorg ser. 3, 11 (1931) 169.
   *Septobasidium compactum* Boedijn in Comm. Gen. Expt. St. A.V.R.O.S. 26 (1926) 7.
   *Helicobasidium mompa* Tanaka forma *macrosporum* Hara in Journ. Seric. Assoc. Japan, Tokyo, 6 (1917) 725. [non *Septobasidium mompa* (Tanaka) Rac.]
   *Helicobasidium purpureum* (Tul.) Pat. var. *orientale* Pat. in Bull. Soc. Myc. de Fr. 36 (1920) 176.
   Above Synonymy after Boedijn.
   *Illustrations*: Boedijn (1930 and 1931, l.c.).

   PLATE 2.

Resupinate, investing plant parts or soil with a thick, soft, spongy cushion, fawn to chocolate coloured with violet tints, up to 2 cms. in thickness, or occasionally rather thin. Hymenium smooth, dry, membranous, pruinose with spores, coloured fawn to violaceous-fawn. Context concolorous, spongy. Mycelial cords frequently creep over the substratum, according to Boedijn.

Basidia: arising direct from hyphae, without probasidia; cylindrical, at first straight, later curling over like a crozier and 1–4 celled, hyaline, 40–80 × 5–6 $\mu$. (Sterigmata 2, lateral from the basidial cells, when mature 1–2 × 25 $\mu$, fide Boedijn.)

Spores: hyaline, smooth, elliptic with one end round and the basal end attenuate and often abruptly bent at the attachment, 4–5·5 × 18–23 $\mu$.

Hyphae: subhymenial hyphae hyaline or very dilutely coloured, much bent and twisted, profusely branched; tramal hyphae brown, thin walled, lacking clamps, much branched, septate, 4–6–(7) $\mu$ wide, chiefly vertically arranged, sometimes forming zones of different densities. Fine granular mineral matter is often scattered among the hyphae.

Specimens examined: On *Pinus luchuensis*, *E. M. Laughton*, Bergplaats, George, C.P., Aug. 1937 (in Herb. I.M.I.); on *Pinus longifolia*, 27347 and 27346, *D.F.O.*, Timbadola, Louis Trichardt, Oct. 1933; on *Pinus longifolia*, 26855, *D.F.O.*, Hangklip, Louis Trichardt, Oct. 1931 and Sept. 1932; On *Acacia melanoxylon*, 9049, *D.F.O.*, Katberg Main Forest, 1/6/1915 (this specimen is sterile but otherwise agrees with *H. compactum*); on *Pinus longifolia*, 27345, *Forester*, Hangklip, Louis Trichardt, Jan. 1934; on *Pinus* sp. 27701, *Conservator of Forests*, Hangklip, Louis Trichardt, Sept. 1934; on base of dying *Pinus longifolia*, 26329, *Forester*, Hangklip, Louis Trichardt, Oct. 1930; on *Pinus insignis*, 21054, *D.F.O.*, Karatara, Knysna, 13/12/1926 (sterile); on *Acacia melanoxylon*, 9154, *J. D. Keet*, Katberg (basidia present, but no spores; as *Corticium laetum* in Herb. Pretoriae); on *Camellia theifolia*, *A.C. Tunstall*, Assam, India, det. K. B. Boedijn, 22/4/1926.

The pathogenicity of this species on *Pinus* trees in the Transvaal is discussed by Miss Bottomley [in S.A. Jour. Sci. 33 (1936) 374–5]. A note on one of the herbarium sheets, probably copied from a letter from Miss Wakefield, states: " The very thick spongy texture and the stratified hymenium are unusual in the genus *Helicobasidium* and in this respect, as well as in spore characters, the fungus agrees exactly with *Helicobasidium compactum* Boedijn, which is the cause of a serious root disease of coffee in the Dutch East Indies, and has been recorded on various other plants in that region. The species of true *Helicobasidium* are all suspect as root parasites, and this case is therefore particularly interesting . . . . The fruiting stage can usually be recognised by the presence of a pale lilac ' bloom ' on the surface, due to the abundance of spores. The species is very close to *H. longisporum* described from roots of cacao from Uganda (Kew Bull., 1917). *H. longisporum* forms a delicate, pulverulent layer, and the spores are more deeply coloured and average longer, 20–26–(30) $\mu$."

Other species of *Helicobasidium* with lilac, vinous or purple hymenia are: *H. purpureum* (Tul.) Pat. [spores reniform, 10–12–(15) × 6–7 μ], *H. longisporum* Wakef. ! (spores purple, 25–26 × 4·5 μ) and *H. mompa* Tanaka (spores 10–12 × 5–7 μ).

2. **Helicobasidium purpureum** (Tulasne) Patouillard in Bull. Soc. Bot. Fr. 32 (1885) 171; Saccardo, Syll. Fung. 6 (1888) 666; Boudot and Galzin in Bull. Soc. Myc. de Fr. 25 (1909) 17, Hym. de Fr. (1928) 9; Buddin and Wakefield in Trans Brit. Myc. Soc. 12 (1927) 116–140, cum icones; Patouillard in Bull. Soc. Bot. Fr. 33 (1886) 335–337, Essai Taxon. sur les Hym. (1900) 12; Ware in Trans. Brit. Myc. Soc. 14 (1929) 94; Sampson and Western, Diseases of Brit. Grasses and Herbage Legumes (1941) 42.

*Hypochnus purpureus* Tulasne in Ann. Sci. Nat. ser. 5, 4 (1865) 295, in Journ. Linn. Soc. Bot. 13 (1871) 37 and Ann. Sci. Nat. ser. 5, 15 (1872), 227.

*Helicobasis purpureus* (Tul.) Clements and Shear, Genera of Fungi (1931) 341.

*Rhizoctonia crocorum* (Pers.) DC.—Duggar in Ann. Mo. Bot. Gard. 2 (1915) 403; Buddin and Wakefield in Trans. Brit. Myc. Soc. 12 (1927) 116–140, in Ann. Appl. Biol. 11 (1924) 292, in Trans. Brit. Myc. Soc. 14 (1929) 97; Ware in Trans. Brit. Myc. Soc. 14 (1929) 94; Watson in Trans. Brit. Myc. Soc. 14 (1929) 95; Doidge and Bottomley, Revised List of Plant Diseases occurring in South Africa (1931) 35.

*Rhizoctonia medicaginis* DC.—Eriksson, Die Pilzkrankheiten der Landwirtschaftlichen Kulturgewäsche 1 (1926) 197; van der Byl, Plantsiektes, hul oorsaak en bestryding (1928) 343.

*Rhizoctonia violacea* Tulasne, Fungi Hypogaei pg. 188; Saccardo, Syll. Fung. 14 (1899) 1175; van der Lek, Meded. Rijks Hoogere Land-, Tuin-, en Boschbouwschool, Wageningen 12 (1917) 94; Ware in Trans. Brit. Myc. Soc. 14 (1929) 94; Board of Agric. and Fisheries Leaflet 171, London (1906); Eriksson, Fungoid diseases of Agric. Plants (Transl.) London (1912); Eriksson, Die Pilzkrankheiten der Landwirtschaftlichen Kulturgewäsche 1 (1926) 243.

*Thanatophyton crocorum* Nees; *Tuber croci* Duby, *Sclerotium crocorum* Pers., *Stypinella purpurea* Schroeter (fide Saccardo).

*Illustrations*: Buddin and Wakefield (1927) loc. cit.; See list in Saccardo, Syll. Fung. 20 (1911) 678.

Only the *Rhizoctonia* stage of this species has so far been found in South Africa. It occurs as a mycelial mat, byssoid to compressed, covering the base of stems, roots of small herbs, and potato tubers. It is a distinctive violet colour, often drying to a cinnamon-drab colour, and forming mycelial strands.

Hyphae: (in KOH) reddish-brown with slightly darker thin walls, very even in diameter over long distances, regularly septate, branching almost at right angles, lacking clamps. When old, the cells have thicker walls. Short, swollen cells associated with sclerotia do not occur in the *Rhizoctonia* stage. The hyphae are (2·5)–5–(11) μ wide.

In colour and occurrence this forms a very distinctive sterile mycelium.

Specimens examined: As *R. crocorum*: 35572, *Baragwanath*, on *Solanum tuberosum*, Tzaneen, Transvaal, 2/7/1946; 31833, *Glasse* (N.H.584), on *Medicago*, n'Karini, Weenen, Natal, 25/4/1917. As *R. violacea*: 2540, *Glasse*, on *Medicago sativa*, Weenen, Natal, 9/7/1912.

## SEPTOBASIDIUM Patouillard.

The genus *Septobasidium* is well represented in the Union, but it is felt that it lies somewhat outside the scope of this paper. However, as the author has worked through all its representatives in the Pretoria Herbarium, he appends the following key to species for the purposes of identification. He has found it impossible to improve on the key,

descriptions and figures of these species given by J. N. Couch in his monograph " The genus *Septobasidium*," 1938, and therefore quotes this work except in the citation of some of the literature references and herbarium numbers of the specimens which he has examined and identified.

I. Basidia 2-celled, with persisting probasidium.
A.—Context with distinct pillars, 2–3 mm. thick, blackish; surface grey, much cracked, texture firm and hard throughout.
1. *S. protractum.*
B.—Context without pillars; surface smooth and glabrous in places, colour blueish-grey.
2. *S. griseopurpureum.*

II. Basidia 4-celled, curved, without persisting probasidium.
Context with distinct pillars: with two horizontal layers, subiculum and top layer, without a winged margin.
A.—Surface smooth or minutely warted, velvety, colour near benzo-brown, usually with a purplish tint; margin with tent-like structures.
3. *S. Schweinitzii.*
B.—Surface smooth at first, becoming slightly wrinkled or cracked, clay colour to drab.
4. *S. natalense.*

III. Basidia 4-celled, straight, without persisting probasidia.
A.—Context with pillars, usually tall and distinct. Surface smooth, glabrous, buff-coloured; pillars dark brown, unbranched, subiculum whitish.
5. *S. pseudopedicellatum.*
B.—Context with pillars, usually short and stubby.
(*a*) Surface with mottled brownish and whitish areas, with large conical spines, otherwise smooth; probasidia irregular.
6. *S. grandispinosum.*
(*b*) Surface smooth but top layer incompletely formed, leaving pinholes and cracks; cream colour to cinnamon brown; probasidia pyriform, borne in clusters (*S. carestianum*). With surface even less compact, and basidia and spores larger.
7. *S. Carestianum* var. *natalense.*
(*c*) Surface nearly smooth or with holes, cracks or spines, or mound-like insect houses; purplish-black throughout.
8. *S. Curtisii.*

IV. Basidia 4-celled, curved, with persisting probasidia.
A.—Context with pillars, tall or stubby, distinct, mostly unbranched; three- or four-layered; surface some shade of grey, usually pale smoke-grey, smooth.
9. *S. bogoriense.*
B.—Context without pillars; in section less than 500 $\mu$ thick; forming small anastomosing patches intermingled with mosses and liverworts; fruiting surface smooth with upturned margins, brownish; rhizomorphs extending between cracks of bark.
10. *S. Bagliettoanum.*

V. Basidia 4-celled, straight or slightly curved, usually without a probasidial cell.
Context with distinct pillars; with closely packed parallel upright threads in the hymenium; context 400–700 $\mu$ thick; hymenium conspicuously cracked.
11. *S. philippinense.*

1. **Septobasidium protractum** Sydow! in Ann. Myc. 10 (1912) 33; Couch, l.c., p. 91; v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 22.
Specimens examined: 2002, 22552, 30280, 34588.

2. **Septobasidium griseopurpureum** Couch l.c., p. 105.
No specimens seen.

3. **Septobasidium Schweinitzii** Burt in Ann. Mo. Bot. Gard. 3 (1916) 324; Couch, l.c., p. 112. (= *Thel. pedicellata* Schw., non *S. pedicellatum* Pat., fide Miss Wakefield in MS. note.)
No specimens seen.

4. **Septobasidium natalense** Couch! loc. cit., p. 118.
Specimens examined: 2107, 17276, 21011, 25477, 27690.

5. **Septobasidium pseudopedicellatum** Burt in Ann. Mo. Bot. Gard. 3 (1916) 327; Couch, l.c., p. 132; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 22; Coker in Journ. Elisha Mitchell Soc. 35 (1920) 125.
No specimens seen.

6. **Septobasidium grandispinosum** Couch! loc. cit., p. 154.
   Specimens examined: 12463, 20350.
7. **Septobasidium Carestianum** Bres. var. **natalense** Couch! loc. cit., p. 157.
   Specimens examined: 26321, 28322, 33555, 22086, 27688, 30824, 34403.
8. **Septobasidium Curtisii** (B. & D.) Boedijn and Steinmann in Bull. Jard. Bot. Buitenzorg iii: 2 (1931) 181; Couch, loc. cit., p. 164.
   Specimens examined: 1890, 2381, 22338, 28522, 17820.
9. **Septobasidium bogoriense** Patouillard in Otto Warburg, Monsunia 1 (1900) 138; Couch, loc. cit., p. 213; Boedijn and Steinmann in Bull. Jard. Bot. Buitenzorg iii: 2 (1931) 205. [= *Septobasidium mompa* (Tanaka) Rac. non *Helicobasidium mompa* Tanaka.]
   Specimens examined: 30276.
   Van der Byl's description of *S. mompa* [in Ann. Univ. Stellenbosch 7 (1929) 23] is not in accordance with Couch's, nor with the specimens I have seen. Van der Byl's plant differs in purple-brown to blackish colour, lack of pillars, and ovate spores.
10. **Septobasidium Bagliettoanum** (Fr.) Bresadola in Ann. Myc. 3 (1905) 164; Couch, loc. cit., p. 241; v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 23. [=*Hypochnus Bagliettoanus* Fries, Hym. Eur. (1874) 705.]
    This species is noted on the record of v. d. Byl cited above, but he himself does not appear to be sure of the diagnosis and his description, taken from Saccardo, Syll. Fung. 6 (1888) 661, differs in important points from the description in Couch's monograph.
11. **Septobasidium philippinense** Couch !, loc. cit., p. 247.
    Specimens examined: 2382, 28962, 34125.

## SEBACINA Tulasne.

1. **Sebacina africana** Burt [in Ann. Mo. Bot. Gard. 13 (1926) 338], described from a collection of van der Byl (No. 1342) at Knysna, is stated by McGuire in his monograph of the genus *Sebacina* [Lloydia 4 (1941) 43] to be " a *Corticium* with typical clavate undivided basidia at the surface and possessing hyaline subulate gloeocystidia." The present writer has not yet seen specimens of this. The type is in the Farlow Herbarium and there is an isotype in Herb. v. d. Byl, Stellenbosch.
2. **Sebacina epigaea** (B. & Br.) Bourd. and Galz. [in Hym. de Fr. (1928) 39] was collected by Eaton at the Cape and identified by Berkeley as *Tremella epigaea* B. & Br. [Jour. of Bot. 14 (1876) 175]. There is not a specimen in the Berkeley Herbarium at Kew, and apparently the species has not since been collected in South Africa.
3. In Herb. Pretoriae No. 11520 (as *Sebacina* sp.) is a specimen which is sterile and consists of a few hyphal strands and much detritus of an amorphous nature resembling white paint. The specimen is certainly indeterminable, and not referable to *Sebacina.*

## HETEROCHAETE Patouillard.

1. **Heterochaete andina** Pat. apud Pat. and Lagerheim in Bull. Soc. Myc. de Fr. 8 (1892) 120; Patouillard, Essai sur les Hym. (1900) 25, f. 18.
   This species is described and recorded for South Africa by van der Byl [in Ann. Univ. Stellenbosch 1 (1923) 5, f. 4] but neither of his two collections has been available to me for study.

## HOMOBASIDIOMYCETAE.

Basidia always non-septate, claviform, cylindric, ovoid or urniform, bearing at the apex a number of sterigmata (2 or 4, rarely 1–3 or 5–8 or an indefinite number) at whose extremities the spores develop. Probasidia lacking. Spores on germination do not produce secondary spores but give rise to a definite mycelium directly.

There follow descriptions and notes on the resupinate species of the Aphyllophoraceae recorded for South Africa, excluding the genera *Irpex* and *Poria*. Where there are several species in one genus, a key to the species is provided.

## EXOBASIDIUM Woronin.

1. **Exobasidium Vaccinii** (Fuckel) Woronin in Verh. der naturf. Ges. zu Freiburg 1, B. 4, Heft 4 (1867) 397; Sorauer, Handbuch der Pflanzenkrankh. Ed. 3 : 2 (1906) 379; Saccardo Syll. Fung. 6 (1888) 664; Patouillard, Essai taxon. sur les Hym. (1900) 35; Ross, Die Pflanzengallen Mittel und Nord Europas 2 Ed. (1927) 29, f. 30; Burt in Ann. Mo. Bot. Gard. 2 (1915) 649; Rea, Brit. Basid. (1922) 725; Bourdot and Galzin, Hym. de Fr. (1928) 75; Donk, Rev. Ned. Hetero- en Homobas. 1 (1931) 124.

   *Fusidium Vaccinii* Fuckel, Fung. Rhen. Exsicc. No. 221.

   *Exobasidium Andromedae* Peck, 26 Rept. of Botanist Univ. N.Y. State (1874) 73; Saccardo, Syll. Fung. 6 (1888) 665.

   *Exobasidium Azaleae* Peck, loc. cit., p. 72; Saccardo, Syll. Fung. 6 (1888) 665; Bourdot and Galzin, Hym. de Fr. (1928) 76.

   *Exobasidium Rhododendri* Cramer in Rabenh. Fung. Eur. Exsicc. No. 1910; Saccardo, Syll. Fung. 6 (1888) 664; Bourdot and Galzin, Hym. de Fr. (1928) 75.

   *E. Arctostaphyli* Harkness; *E. cassandrae* Peck; *E. discoideum* Ellis; *E. Karstenii* Sacc.; *E. Karstenii* Lind.; *E. Myrtilli* Siegm.; *E. oxycocci* Rostr.; *E. Peckii* Halst.; *E. Vaccinii-Myrtilli* (Fuckel) Juel.

   Above synonyms after Donk.

   *Illustrations*: Sorauer (1906) l.c.; Patouillard (1900) l.c., f. 26; Ross (1927) l.c., f. 30; Clements and Shear, Genera of Fungi (1931) Pl. 42, f. 14.

   PLATE 3, fig. 1.

Fungus parasitic on leaves of higher plants, producing hypertrophy and galls. Mycelium hyaline, inter- and intracellular.

Basidia: produced subepidermally, unilaterally or amphigenously on leaves, in groups, eventually breaking through and projecting beyond the epidermis, clavate, with (2)–4–6 straight thin sterigmata; Basidia 26–40 × 4–6·6 $\mu$.

Spores: spindle-shaped or cylindric, narrowing at one end, straight or curved, hyaline, smooth, with granular contents, 7–15 × 2–4 $\mu$, becoming septate and budding off sessile secondary conidia.

Conidial Hyphae: accompanying the basidia, branched, vertical, projecting beyond the basidia and bearing conidia which are cylindric, narrowed at each end, 1·5 × 8 $\mu$, according to Donk.

Specimens examined: 17819, *Davies*, on *Azalea*, Cape Town, 3/11/23; 30645, *Anderssen*, on *Azalea*, Pretoria (nursery plants imported from Belgium); 34151, *Wager*, on *Azalea*, Gillets, Natal, 28/8/1944; 36110, *Sutton*, on *Azalea*, Villerust, Durban, 21/11/1946.

The secondary spores are produced as buds from the mature basidiospores, not by a process of germination or renovation. This fact, together with the fact that the basidia are undivided, indicates that *Exobasidium* is a homobasidiomycete and not a heterobasidiomycete. It is likely that the species was introduced into South Africa with *Azalea* plants and is not indigenous to the country.

2. **Exobasidium Giseckiae** Allescher apud Hennings, Pilze Ostafrika, in A. Engler, Die Pflanzenwelt Ostafrikas und der Nachbargebiete (1895) 54; Saccardo, Syll. Fung. 14 (1899) 230; v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 9.

   *Illustrations*: PLATE 3, fig. 2.

Fungus parasitic on the leaves and flowers of *Giseckia pharnacioides* L., producing slight hypertrophy of the infected areas in the form of pale-rosy to distinctly red galls which are amphigenous. Mycelium hyaline, inter- and intracellular.

Basidia: produced subepidermally in groups, eventually breaking through and projecting beyond the epidermis, clavate-cylindric, about 30 × 3·5 μ, with four sterigmata. Accompanied by very narrow paraphyses, unbranched.

Spores: hyaline, at first ellipsoid then later ovate, 8–9 × 6–6·5 μ ("6–9 × 4–5 μ"—Engler).

Specimens examined: Host plant in each case is *Giseckia pharnacioides*. 2248, *J. Burtt-Davy* (12824), Kaffraria nr. Christiana, Bloemhof distr., 15/3/1912; 7380, *Pott*, Magaliesberg, 29/1/1914; 9685, *Moran*, Kimberley, 31/3/1916; 10033, *Potts*, Bloemfontein, Feb. 1917; 10054, *Fuller*, Pienaar's River, Pretoria, 16/3/1917; 21100, *Wager*, Tuinplaats, Springbok flats, 5/2/1927; 25919, *Paynter*, Pretoria North, 26/3/1931; 26073, *Liebenberg* (2848), Nelspruit, May 1931; 26685, *Phillips*, Magaliesberg, 1/12/1932; 32670, *Hean*, Taungs, C.P., 8/4/1940; 32804, *du Plessis*, nr. Vaalwater, N. Transvaal; 26101, *Smith* (6051), Wonderboom Poort, Pretoria, 22/2/1932; 26629, *Wager*, Goldin, Nelspruit, 14/12/1932; 550, *Pole Evans*, Pienaar's Poort, Pretoria, 21/1/1909.

"**Erineum**" **Galls** on *Gymnosporia buxifolia* leaves.

*Illustrations*: PLATE 4.

Two collections in Herb. Pretoriae, Nos. 11684 and 13087, under the genus *Exobasidium* prove to be non-fungal galls of the sort which were formerly given the generic name *Erineum*. The under-surface of the leaves is covered with closely arranged small, golden-yellow pustules from which fascicles of hairs arise, the hairs being large and clavate and bearing a slight resemblance to basidia. However, they are thicker-walled than a basidium, have occasionally up to two transverse septa and always lack any suggestion of sterigmata and spores. No hyphae are present in sections of the galls and there is every indication that the hypertrophy and production of hairs is caused by insect stimulation, possibly by a mite. Most of the cells within the galls are clearly neoplasms in which the nuclei are still plainly visible. An illustration of this structure is given in Plate 4. It is similar to *Erineum aureum* illustrated in Greville's Scot. Crypt. Flora 1 (1823) Pl. 33.

The specimens referred to above are: 11684, *Junod*, Rikatle, P.E. Africa, 31/5/1918; 13087, *Doidge*, Zilikats Nek, Pretoria, 10/4/1920.

## CORTICIUM Pers. ex Fries.

Key to species described:—

1) With gloeocystidia:
   a. Gloeocystidia numerous, immersed, with bright yellow contents; spores 4–5 × 9–11·5 μ. *C. luteocystidiatum* (1).
   aa. Gloeocystidia immersed, hyaline, often capped by amber coloured resinous globules; spores 3–4 × 7–10 μ *C. pallidum* (2).

2) With cystidioles:
   Cystidioles rare, immersed or slightly emergent, hyaline, sometimes with a subapical septum; spores pip-shaped, usually agglutinated, 3–4 × 5·5–6·5 μ *C. gloeosporum* (3).

3) Without gloeocystidia or cystidioles:
   a. Fungus bright blue throughout *C. caeruleum* (4).
   aa. Fungus not at all blue.
      v. Hymenium waxy, smooth, apricot to cinnamon-buff colour, spores 6–6·7 × 10–16 μ *C. armeniacum* (5).
      w. Hymenium cracking into flaky areoles with whitish subiculum; dirty white to light tan colour; spores 5–7–(9) × 3·5–(5) μ *C. scutellare* (6).
      x. Hymenium tuberculate, reddish-ochre with liver-brown tubercles and pale margin, context dingy yellow; spores 3–4·2 × 4·5–5·5 μ *C. tumulosum* (7).

y. Hymenium rosy, paling to flesh colour, smooth or cracked into areoles connected by whitish subiculum; hyphae up to 10 $\mu$ wide; spores 6·5–8·3 × 10–13 $\mu$ *C. salmonicolor* (8).

z. Hymenium waxy, whitish, like candle grease when fresh, smooth, seldom cracked, drying buff to light pinkish-buff; spores oblong-subspherical, 7–8 × 10–11·5 $\mu$, with prominent apiculi *C. confluens* (9).

1. **Corticium luteocystidiatum** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 941, f. 2.

Resupinate, not adnate, membranous, cracking into large separated areas. Hymenium ochraceous-salmon drying to pale yellow-orange, almost smooth or papillate or with fine raduloid ridges. Margin lifting from substratum on drying, sometimes with small indentations, rarely distinctly fibrillose-radiate. Context concolorous, about 300 $\mu$ thick. A bright yellow colour develops on contact with KOH.

Basidia: clavate, very variable size, up to 40 $\mu$ long.

Spores: 4–5–(6) × 9–11·5–(12) $\mu$, cylindric or ellipsoid, frequently with one side depressed or flattened, hyaline, smooth.

Gloeocystidia: Numerous, conspicuous, with bright yellow oily globular contents, scattered throughout the subhymenium and trama except next to the substratum, often penetrating the hymenium, irregular elongated outline, about 60–80 × 6–14 $\mu$, irregular or clavate to cylindrical.

Hyphae: very fine, mostly indistinct, basally horizontal, the superior hyphae erect.

Specimens examined: 28307, *Rump* (241), Town Bush, Maritzburg, Oct. 1934; 28557, *Rump* (167), Impolweni, Natal, Sept. 1934; 28690, *Rump* (283) Town Bush, Maritzburg, Nov. 1934; 28679, *Rump* (319. b) Town Bush, Maritzburg, Nov. 1934; 28947, *Doidge*, Xumeni, Donnybrook, Natal, July 1935; 34378, *Rump* (644) Krantzkop, Natal, 1935; 27759, *Rump* (104), Town Bush, Maritzburg, Aug. 1934; Belgian Congo: (Specimens in Herb. Kew) Mission Agronomique, *P. Hyac. Vanderyst* (16309 and 16325), 1925.

This species is one of the relatively few with bright yellow gloeocystidia and is distinguished especially by its hymenium colour and by its spores. The colour reaction with KOH is a help in diagnosis. *C. abeuns* Burt, recorded from South Africa, has almost colourless gloeocystidia and spores of a different size and shape (6–7 × 4–6 $\mu$). *C. seriale* Fr., another species with bright yellow gloeocystidia has larger spores, 6 × 10–13 $\mu$ and is otherwise different, particularly in colour.

2. **Corticium pallidum** Bresadola, Fung. Trident, 2 (1898) 59; Rogers and Jackson in Farlowia 1 (1943) 296.

*Gloeocystidium pallidum* (Bres.) Höhnel and Litsch. in K. Akad. Wiss. Wien Sitzungsb. 116 (1907) 838; Bourdot and Galzin, Hym. de Fr. (1928) 258.

*Gloeocystidium argillaceum* von Höhnel and Litschauer in K. Akad. Wiss. Wien Sitzungsb. 117 (1908) 1094 (*nomen nudum*); Ibid in Österr. Corticeen (1908) 67 (with description); Bourdot and Galzin Hym. de Fr. (1928) 258.

*Gloeocystidium pallidum* subsp. *argillaceum* sensu Bourd. and Galz. in Bull. Soc. Myc. de Fr. 28 (1913) 263, Hym. de Fr. (1928) 258.

*Corticium ochrofarctum* Burt in Ann. Mo. Bot. Gard. 13 (1926) 275. [Non *Corticium* (*Peniophora*) *argillaceum* Bresadola, Fung. Trident. 2 (1898) 63, nec *Peniophora carneola* (Bres.) Höhnel and Litsch., Österr. Corticeen (1908) 70].

Above synonymy after Rogers and Jackson, loc. cit.

*Illustrations*: Höhnel and Litschauer (1907) loc. cit. (As *Gloeocystidium pallidum*.)

PLATE 5.

Resupinate, indeterminate, granular, very thin, up to 140 $\mu$ in thickness, crustose, whitish becoming spotted with dark resinoid granules giving the whole hymenium a beige colour, adnate, non-continuous under the lens, subfarinaceous.

Basidia: " 20–45 × 5–8 μ" (Bourd. and Galz.), with 2 or 4 long, straight sterigmata, 4–6 μ in length.

Spores: Oblong or subcylindric, often with one side depressed, hyaline, smooth, often uniguttulate, 7–10 × 3–4 μ.

Gloeocystidia: fusiform, or obtuse at upper end, hyaline, thin walled, with homogeneous contents, 48–60 × 4–7 μ, capped by resinous granules, immersed throughout the trama.

Resinous granules: amber to reddish-brown, irregular in size and shape but commonly 13–20 μ diam., often aggregated, capping gloeocystidia and hymenial hyphae, deposited in all parts of the trama, partly soluble in hot lactic acid.

Hyphae: hyaline, completely indistinct in the specimen seen from South Africa. " Often little distinct, 2–3–4·5 μ diam., with rare clamps, the mycelial hyphae more regular, 2–5 μ."—Bourd. and Galz.

Specimens examined: Exsicc. *Brinkmann* Westfälische Pilze iv, No. 157; 28939, *Doidge and Morgan*, Donnybrook, Natal, February, 1935.

*Peniophora argillacea* Bres., a species which produces amber coloured resinous granules, was at first confused with the present species by von Höhnel and Litschauer, but it differs in having emergent, thin-walled cystidia up to 100 μ long, and considerably wider elliptic-depressed spores. These differences were first observed by Bourdot and Galzin. Recently Rogers and Jackson (1943, l.c.) have shown that *Gloeocystidium argillaceum* Höhnel and Litsch. should be regarded as a synonym of *Corticium pallidum* Bres., raising it from the subspecific status suggested by Bourdot and Galzin (1913, l.c.).

3. **Corticium gloeosporum** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 940. *Illustrations*: PLATE 6.

Resupinate, orbicular when young becoming widely effused and confluent, adnate, later areolately cracked and separable, the edges of the cracks sometimes lifting, often showing a silky fibrillose whitish subiculum between the cracks. Hymenium smooth, somewhat waxy, undulate or tubercular in places, cream coloured, becoming pale buff tinged incarnate, or rosy buff paling in the herbarium. Margin abrupt or very narrowly radiating in white adnate hyphae. Context creamy, 200–500 μ thick.

Basidia: cylindric-clavate, in close fascicles forming a very compact palisade, 4–5·5 × 24–30 μ, usually with a clamp connection at the base of the basidium, arising from deep seated hymenial hyphae.

Spores: pip-shaped, 3–4 × 5·5–6·5 μ, smooth, hyaline, usually agglutinated in groups of up to 4 spores in number, with a basal apiculus, often somewhat curved, not amyloid.

Cystidioles: rather rare usually, very slightly emergent, or immersed, fusiform, hyaline, thin walled, with a pointed apex, occasionally with a subapical septum, 4–5 × 32–45 μ, with homogeneous contents.

Hyphae: subhymenial hyphae more or less erect, thin walled, rather indistinct; basal hyphae very distinct, thin walled, much branched, septate, with abundant clamp connections and occasional H-anastomoses, 2–5 μ wide, closely interwoven in a subhorizontal direction.

Specimens examined: Type, 28288, *Rump* (212), Town Bush, Maritzburg, Oct. 1934, on indigenous wood possibly *Fagara capensis*; 27603, *Rump* (26), Bulwer, Natal, 1934, on bark of wattle; 28712, *Joubert*, Windy Hill Estate, Maritzburg, on bark of *Acacia mollissima*, 30/10/1936.

This species differs from *Corticium laeve* Pers. principally in having basidia and spores which are very considerably smaller. (*C. laeve* basidia 25–40–90 × 4·5–9 μ; spores 7–9–12 × 4·5–7 μ, in European specimens.) *C. laeve* has not been collected in

South Africa. *Corticium gloeosporum* corresponds almost exactly with *C. laeve* in external features but is perhaps more areolately cracked and thinner at the margin; the spores of both species have the highly characteristic pip-shape and the property of adhering to one another; their hyphae correspond almost exactly; the presence of similar cystidioles and of basal clamps to the basidia are other points of similarity. *C. gloeosporum* is almost certainly the South African analogue of *C. laeve*. In one of the specimens (28712) some of the hyphae have a finely granular incrustation which is soluble in potassium hydrate. Large cystidioles may be interpreted by some workers as cystidia, with consequent change of genus, but in assigning this species to *Corticium* the author has followed the practice observed with *C. laeve*. If mounts of the spores are made in weak sepia solution it can readily be observed that each spore has a very narrow mucilaginous investment which may account for their property of adhering together in groups. [This property does not seem to be very common but it has also been observed in *Corticium centrifugum* (Lév.) Bres. and *Cytidia flocculenta* (Fr.) Höhnel and Litschauer.]

4. **Corticium caeruleum** (Schrad. ex Fr.) Fries, Epicrisis Syst. Myc. (1838) 562, Hym. Eur. (1874) 651, Fung. Natalenses (1848) No. 38; Berkeley, Outl. Brit. Fung. (1860) 274; Kalchbrenner in Grev. 10 (1881) 59; Massee in Journ. Linn. Soc. Bot. 27 (1890) 151; Saccardo, Syll. Fung. 6 (1888) 614; Quélet, Flor. Myc. de Fr. (1888) 10; Wakefield in Trans. Brit. Myc. Soc. 4 (1913) 119; Rea, Brit. Basid. (1922) 673; Burt in Ann. Mo. Bot. Gard. 13 (1926) 301; Bourdot and Galzin, Hym. de Fr. (1928) 183; Petch in Ann. Roy. Bot. Gard. Peradeniya 9 (1925) 287; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 27.

   *Thelephora caerulea* Schrader in De Candole Fl. Gall. Fr. 2 (1815) 107; Persoon, Myc. Eur. 1 (1822) 147; Fries, Elenchus Fung. (1828) 202; Hussey, Illustr. Brit. Myc. 1 (1847) t. 20 b.

   *Byssus phosphorea* Linn., Spec. Plantarum Ed. 3, 2 (1764) 1638.

   *Auricularia phosphorea* (L.) Sowerby, Eng. Fung. (1803) t. 350.

   *Mycinema phosphoreum* (L.) Agardh., Systema Alg. (1824) 33.

   *Thelephora indigo* Schweinitz in Naturforsch. Ges. Leipzig Schrift 1 (1822) 107 (fide Burt).

   *Thaelaephora fimbriata* Roth, Catalecta Botan. 2 (1800) 257, tab. 9, f. 2.

   *Thelephora atro-coerulea* Trog. in All. Bot. Zeit. 2 (1832) 560.

   *Illustrations*: Wakefield (1913) loc. cit., t. 3, f. 26; Sowerby l.c., as *Auricularia phosphorea*; Hussey l.c., as *Thelephora caerulea*.

   PLATE 7.

   Resupinate, effused, velutinous-floccose becoming membranous, separable when moist, bright indigo to Prussian blue throughout. Margin concolorous or paler, thinning out, satiny. Colour changing immediately to greenish in potassium hydrate. Context loose, 200–400 $\mu$ thick.

   Basidia: 5·5–8 × 30–40 $\mu$, with 2–4 sterigmata.

   Spores: not seen in S. African specimens, " hyaline, ovate-elliptical, 7–9 × 4–6 $\mu$ "—Wakefield.

   Hyphae: loosely intertexed, 4–5 $\mu$ diam., with numerous septa and clamp connections, thick walled, coloured blueish especially near the hymenium. A few of the hyphae are thinwalled.

   Specimens examined: 26847, *Ackerman* (2), Maritzburg, 1933 (in Herb. Kew); 28888, *Bottomley*, The Cavern, Drakensberg, Natal, 1927; 27801 *Craik*, Caverns Valley, Mont-aux-Sources, Natal, Feb. 1935; 34320, *Doidge*, Xumeni, Donnybrook, July 1944; 35323, *Rump*, (590), Karkloof Bush, March 1944;

33206, *Doidge and Bottomley*, Wolhuterskop, Rustenburg Distr., 5/5/1939; *van der Byl* (1051), East Africa, 1923; *Maitland* (38) 1929, (110) Jan. 1931, (106) Dec. 1930, Cameroon Mountains.

5. **Corticium armeniacum** Saccardo, Syll. Fung. 6 (1888) 637 (non *C. armeniacum* B. & C.! *nomen nudum*, in Herbarium, which is an *Asterostromella*).

*Corticium ceraceum* Berk. and Ravenel! in Ravenel Fung. Car. Exsicc. 3 (1855) 29, *nom. nudum*; Massee in Jour. Linn. Soc. Bot. 27 (1890) 150; Höhnel and Litschauer in K. Akad. Wiss. Wien Sitzungsb. 116 (1907) 785, f. 6; Burt in Ann. Mo. Bot. Gard. 13 (1926) 216; v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 30.

*Corticium molle* B. and C. ! in Jour. Linn. Soc. Bot. 10 (1868) 336, Grevillea 1 (1873) 180. (non *C. molle* Fries.)

*Corticium mauritianum* Berk. ! in Herb.

*Illustrations*: Höhnel and Litschauer l.c., text fig. 6.

PLATE 8.

Resupinate, widely effused, fleshy then becoming very membranous-ceraceous, somewhat shiny, very smooth, with very occasional cracks, not adnate. Hymenium apricot colour becoming cinnamon-buff in the herbarium. Margin lighter in colour. Context white, 100–500 $\mu$ thick.

Basidia: flexuous, narrow-clavate, (30)–56 × (5)–7 $\mu$; sterigmata and spores not seen in South African material; sterigmata 4, thick, curved, 10–14 × 1·5–3 $\mu$ fide Höhnel and Litschauer, loc. cit.

Spores: (from type) long ellipsoid to cylindrical, flattened unilaterally, usually with a prominent apiculus, 6–6·7 × 10–16 $\mu$, hyaline, smooth.

Hyphae: in a generally erect position; those below the hymenium very compact and indistinct; basal hyphae erect or suberect, 3–3·5–4 $\mu$ wide, at first distinct but later cleaving together and modified by waxy coating; clamp connections, when present, are quite numerous and frequently in whorls, sometimes absent.

Minerals: quite large concretions sometimes found in the upper layers of the trama.

Specimens examined: *Ravenel* Fung. Car. 3, No. 29, in Herb. Kew; *v. d. Byl* (2568), Natal, 1930; 27802, *Conservator of Forests*, Manubi, Butterworth, Cape, 23/10/1934, on *Ekebergia capensis*; 30227, *Rump* (445), Krantzkop, Nov. 1935; 30219, *Rump* (429), Compensation Beach, Natal, Dec. 1934; 34326, *Rump*, Town Bush, Maritzburg, 1935; 36708, *Talbot*, Kloof Falls, Natal, May 1948; *Dümmer* (2398), on *Ficus* sp., Kipayo, Uganda, Apr. 1915.

The type of the species, from North America, has very variable spores which at their narrowest measure 5·5 $\mu$, depending in the same spore on the side from which it is viewed. The Uganda specimen cited above is undoubtedly this species, but its spores are 4·5–5·5 × 9–13 $\mu$, oblong-elliptic, and lacking a prominent apiculus.

6. **Corticium scutellare** Berk. and Curtis ! in Grevillea 2 (1873) 4; Saccardo, Syll. Fung. 6 (1888) 634; Massee in Jour. Linn. Soc. Bot. 27 (1890) 128; Burt in Ann. Mo. Bot. Gard. 13 (1926) 192; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 27.

*Illustrations*: van der Byl loc. cit., Pl. 2, f. 9.

PLATE 9.

Resupinate, effused, dirty-white becoming light tan, waxy, adnate, thin, 100–250 $\mu$ in section, cracking into small irregular areoles in great profusion, sometimes flaking away and leaving a little of the white subiculum behind. Context whitish.

Basidia: clavate or obconical, circa 24–33 × 4–7 $\mu$, with 2 or 4 short, curved sterigmata.

Spores: In the type specimen 7–9 × 4–5 μ, elliptical; fide Burt loc. cit., hyaline, smooth, 4–6 × 2–3 μ; as observed in South African specimen, 5–7 × 3·5 μ, elliptical, flattened unilaterally, with a distinct apiculus.

Hyphae: narrow, 2·5–3·5 μ wide, more or less erect below the basidia, but so mixed with mineral inclusions in the deeper tissues as to be almost indistinguishable.

Specimens examined: Type, 2473 Car. Inf., in Kew Herbarium; 27680, *Rump* (53), Winterskloof, Natal, 1934.

It will be noted that the spores in the South African specimen are smaller than those in the type, but not as small as those quoted for the species by Burt. Further collections are required to establish the range of variation in spore size; in all other characters the South African specimen is a good match with the type of the species.

7. **Corticium tumulosum** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 941, f.3.

Resupinate, closely adnate, orbicular becoming effused, cracking deeply crosswise in one direction. Margin thinning out to a definite, pale coloured edge. Hymenium tuberculate, waxy, papillate or ridged, the raised portions being liver-brown in colour and the remainder reddish-ochre. Context dingy yellow, showing through the cracks. In section 60–100–(200) μ including basal layers which separate the periderm cells of the substrate and also contain much crystalline matter.

Basidia: cylindric-clavate, 28–34 × 5·5 μ with 4 short, curved sterigmata.

Spores: hyaline, smooth, broadly ellipsoid, 3–4·2 × 4·5–5·5 μ.

Hyphae: distinct, pale yellowish horizontal weft: the few hyphae which curve abruptly into the hymenium are colourless; septation frequent, without clamp connections, 3–4 μ wide, thin walled.

Minerals: A great deal of amorphous or crystalline mineral matter at the base of the trama.

Specimens examined: 28897, *Lansdell*, The Willows, Pretoria distr., 27/4/1937; 36857, *Talbot*, Garstfontein, Pretoria distr., 21/8/48.

In external appearance, and especially in colour, *C. tumulosum* is very much like *C. cacaoicolor* Petch ! [in Ann. Roy. Bot. Gard. Perad. 9 (1925) 288]. The latter, however, has spores which are oblong-ovate, 3 × 7 μ, and hyphae which are much finer and less distinct than those of *C. tumulosum*.

8. **Corticium salmonicolor** Berk. and Broome ! in Jour. Linn. Soc. Bot. 14 (1873) 71; Saccardo, Syll. Fung. 6 (1888) 620; Burt in Ann. Mo. Bot. Gard. 13 (1926) 227; Massee in Jour. Linn. Soc. Bot. 27 (1890) 122; Petch, Phys. and Diseases of *Hevea brasiliensis* (1911) 209, Diseases and Pests of the Rubber Tree (1921) 134, Ann. Roy. Bot. Gard. Perad. 9 (1925) 281; Brooks in Agric. Bull. F.M.S. 2 (1914) 238; Brooks and Sharples in Dept. Agric. F.M.S. Bull. No. 21 (1914) figs. 1–19; Rorer, Trinidad Dept. Agric. Bull. 15 (1916) 86, f. 1–2; Fawcett, Citrus Diseases and their Control (1936) 324; Lee and Yates in Philippine Jour. Sci. 14 (1919) 657, Pl. 1–7.

*Necator decretus* Massee ! in Kew Bull. (1898) 119; Saccardo, Syll. Fung. 16 (1902) 1094; Rant in Bull. Jard. Bot. Buitenzorg 4 (1912) 1, f. 1–14.

*Corticium javanicum* Zimmermann in Centralbl. für Bakt. 7 (1901) 103, f. 3 [non *C. javanicum* (P. Henn.) Sacc. and Syd.]; Rant, (1912) loc. cit.

*Corticium Zimmermanni* Sacc. and Syd. In Saccardo, Syll. Fung. 16 (1902) 1117; ibid 17 (1905) 169.

*Illustrations*: Brooks and Sharples, 1914 l.c.; Rant, 1912 l.c. (as *C. javanicum*); Zimmermann, 1901 l.c. (as *C. javanicum*).

PLATE 10.

*Type*: in Herb. Kew, from Ceylon.

Resupinate, effused, membranous-pellicular, hymenium rosy when fresh, drying fleshy-buff or creamy-yellowish colour in the herbarium, smooth, cracked into many small areoles connected by whitish subicular strands. Context 250–350 $\mu$ thick.

Basidia: irregularly cylindric-clavate, 6–8 × 26–40 $\mu$.

Spores: hyaline (pale rosy tint in a mass), broadly elliptic to ovate or subglobose, often unilaterally depressed, 6·6–7–8·3 × 10–13·2 $\mu$, with a prominent basal apiculus.

Hyphae: hymenial hyphae densely aggregated and indistinct; basal hyphae strand-like, hyaline, thickwalled, seldom branched, with frequent septa; superior hyphae much branched, with frequent septa, thin walled. All hyphae take stain readily except in their walls; rare H-anastomoses but no clamps seen, hyphae loosely intertexed, the basal ones horizontally, the superior ones ascending. Hyphal width 6–10–11·5 $\mu$, their width and thickness of walls progressively diminishing from the basal tissues upwards.

Conidial stage: (*Necator decretus*). Not seen in South African specimens.

Specimens examined: 31998, *Ballenden*, on *Pyrus malus*, Maritzburg, 8/1/1918; 12829, Maritzburg, Natal; 34168, *Forest Officer*, on dead *Quercus reticulata*, Tweefontein nr. Sabie 21/4/1944; 20669, *Dungan*, on *Pyrus malus*, Town Bush, Maritzburg, 19/2/1926 (as *C. laetum*); 12177, *Marshall*, on *Pyrus malus*, Hilton Road, Natal, May 1919 (as *C. laetum*); 14479, *Govt. Horticulturist*, on *Pyrus malus*, Hilton Road, Natal, Feb. 1921 (as *C. laetum*); *Brooks*, on *Ipomaea carnea*, Malay States, 16/10/1914 (incl. *Necator* stage) in Herb. Kew; *Jacobson*, ex Herb. Hort. Bot. Bog. (6019), Sumatra, 1924, in Herb. Kew; *Rorer*, on *Cacao*, Trinidad, July 10, 1915, in Herb. Kew; *MacDonald*, on leaves of *Coffea*, Kenya, Dec. 1923 and March, 1924, in Herb. Kew; Type from Ceylon in Herb. Berkeley at Kew; *Petch*, on *Hevea brasiliensis*, Ceylon, 1913.

Apart from its parasitic occurrence on woody plants, a thinner more areolately cracked hymenium, and possibly somewhat thicker walls to the basal hyphae, this species is so near to *C. laetum* (Karst) Bres. in microscopic structure that a very close relationship must be implied. *C. laetum* is more membranous, smooth, lacking areoles connected by subicular strands. It has been reported by Stevens [The Fungi which cause Plant Disease (1913) 408] as parasitic on apple and fig trees.

*C. roseum* Pers. (= *C. roseolum* Massee !) bears a resemblance to these species but its spores are smaller (6 × 9–10 $\mu$) and its thick-walled, narrow (2·5–5 $\mu$) hyphae have numerous clamp connections.

*C. aurora* Berk. ! differs from *C. laetum* in texture and thickness, but more especially in its spores which are subclavate, slightly curved, basally attenuated, 13–16 × 3–4 $\mu$ [see Bourdot and Galzin, Hym. de Fr. (1928) fig. 62]. Massee [in Jour. Linn. Soc. Bot. 27 (1890) 141] recorded the spores as " ellipsoid, basally apiculate, 10–11 × 7–8 $\mu$," which led Höhnel and Litschauer to suggest its identity with *C. laetum*. In fact, it is not confusable with this or with *C. salmonicolor*.

9. **Corticium confluens** (Fries) Fries, Epicr. Syst. Myc. (1838) 564, Hym. Eur. (1874) 655; Berkeley, Outl. Brit. Fung. (1860) 276; Saccardo, Syll. Fung. 6 (1888) 626; Massee in Jour. Linn. Soc. Bot. 27 (1890) 133; Bresadola in I.R. Accad. Agiati Atti, iii, 3 (1897) 112; Bourdot and Galzin in Bull. Soc. Myc. de Fr. 27 (1911) 252, Hym. de Fr. (1928) 212; Rea, Brit. Basid. (1922) 679; Burt in Ann. Mo. Bot. Gard. 13 (1926) 220; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 29.

*Thelephora confluens* Fries, Syst. Myc. 1 (1821) 447.

*Corticium confluens* var. *subcalceum* Karsten in Rev. Myc. 10 (1888) 74.

Above synonymy after Burt.

*Illustrations*: PLATE 11.

Resupinate, widely effused, when fresh waxy-membranous, whitish, sometimes glistening with raised hairs at the surface, appearing like a patch of candle grease; rather adnate when dry, and drying membranous, smooth, seldom cracked, buff to light pinkish buff. Margin paler, thinner and either finely radiate-byssoid or ending abruptly. Context pale buff, 200–500 $\mu$ thick in section.

Basidia: cylindric-clavate, somewhat contorted, large, 6·5–11·5 × 50–80 $\mu$, often guttulate, with sterigmata 4·5 $\mu$ long, or longer.

Spores: 7–8 × 10–11·5 $\mu$; hyaline, oblong-subspherical or broadly ovoid, with a prominent lateral apiculus, smooth, with finely granular content (stippled appearance) or with large guttules, abundant.

Paraphyses: simple, smooth, about 2 $\mu$ wide, interspersed among the basidia, sometimes with up to four short lateral branches near the apex. Occasionally these paraphyses are lacking.

Hyphae: superior hyphae more or less vertical, agglutinated, rather indistinct, thin-walled, hyaline, with few clamps, 2–3 $\mu$ wide. Basal hyphae usually more or less horizontal and entirely collapsed or very indistinct.

Specimens examined: 35328, *Rump* (687), on *Quercus*, Maritzburg, 1943; 36850, *Talbot*, on *Acacia* sp., Buffelspoort, Rustenburg distr., 12/8/1948; 36914, *Talbot*, Fountains Valley, Pretoria, 24/10/48.

Bourdot and Galzin (1928) point out the interesting fact that *Corticium confluens* and *Radulum membranaceum* (Bull.) Bres. have the same internal structure and spore characters, and that the corticioid form may pass into the raduloid in some specimens. The large oblong spores with prominent apiculi are unmistakable, as also is the " candle grease " appearance of fresh specimens.

SYNONYMS AND EXCLUDED SPECIES IN THE GENUS **CORTICIUM**:

**atrocinereum** Kalchbr., *nomen nudum*, = *Stereum Schomburgkii* Berk. (q.v.) if the MacOwan specimen in Herb. Kew is authentic.

**calceum** Fries sensu Romell and Burt. *Nomen confusum* fide Rogers and Jackson in Farlowia 1 (1943) 284. The MacOwan specimen in Herb. Kew. is *Aleurodiscus acerinus* (Pers.) Höhn and Litsch. (? var. *longisporus* Höhn. and Litsch) q.v.

**calceum** Fries var. *lacteum* Fries. *Nomen confusum.* MacOwan (1074), Somerset East, is the type specimen of *Aleurodiscus acerinus* var. *longisporus* Höhn. and Litsch.

**ceraceum** Berk. and Ravenel. *Nomen nudum* = *Corticium armeniacum* Sacc.

**cinereum** Pers. ex Fries. = *Peniophora cinerea* (Pers. ex Fr.) Cooke.

**Dregeanum** Berk. = *Lopharia Dregeana* (Berk.) comb. nov. (q.v.).

**nudum** Fries. = *Peniophora nuda* (Fr.) Bres. (q.v.).

**CORTICIUM** SPECIES RECORDED FOR SOUTH AFRICA, BUT NOT AVAILABLE FOR STUDY.

**abeuns** Burt—v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 29; in S.A. Journ. Sci. 23 (1926) 288.

**bombycinum** (Sommerf.) Bres.—Miss E. M. Wakefield in Litt.

**lacteum** Fries—v. d. Byl (1929) loc. cit., p. 30 [fide Rogers and Jackson in Farlowia 1 (1943) 294, this is a *nomen dubium*].

**pelliculare** Karst—v. d. Byl (1929) loc. cit., p. 29.

**portentosum** B. and C. !—v. d. Byl (1929) loc. cit., p. 28. South African specimens of this species which the author has so far seen are all considered to be *Asterostromella duriuscula* (B. and Br.) comb. nov. (q.v.).

**vagum** B. and C.—Phillips in Bot. Survey of S.A. Mem. 14 (1931) 159.

## PENIOPHORA Cooke.

Key to species described:—

1. Context yellow-buff or isabelline colour, turning strong violet colour instantly on application of a drop of potassium hydroxide solution. *P. filamentosa* (5).

2. No violet colour reaction with potassium hydroxide solution:

A.—Cystidia occupying a relatively narrow zone confined to the hymenium and subhymenium:

a) Cystidia occupying a zone 70–100 $\mu$ thick above a byssoid subiculum of thick-walled hyphae; cystidia encrusted, 20–36–(40) × 10–13 $\mu$, fairly thin-walled *P. pelliculosa* (1).

aa) Cystidia thick-walled, heavily encrusted, 36–80 × 10–11·5 $\mu$; subicular hyphae not byssoid, indistinct *P. gigantea* (6).

AA.—Cystidia not in a distinct zone above the subiculum, staged throughout the trama or at least originating in mid-trama:

a) Cystidia septate, thin-walled, often with clamp connections, encrusted *P. aspera* (2).

aa) Cystidia not septate or clamped, thick-walled, densely encrusted:

b) Cystidia 6–10 × 50–120 $\mu$; spores 2·5–3 × 6·8 $\mu$; hyphae distinct, 3–6 $\mu$ wide *P. arenata* (3).

bb) Cystidia 10–16 × 50–70 $\mu$; spores 3 × 5·5 $\mu$; hyphae agglutinated, 3 $\mu$ wide *P. Roumeguerii* (4).

1. **Peniophora pelliculosa** sp. nov.

*Illustrations*: PLATE 12.

*Type*: 30231, *Rump* (450), on indigenous wood, Krantzkop, Natal, Dec. 1935. In Herb. Kew with isotypes in Pretoria Herbarium and Herb. University of Toronto.

Resupinate, widely effused, thick, soft, pellicular, separable when moist. Hymenium very smooth, usually not cracked, coloured " pinkish-buff " (Ridgway), or a more fleshy-yellow, able to flake off like plaster leaving the byssoid white subiculum showing beneath. Margin indeterminate, byssoid to arachnoid. Context floccose, white, width in section 550–1,000 $\mu$.

Basidia: cylindric-clavate, compact in fascicles, 5–6 × 16–23 $\mu$ (immature).

Spores: ellipsoid or oblong, 3–3·3 × 5–7 $\mu$, smooth, hyaline.

Cystidia: in a zone 70–100 $\mu$ thick above the subiculum, mostly immersed, a few projecting up to 12 $\mu$, relatively thin-walled, some thickened at the apex, heavily encrusted with mineral matter which dissolves in KOH, 20–36–(50) × (8)–10–13 $\mu$, more or less cylindric-clavate to obconic, frequently capitate-encrusted only.

Hyphae: indistinct in cystidial layer; in context very distinct, branched, hyaline, septate, without clamps, loosely interwoven, rather thick-walled, with an incrustation of large detersile crystals especially under the cystidial zone, 3·5–5–6·5 $\mu$ wide, somewhat narrower beneath the hymenium.

Specimens examined: Type, 30231, *Rump* (450), Krantzkop; 34383, *Rump* (653), Krantzkop, Natal, 1935; 34359, *Rump* (559), Krantzkop, Natal, 1935.

This species falls in the group containing *P. cremea* Bres. (for which it has been mistaken in South Africa) and *P. subiculosa* Burt. The latter species has not been seen, but it is evidently thinner and has a chamois-coloured subiculum and spores which are smaller, 3–3·5 × 2·5 $\mu$ [Burt in Ann. Mo. Bot. Gard. 12 (1925) 259]. *P. cremea* is not so thick and byssoid-pellicular as the new species, and has larger cystidia which project further. The mineral encrustation is much more marked in the cystidia and hyphae of the new species. I have much pleasure in acknowledging the assistance of Dr. H. S. Jackson of Toronto University, who examined collections of this species and reported: " The combination of rather short incrusted cystidia with the byssoid subiculum of thick-walled hyphae makes this unique among the species I am familiar with."

2. **Peniophora aspera** (Pers.) Saccardo, Flor. Ital. Crypt. Hymen. (1916) 1182; Rogers and Jackson in Farlowia 1 (1943) 282.

*Peniophora setigera* (Fr.) Höhnel and Litschauer in K. Akad. Wiss. Wien Sitzungsb. 115 (1906) 7.

*Peniophora setigera* (Fr.) Bresadola in Litt.; Rea, Brit. Basid. (1922) 692; Bourdo and Galzin, Hym. de Fr. (1928) 309.

*Kneiffia setigera* Fries, Epicrisis Syst. Myc. (1838) 529; Bresadola, Hym. Hung. Kmetiani (1897) 40, in Ann. Myc. 1 (1903) 103; Saccardo, Syll. Fung. 6 (1888) 510 and ibid. 9 (1891) 218; Karsten in Hedwigia 28 (1889) 195.

*Odontia setigera* (Fr.) Miller in Mycologia 26 (1934) 19, Pl. 2, f. 3.

*Corticium latitans* Karsten in Rev. Myc. 10 (1888) 74, fide Rogers and Jackson (l.c.).

*Corticium Berkeleyi* Cooke and Massee in Journ. Linn. Soc. Bot. 27 (1890) 133; Burt in Ann. Mo. Bot. Gard. 13 (1926) 183, fide Rogers and Jackson (l.c.).

*Corticium myxosporum* Karsten, Symb. Myc. Fenn. 9, p. 53; Saccardo, Syll. Fung. 6 (1888) 635; Massee in Journ. Linn. Soc. Bot. 27 (1890) 130; Höhnel and Litschauer in K. Akad. Wiss. Wien Sitzungsb. 115 (1906) 7, [non *C. myxosporum* sensu Bresdola in Ann. Myc. 1 (1903) 94.].

*Illustrations*: Miller (1934) loc. cit., as *Odontia setigera.*

PLATE 13.

Resupinate, effused, membranous-byssoid, firmly adnate. Hymenium white then creamy, later alutaceous and cracking on drying, rather poroid or finely papillate and silky-setose. Context greatly variable in thickness.

Basidia: cylindric, 33 × 5–6 $\mu$, somewhat fasciculate.

Spores: hyaline, smooth, cylindric, one side often flattened or curved, 3–5 × 9–11 $\mu$, with granular or guttulate contents.

Cystidia: cylindrical, 8–11 × 100–150 $\mu$ (or longer), included or emergent up to about 40 $\mu$, septate, often with clamps at the septa, fairly thin-walled, hyaline, frequently encrusted with detersile mineral matter, arising deep in the subhymenium or mid-trama as lateral branches of the hyphae.

Hyphae: subhymenial hyphae 2·5–3·5 $\mu$ wide, hyaline, much branched, septate, with scanty clamp connections, frequently collapsed or indistinct. Basal hyphae similar but seldom collapsed and up to 6–8 $\mu$ wide, thin-walled.

Specimens examined: *van der Byl* (1461), on dry *Eucalyptus* poles, Tzaneen, Transvaal, July, 1925.

The species is very variable in colour, thickness, and convolution of the hymenium. The South African collection cited above is a small one in which the fungus is thin and of a uniform creamy colour. Otherwise it corresponds very well with British material of which I have made numerous collections.

The collection, v. d. Byl (1496), Woodbush, Transvaal, cited as *P. setigera* in Nel, Ann. Univ. Stellenbosch 20 (1942) 91 has been examined in Herb. Kew. and proves to be a species of *Grandinia.*

The septate cystidia of *P. aspera* are highly distinctive. Other British species which have septate cystidia are *P. pallidula* (Bres.) Bourd. and Galz., *P. tomentella* Bres. and *P. byssoidea* (Pers. ex. Fr.) Höhn. and Litsch., but in all these the cystidia are much smaller and not above about 6 $\mu$ in width.

In a young condition, where some of the cystidia are still unseptate and with dense contents, *P. aspera* approaches very closely the form of *Corticium roseo-cremeum* Bres.

3. **Peniophora arenata** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 944, fig. 4.

Resupinate, widely effused, membranous or pellicular, easily separable when moist, cracking on drying revealing a whitish fibrillose subiculum, orbicular when young. Margin whitish, fibrillose. Hymenium light sandy-buff colour, pruinose to farinaceous and finely granular. Context white, up to 300 $\mu$ in thickness.

Basidia: clavate, 3–5 × 23–30 $\mu$.

Spores: hyaline, smooth, cylindric, 2·5–3 × 6–8 $\mu$, apiculate-attenuate at one end, usually slightly curved.

Cystidia: immersed, rarely projecting beyond the hymenium, cylindrical, thick walled, very heavily encrusted, attenuated gradually at the base into a long hypha-like cystidiophore originating in mid-trama, sometimes forking briefly at the apex, sometimes closely grouped in fascicles, 6–10 × 50–120 $\mu$.

Hyphae: distinct, hyaline, rigid, thick-walled, with very sparse clamp connections, in a dense basal horizontal layer and a rather looser semi-vertical layer near the hymenium, frequently septate, sometimes encrusted, 3–6 $\mu$ wide. The basal hyphae are stouter and thicker walled than the superior hyphae.

Specimens examined: 27645, Type, *Rump* (34), Cato Ridge, Natal, 1934; 28916, *Doidge and Morgan*, nr. Donnybrook, Feb. 1935; 28891, *Bottomley*, The Cavern, Drakensberg, Natal, 20/7/37; 35314, *Rump* (733), Champagne Castle, Natal, Feb. 1945; 33209, *Doidge and Bottomley*, Wolhuterskop, Boschfontein Kloof, Transvaal, 5/5/39; *Rump* (625), Table Mountain, Natal, 1935.

The hymenium of this species, with its sandy appearance both in texture and colour, is distinctive. Microscopically, *P. arenata* should be grouped with *P. leprosa* Bourd. and Galz. The latter differs especially in having cystidia which are more frequently emergent and often tapering towards the apex, and also in having a distinct basal layer of thick-walled, heavily encrusted hyphae. In both species the cystidia are long and roughly cylindrical, heavily encrusted, showing a tendency to fork or fragment, and arise from a hypha-like base but are sharply differentiated from hyphae.

4. **Peniophora Roumeguerii** (Bres.) Burt in Ann. Mo. Bot. Gard. 12 (1925) 270; Bourdot and Galzin, Hym. de Fr. (1928) 316.

*Corticium Roumeguerii* Bresadola, Fung. Trident. 2 (1892) 36; Sacc. Syll. Fung. 11 (1895) 125.

*Kneiffia Roumeguerii* (Bres.) Bresadola in Ann. Myc. 1 (1903) 103.

*Corticium Mollerianum* Bresadola in Saccardo, Soc. Brot. Bol. 11 (1892) 13.

*Peniophora Molleriana* (Bres.) Saccardo, Soc. Brot. Bol. 11 (1892) 13; Saccardo, Syll. Fung. 11 (1895) 128; Bourdot and Galzin in Bull. Soc. Myc. de Fr. 28 (1912) 401; Wakefield in Trans. Brit. Myc. Soc. 5 (1915) 132; Rea, Brit. Basid. (1922) 693.

*Peniophora macra* Karsten. [Fide Bourd. and Galz. l.c. (1928)].

*Peniophora stratosa* Burt in Ann. Mo. Bot. Gard. 12 (1925) 333, nec. *P. stratosa* Petch in Ann. Roy. Bot. Gard. Peradeniya 9 (1925) 293 [fide Rogers and Jackson in Farlowia 1 (1943) 324].

*Illustrations*: Bresadola, Fung. Trident. 2 (1892) Pl. 144, f. 1.

PLATE 14.

Resupinate, widely effused, very adnate, membranous, brittle when dry, cream to chamois or biscuit colour, much cracked when dry, smooth or sometimes a little tuberculate. Hymenium at first rather pruinose, later with a waxy aspect. Margin narrow, whitish, pruinose to finely pubescent. In section up to 700 $\mu$ thick.

Basidia: narrow, cylindric-clavate, 3–5 × 12–20–30 μ.

Spores: 3 × 5·5 μ, ovoid-oblong, sometimes more elliptical, briefly and obliquely attenuated at the base.

Cystidia: very numerous, scattered throughout the trama, only a few emergent, thick-walled, encrusted, subconical or fusiform with acute apex, occasionally much fragmented, 10–16 × 50–70 μ.

Hyphae: erectly arranged, thin-walled, hyaline, with frequent septa but no clamp connections, 3 μ wide, usually agglutinated and rather indistinct.

Specimens examined: 27764, *Rump* (115), Town Bush, Maritzburg, Aug. 1934; 27761, *Rump* (107), Town Bush, Maritzburg, Aug. 1934. (The latter without spores and in poor condition.)

In hyphal characters and in the possession of abundant, thick-walled, acutely pointed cystidia, *P. Roumeguerii* is closely allied to *P. gigantea* (Fr.) Massee and *P. pubera* (Fr.) Sacc., both of which differ from *P. Roumeguerii* in producing their cystidia only in the superior part of the trama and hymenium. *P. gigantea*, moreover, becomes horny on drying while the other two species remain brittle.

5. **Peniophora filamentosa** (B. and C.) Burt apud Coker in Elisha Mitchell Sci. Soc. Journ. 36 (1921) 162, Pl. 32, f. 5, 6; Burt in Ann. Mo. Bot. Gard. 12 (1925) 320; Bourdot and Galzin, Hym. de Fr. (1928) 311.

*Corticium filamentosum* Berk. and Curt. in Grevillea 1 (1873) 178; Saccardo, Syll. Fung. 6 (1888) 619; Massee in Journ. Linn. Soc. Bot. 27 (1890) 154.

*Corticium Petersii* Berk. and Curt. *pro parte*, in Grevillea 1 (1873) 177.

*Peniophora unicolor* Peck in N.Y. State Mus. Rept. 43 (1890) 66; Saccardo, Syll. Fung. 9 (1891) 239.

*Corticium radicatum* P. Hennings, Pilze Östafrikas (1895) 54; Saccardo, Syll. Fung. 14 (1899) 222 ? (see Höhnel and Litschauer in K. Acad. Wiss. Wien. Sitzungsb. 117 (1908) 1093.

*Peniophora radicata* (P. Henn.) Höhnel and Litschauer, loc. cit., p. 1092—see Saccardo, Syll. Fung. 21 (1912) 411.

Above synonymy after Burt (1925).

*Illustrations*: Burt (1921) loc. cit. Pl. 32, f. 5, 6.

PLATE 15.

Resupinate, membranous, easily separable from the substratum when moist, smooth, soft, typically yellow-buff colour (buffy citrine, Ridgway) or isabelline. Margin concolorous or paler, composed of radiating adpressed fibrils, often forming branched mycelial strands. Context concolorous, 150–400 μ thick. Reacting in KOH to produce a strong violet colour.

Basidia: cylindrical, 3–4·5 × 28–38 μ.

Spores: 3·5–4·5 × 2–2·8 μ, ellipsoid, hyaline, smooth.

Cystidia: arising as branches of the hymenial hyphae only, fusoid, cylindrical or subulate, fairly thick-walled, encrusted with granules which rapidly dissolve in KOH but not in lactic acid, immersed or projecting up to 40 μ beyond the basidia, 5·7–9·3 × 35–65 μ.

Hyphae: hyaline, but encrusted with KOH-soluble coloured granules, with rare clamp connections, loosely intertexed, 2·8–5·6 μ, with appreciably thick walls but wide lumen.

Specimens examined: 35306, *Rump* (581), Botanical Gardens, Maritzburg, 1943; 12029, *Dümmer* (636), Kyagwe, Uganda, May 1915 (as *P. radicata*).

These specimens agree very closely in all particulars with Burt's description of the species. The vinous colour reaction with KOH is especially striking, as also are the soluble granular encrustation of the cystidia, and the small colourless spores. Mycelial strands, when present, are a useful pointer to the classification of the species in the group Radicatae of Bourdot and Galzin.

A vinous colour reaction with KOH is also a characteristic of *Polyporus rutilans* (Pers.) Fr. (= *P. nidulans* Fr.), a fungus with the same type of context, colour, hyphae and encrustation of hyphae, and spores, as *Peniophora filamentosa*. In *P. rutilans* the hyphae are 2–5 $\mu$ diam., with thin to thickish walls and sparse clamps; the spores are ellipsoid, smooth, hyaline to faintly coloured, 3–5 × 2–2·7 $\mu$. There is surely a very close relationship between these two species, which in present classifications are held so far apart.

6. **Peniophora gigantea** (Fries) Massee in Journ. Linn. Soc. Bot. 25 (1889) 142; Karsten in Finska. Vet.-Soc. Bidr. Nat. och Folk 48 (1889) 422; Bresadola in I.R. Accad. Agiati Atti, iii, 3 (1897) 113; Bourdot and Galzin, Hym. de Fr. (1928) 318, Bull. Soc. Myc. de Fr. 28 (1913) 401; Rea, Brit. Basid. (1922) 693; Burt in Ann. Mo. Bot. Gard. 12 (1925) 216.

   *Thelephora gigantea* Fries, Obs. Myc. 1 (1815) 152, Syst. Myc. 1 (1821) 448.

   *Corticium giganteum* (Fr.) Fries, Epicr. Syst. Myc. (1838) 559, Hym. Eur. (1874) 648; Peck in N.Y. State Mus. Rept. 28 (1876) 52; Saccardo, Syll. Fung. 6 (1888) 610.

   *Thelephora pergamenea* Pers., Myc. Eur. 1, p. 150 (fide Bourd. and Galz.).

   *Illustrations*: Fries, Icones Hym. 2, Pl. 197, fig. 3.

   PLATE 16.

Resupinate, widely effused on coniferous wood and bark, white or hyaline when fresh, smooth, waxy, easily separable from the substratum; contracting on drying to an easily detachable, horny or parchment-like layer, coloured whitish to buff or pink-buff. Margin white, radiately fibrillose. Context pale coloured when dry.

Basidia: cylindrical, 27–30 × 3·5–4·3 $\mu$.

Spores: (not seen with certainty in South African material), 2·5–4 × 4–6·5 $\mu$, oblong-subcylindric, attenuated at the base briefly and obliquely.

Cystidia: occupying a narrow zone confined to the hymenium and subhymenium, colourless, thick-walled, heavily encrusted with minerals, fusiform or conical, 10–11·5 × 36–80 $\mu$.

Hyphae: hyaline, vertically arranged and indistinct except near the substratum where they are more horizontal, gelatinously modified thus usually only the lumen is visible, thick walled, with rare clamps, (3)–6–(8) $\mu$ in width.

Subhymenial hyphae are thin-walled, about 2·7 $\mu$ wide.

Specimens examined: 30854, *Hillman Bros. Ltd.*, on pitch pine wood, Lourenco Marques, P.E. Africa, 5/10/1939; 32176, *Weintroub* and *Simpson* (T.R.L. 1313), on bark of *Pinus* sp., Exchange Yard, Johannesburg, 10/9/1940.

Particularly characteristic of this species are its occurrence on conifers, its waxy texture becoming corneous when dry, its fibrillose margin which lifts and curls on drying, and the cystidia confined to the outer part of the fructification. The two specimens cited above were both collected in timber yards and were most probably imported to Southern Africa.

**PENIOPHORA** SPECIES RECORDED FOR SOUTH AFRICA, BUT NOT AVAILABLE FOR STUDY.

**cinerea** (Fr.) Cooke; v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 16. [As *Corticium cinereum* Fr. recorded in: Kalchbrenner in Grev. 10 (1881) 59; De Thümen in Flora 61 (1878) 354; Wood in Rept. Natal Bot. Gard. (1898) 17.]

The author has examined several South African specimens misdetermined as *P. cinerea*, including 22044, P. MacOwan (1054), which is actually *Stereum umbrinum* B. and C.

**cremea** Bresadola; v. d. Byl (1929) l.c., p. 16 and in S.A. Journ. Sci. 23 (1926) 288; Burt in Ann. Mo. Bot. Gard. 12 (1925) 263. Several collections of *P. pelliculosa* sp. nov., in Herb. Pretoriae, were misdetermined as *P. cremea.*

**glebulosa** Bresadola; v. d. Byl (1929) l.c., p. 15 and in S.A. Journ. Sci. 23 (1926) 288.

**nuda** (Fr.) Bresadola; v. d. Byl (1929) l.c., p. 17. [As *Corticium nudum* Fr. recorded in: Kalchbrenner in Grev. 10 (1881) 59; Wood in Rept. Natal Bot. Gard. (1898) 17.]

## PUNCTULARIA Patouillard.

1. **Punctularia affinis** (Berk. and Curt.) comb. nov.

*Reticularia affinis* B. and C. ! in Journ. Linn. Soc. Bot. 10 (1869) 347, Saccardo, Syll. Fung. 7 (1888) 418.

*Reticularia venulosa* B. and C. ! in Journ. Linn. Soc. Bot. 10 (1869) 347.

*Reticularia atro-rufa* B. and C. ! in Journ. Linn. Soc. Bot. 10 (1869) 347; Saccardo, Syll. Fung. 7 (1888) 419.

*Thelephora atropurpurascens* B. and Br. in Jour. Linn. Soc. Bot. 14 (1875) 64; Saccardo, Syll. Fung. 6 (1888) 546.

*Punctularia atropurpurascens* (B. and Br.) Petch in Ann. Roy. Bot. Gard. Peradeniya 6 (1916) 160.

*Trichosporium Curtisii* Massee in Jour. Myc. 5 (1889) 185, t. 14, f. 3; Saccardo, Syll. Fung. 10 (1892) 583.

*Ceriomyces venulosus* (B. and C.) Torrend in Bull. Soc. Portug. Sci. Nat. 4, p. 9.

*Corticium* ? *tuberculosum* Pat. in Bull. Soc. Myc. de Fr. 8 (1892) 118; Saccardo, Syll. Fung. 11 (1895) 126.

*Punctularia tuberculosa* (Pat.) Pat. in Bull. Herb. Boiss. (1895) 57; Saccardo, Syll. Fung. 14 (1899) 223; Patouillard, Essai sur les Hym. (1900) 57, f. 40.

*Illustrations*: Massee (1889) loc. cit. (as *Trichosporium Curtisii*); Patouillard (1900) loc. cit. (as *Punctularia tuberculosa*).

(conoidial stage); fig. 2 (perfect stage).

PLATE 17, fig. 1 (conidial stage); fig. 2 (perfect stage).

(*a*) CONIDIAL STAGE: Loose, floccose, pulvinate, or irregular tufts of hyphae. Coloured Dauphin's violet and greyish violet-blue to dark plum-purple or bluish violet-black (Ridgway). " At first lavender with a white margin, then lavender to greyish blue in the centre and reddish purple outwards. They finally collapse into a purple brown mass of matted hyphae and spores."—(Petch, l.c.).

Hyphae: frequently adherent in easily seen strands, 2–2·5–(3) $\mu$ diam., lightly coloured in the microscope, purplish with the naked eye, thin-walled, with clamp connections and septa. Some hyphae appear to be minutely sculptured.

Conidia: purple-brown, globose, ovate or somewhat elliptical, much variation in shape, 4 $\mu$ diam., 5–6·6 $\times$ 4 $\mu$, or 8 $\times$ 4 $\mu$; smooth. (Petch, loc. cit., states that the conidia are minutely verrucose, at first borne terminally, then laterally.)

(*b*) PERFECT STAGE: Not yet seen in South African material. The description below is drawn from Petch's Ceylon specimens in Herb. Kew.

Thin, effused, resupinate, occasionally radially grooved; centre subgelatinous; margin byssoid; drying horny and crustose. " General colour vinous, purplish in the centre and reddish elsewhere; margin white; centre covered with close-set pulvinate elevations, sometimes radially elongated."—(Petch, l.c.). In section the abhymenial

layer is seen to consist of dark, fuscous hairs, arising from a dark basal seam. *Hairs* thin-walled, fuscous, with clamps, 2–3–(4) $\mu$ wide, densely interwoven. *Middle layer* hyaline, with hyphae which are indistinct through gelatinisation. *Upper layer* light brown, subgelatinous. No hymenial elements can be clearly distinguished. There is an abundance of mineral matter in the troughs surrounding the papillae of the " hymenium," and in concretions throughout the trama.

Specimens examined: 35015 (T.R.L. 2052), *Simpson* and *Talbot*, on *Olea laurifolia*, Qudeni, Zululand, Feb. 1945; 30068, *Bower*, on *Copaifera mopane*, Louis Trichardt, Tvl.; T.R.L. 359, details missing; 33429, *Phillips*, Krugersdorp, 21/3/1942 (as *Trichosporium* ? *purpureum* Massee); 36862, *Talbot*, Fountains Valley, Pretoria, 29/8/48.

As *Punctularia atropurpurascens* (B. and Br.) Petch: Conidial: Peradeniya, Ceylon, *Petch* Oct. 1917; *Petch* (4328) 1914. Immature perfect stage: Herb. Perad. (4676) 1915.

As *Reticularia affinis* B. and C. ! 3012, Car. Inf.; 454, Cuba, *C. Wright*; 1043, *Ravenel*, S.C.

As *Reticularia atro-rufa* B. and C. ! Herb. Hook. 1867, Cuba; Brazil, sine loc.; *Glaziou*, Rio de Janeiro, 1876 (8540); Cuba, *C. Wright* (534); Peradeniya, *Thwaites* (17), Nov. 1867.

As *Reticularia venulosa* B. and Br. ! Cuba, *C. Wright* (675); Fungi Cubenses Wrightiani (524).

As *Punctularia tuberculosa* (Pat.) Pat. on *Olea Europea*, *R. Maire* Myc. Boreali Africani (112), 1913.

In S.A. Journ. Sci. 42 (1946) 133, Simpson and Talbot listed No. 35015 incorrectly as *Ptychogaster* sp.

*Reticularia pyrrhocreas* ! is a fungus with a similar conidial structure, but with larger, red-brown conidia. It is said to have been used by Red Indians as a face powder.

## ALEURODISCUS Rabenhorst.

1. **Aleurodiscus acerinus** (Pers.) Hohnel and Litschauer var. **longisporus** Hohnel and Litschauer ! in K. Akad. Wiss. Wien. Sitzungsb. 116 (1907) 805, Pl. 2, f. 4; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 25.

*Aleurodiscus acerinus* var. *alliaceus* (Quél.) Bourd. and Galz. in Bull. Soc. Myc. de Fr. 28 (1912) 352; Pilát in Ann. Myc. 24 (1926) 217.

*Corticium alliaceum* Quélet, Fl. Myc. de Fr. (1888) 5; Saccardo, Syll. Fung. 6 (1888) 629.

As " *Stereum acerinum* Pers. var. *longisporum* Höhnel and Litschauer " in Saccardo, Syll. Fung. 21 (1912) 388.

*Illustrations*: Höhnel and Litschauer (1907) loc. cit.

PLATE 18.

*Type*: MacOwan (1074), Promont. bonae spei, Somerset East, in cortice arborum varium, 1875.

Resupinate, crustose, adnate, chalk-white becoming pallid ivory-white, finely and closely cracked in herbarium specimens; in section 80–100 $\mu$ thick.

Basidia: clavate with a wavy outline, 35–45 $\times$ 5–7 $\mu$, not in a continuous palisade, exceeded by the branched hyphae from beneath.

Spores: not seen (see note below).

Hyphae: 2 $\mu$ or less in width, hyaline, erect, much branched and closely arranged in the basal part, emerging as racemosely branched paraphyses between and beyond the basidia; very heavily encrusted with amorphous mineral matter.

Specimens examined: 21947, De Thumen Myc. Univ. (807) as *Corticium calceum* Fr. var. *lacteum* Fr., *MacOwan* (1074); 20840, Fungi MacOwaniani No. 1074, as *C. calceum* Fr., In cortice vivo arborum frondosarum in sylvis ad pedem montis Boschberg prope Somerset East. Febr. LXXV; 27566, *Louwrens*, Fountains Valley, Pretoria, 16/4/1934; *MacOwan*, Cap. B. Sp. 9/83 ex Herb. Kalchbrenner in Herb. Kew.

The entire fructification is so heavily impregnated with minerals that treatment of sections with strong HCl is necessary in order to make out the structure. Sections treated with HCl and then rinsed with water and mounted on KOH-phloxine were most satisfactory. Lactophenol will not dissolve the mineral matter.

The author was unable to find spores in the South African material which he examined. The assignation of these specimens to the variety *longisporus* is therefore in some doubt, but it seems reasonable in view of the fact that the Cape Province is the type locality of the variety. The variety *A. acerinus* var. *longisporus* was founded on de Thümen Mycotheca Universalis Exsicc. No. 807 (as *Corticium calceum* var. *lacteum* Fr.), a collection of MacOwan from Somerset East, the distinction being purely a small difference in spore measurement. (See Table 2.)

TABLE 2.
SPORE MEASUREMENTS OF *A. acerinus* AND ITS VARIETIES.

| Fungus Name. | Spore Measurements in $\mu$. | Observer. |
|---|---|---|
| *A. acerinus*..... | 10–13×6–7 | Höhnel and Litschauer. |
| *A. acerinus* var. *longisporus*..... | 12–17×4–6 | Höhnel and Litschauer. |
| | 12–20×8–9 | v. d. Byl. |
| *A. acerinus* var. *alliaceus*..... | 10–16×5–8 | Bourd. and Galz. |
| | 12–17×4·5–7 | Pilát. |

On the above observations of spore size and shape there appears to be an intergrading between *A. acerinus* and *A. acerinus* var. *longisporus* which indicates that it may not be practicable to hold them apart when more collections come to light.

A MacOwan collection from Somerset East also reached Kalchbrenner and was recorded in " Fungi MacOwaniani " [Grev. 10 (1881) 59] as *Corticium calceum* Fr. That collection, or part of it, is in Herb. Kew now. Montagne [in Ann. Sci. Nat. 3 ser., 7 (1847) 175] and de Thümen [in Flora 61 (1878) 353; ibid. 59 (1876) 363] also record *Corticium calceum* or its variety *lacteum* from MacOwan's Somerset East collections. These collections may be summarised thus:—

(*a*) MacOwan, Cap. B. sp. 9/83, determined as *Corticium calceum* Fr. by Kalchbrenner. (Specimen seen, and is *Aleurodiscus acerinus* or var. *longisporus*.)

(*b*) MacOwan (9452, b), Samteesvlakte prope Enon; published by Montagne as *C. calceum* Fr.

(*c*) MacOwan (1032), Somerset East; published by de Thümen as *C. calceum* Fr.

(*d*) MacOwan (1074), Somerset East; published by de Thümen as *C. calceum* Fr. var. *lacteum* Fr., and later made the type of *Aleurodiscus acerinus* var. *longisporus* by Höhnel and Litschauer.

From the Cape Province also, is a collection by Drège (Mus. Paris 9452) which Léveille published as *Thelephora* (*leijostroma*) *acerina* Pers. [in Ann. Sci. Nat. ser. 3, 5 (1846) 150].

*Corticium calceum* Fr., even in the restricted sense of Romell and Burt [Burt in Ann. Mo. Bot. Gard. 13 (1926) 203] has been shown by Rogers and Jackson [in Farlowia 1 (1943) 284] to be a *nomen confusum* which should be rejected. Most records of "*Corticium calceum*" in South Africa probably refer to *Aleurodiscus acerinus* var. *longisporus*. In van der Byl's account of the South African Thelephoraceae [Ann. Univ. Stellenbosch 7 (1929)], *C. calceum* and *A. acerinus* var. *longisporus* are dealt with separately, and it is therefore not clear what fungus is represented by v. d. Byl's concept of *C. calceum*.

For future convenience in deciding whether *A. acerinus* var. *longisporus* should be recognised as a distinct variety, the most important literature references to the species *A. acerinus* are appended:—

**Aleurodiscus acerinus** (Pers.) Höhnel and Litschauer in K. Akad. Wiss. Wien Sitzungsb. 116 (1907) 804; Bourdot and Galzin, Hym. de Fr. (1928) 334; Burt in Ann. Mo. Bot. Gard. 5 (1918) 196; Pilát in Ann. Myc. 24 (1926) 216.

*Corticium acerinum* Persoon, Obs. Myc. 1 (1796) 37; Romell, Bot. Not. (1895) 71.

*Thelephora acerina* (Pers.) Pers., Syn. Fung. (1801) 581, Myc. Eur. 1 (1822) 152; Fries, Syst. Myc. 1 (1821) 453, Hym. Eur. (1874) 648; Léveille in Ann. Sci. Nat. ser. 3, 5 (1846) 150.

*Stereum acerinum* (Pers. ex Fr.) Fr., Epicrisis (1838) 554; Saccardo, Syll. Fung. 6 (1888) 587; Massee in Journ. Linn. Soc. Bot. 27 (1890) 202; Petch in Ann. Roy. Bot. Gard. Perad. 6 (1916) 157.

*Hypochnus acerinus* (Pers.) Pat. in Rev. Myc. (1889) 166, Bull. Soc. Myc. Fr. 5 (1889) 30.

*Illustrations*: Hhönel and Litschauer (1907) loc. cit., Tab. 2, f. 6.

**ALEURODISCUS** SPECIES RECORDED FROM SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY:

**cerussatus** (Bres.) Höhnel and Litschauer; Van der Byl in Ann. Univ. Stellenbosch 7 (1929) 25.

**disciformis** (DC) Patouillard; Van der Byl (1929) loc. cit., p. 24.

## PHLEBIA Fries.

1. **Phlebia strigoso-zonata** (Schwein.) Lloyd in Lloyd Myc. Writ. 4 (1914) L. 53: 15; Burt in Ann. Mo. Bot. Gard. 8 (1921) 394.

   *Merulius strigoso-zonatus* Schweinitz in Trans. Amer. Phil. Soc. n.s. 4 (1834) 160.

   *Auricularia strigoso-zonata* (Schwein.) Lloyd (as "McGinty") in Lloyd Myc. Writ. 4 (1913) L. 46 : 6.

   *Phlebia rugosissima* Lév., Champ. Exot. in Ann. Sci. Nat. ser. 2, 3 (1844) 214; Saccardo, Syll. Fung. 6 (1888) 499.

   *Auricularia rugosissima* (Lév.) Bres. in Ann. Myc. 14 (1916) 231.

   *Phlebia reflexa* Berk. in Hook. Jour. Bot. 3 (1851) 168; Saccardo, Syll. Fung. 6 (1888) 500.

   *Auricularia reflexa* (Berk.) Bres. (non *A. reflexa* Bulliard) in Ann. Myc. 9 (1911) 551; Lloyd, Myc. Writ. 5 (1918) L.67: 12.

   *Phlebia rubiginosa* Berk. and Rav. in Ravenel Fasc. iii: 23, and in Grevillea 1 (1873) 146; Saccardo, Syll. Fung. 6 (1888) 499.

   *Phlebia zonata* Berk. and Curt. in Grevillea 1 (1873) 146; Saccardo, Syll. Fung. 6 (1888) 499.

   *Phlebia pileata* Peck in 29th Ann. Rept. N.Y. State Mus. (1877) 45; Saccardo, Syll. Fung. 6 (1888) 499.

*Phlebia hispidula* Berk. in Journ. Linn. Soc. Bot. 16: p. 167; Saccardo, Syll. Fung. 6 (1888) 499.

*Auricularia sordescens* Cesati, Myc. Born. (1879) 10; Saccardo, Syll. Fung. 6 (1888) 764.

*Stereum lugubris* Cooke in Grevillea 12 (1884) 85; Saccardo, Syll. Fung. 6 (1888) 574.

*Auricularia Butleri* Massee in Kew Bull. (1906) 94; Saccardo, Syll. Fung. 21 (1912) 441; Banerjee in Bull. Bot. Soc. Bengal 1 (1947).

*Illustrations*: PLATE 19.

Resupinate-reflexed, becoming dimidiate, sessile, with imbricate pileoli. Margin strongly involute and of a lighter colour, yellow-ochre when freshly collected and moistened. Abhymenial surface densely tomentose, dark reddish-brown, deeply concentrically furrowed. Hymenium black when dry, reddish-black and somewhat gelatinous when moist, radially raised in minute ridges or pleats, concentrically furrowed in formation corresponding to the upper surface. Context dark. Pileate parts 3–6 cms. in length. Reported by one collector to have a faint cocoa smell when fresh.

Basidia: cylindric-clavate, (3)–3·5–4·3 × (16)–31–36 $\mu$, in very tight palisade. None seen with sterigmata.

Spores: not seen ["hyaline, obovoid, 9–10 × 5 $\mu$," fide Bresadola in Ann. Myc. (1911) loc. cit.]

Tissue differentiation: 600 $\mu$ thick, excluding the much thicker tomentum; Hymenium composed of a thin dark layer of hyphae covered externally with minute dark globose granules. Next to the tomentum is a thick, black zone. Middle layers composed of fine filamentous hyphae, rather indistinct and gelatinised. (Bresadola, loc. cit., states that the hyphae are 2–4·5 $\mu$ wide, hyaline, with clamp connections.)

Surface hairs: fuscous; 3–5 $\mu$ wide, rather thick-walled, with abundant clamp connections.

Specimens examined: 27646, *Rump*, Town Bush, Maritzburg, 1934; *Ledeboer*, on wattle stump, nr. Maritzburg, Jan. 1945; 36700, *Talbot*, on *Acacia mollissima* stump, Lions River, Natal, 17/5/1948; 36695, *Talbot*, on *Acacia mollissima*, Byrne, Natal, 24/5/1948.

As the basidia in this species are difficult to see and, when seen, are very rarely mature, the genus has always been in doubt. Burt (1921) states that the species is a Eubasidiomycete and cannot be placed in *Auricularia*. Bresadola described the basidia as " cylindric-subclavate, 30–35 × 4–5 $\mu$ " but placed the species in *Auricularia*. In several specimens which the author examined in Kew and in Pretoria, no septate basidia were seen, but admittedly all were immature. On account of the holobasidia he places the species in *Phlebia*, while realising that the effuso-reflexed, subgelatinous pileus does not fit in well with this genus.

The species is widely distributed in the Far East, Australia, New Zealand and America, but is not found in Europe.

## MERULIUS Haller ex Fries.

Key to species described:—

1. Hymenium light buff with fleshy tint when old; spores colourless, subcylindrical, about 2·5–3·5 ×6–7·5 $\mu$ *M. corium* (1).

2. Hymenium dark coloured when old, reddish brown; spores coloured, elliptical, about 5–6·5 × 8–11·6 $\mu$.

   a) Young hyphae often with pale lilaceous tint; hyphae with infrequent clamp connections and frequent ampoule-swellings; no rapid colour change when moistened *M. himantioides* (2).

   aa) Young parts without lilaceous tint; hyphae with frequent clamps but no marked ampoules; when moistened there is a rapid colour change from dresden brown to bright russet, also becoming slightly gelatinous; hyphae frequently finely encrusted *M. gelatinosus* (3).

1. **Merulius corium** (Pers. ex Fries) Fr., Elenchus Fung. 1 (1828) 58, Epicr. (1838) 500, Hym. Eur. (1874) 591; Rea, Brit. Basid. (1922) 620; Saccardo, Syll. Fung. 6 (1888) 413; Burt in Ann. Mo. Bot. Gard. 4 (1917) 322; Donk, Rev. Nederl. Heterobas. en Homobas.—Aphyllophoraceae 1 (1931) 155; Kalchbrenner in Grev. 10 (1881) 57; Lloyd, Myc. Writ. 6 (1920) 952; Nel in Ann. Univ. Stellenbosch 20 (1942) 77.

   *Thelephora corium* Persoon, Syn. Meth. Fung. (1801) 574; Greville, Scot. Crypt. Fl. 3 (1825) tab. 147.

   *Thelephora incarnata* var. $\beta$ Persoon, Myc. Eur. 1 (1822) 131.

   *Auricularia papyrina* Bulliard, Champ. de la Fr. (1780–1784) Pl. 402; Sowerby, Eng. Fung. 3 (1803) tab. 349.

   *Merulius papyrinus* (Bull.) Quélet, Fl. Myc. de Fr. (1888) 32; Bourdot and Galzin, Hym. de Fr. (1928) 347.

   *Boletus purpurascens* De Candolle, Fl. Franc. 6 (1815) 41.

   *Polyporus purpurascens* (DC.) Persoon, Myc. Eur. 2 (1825) 60.

   *Illustrations*: Greville (1825) l.c., tab. 147; Burt (1917) l.c., f. 7.

   PLATE 20.

Resupinate, effused, at first orbicular, membranous-ceraceous, soft, thin, in section 300–500 $\mu$. Margin eventually lifting, narrow, showing a narrow, whitish, villose, sometimes sulcate, reflexed surface. Hymenium in early stages and near margin smooth, becoming poroid with small shallow reticulations, about 2 per mm., drying buff with often a fleshy pink tint.

Basidia: cylindrical, narrow, densely aggregated, 2·5–4 × 24–33 $\mu$; sterigmata 2–4, straight, narrow, up to 4 $\mu$ long.

Spores: not seen in South African specimens; hyaline, subcylindric, smooth, 2·5–3·5 × 6–7·5 $\mu$ (see note on spore size, below).

Hyphae: subhymenial hyphae thin walled, hyaline, branched, with numerous septa, 2–4 $\mu$ wide, with or without accompanying mineral matter in the form of small granules. Basal hyphae thicker—walled, hyaline, branched, septate, 3–6 / wide. All hyphae very distinct and forming a fairly loosely interwoven network, lacking clamp connections. The thick-walled hyphae appear to be merely older hyphae, not a specialised skeletal system.

Specimens examined: 28885, *Bottomley*, The Cavern, Drakensberg, Natal, 20/7/37; 31725 (N.H. 391), Klapmuts, Cape, Dec. 1916; 26654, *Stephens* (158), Kuils River, Cape, Sept. 1932; 1350, *Doidge*, Garstfontein, Pretoria Dist., 11/4/1911; *Rump* (625), Table Mountain, Natal, 1935; *Dr. Holub*, " Interior of South Africa," (in Herb. Kew).

*Merulius confluens* Schweinitz is recorded for South Africa by Nel [in Ann. Univ. Stellenbosch 20 (1942) 77], but the author has not yet been able to consult this specimen in the van der Byl Herbarium. *M. confluens* is extremely near to *M. corium* and is held as synonymous by Lloyd [in Lloyd, Myc. Writ. 3 (1909) 422 and ibid. 4 (1914) L. 52: 8] to which opinion I subscribe after examining some of the American specimens of *M. confluens* in Herb. Kew, not, however, including the Type, and numerous of my own collections of *M. corium*. Burt (1917, l.c., p. 319) writes, " *M. confluens* has the general aspect of *M. corium* but is distinguished from that species by frequently a more broadly reflexed margin, which is shallowly, concentrically sulcate when broadly reflexed, by larger and usually deeper pores, by the incrusted hyphae of the subhymenial region and by the small spores."

As there is some variation in spore size between European and American specimens of *M. corium*, Burt (l.c., p. 323) emphasises the incrustation of hyphae in *M. confluens* as a clear-cut diagnostic character. This is a most uncertain character: in specimens

of *M. corium* collected in England, and those in Herb. Kew, there is often much mineral matter in the subhymenium so that the hyphae appear encrusted. Spore size is not a reliable character, for in *M. corium* it is very variable and is generally greater than that of *M. confluens* except in America, where, according to Burt's descriptions the spores of the two have almost identical measurements. Spore sizes in these two species are indicated in the accompanying table (see Table 3).

Macroscopic variations in *M. corium* are sufficient to embrace all the supposed points in which *M. confluens* is held to differ. The author would suggest that typically the two species represent extremes of a graded series, but without seeing authentic material of them one cannot formally propose *M. confluens* as a synonym of *M. corium*.

TABLE 3.

SPORE SIZES OF SOME *Merulius* SPECIES.

| Species. | Country. | Spore Size in $\mu$. | Observer. |
|---|---|---|---|
| *M. confluens*..... | America..... | 4·5–5×2·5 | Burt. |
| *M. confluens*..... | America..... | 4·6×2–2·5 | Talbot. |
| *M. corium*..... | America..... | 4·5–5×1·75–2·5 | Burt. |
| *M. corium*..... | Europe..... | 6–7×3 | Burt. |
| | | 6–12×2·5–4 | Bresadola and Brinkmann. |
| | | 5–6–8×2·5–3–4 | Bourdot and Galzin. |
| *M. corium*..... | England..... | 6–6·6×3·5 | Talbot. |

2. **Merulius himantioides** Fries !, Syst. Myc. 1 (1821) 329, Epicr. (1838) 501, Hym. Eur. (1874) 592; Saccardo, Syll. Fung. 6 (1888) 415; Burt in Ann. Mo. Bot. Gard. 4 (1917) 349; Rea, Brit. Basid (1922) 623.

*Gyrophana himantioides* (Fr.) Bourd. and Galz. in Bull. Soc. Myc. de Fr. 39 (1923) 13, Hym. de Fr. (1928) 354.

*Merulius tenuis* Peck in N.Y. State Mus. Rept. 47 (1894) 147; Saccardo, Syll. Fung. 11 (1895) 105 (fide Burt).

*Merulius umbrinus* Fries, Elench. Fung. 1 (1828) 61 [fide Lundell and Nannfeldt, Fungi Exsicc. Suecici (1941) No. 1014].

*Merulius squalidus* Fries, Elench. Fung. 1 (1828) 62 [fide Lundell and Nannfeldt, Fungi Exsicc. Suecici (1941) No. 1014]; Fries, Hym. Eur. (1874) 594; Saccardo, Syll. Fung. 6 (1888) 420, ibid 23 (1925) 465; Rea, Brit. Basid. (1922) 623; Bresadola in Ann. Myc. 18 (1920) 69; Lloyd, Myc. Writ. 4 (1914) L. 52: 26.

*Illustrations*: Fries, Icones Hym. (1877–1884) Pl. 192, f. 1; Romell in Arkiv. för Bot. $11^3$ (1911) 28, Pl. 2, f. 19 (as *M. himantioides*).

PLATE 21, fig. 1.

Effused, resupinate, occasionally a little reflexed, dry, brittle. Hymenium spread over gyrose plicate folds which are almost poroid in places, or elsewhere bluntly toothed, irpiciform, or labyrinthiform; when dry, umber to warm Brussels Brown colour, when moistened turning a warmer, darker colour. Margin thin and dingy white, pale buff, or with a distinct lilac tinge, soft, sometimes produced in places into short rhizoidal strands. Context pale coloured, somewhat floccose, in section 300–500 · thick.

Basidia: cylindric-clavate, (5·3)–8–11 × (33)–44–(60) $\mu$, with four sterigmata up to 5 $\mu$ long.

Spores: 5–6·5 × 8–10·6 $\mu$, light yellow colour, broad elliptic, often with one side flattened, smooth, often 1–2 guttulate.

Hyphae: of two kinds, hyaline or coloured, the types differing only in colour. Hyphae thin-walled, not encrusted, with frequent large clamp connections and occasional H-anastomoses and ampoullar swellings, very frequently collapsed, closely intertexed, branched, very variable in width, 2–12 $\mu$ wide.

Specimens examined: *Timber Research Lab.* (2090) on wattle pole near mouth of an adit in Elands Drift Mine, Sabie, E. Tvl. (Dry bulb 60° F., wet bulb 47° F.), 1945; T.R.L. (361), *Henderson*, on old beam of wood on the ground at Exchange Yard, Johannesburg, 1938; 36730, *Louwrens*, Wynberg Park, Wynberg, 19/6/48.

As *M. squalidus*: Exsicc. *W. Brinkmann*, Westfälische Pilze iii: No. 121; 24861, *Stephens*, Westbrooke, Newlands C.P., June, 1929.

Bresadola [in Ann. Myc. 18 (1920) 69] reduces *M. squalidus* to a synonym of *M. umbrinus* which has page priority in the Elenchus Fungorum 1 (1828) 61. This treatment is substantiated by Lundell and Nannfeldt (loc. cit.) who include both these species as synonyms of *M. himantioides*, with the following notes: " The fresh colour of the subiculum was almost lilacino-roseus. It seems certain that this species reaches full development only in years with exceptionally large precipitation. Fries' original water colour drawing shows excellently a juvenile stage with margin still coloured, but the reproduction in Icon. Sel. Tab. 193 : 1 has lost the colour and shows a white margin. It is only with increasing age that the margin turns whitish. Authentic material in Upsala Herb. shows *M. squalidus* Fr. and *M. umbrinus* Fr. to be synonyms. The former species represents a young stage, and the latter was described from the old over-ripe stage."

The South African specimen No. 24861 (as *M. squalidus*) is a close match with the Brinkmann Exsicc. No. iii: 121. Specimen T.R.L. 361 is a close match in all respects with *M. himantioides* as represented in the British Collection of Herb. Kew. The microscopic characters of T.R.L. 2090 are also the same, but macroscopically it has a more robust growth form and a hymenium which is more distinctly toothed than usual.

*M. himantioides* differs from the better-known *M. lacrymans* most notably in microscopic characters and habitat, but also in not being rather fleshy and rusty brown in colour. The spores of *M. lacrymans* are paler, narrower [(4·3)–5–(6) × 10 $\mu$) and flatter, and its coloured hyphae are always thick-walled or even without a visible lumen, while its hyaline hyphae may be either thin- or thick-walled (see Plate 21, fig. 2).

*M. lacrymans* Wulf. ex Fr. has once been recorded in South Africa [v. d. Byl in Trans. Roy. Soc. S.A. 10 (1922) 285] occurring under the linoleum of an old house in Stellenbosch. This is an interesting record, for *M. lacrymans* is a fungus sensitive to high temperatures and dry conditions, and is usually only to be found in temperate regions. It is unlikely that *M. lacrymans* would flourish in the gold mines, for although the relative humidity is high, it is accompanied by high temperatures [cfr. Brown in S.A. Journ. Sci. 33 (1936) 383].

3. **Merulius gelatinosus** Lloyd ! in Lloyd, Myc. Writ. 7 (1922) 1158, f. 2293, published by typographic error in part as " Merulius gelatinous "; non *M. gelatinosus* Petch ! in Ann. Roy. Bot. Gard. Perad. 9 (1925) 315, published by typographic error as " Mesulius gelatinosus."

*Illustrations*: Lloyd (1922) loc. cit., f. 2293.

PLATE 22.

Resupinate, effused over old logs and forest debris. When dry, brittle, hymenium Dresden brown, almost smooth with only the faint outline of reticulations. When wetted, changing colour immediately to a bright warm russet and swelling into semi-

gelatinous convolutions of somewhat darker colour. Margin smooth, pale, yellowish buff. Thickness in section up to 2 mm. when dry; context pale coloured.

Basidia: 6·5–8 × (36)–40–48 μ, with 4 curved sterigmata 4–5 μ long, clavate, hyaline.

Spores: (6)–6·5 × 10–(11·6) μ, smooth, elliptical, bright yellow.

Hyphae: Subhymenial tissue pale coloured in mass but composed of hyaline and coloured hyphae; hyphae thin-walled, irregular in outline, frequently septate, branched, with frequent large clamp connections, 2–3·5 μ wide. Nearer the base, the hyphae are hyaline or quite deeply coloured, frequently much encrusted, septate, branched, (2)–4–10 μ wide, with clamp connections. The tissues merge into one another and the three distinct layers of hyphae described by Lloyd (l.c.) were not seen.

Specimens examined: 31481, *Duthie*, on old logs and debris, Belvidere, Knysna, C.P., July 1921. (Probably authentic material.)

The distinctive points about this species are (1) the almost smooth hymenium when dry; (2) change of colour and texture on moistening (though the gelatinous consistency should not be over emphasised); (3) thin-walled, coloured or hyaline hyphae, with clamps, and encrusted in parts.

Except for the greater irregularity of outline, and encrustation, the hyphal characters are like those found in *M. himantioides*, though in the latter the clamp connections are usually rather infrequent. In *M. lacrymans* the hyphae lack clamps, are thick-walled and coloured.

*M. gelatinosus* Petch ! is very different from *M. gelatinosus* Lloyd ! , and being a later homonym the former species should be renamed.

SYNONYMS AND EXCLUDED SPECIES IN **MERULIUS.**

**confluens** Schweinitz = *M. corium* Pers. ex Fries, fide Lloyd in Myc. Writ. 3 (1909) 422 and ibid. 4 (1914) L. 52: 8.

**squalidus** Fries = *M. himantioides* Fries, fide Lundell and Nannfeldt, Fungi Exsicc. Suecici (1941) No. 1014.

**umbrinus** Fries = *M. himantioides* Fries, fide Lundell and Nannfeldt, loc. cit.

**MERULIUS** SPECIES RECORDED FOR SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY:

**confluens** Schweinitz; Nel in Ann. Univ. Stellenbosch 20 (1942) 77.

**lacrymans** Wulf ex Fr.; van der Byl in Trans. Roy. Soc. S.A. 10 (1922) 285; Nel in Ann. Univ. Stellenbosch 20 (1942) 77.

**serpens** Fries; Kalchbrenner in Grevillea 10 (1881) 57.

## CONIOPHORA DC. ex Persoon.

1. **Coniophora papillosa** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 939, f. 1. *Illustrations*: PLATE 23, fig. 1.

*Type*: Timber Research Lab. (1852), on timber, Venterspost Gold Mining Co., Ltd., 23/10/42. (In Herb. Kew.)

Resupinate, widely effused, adnate, circa 500 μ thick, brittle, occasionally cracked when dry. Hymenium dark drab colour, covered with small, hemispherical, discrete, fertile papillae of superficial origin. Context fuscous.

Basidia: very rarely seen, not in palisade, clavate-cylindric, hyaline, 23–30 × 4–5 μ, at maturity projecting almost full length above the mass of tissue; sterigmata 2 or 4, short.

Spores: Elliptical or ovate, occasionally subglobose, coloured yellowish brown, smooth, 4–6 × 7·5–10 μ, sometimes unilaterally flattened, rather thick-walled, sometimes guttulate, very numerous and embedded in the upper parts of the trama, hyaline when immature.

Tissue differentiation: Basal layers of trama composed of much interwoven, branched, very dark coloured hyphae, 2 $\mu$ wide, some dendroid but not markedly so. The remainder of trama composed of lightly coloured to hyaline tissue which is indistinct or in parts almost pseudoparenchymatous and is progressively darker from hymenium to substratum.

Specimens examined: Type, T.R.L. (1852), cited above; 30194, *Rump* (393), on indigenous wood in swamp bush, Compensation Beach, Natal, 1935.

Despite their very different habitats these two specimens are identical except that no basidia could be demonstrated in the Natal specimen. This *Coniophora* is very distinctive, particularly in the arrangement of the tissues. The hymenium has a characteristic colour and is more markedly papillate than is seen in other species. *C. sistrotremoides* (Schw.) Massee is described as papillate but is entirely different in other respects.

2. **Coniophora fodinarum** sp. nov. (Etym. fodina = a mine).

*Illustrations*: PLATE 23, fig. 2.

Type: 27558, *R. Lurie* (T.R.L. 81) on underground timbers, New Modder Mine, Johannesburg, 3/4/1934. Type in Herb. Kew, with Isotypes in Herb. Pretoriae and Herb. University of Toronto.

Resupinate, widely effused, readily separable from the substratum, brittle when dry, not cracking, up to 2 mm. in thickness. Hymenium very tubercular, coloured olivaceous umber, yellowish or raw umber. Abhymenial surface soft, velvety, dark brown. Context pale coloured. Rhizoidal strands may develop.

Basidia: not seen except in collapsed condition.

Spores: very variable in size, 5–6·6 × 6·6–7·5–8·3–10 $\mu$, and varying in shape from subglobose to elliptical with one side often flattened, usually the latter shape; coloured, smooth, relatively thin-walled, free or embedded among hyaline much branched, filamentous hyphae, in a layer up to 260 $\mu$ in thickness.

Hyphae: (1) of the spore-bearing layer: filamentous, hyaline, much branched, less than 1 $\mu$ diam. (2) Of the middle layers (500–660 $\mu$ thick), lightly coloured, 2 $\mu$ diam., densely intertexed with more filamentous hyphae which form a vague tissue. (3) Abhymenial hyphae, thin-walled, dark coloured, septate, not profusely branched, 3–(6) $\mu$ diam., forming a spongy layer over 250 $\mu$ in thickness.

Specimens examined: Type, 27558, cited above; 28857, *R. Lurie*, Randfontein Estates, Johannesburg, Jan. 1937; 24871, *Wilman*, on *Acacia mollissima* caps, River View Mine, Wedburg, C.P., 25/7/1928; 28767, *R. Brown* (38), Jubilee Mine, T.G.M.E., Pilgrims Rest, E. Tvl., 19/10/1936.

This species differs from *C. puteana* (Schum. ex Fr.) Karst. in being easily separable from the substratum when dry, in its greater thickness, and particularly in the organisation of the hyphae and their deep colour in the basal layer. The spores are also very much smaller than those of *C. puteana* [(5·3)–6·5–8 × 9–12–14·7 $\mu$ in British collections]. The author has not seen examples of *C. fumosa* Karst., but the present specimens do not agree with the plate of this in Fries, Icones Tab. 198, f. 3, nor with the description in Saccardo, Syll. Fung. 6 (1888) 651. The especial differences are the arachnoid-membranous, adherent, smooth features of *C. fumosa*. Rogers and Jackson [in Farlowia 1 (1943) 273] reduce *C. fumosa* to synonymy with *C. olivacea* (Pers. ex Fr.) Karst. which is cystidiate and quite different from the new species proposed here. Dr. Jackson, of Toronto University, very kindly examined specimens of *C. fodinarum* at my request, and confirmed that it was probably undescribed, and unlike any species of *Coniophora* known to him. The species was formerly confused with *C. puteana* or *C. fumosa* in South African Herbaria.

3. **Coniophora olivacea** (Fries) Karsten in Bidr. Känned Finl. nat. o. Folk 37 (1882) 162; Saccardo, Syll. Fung. 6 (1888) 649; Massee in Journ. Linn. Soc. Bot. 25 (1889) 129; Bresadola in I.R. Accad. Agiati Atti iii, 3 (1897) 116; Burt in Ann. Mo. Bot. Gard. 4 (1917) 257; Rogers and Jackson in Farlowia 1 (1943) 273.

*Hypochnus olivaceus* Fries, Obs. Myc. 2 (1818) 282, *pro parte.*

*Corticium* (*Hypochnus*) *olivaceum* Fries, Hym. Eur. (1874) 660 *pro parte.*

*Corticium* (*Coniophora*) *olivaceum* (Fr.) Cooke in Grevillea 8 (1880) 89.

*Coniophorella olivacea* (Fr.) Karsten in Bidr. känned Finl. nat. o. Folk 48 (1889) 438; Bresadola in Ann. Myc. 1 (1903) 110; Bourdot and Galzin, Hym. de Fr. (1928) 362; Rea, Brit. Basid. (1922) 628; Lundell and Nannfeldt, Fungi Exsicc. Suecici. Uppsala. Fasc. XV–XVI (1939) No. 750.

*Corticium leucothrix* Berk. and Curt. in Grevillea 2 (1873) 4.

*Corticium* (*Coniophora*) *leucothrix* (B. and C.) Cooke in Grev. 8 (1880) 89.

*Coniophora leucothrix* (B. and C.) Cooke in Saccardo, Syll. Fung. 6 (1888) 648; Massee in Journ. Linn. Soc. Bot. 25 (1889) 133.

*Corticium brunneolum* B. and C. in Grevillea 2 (1873) 4.

*Corticium* (*Coniophora*) *brunneolum* (B. and C.) Cooke in Grevillea 8 (1880) 88.

*Coniophora brunneola* (B. and C.) Cooke in Saccardo Syll. Fung. 6 (1888) 648; Massee in Journ. Linn. Soc. Bot. 25 (1889) 134.

*Hymenochaete Ellisii* Berk. and Cooke in Grev. 4 (1876) 162.

*Corticium* (*Coniophora*) *Ellisii* (Berk. and Cooke) Cooke in Grevillea 8 (1880) 89.

*Coniophora Ellisii* (Berk. and Cooke) Cooke in Saccardo, Syll. Fung. 6 (1888) 648; Massee in Journ. Linn. Soc. Bot. 25 (1889) 129.

*Coniophora fulvo-olivacea* Massee in Journ. Linn. Soc. Bot. 25 (1889) 134; Saccardo, Syll. Fung. 9 (1891) 241.

*Coniophora atrocinerea* Karsten in de Thümen Myc. Univ. No. 1806 (1881); Soc. pro Faune et Flora Fennica Meddel. 6 (1881) 12; Finska Vet.-Soc. Bidrag Natur. och Folk 37 (1882) 162; Saccardo, Syll. Fung. 6 (1888) 650; Massee in Journ. Linn. Soc. Bot. 25 (1889) 132; Burt in Ann. Mo. Bot. Gard. 4 (1917) 260; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 17; Rogers and Jackson in Farlowia 1 (1943) 273 (fide Rogers and Jackson loc. cit.).

*Coniophorella atrocinerea* Karsten, Finl. Basidsv. (1889) 438; Bourdot and Galzin, Hym. de Fr. (1928) 364.

*Coniophora fumosa* Karsten Symb. 8 pg. 13; Saccardo Syll. Fung. 6 (1888) 651; Bourdot and Galzin, Hym. de Fr. (1928) 360; Höhnel and Litschauer, Beitr. der kennt. der Corticeen (1908) 16. (fide Rogers and Jackson, loc. cit.).

*Corticium fumosum* Fries *pro parte*, Fries, Icones Fung. tab. 198, f. 3.

Above synonymy after Burt, and Rogers and Jackson.

*Illustrations*: Trans. Brit. Myc. Soc. 6 pg. 73; Burt in Ann. Mo. Bot. Gard. 4 (1917) 258, f. 14.

PLATE 24.

Resupinate, widely effused, byssoid to membranous, cracking or remaining entire on drying, fragile, separable when fresh, somewhat adnate when dry, olivaceous, drying isabelline or brownish. Margin paler and byssoid or arachnoid when distinct. In section 100–150 $\mu$ thick (up to 1,300 $\mu$ thick according to v. d. Byl, l.c.).

Basidia: hyaline, cylindric, 6·5–10 × 39–45 $\mu$, with 2–4 sterigmata up to 8·5 $\mu$ long. A few hyaline, simple paraphyses present, 3·5–4·2 $\mu$ wide.

Spores: yellow-brown, smooth, with a distinct apiculus, often l-guttulate, elliptical with one side often depressed and narrowing towards the apiculus, (5)–6–7–(8) × (10)–12–13–(14) $\mu$.

Cystidia: numerous, cylindric with rounded apex and gradually tapered base, arising as lateral branch of subhymenial or mid-tramal hypha, brownish with paler apex, septate (almost hyaline when young and non-septate), relatively thin-walled, covered with large detersile crystals partly soluble in KOH, projecting 52–110 $\mu$, in size 12–13 $\times$ 100–150–(300) $\mu$, usually about 140 $\mu$ long.

Hyphae: densely intertexed, clamps very rare, septate, not encrusted, much branched, (2·8)–4–(5·6) $\mu$ wide. Inferior hyphae brown, rather lax; superior hyphae brown, compact, mixed with some hyaline hyphae in the subhymenium. No marked differentiation of tissues.

Occurrence: usually on pine wood.

Specimens examined: 27665, *Stephens* (367), on base of pine stump near University Course, Rondebosch, C.P., June 1934; 32086, *Weintroub* (T.R.L. 1158), on badly decayed joist of flooring board, Exchange Yard, Johannesburg, 1940; 36823, *A. A. Pearson* (*Stephens* 650) on stumps of *Pinus* sp., Groot Constantia Woods, 18/6/1948.

Burt (1917, l.c., pg. 239) indicates that there are many species connecting *Coniophorella* with *Coniophora*, and that the presence or absence of cystidia is not a good character for segregating these genera. For this reason his rejection of the genus *Coniophorella* is followed here, though the cystidia of *C. olivacea* are an extremely distinctive aid to specific diagnosis. In this species the cystidia are modified lateral branches of ordinary hyphae, and in form and origin resemble those of *Peniophora aspera* q.v.

The South African collections cited above appear to be darker than British ones, and their spores average slightly larger and slightly darker, especially in the epispore, than in the British specimens. The writer does not consider that the differences are sufficiently marked to warrant a new name, especially as he has not been able to compare with the type of *C. atrocinerea*, which Rogers and Jackson reduce to synonymy with *C. olivacea*. The spores in South African specimens are mummy-brown colour, 6 $\times$ 12 $\mu$; those of British specimens are Saccardo's umber, 5 $\times$ 11·4 $\mu$.

NOTE ON SYNONYMY:

Burt (1917 l.c.) notes that an authentic specimen of *Thelephora olivacea* Fries [Fries, Elenchus Fung. 1 (1828) 197; Epicr. Syst. Myc. (1836–38) 543; Berkeley, Outl. Brit. Fung. (1860) 269] in Herb. Kew is *Coniophora Betulae*, and not the present species.

Bourdot and Galzin [in Hym. de Fr. (1928) 360] note: " *C. fumosa* Karst., after an authentic specimen, is, according to Höhnel and Litschauer (Beitr. 1906, p. 26), a form of *C. arida* with much smaller spores, 9–10 $\times$ 6–7 $\mu$. The original of the same *C. fumosa* does not differ from *C. olivacea*, according to the same authors (Beitr. 1908, p. 16)."

NOTE ON OTHER **CONIOPHORA** SPECIES RECORDED FOR SOUTH AFRICA.

(1) *C. puteana* (Schum. ex Fr.) Karst. [= *C. cerebella* (Pers.) Duby]. Mrs. R. Brown (R. Lurie) records in S.A. Journ. Sci. 33 (1936) 388 that several collections of this species have been made in the gold mines of the Central and East Witwatersrand, at temperatures between 68°–72° F. These collections have not all been seen by the writer, but he feels that they may prove to be *C. fodinarum*, which comes from mines and has frequently been mistaken for *C. puteana*.

(2) In Herb. Pretoriae No. 30633 is a *Coniophora* collected from the wall of a dairy by K. Morgan, Hopevale, Donnybrook, Natal, 6/5/1939. This fungus is characterised by a very heavy encrustation of minerals on the hyphae which is suggestive of *Coniophora Betulae* (Schum.) Karst, but as good material of that species is lacking Kew I am unable to make a satisfactory comparison. Superficial comparison suggests that the hymenium

of No. 30633 is much too dark (dark red-brown) and that the trama is too thick and membranous. There is also some doubt whether *C. Betulae* is not merely a variation from *C. suffocata* (Peck) Massee. [See Rogers and Jackson in Farlowia 1 (1943) 280.]

(3) Miss D. Weintroub has submitted to us several specimens of *Coniophora* collected from mires, which at present cannot be named.

## STEREUM Persoon ex S. F. Gray.

Key to species described:—

1. Fresh plant exuding reddish juice when wounded: conducting organs seen microscopically:
   a) Thin; reflexed surface clothed with short silky hairs; spores (7)–8–(9) × 3–3·5 μ; on conifers *S. sanguinolentum* (1).
   aa) Thick; conspicuously rimose; reflexed surface clothed with a thick pad-like tomentum; spores 3·5–5·5 × 2–3 μ; on indigenous woods *S. rimosum* var. *africanum* (2).

2. Fresh plant not " bleeding "; conducting organs absent.
   a) Gloeocystidia abundant, hyaline; hymenium pallid; abhymenial surface snuff-brown; spores 3–4·5 × 2–3 μ *S. bicolor* (3).
   aa) Gloeocystidia absent:
      x. Large encrusted (rarely smooth) peniophoroid cystidia present:
         y. Cystidia hyaline, or faintly yellowish, not arising from skeletal hyphae; spores 10–13 × 6–7 μ *S. cinerascens* (4).
         yy. Cystidia dark coloured (sometimes nearly smooth), arising as apical modifications of skeletal hyphae; spores 6–8 × 3–4 μ *S. umbrinum* (5).
      xx. Peniophoroid cystidia absent:
         Cylindrical, rugose, coloured " false setae " arising from skeletal hyphae present, darkening in potash; spores 6–7 × 3–4 μ *S. Schomburgkii* (6).

1. **Stereum sanguinolentum** (A. and S.) Fries, Epicrisis (1838) 549, Hym. Eur. (1874) 540; Albertini and Schweinitz, Consp. Fung. (1805) 274 (under β. *Sterea* of *Thelephora*); Schweinitz in Naturforsch. Ges. Leipzig Schrift 1 (1822) 106; Berkeley, Outl. Brit. Fung. (1860) 271; Saccardo, Syll. Fung. 6 (1888) 564; Quélet, Fl. Myc. de Fr. (1888) 14; Karsten, Myc. Fenn. 3 (1876) 306, Finnlands Basidsv. (1887) 396; Cooke, Brit. Fung. Handbook 1 (1871) 317; Massee in Journ. Linn. Soc. Bot. 27 (1890) 189; Greville, Scot. Crypt. Flora 4 (1826) t. 225; Bresadola in Ann. Myc. 1 (1903) 92; Höhnel and Litschauer, Weisner Festschr. (1908) 60; Herter, Pilze in Krypt.—Fl. der Mark Brand. 6 (1910) 125; Brinkmann, 44 Jahresber. Westf. Prov. Ver. f. Wiss. (1916) 34; Burt in Ann. Mo. Bot. Gard. 7 (1920) 145; Bourdot and Galzin in Bull. Soc. Myc. de Fr. 37 (1921) 109, Hym. de Fr. (1928) 373; Pilát in Hedwigia 70 (1931) 59; Velenovský, České houby (1922) 761; Rea, Brit. Basid. (1922) 663.

   *Thelephora sanguinolenta* Alb. and Schwein., Consp. Fung. (1805) 274; Fries, Syst. Myc. 1 (1821) 440; Elenchus Fung. 1 (1828) 178; Greville, Scott. Crypt. Fl. 4 (1826) t. 225.

   *Thelephora hirsuta* β Persoon, Synopsis (1801) 570, (fide Pilát).

   *Thelephora sericea* β Persoon, Myc. Eur. 1 (1822) 117, (fide Pilát).

   *Stereum crispum* Quélet, Assoc. Franc. 18 Suppl. (1891) 2; Schroeter, Pilze Schl. in Kohns Krypt.—Fl. v. Schl. 3 (1889) 427; Herter in Krypt.—Fl. der Mark Brand. 6 (1910) 124, (fide Pilát).

   *Stereum balsameum* Peck in N.Y. State Mus. Rept. 27 (1875) 99, ibid. 30 (1879) 75; Saccardo, Syll. Fung. 6 (1888) 584; Massee in Journ. Linn. Soc. Bot. 27 (1890) 196, (fide Pilát).

   *Stereum balsameum* f. *reflexum* Peck, N.Y. State Mus. Rept. 47 (1894) 152, (fide Pilát).

*Stereum rigens* Karsten in Finska Vet.-Soc. Bidrag Natur och Folk 37 (1882) 243, ibid. 48, p. 396; Saccardo, Syll. Fung. 11 (1895) 121; Pilát in Bull. Soc. Myc. de Fr. 42 (1926) 109, Hedwigia 70 (1931) 62 (as f. *rigens* Karst. pro sp.); fide Burt.

*Illustrations*: Greville (1826) l.c., Pl. 225; Burt in Ann. Mo. Bot. Gard. 7 (1920) 145, f. 20.

PLATE 25.

Flesh exuding reddish juice when wounded in fresh state. Coriaceous, thin, resupinate, effused, becoming narrowly reflexed, orbicular-confluent; margin acute, pallid. Hymenium wood-brown becoming darker, smooth or cracking rimosely, often zonate. Surface villose with short, adpressed, silky hairs, zonate and striate, some tint of buff. In section 400–500 $\mu$ thick, excluding surface hairs.

Basidia: Clavate, 25–40 × 4·5–6·5 $\mu$.

Spores: hyaline, smooth, cylindric, unilaterally depressed, (7)–8–(9) × 3–3·5 $\mu$.

Conducting organs: conspicuous, reddish-brown, numerous, in the intermediate tissues and curving upwards to the hymenium, 3–4 $\mu$ wide, very occasionally forked.

Surface hairs: simple, thick-walled, agglutinated, short, adpressed, 4–5 $\mu$ wide.

Specimens examined: 28933, *Doidge* and *Morgan*, on dead coniferous wood, Donnybrook Forest, Natal, Feb. 1935.

This specimen is more reflexed than is usual in British material, but the writer feels no doubt as to its identity. *Stereum rimosum* var. *africanum*, the common " bleeding " *Stereum* of South Africa, is much more reflexed, thicker, has yellow conducting vessels, and spores about half the size of those in *S. sanguinolentum*. The thin, almost papery texture of the latter is at once a characteristic difference. *S. sanguinolentum* is usually a North Temperate species, and was possibly introduced to South Africa with conifers imported for plantations.

2. **Stereum rimosum** Berk. var. **africanum** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 945, fig. 5.

*Stereum adnatum* Lloyd in Myc. Writ. 7 (1925) 1336, f. 3093.

Effused, resupinate-reflexed, sometimes sessile, attached by a broad umbo, or composed of several connate, resupinate-umbonate pilei, each roughly circular in outline, coriaceous. Surface cinnamon-buff colour, concentrically furrowed, covered with a thick, felty, pad-like tomentum. Margin even or lobate. Hymenium rimose, showing pallid, silky context, often concentrically zoned, warm buff or pinkish buff, when older becoming a darker vinaceous or cinereous colour. Almost certainly a " bleeder " when fresh.

Basidia: closely aggregated, 4–4·5 $\mu$ wide at apex.

Spores: hyaline, smooth, elliptic-ovate, with one side frequently depressed, and a small attenuated apiculus, 2–3 × 3·5–5·5 $\mu$.

Conducting organs: yellow, 5·5–8·5 $\mu$ wide, with rigid walls, in a layer about 200 $\mu$ wide, distributed in the subhymenium and curving upwards into the hymenium, not emergent.

Hyphae: thin-walled, hyaline, frequently septate, 3·5 $\mu$ wide. Trama bordered next to the tomentum by a narrow orange coloured zone. Width in section, excluding tomentum, 700–1,000 $\mu$.

Surface hairs: thick-walled, very much intertwined, almost hyaline to pale yellowish, 4·2 $\mu$ in width.

Specimens examined: Type, 30233, *Rump* (486), Karkloof, Natal; 30268, *Morgan* and *Doidge*, Donnybrook, Natal, 1936; 30777, *Bower*, Entabene, Louis Trichardt, Tvl. 24/8/38 (bleached and insect-eaten); 28285, *Rump* (205), Town Bush, Maritzburg, Oct. 1934; Uganda; *T. D. Maitland* (460) 1919 and (19. A) 1915; The following under *Stereum adnatum* in Herb. Kew: 27755, *Rump* (98), Hilton Road, Natal, Aug. 1934; 28296, *Rump* (222) Town Bush, Maritzburg, Oct. 1934; 28303, *Rump* (232), Town Bush, Maritzburg, Oct. 1934.

Massee [in Journ. Linn. Soc. Bot. 27 (1890) 187] quotes the spores of the species *S. rimosum* as " globose, 6–7 $\mu$ diam." I have examined the type specimen in Herb. Berkeley (Darjeeling, 7,500 ft.) at Kew, and was unable to confirm the presence of such basidiospores although there were large numbers of globose hyphomycete spores, 4–6·5 $\mu$ diam., echinate and faintly coloured, which were conclusively traced to conidiophores of an *Aspergillus* sp. Should basidiospores of the sort described by Massee be found in the species *S. rimosum*, it will be necessary to alter the variety *africanum* to specific rank. Apart from the above consideration of spores, the species and the new variety are identical in microscopic structure but differ macroscopically. Whereas the species is usually more or less pileate or sessile-umbonate, the variety is more resupinate-reflexed and has a tomentum of much greater thickness. The variety has a more markedly zoned, lighter coloured hymenium than the almost livid hymenium of the species.

Lloyd (loc. cit.) described *Stereum adnatum* from South Africa, but stated that it lacks distinctive cystidia, ducts and vesicular cells. The writer has recently seen a co-type of Lloyd's species (No. 1708, *Doidge*, on dead branch, Zoutpansberg, Tvl., 4/8/1911) which possesses ducts and is identical with *S. rimosum* var. *africanum*. It is considered that the fungus only merits varietal rank, and consequently *S. adnatum* is reduced to synonymy. C. H. Humphrey (in Litt., Division of Botany File No. M. 31/86/1) considers that *S. rimosum* and *S. adnatum* are identical.

3. **Stereum bicolor** (Pers. ex Fries) Fries, Epicrisis (1838) 549, Hym. Eur. (1874) 640; Saccardo, Syll. Fung. 6 (1888) 565; Massee in Journ. Linn. Soc. Bot. 27 (1890) 177; Rea, Brit. Basid. (1922) 665; Kalchbrenner in Grev. 10 (1881) 58; van der Byl in Trans. Roy. Soc. S.A. 10 (1922) 153; Wakefield in Det. Kong. Norske Vidensk. Selsk. Forh. 9 (1936) 52.

   *Thelephora bicolor* Persoon, Syn. Meth. Fung. (1801) 568, Myc. Eur. 1 (1822) 122; Fries, Syst. Myc. 1 (1821) 438.

   *Lloydella bicolor* (Pers. ex Fr.) Bresadola in Lloyd Myc. Writ. 1 (1898) 51.

   *Stereum fuscum* (Schrader) Quélet, Flor. Myc. de Fr. (1888) 14; Karsten, Finn. Basidsv. (1889) 397; Bresadola, Fung. Kmet. (1897) 106; Burt. in Ann. Mo. Bot. Gard. 7 (1920) 117, Pl. 4, f. 26; Bourdot and Galzin, Hym. de Fr. (1928) 382; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 41; Pilát in Hedwigia 70 (1930) 92.

   *Thelephora fusca* Schrader, Spic. Fl. Germ. (1794) 184; Persoon, Syn. Meth. Fung. (1801) 568, Myc. Eur. 1 (1822) 122; Fries, Syst. Myc. 1 (1821) 438.

   *Stereum coffeatum* Berk. and Curt. ! in Grevillea 1 (1873) 164; Saccardo, Syll. Fung. 6 (1888) 568; Massee in Journ. Linn. Soc. Bot. 27 (1890) 190.

   *Thelephora vinosa* Persoon, Syn. Meth. Fung. (1801) 578, (fide Pilát).

   *Stereum pannosum* Cooke ! in Grevillea 8 (1879) 56; Massee in Journ. Linn. Soc. Bot. 27 (1890) 185 (non *Thelephora pannosa* Sow. ex Fr.).

   *Illustrations*: Burt (1920) l.c., Pl. 4, f. 26; Fries, Icones Hym. Pl. 197, f. 2; Karsten, Icones Hym. Pl. 2, f. 9.

PLATE 26.

Occasionally entirely resupinate, usually resupinate-reflexed, sometimes pileate, imbricate, soft spongy texture. Abhymenial surface snuff-brown, concentrically furrowed, floccose, becoming smooth. Margin paler. Hymenium smooth, whitish to creamy, not furrowed, sometimes rimose when dry, rather velvety. In section up to 1,000 $\mu$ thick; hymenial layer hyaline, about 100 $\mu$ thick, the rest of the tissue coloured brownish. Not adnate.

Basidia: 3·5–5·5 × 22–27 μ, cylindric, with 2 or 4 sterigmata.

Spores: hyaline, smooth, elliptical, unilaterally depressed, or oblong, frequently guttulate, 3–4·5 × 2–3 μ.

Gloeocystidia: very abundant in the hymenium, not usually emergent, hyaline, very refractile, thin walled, cylindric, fusoid or somewhat ventricose, averaging 4–11 × 90 μ, borne on very narrow hyaline hyphae about 2 μ wide, frequently fragmented when old.

Hyphae: all smooth, thin-walled, with occasional to numerous clamp connections, much branched, septate; subhymenial hyphae colourless to pale brownish, 1·5–3 μ wide; tramal hyphae brown, 3–6 μ wide, loosely intertexed.

Specimens examined: *v. d. Byl* (2239), South Africa, sine loc.; 27596, *Rump* (12), Maritzburg, 1934; *Read* (T.R.L. 200), Rooikoppies, Duiwelskloof, N.Tvl., Apr. 1937; *MacOwan* (1244), C.B.S. 9/83, in Herb. Kew; *Thorold* (77), Njoro, Kenya, 1923; *Farquharson* (48), Eket Distr., S. Nigeria; *Maitland* (451), Uganda, March 1919; *Maitland*, Victoria Nyanza, Uganda, 14/7/1914.

NOTE ON NOMENCLATURE:

In the works of Persoon and Fries prior to the " Epicrisis " (1838), the species was placed in the tribe *Stereum* of the genus *Thelephora*, and *T. fuscum* Schrad. was quoted as a synonym, indicating that the authors recognised it as the same plant but had renamed it, no doubt because the epithet *bicolor* is so much more descriptive of the species. Art. 40 of the International Rules of Botanical Nomenclature states: " The name of a taxonomic group is not validly published when it is merely cited as a synonym." Further, as nomenclature of this group starts with Fries' (1821–32) " Systema ", the name of the species in question must be taken as *S. bicolor* (Pers. ex Fr.) Fr., and not as *S. fuscum* (Schrad.) Quél. as is most frequently done.

*Stereum pannosum* Cooke ! appears to be the same as *S. bicolor* in all respects. Bresadola [in Ann. Myc. 14 (1916) 232] gives the former as a synonym of *Lloydella Beyrichii* (Fr.) Bres., which was published as *Thelephora Beyrichii* by Fries in Linnea 5 (1830) 529. Bresadola'a definition of the genus *Lloydella* [in Lloyd, Myc. Writ. 1 (1899) 51] was, " *Stereum* possessing cystidia," but he included in it species such as *S. cinerascens* (with large encrusted cystidia), *S. bicolor* (with gloeocystidia) and later *S. Schomburgkii* (with " false setae "), and it is thus a highly artificial genus not worthy of retention.

4. **Stereum cinerascens** (Schw.) Massee ! in Journ. Linn. Soc. Bot. 27 (1890) 179; Burt in Ann. Mo. Bot. Gard. 7 (1920) 203; Bourdot and Galzin, Bull. Soc. Myc. de Fr. 37 (1920) 203, Hym. de Fr. (1928) 376; Pilát in Hedwigia 70 (1931) 83; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 43.

*Thelephora cinerascens* Schweinitz in Amer. Phil. Soc. Trans. N.S. 4 (1832) 167.

*Hymenochaete cinerascens* (Schw.) Lèveillè in Ann. Sci. Nat. Bot. ser. 3: 5 (1846) 152.

*Peniophora cinerascens* (Schw.) Saccardo, Syll. Fung. 6 (1888) 646.

*Lloydella cinerascens* (Schw.) Bresadola in Lloyd Myc. Writ. 1 (1901) 51.

*Peniophora Schweinitzii* Massee in Journ. Linn. Soc. Bot. 25 (1889) 145.

*Corticium aschistum* Berk. and Curt. ! in Amer. Acad. Arts and Sci. Proc. 4 (1858) 123; Berkeley in Grevillea 2 (1873) 3.

*Peniophora Berkeleyi* Cooke ! in Grevillea 8 (1879) 20; Saccardo, Syll. Fung. 6 (1888) 642; Massee in Journ. Linn. Soc. Bot. 25 (1889) 144.

*Stereum moricola* Berk. ! in Grevillea 1 (1873) 162; Saccardo, Syll. Fung. 6 (1888) 567.

*Peniophora moricola* (Berk.) Massee in Journ. Linn. Soc. Bot. 25 (1889) 141.

*Stereum dissitum* Berk. ! in Grevillea 1 (1873) 64.

*Peniophora dissita* (Berk.) Cooke in Grevillea 8 (1880) 150; Saccardo, Syll. Fung. 6 (1888) 645; Massee in Journ. Linn. Soc. Bot. 25 (1889) 143.

*Corticium ephebium* Berk. and Curt. ! in Grevillea 1 (1873) 178; Saccardo, Syll. Fung. 6 (1888) 618.

*Peniophora ephebia* (B. and C.) Massee in Journ. Linn. Soc. Bot. 25 (1889) 131.

*Stereum neglectum* Peck, N.Y. State Mus. Rept. 33 (1880) 22.

*Peniophora neglecta* (Peck) Peck, N.Y. State Mus. Rep. 40 (1887) 76.

*Peniophora occidentalis* Ellis and Everh. ! in Bull. Torrey Bot. Club 24 (1897) 277; Saccardo, Syll. Fung. 14 (1900) 224.

*Lloydella occidentalis* (Ellis and Everh.) Höhnel and Litschauer in K. Akad. Wiss. Wien. Sitzungsb. 116 (1907) 791.

*Stereum purpurascens* Lloyd, Myc. Writ. 4 (1914) L. 53: 15.

*Hymenochaete bonariensis* Speg. (fide Bresadola, Sel. Myc. ii. Trento. 1916).

Above Synonymy after Pilát, loc. cit.

*Illustrations*: Cooke in Grev. 8 (1879) Pl. 122, f. 4; Burt in Ann. Mo. Bot. Gard. 7 (1920) f. 36 and Pl. 6, f. 64.

PLATE 27.

Coriaceous, resupinate, not adnate, effused, sometimes with a narrowly reflexed margin. Abhymenial surface ochraceous, ashen or warm buff, with sharp hairs, concentrically furrowed. Hymenium drab or pinkish buff, smooth, sometimes slightly scabrid to touch. In section 250–400–800 $\mu$ thick. Cystidia plainly visible with a hand lens.

Basidia: 40–50–(60) $\times$ 9–10 $\mu$, clavate.

Spores: hyaline, smooth, oblong-cylindric, often with one side depressed, 6–7 $\times$ 10–13 $\mu$.

Cystidia: embedded or occasionally projecting, heavily encrusted with large crystals, thick-walled, often faintly coloured at the base, conical, 100–(150) $\times$ 12–24 $\mu$.

Hyphae: 3·5–4–4·5 $\mu$ wide, hyaline to very faintly coloured, rather opaque and stout-walled, those adjacent to the substratum forming a narrow, dense, yellow-brown layer.

Abhymenial hairs: much intertwined, like the hyphae but dark coloured.

Specimens examined: *v. d. Byl* (2732), Table Mountain, Natal, June 1930; 28688, *Rump* (280), Town Bush, Maritzburg, Nov. 1934; 28498, *Rump* (255), Town Bush, Maritzburg, Oct. 1934; 34377, *Rump*, Town Bush, Maritzburg, 1936; 35421, *Rump* (700), Isipingo Beach, Natal, 1944; 31368, *Duthie*, Knysna; 28926, no details of collection; *Maitland* (114), Uganda (as *Peniophora occidentalis* in Herb. Kew.).

The marked affinity of *S. cinerascens* to *Lopharia mirabilis* ! is discussed elsewhere (page 57). On casual examination *S. cinerascens* might be taken for a *Peniophora*, but it is distinguished even when wholly resupinate by a *Stereum* distribution of tissues, and by its loose attachment to the substratum by distinct hairs.

*Peniophora flavido-alba* Cooke !, an American species, is very near to *S. cinerascens* but its spores are only 4·5–6 $\times$ 2·5–3·5 $\mu$, and also it cracks a lot on drying. The small spores of this species come within the range of *Peniophora Roumeguerii* which is somewhat allied in structure, but is nevertheless quite distinct.

5. **Stereum umbrinum** Berk. and Curtis ! in Grevillea 1 (1873) 164; Wakefield in Kew Bull. (1915) 369; Burt in Ann. Mo. Bot. Gard. 7 (1920) 191; Pilát in Hedwigia 70 (1930) 94; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 42; Bourdot and Galzin in Bull. Soc. Myc. de Fr. 37 (1921) 123, Hym. de Fr. (1928) 382.

*Thelephora crassa* Léveillé in Gaudichand, Voyage Bonite Bot. 1 (1846) 190, Pl. 139, f. 1 [non *Stereum crassum* Fries, R. Soc. Sci. Upsal. Actis. 3 (1851) 111].

*Hymenochaete crassa* (Lév.) Berk. apud Cooke in Grevillea 8 (1880) 148; Saccardo, Syll. Fung. 6 (1888) 597; Massee in Journ. Linn. Soc. Bot. 27 (1890) 114.

*Hymenochaete umbrina* B. and C. apud Cooke in Grev. 8 (1880) 148; Saccardo, Syll. Fung. 6 (1888) 598; Massee in Journ. Linn. Soc. Bot. 27 (1890) 113.

*Hymenochaete vinosa* (Berk.) Cooke ! in Grev. 8 (1880) 149; Saccardo, Syll. Fung. 6 (1888) 600.

*Hymenochaete multispinulosa* Peck in Bot. Gaz. 7 (1882) 54; Saccardo, Syll. Fung. 6 (1888) 600; Massee in Journ. Linn. Soc. Bot. 27 (1890) 108.

*Hymenochaete scabriseta* Cooke ! in Ravenel, Fung. Amer. (1882) 717; Massee in Journ. Linn. Soc. Bot. 27 (1890) 113, Pl. 5, f. 7.

*Lloydella scabriseta* (Cooke) Höhnel and Litschauer in K. Akad. Wiss. Wien. Sitzungzb. 115 (1906) 1580.

*Hymenochaete purpurea* Cooke and Morgan ! apud Cooke in Grev. 11 (1883) 106; Morgan in Cicinnati Soc. Nat. Hist. Journ. 10 (1888) 198; Saccardo, Syll. Fung. 6 (1888) 597; Massee in Journ. Linn. Soc. Bot. 27 (1890) 115.

*Kneiffia purpurea* (Cooke and Morgan) Bresadola in Ann. Myc. 1 (1903) 100.

*Peniophora intermedia* Massee in Journ. Linn. Soc. Bot. 25 (1889) 143; Saccardo, Syll. Fung. 9 (1891) 238.

*Hymenochaete Kalchbrenneri* Massee ! in Journ. Linn. Soc. Bot. 27 (1890) 116; Saccardo, Syll. Fung. 9 (1891) 230.

Above synonymy after Pilát.

*Illustrations*: Burt (1920) l.c., f. 31; Massee in Journ. Linn. Soc. Bot. 27 (1890) Pl. 5, f. 7.

PLATE 28.

Resupinate, effused, sometimes narrowly reflexed, never pileate; margin shortly villose. Context soft, spongy. Hymenium velutinous, cracking but little in drying, sometimes pitted, umber, vinaceous purple, purple-brown, light sandy-brown, or snuff-brown in colour.

Basidia: hyaline or very faintly coloured, about 6 × 30 $\mu$.

Spores: cylindrical to ellipsoid, hyaline, smooth, 3–4 × 6–8 $\mu$.

Cystidia: originating in basal or middle part of the trama, curving upwards into hymenium and frequently projecting 10–20 $\mu$ beyond; dark yellow-brown, in young stages lighter colour, not very thick-walled, encrusted or rugose especially near the apex, rarely quite smooth, 100–250 × 7–9 $\mu$, cylindric-clavate or fusoid, arising as apical modifications of skeletal hyphae.

Hyphae: lightly coloured, 3–4·5 $\mu$ wide, in a loose network, lacking clamp connections, not forming a distinct intermediate layer of tissue.

Specimens examined: Type in Herb. Berk. at Kew; 22044, *P. MacOwan* (1054), Boschberg, Somerset East, 1876 (as *Peniophora cinerea* in Herb. Pretoriae); *van der Byl* (2737), Izotsha, Natal, Feb. 1930; 30220, *Rump* (433) Umgeni Bush, Durban; 27626, *Rump*, Cato Ridge, Natal, 1934; 34357, *Rump*, Table Mountain, Natal, 1935; 34393, *Rump* (613), Table Mountain, Natal, July 1935; 35419, *Rump* (679), on *Quercus*, Maritzburg, 1943; 34381, *Rump*, Town Bush, Maritzburg, May 1936; 33392, 33400, *Scott*, on *Populus*, Pretoria, March 1942; 36839, *Talbot*, Garstfontein, Pretoria, 21/8/48; 36710, *Talbot*, Kloof Falls, Natal, 31/5/48; the following from Town Bush, Maritzburg, Aug.-Nov., 1934 viz. 28294, *Rump* (218); 28702, *Rump* (305); 28276, *Rump* (208); 28277, *Rump* (209); 27767, *Rump* (122).

The cystidia of this species are apical modifications of skeletal hyphae, reminiscent of the origin of the " false setae " in the genus *Duportella*. They do not darken in potassium hydrate and are paler and differ in origin and morphology from the true setae of an *Hymenochaete*, but in some specimens they lack conspicuous encrustation or roughness. This is one of the few species of *Stereum* lacking a distinct layer of horizontal hyphae as an intermediate or basal tissue. Its closest affinity is with *Stereum papyrinum* Mont. ! (= *S. membranaceum* Fr.) which may be distinguished by frequently being pileate and always possessing wider, more encrusted, more peniophoroid cystidia with thicker walls.

Most Natal specimens of *S. umbrinum* have a purplish tinge in place of the umber colour, and their tissues are rather more loosely interwoven than in typical North American specimens. But the fungus does vary greatly in texture and colour, as is beautifully demonstrated in a set of E. A. Burt's specimens in Herb. Kew., illustrating the synonymy of the species.

No. 34393 has hyaline cystidia, but is otherwise indistinguishable from the purple forms of this species.

6. **Stereum Schomburgkii** Berkeley ! in Journ. Linn. Soc. Bot. 13 (1873) 168; Saccardo, Syll. Fung. 6 (1888) 568; Wakefield in Kew Bull. (1914) 259; Lloyd, Myc. Writ. 6 (1919) 960; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 43; Bannerjee in Journ. Ind. Bot. Soc. 14 (1935) 33.

*Lloydella Schomburgkii* (Berk.) Bres. var. *brunnea* Bresadola in Ann. Myc. 18 (1920) 45; Saccardo, Syll. Fung. 23 (1925) 534.

*Stereum atrocinereum* (Massee) v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 44.

*Peniophora atrocinerea* Massee ! in Journ. Linn. Soc. Bot. 25 (1889) 141.

*Stereum retirugum* Cooke ! in Proc. Roy. Soc. Edinb. (1882) 456; Massee in Journ. Linn. Soc. Bot. 27 (1890) 186; Saccardo, Syll. Fung. 23 (1925) 510; Bresadola in Ann. Myc. 14 (1916) 232.

*Hymenochaete olivaceum* Cooke ! in Grevillea 14 (1885) 11; Massee in Journ. Linn. Soc. Bot. 27 (1890) 116.

*Hymenochaete griseocervina* P. Henn., fide Bresadola in Ann. Myc. 18 (1920) 70.

*Illustrations*: PLATE 29, mature stage; PLATE 30, young stage.

Resupinate or resupinate-reflexed, or conchiform attached by a small umbo, orbicular-confluent, thin, coriaceous, or papyraceous, loosely attached to the substratum. Reflexed surface tomentose, glabrescent when old, buffy-brown, concentrically furrowed in pileate specimens, the troughs being paler. Hymenium smooth, or more usually furrowed concentrically and cracking radially. Colour very variable through umber, brown, olive brown, light yellow brown, brownish slate, depending on the state of development. Margin narrow, yellowish, finely fibrillose, usually free. Context concolorous, 200–(500) $\mu$ thick.

Basidia: clavate, 4–5·5 × 20–25 $\mu$, in young stages in a regular palisade, later interrupted and exceeded by the false setae.

Spores: not seen (" 6–7 × 3–4 $\mu$, colourless "—v. d. Byl).

False setae: 3·5–8 $\mu$ wide, cylindrical, often with a fusoid apex, thick-walled with a very narrow lumen sometimes expanded at the apex, immersed or emergent up to 16 $\mu$, originating as horizontal skeletal hyphae which curve upwards into the hymenium, therefore the total length is variable and indeterminable, very densely arranged, darkening in 5 per cent. KOH.

Hyphae: (1) Skeletal hyphae, brown, thick-walled, smooth, without clamps, of the same dimensions as the false setae. (2) Colourless hyphae intermeshing the skeletal, 3·5–4·5 $\mu$ wide, often indistinct, thin to thicker-walled, with occasional clamp connections. Hyphae forming a more or less horizontal weft without a darker or more compact basal layer.

Surface hairs: pallid to light yellow-brown, 5 $\mu$ diam., fairly thick-walled, septate, with occasional clamp connections.

Specimens examined: Type, *Schomburg*, Port Darwin, Australia; *Cheesman*, New S. Wales, Australia, 1914; *Crawford*, New England, Australia; 27644, *Rump* (33), Cato Ridge, Natal, 1934; 27544, *Rump*, Winterskloof, Natal, 1934; 27552, *Rump* (20), Table Mountain, Natal, 1934; 35327, *Rump* (683), on *Quercus*, Maritzburg, 1943; 28942, *Doidge*, Xumeni Forest, Donnybrook, Natal, June 1935; 20944, *MacOwan* (1210 ?), in Herb. Pretoriae as *Corticium albocinereum* Kalch., possibly a pen error of MacOwan for *C. atrocinereum*; *Rump* (273) Town Bush, Maritzburg, Oct. 1934; 34951, *Simpson* and *Talbot*, Qudeni, Zululand, 1945; *O. A. Höeg* (F. 67), Eshowe, Zululand, Aug. 1929; *Maitland* (542), Mombasa, Kenya, Sept. 1920; *Dümmer* (1133), Kipayo, Uganda, Oct. 1914; *Dümmer* (945), Kipayo, Uganda, Aug. 1914; *Maitland* (34 a.), Uganda, Jan. 1915; *Farquharson* (3), S. Nigeria, 1914; *van der Byl* (1049), East Africa, 1923; *MacOwan*, Cape Province (in Herb. Kew under *Corticium atrocinereum* Kalchbr.); *Pegler* (1234), Kentani, C.P., (in Herb. Kew under *Stereum membranaceum* Fr.); the following specimens from Town Bush, Maritzburg, Oct. 1934, viz. 28496, *Rump* (252); 28499, *Rump* (258); 28304, *Rump* (235); 28504, *Rump* (274); 28687, *Rump* (278).

*Stereum atrocinereum* (Massee) v. d. Byl is reduced to synonymy for the following reasons: On the only sheet of " *Corticium atrocinereum* Kalchbr." in Herb. Kew there is a note from the collector, P. MacOwan, which reads " I take this to be *Corticium atrocinereum* Klch. described from the single set of sps. sent in '66. I have not yet received from the author an authentic type, but the description agrees. Authentication hereafter. P. MO." As far as can be ascertained this specimen was never authenticated and the name *Corticium atrocinereum* Kalchbr. is a *nomen nudum* and must be disregarded. This specimen is, however, the type of *Peniophora atrocinerea* Massee. Van der Byl (l.c.) bases his description on a collection by MacOwan, Crypt. Aust. Africa 1197, Boschberg, Somerset East, in Herb. S.A. Musuem No. 34248, which he assumes is part of the same collection as reached Kew under the name *C. atrocinereum*. Massee gives the spore size as 10 $\times$ 4–5 $\mu$; van der Byl as 8 $\times$ 4 $\mu$; the present writer has only found spores in No. 35327, where they measured (5)–6–(7) $\times$ (3)–4 $\mu$.

The MacOwan specimens differ from the other specimens of *S. Schomburgkii* only in the colour of the hymenium, but this slight difference is found to be embraced in variations in colour which form a natural graded series over a large number of collections. The reason for this variation in colour is discovered microscopically, and is of considerable interest. The depth of colour is dependent on the number of skeletal hyphae which curve upwards and emerge as false setae. Thus in the pale stage (Plate 30) (*S. atrocinereum*) there is an almost continuous palisade of basidia at the surface, and only a few of the horizontal dark hyphae curve up through the hymenium. There is also a larger proportion of hyaline generative hyphae than is found in dark forms. This too is the case in the pale margin of an otherwise characteristically dark-coloured *S. Schomburgkii* and it suggests that the pale form is simply a young stage in the development of the plant. In dark specimens the basidia are separated to a considerable extent by the intrusive false setae, and do not form a continuous palisade. The greatest number of emergent false setae is always found towards the centre away from the growing margin. The pale condition is undoubtedly associated with young stages of growth (e.g. at the margin), but it seems likely that it is also associated with rapidity of centrifugal growth, for some pale specimens are luxuriantly developed and occupy a large area. It would seem that the false setae are differentiated some time after the formation of the hymenium and that they remain smooth and more or less horizontal beneath the hymenium until a certain age or slackening in the growth rate, then there is some stimulus which causes them to curve upwards and become minutely rugose

false setae. Petch [in Ann. Roy. Bot. Gard. Perad. 9 (1925) 259] observes that in many species of *Stereum* the fungus may attain full stature before the hymenium is formed, and in such herbarium specimens there is likely to be a lack of accessory hymenial organs, e.g., cystidia. Present work shows that in *Stereum Schomburgkii* the reverse appears to be true, namely, that the basidia are precocious. This is of particular interest in view of the very late development of basidia above the false setae in *Duportella tristicula* (B. & Br.) Reinking, a species which the auther considers related to *S. Schomburgkii* in the same way as the genera *Gloeocystidium* and *Peniophora* are to *Corticium*. (See notes on *D. tristicula*, page 46.)

The only record of *Stereum membranaceum* Fr. in South Africa [Pole Evans and Bottomley in Ann. Bolus Herb. 2 (1918) 192] is based on a specimen from Kentani, Pegler (1234). This is not *S. membranaceum* but appears to be a pale form of *S. Schomburgkii* in which the false setae are more encrusted apically than is usual in this species.

SYNONYMS AND EXCLUDED SPECIES IN **STEREUM.**

**adnatum** Lloyd=*Stereum rimosum* Berk. var. *africanum* Talbot q.v.

**atrocinereum** (Massee) v. d. Byl !=*Stereum Schomburgkii* Berk. q.v.

**duriusculum** B. and Br. !=*Asterostromella duriuscula* (B. and Br.) comb. nov. q.v.

**fuscum** Schrad. ex Quélet=*Stereum bicolor* Pers. ex Fr. q.v.

**luteobadium** Fries=*Hymenochaete luteobadia* (Fr.) Höhnel and Litsch.

**rubiginosum**=*Hymenochaete rubiginosa* q.v.

INCORRECT RECORDS OF **STEREUM** SPP. IN SOUTH AFRICA.

**albobadium** (Schw. ex Fr.) Fr. Recorded in Grevillea 10 (1881) 58. The specimen referred to lacks cystidia and branched paraphyses and cannot be *S. albobadium*. The material is so scanty that it probably cannot be named with certainty.

**elegans** Meyer. Recorded in Fungi MacOwani, Grev. 10 (1881) 58. The specimen referred to is *Stereum Thozetii* Berk.

**luteobadium** Fries. Recorded in Grev. 10 (1881) 58. The specimen referred to is *Stereum fasciatum* Schw.

**membranaceum** Fries. Recorded in Ann. Bolus Herb. 2 (1918) 192. The specimen referred to is a pale form of *Stereum Schomburgkii* Berk.

**rimosum** Berk. ! Specimens ex Herb. Pretoriae Nos. 28285 and 30777 in Herb. Kew. should be transferred to *S. rimosum* var. *africanum* nov. var.

**percome** B. and Br. ! The MacOwan specimen in Herb. Kew. No. 7355 is *Hymenochaete nigricans* (Lév.) Bres.

**pruinatum** B. and C. ! The MacOwan collection (1227), Somerset East, in Herb. Kew. No. 7396 has been compared with the type of *S. pruinatum* and is not that species.

RESUPINATE SPECIES OF **STEREUM** RECORDED FOR SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY.

**laxum** Lloyd. Lloyd, Myc. Writ. 4 (1915) L. 60, p. 10.

## DUPORTELLA Patouillard.

1. **Duportella tristicula** (B. & Br.) Reinking in Philippine Journ. Sci. 17 (1920) 364, [in error as *Duportella tristiuscula* (Berk.) Pat.].

*Corticium tristiculum* B. & Br. ! in Journ. Linn. Soc. Bot. 14 (1873) 71; Saccardo, Syll. Fung. 6 (1888) 622; Petch in Ann. Roy. Bot. Gard. Perad. 9 (1925) 282.

*Hymenochaete tristiuscula* (B. & Br.) Massee in Journ. Linn. Soc. Bot. 27 (1890) 111 (orthographic variant); Teodoro, Enum. Philippine Fung., Dept. Agric. & Comm. Tech. Bull. 4 (1937) 277.

*Hymenochaete tristicula* (B. & Br.) Massee, Wakefield in Kew Bull. (1916) 73.

*Hymenochaete castanea* Wakefield ! in Kew. Bull. (1914) 260; Saccardo, Syll. Fung. 23 (1925) 528.

*Duportella velutina* Patouillard in Philippine Journ. Sci. 10 (1915) 87.

*Illustrations*: Wakefield in Kew Bull. (1914) 260 (as *H. castanea*).

PLATE 31, young stage; PLATE 32, mature stage.

Resupinate, widely effused, orbicular-confluent, when old sometimes becoming narrowly reflexed at the margin otherwise closely adnate. Hymenium at first chestnut brown, smooth and velutinous, later more waxy, fawn brown, purple-brown or pale ashen, plainly tuberculate and finely reticulately cracked. Margin pale brown rimmed with a very narrow whitish edge, determinate, not very conspicuous in old specimens. In section 200–500 $\mu$ thick.

Basidia: 23–40 × 4–5–7 $\mu$, clavate, at first scattered, immersed among the false setae; later forming a hyaline palisade 5–15 $\mu$ wide above the false setae and when fertile sometimes emerging a further 10–13 $\mu$ above the general level of the basidia. Sterigmata 4, slightly curved, up to 4 $\mu$ long.

Spores: hyaline, oblong or subcylindrical, usually slightly curved, 3–3·5–4 × 7–8·5–9–10 $\mu$; Massee (l.c.) cites them as: " olivaceous elliptical, 10 × 4 $\mu$."

False setae: deep yellow-brown, darkening in potash, cylindrical, very numerous and densely arranged, fairly thick-walled; apex rounded and sometimes septate, finely rugose; originating as skeletal hyphae and differentiated only by a vertical position and sculptured apex; at first exceeding the hymenial elements, later becoming embedded under them, 3–3·5–4 $\mu$ diam.

Cystidia: thin-walled, fusoid, hyaline, emergent up to 20 $\mu$ beyond the basidia, encrusted or almost smooth, 10 × 40–45 $\mu$, scanty and only found in old specimens.

Gloeocystidia: ventricose or fusiform, smooth, hyaline, thin-walled, sometimes with a subapical cross septum, 12–25 × 50–80 $\mu$, with granular or homogeneous contents, arising from the basal layers, present at all ages of the fungus.

Hyphae: (1) Skeletal hyphae, brown, and of the same construction as the false setae but smooth and apparently not septate, loosely interwoven in a horizontal layer. (2) Septate, thin-walled amost colourless, branching, form of generative hyphae, closely arranged between both the skeletal hyphae and the false setae, 2–3 $\mu$ wide, conglutinate and indistinct at the junction with the substratum, but not forming a notably differentiated basal layer.

Specimens examined: Type in Herb. Berkeley, Ceylon 994, at Kew; 11533, *Leighton*, on wattle, Buccleuch, Natal, 25/5/1918; 28937, *Doidge* and *Morgan*, Donnybrook, Natal, Feb. 1935; 28946, *Doidge*, Xumeni, Donnybrook, 1935; 27768, *Rump* (123), on *Acacia mollissima*, Town Bush, Maritzburg, Aug. 1934; 28492, *Rump* (272), Town Bush, Maritzburg, Oct. 1934; *Höeg* (F. 113), on " Syringa " (*Melia Azedarach*), Maritzburg, (in Herb. Kew); 27553, *Rump*, Bot. Gard., Maritzburg, 1934; 27628, *Rump*, Cato Ridge, Natal,

1934; 36706, *Talbot*, on *Dalbergia armata*, Kloof Falls, Natal, 31/5/48; 36705, *Talbot*, Kloof Falls, Natal, 31/5/48; *Rump* (625), Table Mountain, Natal, 1935.

This species is most closely related to *Stereum Schomburgkii* Berk. (q.v., pg. 43), in the same way as a *Gloeocystidium* or *Peniophora* is related to a *Corticium*, and there is also some macroscopic resemblance between the two species, but *D. tristicula* is thicker, more tuberculate, and hardly reflexed. One wonders nevertheless whether *S. Schomburgkii* would not be more appropriately placed in *Duportella*. Its lack of a basal layer, colour reaction of the false setae with KOH, organisation of the tissues, and general appearance all appear notable pointers to close affinity, and more important than absence of cystidia and gloeocystidia.

The false setae are particularly characteristic of these two species. The writer has not yet seen them in any other species, though they are to some extent paralled in the hymenium of *Stereum percome* B. & Br. ! by hyaline hyphae which arise from the skeletal hyphae and become thickly encrusted with heavy yellowish crystals, and also in the cystidia of *Lopharia Dregeana* (Berk.) comb. nov. In *Stereum umbrinum* the cystidia also arise from skeletal hyphae but are clearly differentiated as cystidia and do not darken in potash. In fungi of the *Peniophora laevigata* (Fr.) Massee group, the coloured cystidia are staged throughout the trama, arise as cystidia from the outset, and are not merely apical modifications of skeletal hyphae since these are entirely lacking. These cystidia are not homologous with the false setae of *D. tristicula* and *S. Schomburgkii* though they are approximately the same width and colour, but shorter.

A difference between *D. tristicula* and *S. Schomburgkii* is that the former delays the production of a continuous layer of basidia, whereas the basidia are precocious in the latter species. *D. tristicula* is a fungus in which the body reaches full stature before the complete differentiation of the basidia and cystidia, a fact which Petch [in Ann. Roy. Bot. Gard. Perad. 9 (1925) 259] observes is common in many species of *Stereum*.

DEVELOPMENT IN DUPORTELLA TRISTICULA.

As a result of examination of three old specimens from South Africa, it is now possible to give a new and fuller concept of the development of this species. The specimens referred to are Höeg (F. 113), and Herb. Pretoriae Nos. 27768 and 28492 (in Herb. Kew).

The young stages are orbicular, enlarging by confluence to the effused state found in mature specimens. When young, the colour is a warm argus brown (Ridgway) all over, except at the margin which is paler and bordered by a very narrow whitish band, and the texture and appearance is velvety, smooth and uncracked, the reason for this being that the hymenium is as yet unformed and the surface is composed of the rounded tips of the upright false setae only. Sections show the presence of these false setae arising almost vertically from a narrow, basal, horizontally-woven hyphal layer and also the presence of gloeocystidia, almost all of which are basal in origin. This is the stage which received the name *Hymenochaete castanea* Wakef. Later, on receipt of older specimens, Miss Wakefield [in Kew Bull. (1916) 73] reduced this species to synonymy with *Hymenochaete tristicula* (B. & Br.) Massee.

When the hymenium is formed, the first basidial elements are found spaced out in loose groups between, and exceeded by the false setae, but later the latter are overlaid by a continuous hymenium consisting of basidia in close palisade and occasional projecting, fusoid, rugose or smooth, thin-walled cystidia. Such cystidia are not mentioned in previous descriptions of the species. The fungus by this time has lost its velvety texture and its surface has turned from brown to fawn, or purple-brown, or ashen grey, become rather tuberculate and cracked into innumerable minute reticulate cracks. The margin now is still brown with a whitish rim but is very narrow or indistinguishable. In section it is found that gloeocystidia are still present among the basal tissues, and

that the fungus has thickened by development of a fairly wide intermediate layer of skeletal and generative hyphae between the false setae and the substratum. The hymenial cystidia are evidently formed only in old specimens. The writer has not been able to trace the manner of their formation. One specimen in Herb. Kew (Petch: Herb. Perad. No. 5859) shows admirably every stage in development and the corresponding anatomical changes in section.

The structures called " false setae " above, have been variously referred to in the literature as paraphyses, setae or hyphae. Petch pointed out [in Ann. Roy. Bot. Gard. Perad. 9 (1925) 282] that these structures are merely the tips of hyphae curling upwards, and not specially differentiated, and that they differ from the setae of an *Hymenochaete* in being relatively thin-walled and immersed in later stages. In the present paper they are considered as continuations of the skeletal hyphae with a slightly rugose and inflated apex. They are called " false setae " here because they darken in potassium hydrate and because their connection with skeletal hyphae can only be seen in very thin sections. This fundamental difference in their origin from the setae of *Hymenochaete* is, apart from all other considerations, sufficient to justify *Duportella* as a genus distinct from *Hymenochaete*, recognition of which has been slow to gain ground in the past.

The basal embedded gloeocystidia have also been known as cystidia, e.g., in Patouillard's diagnosis of the genus, but their structure and position are typical of the bodies now known as gloeocystidia.

## HYMENOCHAETE Léveillé.

Key to species described:

Resupinate; setae commonly set in fascicles found throughout the trama 1. *H. fasciculata.*

Resupinate; setae not fasciculate, found in a layer about 260 $\mu$ thick above the trama 2. *H. semistupposa.*

Reflexed to dimidiate and imbricate, or sometimes resupinate; setae not fasciculate, found in a layer about 160 $\mu$ thick above the trama. Margin conspicuous ochre colour. Abhymenial surface soft, rubbing ochraceous 3. *H. ochromarginata.*

1. **Hymenochaete fasciculata** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 943.
*Illustrations*: PLATE 33.

*Type*: 28279, *Rump* (220), on indigenous wood, Town Bush, Maritzburg, Oct. 1934. In Herb. Kew with isotype in Herb. Pretoriae.

Resupinate, adnate, brittle, cracking on drying, verona brown colour. Hymenium uneven, tuberculate or granular. Width in section 250–400 $\mu$.

Basidia and Spores: not seen.

Setae: entirely embedded, or emergent up to 50 $\mu$, somewhat encrusted, 70–80–(120) $\times$ 6·6–9 $\mu$, deep red-brown, acutely pointed, cylindric to subulate, solitary or set in fascicles (especially at the papillae) of 8–12 setae. Setigerous layer not differentiated; setae found throughout the tissues.

Hyphae: light yellow-brown, 1 $\mu$ wide, mostly very much branched with short side branches, dendroid, bordered on the abhymenial side by a narrow dark seam. In places two such seams are seen as though the fungus has renewed its growth and become secondarily thickened.

Specimens examined: Type, cited above; 28500, *Rump* (262) Town Bush, Maritzburg, Oct. 1934.

This species falls in a group with *H. corrugata* (Fr.) Lév. and *H. fuliginosa* (Pers.) Bres. on account of the lack of differentiation of hyphal and setigerous layers, but it is immediately distinguished by the highly characteristic fasciculate setae. The specimen No. 28500 has a rather smoother hymenium than the type and fasciculation is not quite so marked.

*H. lictor* Petch ! [in Ann. Roy. Bot. Gard. Perad. 9 (1925) 277], which was at one time confused with *H. fuliginosa*, also has fasciculate setae. Its type differs from the new species as follows: (1) a smoother, more reddish hymenium; (2) fewer setae per fascicle (up to 6) and the fascicles not very dense; (3) lighter context colour and a light yellow basal seam; (4) conspicuous cavities in the trama; (5) the hyphae in *H. lictor* are not quite so narrow nor so dendroid as those of *H. fasciculata*.

*Hymenochaete cervina* B. & C. ! of the same group, differs in being thinner, paler coloured, and without fasciculate setae, but in other respects it is close. It is found in East Africa [Uganda: Dummer (4038); Small (227); in Herb. Kew]. Possibly *H. fasciculata* is an extreme form of *H. cervina* but no intermediates have yet been discovered.

2. **Hymenochaete semistupposa** Petch ! in Ann. Roy. Bot Gard. Perad 9 (1925) 278.

*Illustrations*: PLATE 34.

*Type*: Herb. Perad. No. 5627, in Herb. Kew.

Resupinate, effused, separable when moist, brittle when dry, vertically fibrillose when broken across, up to 900 $\mu$ thick. Hymenium smooth, little cracked, dark verona brown. Margin cinnamon-rufous, thinner. Forming a pocket rot of the underlying wood.

Basidia and Spores: not seen.

Setae: arising in all parts of a setigerous layer about 260 $\mu$ thick, which may show one or two interrupted strata of darker material. Setae fusoid to subulate, deep yellow-brown, apex pointed, 45–70 × 5·6–8·4 $\mu$, emergent up to 30–50 $\mu$, or immersed.

Hyphae: yellow-brown, branched, septate, without clamp connections; those in the setigerous layer vertical, closely arranged, 3 $\mu$ wide, lightly coloured; intermediate hyphae loosely interwoven, 2·8–3·5 $\mu$ wide, with appreciably thick walls but a wide lumen, the walls being straight, wavy or constricted in outline, when constricted having a moniliform appearance. Basal hyphae closely massed in a dark seam, horizontal, 70–200 $\mu$ wide.

Specimens examined: 30232, *Rump* (453), Krantzkop, Natal, Nov. 1935; *Maitland* (517), Gongoni Forest, Kenya, Sept. 1920; *Petch* (5657, 4044, 5107), Hakgala, Ceylon.

In microscopic structure this South African collection is a close match with the Type specimen from Ceylon, though the setae in the former are rather more subulate than fusoid. In the Type, the intermediate hyphae do show an occasional wavy outline but they are never moniliform. The monilioid constrictions are quite plain in parts of the Kenyan specimen and reach their highest development in the South African specimen. There is insufficient reason for separating these African examples as a distinct new variety. The colour of all these specimens is rather variable even in a single collection. The typical colour is an olivaceous Prout's brown with a cinnamon margin, but it is often a warmer shade of reddish-brown or even darker.

3. **Hymenochaete ochromarginata** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 944.

*Illustrations*: PLATE 35.

*Type*: 2133, *Pienaar*, Tenadu, Tembuland, 26/2/1912. In Herb. Kew with isotype in Herb. Pretoriae.

Narrowly resupinate, mainly reflexed to dimidiate, tough, not pliable, laterally connate, imbricate, 4 × 2 cm. Upper surface concentrically furrowed, with velvety pubescence, light bay colour, rubbing away to yellow ochre. Hymenium smooth, warm argus brown, not cracked, somewhat reflecting the surface furrows. Margin acute, with bright yellow ochre band less than 1 mm. wide. Width in section 500–650 $\mu$. Basidia and Spores: not seen.

Setae: emergent, or fully immersed in a layer up to 160 $\mu$ thick, yellow-brown, subulate, 30–45 × 6–8 $\mu$, with narrow lumen, emergent up to 20 $\mu$.

Hyphae: yellow-brown, narrow, 1·5–2·5 $\mu$ diam., much interwoven and more or less horizontal in the greater part of the trama. Trama bordered on both sides by a seam of dark closely-woven hyphae, the seam not very pronounced on the setigerous side, being only conspicuous in rather thick sections.

Tomentum: on the upper surface, confluent with and exactly similar to tramal hyphae.

Specimens examined: Type, cited above; 30260, *Morgan* and *Doidge*, Donnybrook Natal, 1936; 28879, *Bottomley*, The Cavern, Drakensberg, Natal, 20/7/1937; *Maitland* (93), Cameroon Mountains, Cameroons, 1930 (in Herb. Kew, filed under unnamed *Hymenochaete*).

In structure this species comes within the small group which includes *H. rigidula* B. & C. !, *H. tabacina* (Sow.) Lév., and *H. rubiginosa* (Dicks.) Lév. There is no likelihood of confusion with *H. tabacina*. *H. rubiginosa* may be distinguished by longer, narrower setae (50–60 × 5–6 $\mu$), by its colliculose bistre hymenium, and wider hyphae (2·5 $\mu$), but especially by becoming indurated and blackish on the abhymenial surface. In *H. ochromarginata* the surface remains ochraceous and soft. The hyphal width in *H. ochromarginata* is more variable than was supposed at the time of first describing the species, and should not be over-emphasised. *H. rigidula* differs in being predominantly resupinate and having sensibly darker, wider hyphae (3–4 $\mu$).

In Herb. Kew are several specimens from Ceylon under *H. rigidula* B. & C. (Nos. 3042, 6670, 3866, 6058, 4031) which differ from the type of *H. ochromarginata* only in hymenial colour. Petch [in Ann. Roy. Bot. Gard. Perad. 9 (1925) 272] gives notes on *H. rigidula* and concludes: " It would seem probable that the Ceylon species is not the same as that from Cuba," (type locality). As the hymenial colour of *H. ochromarginata* in South Africa varies from warm argus brown to almost the bistre of *H. rubiginosa*, Petch's specimens lie within this colour range and should be regarded as *H. ochromarginata*.

SYNONYMS AND EXCLUDED SPECIES IN THE GENUS **HYMENOCHAETE.**

**tristicula** B. & Br. = *Duportella tristicula* (B. & Br.) Reinking. q.v.

INCORRECT RECORDS OF **HYMENOCHAETE** SPECIES IN SOUTH AFRICA.

**luteobadia** (Fr.) Höhnel and Litsch. Recorded in Grevillea 10 (1881) 58 sub *Stereum*. The specimen referred to is in Herb. Kew under *Hymenochaete*, but is actually *Stereum fasciatum* Schw. (*Hymenochaete luteobadia* is, however, found in South and East Africa.)

**tenuissima** Berk. ! Specimen No. 15596 (Natal Herbarium, 290) is a polypore. It would seem that the specimen was misplaced at some time, for v. d. Byl refers to this collection in S.A. Journ. Sci. 18 (1921) 347 and gives a particular note on its thin, flexible structure, whereas the present specimen is a thick polypore, namely *Polystictus tabacinus* Mont.

RESUPINATE SPECIES OF **HYMENOCHAETE** RECORDED FOR SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY.

**fusco-violascens** (Mont.) Sacc.; Montagne in Ann. Sci. Nat. ser. 3, 7 (1847) 174, sub *Thelephora*; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 14.

**rubiginosa** (Schrad.) Lév.; Van der Byl (1929) l.c., p. 14; Massee in Journ.L inn. Soc. Bot. 27 (1890) 97; Eyles in Trans. Roy. Soc. S.A. 5 (1915) 277, (Rhodesia); Montagne in Ann. Sci. Nat. ser. 3, 7 (1847) 174, sub *Stereum rubiginosum* Fr.

There are many unmatched collections of *Hymenochaete* in Herb. Pretoriae. The writer could not match them at Kew, and he considers that comparison with North American collections is necessary. Most collections of *Hymenochaete* lack basidia and spores and the genus presents unusually great difficulty.

**ASTEROSTROMELLA** von Höhnel and Litschauer.

1. **Asterostromella duriscula** (B. & Br.) comb. nov.

*Stereum duriusculum* Berk. and Broome ! in Journ. Linn. Soc. Bot. 14 (1873) 66; Saccardo, Syll. Fung. 6 (1888) 585; Bourdot and Maire in Bull. Soc. Myc. de Fr. 36 (1920) 74; Petch in Ann. Roy. Bot. Gard. Perad. 9 (1925) 267. [non *S. duriusculum* sensu Bresadola in Ann. Myc. 6 (1908) 43, nec *S. duriusculum* Bres. sensu Overholts in Mycologia 30 (1938) 279.]

*Illustrations*: PLATE 36.

Resupinate effused, up to 1·5 mm. thick, tough, fibrous-suberose. Context pale creamy white to pale yellowish-brown, markedly stratose. Hymenium very smooth, creamy to chamois colour, sometimes pruinose with the spores.

Basidia: scattered, not in palisade, exceeded by the hymenial hyphae, about 4 × 24 μ.

Spores: globose-subglobose, often with a blunt apiculus, smooth, hyaline, 6–6·8 μ diam.

Gloeocystidia: thin-walled, with large irregularly shaped contents staining readily with phloxine, embedded fairly deeply or in the plane of the basidia, reaching maximum size of 6·8 × 120 μ, usually about 4 × 48 μ, rare or abundant depending on the specimen.

Context: zoned with alternate hyaline and pale yellowish zones, the hyaline part (fide Petch) being the lower part of each growth zone.

Hyphae: thick-walled or without visible lumen, hyaline, very finely filamentous or up to 3 μ wide, very much branched but not true dichophyses.

Minerals: concretions common in lower layers, especially at the junction of growth zones.

Specimens examined: Type, *Thwaites* (569 and 329) in Herb. Kew, Ceylon; 27604, *Rump* (25), Town Bush, Maritzburg, 1934; 30208, *Rump* (409), Umhlali, Natal, 1935; 30209, *Rump* (410), Compensation Beach, Natal, Dec. 1934; 30210, *Rump* (411), Umgeni Bush, Durban, March, 1935; 35423, *Rump* (741), Richmond, Natal, March, 1945; 34360, *Rump*, Karkloof, Natal, 1936; 36429, *Rump*, Maritzburg, May 1947; 35324, *Rump* (591), Isipingo Beach, Natal, 1944; 28473, *Rump* (191), Winterskloof, Natal, 1934; 33902, *Rump* (534), Scottburgh, Natal, Feb. 1943; 30823, *Rump* (479), Port St. Johns, Pondoland, Aug. 1937; 34543, *Scott*, Munnik-Tzaneen Road, 27/5/1943; 33993, *Rump* (675), on *Euphorbia pulcherrima* (Poinsettia), Maritzburg, 1943; *Rump* (796), Verulam, Natal, 1946; *Glaziou* (12333), Rio Janeiro, Brazil; *Alban Stewart* (975), Galapagos, 1905; *J. Peres Guimarais*, Lourenco Marques, P.E. Africa, 23/3/1940 and 18/3/1940.

*Asterostromella duriuscula* belongs to a group of stratose resupinates of which *Corticium portentosum* B. and C. ! is another example. The taxonomy of the group is confused. In this group the characters of taxonomic importance are: (1) Context colour; (2) Nature of the branching of the hyphae; (3) Colour of hyphae, and their reaction with KOH; (4) Presence or absence of gloeocystidia; (5) Colour and sculpturing of spores. Of little taxonomic value are: (*a*) Width, septation, and thickness of the hyphal walls; (*b*) Hymenium colour (useful for *A. dura*); (*c*) Thickness and degree of stratification of the context; (*d*) Spore size, for all the spores in this group are almost globose and about (5·5)–6–6·5–(8) μ in diameter.

For comparative studies a standard mounting technique was used. Sections were mounted in a drop of concentrated hydrochloric acid (to clear minerals) which was then drained away and replaced by 10% KOH until bubbling ceased. Two such alkaline mounts were made, one with the addition of phloxine stain and the other without. For examining the branching of hyphae the sections were teased out with needles.

The species examined can conveniently be classified in the following manner: (see also PLATE 37)—

Group 1. A: Context white or light yellowish; sections not darkening in KOH. Hyphae hyaline, much branched, dendrophytic not dichophytic.

Group 1. B: Differing from 1. A in having dichophytic hyphae, which are hyaline or very lightly coloured and darken very slightly in KOH.

Group 2: Context not light coloured; sections darkening in KOH. Hyphae coloured, markedly dendroid.

Group 3: Context not light coloured; sections darkening slightly in KOH. Hyphae hyaline or very dilutely coloured, dendroid, not dichophytic.

GROUP 1. A.

(*a*) *Corticium portentosum* B. and C. ! (=*C. diminuens* B. and C.).

(*b*) *Stereum duriusculum* B. and Br. !

The most significant difference between these two very similar species is one which does not appear to have been recorded previously, namely that there are gloeocystidia in *S. duriuseulum*, which cannot be found in any North American specimens the writer has examined in this group, including the type of *C. portentosum*. The gloeocystidia are difficult to demonstrate but they are present in the type of *S. duriusculum*, and are most numerous and conspicuous in some South African specimens which are filed under both species in Herb. Kew. Two collections from Lourenco Marques are interesting in that they were both found at about the same time and locality, yet in one the gloeocystidia are abundant and in the other very rare. Examples with gloeocystidia are also found from Ceylon (Type of *S. duriusculum*), the Galapagos, and Brazil.

It was first considered that the character of gloeocystidia taken alone did not warrant the retention of *C. portentosum* and *S. duriusculum* as distinct species, it being well known that such structures are not necessarily found in all specimens of a single species. But there are indications that the two species should not be merged. The type specimens differ in hymenial colour, *C. portentosum* being a somewhat lighter chamois, and in width of hyphae, *S. duriusculum* having doubly wide hyphae. These characters are not very helpful because intergrading variations are common. Most specimens the writer assigns to *S. duriusculum* on the grounds of having gloeocystidia, give an immediate jet black colour if the hymenium is touched with a drop of KOH, while most assigned to *C. portentosum* react by developing a reddish-brown colour which slowly darkens. But again, this chemical test is not invariable. Some of the South African specimens of *S. duriusculum* are rich in mineral concretions at the junction of the strata. This, too, is a variable feature. The writer has not yet seen an example of *C. portentosum* from South Africa. for all those in Herb. Kew he would call *S. duriusculum*. It seems probable that *C. portentosum* is a North Temperate species and predominantly American.

Certain other fungi have been confused, or merged properly or improperly with these two:—

*Corticium diminuens* B. and C. ! is given by Höhnel and Litschauer [in K. Akad. Wiss. Wien. Sitzungsb. (1907) 743] as a synonym of *C. portentosum*. I consider this is substantiated. It is significant that the species is known only from Alabama, North America.

*Corticium grammicum* P. Henn. is cited in the same place as another synonym. No material of this was available for study, but in Saccardo, Syll. Fung. 21 (1912) 395 and in Engler Jahrb. 38 (1905) 106 the spores are given as " ellipsoidal, 2·5–3 × 2 $\mu$," which indicates that Höhnel's statement of synonymy should be further enquired into.

*Stereum duriusculum* has evidently been confused both by Burt and by Bresadola. The latter has written on the type sheet in Herb. Kew that *C. portentosum*, *S. duriusculum* and *S. induratum* Berk. ! are all the same species, and in Ann. Myc. 14 (1916) 232 he gives *S. albo-cinctum* B. and Br. ! as a synonym of *S.*

*duriusculum*. It is plain on examination that *S. induratum* and *S. albo-cinctum* belong in Group 2 of this treatment, and that *S. duriusculum* sensu Bresadola is *Asterostromella dura* Bourdot and Galzin.

Burt [in Ann. Mo. Bot. Gard. 7 (1920) 236] says that *S. duriusculum* " as determined by Patouillard in Duss, Fl. Antilles Fr. 232. 1903, is probably *Hypochnus pallescens* (Schw.) Burt, a species common in the West Indies." Burt draws his description of the latter species from authentic material in the Curtis Herbarium. The material in Herb. Kew (7412) sent by Curtis to Berkeley and labelled in the latter's handwriting as " *Thel. pallescens* (*a*), Herb. Schwein. !" cannot be considered authentic, for it is actually a *Peniophora* bearing very large, thick-walled, encrusted cystidia, conical in shape. Examination of recent American material which coincides with Burt's descriptions shows that this species has nothing to do with *S. duriusculum* but falls in Group 2 of this treatment.

GROUP 1. B.

In Herb. Kew, under *C. portentosum* are a series of three Swedish collections ex Mus. Botan. Stockholm, Nos. 1523, 1334 and 4135, which the author considers distinct from *C. portentosum* for the reason that their hyphae are truly dichophytic. These specimens, then, belong to *Asterostromella* and possibly represent a new species.

GROUP 2.

(*a*) *Stereum induratum* B. and C. ! (=*S. albo-cinctum* B. and Br. !). This species lacks the tissue differentiation of a *Stereum* and possesses dichophytic hyphae.

(*b*) *Asterostromella dura* Bourd. and Galz. (=*S. duriusculum* sensu Bresadola). Differs from the above in greater thickness, darker context, and ochraceous hymenium colour. The two are obviously very closely related. This species is the type of the genus *Dichostereum* proposed by Pilát [in Ann. Myc. 24 (1926) 223] as a segregate from *Asterostromella*. Rogers and Jackson [in Farlowia 1 (1943) 310] make this species a synonym of *Vararia pallescens* (Schw.) Rogers and Jackson. This may well be so, but for the present the writer prefers to keep the two species separate, as he believes that they differ in colour and closeness of branching of the hyphae.

(*c*) *Hypochnus pallescens* (Schw.) Burt. [Synonyms: *Coniophora sordulenta* (Cooke and Massee) Sacc. !; *Hypochnus thelephoroides* (Ellis and Everh.) Burt, fide Burt; *Thelephora insinuans* Schwein., fide Burt.]

This species is an *Asterostromella*.

The above three species would all fall into the genus *Dichostereum* of Pilát (l.c.), who mentions the species *induratum*, *albocinctum*, and *duriusculum* in this connection; but it is plain that he has taken *duriusculum* in the sense of Bresadola. The present writer includes *Dichostereum* in the genus *Asterostromella*.

GROUP 3.

*Asterostromella Rumpiana* Talbot, which see (page 54).

There remains to assign *C. portentosum* and *S. duriusculum* to a suitable genus, for it seems that they fit neither *Stereum* nor *Corticium* and that their affinities lie wholly with the rest of this group of stratose resupinates. I propose, therefore, that both should be referred to the genus *Asterostromella* despite the fact that they possess hyphae which are not the dichophyses of *Asterostromella*, but rather dendrophyses of the kind found in some species of *Aleurodiscus*. *Aleurodiscus* as constituted at present is a repository for many unrelated species distinguished by possession of pseudophyses, dendrophyses or acanthophyses but with very little else in common, and it would only add to the muddle to include two more species on these very slender grounds alone. *Asterostromella* itself is a somewhat polyglot genus, but the time does not yet appear ripe for making segregations of the kind of *Dichostereum*.

Donk [in Rev. Ned. Hetero.-en Homobas.-Aphyll. 1 (1931) 191] points out that *Vararia* Karst. is an earlier name for *Asterostromella* Höhnel and Litsch., and that if the latter is to be retained, conservation against the former is necessary.

2. **Asterostromella Rumpiana** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 939.

*Illustrations*: PLATE 38.

*Type*: 30200, *Rump* (399), Nkandhla Forest, Zululand. In Herb. Kew, with isotype in Herb. Pretoriae.

Resupinate, widely effused, adnate, up to 2 mm. thick. Context tough, corky-fibrous, markedly stratose, light biscuit-brown colour. Hymenium smooth, with buffy colour unmatched in Ridgway, turning black instantly on application of KOH.

Basidia: scattered, not in palisade, clavate-cylindric, about 4·5 × 30 μ, exceeded by the hymenial hyphae.

Spores: elliptic-oval (not ovate), hyaline, 5·5 × 8·3 μ, with granular contents giving a finely punctate appearance.

Gloeocystidia: thin-walled, with homogeneous, evenly staining contents, embedded, 6·5 × 53–80 μ.

Hyphae: thick-walled or without visible lumen, hyaline or lightly coloured, darkening slightly in KOH, filamentous or up to 3 μ wide, very much branched but not dichophytic.

Context: zoned with alternate lighter and darker zones.

Minerals: common at the junction of the strata.

Specimens examined: Type, 30200, cited above.

In structure this species is very close to *A. duriuscula*, from which it differs in darker colour of the context, spore size and shape, and the more homogeneous contents of the gloeocystidia. *Corticium hinnuleum* Bres. [in Hedwigia 56 (1915) 303] from the Philippines may be closely related, but specimens have not been seen.

## ASTEROSTROMA Massee.

1. **Asterostroma cervicolor** (B. and C.) Massee in Journ. Linn. Soc. Bot. 25 (1889) 155; Bourdot and Galzin in Bull. Soc. Myc. de Fr. 36 (1920) 45, Hym. de Fr. (1928) 400; Burt in Ann. Mo. Bot. Gard. 11 (1924) 28; Saccardo, Syll. Fung. 9 (1891) 237.

*Corticium cervicolor* Berk. and Curt. ! in Grevillea 1 (1873) 179; Saccardo, Syll. Fung. 6 (1888) 621.

*Asterostroma corticola* Massee ! in Journ. Linn. Soc. Bot. 25 (1889) 155.

*Asterostroma albido-carneum* Massee ! in Journ. Linn. Soc. Bot. 25 (1889) 155, non *Thelephora albido-carnea* Schwein.

*Asterostroma pallidum* Morgan in Cincinnati Soc. Nat. Hist. Journ. 18 (1895) 38, (fide Burt).

*Illustrations*: Massee (1889) l.c., Pl. 46, f. 8, 9, as *A. albido-carneum*; Morgan (1895) l.c. Pl. 1, f. 6, as *A. pallidum*.

PLATE 39.

Entirely resupinate, fawn, byssoid when young with a whitish arachnoid margin, effused, adnate. Hymenium fawn-avellaneous becoming pallid buff when sporing, pulverulent, smooth.

Context thin, 150–300 μ, spongy and dry.

Basidia: 16–23–53 × 6·6 μ or narrower, with 2–4 short sterigmata, subcylindric or clavate, in an uneven palisade.

Spores: hyaline, echinulate, subglobose, 4–5 $\mu$ diam., or oblong, 4 × 6 $\mu$.

Asterosetae: throughout the trama, fewer and much smaller in the hymenium and occasionally projecting slightly beyond it; each star composed of about 5 rays borne on a thin hypha. Rays 15–70 × 3–3·5 $\mu$, light brown, the majority unbranched, pointed, largest in the basal layers.

Gloeocystidia: demonstrable with phloxine stain, numerous, immersed in subhymenium or projecting, fusoid or clavate, frequently attenuated into a long neck, 8–12 × 30–45–50 $\mu$, contents homogeneous.

Other ground tissues: hyphae hyaline but quite indistinct.

Specimens examined: Type, *Peters* (4026), Alabama (in Herb. Kew); 30155, *Rump* (348. a) on the hymenium of a *Fomes* sp., Umgeni Bush, Durban, March 1935; 36821, *Rump* (469), Van Reenen, Natal, Jan. 1937; 34387, *Rump* (602), Town Bush, Maritzburg, May 1936.

In the last two specimens cited above, the rays of the asterosetae radiate from quite a stout central boss, and there is rather more branching of the rays than is typical. Otherwise these specimens are no different from *A. cervicolor*.

## MYCOLEPTODON Patouillard.

1. **Mycoleptodon ochraceum** (Pers. ex Fr.) Patouillard, Essai Taxon. sur les Hym. (1900) 116; Rea, Brit. Basid. (1922) 639; Pilát in Bull. Soc. Myc. de Fr. 42 (1926) 102; Bourdot and Galzin, Hym. de Fr. (1928) 440.

   *Hydnum ochraceum* Pers. ex Fr., Systema Myc. 1 (1821) 414, Hym. Eur. (1874) 612; Persoon apud Gmelin in Linne, Systema Naturae 2 (? 1796) 1440; Persoon, Syn. Meth. Fung. (1801) 559, T.5, f. 5, Myc. Eur. (1825) 176, Obs. Myc. 1 (1796) 73; Bresadola, Fung. Kmet. (1897) n. 98, in Ann. Myc. 1 (1903) 85; Saccardo, Syll. Fung. 6 (1888) 457.

   *Steccherinum ochraceum* (Pers.) S. F. Gray, Nat. Arr. Brit. Plants 1 (1821) 651; Miller in Mycologia 25 (1933) 296.

   *Leptodon ochraceum* (Pers. ex Fr.) Quélet, Fl. Myc. de Fr. (1888) 441.

   *Hydnum pudorinum* Fries, Hym. Eur. (1874) 612, Elenchus Fung. 1 (1828) 133; Saccardo, Syll. Fung. 6 (1888) 456; Quélet, Fl. Myc. de Fr. (1888) 440.

   *Hydnum microdon* Persoon, Syn. Meth. Fung. (1801) 561; Bresadola in Ann. Myc. 1 (1903) 85.

   *Hydnum Daviesii* Sowerby, Engl. Fung. 1 (1797) 15; Saccardo, Syll. Fung. 6 (1888) 457. (Fide Persoon and others.)

   *Hydnum alnicolum* Velenovsky (fide Bourd. and Galzin).

   *Illustrations*: Persoon, Syn. Meth. Fung. (1801) T.5, f.5; Sowerby, Engl. Fung. 1 (1797) T. 15, as *H. Daviesii*.

   PLATE 40.

Resupinate, effused, becoming reflexed, or even pileate (not yet seen in South Africa), readily separable from substratum. Reflexed upper surface pale coloured, concentrically furrowed, tomentose. Hymenium light ochraceous with a light fleshy tint; composed of very closely arranged regular subulate small teeth, shorter towards the margin. Margin whitish, narrow, subfimbriate, in section 250–400u thick excluding the teeth.

Basidia: 3·5–4 × 12–15–(18) $\mu$, clavate, with very short straight sterigmata.

Spores: not yet seen in South African material: 3–4–(5) × 2–2·5 $\mu$, obovate-oblong.

Cystidia: numerous, long-clavate or fusoid, thick-walled, covered at least near the apex with easily detersile incrustation, 6·5–10 × (40–55)–105 $\mu$, arising from ordinary deep-seated hyphae as terminal modifications near the hymenium.

Hyphae: subhymenial hyphae more or less thin-walled; tramal hyphae thick-walled, (2)–2·5–4 $\mu$, colourless, distinct, suberect, densely interwoven.

Specimens examined: 27796, *Rump* (82), Town Bush, Maritzburg, Aug. 1934; *Simpson* and *Talbot* (T.R.L. 2021), Qudeni Forest, Zululand, Feb. 1945.

In Grevillea 10 (1881) 27 and in S.A. Journ. Sci. 13 (1917) 440, reference is made to a collection of Medley Wood (479), Inanda, Natal, as *H. ochraceum*. I have been unable to find cystidia in this specimen and therefore suggest that it is some other species.

## LOPHARIA Kalchbrenner and MacOwan.

1. **Lopharia mirabilis** (B. and Br.) Patouillard in Bull. Soc. Myc. de Fr. 11 (1895) 14, Pl. 1, Essai Taxon. sur les Hym. (1900) 74; van der Byl in Ann. Univ. Stellenbosch 12 (1934) 2, f. 1.; Petch in Ann. Roy. Bot. Gard. Perad. 4 (1910) 410.

*Radulum mirabile* B. and Br. ! in Journ. Linn. Soc. Bot. 14 (1873) 61; Saccardo, Syll. Fung. 6 (1888) 496.

*Thwaitesiella mirabilis* (B. and Br.) Massee in Grev. 21 (1892) 3.

*Lopharia lirellosa* Kalchbr. and MacOwan ! in Grev. 10 (1881) 58; Patouillard in Bull. Soc. Myc. de Fr. 11 (1895) 14, Pl. 1, Essai Taxon. sur les Hym. (1900) 74.

*Licentia yao-chanica* Pilát in Ann. Myc. 38 (1940) 66, text fig. 2, Tab. 1, f. 1, 2, 3.

*Illustrations*: Patouillard (1895) l.c.; v. d. Byl (1934) l.c.; Pilat (1940) l.c.

PLATE 41.

Resupinate, effused, sometimes reflexed, slightly waxy when fresh, drying thin and coriaceous, brittle. Upper surface (when exposed) tomentose and obscurely zoned, tan colour. Hymenium first smooth and white, then creamy to ochraceous with light margin, and covered with scattered, erect, laterally compressed, triangular teeth, about 0·5 mm. high, arranged in more or less radial or concentric patterns: teeth coalesce into short ridges. Thickness of context (excluding ridges) 250–300 $\mu$.

Basidia: large, clavate, 50–65 × 9–11 $\mu$, with 4 sterigmata.

Spores: oblong-elliptic or oblong-ovate, occasionally curved, hyaline, smooth, with rather granular contents, (5)–6·6–8·3 × 10–13·2 $\mu$.

Cystidia: present throughout the hymenium and just below it, conical or subfusiform, 66–130 × 13–21 $\mu$, usually emergent up to 50 $\mu$, very thick-walled, coarsely encrusted in the superior half, often smooth and pale brownish at the base, blunt or pointed at the apex.

Hyphae: closely interwoven, more or less erect, thick-walled, 3–4 $\mu$ wide, subtended on the side next to the substratum by a thin layer of horizontal faintly-coloured hyphae.

Surface Hairs: adpressed, faintly coloured, 4 $\mu$ wide.

Specimens examined: *MacOwan*, type of *Lopharia lirellosa*, C. Bon. Spei; *Thwaites* (328), type of *L. mirabilis*, Peradeniya, Ceylon, 1868; ex Herb. von Höhnel, Peradeniya, Ceylon, 1907; *van der Byl* (2261), South Africa, 1926; 27797, *Rump*, Town Bush, Maritzburg, 1934; 28302, *Rump*, Town Bush, Maritzburg, Oct. 1934; 27799, *Rump*, near Maritzburg, 1934; *Rump* (v. d. Byl, 2620), Natal South Coast, Feb. 1931; *v. d. Byl* (551), on dead *Plectronia*, Durban; *v. d. Byl* (1429), South Africa; 27769, *Rump* (125), Town Bush Valley, Maritzburg, Aug. 1934; 31911, (Natal. Herb. 714), *v. d. Byl*, Bluff, Durban, 6/8/1917; 31356, *Duthie*, Knysna; 31309, *Duthie*, Knysna; ex Herb. *T. Petch* (Nos. 4499, 3306, 5354), Peradeniya, Ceylon; *Sappan*, Flor. Singapore 5119, Singapore Bot. Gard., 1919; *F. T. Brooks* (113), Fed. Malay States, 1914; *M. Noor*, Flor. Selangor 5559, 1920; *T. F. Chipp*, Flor. Singapore 5910, 1920; *R. E. Holttum* (9240), Malay Peninsula, 1922.

This species is of peculiar interest as a link between other genera both of the Hydnaceae and the Thelephoraceae. It has the internal structure of a *Stereum* of the "*Lloydella*" group (Bresadola), and in particular a very marked similarity to *S. cinerascens* (see pg. 41). The last-named is thicker and has deeper-embedded cystidia, but its other microscopic features including spore size and shape are the exact counterpart of *L. mirabilis*. But for the fact that this is resupinate, it also connects with *Cladoderris* which has a papillate hymenium and, in some species, cystidia. *Cladoderris* cystidia are usually small, but Lloyd [Myc. Writ. 4 (1913) 11] says that in *C. Pritzelii* Hennings these are large "metuloids." The structure of *L. mirabilis* with a darker compact zone adjacent to the substratum, and hairs, even when apparently resupinate, is evidence that the fungus is capable of reflexion, and distinguishes it from *Peniophora*. Though *Lopharia* is grouped next to *Radulum* in the Hydnaceae on account of its incised ridges, the writer considers it certainly more nearly related to the Thelephoraceae through the genus *Stereum*.

Hymenial configuration in *L. mirabilis* is variable. One specimen in Herb. Kew has a distinctly poroid hymenium and could be taken for a *Poria*. The disposition of hymenial crests irregularly or in somewhat concentric rings was taken by Patouillard as the basis for separating *L. lirellosa* and *L. mirabilis*, but this is now considered untenable. In the type specimens of these, the writer has found that the spores show a distinct difference in size and shape [*L. lirellosa*, 6·6–(8·3) × (9·9)–13·2–(15) $\mu$, mostly elliptical; *L. mirabilis*, 5 × 9·9–(13·2) $\mu$, mostly almost cylindric with flattened sides], but these are evidently extremes, for in examination of other collections from South Africa and Ceylon it is seen that the spore sizes and shapes intergrade. The spores in South African material are nevertheless slightly larger and wider than those from Ceylon, but not significantly so. The following summary of spore measurements by different observers is of interest (Table 4).

TABLE 4.

SPORE MEASUREMENTS OF CERTAIN *LOPHARIA* SPECIES.

| Fungus. | Spore Size in $\mu$. | Observer. |
|---|---|---|
| *L. lirellosa* | 8–10 × 15–17 | Patouillard. |
| *L. lirellosa* | 8–10 × 12–14 | Van der Byl. |
| *L. lirellosa* (Type) | 6·6–(8·3) × (9·9)–13·2–(15) | Talbot. |
| *L. mirabilis* | 4–5 × 8–12 | Petch. |
| *L. mirabilis* | 5 × 9 | Massee. |
| *L. mirabilis* | 5–6·5 × 9–10 | Höhnel. |
| *L. mirabilis* (Type) | 5 × 9·9–(13·2) | Talbot. |
| *L. yao-chanica* | 6–8 × 10–15 | Pilát. |

*Lopharia javanica* P. Henn. has large cystidia too, but spores measuring only 5–6 × 5–7 $\mu$,: *Lopharia Dregeana* (Berk.) comb. nov. (see following) has smaller cystidia of a different kind, and spores 4·5–5 × 6·5–7 $\mu$.

2. **Lopharia Dregeana** (Berk.) Talbot comb. nov.

*Corticium Dregeanum* Berkeley ! in Hooker's Lond. Journ. Bot. 5 (1846) 3; Saccardo, Syll. Fung. 6 (1888) 636; Montagne in Ann. Sci. Nat. ser. 3, 7 (1847) 174.

*Hymenochaete Dregeana* (Berk.) Massee in Journ. Linn. Soc. Bot. 27 (1890) 114.

*Illustrations*: PLATE 42.

*Type*: Drège (9451. c), South Africa. In Herb. Kew.

Resupinate, effused, not adnate, somewhat flexible, at first orbicular then confluent. Margin determinate, smooth, somewhat paler than the remainder, becoming a little reflexed, the reflexed side softly byssoid. Hymenium considerably papillate or with incised ridges, dry, pruinose, cracked or uncracked, colour varying from rosy-violaceous or pale ochraceous with a faint vinous tinge to brownish. Context pale, about 400 $\mu$ thick. Basidia: clavate-cylindric, 3–3·5 × 15–20–26 $\mu$, in close palisade and difficult to observe. Spores: hyaline, smooth, elliptical, 4·5–5 × 6·5–7 $\mu$.

Cystidia: cylindrical, hyaline to very dilutely coloured, thick-walled, the lumen often expanding towards the apex, minutely encrusted more usually in the upper third of the length, very numerous, entirely immersed or emergent up to 27 $\mu$, arising as apical continuations of ordinary hyphae deep in the trama, not darkening in KOH, (5)–6–8 $\mu$ wide, up to 170 $\mu$ long.

Hyphae: hyaline, thick-walled with very narrow lumen, rather vitreous, 5–6·5–8 $\mu$ wide, closely intertwined without showing a well-defined basal or median tissue in the trama.

Specimens examined: Type, *Drège* (9451. c), cited above; *Drège* (4109), C.B.S., ex Herb. Montagne; *Dunlap*, Cameroon Mtns., 5000′ alt., 1926. In Herb. Kew.; *Macdonald*, Ngong Forest, Nairobi, Kenya, 24/5/29.

Massee (1890 l.c.) wrote of this species that it is a true *Hymenochaete*, but both in origin and morphology the accessory organs of this fungus must be taken as cystidia and not as setae. The cystidia arise as apical modifications of thick-walled, deep-seated hyphae curving outwards, and in this respect they are of a rare kind whose origin may be compared with that of the false setae in *Duportella tristicula* and *Stereum Schomburgkii*, though no affinity is to be implied from this.

Microscopically all the specimens of *L. Dregeana* cited above are identical, but they differ somewhat in external colour and particularly in the hymenial crests. The Drège specimens have mere papillae scattered roughly concentrically over the hymenium; the Macdonald specimen has incised ridges, and in places is almost poroid; there are closely arranged incised ridges in the Dunlap specimen. In view of these incised ridges and the presence of cystidia I have referred the species to *Lopharia*. This choice of genus is not entirely satisfactory, for the following reasons:—

(1) The cystidia of both other known species of *Lopharia* (*L. mirabilis* and *L. javanica*) are very large, fusoid or subulate, peniophoroid, and not merely apical modifications of ordinary hyphae.

(2) *Lopharia* is possibly not a " good " genus. Under *L. mirabilis* it has been shown that the hymenial configuration is very variable, and that its affinities lie with the Thelephoraceae, particularly with *Stereum cinerascens*.

(3) *L. Dregeana* is composed throughout of uniformly interwoven hyphae without differentiation into a denser basal layer and hairs as in *L. mirabilis*.

(4) A fifth specimen in Herb. Kew [Viz. Maitland (143), Cameroon Mtns., March 1931] has the same microscopic features as *L. Dregeana* and the same violaceous tint, but is widely reflexed with a zonate abhymenial surface. It also has the long separated teeth of a *Hydnum*. The writer places this specimen only tentatively with *L. Dregeana*, there being a trifling difference in length and incrustation of the cystidia which causes him uncertainty.

*Corticium Dregeanum* was said by Saccardo (l.c.) to be near to *Corticium molle* Fr., but from the description this can only be a superficial resemblance and takes no account of the much more hydnoid collections of the former which have now come to light.

A specimen in Herb. Kew (J. B. Ellis, 3723, Iowa) included as *Hymenochaete Dregeana* is misdetermined. It is almost certainly *Stereum cinerascens* (Schw.) Massee, and is interesting in showing a few small papillae on the hymenium which suggests a variation towards the form of *L. mirabilis*.

## **ACIA** Karsten.

1. **Acia conferta** sp. nov.

*Illustrations*: PLATE 43, fig. 2.

*Type*: 28494, Rump (275), Town Bush, Maritzburg, Oct. 1934.

Effused, firmly adnate, subceraceous, sometimes crustose, with indeterminate margin. Spines crowded together, papillate to subulate, or fused in part at the base, fulvous to chestnut colour when dry, 0·3–1–(1·5) mm. in length. Subiculum very thin, creamy-fawn colour.

Basidia: hyaline, clavate, 16–28 × 4–5·3 $\mu$.

Spores: hyaline, elliptic, smooth, often unilaterally depressed, often uniguttulate, (3·5)–4–5·5–(6) × 2·5–4 $\mu$.

Cystidioles: scanty, cylindric, hyaline, with rounded apex, 3–4 × 40–46 $\mu$.

Hyphae: of the subiculum, thin-walled, scanty, hyaline, without clamp connections, 2·4 $\mu$ diam.

Specimens examined: Type, cited above; van der Byl (308); Timber Research Lab. (9); Timber Research Lab. (14).

Differs from *Acia subceracea* Wakef. ! [in Trans. Proc. Roy. Soc. S. Australia 54 (1930) 155] in having larger spores, cystidioles with rounded apex, and usually longer hymenial spines; but otherwise in structure and appearance the two species are very close. (Cfr. PLATE 43, fig. 1.) Except for their hydnoid structure these species are related in microscopic features to the Ceracea group of *Corticium*, especially to *C. ochraceo-fulvum* Bourd. and Galz. *Acia fusco-atra* (Fr.) Pat. is darker in colour and sometimes shows similar but much smaller cystidioles.

## **GRAMMOTHELE** Berkeley and Curtis.

1. **Grammothele pseudomappa** sp. nov.

*Illustrations*: van der Byl in Ann. Univ. Stellenbosch 12 (1934) fig. 11 (as *G. mappa* B. and C.)

PLATE 44.

*Type*: 34963, *Simpson* and *Talbot*, Qudeni Forest, Zululand, Feb. 1945. Type in Herb. Kew; authentic material in Herb. Pretoriae.

Resupinate, adnate, effused. Margin determinate, about 0·5 mm. wide, light brown. Hymenium whitish to light buff colour, spread over tooth-like plates which are poroid at the base and capped with glistening granules. Surface with irregular anastomosing cracks. Context whitish, 0·5–1 mm. thick.

Basidia: 9–13 × 2·5–4 $\mu$, cylindric or clavate, hyaline, very small, with two or four short straight sterigmata.

Spores: not seen with certainty; possibly broad elliptic or sub-globose, about 1·5 $\mu$ diam.

Cystidia: thin-walled, fusoid or cylindric, light yellow-brown, with homogeneous contents becoming hyaline when old, embedded in hymenium, seldom emergent, 4–6–(8) × 26–36 $\mu$. There seem to be similar cystidia embedded in strata especially towards the base of the trama, but they are colourless and very hard to see clearly.

Tissues: hyphae throughout are hyaline, very narrow, very much branched, very densely intertexed so that individual hyphae cannot be teased out. There are indications of strata showing that the fungus is perennial. In the latest hymenium the troughs of the pores are becoming filled with a network of young hyphae.

Minerals: large, often yellowish, irregularly shaped, in concretions up to 120 $\mu$ diam., scattered throughout the tissues and in the hymenium.

Specimens examined: (All as *G. mappa* in Herb. Pretoriae.) Type, 34963 (T.R.L. 2018), cited above; 31604, on *Gymnosporia*, Horseshoe, C.P., 11/8/1915; 11289, *v. d. Byl*, on *Ilex mitis*, Katberg Main Forest, 15/8/1915; 36434, *Rump* (766), Bulwer, Natal, Feb. 1947.

Macroscopically this species is very similar to *G. mappa* B. and C. ! from Cuba, but the new species has not quite so coarse an appearance. The arrangement of the teeth and cracks in the two is identical, and a marked contrast to the poroid hymenium of *G. cineracea* Bres. ! , and the linear striae of *G. lineata* B. and C. ! and *G. polygramma* B. and C. !, which also differ microscopically.

The new species is distinguished from *G. mappa* by:—

(1) Smaller basidia. (Basidia of *G. mappa* are 2·5–4 × 16–19 $\mu$);

(2) The presence of coloured or hyaline cystidia embedded in the tissues;

(3) The absence of erect sheaves of brownish hyphae capped by minerals. These embedded, or rarely emergent, structures are what Patouillard called " sterile cylindrical emergences " [Essai sur les Hym. (1900) 62, f. 44]. In *G. pseudomappa* they are represented merely by large mineral concretions lacking any hyphal base or core whatsoever. It should be added that Patouillard's fig. 44 is exceptionally misleading. For comparison PLATE 45, drawn from type material of *G. mappa*, is presented.

Lloyd [Myc. Writ. 5 (1916) 581] first cast doubt on the identity of the South African collections with *G. mappa*, mentioning the cystidia and the lack of " sterile emergences.' Van der Byl [in Ann. Univ. Stellenbosch 12 (1934) 8] describes as *G. mappa* specimens which are now referred to *G. pseudomappa*, while the collection cited by Simpson and Talbot [in S.A. Journ. Sci. (1946) 133] as *G. mappa* becomes the type of the new species. *G. mappa* is apparently not a South African species.

It may be noted that Lloyd [Myc. Writ. 7 (1923) 1214], in an article headed " Miscellaneous Notes in Cesati's Herbarium ", states: " *Grammothele mappa* is *Poria Ravenelae*." The former is certainly not synonymous with *P. Ravenalae* B. and Br. !. Possibly this reference is simply a correction of the determination in Cesati's Herbarium.

## GRANDINIA Fries.

1. **Grandinia bicolor** Talbot apud Wakefield and Talbot in Bothalia 4 (1948) 947, fig. 6.
*Type*: 27756, Rump (100), Town Bush, Maritzburg; In Herb. Kew, with isotype in Herb. Pretoriae.

Resupinate, effused, cracking but little on drying, separable from the substratum. Margin lifting slightly on drying, determinate, light brown, pubescent. Hymenium pallid, with a pale greenish-yellow, glaucous, tint. Context Prout's brown colour. Spines densely crowded, hemispherical or pointed.

Basidia: hyaline, cylindric-clavate, 14–17 × 4–5 $\mu$.

Spores: hyaline, smooth, elliptic-cylindric, usually with one side flattened, 7–8·5–(10) × 2·8–3·5 $\mu$.

Hyphae: dark brown, moderately thick-walled, 3 $\mu$ wide, densely packed adjacent to the substratum, extending in a looser horizontal network in the mid-trama and sweeping up in numerous vertical branches into the hymenium. Occasionally

several hyphae aggregate into a thick cord in the trama. Between these conspicuous hyphae is a system of branched, nearly hyaline, filamentous hyphae sometimes seen protruding as branched paraphyses (? dendrophyses) from the apex of the spines.

Minerals: present as crystals or granules.

Specimens examined: Type, cited above; 28502, *Rump* (270); 28291 *Rump* (215); 28292, *Rump* (217); all from type locality, Aug. and Oct. 1934.

A most distinctive species differing from all known species of *Grandinia* in the colour contrast of hymenial and abhymenial surfaces, and in the hyphal systems.

**GRANDINIA** SPECIES RECORDED FROM SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY:
**rosea** P. Henn.; Van der Byl in Ann. Univ. Stellenbosch 12 (1934) 8.

## ODONTIA Persoon ex S. F. Gray.

1. **Odontia arguta** (Fr.) Quélet, Flor. Myc. de Fr. (1888) 435; Bresadola, Fung. Kmet. (1897) n. 114; Bourdot and Galzin, Hym. de Fr. (1928) 427; Rea, Brit. Basid. (1922) 648; Wakefield in Trans. Roy. Soc. S. Australia 54 (1930) 157; van der Byl in Ann. Univ. Stellenbosch 12 (1934) 8.

*Hydnum argutum* Fries, Syst. Myc. 1 (1821) 414, Hym. Eur. (1874) 616.

*Hydnum stipitatum* Fr. sensu Romell (fide Bourd. and Galz.).

*Illustrations*: Bourdot and Galzin (1928) l.c., f. 114.

PLATE 46.

Effused, resupinate, rather adnate, dry. Margin indeterminate, whitish. Hymenium creamy to ochraceous, with granuliform or subulate spines up to 1 mm. long, usually much shorter, discrete or basally united, penicillate at the apex. Context floccose, with a little mineral content.

Basidia: roughly clavate, 3–5 × 13–20 $\mu$, with four sterigmata.

Spores: hyaline, broadly ovate, smooth, often uniguttulate, 3–4 × 5 $\mu$.

Cystidia: small, subulate, with a capitate encrusted apex, the capitate part 8 × 2·5–3·5 $\mu$; or cylindrical with rounded apex and crowned with a yellowish resinous globule; cystidia borne apically or laterally on the spines.

Hyphae: hyaline, with many clamp connections, 2–(4) $\mu$ diam.

Specimens examined: 28883, *Bottomley*, The Cavern, Drakensberg, Natal, 20/7/1937; 28313, *Doidge* and *Morgan*, nr. Donnybrook, Natal, Feb. 1935; *Acock* (v. d. Byl, 2638), Stickland, Feb. 1933; *van der Byl* (2726), South Africa, Oct. 1933.

Of the specimens cited above, No. 28883 has both spathulate and globular cystidia. The two collections of van der Byl have resinous globules but no spathulate cystidia, and in this they correspond with the Australian forms described by Miss Wakefield (1930, l.c.). On occasions only spathulate cystidia may be found.

2. **Odontia knysnana** van der Byl ! in Ann. Univ. Stellenbosch 12 (1934) 9.

*Illustrations*: PLATE 47.

Resupinate, adnate, confluent, white, later creamy, with byssoid margin. Context thin, effused. Teeth minute, discrete though close together, 6–8 per mm., granuloid, microscopically ciliate at the apex.

Basidia: clavate-cylindric, 4 × 23 $\mu$.

Spores: hyaline, smooth, elliptical, often with one side flattened, apiculate towards the side, 2·5–3 × 5 $\mu$.

Cystidia: mostly at the apex of the spines, fine pointed, about 35 × 3–4 μ, encrusted with crystals readily soluble in KOH, hyaline.

Hyphae: thin-walled, 3–4 μ diam., with clamp connections, much branched, densely and suberectly interwoven, encrusted with granules, becoming smooth in KOH after some time.

Specimens examined: Type, *v. d. Byl* (1332), Knysna, Jan. 1924. (Part of Type in Herb. Kew.)

This species is not far removed from *Odontia crustosa* (Pers.) Quélet. The latter, however, has non-encrusted cystidia and hyphae. Its hyphae have only rare clamps and appear to collapse more readily than those of *O. knysnana*. As there is only one collection of *O. knysnana* in existence, it is not possible to assess whether it is a " good " species or not.

## HYDNUM Linn. ex Fries.

RESUPINATE **HYDNUM** SPECIES RECORDED FOR SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY.

**ambiguum** B. and Br.; Kalchbrenner in Grev. 10 (1881) 57, from Kaffraria.

**mucidum** Fr.; Kalchbrenner in Grev. 10 (1881) 57, from Somerset East; Saccardo, Syll. Fung. 6 (1888) 471.

**sclerodontium** Mont. & Berk.; in Litt. Timber Research Lab. (165), from Rand gold mines.

SYNONYMS AND EXCLUDED SPECIES IN **HYDNUM.**

**ochraceum** Pers. ex Fries=*Mycoleptodon ochraceum* (Pers. ex Fr.) Pat. The Medley Wood (479) collection referred to as *H. ochraceum* in Grev. 10 (1881) 27 and S.A. Journ. Sci. 13 (1917) 440 lacks cystidia and is some other species of *Hydnum*.

**pudorinum** Fries. [Recorded in Grev. 10 (1881) 57.]
=*Mycoleptodon ochraceum* (Pers. ex Fr.) Pat. q.v.

## RADULUM Fries.

SPECIES RECORDED FOR SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY:

**javanicum** (P. Henn.) Lloyd.; Lloyd, Myc. Writ. 6 (1920) 952.

**orbiculare** Fries; Kalchbrenner in Grev. 10 (1881) 57, from Somerset East.

SYNONYMY AND EXCLUDED SPECIES IN **RADULUM**:

**javanicum** (P. Henn.) Lloyd =*Lopharia javanica* P. Henn.

**mirabile** B. and Br. ! =*Lopharia mirabilis* (B. and Br.) Pat. q.v.

## THELEPHORA Ehrhart ex Fries.

NOTES ON RECORDS OF RESUPINATE SPECIES OF **THELEPHORA** FROM SOUTH AFRICA:

**acerina** Pers.; Lévéille in Ann. Sci. Nat. ser. 3, 5 (1846) 150=*Aleurodiscus acerinus* (Pers.) Höhnel and Litschauer, or its variety *longisporus* Höhnel and Litschauer. q.v.

**biennis** Fries; Kalchbrenner in Grev. 10 (1881) 58. The MacOwan collections of this in S.A. Museum are *Stereum bicolor* fide v. d. Byl in Ann. Univ. Stellenbosch 7 (1929) 42.

**fusco-violascens** Mont.; Montagne in Ann. Sci. Nat. ser. 3, 7 (1847) 174. = *Hymenochaete fuscoviolascens* (Mont.) Sacc. fide v. d. Byl (1929) l.c. Pg. 14.

**pedicellata** Schwein.; Bottomley in S.A. Journ. Sci. 13 (1917) 440, refers to a collection Medley Wood No. 532. This collection is a species of *Septobasidium*.

**punicea** Alb. and Schwein.; Kalchbrenner in Grev. 10 (1881) 58 = *Tomentella punicea* (Alb. and Schwein.).

## TOMENTELLA Patouillard.

**TOMENTELLA** SPECIES RECORDED FOR SOUTH AFRICA BUT NOT AVAILABLE FOR STUDY:

**Eylesii** (van der Byl); v. d. Byl in S.A. Journ. Sci. 22 (1925) 168, in Ann. Univ. Stellenbosch 7 (1929) 18, as *Hypochnus Eylesii*.

**puniceus** (Alb. and Schwein.); v. d. Byl (1929) l.c. Pg. 19, as *Hypochnus*; Kalchbrenner in Grev. 10 (1881) 58, as *Thelephora*; Wood in Rept. Natal Bot. Gard. (1898) 19, as *Thelephora*.

## THELEPORA Fries.

1. **Thelepora cretacea** Fries ! in Hornsch. Skand. Beitr. Naturgesch. 2 (1847) 333, in Bot. Zeit. 6 (1848) 340.

*Theleporus cretaceus* Fries (orthographic variant) in Actis Acad. Scient. Holm. (1848) 138, in Summ. Veg. Scand. 2 (1849) 235; Saccardo, Syll. Fung. 6 (1888) 421; Lloyd, Myc. Writ. 3 (1910) 479, fig. 374.

*Illustrations*: Lloyd (1910) l.c., f. 374.

Plate 48.

Resupinate, effused, light creamy yellow colour in herbarium, closely adnate. Hymenium poroid. Pores shallow, angular, fairly regular, about 3–4 per mm., with thin dissepiments, each pore with a small basidia-bearing papilla in the centre which originates in the same manner as the pore walls.

Basidia: not reviving properly on mounting treatment but thought to be irregularly clavate, about 18 × 3·5 $\mu$.

Spores: none seen attached. A few spores seen, globose, hyaline, rather thick-walled, 3·5 $\mu$ diam., but it is doubtful whether these really belong.

Hyphae: thick-walled, 4 $\mu$ wide, in a close horizontal network below the pore layer.

Specimens examined: Part of the Friesian Type in Herb. Kew, collected by *Wahlberg* in Natal.

The genus *Thelepora* is closely allied to *Poria* and may prove to be merely a freak *Poria*. *Thelepora cretacea* comes very near to *Poria versipora* (Pers.) Fr. in structure. Fries writes of the papillae in the pores thus: " This definite formation is not only peculiar and remarkable, but also serves to distinguish it from *Porothelium*." There is not in fact much resemblance to a *Porothelium*.

One other species of *Thelepora* has been described. This is *T. griseus* Rick [in Broteria 5 (1906) 15; Saccardo, Syll. Fung. 21 (1912) 361], a Brazilian species of greyish colour, with round or polygonal, coloured spores, 3–6 $\mu$ diam. The writer has not seen any material of this species.

## LATIN DIAGNOSES OF NEW SPECIES.

**Peniophora pelliculosa** sp. nov.

Fungus resupinatus, late effusus, crassus, molliter pelliculosus, udus separabilis. Color hymenii plus minus roseobubalinus vel stramineus. Subiculum candidum, floccosum, 550–1,000 $\mu$ crassum. Basidia cylindraceo-clavata, dense fasciculata, 5–6 × 16–23 $\mu$ (immatura). Sporae oblongae vel ellipsoideae, laeves, hyalinae, 3–3·3 × 5–7 $\mu$. Cystidia in strato superiore 70–100 $\mu$ crasso immersa, raro usque 12 $\mu$ emergentia, dense incrustata vel capitatim incrustata, tenuiter tunicata, interdum apice

incrassata, clavato-cylindracea, 20–36–(50) × (8)–10–13 μ. Hyphae hyalinae; hyphae hymeniales et subhymeniales non distinctae; hyphae subiculi distinctissimae, ramosae laxe intertextae, septatae, basales 3·5–5–6 μ crassae, subhymenio interdum granulis incrustato.

Hab. ad lignum, Krantzkop, Natal.

**Coniophora fodinarum** sp. nov.

Fungus resupinatus, late effusus, facile separabilis, siccitate fragilis haud rimosus, ad 2 mm. crassus. Hymenium tuberculosum, olivaceo-umbrinum vel umbrinum. Superficies superior mollis, velutina, fusca. Contextus pallidus. Interdum fila rhizoidea adsunt. Basidia non visa nisi collapsa. Sporae magnitudine variae, 5–6–6·6 × 6·6–7·5–8·3–10 μ, subglobosae vel plerumque ellipsoideae, saepe uno latere plano, coloratae, laeves, liberatae vel inter hyphas hyalinas ramosas filamentas in strato ad 260 μ crasso immersae. Hyphae (1) strati sporogenosi hyalinae, ramosae, ad 1 μ diam. (2) strati intermedii (500–660 μ crassi) pallide coloratae, 2 μ diam., dense intertextae (3) superiores tenuiter tunicatae, 3–(6) μ diam., fuscae, stratum fuscum spongiosum circiter 250 μ crassum efformantes.

Hab. ad lignum in fodinis Transvaaliae.

**Acia conferta** sp. nov.

Fungus effusus, arcte adnatus, subcereus interdum crustaceus margine indeterminato. Aculei conferti, papillosi vel subulati vel ex parte basi coalescentes, fulvescentes vel castanei, 0·3–1–1·5 mm. longi. Basidia clavata, hyalina, 16–28 × 4–5·3 μ. Sporae laeves, ellipticae, hyalinae, saepe uno latere depressae, interdum uniguttulatae, (3·5)–4–5·5–(6) × 2·5–4 μ. Cystidiola sparsa, cylindrica, hyalina, apicibus rotundatis, 3–4 × 40–46 μ. Hyphae basales tenuiter tunicatae, sparsae, hyalinae, haud nodosae, 2–4 μ diametro.

Hab. ad lignum: Pietermaritzburg, Natal.

**Grammothele pseudomappa** sp. nov.

Fungus resupinatus, effusus. Margo definitus, circiter 0·5 mm. latus, pallide-brunneus. Hymenium sordide album vel bubalinum, dentibus vel lamellis curtis confertis, basi porosum, apice corrusco-granulosum. Contextus sordide albus, 0·5–1 mm. crassus. Basidia 9–13 × 2·5–4 μ, cylindrica vel clavata, hyalina; sterigmatibus 2–4, rectis. Sporae non certe visae; late ellipsoideae subglobosae, circiter 1·5 μ diam. Cystidia fusoidea vel cylindrica, tenuiter tunicata, pallide flavo-brunnea, senectute hyalina, immersa, raro emergentia, 4–6–(8) × 26–36 μ. Hyphae hyalinae, ramosissimae, tenuissimae, dense intertextae. Crystalla magna, saepe flavida, irregulariter formata, usque ad 120 μ diam., in trama et hymenio immersa.

Hab. ad lignum: Qudeni, Zululand.

## EXPLANATION OF THE PLATES.

The illustrations were drawn with the aid of a Reichert drawing apparatus. In general, a transverse section through the body of the fungus is shown, and in addition there are separate drawings of various individual organs at a higher magnification. The magnifications are indicated by linear scales on the plates, the smaller scale, when present, invariably referring only to the sectional drawing.

A broken line running horizontally across a sectional drawing indicates that the full width of the section has not been included. The following scheme of lettering has been used throughout the illustrations:—

B =basidia.
S =spores.
C =cystidia or cystidioles.
V =conducting vessels.
E =setae.
FE =false setae.

G =gloeocystidia.
H =hyphae.
D =view in transverse section.
X =substratum tissue.
AE =asterosetae.
M =mineral inclusions.
O =oil globules.
SH =hairs of the abhymenial surface.

## INDEX TO GENERA AND SPECIES.


**Acia**, 5, *59*.
conferta, *59*, *63*, Pl. 43.
fusco-atra, 59.
subceracea, 59, Pl. 43.

**Aleurodiscus**, 5, *26*.
acerinus, 19, 27, 28, 62.
acerinus var. alliaceus, 26, 27.
acerinus var. longisporus, 19, *26*, 27, 28, 62, Pl. 18.
cerussatus, 28.
disciformis, 28.

**Aspergillus**, 39.

**Asterostroma**, 5, *54*.
albido-carneum, 54.
cervicolor, *54*, 55, Pl. 39.
corticola, 54.
pallidum, 54.

**Asterostromella**, 5, *51*, 54.
dura, 51, 53, Pl. 37.
duriuscula, 19, 45, *51*, 54, Pl. 36.
Rumpiana, 53, *54*, Pl. 38.

**Auricularia**, 5, *6*, 29.
Butleri, 29.
corrugata, 6.
mesenterica, *6*, Pl. 1.
mesenterica var. lobata, *6*.
papyrina, 30.
phosphorea, 15.
reflexa, 28.
rugosissima, 28.
sordescens, 29.
strigoso-zonata, 28.
tremelloides, 6.

**Boletus** purpurascens, 30.

**Byssus** phosphorea, 15.

**Ceriomyces** venulosus, 25.

**Cladoderris** Pritzelii, 57.

**Coniophora**, 5, *33*, 36.
arida, 36.
atrocinerea, 35, 36.
Betulae, 36, 37.
brunneola, 35.
cerebella, 36.
Ellisii, 35.
fodinarum, *34*, 36, *64*, Pl. 23, Fig. 2.
fumosa, 34, 35, 36.
leucothrix, 35.
olivacea, 34, *35*, 36, Pl. 24.
papillosa, *33*, Pl. 23, Fig. 1.
puteana, 34, 36.
sistotremoides, 34.
sordulenta, 53, Pl. 37.
suffocata, 37.

**Coniophorella**, 36.
atrocinerea, 35, 36.
olivacea, 35, 36.

**Corticium**, 5, *12*.
abeuns, 13, 19.
acerinum, 28.
alliaceum, 26.
armeniacum, 12, *16*, 19, Pl. 8.
aschistum, 40.
atrocinereum, 19, 44.
aurora, 18.
Berkeleyi, 21.
bombycinum, 19.
brunneolum, 35.
cacaoicolor, 17.
caeruleum, 12, *15*, Pl. 7.
calceum, 19, 27, 28.
centrifugum, 15.
ceraceum, 16, 19.
cervicolor, 54.
cinereum, 19, 24.
confluens, 13, *18*, 19, Pl .11.
confluens var. subcalceum, 18.
diminuens, 52.
Dregeanum, 19, 57, 58.
Ellisii, 35.
ephebium, 41.
filamentosum, 23.
giganteum, 24.
gloeosporum, 12, *14*, 15, Pl. 6.
grammicum, 52.
hinnuleum, 54.
javanicum, 17.
lacteum, 19.
laetum, 18.
laeve, 14, 15.
latitans, 21.
leucothrix, 35.
luteocystidiatum, 12, *13*.
mauritianum, 16.
molle, 16, 58.
Mollerianum, 22.
myxosporum, 21.
nudum, 19, 25.
ochraceo-fulvum, 59.
ochrofarctum, 13.
olivaceum, 35.
pallidum, 12, *13*, 14, Pl. 5.
pelliculare, 19.
Petersii, 23.
portentosum, 19, 51, 52, 53.
radicatum, 23
roseo-cremeum, 21.
roseolum, 18.
roseum, 18.
Roumeguerii, 22.
salmonicolor, 13, *17*, 18, Pl. 10.
scutellare, 12, *16*, Pl. 9.
seriale, 13.
tristiculum, 46.
tuberculosum, 25.
tumulosum, 12, *17*.
vagum, 19.
Zimmermanni, 17.

**Cytidia** flocculenta, 15.

**Dichostereum**, 53.

**Duportella**, 5, 43, *46*, 50.
tristicula, 45, *46*, *47*, 58, Pl. 31, Pl. 32.
tristiuscula, 46.
velutina, 46.

**" Erineum "** gall., *12*, Pl. 4.

**Exobasidium**, 5, *11*.
Andromedae, 11.
Arctostaphyli, 11.
Azaleae, 11.
cassandrae, 11.
discoideum, 11.
Giseckiae, *11*, Pl. 3, Fig. 2.
Karstenii, 11.
Myrtilli, 11.
oxycocci, 11.
Peckii, 11.
Rhododendri, 11.
Vaccinii, *11*, Pl. 3, Fig. 1.
Vaccinii-Myrtilli, 11.

**Fomes**, 55.

**Fusidium** Vaccinii, 11.

**Gloeocystidium.**
argillaceum, 13, 14.
pallidum, 13
pallidum subsp. argillaceum, 13.

**Grandinia**, 5, *60*.
bicolor, *60*.
rosea, 61.

**Grammothele**, 5, *59*.
cineracea, 60.
liniata, 60.
mappa, 59, 60, Pl. 45.
polygramma, 60.
pseudomappa, *59*, *60*, *63*, Pl. 44.

**Gyrophana** himantioides, 31.

**Helicobasidium**, 5, *7*.
compactum, *7*, Pl, 2.
longisporum, 7, 8.
mompa, 8.
mompa forma macrosporum, 7.
purpureum, *8*.
purpureum var. orientale, 7.

**Helicobasis** purpureus, 8.

**Helvella** mesenterica, 6.

**Heterochaete** andina, *10*.

**Hydnum**, 5.
alnicolum, 55.
ambiguum, 62.
argutum, *61*.
Daviesii, 55.
microdon, 55.
mucidum, 62.
ochraceum, 55, 56, 62.
pudorinum, 55, 62.
sclerodontium, 62.
stipitatum, *61*.

**Hymenochaete**, 5, 43, *48*.
bonariensis, 41.
castanea, 46, 47.
cervina, 49.
cinerascens, 40.
corrugata, 48.
crassa, 42.
Dregeana, 57, 59.
Ellisii, 35.
fasciculata, *48*, 49, Pl. 33.
fuliginosa, 48, 49.
fuscoviolascens, 50, 62.
griseocervina, 43.
Kalchbrenneri, 42.
lictor, 49.
luteobadia, 45, 50.
multispinulosa, 42.
nigricans, 45.
ochromarginata, 48, *49*, 50, Pl. 35.
olivaceum, 43.
purpurea, 42.
rigidula, 50.
rubiginosa, 45, 50.
scabriseta, 42.
semistupposa, 48, *49*, Pl. 34.
tabacina, 50.
tenuissima, 50.
tristicula, 46, 47, 50.
tristiuscula, 46.
umbrina, 42.
vinosa, 42.

**Hypochnus.**
acerinus, 28.
Bagliettoanus, 9.
Eylesii, 63.
olivaceus, 35.
pallescens, 53, Pl. 37.
puniceus, 63.
purpureus, 8.
thelephoroides, 53.

**Irpex**, 11.

**Kneiffia.**
purpurea, 42.
Roumeguerii, 22.
setigera, 21.

**Leptodon** ochraceum, 55.

**Licentia** yao-chanica, 56, 57.

**Lloydella**, 57.
Beyrichii, 40.
bicolor, 39.
cinerascens, 40.
occidentalis, 41.
scabriseta, 42.
Schomburgkii var. brunnea, 43.

**Lopharia**, 5, *56*.
Dregeana, 19, 47, *57*, 58, Pl. 42.
javanica, 57, 58, 62.
lirellosa, 56, 57.
mirabilis, 41, *56*, 57, 58, 59, 62, Pl. 41.

**Merulius**, 5, *29*.
confluens, 30, 31, 33.
corium, 29, *30*, 31, 33, Pl. 20.
gelatinosus 29, *32*, 33, Pl. 22.
himantioides, 29, *31*, 32, 33, Pl. 21.
lacrymans, 32, 33, Pl. 21.
papyrinus, 30.
serpens, 33.
squalidus, 31, 32, 33.
strigoso-zonatus, 28.
tenuis, 31.
umbrinus, 31, 32, 33.

**Mycinema** phosphoreum, 15.

**Mycoleptodon** ochraceum, *55*, 62, Pl. 40.

**Necator** decretus, 17, 18.

**Odontia**, 5, *61*.
arguta, *61*, Pl. 46.
crustosa, 62.
knysnana, *61*, 62, Pl. 47.
setigera, 21.

**Peniophora**, 5, *20*.
arenata, 20, *22*.
argillacea, 13, 14.
aspera, 20, *21*, 36, Pl. 13.
atrocinerea, 43, 44.
Berkeleyi, 40.
byssoidea, 21.
carneola, 13.
cinerascens, 40.
cinerea, 19, 24, 25, 42.
cremea, 20, 25.
dissita, 41.
ephebia, 41.
filamentosa, 20, *23*, 24, Pl. 15.
gigantea, 20, 23, *24*, Pl. 16.
glebulosa, 25.
intermedia, 42,
laevigata, 47.
leprosa, 22.
macra, 22.
Molleriana, 22.
moricola, 40.
neglecta, 41.
nuda, 19, 25.
occidentalis, 41.
pallidula, 21.
pelliculosa, *20*, 25, *63*, Pl. 12.
pubera, 23.
radicata, 23.
Roumeguerii, 20, *22*, 23, 41, Pl. 14.
Schweinitzii, 40.
setigera, 21.
stratosa, 22.
subiculosa, 20.
tomentella, 21.
unicolor, 23.

**Phlebia**, 5, *28*, 29.
mesenterica, 6.
hispidula, 29.
pileata, 28.
reflexa, 28.
rubiginosa, 28.
rugosissima, 28.
strigoso-zonata, *28*, Pl. 19.
zonata, 28.

**Polyporus**
nidulans 24.
purpurascens, 30.
rutilans, 24.

**Polystictus** tabacinus, 50.

**Poria**, 11, 57, 63.
Ravenalae, 60.
versipora, 63.

**Porothelium**, 63.

**Ptychogaster**, 26.

**Punctularia**, 5, *25*.
affinis, *25*, Pl. 17.
atropurpurascens, 25, 26.
tuberculosa, 25, 26.

**Radulum**, 5, 57, 62.
javanicum, 62.
membranaceum, 19.
mirabile, 56, 62.
orbiculare, 62.

**Reticularia**
affinis, 25, 26.
atropurpurascens, 25.
atrorufa, 25, 26.
pyrrhocreas, 26.
venulosa, 25, 26.

**Rhizoctonia**, 8.
crocorum, 8.
medicaginis, 8.
violacea, 8.

**Sclerotium** crocorum, 8.

**Sebacina**, 5.
africana, 10.
epigaea, 10.

**Septobasidium**, 5, *8*, 63.
Bagliettoanum, 9, *10*.
bogoriense, 9, *10*.
carestianum var. natalense, 9, 10.
compactum, 7.
Curtisii, 9, 10.
grandispinosum. 9, 10.
griseopurpureum, 9.
mompa, 7, 10.
natalense, *9*.
philippinense, 9, *10*.
protractum, *9*.
pseudopedicellatum, *9*.
Schweinitzii, *9*.

**Steccherinum** ochraceum, 55.

**Stereum**, 5, *37*.
acerinum, 28.
acerinum var. longisporum, 26
adnatum, 38, 39, 45.
albobadium, 45.
albocinctum, 52, 53, Pl. 37.
atrocinereum, 43, 44, 45.
balsameum, 37.
balsameum f. reflexum, 37.
bicolor, 37, *39*, 40, 45, 62, Pl. 26.
cinerascens, 37, *40*, 41, 57, 58, 59, Pl. 27.
coffeatum, 39.
crassum, 42.
crispum, 37.
dissitum, 41.
duriusculum, 45, 51, 52, 53.
elegans, 45.
fasciatum, 45, 50.
fuscum, 39, 45.
induratum, 52, 53, Pl. 37.
laxum, 45.
lugubris, 29.
luteobadium, 45.
membranaceum, 43, 44, 45.
moricolum, 40.
neglectum, 41.
pannosum, 39, 40.
papyrinum, 43.

percome, 45, 47.
pruinatum, 45.
purpurascens, 41.
retirugum, 43.
rigens, 38.
rimosum, 39, 45.
rimosum var. africanum, 37, *38*, 39, 45.
rubiginosum, 45, 50.
sanguinolentum, *37*, 38, Pl. 25.
Schomburgkii, 19, 37, 40, *43*, 44, 45, 47, 58, Pl. 29, Pl. 30.
Thozetii, 45.
umbrinum, 25, 37, *41*, 43, 47, Pl. 28.

**Stypinella** purpurea, 8.

**Thanatophyton** crocorum, 8.

**Thelephora**, 5, 62.
acerina, 27, 28, 62.
albido-carnea, 54.
atro-coerulea, 15.
atropurpurascens, 25.
Beyrichii, 40.
bicolor, 39.
biennis, 62.
caerulea, 15.
cinerascens, 40.
confluens, 18.
corium, 30.
crassa, 42.
fimbriata, 15.
fusca, 39, 40.
fuscoviolascens, 62.
gigantea, 24.
hirsuta **B**, 37.
incarnata var. **B**, 30.
indigo, 15.
insinuans, 53.
mesenterica, 6.
olivacea, 36.
pallescens, 53.
pannosa, 39.
pedicellata, 63.
pergamenea, 24.
punicea, 63.
sanguinolenta, 37.
sericea **B**, 37.
vinosa, 39.

**Thelepora** cretacea, *63*, Pl. 48.

**Theleporus**
cretaceus, 63.
griseus, 63.

**Thwaitesiella** mirabilis, 56.

**Tomentella**, 5.
Eylesii, 63.
punicea, 63.

**Tremella**
epigaea, 10.

**Trichosporium** Curtisii, 25.

**Tuber** croci, 8.

**Vararia**, 54.
pallescens, 53.

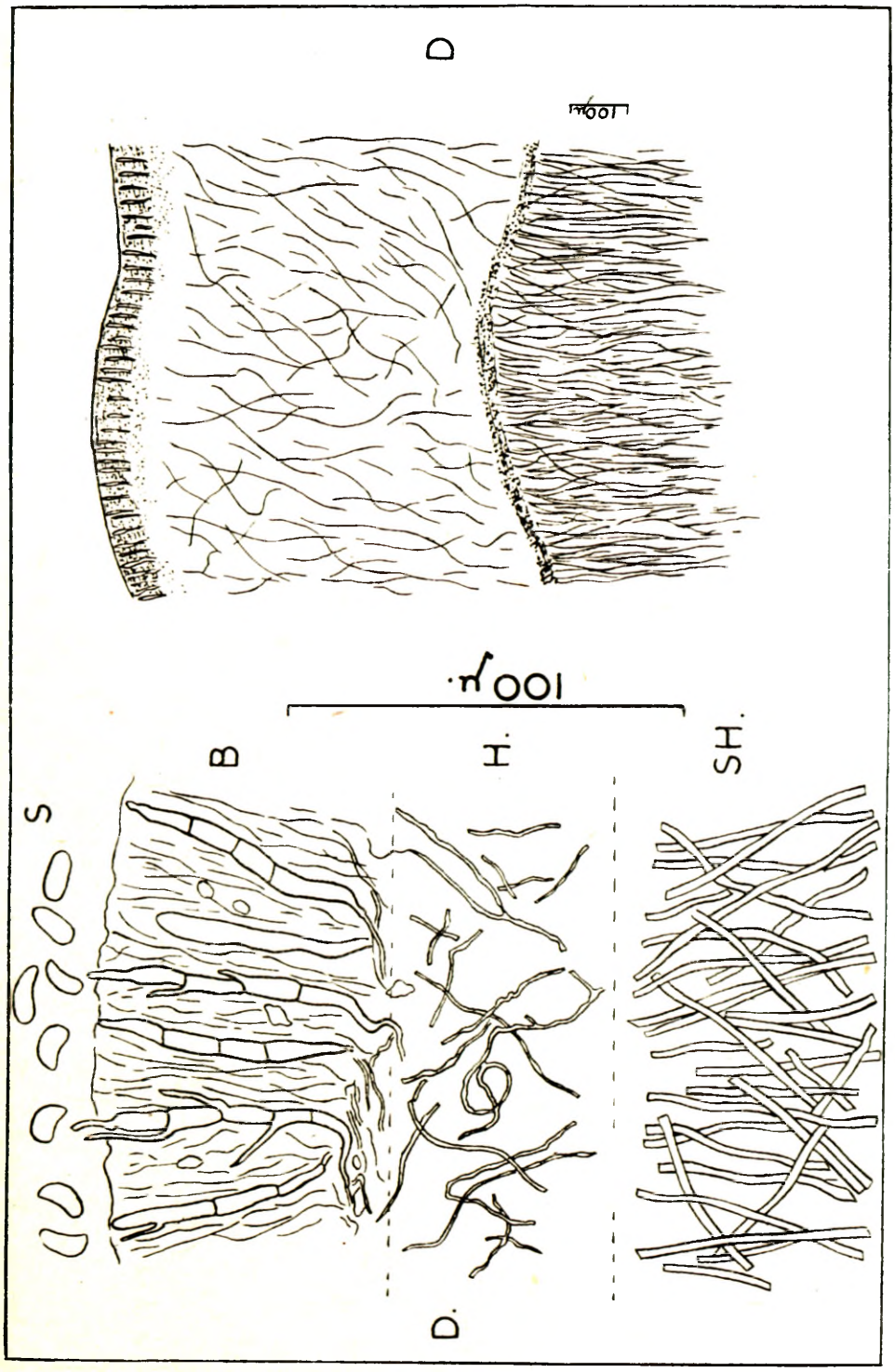


PLATE 1.
*Auricularia mesenterica* (Dicks ex Fr.) Fr.

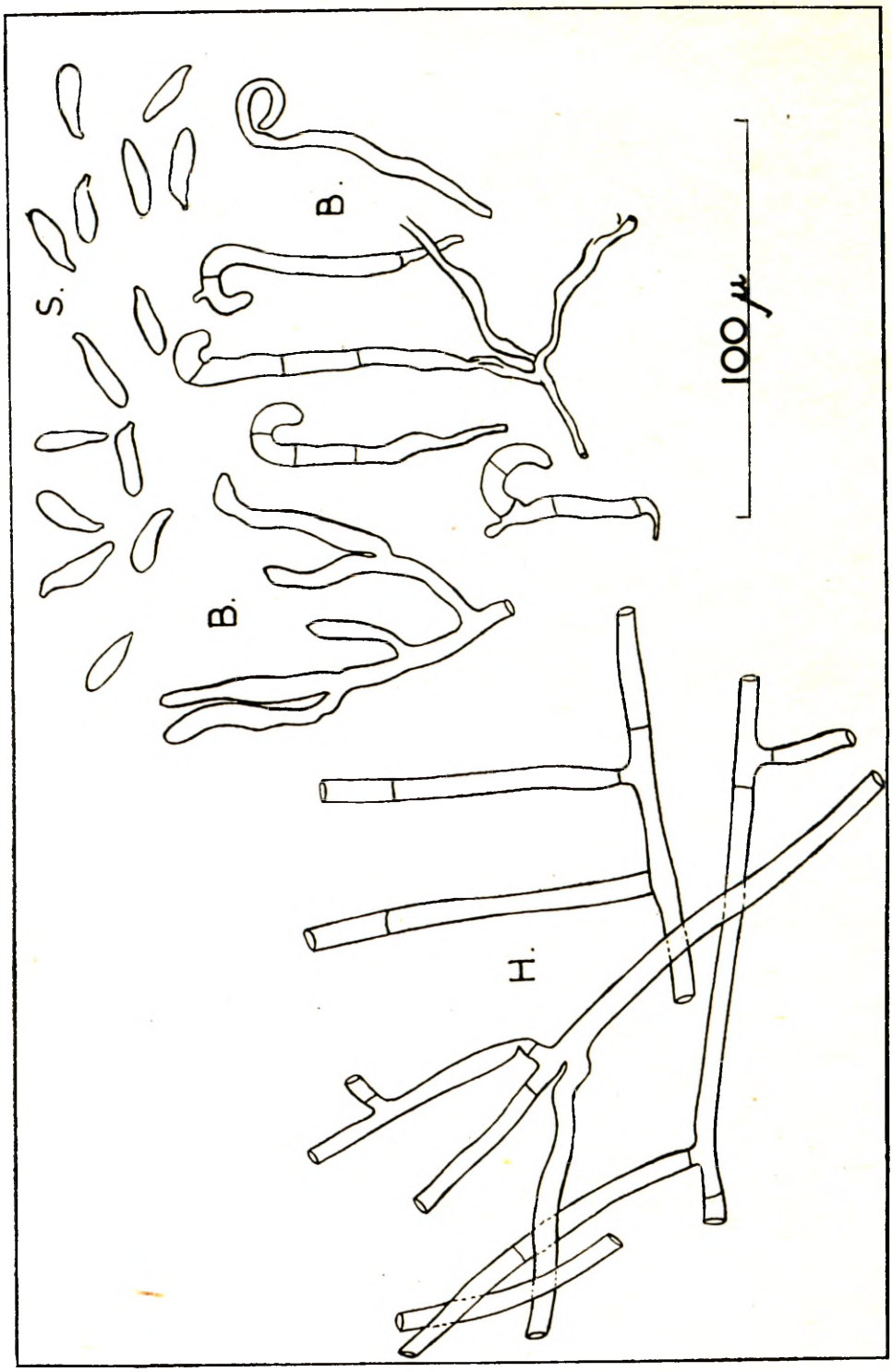


PLATE 2.
*Helicobasidium compactum* (Boedijn) Boedijn.

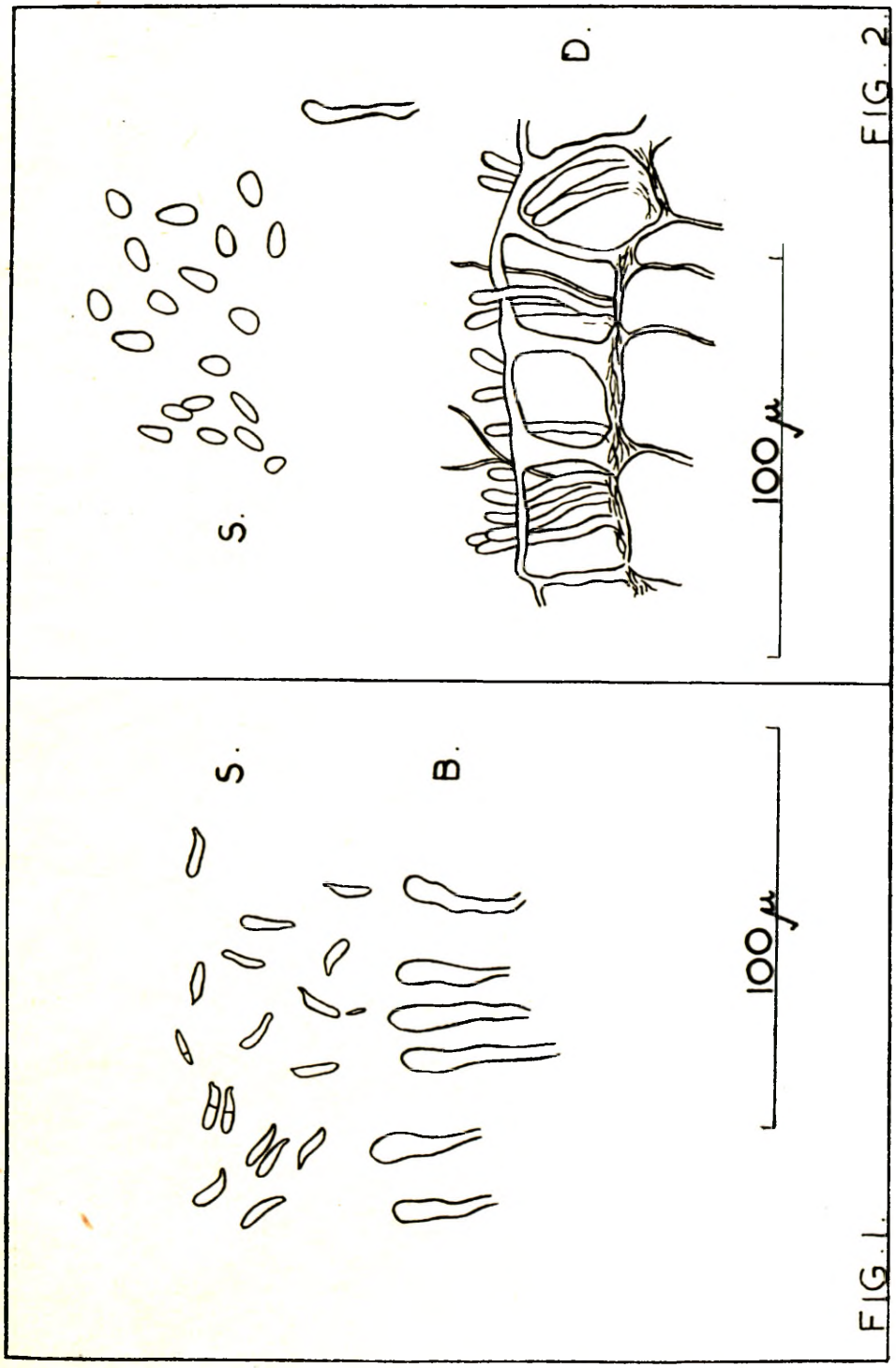


PLATE 3.
FIG. 1.—*Exobasidiumvacciniic* (Fuckel) Woronin.
FIG. 2.—*Exobasidium Gisekiae n*Allescher.

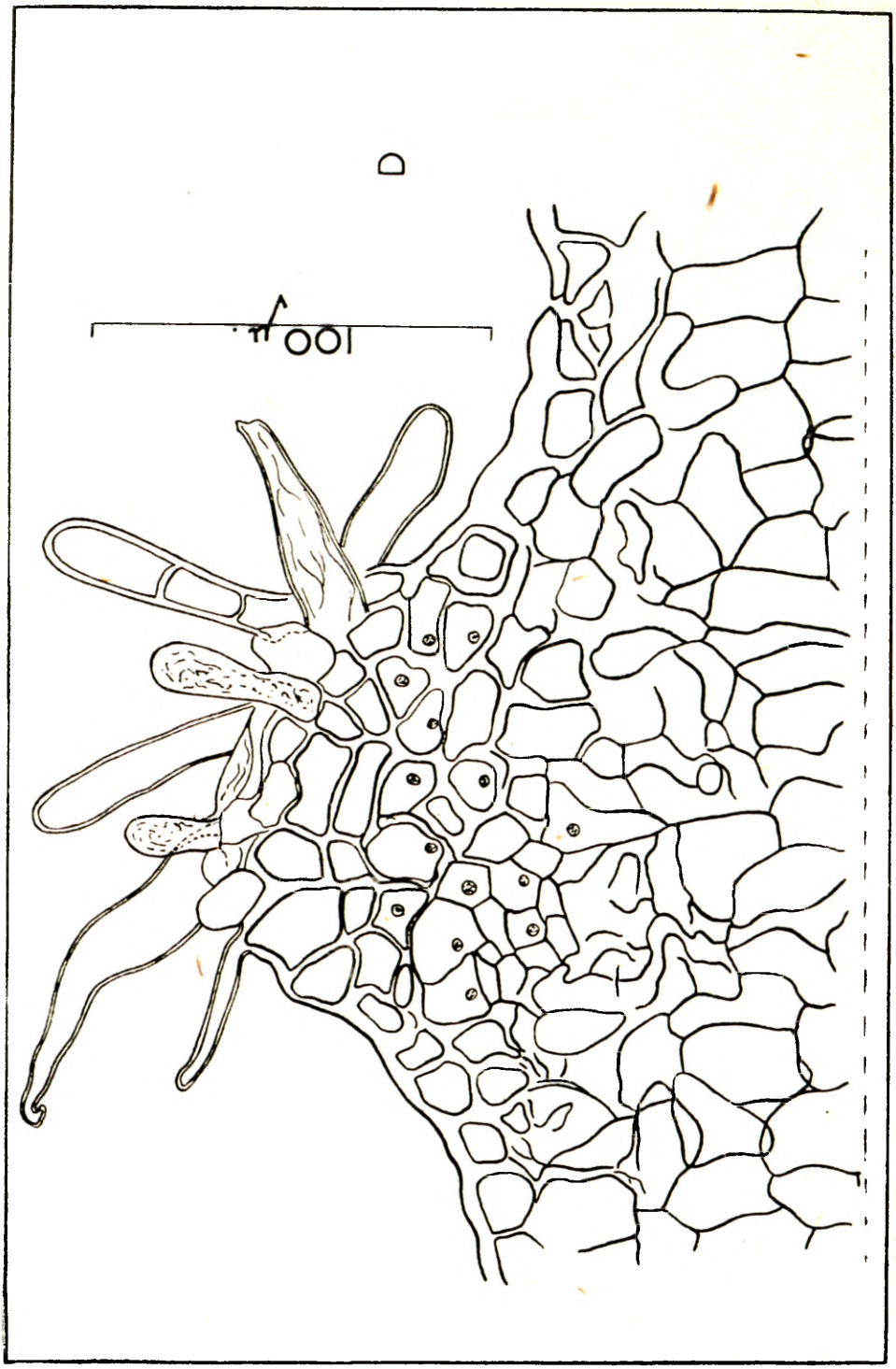

PLATE 4.
Transverse section of an " *Erineum* " gall on the leaf of *Gymnosporia buxifolia*.

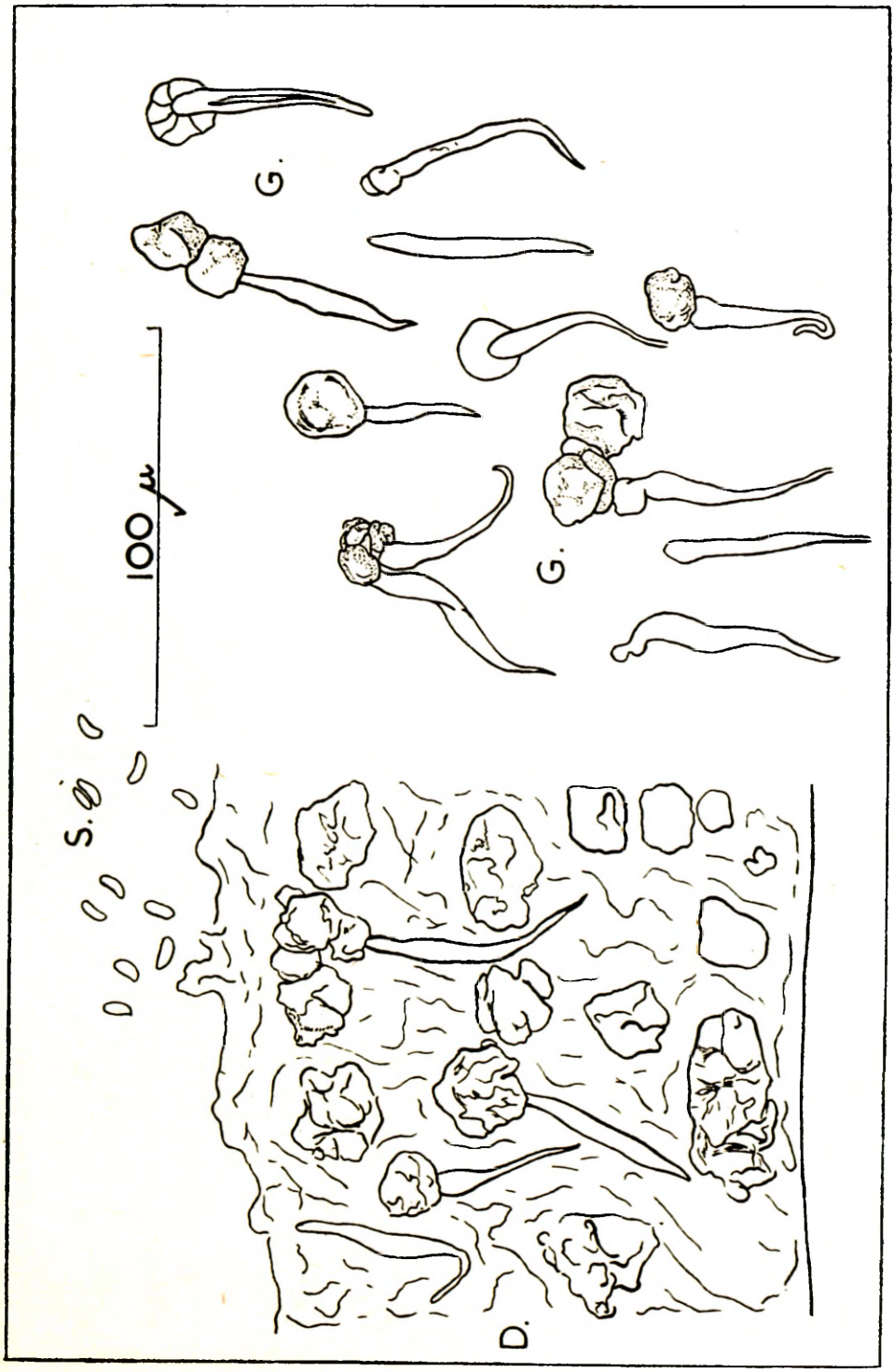


PLATE 5.
*Corticium pallidum* Bres.

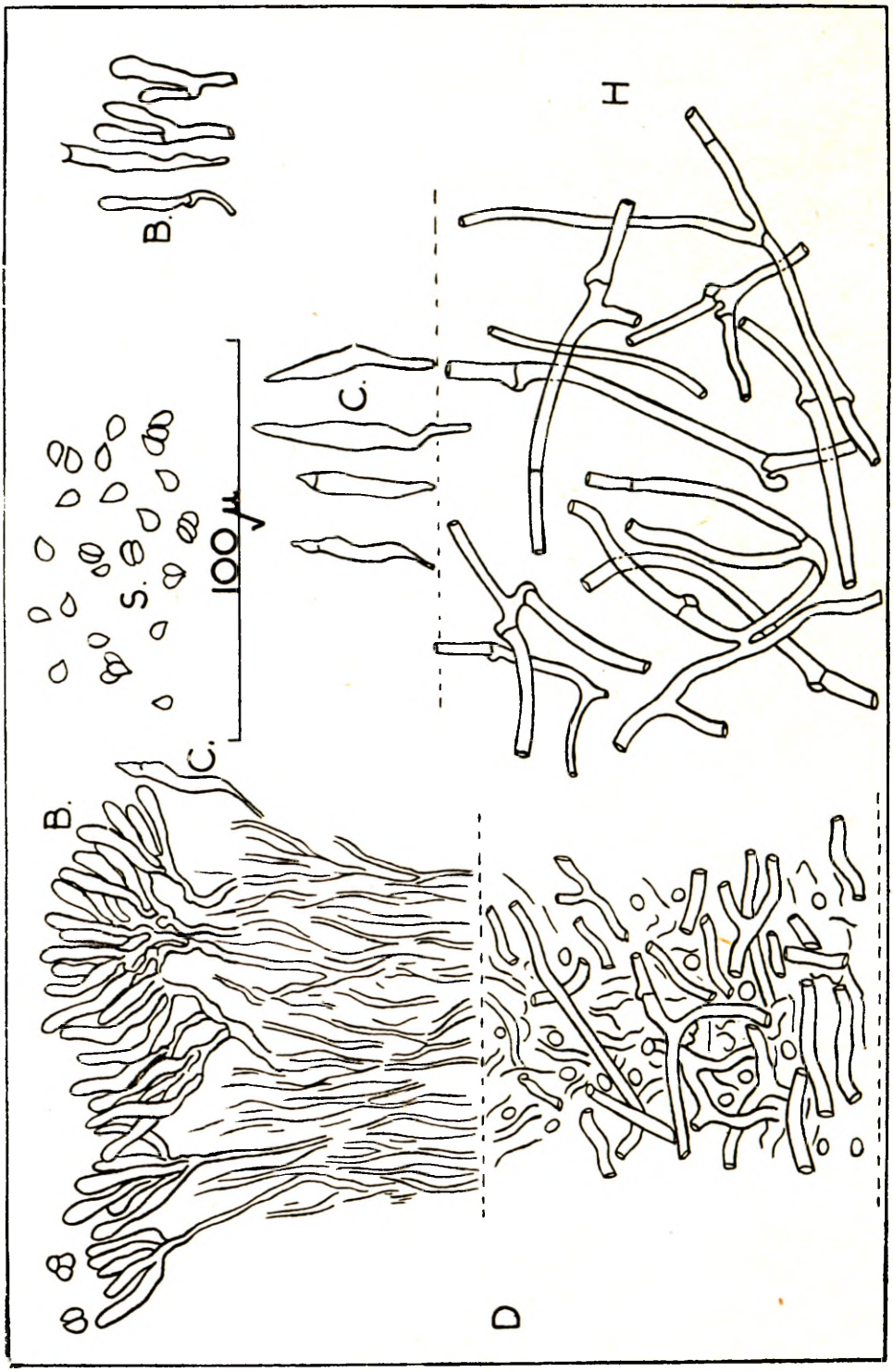


PLATE 6.
*Corticium gloeosporum* Talbot.

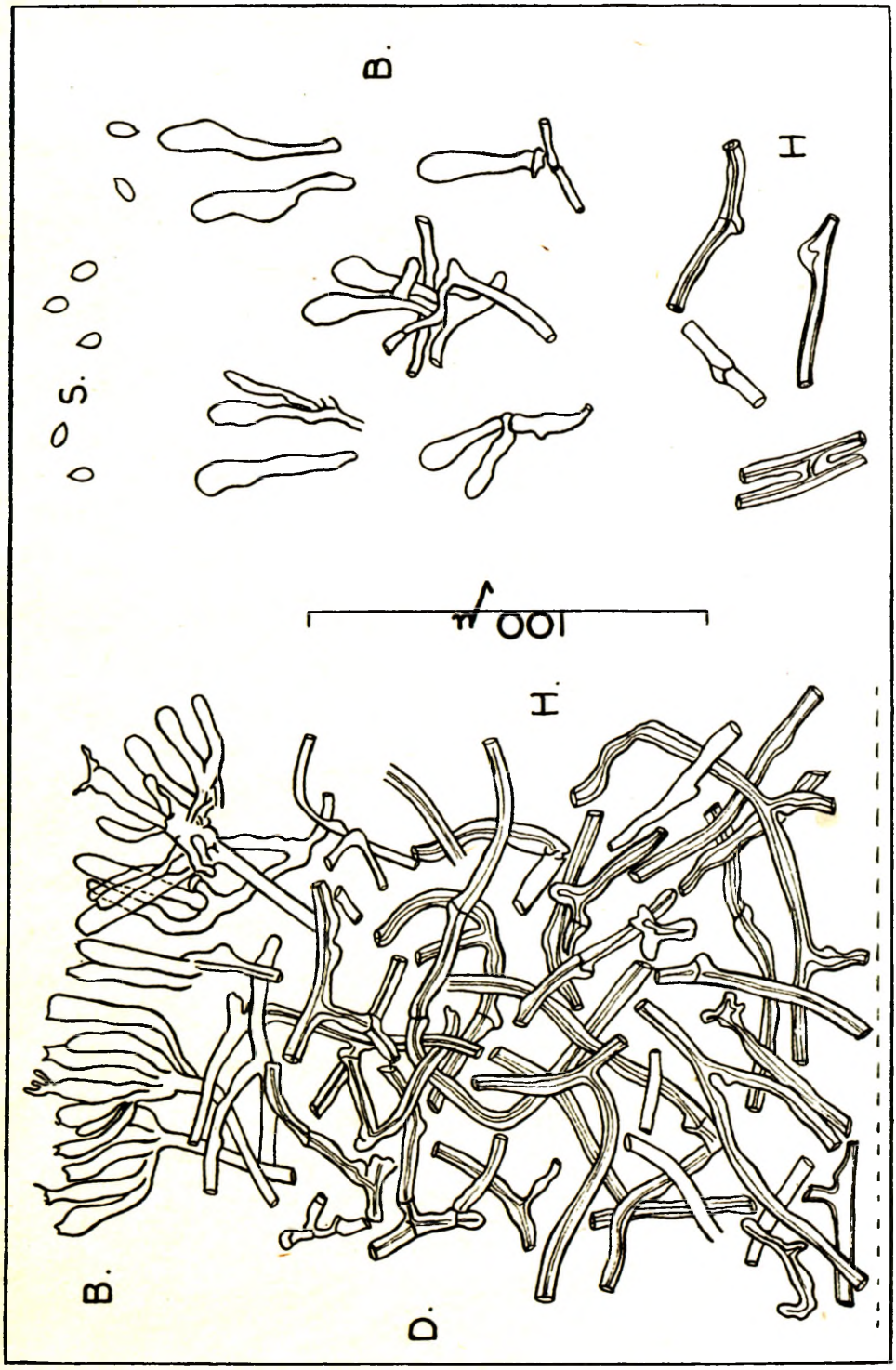


PLATE 7.
*Corticium caeruleum* (Schrad. ex. Fr.) Fr.

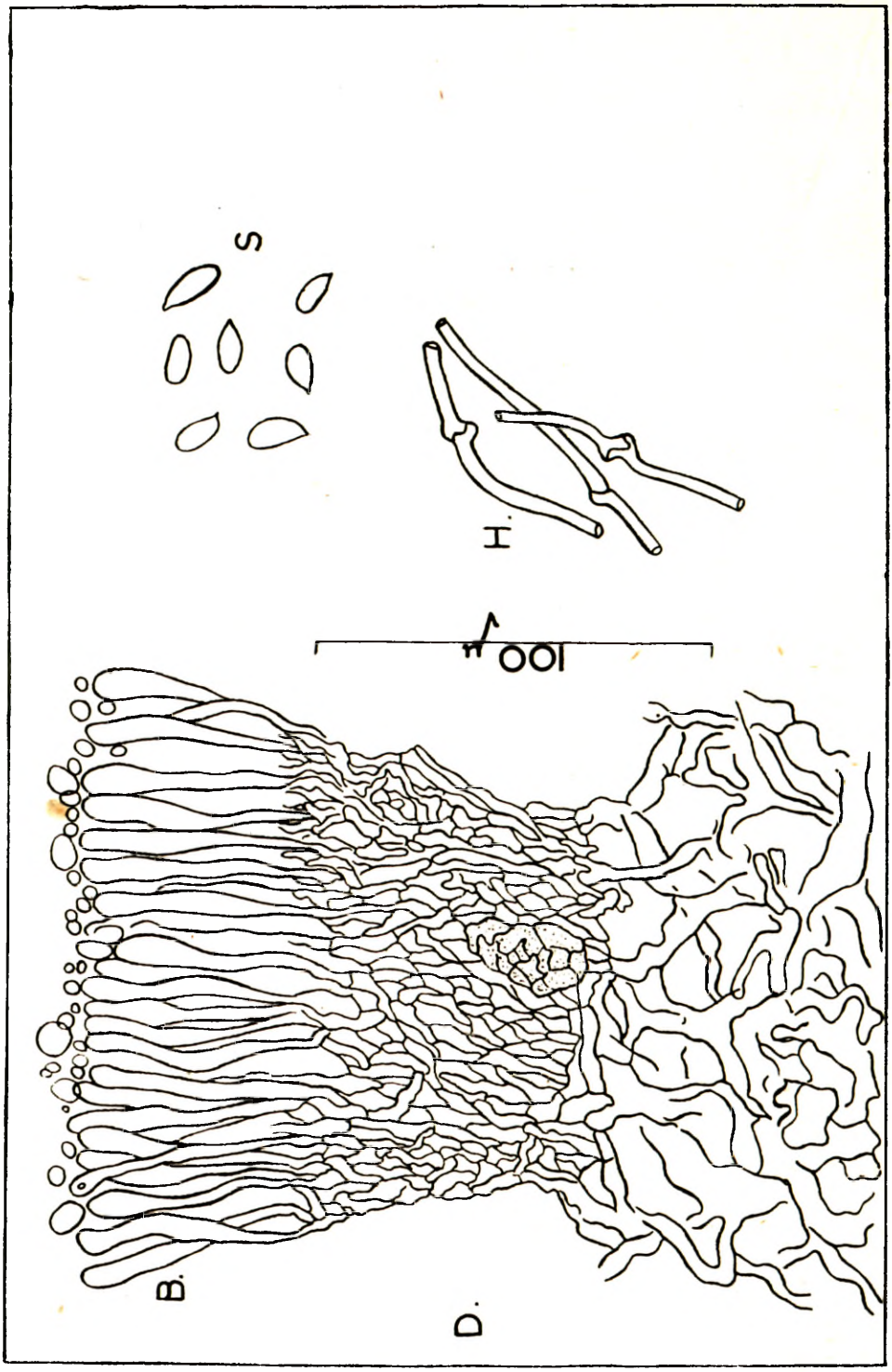


PLATE 8.
*Corticium armeniacum* Sacc.

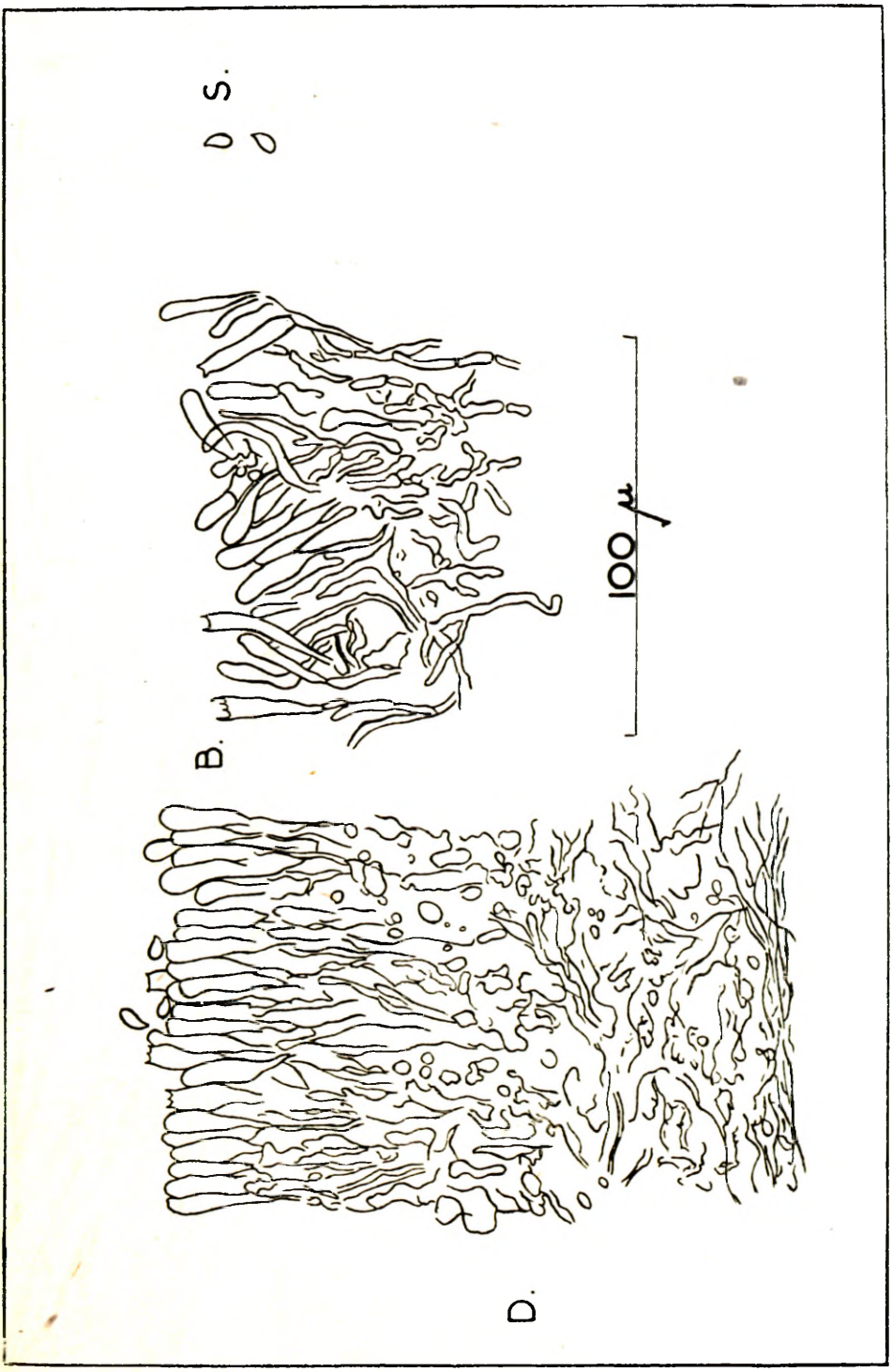


PLATE 9.
*Corticium scutellare* B. & C.

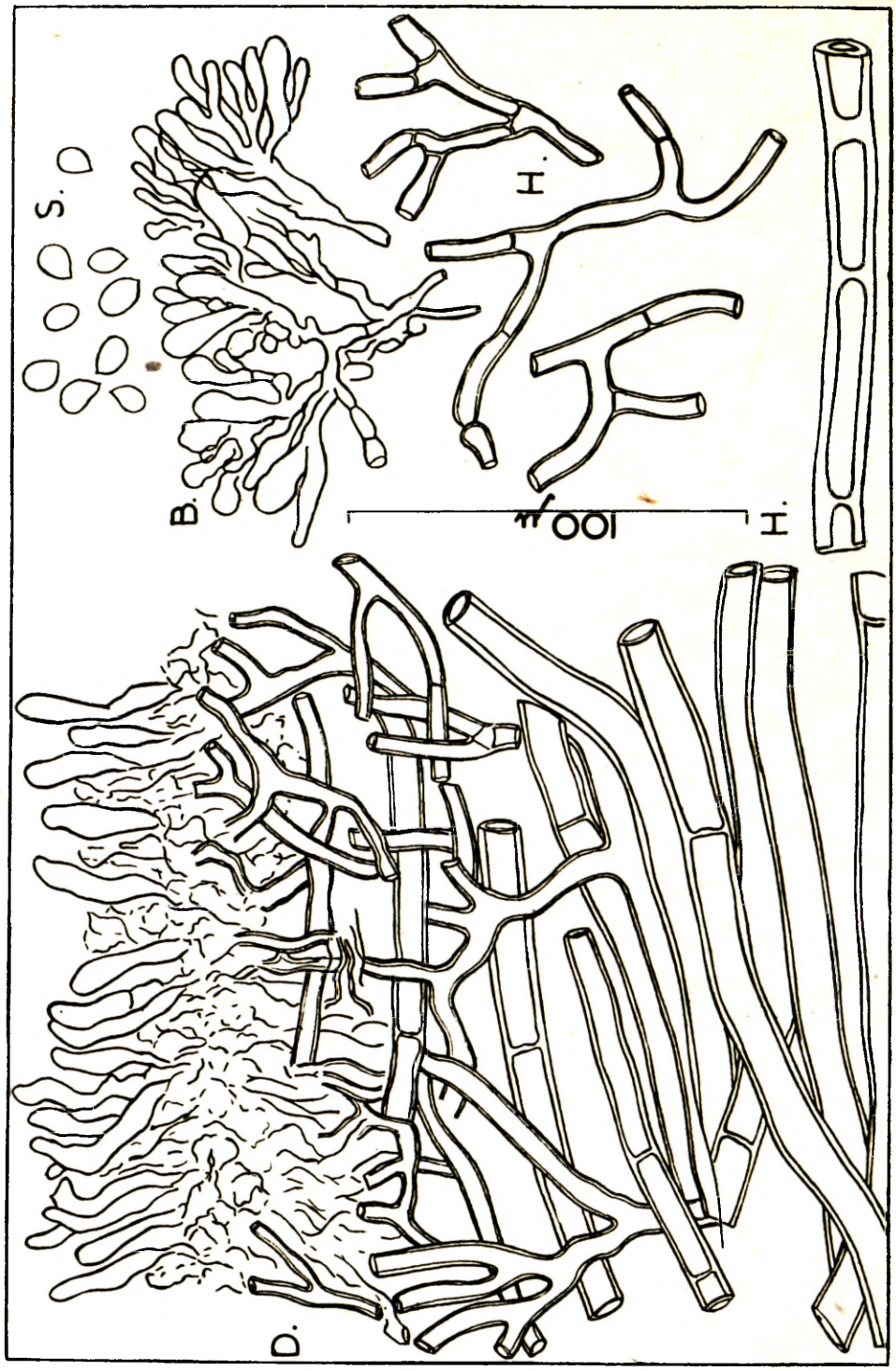


PLATE 10.
*Corticium salmonicolor* B. & Br.

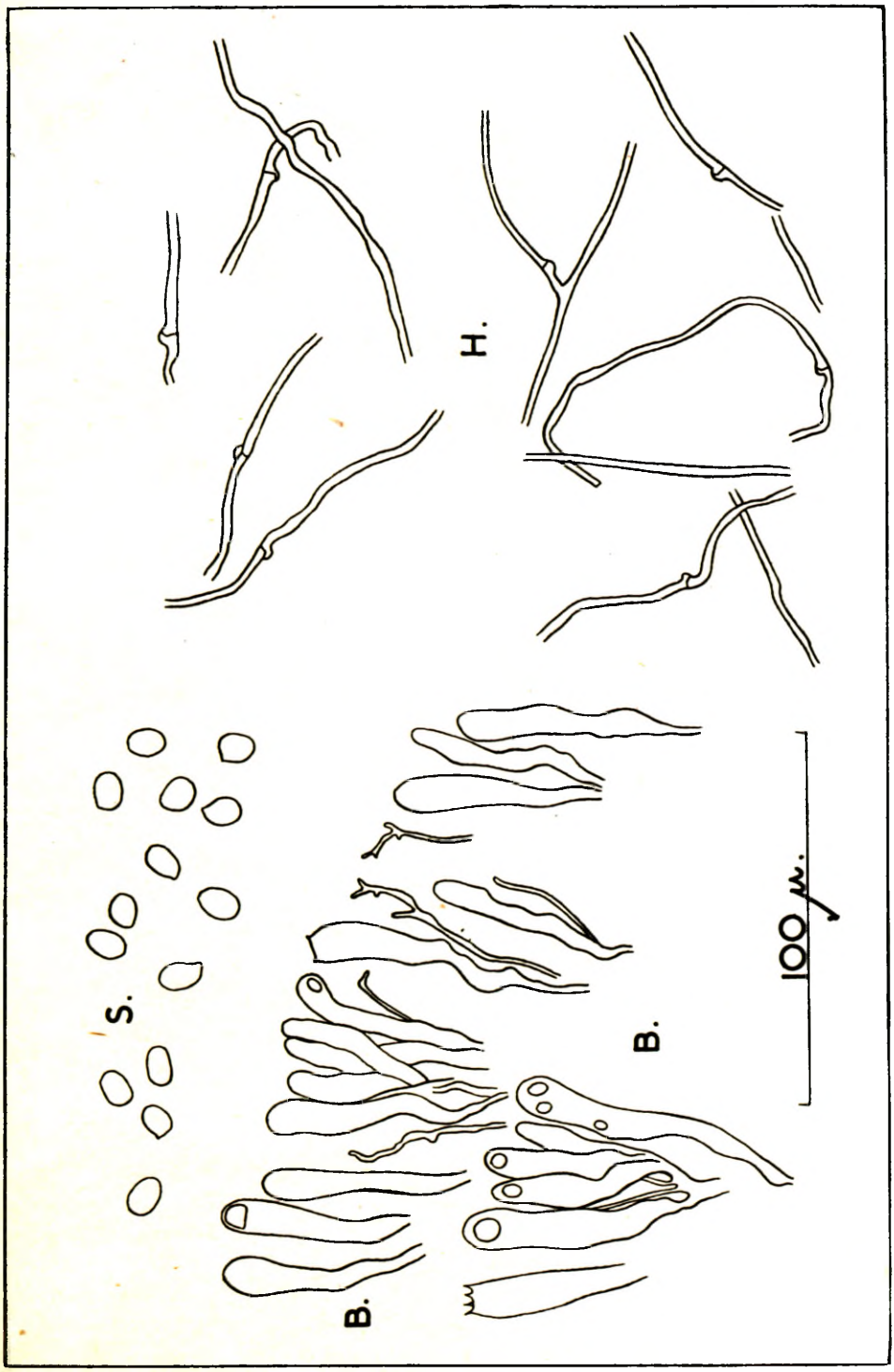


PLATE 11.
*Corticium confluens* (Fr.) Fr.

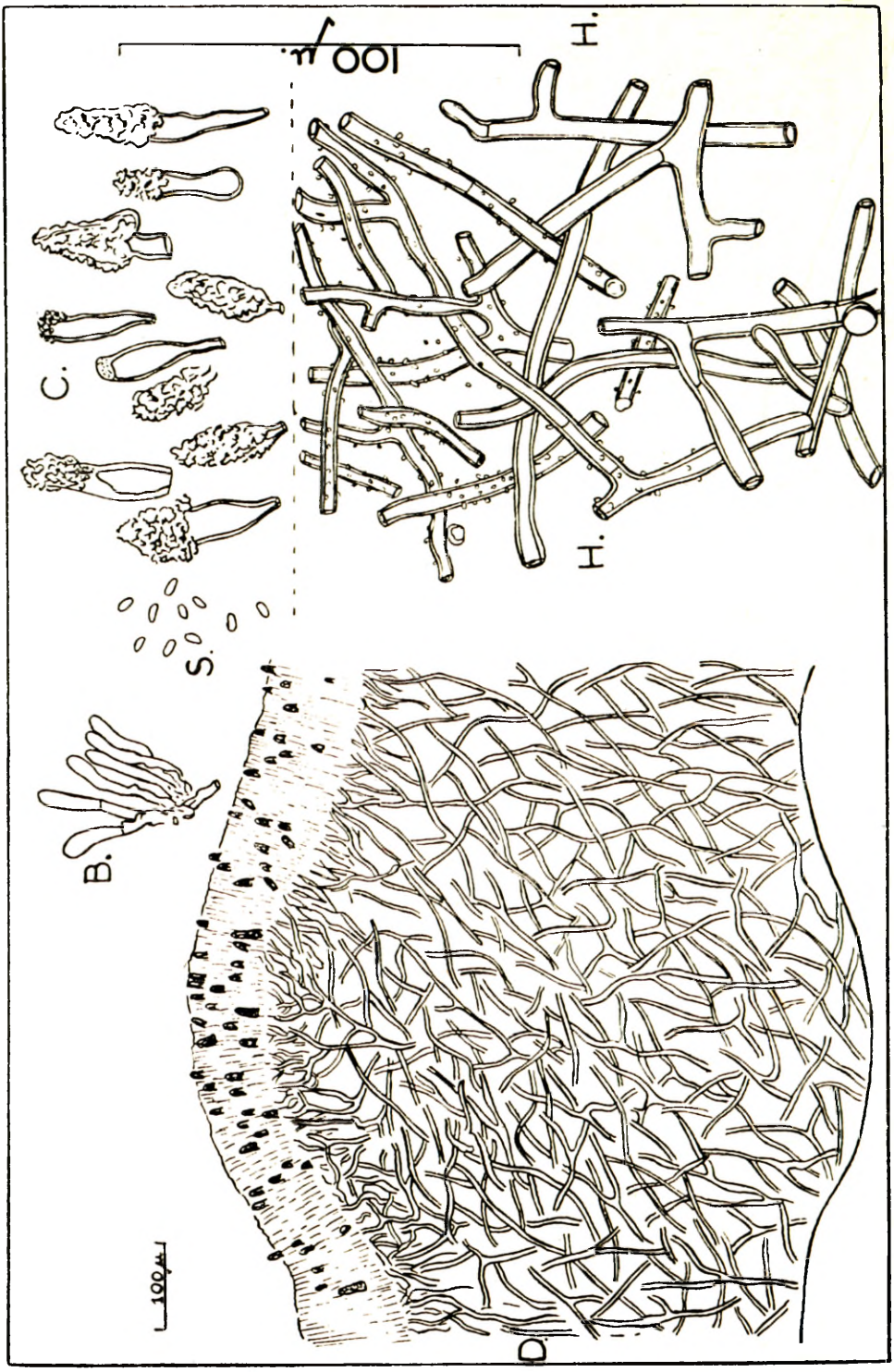


PLATE 12.
*Peniophora pelliculosa* sp. nov.

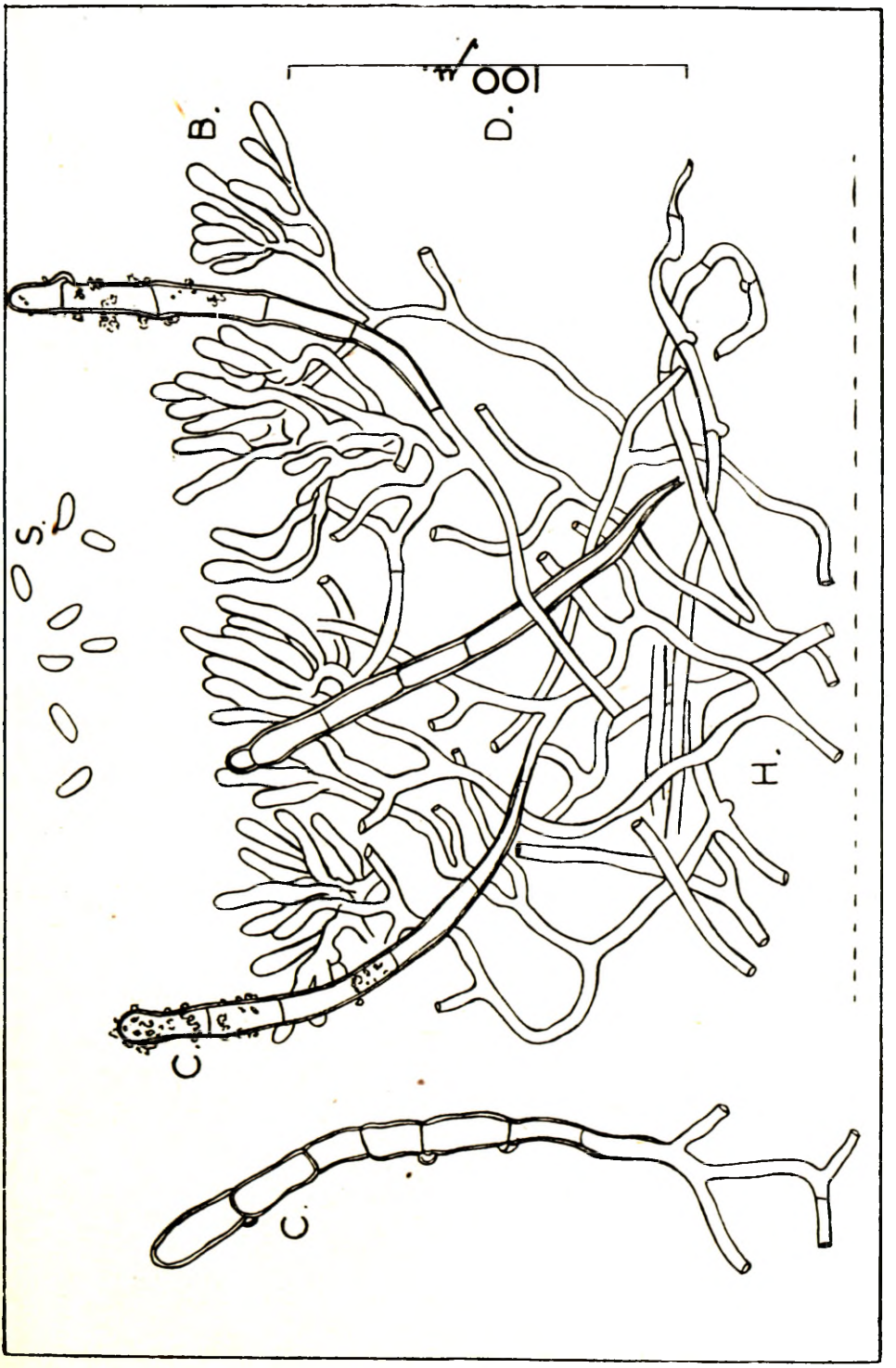


PLATE 13.
*Peniophora aspera* (Pers.) Sacc.

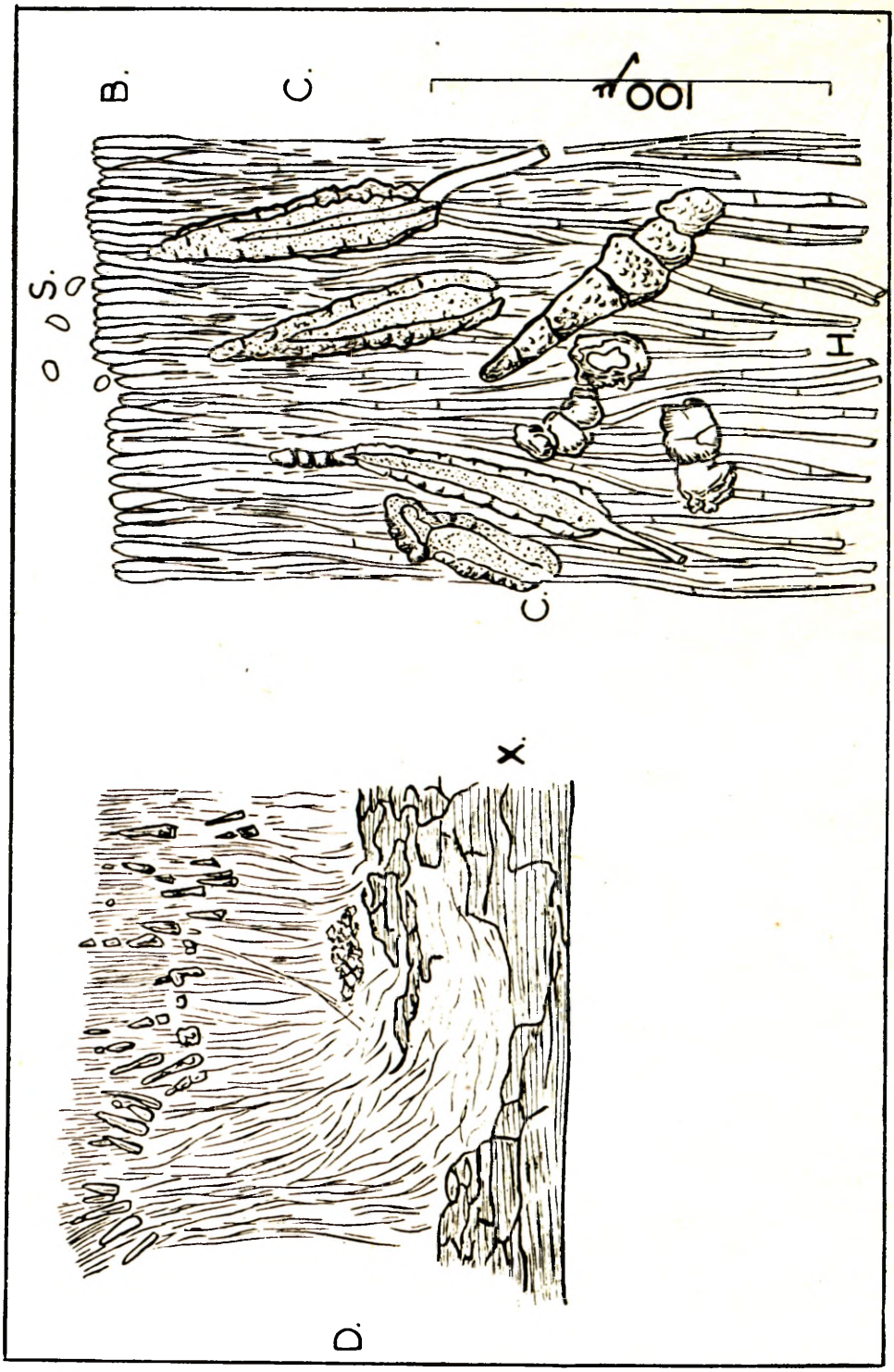


PLATE 14.
*Peniophora Roumeguerii* (Bres.) Burt.

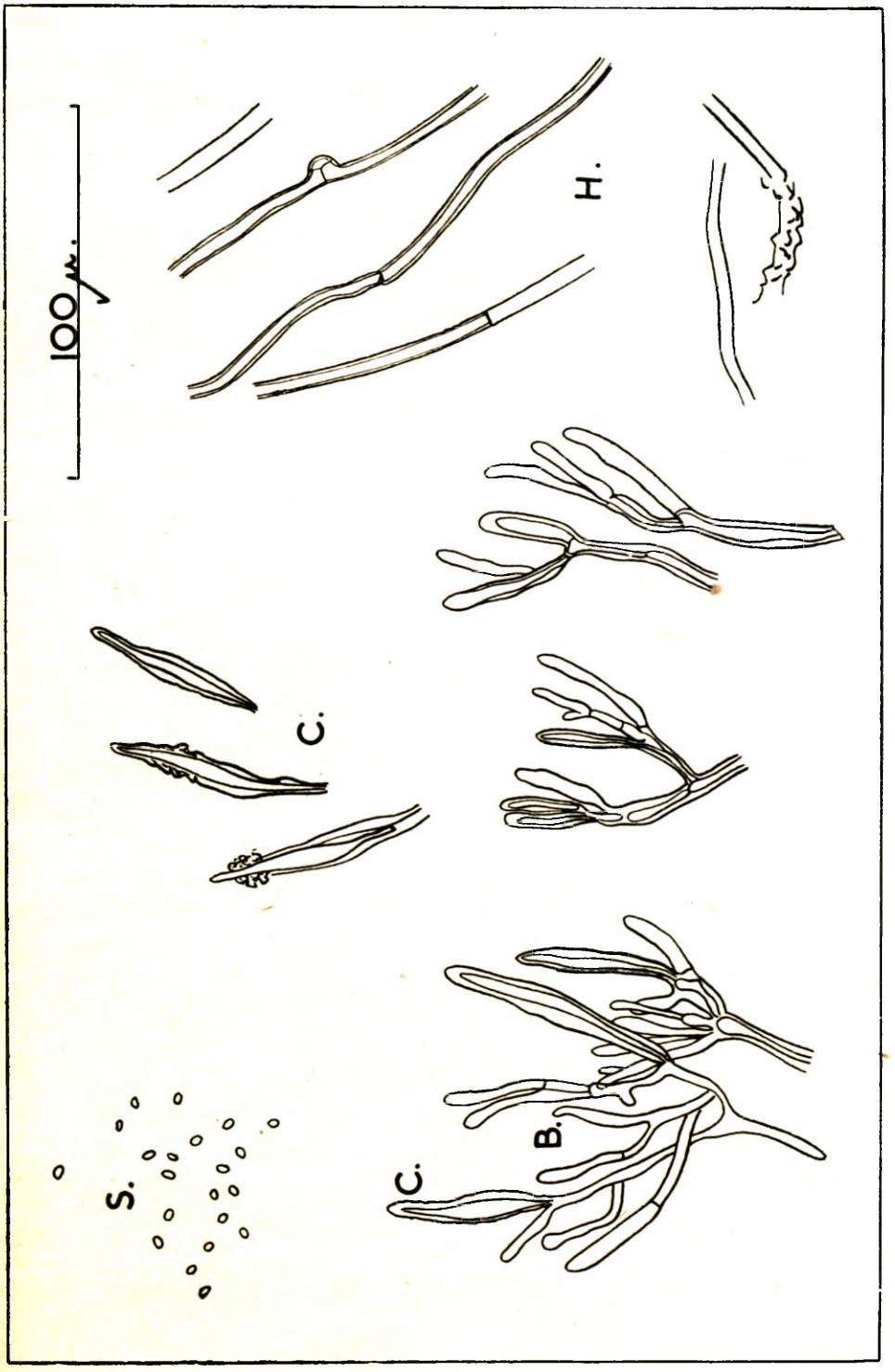


PLATE 15.
*Peniophora filamentosa* (B. & C.) Burt.

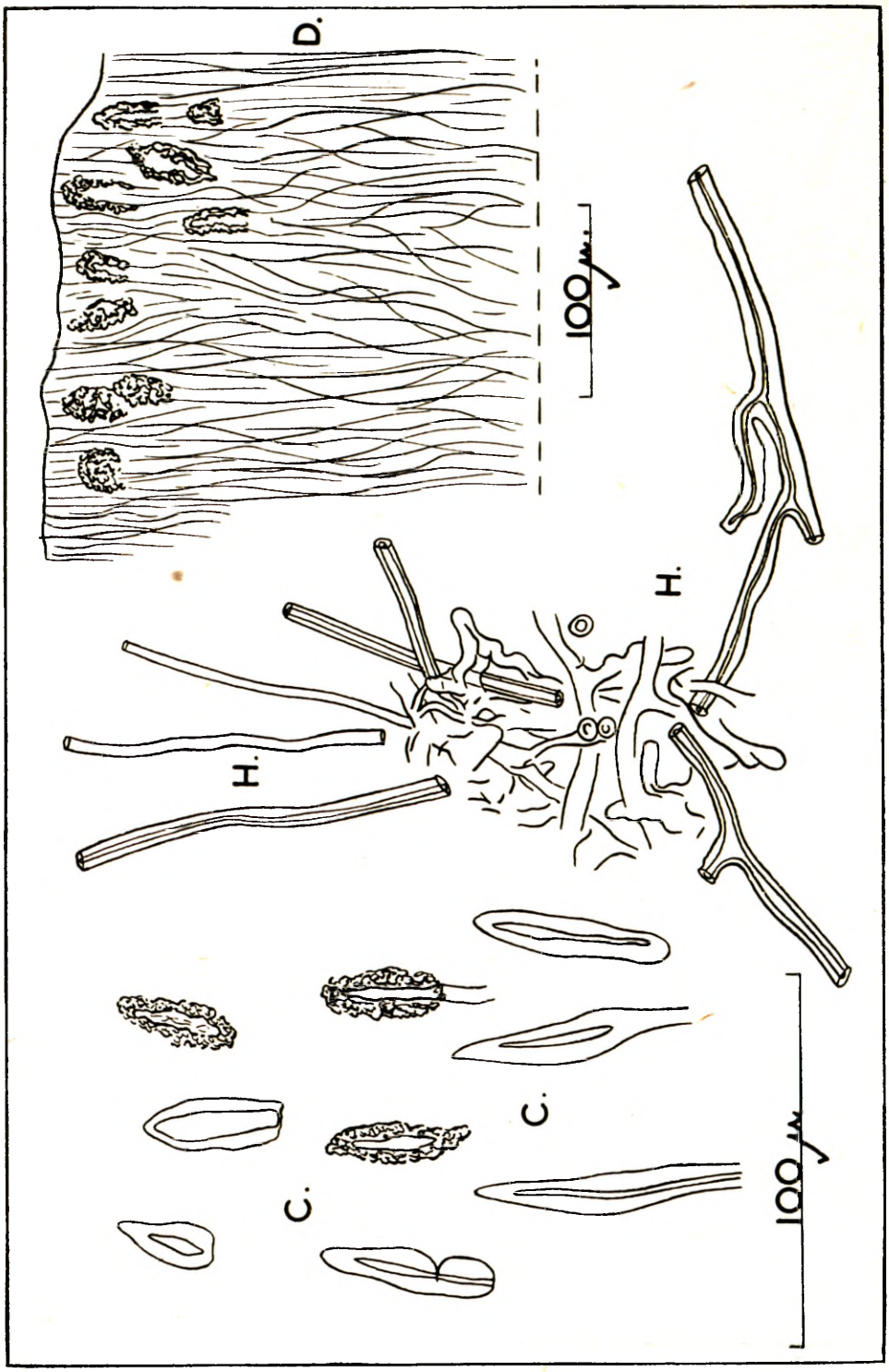


PLATE 16.
*Peniophora gigantea* (Fries.) Massee.

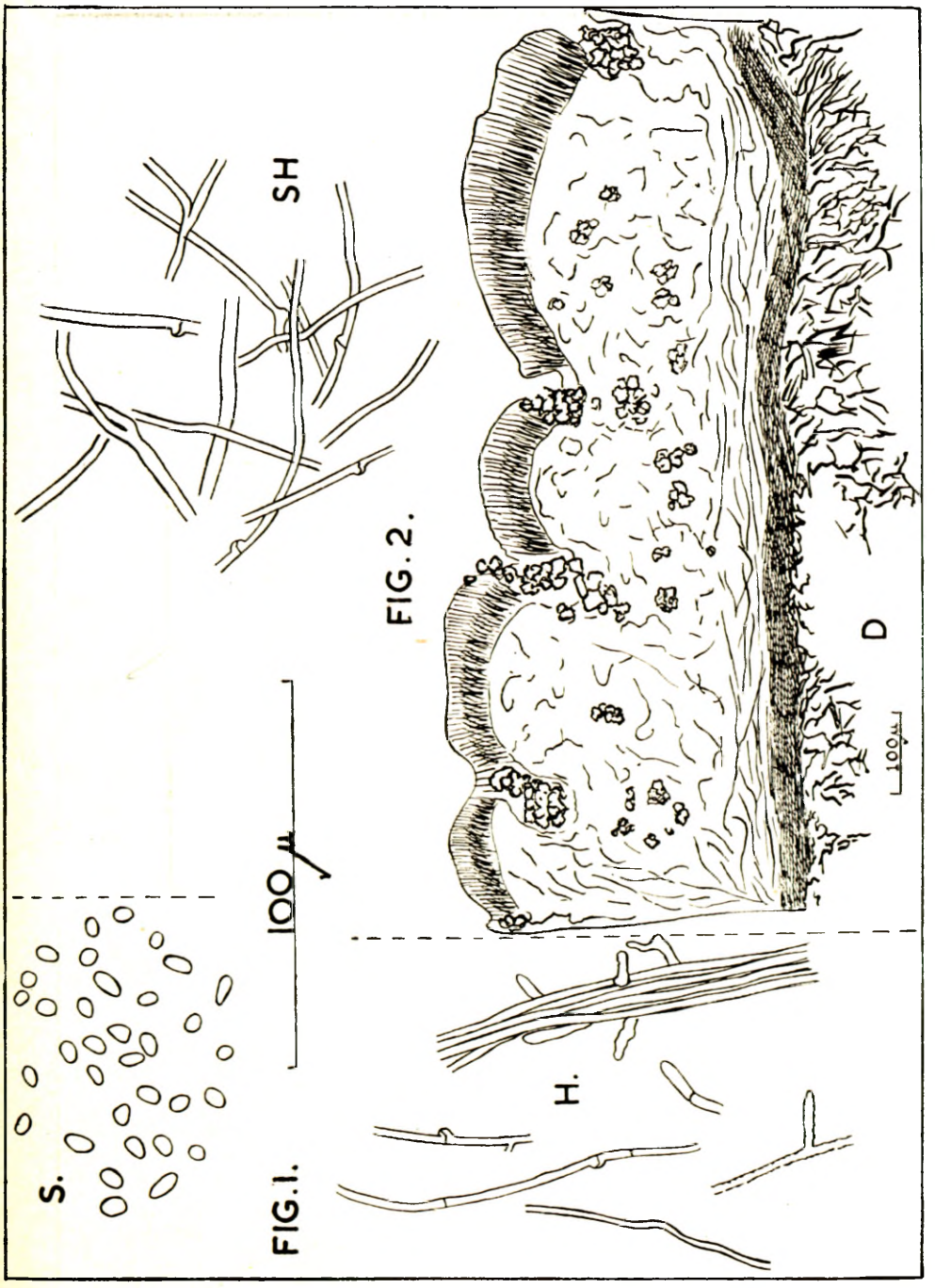


PLATE 17.

FIG. 1.—*Punctularia affinis* (B. & C.) comb. nov. conidial stage.

FIG. 2.—*Punctularia affinis* (B. & C.) comb. nov.

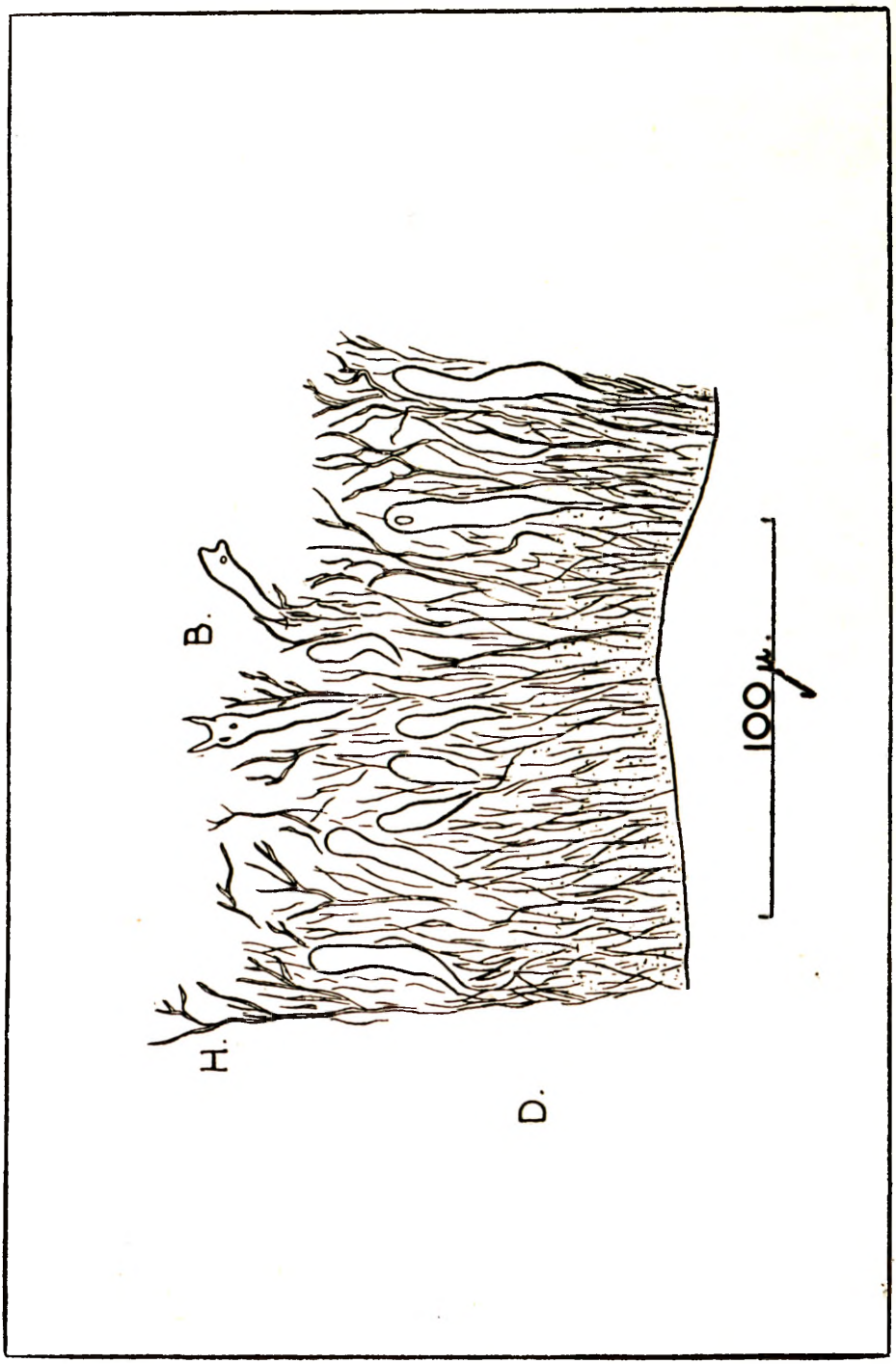


PLATE 18.
*Aleurodiscus acerinus* var. *longisporus* Höhnel & Litsch.

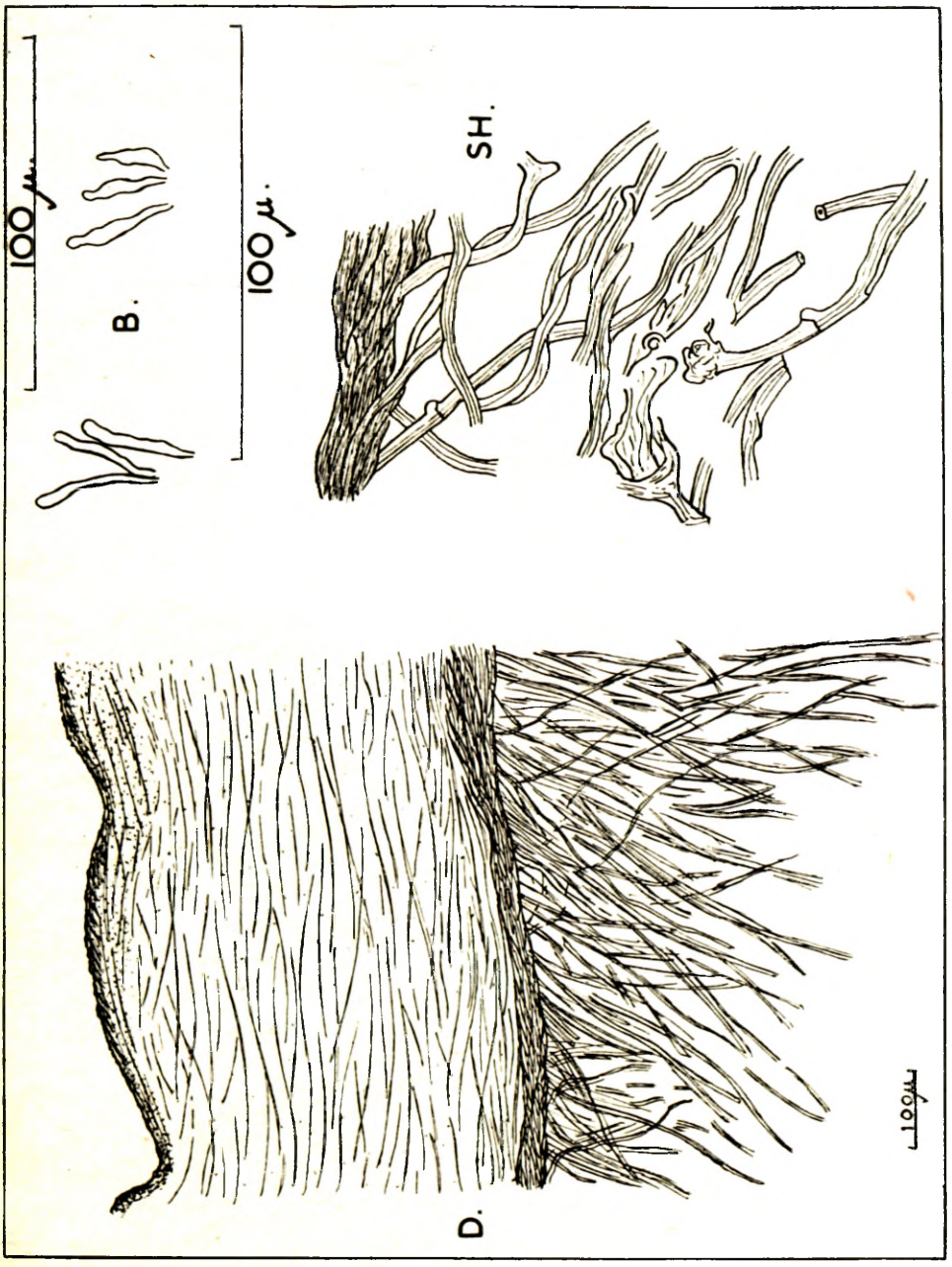


PLATE 19.
*Phlebia strigoso-zonata* (Schwein.) Lloyd.

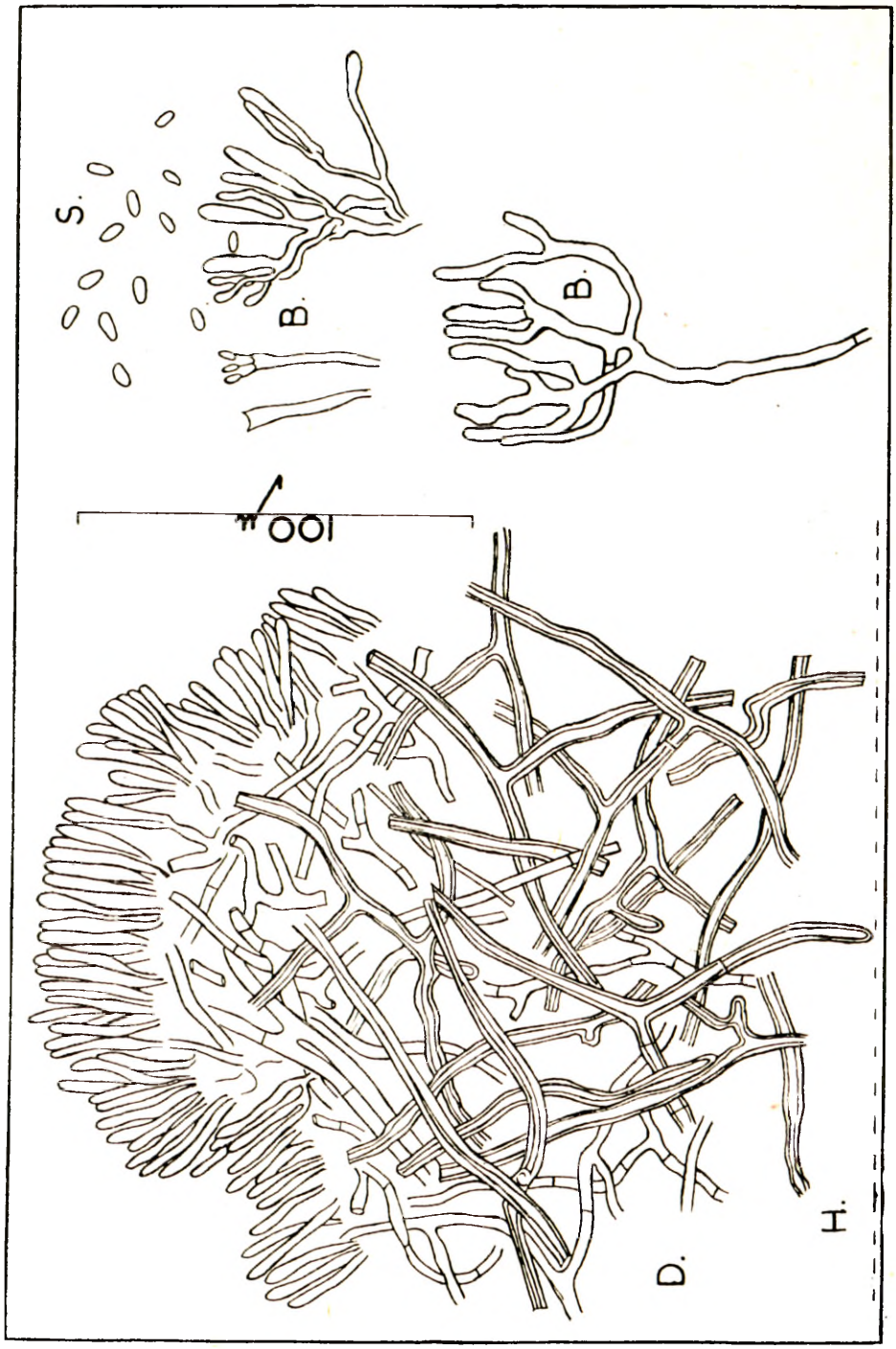


PLATE 20.
*Merulius corium* (Pers. ex Fr. )Fr.

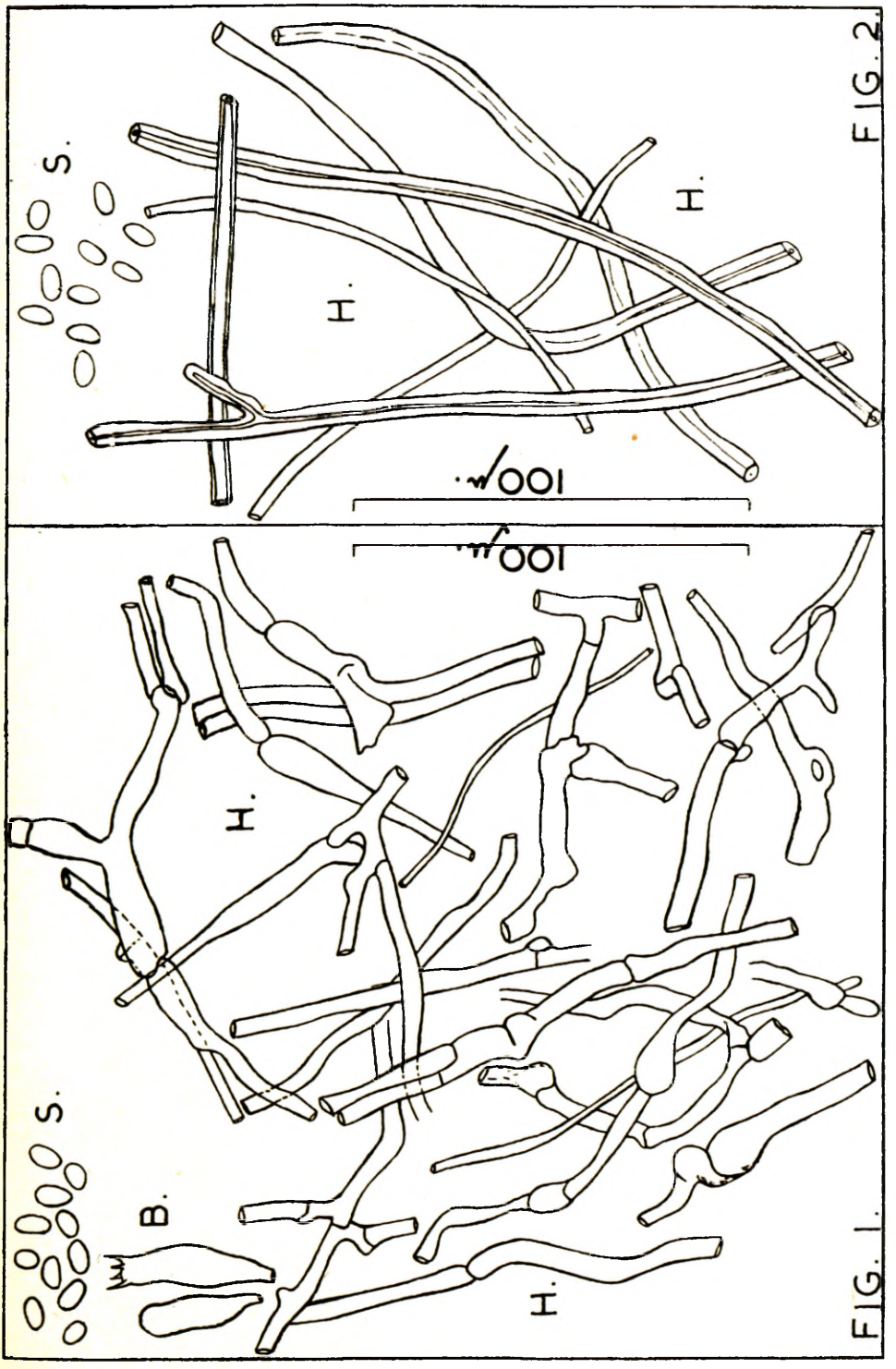


PLATE 21.
FIG. 1.—*Merulius himantioides* Fries.
FIG. 2.—*Merulius lacrymans* Wulf. ex Fr.

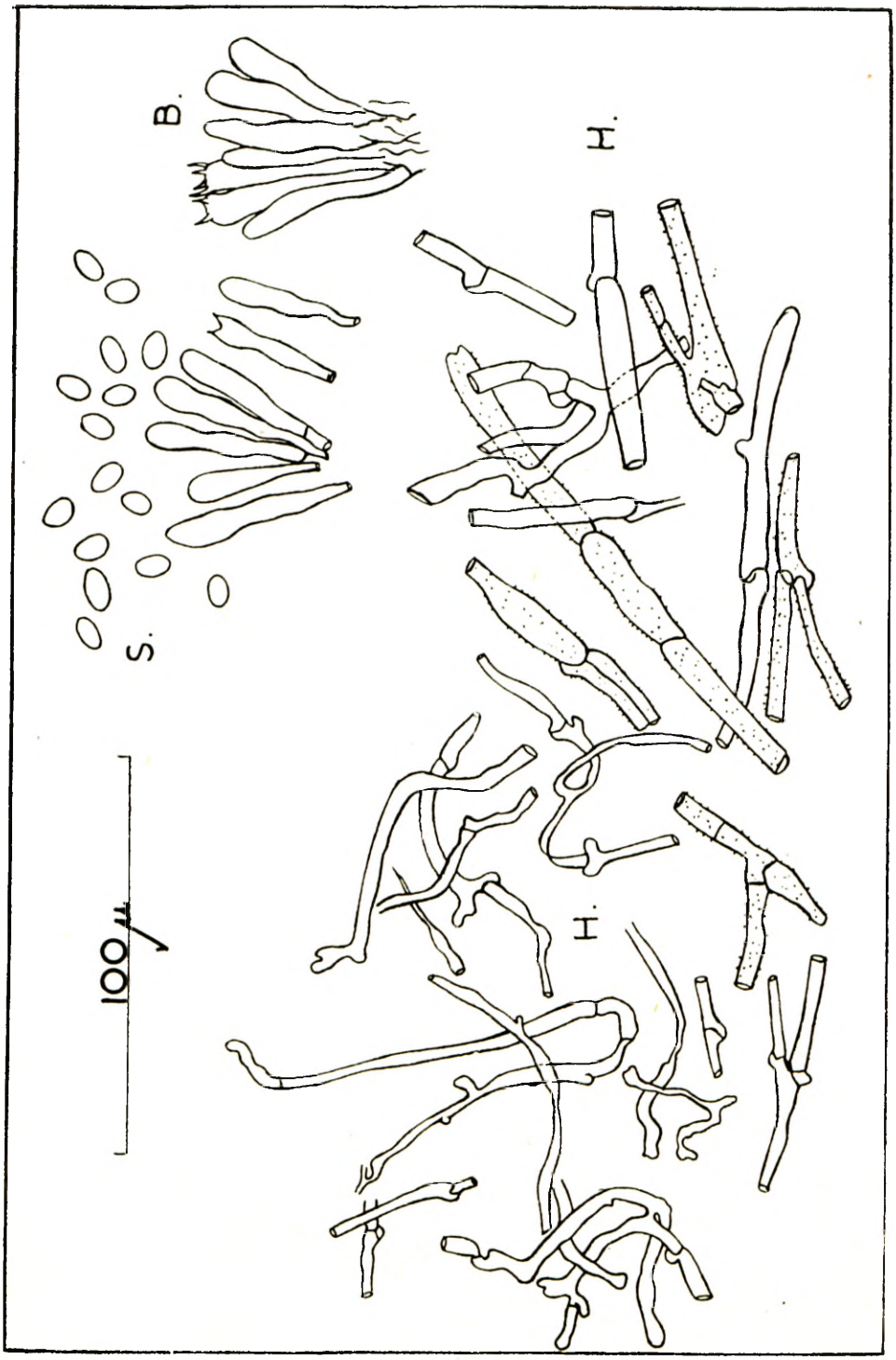


PLATE 22.
*Merulius gelatinosus* Lloyd.

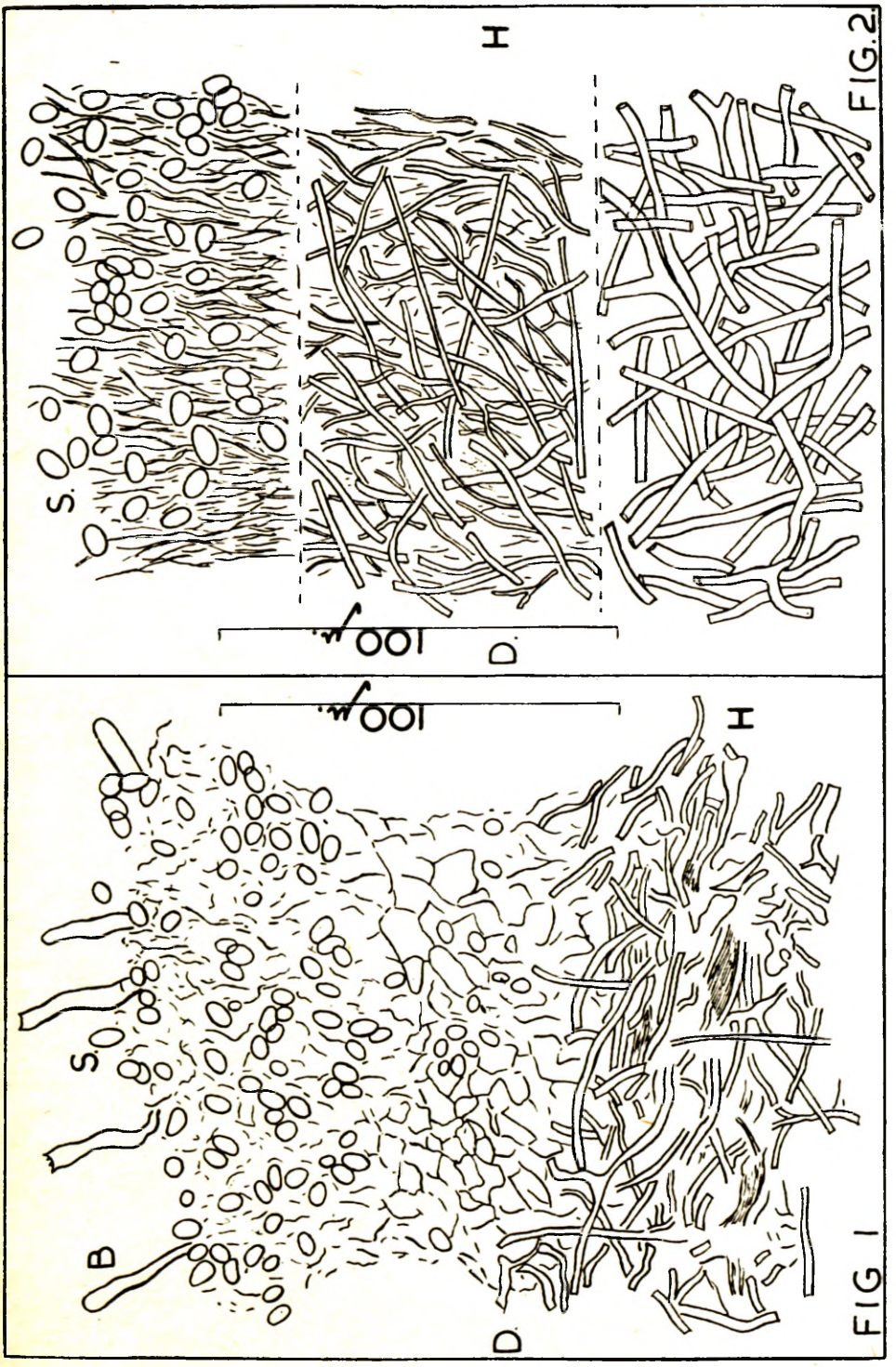


PLATE 23.
FIG. 1.—*Coniophora papillosa* Talbot.
FIG. 2.—*Coniophora fodinarum* sp. nov.

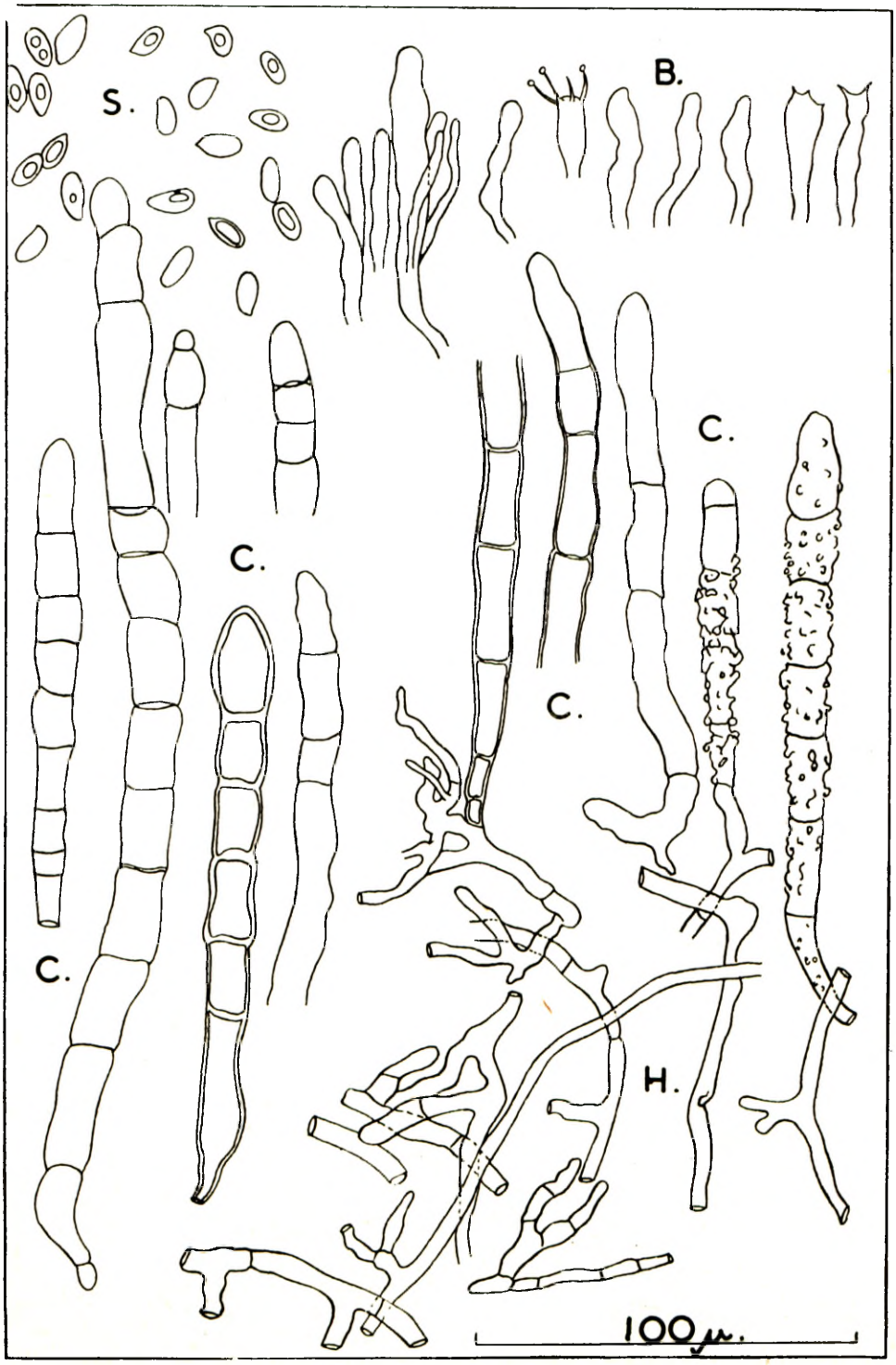


PLATE 24.
*Coniophora olivacea* (Fr.) Karsten.

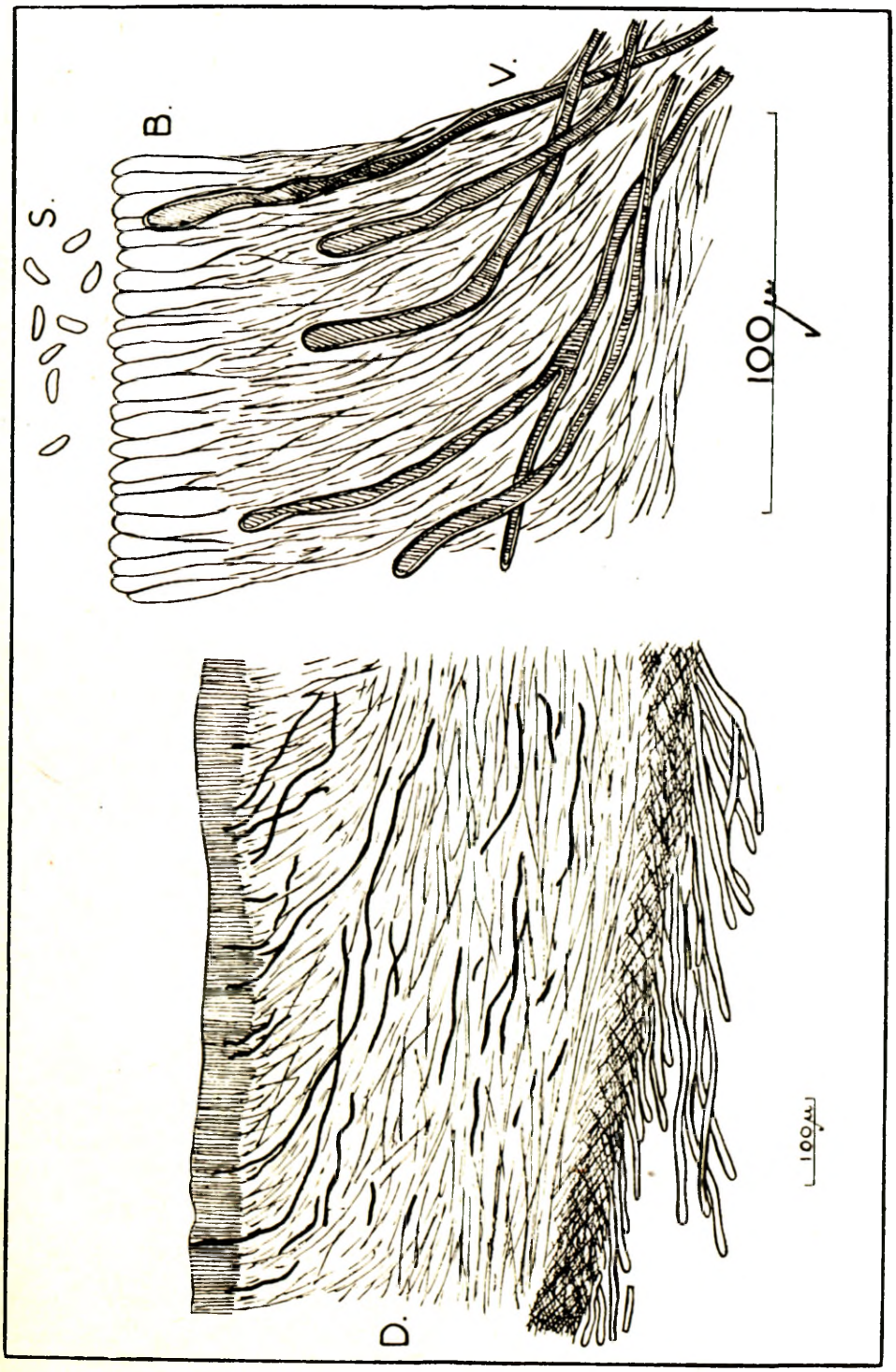


PLATE 25.
*Stereum sanguinolentum* (A. & S.) Fries.

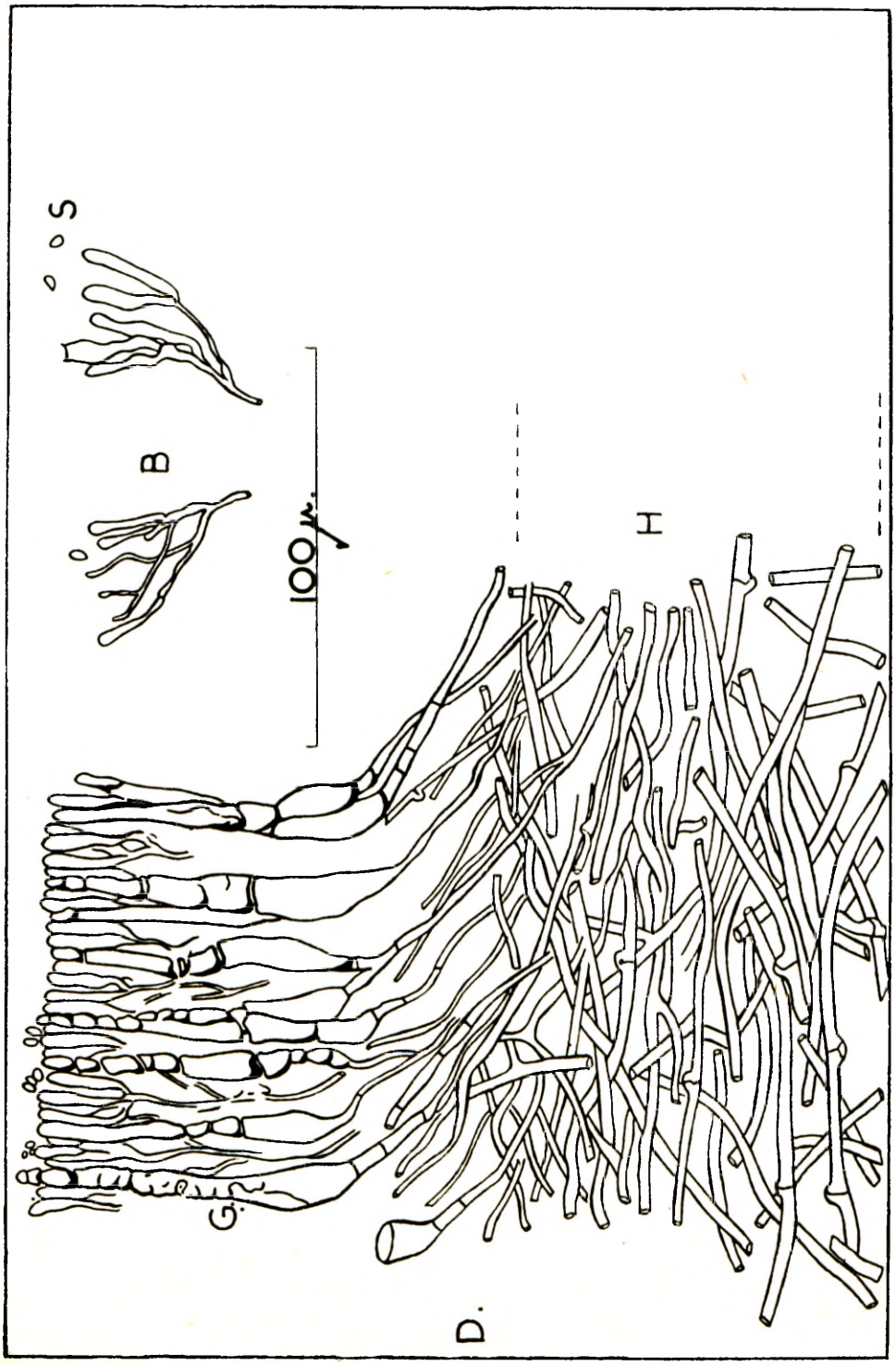


PLATE 26.
*Stereum bicolor* (Pers.) Fr.

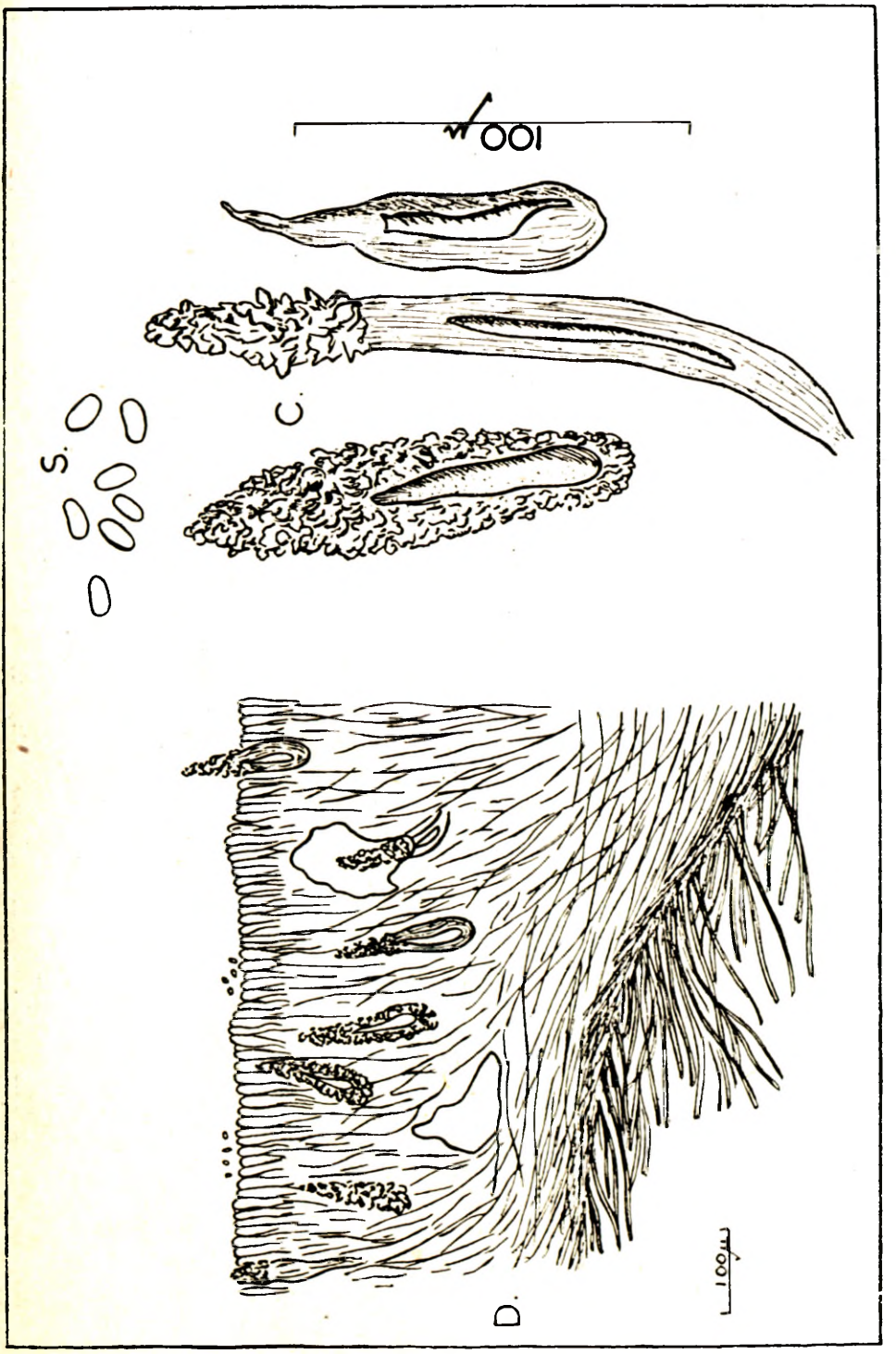


PLATE 27.
*Stereum cinerascens* (Schw.) Massee.

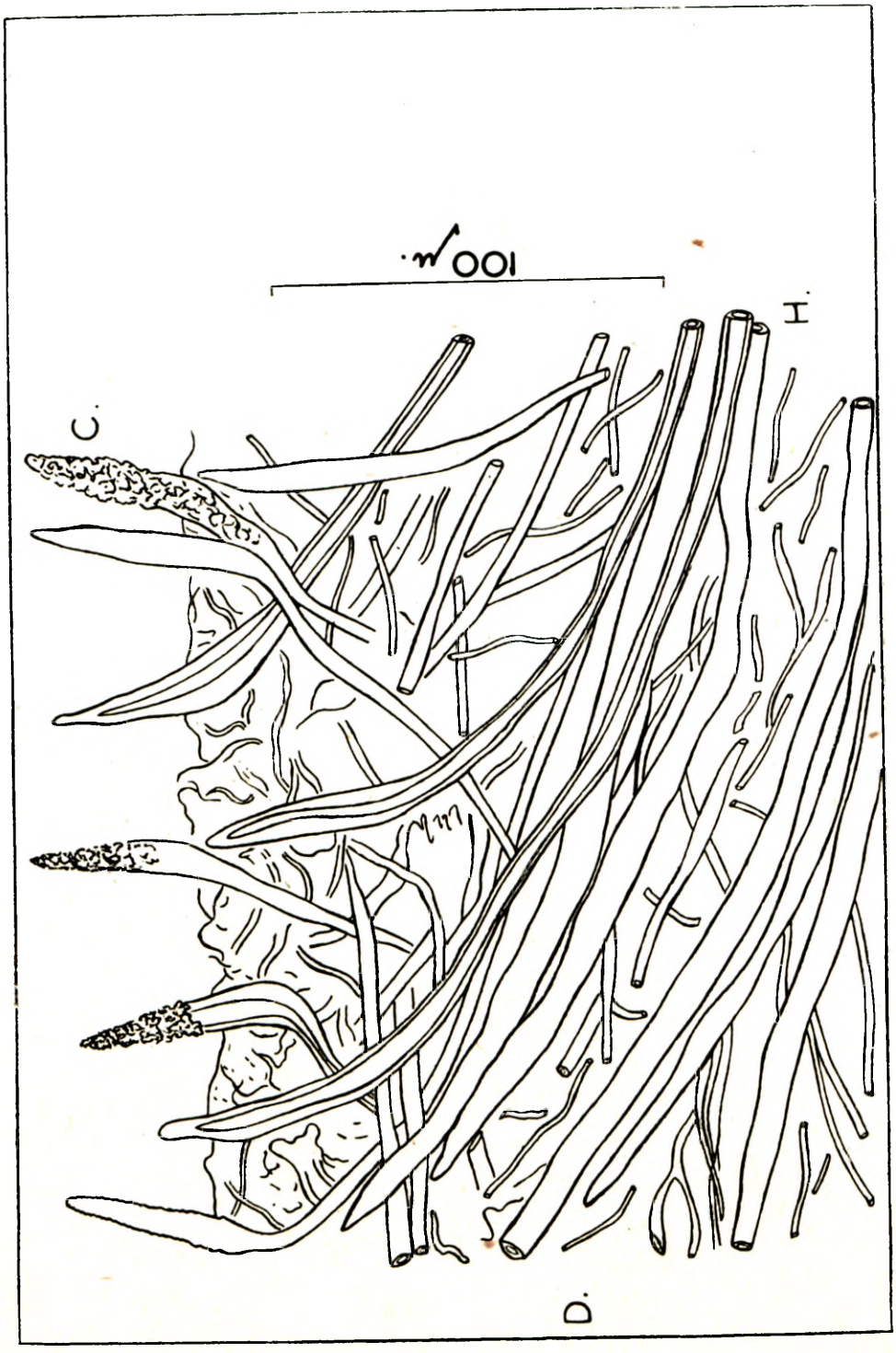


PLATE 28.
*Stereum umbrinum* B. & C.

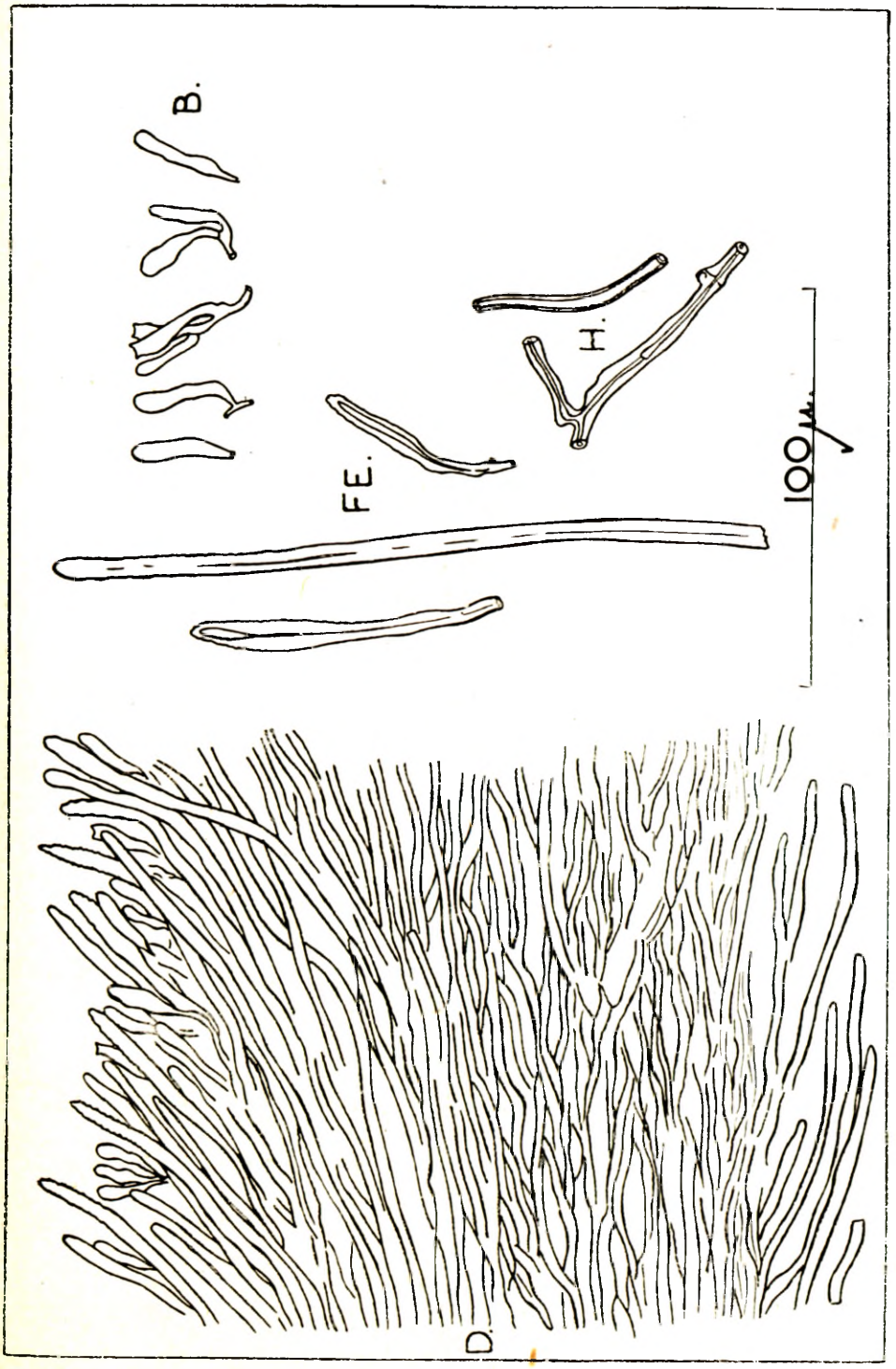


PLATE 29.
*Stereum Schomburgkii* Berk. Mature stage.

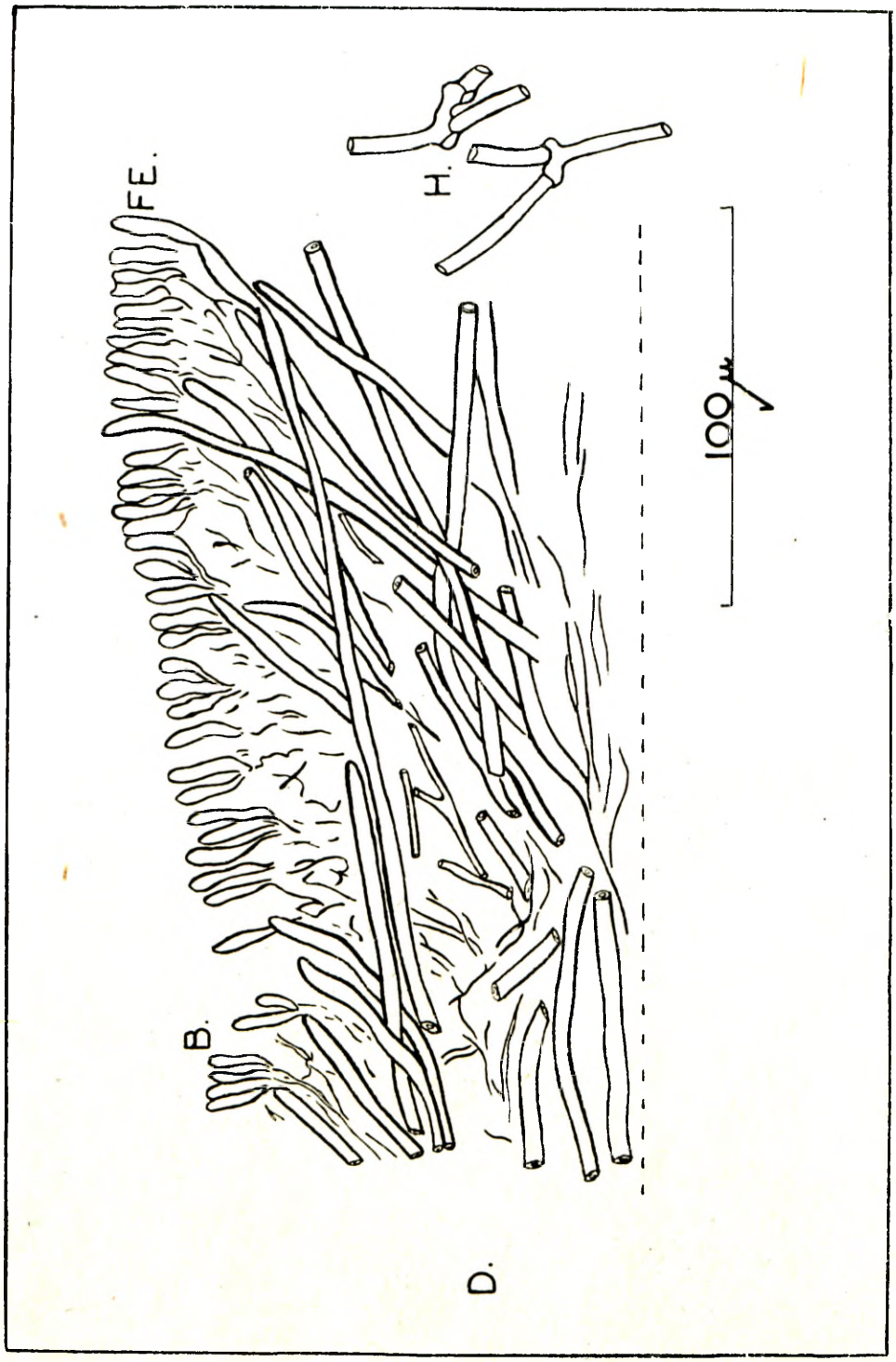


PLATE 30.
*Stereum Schomburgkii* Berk. Young stage.

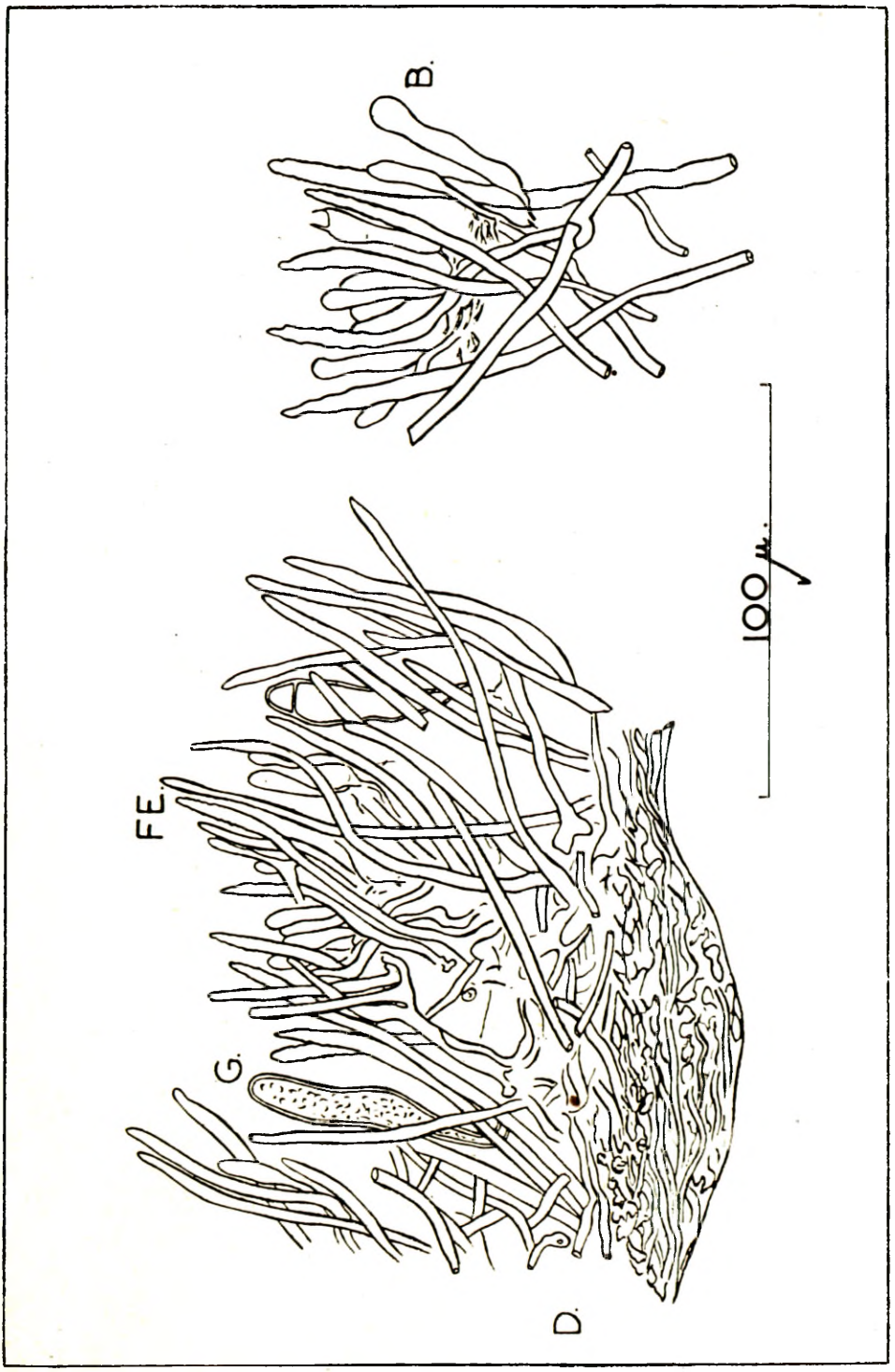


PLATE 31.
*Duportella tristicula* (B. & Br.) Reinking. Young stage.

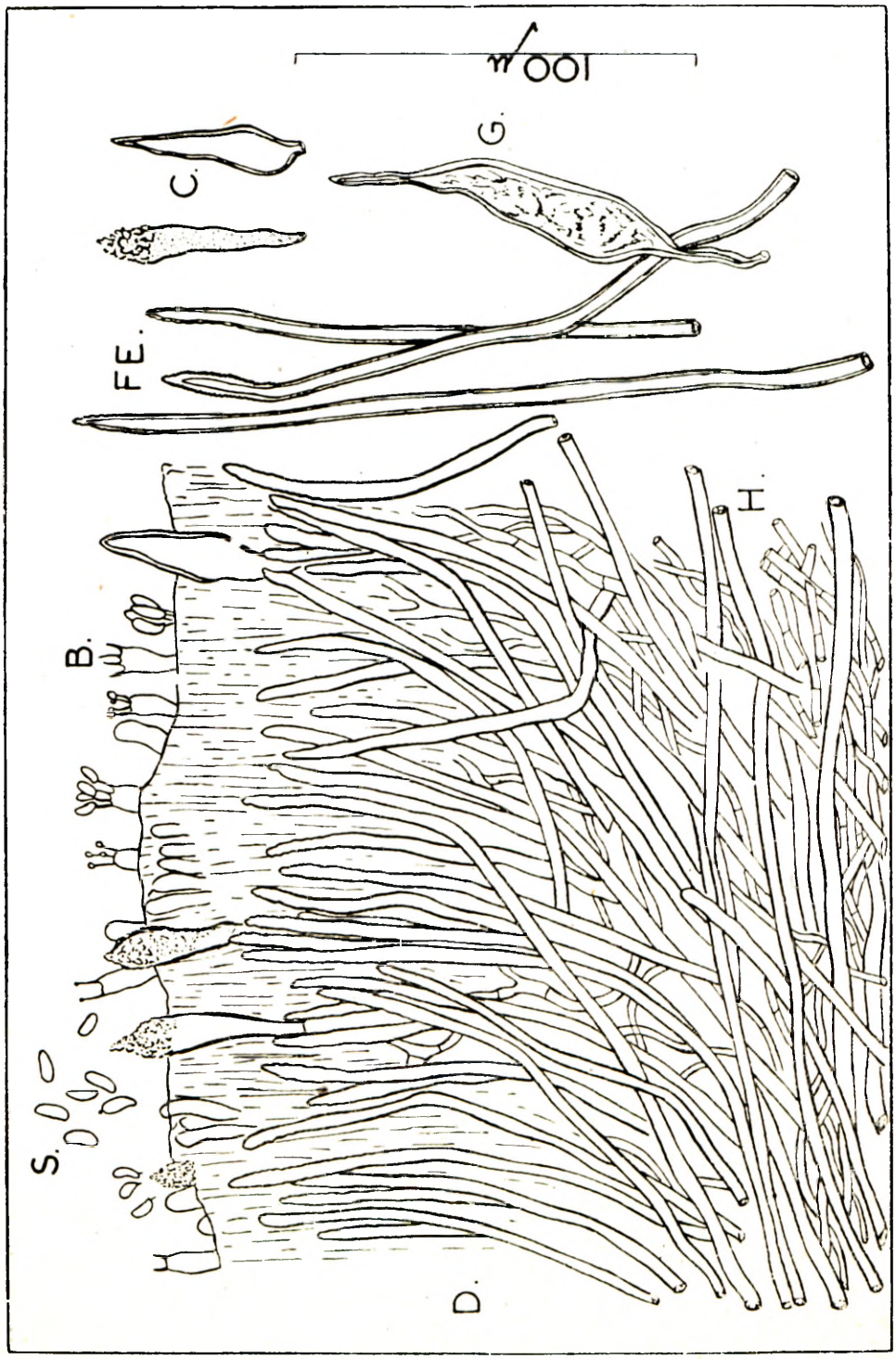


PLATE 32.
*Duportella tristicula* (B. & Br.) Reinking. Mature stage.

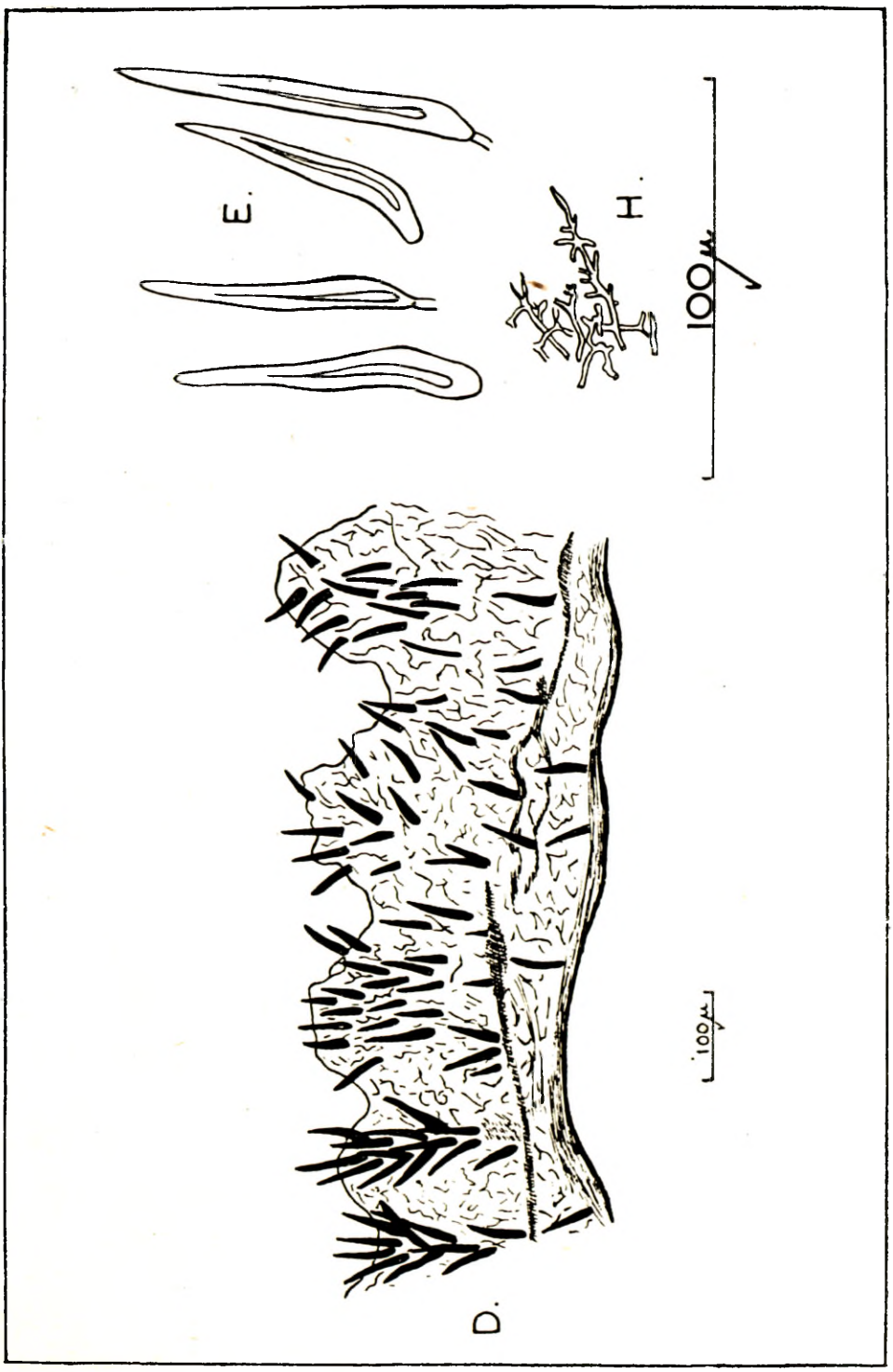


PLATE 33.
*Hymenochaete fasciculata* Talbot.

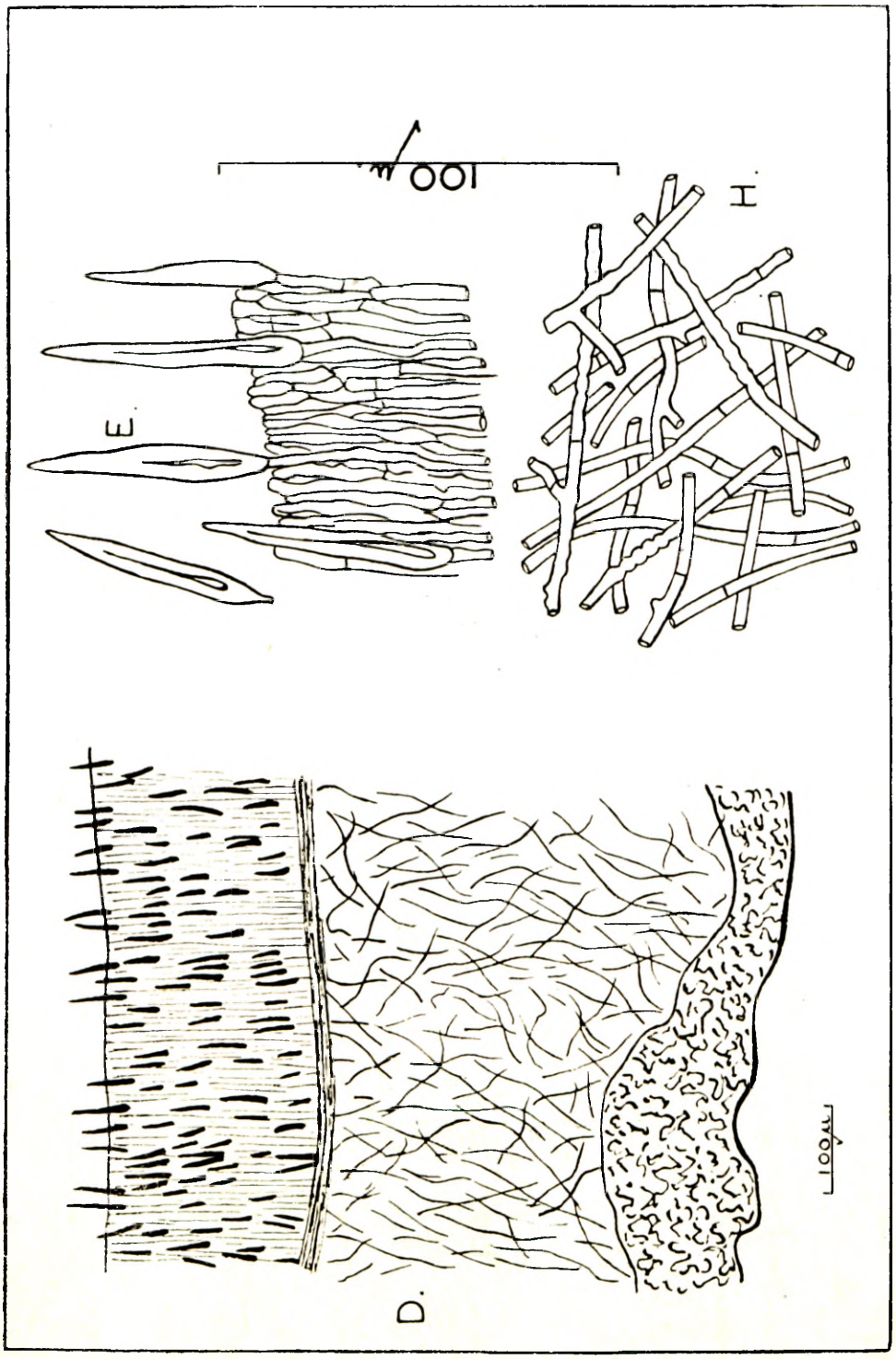


PLATE 34.
*Hymenochaete semistupposa* Petch.

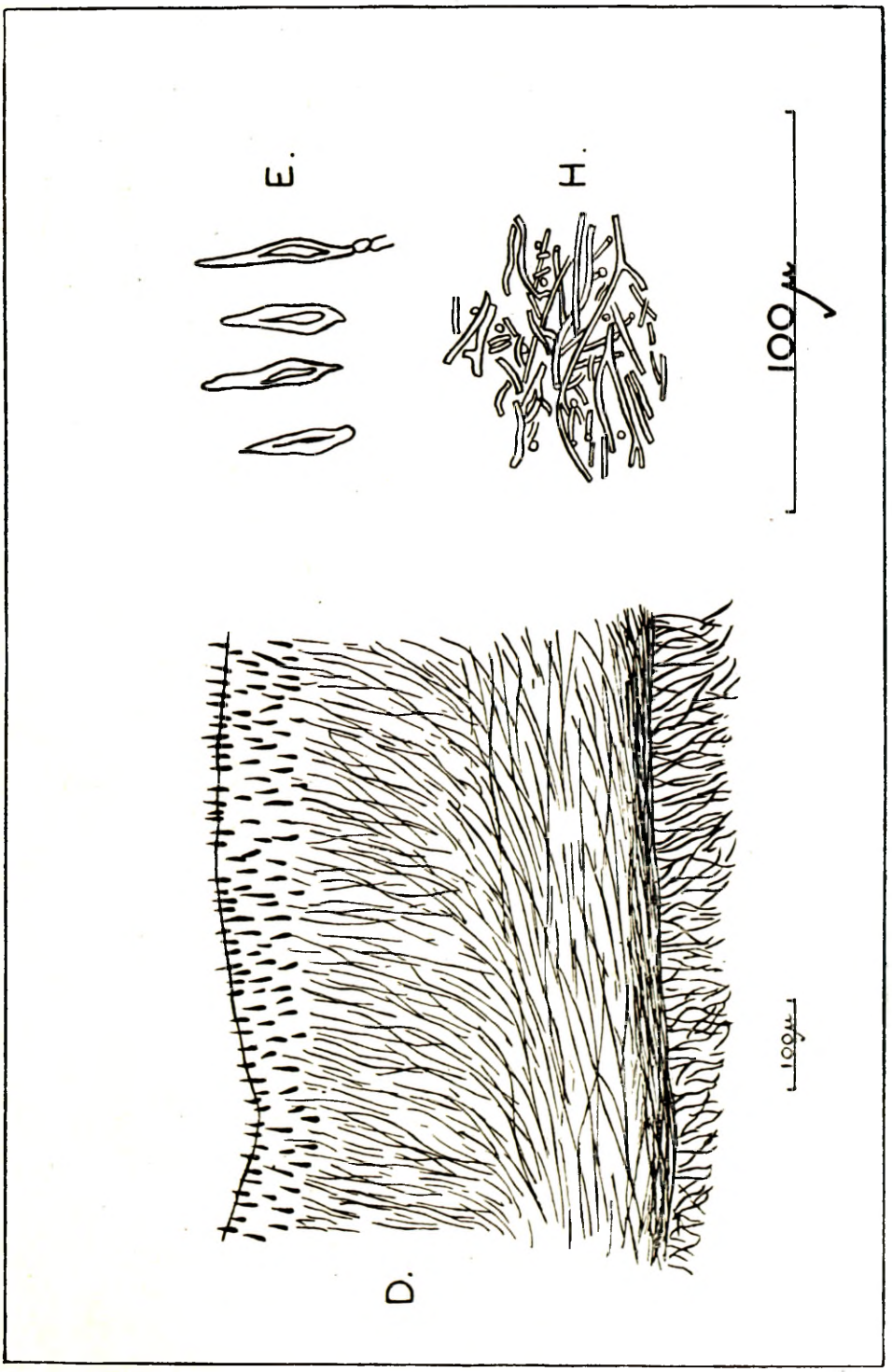


PLATE 35.
*Hymenochaete ochromarginata* Talbot.

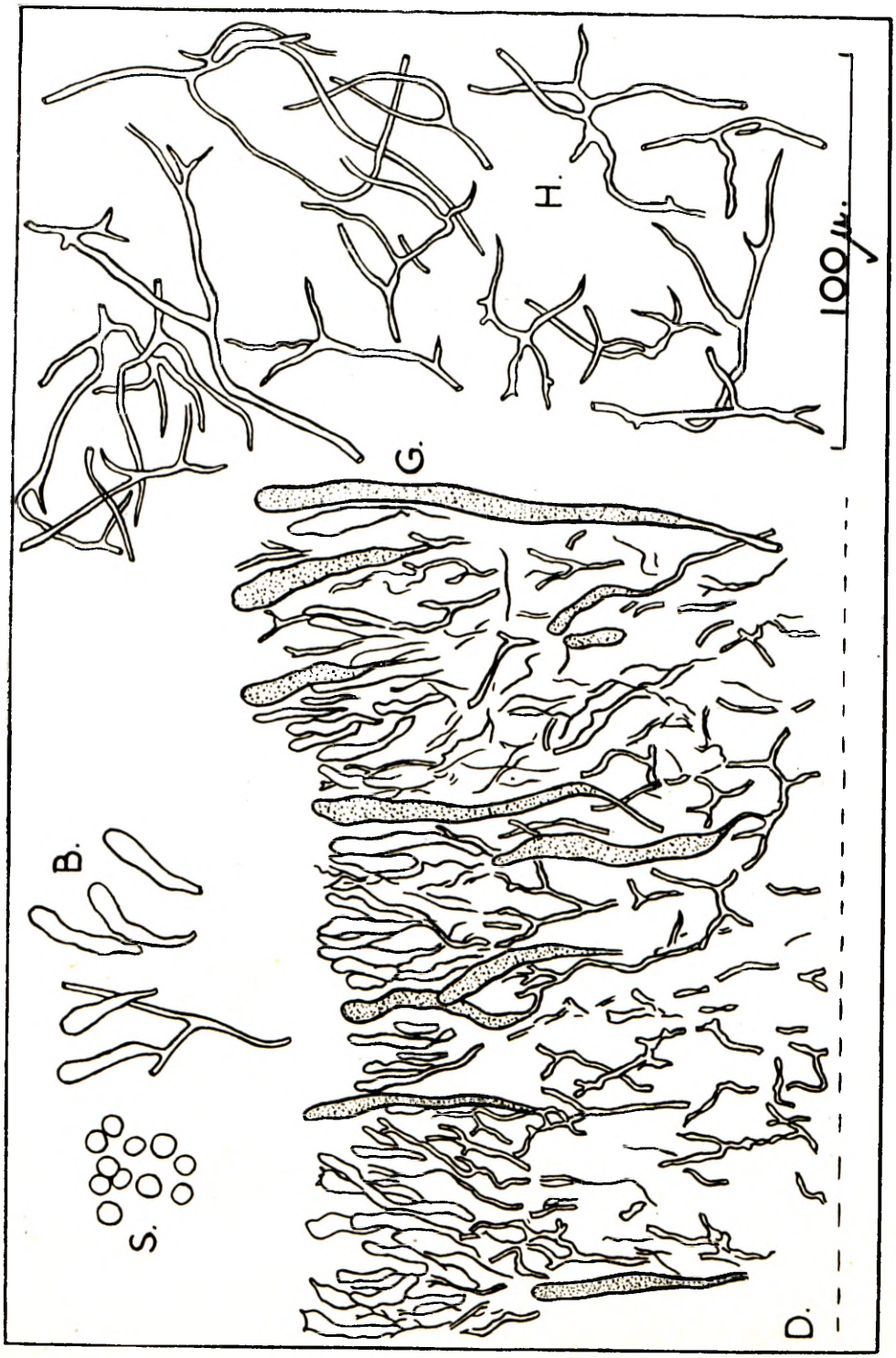


PLATE 36.
*Asterostromella duriuscula* (B. & Br.) comb. nov.

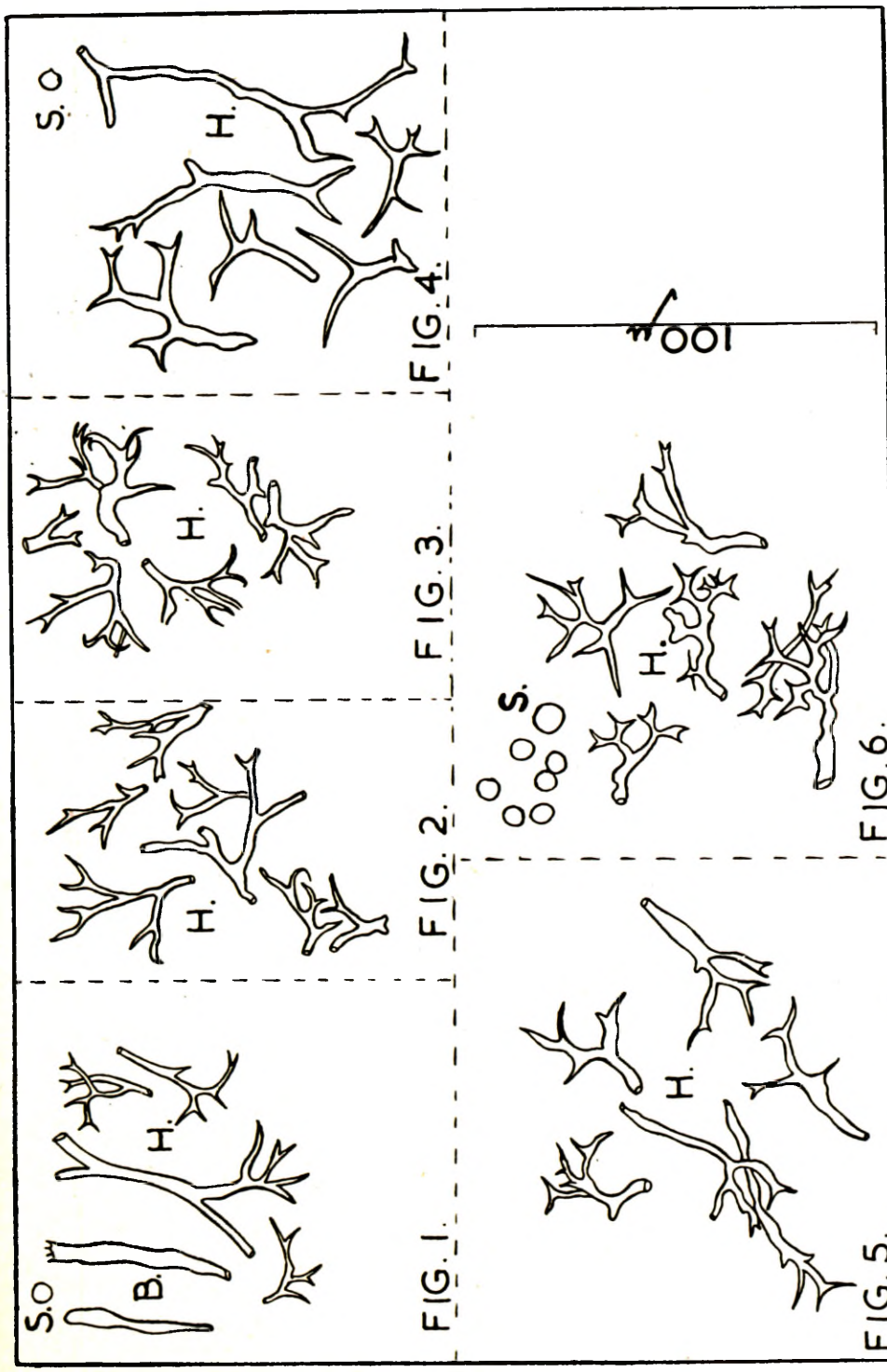


PLATE 37.
Comparative drawings of *hyphae* of certain *Asterostromella* species mentioned in the text.

FIG. 1.—Swedish collection, Romell (4135), in Herb. Kew.
FIG. 2.—*Stereum induratum* B. & C.
FIG. 3.—*Stereum albo-cinctum* B. & Br.
FIG. 4.—*Asterostromella dura* Bourd. & Galz.
FIG. 5.—*Hypochnus pallescens* (Schw.) Burt.
FIG. 6.—*Coniophora sordulenta* (Cooke & Massee) Sacc.

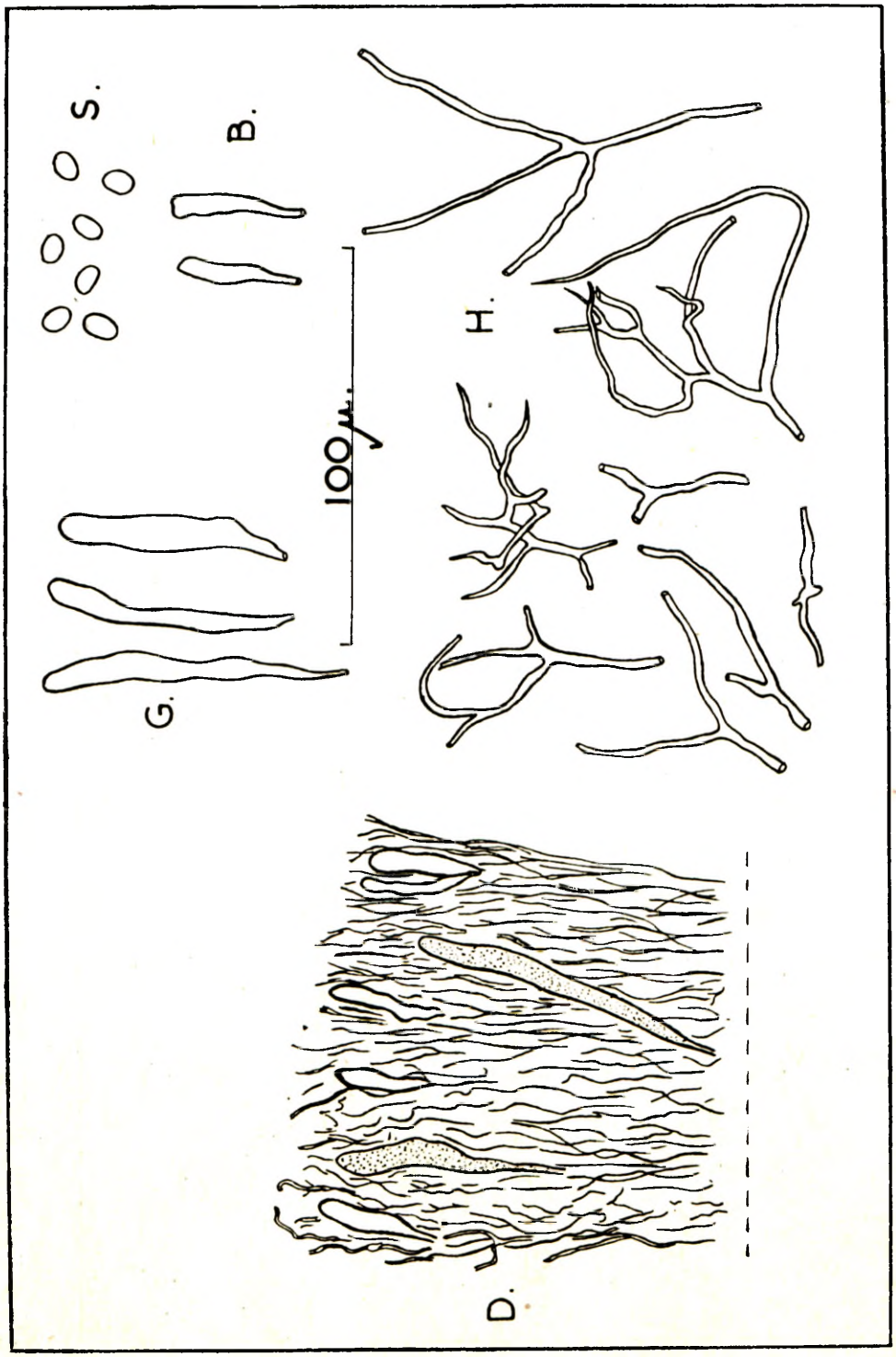


PLATE 38.
*Asterostromella Rumpiana* Talbot.

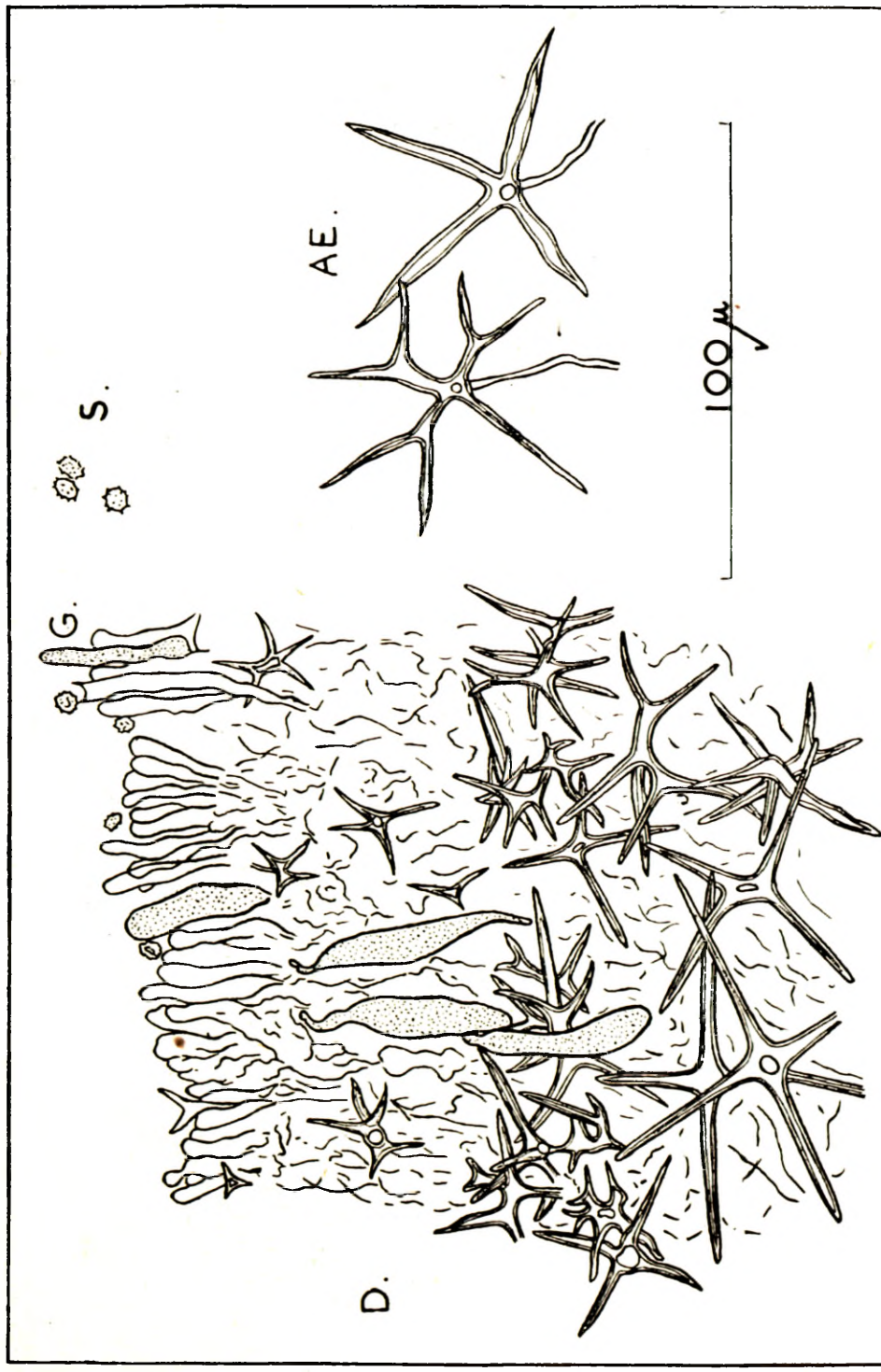


PLATE 39.
*Asterostroma cervicolor* (B. & C.) Massee.

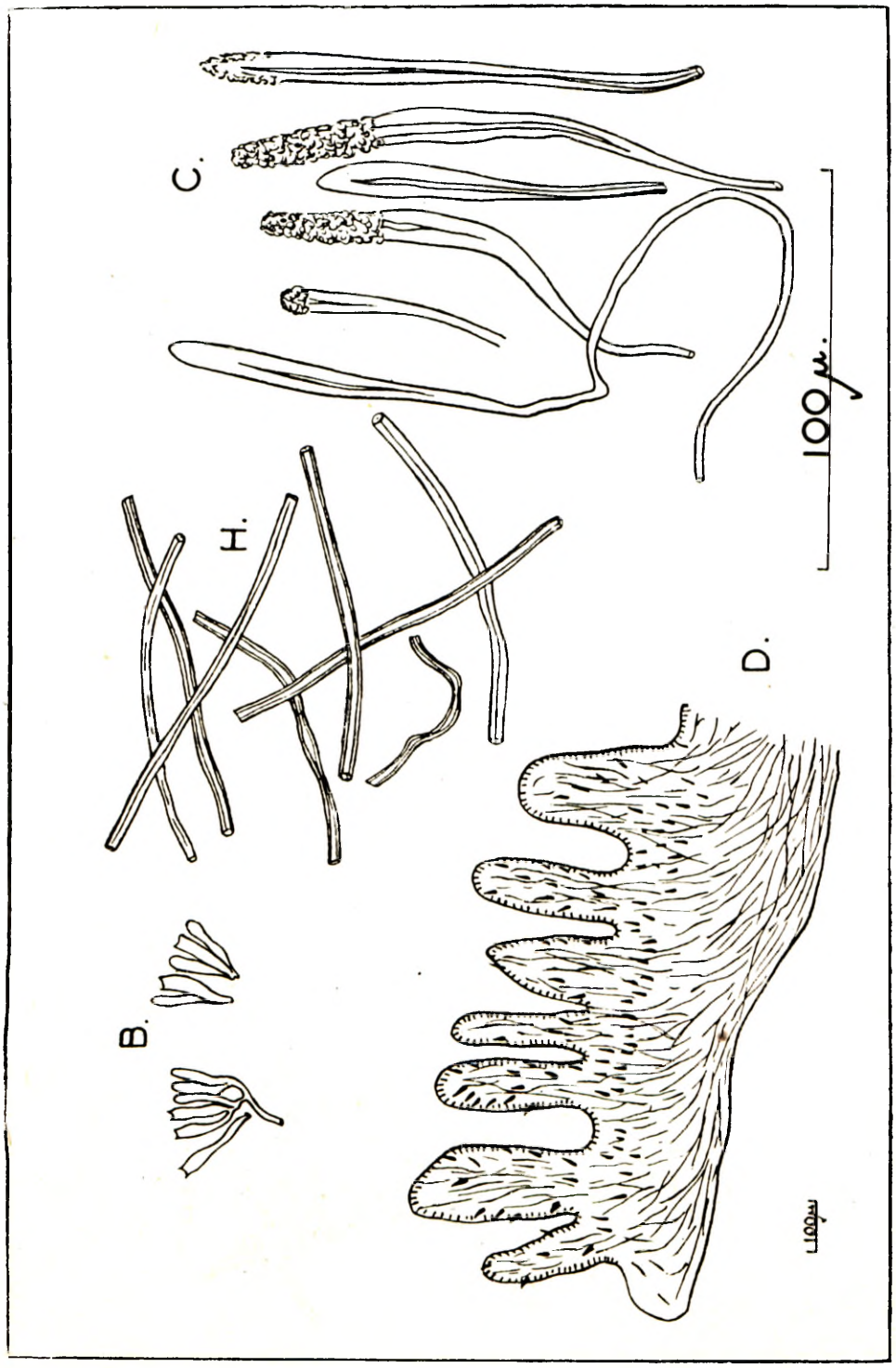


PLATE 40.
*Mycoleptodon ochraceum* (Pers. ex. Fr.) Pat.

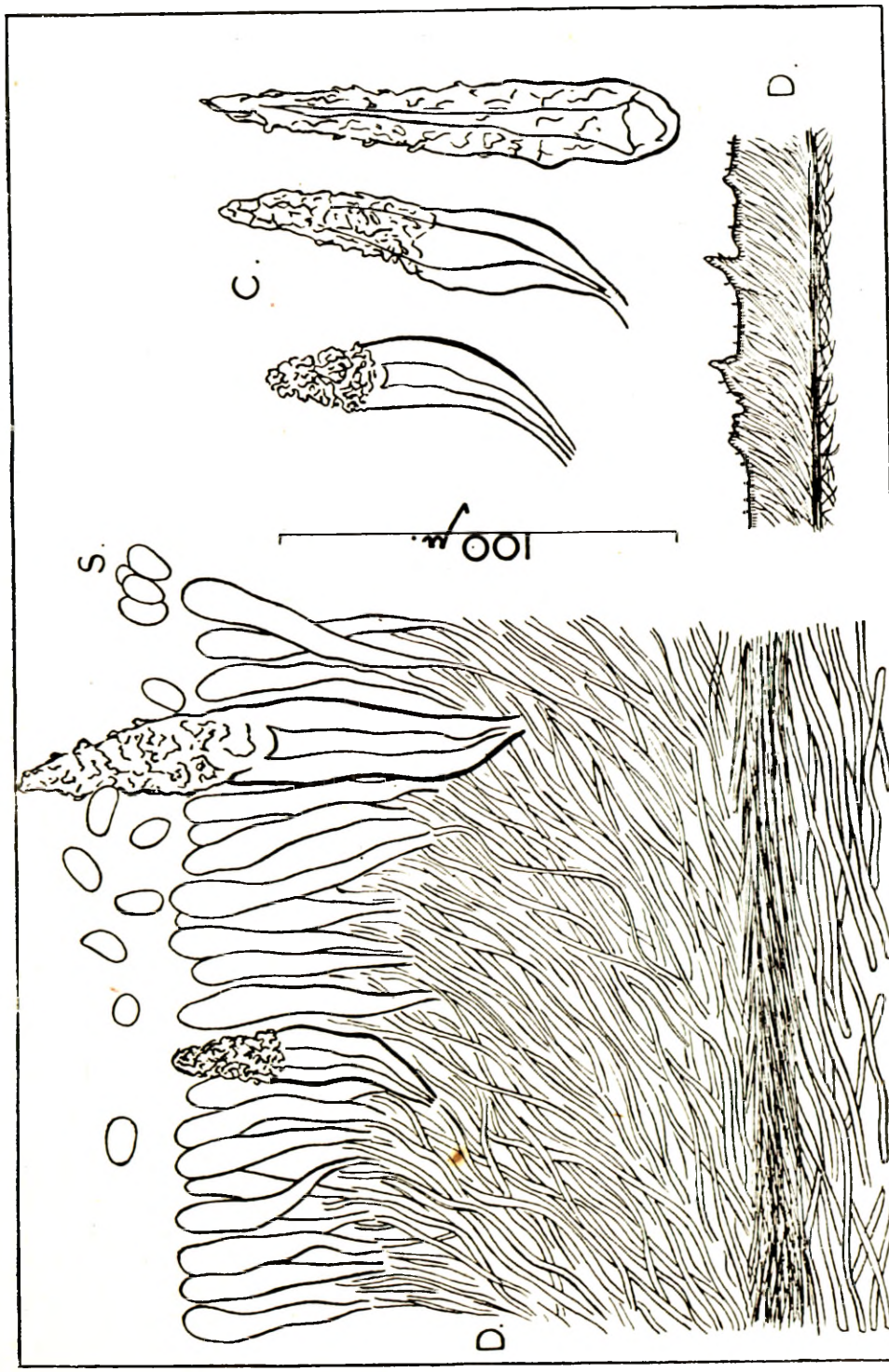


PLATE 41.
*Lopharia mirabilis* (B. & Br.) Pat.

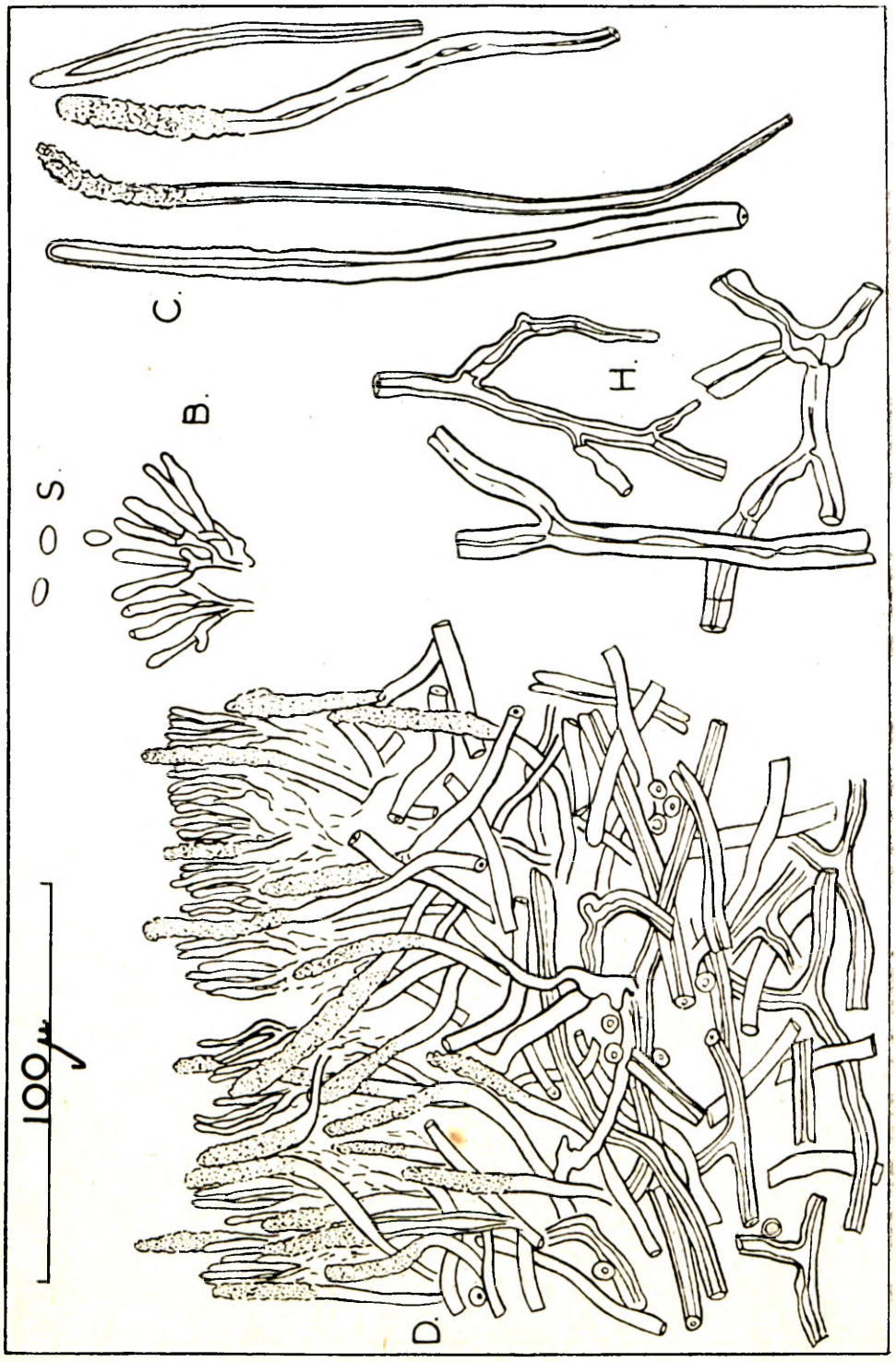


PLATE 42.
*Lopharia Dregeana* (Berk.) comb. nov.

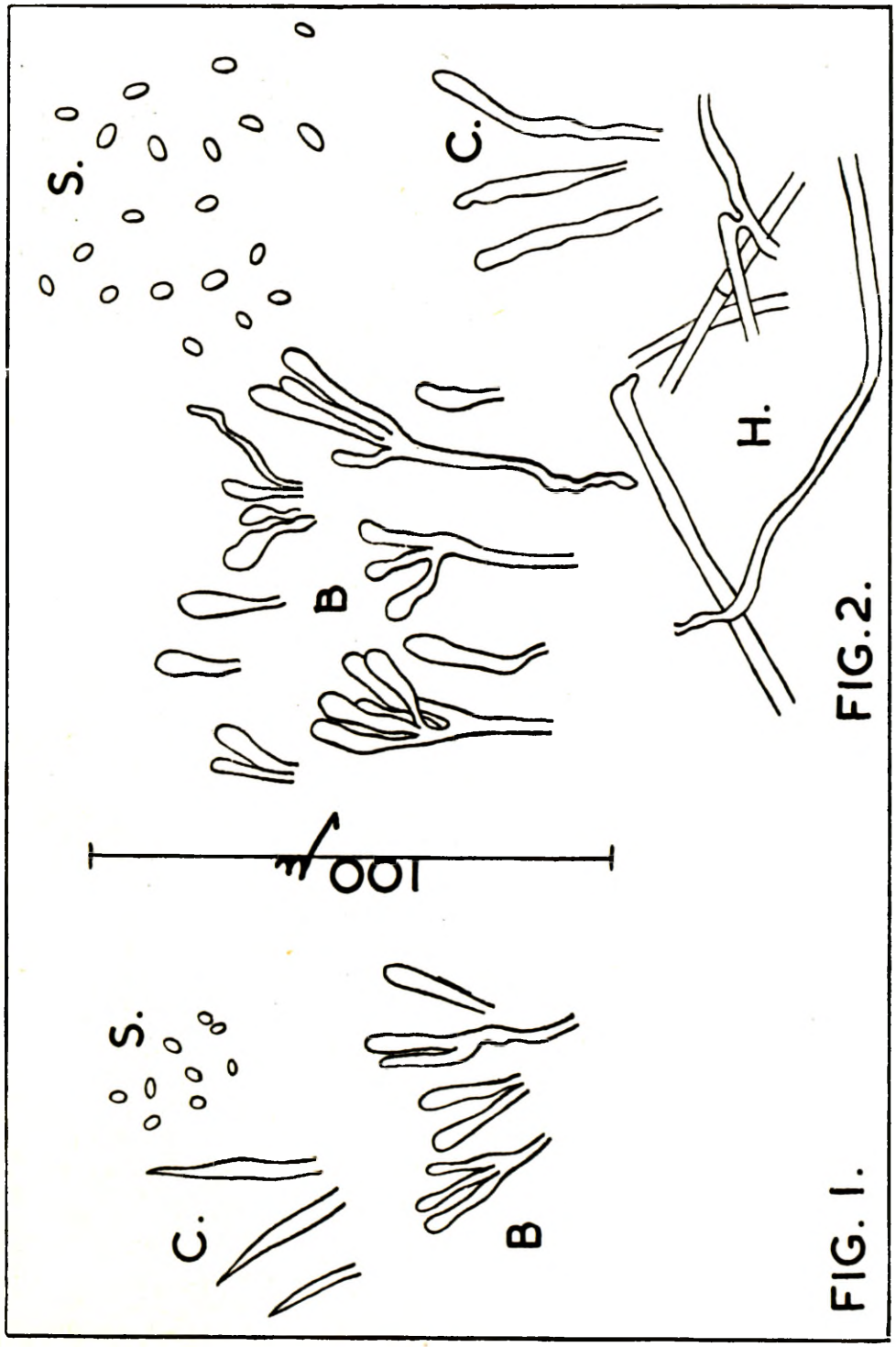


PLATE 43.
FIG. 1.—*Acia subceracea* Wakef.
FIG. 2.—*Acia conferta* sp. nov.

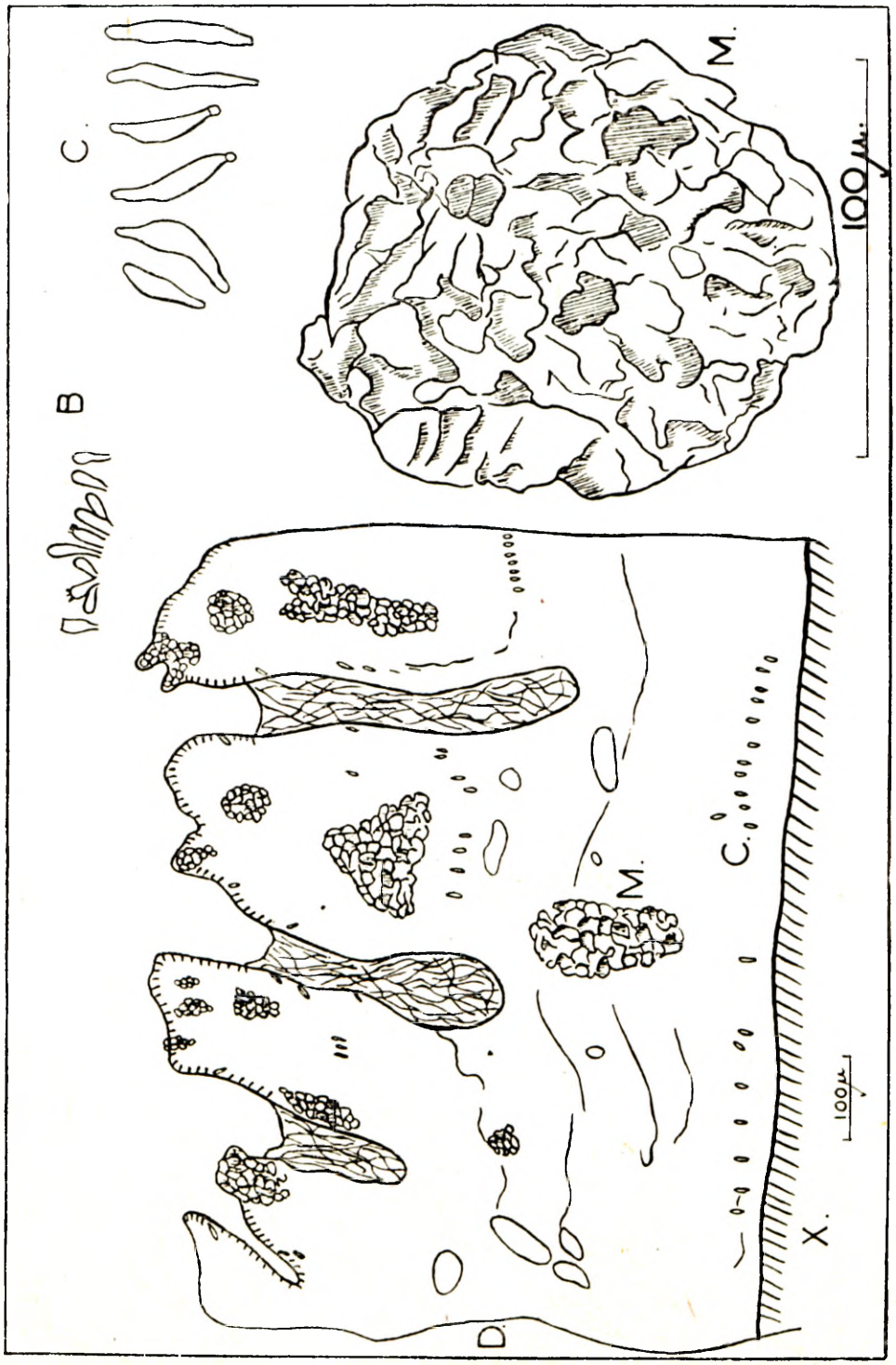


PLATE 44.
*Grammothele pseudomappa* sp. nov.

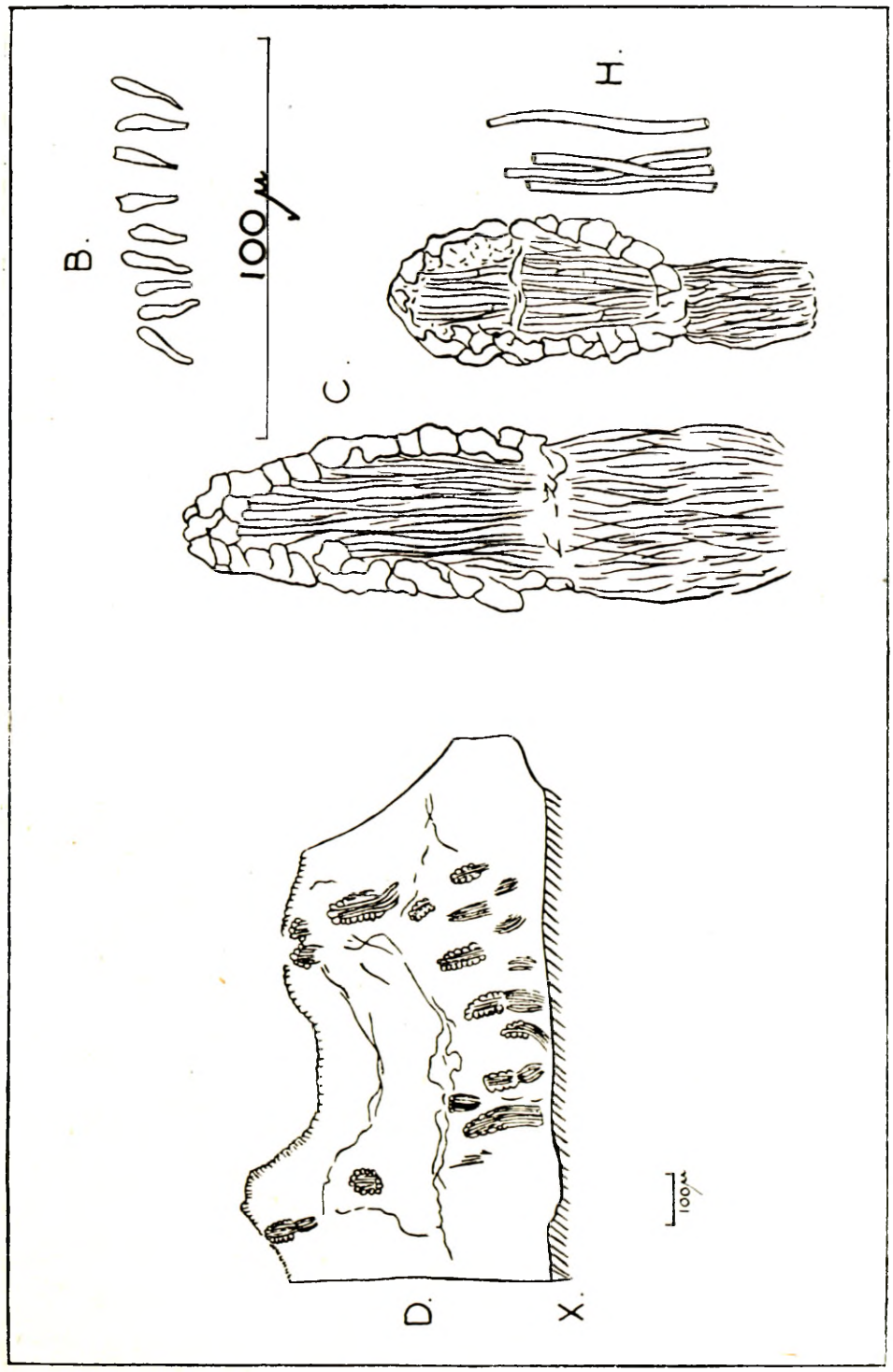


PLATE 45.
*Grammothele mappa* B. & C.

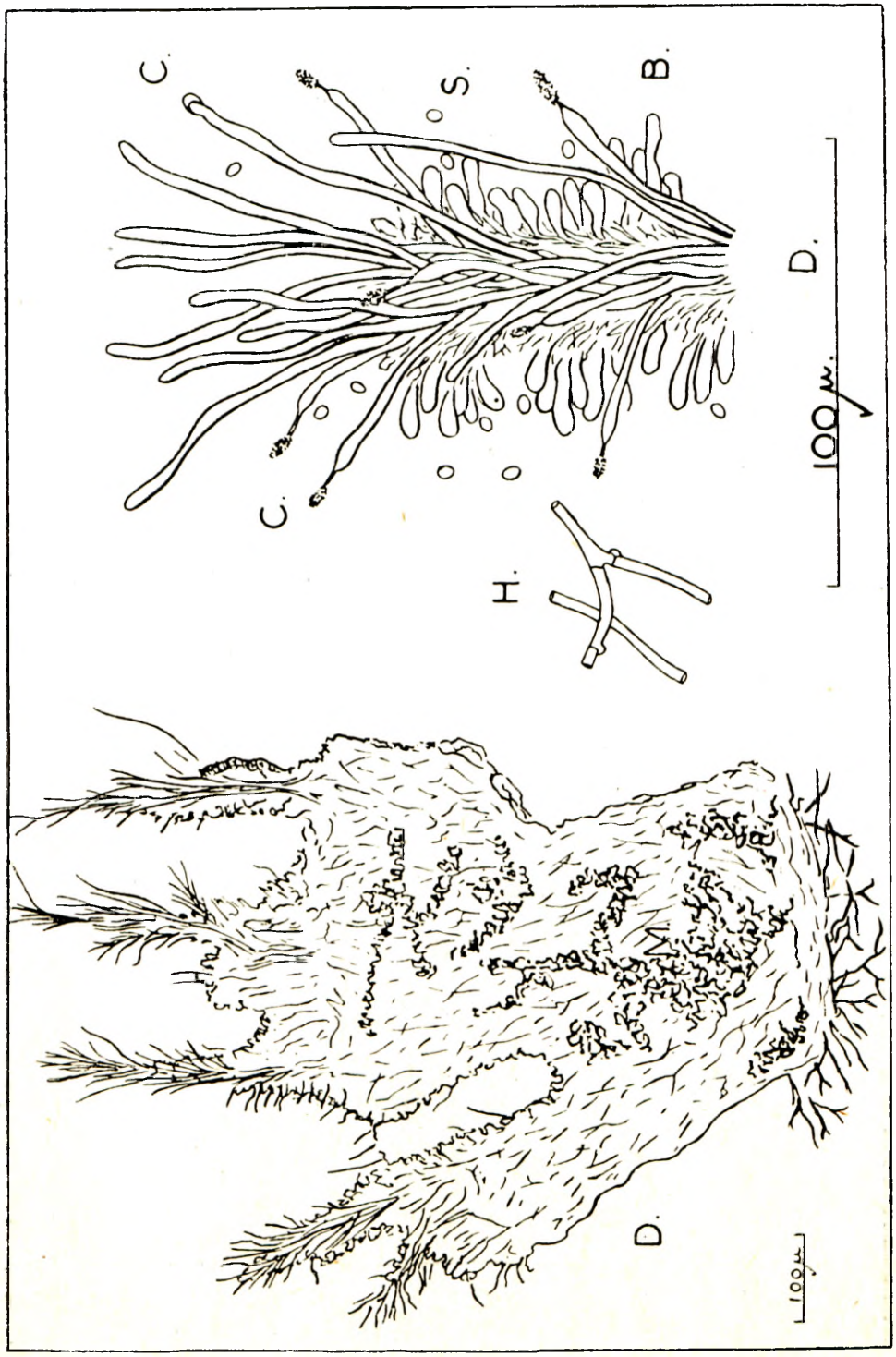


PLATE 46.
*Odontia arguta* (Fr.) Quélet.

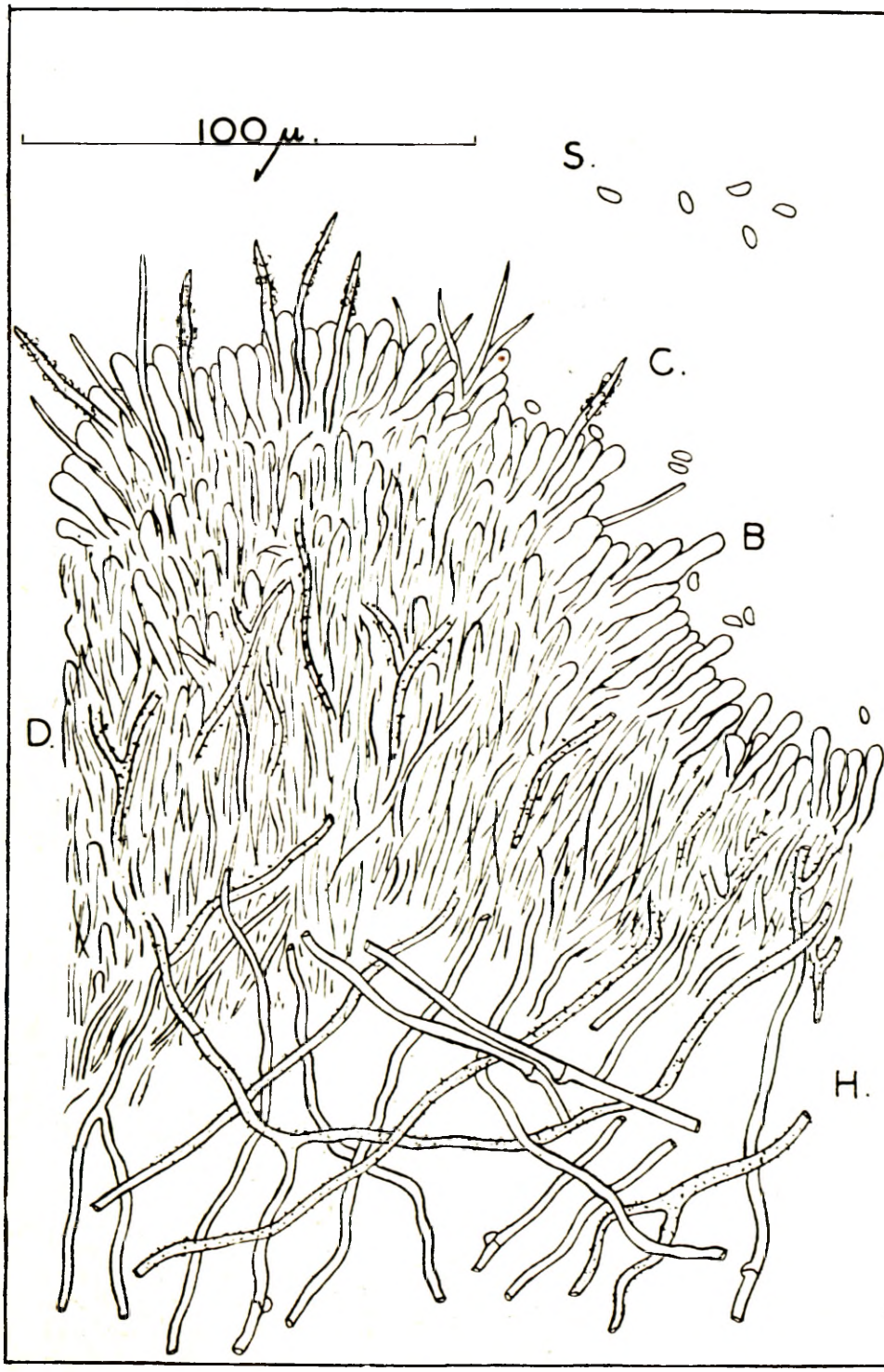


PLATE 47.
*Odontia knysnana* v.d. Byl.

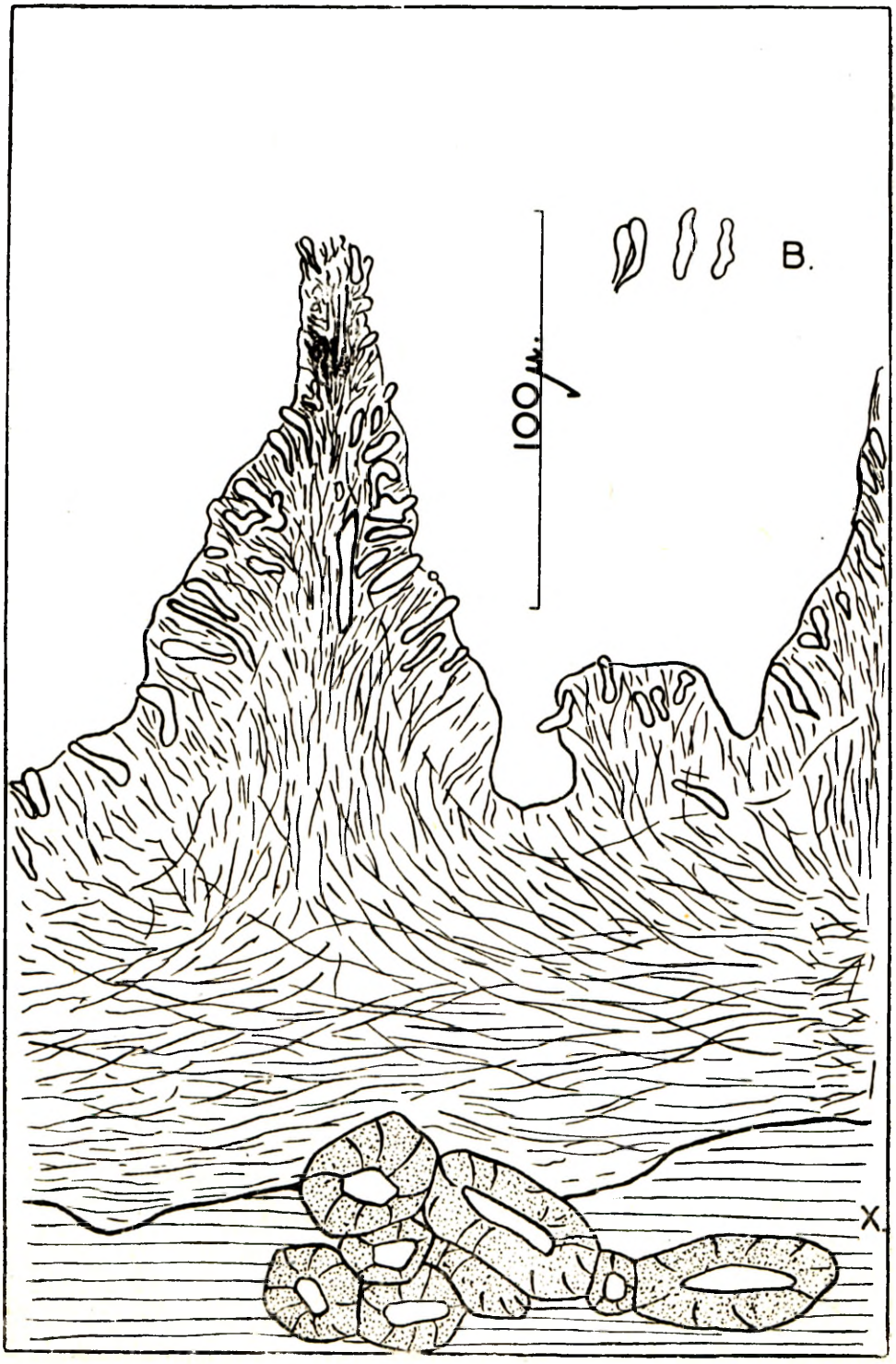


PLATE 48.
*Thelepora cretacea.* Fries.