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NOTES ON FUNGI WHICH HAVE BEEN REFERRED TO THE THELEPHORACEAE SENSU LATO

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(With 59 Text-figures)

This paper deals mainly with species found to have been wrongly described in, or transferred to, such genera as *Beccariella, Cladoderris, Podoscypha, Polyozus, Stereum* and *Thelephora*. The author excludes these species from the stipitate stereoid series. Descriptions and illustrations of most of them are based on type material. Many names are reduced to synonymy. One new genus is described, *Hydnopolyporus* Reid. *Xylobolus* Karst. is given sectional rank as *Stereum* sect. *Phellina* (Endl.) Reid. New combinations are made in *Amauroderma* (1), *Clavulina* (1), *Clavulinopsis* (1), *Dacryopinax* (1), *Gomphus* (1), *Hydnopolyporus* (2), *Pleurotus* (1), *Pseudocraterellus* (7) and *Scytinopogon* (1).

During an investigation of the taxonomy of the stipitate stereoid fungi a number of species were found to have been wrongly described in, or transferred to, such genera as *Beccariella, Cladoderris, Podoscypha, Polyozus, Stereum* and *Thelephora*. It is these fungi, which the author has excluded from the stipitate stereoid series, that form the subject of this paper. In addition full accounts are also given of other species which were examined in order to confirm that they had no affinity with the stipitate fungi then under investigation. Hitherto the descriptions of the fungi falling in this latter category were so vague as to make their classification virtually impossible by modern standards.

The species described in this paper are arranged alphabetically according to the genera in which Saccardo (*1888*) placed them in volume 6 of his "Sylloge Fungorum". Species published subsequent to that volume are considered under the genera to which they were assigned by their various authors.

The following notes are based on examinations of type specimens preserved in the Kew Herbarium, unless otherwise stated. The herbaria are indicated by the abbreviations used by Lanjouw & Stafleu (*1959*). The figures are all × 1300 except where otherwise indicated.

BECCARIELLA CAESPITOSA (Cooke) Sacc. — FIG. 1

Beccaria caespitosa Cooke *in* Grevillea **9**: 100. 1881.
Beccariella caespitosa (Cooke) Sacc. *in* Syll. Fung. **6**: 551. 1888.
Type: Rio de Janeiro, Brazil, coll. Glaziou (No. 9157).

Sporophores forming rosette-like clusters up to 6 cm high and 3.5 cm wide. Some of the specimens appear to have been buried during their early development,

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and to have subsequently grown up and produced a second crop of pilei. *Pilei* becoming greatly divided into an enormous number of erect lobes which have become variously folded and fused together to form extremely dense, compact, cauliflower-like masses. Cooke's original description of the pileus as "much folded, infundibuliform, from which arise various stipitate confluent lobes" does not convey an adequate picture of the fungus. The colour of the living plant was not stated by the collector, but the herbarium material is now entirely dark chestnut brown to almost black. *Hymenial surface* covered with long, narrow, radial ridges, which frequently fork and often become interconnected by transverse partitions to form pores. The pores formed in this manner tend to retain a predominantly radial orientation. In addition to these ridges and pores there are also isolated warts and granules. *Stipe* rudimentary or absent. There is a conspicuous basal ball of earth held together by mycelium, and from this arise a multitude of very short divided branches which themselves branch repeatedly to form numerous flattened lobes. *Hyphal structure* monomitic, consisting of scantily branched, hyaline, generative hyphae, 2–8 μ in diam. These hyphae which lack clamp-connexions at the septa often develop distinctly thickened walls especially in the older portions of the fruitbody. There is no very distinct cuticle. *Hymenium* not thickening, but forming a layer 26 μ wide. *Cystidia* and *gloeocystidia* absent. *Basidia* 4-spored. *Spores* 3.5–4.5 × 2–3.5 μ, hyaline, broadly elliptical to subglobose, often with a single refractive guttule.

HABITAT: On the ground.

This species is typical *Hydnopolyporus* (*Polyporus*) *fimbriatus* (Fr.) Reid as noted by Lloyd (*1912a*; *1913a*) and Reid (*1959*), see also page 151. It is a widespread species in tropical America.

There has been some confusion over the nomenclature of this fungus for Lloyd (*1913a*) when listing this species, wrote "*caespitosa*, Brazil, Cooke (as *Beccariella*) = *Polyporus fimbriatus*." In fact Cooke described it, by error, as *Beccaria caespitosa* obviously intending to use the generic name *Beccariella* since he wrote of the fungus "referred with some hesitation to the genus instituted by Baron V. de Cesati." It was this latter author who was responsible for describing the genus *Beccariella* there being no genus bearing the name *Beccaria*. It was Saccardo (*1888*: 551) who eventually corrected the error and gave a description of the fungus under the name *Beccariella caespitosa*.

CLADODERRIS FUNALIS P. Henn. — FIGS. 2, 55

Cladoderris funalis P. Henn *in* Bot. Jb. **38**: 120. 1905.

Type: Victoria, Kamerun, coll. Winkler (No. 985), 1905 (S).

Sporophores up to 6.5 cm high, and 3–6 cm wide, appearing somewhat intermediate between a branched clavarioid fungus and members of the genus *Cymatoderma* Jungh. (*Cladoderris*). There is a main trunk up to 3.5 cm long and 1 cm thick which is somewhat compressed, rugulose and woody, and often bulbous at the base. From

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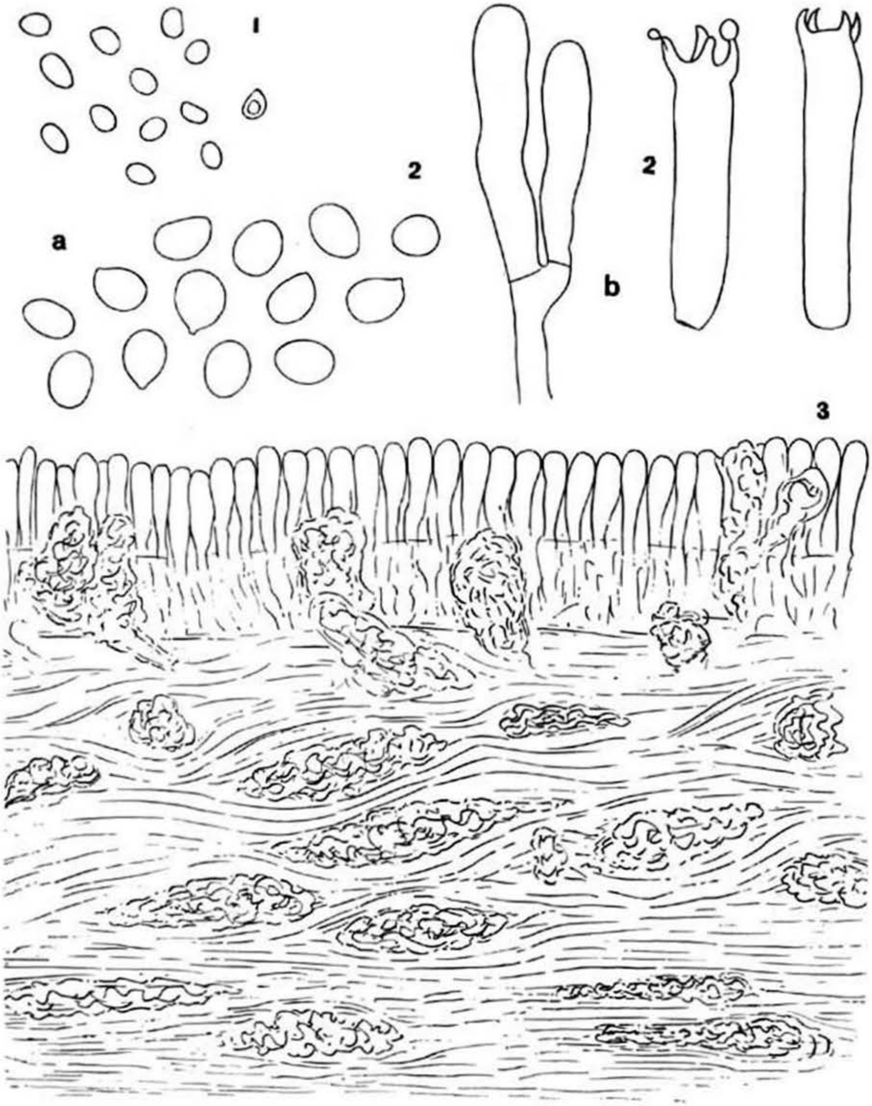
EXPLANATIONS OF FIGURES 1–3

Figs. 1–3. — 1. *Beccariella caespitosa*. Spores. — 2. *Cladoderris funalis*. a. Spores. b. Basidia. — 3. *Cladoderris membranacea*. Section through the fruitbody showing yellowish oily masses in the context and hymenial tissue.



Figs. 1–3

the upper part of the trunk arise a number of main branches. These in turn, by pinnate branching, give rise to numerous crowded lateral branchlets which leave the parent branch at a very acute angle. The lateral branchlets then branch in a similar manner and this may be repeated further until the ultimate branchlets become extremely crowded and tend to fuse along their length. The fruitbody therefore tends to be formed of a series of fan-like segments formed by multipinnate branching in one plane. There is, however, a certain amount of fusion of branches wherever these come into contact and this destroys any regular pattern which might otherwise appear with the result that the fruitbodies have a rather shredded and tattered look. They nevertheless retain a distinctly feathery appearance. The branches are rather flattened and have the hymenium confined to the lower surfaces. The upper surface of the branches is fibrillose and although it was originally described as ashy-alutaceous is now pale fawn. The hymenial surface was also said to be similarly coloured but is now yellowish fawn and rather darker than the upper surface. *Hyphal structure* monomitic, consisting of thin-walled hyaline, sparsely branched, generative hyphae, 2.5–5 μ in diam., which lack clamp-connexions at the septa. The flesh in section, especially towards the upper surface of the branches appears dark and horny. The fungus is partly overgrown with a mould mycelium which produces thick-walled, terminal, clamydospores, 6–8 μ in diam., which are sometimes found embedded in the tissue of the '*Cladoderris*'. *Hymenium* thickening markedly, reaching 450 μ in width on the main branches, but not becoming distinctly layered. *Cystidia* and *gloeocystidia* absent. *Basidia* cylindrical, 33.8–44.2 × 6–8 μ, with 4 somewhat incurved sterigmata. *Spores* (6–)7–8 × 5–6.5 μ, smooth, hyaline, elliptical or ovate.

HABITAT: On the ground.

ILLUSTRATIONS: Lloyd, *1913a*: fig. 530 (photo of type material). — Van der Byl *1929*: pl. 3 fig. 18.

This fungus belongs in the Clavariaceae and was transferred to the genus *Aphelaria* by Reid (*1959*) as *A. funalis* (P. Henn.) Reid.

Van der Byl (*1929*) described a second gathering of this species from Salisbury, Southern Rhodesia and subsequently Talbot (*1958*) published an expanded account of this collection. Judging from the latter author's description the fruitbodies of this collection, although somewhat smaller than those of the type, would seem to be very similar to it in appearance. The upper surface of the branches were said to be covered by thick, tangled, sterile fibrils, resembling hydnoid spines and to vary in colour from yellow-brown to pale reddish-brown, while the hymenial surface was described as yellowish to brownish. Talbot (l.c.) also noted that the basidia in the Rhodesian material may be either 2- or 4-spored and that they may reach 50 μ in length. He also stated that the hyphae of the flesh may be inflated, reaching 9 μ in diam., whereas those forming the surface fibrils of the branches were usually uninflated and 3–5 μ wide. Apart from these details Talbot's account is essentially the same as the above description drawn up from the type gathering.

Talbot (l.c.) noted that *C. funalis* was quite distinct from other *Cladoderris* species by virtue of its monomitic hyphal construction and lack of both cystidia and gloeocystidia. He also wrote "it seems certain that the ribbed hymenium is composed basically of flattened clavarioid branches which have fused into an unusual dorsiventral form." Commenting on its systematic position Talbot indicated that *C. funalis* showed some affinity with the genera *Clavulina* and *Aphelaria* in the Clavariaceae. He finally concluded that "*Cladoderris funalis* appears to have characters somewhat intermediate between those of *Clavulina* and *Aphelaria*" and proceeded to state that he was not in a position to decide to which of these genera it should be transferred.

The fungus evidentally proved to be somewhat perplexing to Lloyd (*1913a*) for when he described it in his *Cladoderris* pamphlet he wrote, "It is so different from all other species that it is a question if Hennings was correct in referring it to *Cladoderris*. I am inclined to think it should be so classed. . . . I should not be surprised, however, if it proved to have other names in other genera, such as *Lachnocladium*."

CLADODERRIS MEMBRANACEA de Vriese & Lév. — FIGS. 3, 4

Cladoderris membranacea de Vriese & Léveillé *in* Ann. Sci. nat. (Bot.) III **5**: 153. 1846.
Type: Surinam (Herb. de Vriese) (PC).

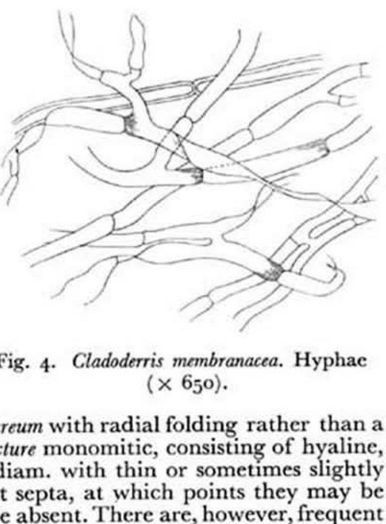


Fig. 4. *Cladoderris membranacea*. Hyphae (× 650).

Sporophores consisting of thin, membranous, orbicular, effuso-reflexed pilei, up to 2.5 cm in width, which frequently fuse one with another. *Pilei* tomentose, and of a pale fawn colour with indistinct zones. *Hymenial surface* somewhat prominently radially ridged behind, but less so nearer the margin where the ridges gradually pass into slight undulating folds. Léveillé's description of the hymenium as being traversed from back to front by veined and branched trunks, is an exaggeration in spite of his qualification that they were not very prominent. The hymenial surface of the dried material is now ochraceous-fawn, except for the folds near the margin which have become dark and discoloured. The general effect of the hymenial configuration is to suggest a *Stereum* with radial folding rather than a species of *Cymatoderma* (*Cladoderris*). *Hyphal structure* monomitic, consisting of hyaline, branched, generative hyphae, 2.5–4(–5) μ in diam. with thin or sometimes slightly thickened walls. These hyphae have abundant septa, at which points they may be somewhat constricted, but clamp-connexions are absent. There are, however, frequent lateral fusions between adjacent hyphae. Further, when the hyphae are examined in aniline blue in lactic acid there is often an intensely stained area visible near the septa, due possibly to an accumulation of the contents in this region. The tomentose covering of the pileus is formed of thick-walled hyphae in which the lumen remains distinct. These hyphae are also abundantly septate and lack clamp-connexions. A notable feature of the microstructure of this fungus is the presence of a copious orange or yellowish oily substance which forms large granular masses between the hyphae of the flesh and less commonly between the basidia. It is, as yet, impossible to be certain whether or not the presence of this substance is a constant feature of the species, but since it has been found in both portions of the type material the probability is that it will be found to be so. Another feature of the anatomy of this fungus is that the flesh consists of two zones. There is a layer of loosely woven

hyphae above the hymenium which forms the bulk of the flesh and varies enormously in width. Above this layer is a zone in which the hyphae are densely compacted, and it is from this zone that the hairs forming the surface tomentum arise. This layer of compacted hyphae is less variable in thickness ranging from 78–91 μ in width. *Hymenium:* examination of sections through the fruitbody appear to show two zones in the hymenium, each 10 μ in width, which would suggest that thickening has occurred. If so, however, the mature basidia must be extremely small. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen. *Spores* not seen.
HABITAT: on trunks.

This fungus has no connexion with the genus *Cymatoderma* (*Cladoderris*) on account of its monomitic hyphal structure and lack of both cystidia and gloeocystidia. It is a difficult species to place with any degree of confidence, but it does show considerable similarity to various species of *Merulius* sensu stricto and especially *M. sordidus* Berk. & Curt. This latter species is formed of hyphae which lack clamp-connexions, although admittedly they are mostly thick-walled. It also develops a brown granular substance in the hymenium, which shows similar layering to that of *C. membranacea*, and also in the trama immediately above it. The hymenium of *M. sordidus* is, however, normally poroid. Nevertheless it is possible that *C. membranacea* is a young stage of a species of *Merulius* related to *M. sordidus*, but in which the hymenium has not yet become poroid. There has been some confusion over the interpretation of this species which began when Montagne sent Berkeley a collection from Cayenne, French Guiana of what he had called *C. membranacea*, but which in fact was a thin form of *Cymatoderma dendriticum* (Pers.) Reid. This led Berkeley to write on the label of one of Wright's gatherings (No. 279) from Cuba "*Cladoderris dendritica*, P. *C. membranacea*, De Vriese & Lév." and this specimen was filed under *C. membranacea* at Kew. From Berkeley's cryptic note, however, it is not clear whether he thought that he had a mixture of two species under the same collector's number, although this in unlikely as Berkeley & Curtis published the collection without comment as *C. dendritica* in their "Fungi cubenses" (1868), or whether he thought that *C. membranacea* was a form of *C. dendritica*, or even that the two names were synonyms. However, after studying the Cayenne specimen determined by Montagne and the Cuban specimen discussed above, which was also filed at Kew under *C. membranacea*, Lloyd (*1913a*) concluded that this species was merely a thin form of *C. dendritica*. Subsequently in the same publication he added the following postscript. "*Cladoderris membranacea*. Our account on page 4 was written at Kew and we took the name in the sense of Berkeley and the other specimen at Kew. If my memory serves me right, there is a specimen at Kew supposed to be a cotype. (This presumably refers to the Montagne specimen which is certainly not a cotype. — D.A.R.) At Paris later we found an undoubted cotype. It is not the same as has been so taken at Kew and in my opinion is not a *Cladoderris*."

CLADODERRIS MINIMA Berk. & Br. — FIG. 5

Cladoderris minima Berk. & Br. *in* Ann. Mag. nat. Hist. V **1**: 24. 1878.
Stereum minimum (Berk. & Br.) Lloyd *in* Mycol. Writ. **4** (Syn. stip. Ster.): 36. 1913.
Type: Scotland, Glamis, coll. Rev. J. Stevenson (No. 849).

Sporophores very minute, 4–6 mm wide (in diameter), either flabellate and somewhat pendulous from a short stem-like base or in the form of small effuso-reflexed pilei. *Pileus* white when fresh, becoming pale fawn in the herbarium, and with a fibrillose upper surface. *Hymenial surface* smooth, without trace of ribs or wrinkles when soaked up in 10 % potassium hydroxide solution. It was, however, originally described as being thrown into radiating branched ribs. Lloyd (*1913b*) also described the hymenium as "uneven with ridges". *Hyphal structure* monomitic, consisting of thin-walled, branched, generative hyphae, 2.5–5 μ in diam. with clamp-connexions at the septa, and with thin but distinct walls at least towards the upper surface of the pileus. The branching of the hyphae frequently takes place from the clamp-connexions. There is no distinct cuticle. The flesh consists of a narrow region in which the hyphae are horizontally orientated. Above this zone some of the hyphae diverge to form the fibrillose surface of the pileus, while below it there is a zone in which the hyphae gradually curve downward toward the hymenium. The latter zone forms the greater part of the context. However, all the hyphae are rather loosely arranged and there is no sharply defined zonation of the flesh. Examination of the hyphal structure also shows a number of deeply staining globose bodies up to 18 μ in diam. in the context, but these were judged to be extraneous. *Hymenium* not thickening. *Cystidia* and *gloeocystidia* absent. There are, however, scanty, fusiform, thin-walled cystidioles, with narrowed, obtuse, sterile apices. Some of these organs project slightly beyond the basidia. *Basidia* 4-spored, up to 56.6 × 6 μ. *Spores* 7–10 × 4–6 μ, smooth, hyaline, elliptic-pip-shaped, with an oblique apiculus; often adhering in groups. Bresadola, who also examined the type specimen, has noted on the herbarium sheet that he found the spores to be 8–10 × 6–8 μ.

HABITAT: on wood. Originally collected on birch trunks.

ILLUSTRATIONS: Lloyd, *1913b*: fig. 556 (a reproduction of Stevenson's illustration of the type collection). — Massee, *1892*: figs. 15–17. — Ramsbottom, *1923*: fig. 82 (a reproduction of Stevenson's illustration of the type collection). — W. G. Smith, *1908*: figs. 97 D–E (a reproduction of Stevenson's illustration of the type collection). — Stevenson, *1886*: fig. 85 (illustration of the type collection).

This is *Corticium laeve* (Pers. ex Fr.) Fr. forma *cucullata* Bourd. & Galz. as indicated by Reid (*1959*).

Cladoderris minima has long remained one of the mysteries of the British fungus flora for the genus *Cymatoderma* (*Cladoderris*) was known to consist of species with a predominantly tropical distribution. Massee (*1892*) certainly did not help towards establishing the true identity of the fungus when he erroneously described the spores as "elliptic-oblong, apiculate at base, curved, 14–15 × 4–5 μ" and added that it could be recognised by its "large, sausage-shaped, curved spores". These erroneous measurements were subsequently reproduced by Rea (*1922*). Furthermore, Bresadola (*1916*), after examination of the type material wrongly concluded that it was *Cyphella galeata* (Schum. ex Fr.) Fr.

It should be noted that in addition to the type gathering of *C. minima*, Berkeley (in Herb.) also assigned a collection from Penzance, Cornwall to this species although, evidently with some reservations, for he annotated it as "*Cladoderris minima* Berk. & Br. Var." This collection is sterile, but it is probably conspecific with the type. A much more recent gathering from Masham, Yorkshire, collected by W. N. Cheesman in September 1923, and probably the basis of the record of *C. minima* in Mason and Grainger's (*1937*) list of Yorkshire Fungi agrees with the type and should likewise be regarded as *Corticium laeve* forma *cucullata*. On the other hand a specimen reported by Pearson (*1918*) from Wimbledon Common, collected in December, 1916 is misdetermined and in fact represents the first British collection of *Stereophyllum boreale* Karst.

CLADODERRIS PLATENSIS Speg.

Cladoderris platensis Speg. *in* An. Mus. nac. B. Aires **6**: 179. 1899.
Type: Parque de la Plata, Argentine, 12 July 1885 (LPS).

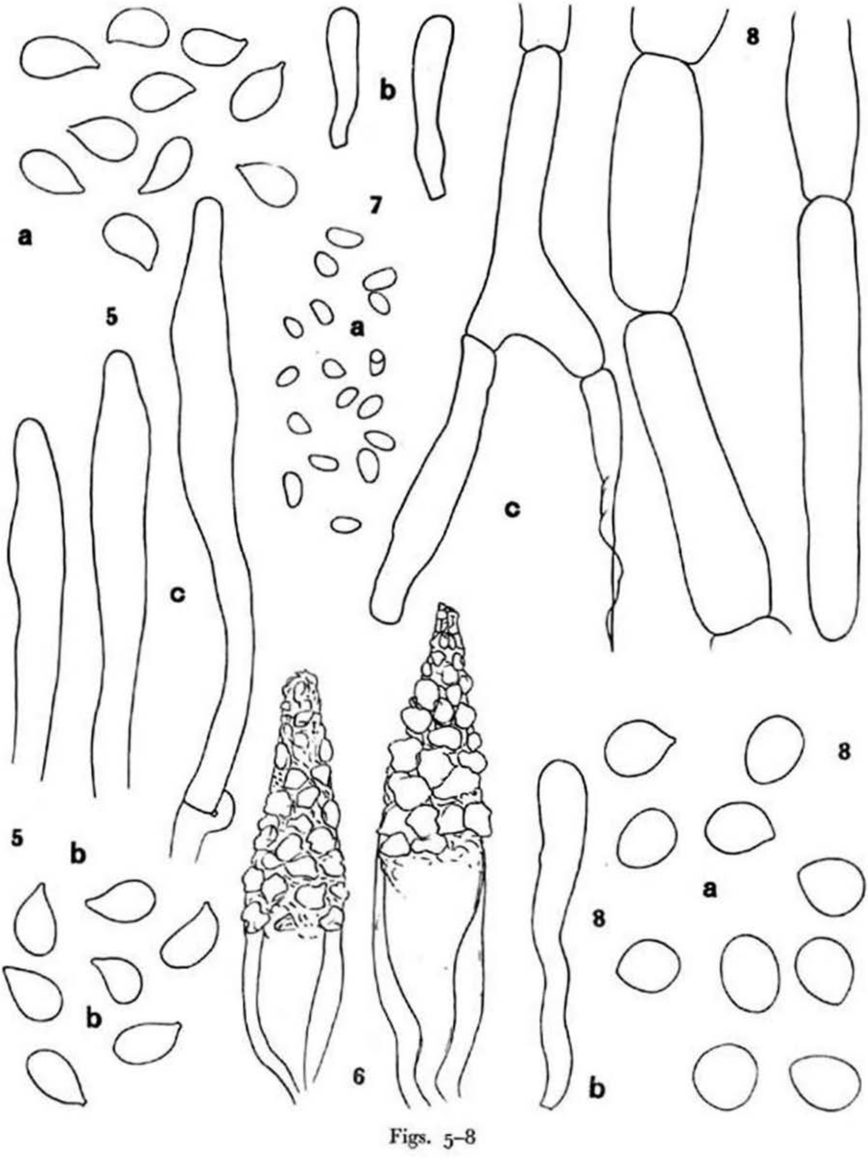
Sporophores 1–2 cm in diameter, 1–1.5 cm in radius, consisting of densely imbricate, thin, membranous, often effuso-reflexed, dimidiate or flabellate pilei, which frequently become intricately fused one with another. *Pileus* concentrically sulcate, but also radiately undulating, folded or crisped. The upper surface is tomentose and ochraceous fulvus in colour becoming tawny-brown when dried, and sometimes slightly paler behind. *Hymenial surface* greyish-white or greyish-flesh-coloured, becoming dark purplish brown in the herbarium; seemingly almost smooth to the eye but under a lens appearing distinctly 'merulioid-poroid'. The pores, however, have a tendency toward radial orientation. *Flesh* dirty white. *Hyphal structure* monomitic, consisting of branched, hyaline, generative hyphae, which lack clamp-connexions at the septa. Many of these hyphae, the main trunks of which are 5–7 μ wide, become very thick-walled. There is no distinct cuticle. The context consists of two zones (1) that nearest the hymenium in which the hyphae have rather thinner walls and are more compacted (2) that forming the upper surface of the pileus in which the hyphae have strongly thickened walls but are more loosely arranged. It should be noted that there is a dense brown granular substance present between some of the hyphae of the context, but this is much more conspicuous at the line of junction between context and hymenium. This brown substance is also present throughout the hymenium itself. It has a tendency to form droplets and does so readily when sections are heated in aniline blue in lactic acid or in 10 % potassium hydroxide solution. *Hymenium* apparently not thickening. There is, however, a deeply staining basidial layer 15.6–23.4 μ in width, beneath which is a loose subhymenial zone 15.6 μ in thickness increasing to 26 μ or more in places, and this in turn is followed by a layer 10–13 μ wide which fails to stain in aniline blue in lactic acid and in which it is almost impossible to make out individual hyphal elements. *Basidia:* mature basidia not seen. *Spores* not seen.
HABITAT: the original fruitbodies were collected on *Eucalyptus globosus*.

This is *Merulius sordidus* Berk. & Curt. as noted by Reid (*1959*).

Lloyd (*1913a*) commenting on this species wrote "unknown to me. Appears, from the description to be thin form of [*Cladoderris*] *dendritica*, viz., *membranacea*."

EXPLANATION OF FIGURES 5–8

Figs. 5–8. — 5. *Cladoderris minima*. a. Spores mounted in aniline blue in lactic acid. b. Spores mounted in 10 % potassium hydroxide solution. c. Cystidioles. — 6. *Cladoderris pritzelii*. Cystidia. — 7. *Cladoderris rickii*. a. Spores. b. Immature basidia. — 8. *Podoscypha alutacea*. a. Spores. b. Basidium. c. Hyphae.



Figs. 5–8

CLADODERRIS PRITZELII P. Henn. — FIGS. 6, 56

Cladoderris pritzelii P. Henn. *in* Hedwigia **42** (Beibl.): 74. 1903.
Type: Kuranda, Northern Queensland, Australia, coll. E. Pritzel (No. 130), May 1902 (S).

Sporophores consisting of thin, membranous, effuso-reflexed, dimidiate pilei up to 8 cm in diam., and 5 cm in radius. *Pileus* covered with a very pale fawn coloured tomentum (cinnamon according to Hennings), becoming brownish near the acute margin. The surface is indistinctly zoned and also concentrically and often radially sulcate. *Hymenial surface* strongly radiately plicate, with a broad marginal zone which is a bright cinnamon colour in contrast to the remainder which is pinkish-buff. There are, however, numerous, small, cinnamon, velvety, granular warts scattered over the lower surface. *Hyphal structure* dimitic. The branched generative hyphae are 2–5 μ in diam., and lack clamp-connexions at the septa. They are thin-walled near the hymenium but are distinctly thick-walled in the rest of the flesh and are then difficult to distinguish from skeletal hyphae. The latter often arise high in the context and curve down toward the hymenium, forming a palisade beneath the subhymenium which is only very rarely penetrated. These unbranched skeletal hyphae, 4.5–6 μ in diam., which often appear slightly yellowish in 10 % potassium hydroxide solution, are thick-walled with the lumen almost obliterated. They are also heavily encrusted with a fine yellowish-brown granular substance which is soluble in 10 % potassium hydroxide solution. There is no distinct cuticle. The flesh consists of a thin zone in which the hyphae are more densely compacted and horizontally orientated and below this is a region in which the skeletal hyphae diverge and curve down toward the hymenium, while above it the hyphae diverge in the opposite direction to form the surface tomentum. The hyphae of the tomentum which are 6–8 μ in diam., are thick-walled, and often unbranched. It seems that the surface tomentum of the pileus is perhaps best regarded as being formed of both modified generative hyphae and skeletal hyphae. The differentiation of the hyphae in this species is, however, not very clear-cut, and it is often difficult to distinguish between the generative and skeletal hyphae, especially in the tomentum where the former have greatly thickened walls. *Cystidia* present as large, conical structures which protrude beyond the basidia for up to 30.2 μ. They have very thickened walls, especially in the basal portion which is often somewhat brownish, and are heavily encrusted with a coarse crystalline deposit which dissolves slowly in both 10 % potassium hydroxide solution and aniline blue in lactic acid. *Basidia:* mature basidia not seen. *Spores* not seen. (Hennings described them, probably wrongly, as "subglobose, internally punctulate, hyaline, smooth, 3.5–4 μ".)
HABITAT: on wood.

This is *Lopharia papyracea* (Jungh.) Reid (*Stereum percome* Berk. & Br.), see Reid (*1959*) who has also published a detailed account of the species (Reid, *1957a*), with illustrations of the microstructure. In addition see this paper page 158.

Lloyd (*1913a*) wrote of *Cladoderris pritzelii*, "In its macroscopic characters same as *spongiosa*, but this specimen has no stem. The hymenium has large metuloids (unknown to the author) . . .."

CLADODERRIS RICKII Lloyd — FIG. 7

Cladoderris rickii Lloyd *in* Mycol. Writ. **7**: 1196. 1923.
Type: Brazil, coll. Rev. J. Rick (BPI, Lloyd Catalogue No. 29345).

Sporophores consisting of thin, membranous, effuso-reflexed pilei forming brackets at least 6 cm in diameter and 1.5 cm in radius. *Pileus* uneven and concentrically sulcate in places. It is ochraceous-cream in colour and covered with a thin tomentum. *Hymenial surface* which is reddish brown with purplish tints, has a typically merulioid configuration, although the ridges and pores show a tendency toward radial orientation. *Hyphal structure* monomitic, consisting of branched, hyaline, generative hyphae which lack clamp-connexions at the septa. These hyphae mostly become very thick-walled and the lumen is often almost obliterated, but in some the walls do not thicken to the same extent and the lumen is then wide and the septa easy to distinguish. The hyphae, the trunks of which are 5–8 μ in diam. branch freely and many of the resulting branchlets are thin-walled and only 2.5–3.5 μ wide. There is no distinct cuticle, but in section the context can be seen to consist of two, more or less equal, zones. In the zone nearer the hymenium the hyphae tend to have thinner walls and stain more deeply in aniline blue in lactic acid, while in the zone forming the upper portion of the flesh the hyphae have thicker walls and do not show great affinity for the stain. The line of junction between these two zones is not usually very obvious but the hyphae in this region often lack the horizontal orientation found in the lower and to a lesser extent also in the upper zone. As a result the hyphae at this point appear to run in all directions and to be much branched. There is also a conspicuous brown granular substance distributed throughout the lower portion of the context and especially nearer the hymenium. This forms droplets when sections are mounted in 10 % potassium hydroxide solution or in aniline blue in lactic acid. *Hymenium* apparently not thickening, although there is a well developed subhymenial layer 20–40 μ in width. Sections through the fruitbody would appear to indicate that the hymenial layers become pushed up and separated in places from the overlying context during growth, leaving the intervening spaces occupied by brown oil droplets and occasional hyphae. The brown oily substance is also conspicuous in the subhymenial tissues. *Basidia* small, hyaline, clavate, 17–23 × 2.5–3.5 (–4) μ with 4 sterigmata. The basidia form a conspicuous layer extending over the apices of the hymenial ridges and pore mouths. *Spores* small, hyaline, elliptical, 3.5–4.5 × 1.75–2.5 μ.

HABITAT: on wood.

ILLUSTRATION: Lloyd, *1923*: pl. 242 fig. 2435 (photo of type collection).

This, like *C. platensis* Speg. (see page 116), is *Merulius sordidus* Berk. & Curt. as noted by Reid (*1959*).

It is remarkable that Lloyd should have described this fungus as a *Cladoderris* for it was sent to him by Rick as a species of *Merulius*.

PODOSCYPHA ALUTACEA Bres. — FIG. 8

Podoscypha alutacea Bres. *in* Bot. Jb. **54**: 251. 1916.

Type: Etappenberg Station, New Guinea, coll. Ledermann (No. 9356), 18 Oct. 1912 (S).

Sporophores thinly membranous, and infundibuliform with a central stipe. *Pileus* 1–2 cm wide, glabrous, appearing alutaceous in dried material; margin more or less entire. *Hymenial surface* smooth and concolorous. *Stipe* 1.5–2 cm long and 1 mm thick, cylindrical, with somewhat swollen bulbous base. It is also pruinose and rufescent in colour. *Hyphal structure* monomitic, consisting of thin-walled, hyaline, branched, generative hyphae 3–10 μ in diam. Those hyphae forming the context are mostly 5–10 μ in width while those forming the subhymenial tissue are 3–4 μ wide. In the flesh the hyphae show abundant septa at variable intervals and are often markedly constricted at these points, but clamp connexions are lacking. The hyphae in the stipe are similar to those in the pileus excepting that they have less numerous septa and are not so conspicuously constricted at points where these occur. There is no distinct cuticle to the pileus. *Hymenium* thickening, reaching 117 μ in width at a point 3 mm in from the margin of the pileus. Beneath the thickened hymenium there is a subhymenial zone 52 μ wide composed of much branched, and very loosely arranged hyphae. *Cystidia* and *gloeocystidia* absent. *Basidia* clavate, up to 49.4 μ in length and 5–8 μ wide, with 2 or 4 sterigmata. (Bresadola gives them as 35–40 × 7–9 μ.) *Spores* smooth, hyaline, non-amyloid, varying in shape from globose to subglobose. When globose they are 6–8 μ in diam., but when subglobose 7–8(–10) × 6–7 μ. (Bresadola described them as subglobose, 8–10 × 6.5–8 μ.) Abundant spores are also present, embedded in the old hymenial layers.

HABITAT: in loamy soil.

This is not a species of *Podoscypha* Pat. because of its monomitic hyphal structure and lack of gloeocystidia. It belongs in the genus *Pseudocraterellus* Corner and is accordingly transferred to that genus as **Pseudocraterellus alutaceus** (Bres.) Reid, *comb. nov.*

PODOSCYPHA LUTEA Pat. — FIG. 9

Podoscypha lutea Pat. *in* Bull. Soc. mycol. Fr. **43**: 24. 1927.
Type: Nhatrang, Annam, coll. Poilane (No. 8329) (PC).

Sporophores centrally stipitate, 15–30 mm high. *Pileus* 4–15 mm wide, thin, membranous, pellucid, glabrous, and of a very distinctive buttercup yellow when fresh, fading to pale brown in the herbarium. It is orbicular and more or less flattened, although depressed at the centre. *Hymenial surface* smooth, bright yellow, becoming golden brown on drying. *Stipe* 1 mm wide, smooth, cylindrical and amber yellow changing to brown in dried specimens. It is slightly enlarged toward the base and also at the summit where it expands into the cap. *Hyphal structure* monomitic, consisting of thin-walled, generative hyphae 3–10 μ in diam. These hyphae which lack clamp-connexions at the septa are often slightly constricted at these points. The hyphae are formed of segments 26–41 μ in length. There is no distinct cuticle. *Hymenium* not thickening, 39 μ in width. *Cystidia* and *gloeocystidia* absent, but there are clavate bodies in the hymenium, up to 10 μ in diam., with densely granular contents and which could be mistaken for gloeocystidia. These structures, however, are probably only young developing basidia. *Basidia* up to 39 μ long and 6.5–10 μ wide, but only one was observed with sterigmata (4 in number). *Spores* (7.5)8–9(–10) × (5–)6–8 μ (Patouillard described them as 9–10 × 7 μ), smooth, hyaline or tinted yellow, varying from broadly elliptical to ovate and with a distinct lateral apiculus.

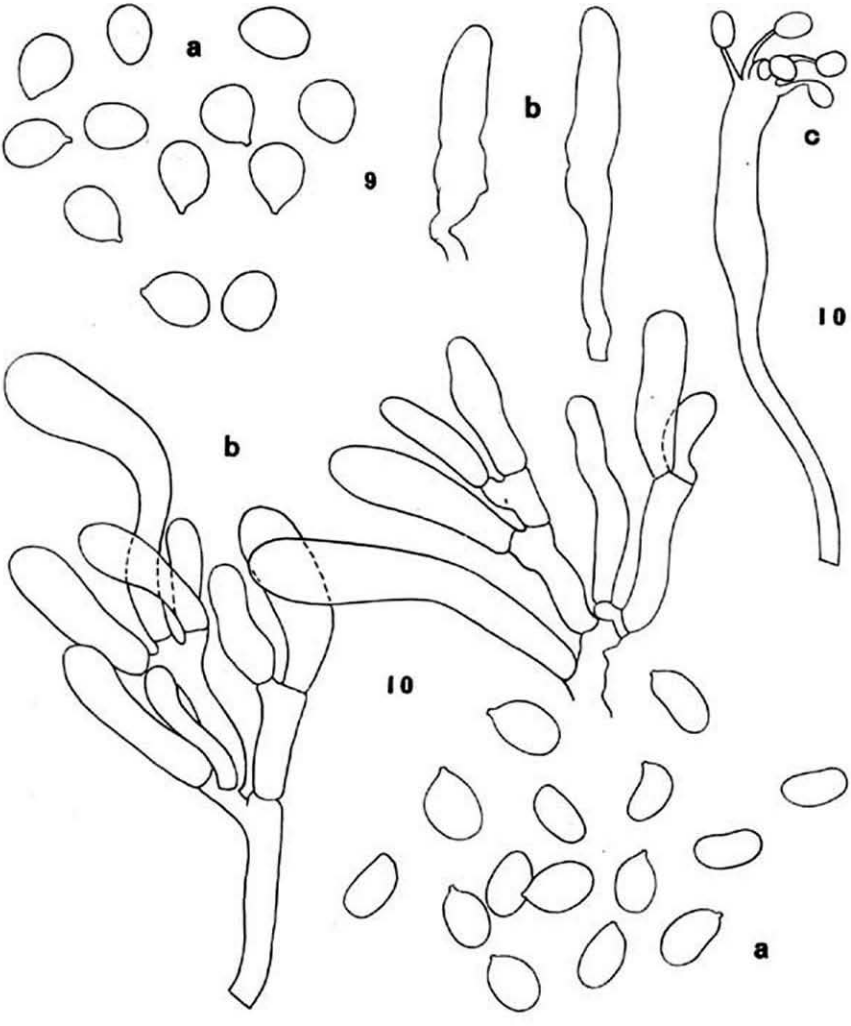
HABITAT: on the ground.

This is not a species of *Podoscypha* Pat. for the same reasons as given for the previous fungus, but like it belongs in the genus *Pseudocraterellus* Corner. It is therefore transferred to that genus as **Pseudocraterellus luteus** (Pat.) Reid, *comb. nov.*

PODOSCYPHA PERTENUIS Skovsted — FIG. 10

Podoscypha pertenuis Skovsted *in* C.R. Lab. Carlsberg (Sér. physiol.) **25**: 392. 1956.
Cotylidia pertenuis (Skovst.) Boidin *in* Rev. Mycol., Paris **24**: 202. 1959.
Type: Søllerup Indelukke, Denmark, coll. Per Skovsted, Aug. 1952 (C).

Sporophores clustered, 2–6 mm high, centrally stipitate, becoming very solid almost woody when dried. *Pileus* 1.5–6 mm in diam., shallowly umbilicate with rather conspicuous spiculose processes in the depressed portion. When fresh ochraceous



Figs. 9, 10. — 9. *Podoscypha lutea*. a. Spores. b. Basidia. — 10. *Podoscypha pertenuis*. a. Spores. b. Basidia. c. Basidium bearing five spores.

with dark brown radiating processes but becoming fawn coloured in the herbarium, except near the somewhat laciniate margin where it is now dark greyish black. *Hymenial surface* radiately ribbed, and of an ochraceous fuliginous colour changing to ochraceous on drying. *Stipe* 0.5–1.5 mm wide, wrinkled and felty, becoming ochraceous with a smoky tinge near the pileus. *Hyphal structure* monomitic, consisting of thin-walled, hyaline, branched, generative hyphae, 2.5–8(–10) μ in diam. These hyphae are septate, and there is a definite constriction at each septum, but they lack clamp-connexions. The hyphae consist of segments 15.6–70.2 μ in length (mostly about 52 μ). There is no distinct cuticle. In the flesh the hyphae are loosely interwoven but nearer the hymenium they tend to be more densely compacted and more or less horizontally orientated. *Cystidia* and *gloeocystidia* absent. *Basidia* 46.8–62.4 × 5–8 μ, at first clavate, then elongated and subcylindric with 3–5 sterigmata. (Skovsted noted that the basidia often protrude and that they are 7–10 μ in diam., with 2–6 sterigmata 5–8 μ in length.) *Spores* 7.5–9.5 × 4–5.5 μ (Skovsted gives them as 7–9 × 3.5–5 μ), smooth, hyaline to pale yellowish in 10 % potassium hydroxide solution, non-amyloid, varying in shape from broadly elliptical to elliptical and with a short lateral apiculus.

HABITAT: on the ground in beech woods.

ILLUSTRATION: Skovsted, *1956*: pl. 1 fig. 1 (photo of type collection).

This fungus does not belong in the genus *Podoscypha* Pat. owing to its monomitic hyphal structure and lack of gloeocystidia, neither can it be assigned to *Cotylidia* Karst. on account of the broad hyphae formed of short segments, its large basidia bearing 2–6 sterigmata and its lack of protruding finger-like cystidia. It is a typical member of the genus *Pseudocraterellus* Corner and is accordingly transferred to that genus as **Pseudocraterellus pertenuis** (Skovst.) Reid, *comb. nov.*

This species is evidently closely related to **Pseudocraterellus sinuosus** (Fr.) Reid, *comb. nov.* (basionym, *Cantharellus sinuosus* Fr., Syst. mycol. **1**: 319. 1821) but differs from it in its smaller size and smaller spores. Fries, however, described a *Cantharellus* (*Craterellus*) *pusillus* which would seem to be very similar in general appearance to this Danish fungus, but the Friesian species is now usually regarded as a synonym of *P. sinuosus*. However, it is obviously desirable to re-examine Friesian material of *C. pusillus* if any remains, with a view to deciding whether or not it is really identical with *P. sinuosus*.

The Danish fungus is also very like *Craterellus subundulatus* (Peck) Peck which has similar hyphae 3–10.5 μ in diam., consisting of segments 23–60 μ in length, Basidia 33.8–52 × 6–10 μ bearing up to 6 sterigmata, and spores 5.5–8 × 3.75–5 μ.

POLYOZUS HISINGERII Karst. — FIG. 11

Polyozus hisingerii Karst. *in* Medd. Soc. Fauna Fl. fenn. **16**: 2. 1888.
Thelephora hisingerii (Karst.) Sacc., Syll. Fung. **9**: 220. 1891.
Lachnocladium hisingerii (Karst.) Corner, Monogr. Clavaria & all. Gen. 425. 1950.
Type: Fagerviken, Finland, coll. E. Hisinger, 3 July 1887 (H).

Sporophores 3–4 cm high, consisting of pale alutaceous, erect, dichotomously branched, clavarioid fructifications with a simple, subfiliform, terete, pubescent or pruinose, stipe-like base. The subfastigiate branches, which are slightly flattened or terete, are covered with a dense pruina but have acute or rarely obtuse naked apices. *Hyphal structure* monomitic, consisting of branched, hyaline, generative hyphae, 2–5 μ in diam., with clamp-connexions at the septa. These hyphae which have thin but distinct walls, occasionally inflate up to 10 μ beneath the point at which a hypha branches. There are no interweaving hyphae present in the flesh. *Cystidia* and *gloeocystidia* lacking. *Basidia* 20–30 × 5–6 μ, clavate with a basal clamp-connexion. The basidia which bear 4 sterigmata, are normally thin-walled but some become extremely thick-walled and then appear very conspicuous in squashes. The walls may be up to 2.5 μ in thickness but even so the sterigmata are still visible. *Spores* abundant, hyaline, elliptical, 3.5–5.5 × 2–3.5 μ (not subspherical, 3 × 2 μ as stated by Karsten).

HABITAT: the type material was collected in an orchid house, growing on the roots of *Cyathea medullaris*.

ILLUSTRATION: Karsten, *1889*: pl. 4 f. 70 (coloured illustration of the type material).

This fungus is a member of the Clavariaceae and belongs in *Clavulinopsis* to which genus it is now transferred as **Clavulinopsis hisingerii** (Karst.) Reid, *comb. nov.*

It is undoubtedly an earlier name for the fungus which Corner (*1950*) described as *Clavulinopsis similis* Corner. There is no question of it being a species of *Lachnocladium* Lév.—the genus to which it was referred by Corner (*1950*) on the basis of the rather brief original description—because of the clamped hyphae, the lack of dichophytic hyphae, and also the absence of gloeocystidia.

STEREUM BOMBYCINUM Lloyd — FIG 12

Stereum bombycinum Lloyd *in* Mycol. Writ. **7**: 1336. 1925.

Type: Melbourne, Australia, coll. C. C. Brittlebank (BPI, Lloyd Catalogue No. 8057).

Sporophores sessile, forming either brackets or rosette-like fruitbodies with a central point of attachment. In the original account of this species Lloyd gave the erroneous impression of a true centrally stipitate fungus when he wrote "Plant with an irregular-rooting stem-like base, . . . Pileus orbicular, depressed." *Pileus* golden brown with faint zones, and appearing distinctly sericeous. This is the result of the removal of the surface tomentum, probably by insects, and the exposure of the underlying golden brown surface of the pileus. In part of the collection, however, the remnants of a surface tomentum are still evident. *Hymenial surface* smooth, ochraceous. *Hyphal structure* dimitic, consisting of both generative and skeletal hyphae. The former, which have thin or slightly thickened walls, are branched, hyaline, 2.5–3.5 μ in diam., and without clamp-connexions at the septa. The skeletal hyphae, up to 8 μ in diam., have thickened walls, often appearing almost solid, and are unbranched. They frequently arise high in the context and curve down into the hymenium where they terminate as modified conducting organs, 4–6 μ in width, which may project slightly beyond the basidia. These conducting organs have very thickened walls with a narrow lumen, but this expands gradually towards the apex which is usually thin-walled. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen. There are, however, numerous thin-walled 'paraphyses', 2–2.5 μ in diam., with very acute apices. *Spores* not seen.

HABITAT: the original gathering was said to have been "evidently growing in the ground". However, this observation was probably incorrect, or if accurate the fungus must have been growing from branches shallowly covered with soil or leaf-litter. It is more probable that the fungus was growing on fallen rotting wood.

ILLUSTRATION: Lloyd, *1925*: pl. 322 fig. 3092 (photo of part of the type material).

This is a typical member of the genus *Stereum* Pers. ex S. F. Gray sensu stricto. Further, it is extremely probable that *S. bombycinum* will be found to be a mere synonym of *S. hirsutum* (Willd. ex Fr.) S. F. Gray.

STEREUM CALYCULUS Berk. & Curt. — FIG. 13

Stereum calyculus Berk. & Curt. *in* Hook. J. Bot. **1**: 238. 1849.

Craterellus calyculus (Berk. & Curt.) Burt *in* Ann. Mo. bot. Gdn **1**: 338. 1914.

Type: Santee River, South Carolina, U.S.A., coll. H. W. Ravenel, Aug. (Curtis No. 1716).

Since this species was re-described by Burt (*1914b*) a full account of the fungus has not been repeated below, but a few additional notes are given to supplement those of Burt:

Hyphal structure monomitic, consisting of thin-walled, hyaline, branched, generative hyphae, 3.5–8 μ in diam., lacking clamp-connexions at the septa at which points they are distinctly constricted. *Basidia* up to 55 × 8 μ clavate with 4-sterigmata. *Spores* 8–10 × 6–7 μ, broadly elliptical to oval with a distinct lateral apiculus. (Burt described them as "slightly yellowish under the microscope, even, 8 × 6 μ".)

Burt transferred *Stereum calyculus* to the genus *Craterellus* Pers., but from this the genus *Pseudocraterellus* Corner has been recently segregated. It is to this latter genus that *S. calyculus* should be more correctly assigned and the combination is accordingly made as **Pseudocraterellus calyculus** (Berk. & Curt.) Reid, *comb. nov.*

STEREUM CAROLINIENSE Cooke & Rav. — FIGS. 14, 15

Stereum caroliniense Cooke & Rav. *in* J. Mycol. **1**: 130. 1885.

Type: Wilmington, North Carolina, U.S.A., coll. T. F. Wood.

Sporophores up to 15 cm high, and 10–12 cm wide, consisting of cauliflower-like masses, formed of erect, glabrous, foliose lobes arising from a thick stem-like base. These flattened lobes, which are ochraceous in colour and faintly zoned, are themselves divided into rather long, narrow, strap-like segments with rounded apices. *Hymenial surface* ochraceous-cream, unilateral, and smooth. *Flesh* soft and juicy. *Hyphal structure* probably monomitic. The flesh is formed of sparingly branched, hyaline hyphae, 8–10 μ in diam., which lack clamp-connexions at the septa, although frequently constricted at these points. Sometimes, however, there is conspicuous ampullaceous swelling of the hyphae at certain septa. These hyphae appear very thick-walled with a narrow deeply staining lumen, but whether the walls are really thickened or have become irregularly gelatinized internally is difficult to determine. The individual hyphae, however, do not become agglutinated. It should be noted that when branching occurs the branchlets are considerably narrower than the main parent hypha. In addition to these hyphae which form the bulk of the flesh there are conspicuous vascular hyphae. These are also branched, but have much thinner

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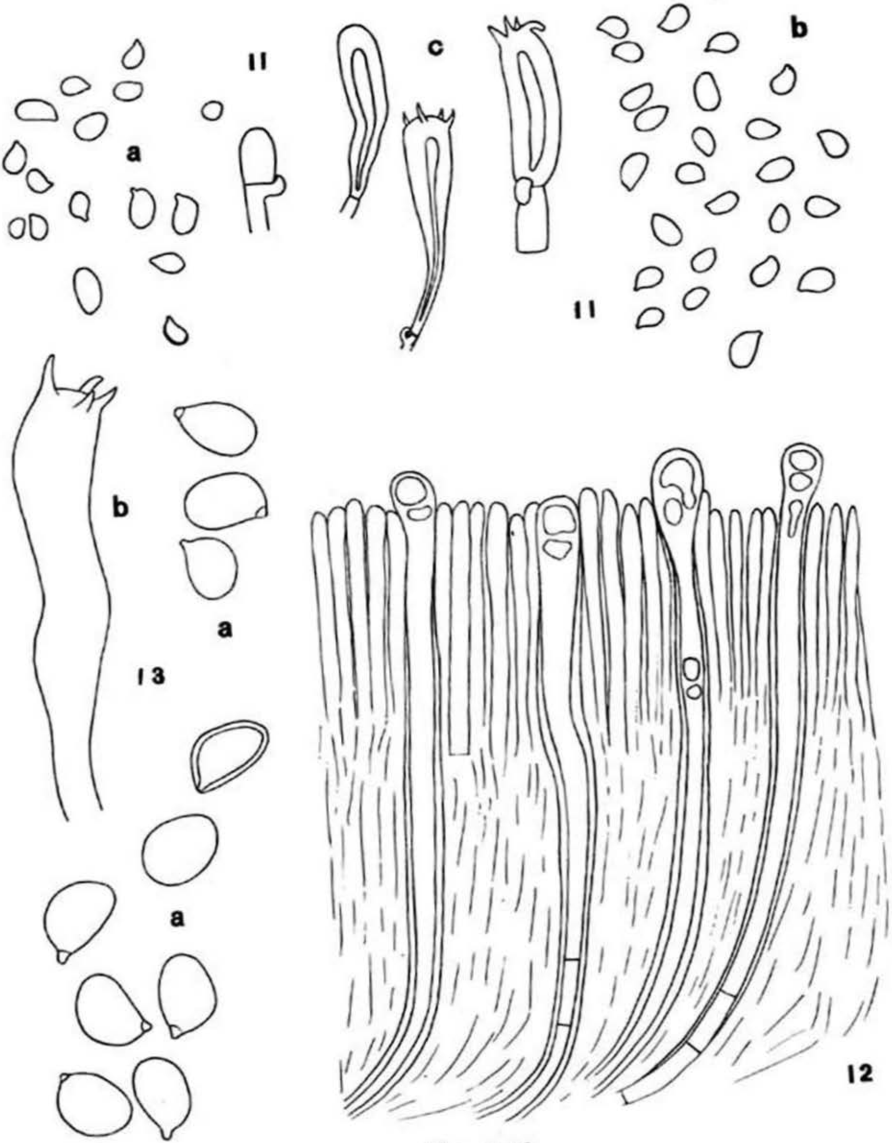
EXPLANATION OF FIGURES 11–13

Figs. 11–13. — 11. *Polyozus hisingerii*. a. Spores mounted in 10 % potassium hydroxide solution. b. Spores mounted in aniline blue in lactic acid. c. Basidia which have become thick-walled. — 12. *Stereum bombycinum*. Section through the hymenium showing conducting organs and a palisade of paraphyses. — 13. *Stereum calyculus*. a. Spores. b. Basidium.



Figs. 11–13

walls. They stain deeply in aniline blue in lactic acid, vary from 5–23 μ in diam., and are conspicuously swollen at each septum. There are also a few hyphae intermediate between those forming the main part of the context and those forming the vascular system. Sections through the fruitbody show that above the subhymenium there is a zone of deeply staining, densely packed, narrow hyphae which bear scanty clamp-connexions at some of the septa, but these hyphae gradually pass into those hyphae, of greater width with thicker walls, characteristic of the flesh proper. Towards the surface of the lobes, however, these broader thick-walled hyphae give way once again to densely compacted, deeply staining, narrow hyphae. *Hymenium* 130–150 μ wide, consisting of a layer of basidia up to 65 μ wide, above which is a subhymenial zone formed of densely packed, and profusely branched hyphae. The hyphae in this subhymenial layer do not show a very definite orientation but tend, nevertheless, to run at right angles to those hyphae forming the flesh. *Cystidia* and *gloeocystidia* absent. *Basidia* up to 44 × 7 μ, clavate, with 4 sterigmata and rather granular contents. They also show a basal clamp-connexion. *Spores* 5–6 × 3.5–4.2 μ, smooth, hyaline, non-amyloid, varying in shape from ovate to broadly elliptical and with a large, often irregular, guttule.

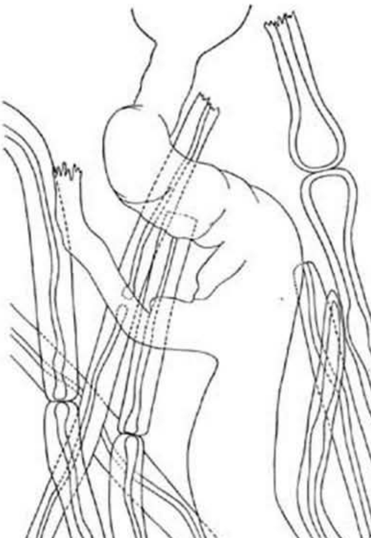


Fig. 14. *Stereum caroliniense*. Hyphae and conducting organ (× 650).

HABITAT: on the ground.

ILLUSTRATIONS: none. However the plant must have looked extremely like Murrill's figure of *Sparassis herbstii in* Mycologia **6**: pl. 128. 1914.

This fungus undoubtedly belongs in the genus *Sparassis* Fr. and has generally been regarded as a synonym of *S. spathulatus* (Schw.) Fr. by American mycologists (Burt, *1920*; Lloyd, *1913b*). However, Lloyd (*1913b*) suggested that *S. spathulatus* was itself possibly the same as a European fungus known as *S. laminosus* Fr. If this suggestion were confirmed *S. spathulatus* would become the correct name for the Friesian species on the basis of priority. However, Reid (*1958*) has already indicated that there is considerable variation within European gatherings of *S. crispa* (Wulf.) ex Fr. in regard to the thickness of the hyphal walls and in the distribution of clampconnexions, and since the spore sizes of the various *Sparassis* species are all very similar it is a difficult task to attempt to work out specific limits in this genus.

STEREUM COALESCENS Lloyd

Stereum coalescens Lloyd *in* Mycol. Writ. **7**: 1338. 1925.
Type: Almora, Himalayas, India, coll. S. D. Joshi, Sept. 1921 (BPI, Lloyd Catalogue No. 8068).

This is an abnormal state of some terrestrial, brown-fleshed polypore!

STEREUM CURREYI Sacc.

Stereum cyathiforme Currey *in* Trans. Linn. Soc. Lond. (Bot.) II **1**: 127. 1880 [nec *S. cyathiforme* (Fr.) Fr., Epicr. 545. 1838].
Stereum curreyi Sacc., Syll. Fung. **6**: 557. 1888.
Stereum crucibuliforme Massee *in* J. Linn. Soc. (Bot.) **27**: 168. 1890.
Type: Bookee Ridges, Karen Hills, Pegu, Burma, 5000–6000 ft. alt. (No. 2619).

This is *Nidularia emodensis* (Berk.) Lloyd. The type consists of empty fruitbodies which lack peridioles.

The species was originally described as *Stereum cyathiforme* by Currey but since this name was preoccupied it was changed to *S. curreyi* by Saccardo. Apparently Massee (*1890*) was unaware of this name change for he in turn renamed it *S. crucibuliforme*, (and claimed to have found spores 7 × 4 μ!!). All these names are based on the same type material and are therefore obligate synonyms.

STEREUM DUBIUM Lloyd — FIG. 16

Stereum dubium Lloyd *in* Mycol. Writ. **7**: 1335. 1925.
Type: New Zealand, coll. H. Hill (BPI, Lloyd Catalogue No. 8053).

ILLUSTRATION: Lloyd, *1925*: pl. 321 fig. 3082 (photo of type material).

This is a laterally-stipitate lignicolous agaric in which the gills have become flattened to form what Lloyd described as a smooth hymenium. According to the original account of the species it was "Pure white when young, becoming at length cinereous". Examination of the gills revealed the presence of small, pointed cystidia with somewhat swollen bases. These organs, 20–28 × 7–9 μ, have slightly thickened walls. There are abundant, hyaline spores, varying in shape from broadly elliptical or ovate to subglobose, each with a single large guttule. These spores measure 6–7 × 4–5 μ or 6–6.5 × 5.5 μ.

It seems clear that the affinities of this fungus lie with species which have been placed in the genus *Pleurotus* (Fr.) Kummer. Accordingly *Stereum dubium* is transferred to that genus as **Pleurotus dubius** (Lloyd) Reid, *comb. nov.*

STEREUM DURUM Lloyd — FIG. 17

Stereum durum Lloyd *in* Mycol. Writ. **6**: 885. 1919 (nec *S. durum* Burt *in* Ann. Mo. bot. Gdn **7**: 226. 1920).
Type: Ashanti, West Africa, coll. T. Hunter (BPI, Lloyd Catalogue No. 6402).

Sporophores consisting of compound brackets, formed by coalescence of several adjacent ligulate or flabellate pilei each of which is attached to the substrate by a broad, discrete, fan-shaped, dorsal prolongation giving an almost stipitate appearance. At first sight the fruitbodies could easily be mistaken for a thick woody polypore. *Pileus* surface unevenly ridged and concentrically sulcate, covered with a pale fawn tomentum, up to 1 mm in thickness. In a few places where the tomentum has been weathered away the underlying, radiately wrinkled chestnut-brown cuticular layer of the pileus is exposed. *Hymenial surface* smooth, and dark grey-brown in colour, probably bleeding when bruised. The undersides of the dorsal stipe-like prolongations however, are sterile and covered with a tawny-brown tomentum. *Flesh* pale wood-coloured and extremely thick, reaching 2–6 mm in width, while the fruitbody as a whole may be up to 8 mm wide in places. The fructifications reach their greatest width just behind the obtuse margin. *Hyphal structure* dimitic, consisting of thin-walled, hyaline, branched, generative hyphae, 2.5–3.5 μ in diam., which lack clamp-connexions at the septa, and thick-walled, unbranched, skeletal hyphae. The latter may or may not have a distinct lumen, but in the region just above the hymenium many of them are faintly coloured and have brownish contents. There is a distinct cuticular layer which is visible on cut surfaces through the fruitbody as a brown horny line separating the surface tomentum from the flesh. This cuticular zone, up to 80 μ in thickness, is formed of thick-walled hyphae with brown walls and contents, bound together with much branched generative hyphae. From the upper portion of this layer arise the hairs which form the tomentose covering of the pileus. These hairs, 4–6 μ in diam., have thick-walls, are septate, and often have brown contents. The lumen may be very distinct or almost obliterated. Beneath the cuticular layer in which the hyphae are strongly coloured and entwined in all directions, the hyphae become gradually less strongly coloured and the skeletals more or less longitudinally orientated. However, in this region there is still a greater percentage of freely branched generative hyphae than in the rest of the flesh. *Hymenium* up to 117 μ in thickness, and containing scattered crystalline masses. There are also abundant conducting organs present. These are the modified endings of skeletal hyphae which curve down through the flesh and either traverse the total width of the hymenium or terminate at various levels within this zone (and then often clavate in shape). Some of these organs, however, arise from generative hyphae in the hymenium itself. All the conducting organs are basically cylindrical, although some are distinctly wider below and others narrow slightly toward their obtuse apices, and all taper toward the base, sometimes quite abruptly. They are thick-walled but have a distinct lumen which often widens out to give a thin-walled apex. Further, they lack septa, are 3–7 μ in diam., and frequently have brown contents, especially towards their tips. In microscope sections through the fruitbody some of these organs can be seen to have very dark brown contents and they stand out very clearly from the rest. The conducting organs with exceptionally dark contents tend to be those which terminate after just penetrating the hymenium. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen. *Spores* not seen (Lloyd described the spores as "globose, hyaline, 4 mic." but these observations were almost certainly based on spores of extraneous origin).

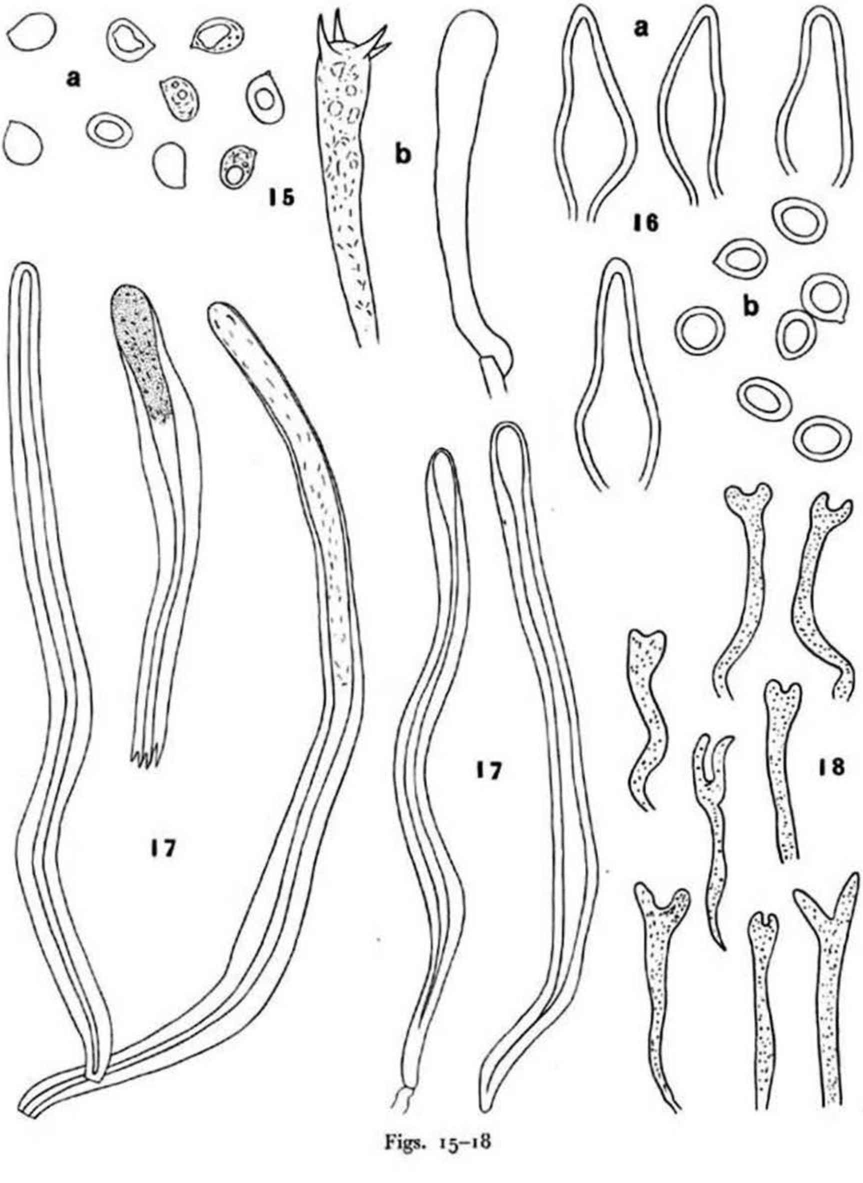
HABITAT: on wood.

ILLUSTRATION: Lloyd, *1919*: pl. 128 fig. 1526 (photo of type material).

This fungus is a member of the genus *Stereum* Pers. ex S. F. Gray sensu stricto, and is evidently a species which bleeds when wounded. It may be only an exceptionally thick form of *S. australe* Lloyd.

EXPLANATIONS OF FIGURES 15–18

Figs. 15–18. — 15. *Stereum caroliniense*. a. Spores. b. Basidia. — 16. *Stereum dubium*. a. Cystidia. b. Spores. — 17. *Stereum durum*. Conducting organs. — 18. *Stereum felloi*. Basidia.



Figs. 15–18

STEREUM ELEVATUM Berk. & Cooke

Stereum elevatum Berk. & Cooke *in* J. Linn. Soc. (Bot.) **15**: 388. 1876.
Type: Rio Jurua, Brazil, coll. Traill (No. 130).

The name *Stereum elevatum* Berk. & Cooke has to be rejected since the original description is based on a mixture of *Hymenochaete damaecornis* (Link ex Fr.) Lév. and immature specimens of an species of *Amauroderma*. The bulk of the type collection consists of the *Amauroderma* which agrees in structure with *A. miquelianum* (Mont.) Reid which is better known as *A. partitum* (Berk.) Wakef. but see page 135. This latter species is rather prone to produce tall, spathulate fruitbodies with rudimentary pores, which resemble various stipitate stereoid fungi.

STEREUM FELLOI Lloyd — FIG. 18

Stereum felloi Lloyd *in* Mycol. Writ. **6**: 1087. 1921.
Type: Mt. Maquiling, Luzon, Philippines, coll. A. Fello, 19 Sept. 1920 (BPI, Lloyd Catalogue No. 23466).

This fungus belongs in the Dacrymycetaceae in the genus *Dacryopinax* Martin. It is accordingly transferred to that genus as **Dacryopinax felloi** (Lloyd) Reid, *comb. nov.*

Because of its dark brown colour when soaked up this species greatly resembles *D. elegans* (Berk. & Curt.) Martin. Unfortunately spores were not found despite the fact that there were numerous mature basidia present. Lloyd's spore measurements (4 × 5 μ) are almost certainly incorrect. The basidia were of the narrow bifurcating kind so characteristic of the family and were 26–28 μ in length.

STEREUM FISSUM Berk., var. VELUTINUM Beeli — FIG. 19

Stereum fissum var. *velutinum* Beeli *in* Bull. Soc. Bot. Belg. **58**: 208. 1926.
Type: Eala, Belgian Congo, coll. Mme. Goossens-Fontana (No. 43), Oct. 1923 (BR).

This is typical *Dacryopinax spathularia* (Schw.) Martin. It was stated to be entirely bright orange when fresh, becoming ochraceous-grey on drying. The upper surface of the pileus and stipe is minutely velvety. The fungus has a monomitic hyphal construction, with the flesh formed of generative hyphae, 1.5–3.5(–5.5) μ in diam., which lack clamp-connexions at the septa. These hyphae have thin or slightly thickened walls especially near the surface of the pileus where they tend to be more densely compacted. The velvety tomentum covering the pileus is formed of tangled, branched, septate hyphae with strongly thickened walls. These hyphae, (3.5–)5–8 μ in diam., are distinctly wider than those forming the flesh. There is no cuticular layer. Sections through the hymenium show a layer of basidia 33.8 μ in thickness and above this a subhymenial zone up to 40 μ wide. There are no cystidia or gloeocystidia. The basidia, up to 30 μ in length are of the usual bifurcating type found in the Dacrymycetaceae and bear hyaline, subcylindrical or slightly curved spores 7.5–8 × 3–3.75(–4) μ which at length become 1-septate.

STEREUM FRIESII (Lév.) Sacc.

Thelephora friesii Lév. *apud* Zollinger, Syst. Verz. indischen Arch. 17. 1854.
Stereum friesii (Lév.) Sacc., Syll. Fung. **6**: 566. 1888.
Type: Java, coll. Zollinger (No. 1526) (PC).

Sporophores of unknown diameter, but up to 6 cm in radius, consisting of coriaceous effuso-reflexed brackets which are variously thrown into radial folds especially toward the margin. In addition the fructifications are also concentrically sulcate. It is also probable that there has been some lateral fusion of adjacent fruitbodies. *Pileus* covered by a well developed, pale brown tomentum up to 2 mm in thickness. *Hymenial surface* smooth, and of a purplish-grey colour passing into a rich brown toward the margin. *Flesh* yellowish-brown. *Hyphal structure* dimitic, consisting of generative and skeletal hyphae. The skeletal hyphae, which are 5–8 μ in diam., are thick-walled, unbranched, and encrusted with a fine yellowish-brown granular deposit which is soluble in 10 % potassium hydroxide solution. The actual walls of the skeletal hyphae are also very pale brown in colour. The generative hyphae are 2–4 μ in diam. and have thin or somewhat thickened walls. These hyphae, which are profusely branched, lack clamp-connexions at the septa. There are also abundant hyphae of an intermediate nature which are thick-walled and branched. Sections through the fruitbody show that the bulk of the flesh is formed of encrusted skeletal hyphae which curve down toward the hymenium and terminate in a palisade-like layer above the basidia. There is a dark horny line visible on broken surfaces of the fruitbody, separating the tomentum from the flesh. This appears to be formed of densely compacted and somewhat agglutinated hyphae which are horizontally orientated and without encrustation. The hyphae in this region, although thick-walled, tend to have a rather wide lumen and to be narrower on average than the skeletal hyphae of the context. From the upper portion of this 'cuticular' layer the hyphae diverge to form the tomentose covering of the pileus. The hyphae forming this tomentum are often almost solid, have brownish walls, are 4.5–6 μ in diam., and lack encrustation. *Cystidia* present, as large, conical, thick-walled bodies, which may project beyond the basidia for up to 40 μ. These organs which are strongly encrusted with crystalline material are hyaline, but if buried in the hymenium they may develop distinctly brown walls. The encrusting crystalline material dissolves rapidly in 10 % potassium hydroxide solution. *Basidia:* mature basidia not seen. *Spores* not seen.

HABITAT: on wood.

This fungus cannot be retained in the genus *Stereum* Pers. ex S. F. Gray sensu stricto since it differs widely in structure from all members of that genus. It belongs in the genus *Lopharia* Kalchbr. & McOwan and is identical with *L. papyracea* (Jungh.) Reid. Accordingly *Stereum friesii* should be added to the synonymy of *Lopharia papyracea* (see page 157) which was also described from material collected in Java. Bresadola (*1916*) erroneously stated that *Stereum vellereum* Berk. was a synonym of *S. friesii*.

STEREUM GRANTII Lloyd — FIG. 20

Stereum grantii Lloyd *in* Mycol. Writ. **7**: 1314. 1924.
Type: Langley, Washington, U.S.A., coll. J. M. Grant, Feb. 1924 (BPI, Lloyd Catalogue No. 8045).

ILLUSTRATION: Lloyd, *1924c*: pl. 307 fig. 3005 (photo of type material).

This is *Aphelaria tuberosa* (Grev.) Corner, as is a second gathering referred to *S. grantii* by Lloyd which was collected by E. B. Sterling of Trenton, New Jersey, U.S.A. (Lloyd Catalogue No. 8064).

In the original account *S. grantii* was described as "Growing in the ground about an inch high. Slender, erect, divided into lobes above. Color (dried) pale brown. . . . It has the general appearance of a *Thelephora*, like *multipartita*. . . . It grows in the ground with a ball of earth adhering to the dried specimens." The fruitbodies which have a monomitic hyphal construction produce a hymenium on the lower surface of the flattened branches. This hymenial layer is formed of 2- and 4-spored basidia. There are no cystidia or gloeocystidia. The spores, 13–20.8 × 5–7 μ are smooth, thin-walled and hyaline. They vary in shape from elliptical to narrowly elliptical, have a distinct lateral apiculus, and rather guttulate contents.

STEREUM GUADELUPENSE Pat. — FIGS. 21, 57

Stereum guadelupense Pat. *in* Bull. Soc. mycol. Fr. **15**: 201. 1899.
Type: Camp Jacob, Guadeloupe, coll. Duss (No. 120), Feb. 1898 (FH).

Sporophores consisting of a stout central stipe which expands into a very thick, woody pileus up to 10 cm in diam. At first sight the fruitbodies could easily be mistaken for a large woody polypore. *Pileus* suborbicular, depressed in the centre, and with a reddish-brown ochraceous, tuberculate, embossed, villose surface. The margin, which is lobed, is very obtuse and up to 1 cm in thickness. *Hymenial surface* reddish-brown, smooth, and partly decurrent down the stalk. *Stipe* 6–7 cm long, and 3 cm thick, rugulose, woody, erect, but attenuated toward the base. *Flesh* hard, brittle, friable and ochraceous in colour. *Hyphal structure* monomitic consisting of pale brown, generative hyphae, 2.5–7 μ in diam. These hyphae which tend to break up into short lengths in microscope squashes, are branched and bear clamp-connexions at the scanty septa. Furthermore, although they are thin-walled, the walls are often rather distinct. *Hymenium* thickening markedly, reaching almost 1 mm in width near the basal portion of the fruitbody. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen. However, in the current hymenial layer there are large thin-walled bodies, up to 56 × 10 μ, which are almost certainly young basidia. These are basically cylindrical but often show a more or less pronounced median constriction. They do not form a definite palisade but appear to be interspersed among thin-walled, septate, clamped hyphae, 2.5–3.5 μ in diam. *Spores* 18–20.8 × 8–10 μ, embedded in the older layers of the hymenium, are pale brown, and distinctly warted. They vary in shape from limoniform to elongate-limoniform and taper at the base to a very prominent, curved apiculus. These embedded spores also tend to have rather thickened walls.

HABITAT: on trunks of *Phyllanthus nobilis*.

ILLUSTRATION: Patouillard, *1899*: pl. 10 fig. 1 (drawing of type material).

Stereum guadelupense belongs in the genus *Gomphus* Pers. ex S. F. Gray, which has recently been made the type genus of a new family—the Gomphaceae Donk

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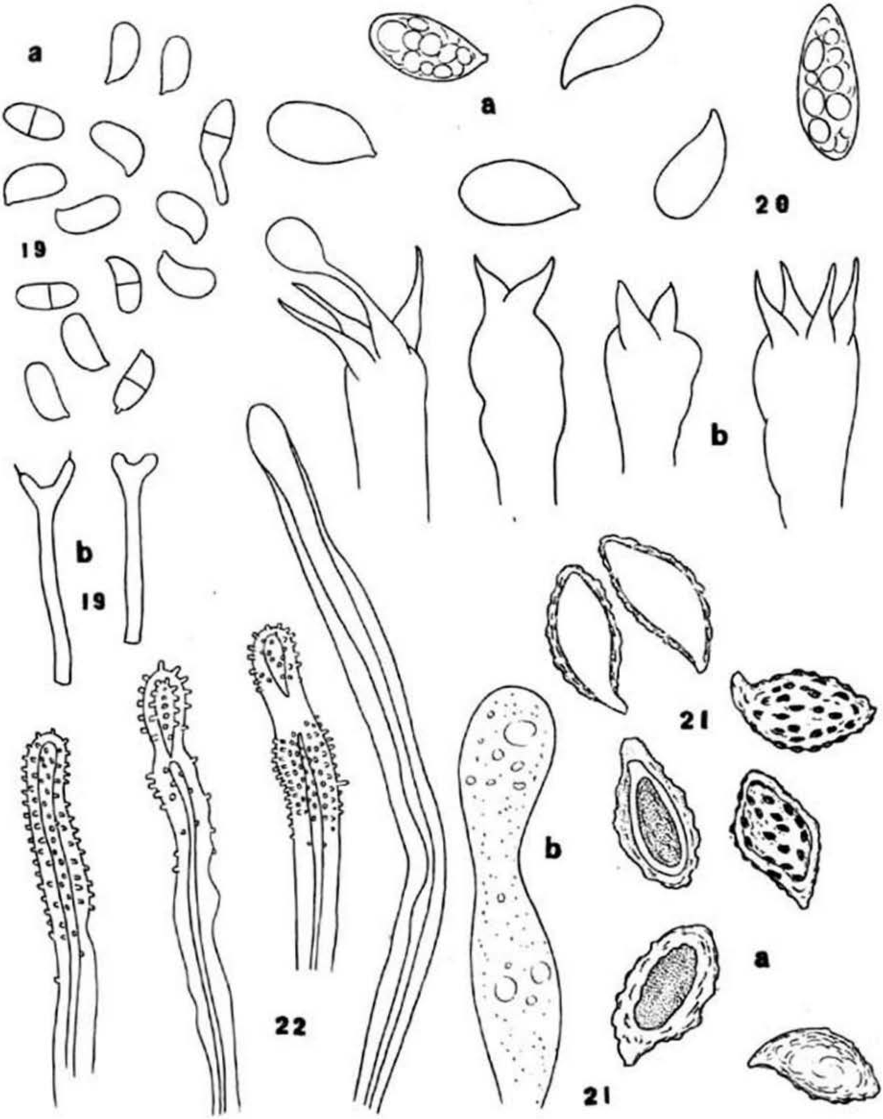
EXPLANATION OF FIGURES 19–22

Figs. 19–22. — 19. *Stereum fissum* var. *velutinum*. a. Spores. b. Basidia. — 20. *Stereum grantii*. a. Spores. b. Basidia. — 21. *Stereum guadelupense*. a. Spores. b. Basidium. — 22. *Stereum princeps*. Acanthophyses.



Figs. 19–22

(*1961*). The species is therefore transferred to that genus as **Gomphus guadelupensis** (Pat.) Reid, *comb. nov.*

It is evident from Patouillard's original account of this fungus that he too observed the spores described above. However he mistook them for cystidia since he wrote "cystidia yellow, short, fusiform, roughened, (20 × 10 μ), disposed in superimposed layers" (from the French). This view is strengthened by Patouillard's figures of these structures. Von Höhnel & Litschauer (*1907*) examined *S. guadelupense*, but they concluded that it was a *Boletus* overrun by a species of *Sepedonium*. Presumably these mycologists regarded the brown, warted spores as belonging to the mould. However, against this is the fact that the spores tend to occur in groups of 2 or 4 in the various hymenial layers. Furthermore they have a distinct apiculus and when in 2's or 4's the apiculi are always directed toward the centre—i.e. the position in which they would be expected if they were borne on basidia. Judging from their occurrence in groups of 2 or 4, their shape and orientation it is virtually certain that they are basidiospores and since there is no evidence of any disruption of the hymenial layers by foreign hyphae there seems to be no obstacle in regarding them as belonging to the fungus.

STEREUM HYMENOGLEUM Speg.

Stereum hymenogleum Speg. *in* Bol. Acad. Cienc. Córdoba **25**: 26. 1921.

Type: Victoria, Mariluan, Chile, coll. J. A. Campos, 20 May 1918 (LPS).

Sporophores 15–25 mm in diam., 10–20 mm in radius, forming small dimidiate or suborbicular pilei which are either adnato-sessile or contracted behind into a subpedicellate base. These fructifications may be found growing singly or they may be imbricate and subcaespitose. *Pileus* when fresh thin and flexible, but becoming rigid when dry. The surface, which is covered by a thick, pale-buff, subsericeous, felty-hirsute or scrupose tomentum, is concentrically sulcate with the tomentum in the furrows slightly darker in colour. *Hymenial surface* smooth, almost transparent, gelatinous and of a brown or lead colour with concentric zones of a darker tint. *Hyphal structure* dimitic, consisting of thick-walled skeletal hyphae 3.5–7 μ in diam., which are septate and unbranched, and thin-walled septate generative hyphae, 2–3.5 μ in diam.; clamp-connexions are absent from both kinds of hyphae. In section the fruitbody is seen to consist of three ill-defined zones. There is a layer 50–100 μ thick just above the hymenium in which there is a high proportion of broad, thick-walled skeletal hyphae. These are rather loosely arranged and tend to curve down into the hymenium where they terminate as modified conducting organs. Above this zone is another, equally variable in thickness in which the hyphae are more densely compacted and horizontally orientated. Here there is a greater proportion of thin-walled generative hyphae and such skeletal hyphae as are present tend to be narrower and less conspicuous. From the uppermost region of this layer arise the hairs which form the shaggy scrupose covering of the pileus. These hairs are long, septate, thick-walled structures, 4–6 μ in diam. They are often united into rope-like strands so giving the scrupose appearance to the pileus. There is no distinct cuticular layer and no deep golden-brown zone as in *S. hirsutum* etc., although there is a faint brownish tint to the hyphae immediately beneath the surface hairs. *Hymenium* 40–55 μ in width. The individual elements in this zone are not gelatinized, but they are covered with a structureless substance which is no doubt responsible for the semitransparent gelatinous nature of the hymenium as described by Spegazzini. The hymenium consists mostly of very narrow, densely packed, thin-walled 'paraphyses' together with thick-walled conducting elements 5–7 μ in diam. The lumen of these conducting organs is very narrow but it expands toward the apex which is often thin-walled. These organs, which do not stain in aniline blue in lactic acid, are more or less cylindrical, although some narrow slightly toward the apex. *Cystidia and gloeocystidia* absent. Spegazzini claimed to have found "lanceolate, pointed cystidia (30 × 8 μ) which are smooth and colourless" (from the Latin). However, it seems probable that these observations were based on the conducting organs described above, although these latter organs are nothing like so pointed as Spegazzini has drawn for his so-called cystidia on the packet in his Herbarium. *Basidia:* mature basidia not seen. Spegazzini described them as clavate, 20–22 × 8 μ, and indicated that they were obtuse and bore 1, 2, or 3, thin, short sterigmata. *Spores* not seen but described by Spegazzini as "elliptical (4–6 × 2–3 μ), smooth, and colourless" (from the Latin).

HABITAT: the original material was collected on dead branches of *Persea lingue*.

This is a member of the genus *Stereum* Pers. ex S. F. Gray sensu stricto.

STEREUM LEICHHARDTIANUM (Lév.) Sacc. — FIG. 23

Thelephora leichkardtiana Lév. *in* Ann. Sci. nat. (Bot.) III **5**: 148. 1846.
Stereum leichardtianum (Lév.) Sacc., Syll. Fung. **6**: 559. 1888.
Type: Moreton Bay, Queensland, Australia, coll. Leichhardt, 1845 (PC).

This is a member of the genus *Stereum* Pers. ex S. F. Gray sensu stricto and Cunningham (*1956*) regarded it as a synonym of *S. lobatum* (Kunze ex Fr.) Fr. which he interpreted in a rather wide sense. If he is correct in this view *S. leichhardtianum* should be grouped with the more densely and completely tomentose forms of *S. lobatum* which some mycologists may still prefer to call *S. fasciatum* (Schw.) Fr.

One of the few noteworthy features of the anatomy of this species is the way in which the skeletal hyphae grow down through the flesh towards the hymenium at an acute angle and then abruptly curve between the basidia to terminate as modified conducting organs. This is reminiscent of the structure of *S. vellereum* Berk. as figured by Boidin (*1960a*) from specimens collected in the Belgian Congo.

This fungus was initially published as *T. leichkardtiana*, but the specific epithet was subsequently altered to 'leichardtiana' by Massee (*1890*). However, since the fungus was named after the collector Leichhardt and since in the original spelling the second 'h' was replaced by a 'k' it seems clear that the epithet should be written 'leichhardtiana' and that Léveillé's spelling should be regarded as an authographic error.

There are additional records of *S. leichhardtianum* from Australia (Wakefield, *1915*; Lloyd, *1915*) and from Ecuador (Lloyd, *1918b*).

STEREUM MIQUELIANUM Mont. — FIG. 58

Stereum miquelianum Mont. *in* Tijdschr. wis- & natuurk. Wetensch. **4**: 203. 1851.
Type: Surinam, coll. Focke (No. 948) (U).

This species is a member of the Polyporaceae and belongs in the genus *Amauroderma* Murrill. It is accordingly transferred to that genus as **Amauroderma miquelianum** (Mont.) Reid, *comb. nov.*

It is significant that Montagne, when describing this species, noted that its stipe resembled that of several centrally and laterally stipitate tropical polypores. In fact the taxon represents a young state of the fungus commonly known as *A. partitum* (Berk.) Wakef. in which the pores have only just started to show as very shallow, ill-defined pits. *Amauroderma partitum* is often collected in a 'stereoid' condition presumably because the pores do not start to form until the fruitbody is already well developed.

Since the specific epithet 'miquelianum' dates from 1851 and since the name *Polyporus partitus* was not published until 1856 it follows that the correct name for the fungus is *A. miquelianum.*

Lloyd (*1913b, 1913c, 1924b, 1925*) reported *Stereum miquelianum* from Brazil, Honduras, Belgian Congo and Singapore, but it is evident from his published accounts and photographs that he had misinterpreted the fungus and that all his records refer to various members of the genus *Podoscypha* Pat.

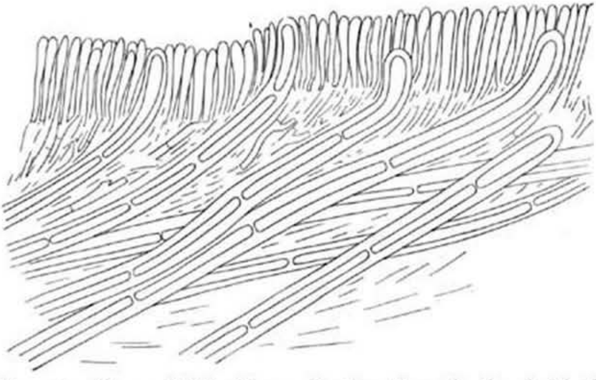
STEREUM PRINCEPS (Jungh.) Lév. — FIG. 22

Thelephora princeps Jungh., Praem. Fl. crypt. Javae Ins. *in* Verh. Bataviaasch Genoot. **17** [2]: 38. 1838.

Stereum princeps (Jungh.) Lév. *in* Ann. Sci. nat. (Bot.) III **2**: 210. 1844.

Xylobolus princeps (Jungh.) Boidin *in* Rev. Mycol., Paris **23**: 341. 1958.

Type: In his original description Junghuhn cited collections from Kendang and Patuha, Java, but these cannot be located in the Leiden Herbarium. It is, therefore, proposed that a specimen in that herbarium bearing the information "Ex. Herb. Junghuhn No. 186" should be taken as the lectotype.



Figs. 23. *Stereum leichhardtianum.* Section through the fruitbody showing the conducting organs penetrating the hymenium (×650).

Sporophores very large, reaching approximately 60 cm in diam., dimidiate, and either sessile or attached to the substrate by a short stipe or elongated tubercle. *Pileus* thick, coriaceous, at first dark ferrugineous but at length pale "fulvo-fuscescent", the base becoming blackish. The pileus is ornamented with distinct concentric zones varying in colour from 'spadiceus' to yellowish and the surface although glabrous may appear longitudinally strigose owing to the presence of ridges and tubercles. *Hymenial surface* pallid alutaceous then greyish, at first smooth but becoming somewhat warted especially toward the base. *Flesh* dry, coriaceous and biscuit coloured. *Hyphal structure* dimitic, consisting of generative and skeletal hyphae. The generative hyphae 2–3 μ in diam., are thin-walled, hyaline or almost so, branched, and without clamp-connexions at the septa. The skeletal hyphae 2.5–5 μ are thick-walled with the lumena almost obliterated. They are unbranched and appear deep brown in 10 % potassium hydroxide solution. There is a very distinct cuticle which is visible as a very dark horny layer on broken surfaces of the fruitbody. This zone is formed of hyphae in which the walls have become somewhat agglutinated. *Hymenium* thickening markedly and reaching over 1 mm in width at the extreme base of the fruitbody. It appears that initially a layer (130 μ wide) of thick-walled, spiny, brown acanthophyses is formed in which the individual elements terminate at various levels. Then it would seem that production of these elements entirely ceases and thin-walled, much branched, hyaline hyphae grow out and produce a functional basidial layer. Following this a new layer of acanthophyses is formed and then a new layer of thin-walled hyphae which again give rise to a new basidial layer, etc. The thickening, therefore, occurs in such a manner that it gives rise to a very distinct layering consisting of alternating golden brown and pale coloured zones of equal width. *Acanthophyses* 2.5–5 μ in diam., with occasional slight swellings up to 6 μ. They are more or less cylindrical, obtuse, thick-walled, brown organs, densely beset with minute spines in their upper regions. Sometimes, however, the spines occur in bands separated by intervening smooth areas. The acanthophyses, or at least those in the more recently formed strata probably arise from thin-walled generative hyphae. *Conducting organs* not conspicuous, but there are thick-walled hyphae, 6 μ in diam., with a distinct lumen which are present throughout the hymenial zones whether formed of thin-walled hyphae or acanthophyses. These hyphae are more or less cylindrical, and have smooth walls which are paler than those of the acanthophyses and thin out toward the apex. These hyphae which are probably to be regarded as, or equivalent to, conducting elements are most easily seen in the zones of pale thin-walled hyphae. They appear to run through from one zone to another, but their total length is uncertain. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* not seen.

HABITAT: on wood.

ILLUSTRATION: Junghuhn, *1838*: pl. 7.

This is a member of the genus *Stereum* Pers. ex S. F. Gray sensu stricto, belonging to a section which has recently been treated as a distinct genus, *Xylobolus* Karst., by Boidin (*1958*: 333). This subdivision may be called *Stereum* sect. **Phellina** (Endl.) Reid, *comb. nov.* [basionym, *Thelephora* sect. *Phellina* Endl., Gen. Pl. **1**: 38. 1836 ≡ *Thelephora* subtrib. *Stratosae* Fr., Elench. Fung. **1**: 170, 190. 1828 (inadmissible term denoting rank); lectotypus, *Thelephora frustulata* Fr.].

STEREUM RIOFRIOI Pat.

Stereum riofrioi Pat. *in* Bull. Soc. mycol. Fr. **8**: 117. 1892.
Hymenogloea riofrioi (Pat.) Pat., Essai taxon. Hymen. 147. 1900.
Type: Gualea, Ecuador, coll. R. Riofrio, Jan. 1892 (FH).

This fungus is generally regarded as a synonym of *Hymenogloea papyraceus* (Berk. & Curt.) Sing. Furthermore, the genus *Hymenogloea* Pat., of which *H. riofrioi* is the type species, is currently placed with the Agaricales in the Tricholomataceae by

Singer (*1951*). Patouillard (*1900*) himself recognised the agaricoid nature of *S. riofrioi* when he described the genus *Hymenogloea* to accommodate this species. He noted that it had a cellular cuticle and that in section it resembled a non-lamellate species of *Heliomyces* (i.e. *Marasmius* Fr. sensu Singer *1951*: 321). Singer (l.c.) was also of the opinion that the genus *Hymenogloea* shows greater affinity with *Marasmius* than any other genus.

The fungus has recently been fully described by Singer (*1960*) under the name *H. papyraceus*.

STEREUM SINENSE Lloyd — FIGS. 24, 25

Stereum sinense Lloyd *in* Mycol. Writ. **7**: 1115: 1922.
Type: China, coll. H. H. Hu (BPI, Lloyd Catalogue No. 24325).

Sporophores 4 cm high, 3 cm wide, consisting of numerous erect, broad, foliose, convolute lobes arising from a swollen, tuberous, underground base, but not truly stipitate in the usually accepted sense of the term. *Pileus* white, becoming uniformly pale yellowish on drying and appearing minutely tomentose under a lens. *Hymenial surface* smooth, and of a bright yellow colour in herbarium material. *Hyphal structure* monomitic, consisting of freely branched, thin-walled, hyaline, septate, generative hyphae, 3–12 μ in diam. These hyphae, which are usually distinctly constricted at the septa, lack clamp-connexions. *Cystidia* and *gloeocystidia* absent. *Basidia* clavate, up to 40 × 8 μ, with 4 sterigmata. *Spores* hyaline, 7.5–9.5 × 4.5–5.5(–7.5) μ, varying in shape from broadly elliptical to ovate, and with a distinct apiculus.

HABITAT: on the ground.

ILLUSTRATION: Lloyd, *1922*: pl. 197 fig. 2102 (photo of the type material).

This is a species of *Pseudocraterellus* Corner and it is accordingly transferred to that genus as **Pseudocraterellus sinensis** (Lloyd) Reid, *comb. nov.*

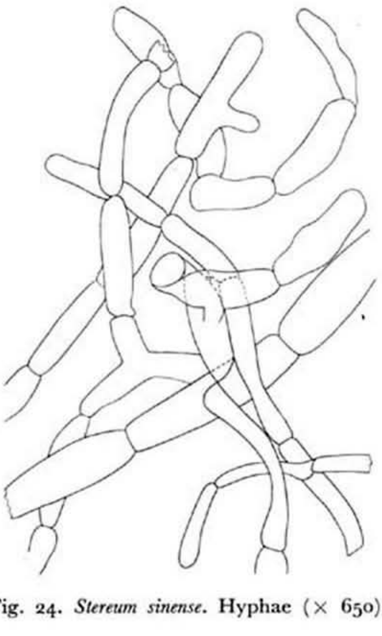


Fig. 24. *Stereum sinense*. Hyphae (× 650).

STEREUM SPATHULATUM Berk.

Stereum spathulatum Berk. *in* Hook. J. Bot. Lond. **8**: 274. 1856 [nec *S. spathulatum* Lloyd *in* Mycol. Writ. **4** (Syn. stip. Stereums): 33. 1913].
Type: Rio Negro, Brazil, coll. Spruce (No. 175).

ILLUSTRATION: Lloyd, *1913b*: f. 558 (photo of the type of *S. spathulatum* although bearing the caption *S. glabrescens*).

This is a polypore, and it would seem to be conspecific with *Polystictus caryophyllaceus* (Berk. & Curt.) Cooke which was described from Venezuelan material. However, the epithet 'spathulatus' cannot be combined in either *Polystictus* Fr. or *Polyporus* [Mich.] Fr., since the name is preoccupied in both these genera. But should one wish to transfer the fungus known as *Polystictus caryophyllaceus* to one of the more recent genera segregated from *Polystictus* and *Polyporus* then the epithet 'spathulatus' would have to be used on the grounds of priority.

Stereum spathulatum has been reported from: Australia (Berkeley & Broome, *1883*; Cooke, *1883*, *1892*), Belgian Congo (Bresadola, *1911*, De Wildeman, *1912*); Brazil (Maia, *1960*), Ceylon (Cesati, *1879*). However, it is probable that most of these records were based on collections of various species of *Podoscypha* Pat., but Maia's record from Brazil refers to a typical gathering of *Polystictus gallinaceus* (Berk. & Cooke) Cooke.

Apart from the type material of *S. spathulatum*, there are three other collections filed under this name in the Kew Herbarium. Two of them were determined by Cooke (Brazil, coll. Glaziou, no. 18769, 1891; Isle de Mayotta) while the third bears a label, apparently written by Cesati, with the following information "*Stereum tuba* 343, Point de Galle". The latter specimen was not annotated by Berkeley, although it formed part of his herbarium. All three gatherings represent species of *Podoscypha*.

STEREUM TJIBODENSE P. Henn. — FIG. 26

Stereum tjibodense P. Henn. *in* Warb., Monsunia **1**: 140. "1900" [1899].

Type: Tjibodas, Java, coll. M. Fleischer, 28 July 1898. The specimen examined is preserved in BPI, and merely bears the information Java, but someone—probably Bresadola—has marked it "orig.!"

Sporophores 2–3 cm in diameter, varying from subresupinate, orbicular, discoid patches to subcupulate or conchate fructifications which are sometimes narrowed behind to form an almost stipe-like base. *Pileus* with a yellow, tomentose, hirsute surface and a thickened, crenate margin. *Hymenial surface* glabrous, sparsely verrucose, and orange in colour. *Hyphal structure* dimitic, consisting of generative and skeletal hyphae. The branched, hyaline, generative hyphae, 2–4 μ in diam., lack clamp-connexions at the septa and are usually thin-walled although some may develop fairly thick walls. The skeletal hyphae, 4–8 μ in diam., are thick-walled, septate and unbranched. Intermediate hyphae also occur. These closely resemble narrow skeletal hyphae but differ from them in that they are somewhat branched. Sections through the fruitbody show a more or less distinct cuticular zone with a large proportion of highly modified, very thick-walled, coralloid, generative hyphae. This cuticular zone merges below with the uppermost region of the flesh. Here the thick-walled skeletal hyphae are bound together by narrow generative hyphae which are less highly modified, but still very much branched. It should also be noted that whereas the uppermost region of the flesh stains deeply in aniline blue in lactic acid the cuticular layer does not stain. Above the cuticle there is a well developed tomentum formed of thick-walled, septate hairs, 3.5–4.5(–6) μ in diam., with obtuse apices. *Hymenium* not thickening; formed of basidia, paraphyses, and conspicuous conducting organs. The latter organs are the modified endings of skeletal hyphae which curve down through the flesh and terminate in the hymenium.

They are thick-walled, cylindrical bodies, 4.5–8 μ in diam., with a narrow lumen which expands toward the tip giving a thin-walled apical portion. These organs have golden-brown oily contents which are often guttulate. Bresadola noticed these conducting organs and made a sketch of them on the type packet. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen, although Hennings described them as "cylindraceo-clavatis 22–26 × 4–5 μ oleoso-aurantiaco guttulatis". It is possible, however, that Hennings mistook the conducting organs for basidia. *Spores* not seen. Hennings described them, probably wrongly, as "ellipsoideis flavo-brunneis vel subaurantiacis, laevibus, 6–8 × 3.5–4 μ".

HABITAT: on tree trunks.

This is a member of the genus *Stereum* Pers. ex S. F. Gray sensu stricto.

Bresadola (*1916*) considered *S. tjibodense* to be a synonym of *S. rimosum* Berk. but this is unlikely. Some years earlier von Höhnel & Litschauer (*1907*) after examining type material had maintained that this fungus belonged in the Auriculariaceae and scarcely differed from *Auricularia mesenterica* (Dicks. ex Fr.) Fr.

STEREUM TRAPLIANUM Vel.

Stereum traplianum Vel., České Houby 759. 1920.
Type: Lower Tatra, Báňská Bystrica, coll. Dr. Trapl.

ILLUSTRATION: Velenovský, *1922*: fig. 8 on p. 136.

Stereum traplianum is a member of the genus *Stereum* Pers. ex S. F. Gray sensu stricto.

It was redescribed by Pilát (*1931*) and Reid (*1957b*). The latter author, after studying part of the type material, concluded that it was a synonym of *S. subpileatum* Berk. & Curt., but this view was challenged by Boidin (*1958*) who pointed out that *S. traplianum* lacked the characteristic 'acanthophyses' of *S. subpileatum*. Re-examination of the Kew material confirms Boidin's statement. It is therefore desirable to study more material of this rather problematical species before speculating on its affinities.

STEREUM TUBA Berk. & Br.

Stereum tuba Berk. & Br. *in* J. Linn. Soc. (Bot.) **14**: 65. 1873.
Type: Ceylon (No. 625), July 1868.

ILLUSTRATION: Massee, *1890*: pl. 7 f. 4 (very poor!).

This fungus is a member of the Cyphellaceae and was transferred to the genus *Cyphella* Fr. by Lloyd, although the full citation should be *Cyphella tuba* (Berk. & Br.) Lloyd *apud* Petch *in* Ann. R. bot. Gdns, Peradeniya **9**: 262. 1925. (N.B. The combination was made again and also ascribed to Lloyd in "The fungi of Ceylon" by Petch & Bisby, *1950*.) The original transfer made by Lloyd (*1913b*) cannot be accepted as a valid combination since it was done under the nom-de-plume of McGinty which this author used when wishing to be facetious. It should, however, be noted that Bresadola (*1916*) had also suggested that *S. tuba* was really a *Cyphella*.

STEREUM UNGULIFORME Lloyd

Stereum unguliforme Lloyd *in* Mycol. Writ. **4** (Letter 48): 10. 1913 ("*unguliformis*").
Type: Madagascar, coll. H. Perrier de la Bathie (BPI, Lloyd Catalogue No. 24328).

ILLUSTRATION: Lloyd, *1913d*: fig. 569 (photo of the type material).

This would seem to be the conidial state of a species of *Xylaria* (*Xylosphaera* Dumort.). Spore production occurs over the entire surface of the lobes of the fruitbody (i.e. there is no differentiation into an upper sterile and lower fertile surface). Sections through the spore producing regions show that there is a thickening hymenium similar to that figured (pl. 3 fig. 3) for *Ustulina vulgaris* by the Tulasnes (*1863*). This is distinctly stratose with the various strata separated one from another by a layer of embedded conidia. The conidia are 4–5 × 2–3 μ and hyaline (Lloyd described them as "2.5–3 × 6–7 μ, straight, hyaline, smooth"). Sections through the fruitbody also show a central core of hyphae which stain more deeply in aniline blue in lactic acid than the rest of the tissue. However, the individual hyphae forming the flesh are strongly agglutinated.

STEREUM UNICUM Lloyd

Stereum unicum Lloyd *in* Mycol. Writ. **4** (Syn. stip. Stereums): 35. 1913.
Type: New York (NYS).

ILLUSTRATION: Lloyd, *1913b*: fig. 555 (photo of the type material).

The type material of this species was not studied but the Dutch collection mentioned by Lloyd (*1921*) was examined and found to be an abnormal sterile condition of either *Coltricia* (*Polystictus*) *perennis* (L. ex Fr.) Murrill or *C. cinnamomeus* (Jacq. ex S. F. Gray) Murrill, as stated by Donk (*1933*). It is probable that the type is also an abnormal fructification of one of these two species or of some related polypore.

THELEPHORA AMBOINENSIS Lév.

Thelephora amboinensis Lév. *in* Ann. Sci. nat. (Bot.) III **2**: 207. 1844.
Type: Amboina (PC).

Thelephora amboinensis belongs in the Clavariaceae and was transferred to the genus *Aphelaria* Corner by Corner (*1953*) as *A. amboinensis* (Lév.) Corner.

Corner (*1950*) at first listed this fungus in synonymy under *Aphelaria dendroides* (Jungh.) Corner, but subsequently he (*1953*) recognised it as a valid species and published a full account of the taxon. He noted that it differed from *A. dendroides* in having wider hyphae, a fibrillose texture and gloeocystidial branches. The type material and all subsequent collections of this species are sterile.

THELEPHORA ANASTOMOSANS Berk. & Curt. — FIG. 27

Thelephora anastomosans Berk. & Curt. *in* J. Linn. Soc. (Bot.) **10**: 329. 1868.
Stereum anastomosans (Berk. & Curt.) Lloyd *in* Mycol. Writ. **4** (Syn. stip. Stereums): 35. 1913.
Type: Cuba, coll. C. Wright (No. 280).

Sporophores 1.5–2.2 cm high, consisting of a mass of tufted branches fused below into a common stipe. These branches have mostly become so compressed in drying that it is impossible to discern much of their shape and size. They appear to expand toward their apices into flabelliform lobes with fimbriate margins, and to have small 'lateral' spine-like processes arranged in a more or less pectinate manner along their length [some of these apparently lateral spine-like processes in fact arise from the lower surface of the branches]. When soaked up in 10 % potassium hydroxide solution the branches have a more or less flabelliform appearance with a lobed apex, and an inferior hymenial surface which bears isolated spines and long, thin plates of tissue up to 2 mm in depth and several mm in length. In the original description the fruitbodies were said to be white becoming pallid when dry. *Hyphal structure* monomitic, consisting of freely branched generative hyphae in which the walls may reach 2 μ in thickness, and sometimes the lumen is almost obliterated. These hyphae have abundant septa but lack clamp-connexions. They are 2.5–7 μ in width, with the main trunks, which have the thickest walls, 4–7 μ in diam. The ultimate branches are thin-walled and often appear rather twisted and ribbon-like. *Hymenium* 20.8–35 μ in width, including in some sections a rather granular layer (up to 10 μ wide) of hyphae above the basidia. The hymenium does not appear to thicken. It covers the spines and plates of tissue on the lower surface of the branches as well as the intervening smooth portions. *Cystidia* and *gloeocystidia* absent. *Basidia*: mature basidia not seen. These probably collapse after spore discharge. *Spores* 4–5 × 3.5 μ smooth, hyaline (or very pale brown in 10 % potassium hydroxide solution), non-amyloid, varying in shape from ovate to very broadly elliptical.

HABITAT: on stumps.

This fungus is synonymous with *Hydnopolyporus hartmannii* (Mont.) Reid (see page 150). Burt (*1920*) attempted to distinguish between *Stereum anastomosans* and *S. hartmannii* (Mont.) Lloyd on the basis of whether specimens were merismatoid or laterally stipitate respectively but this is a quite unsatisfactory distinction.

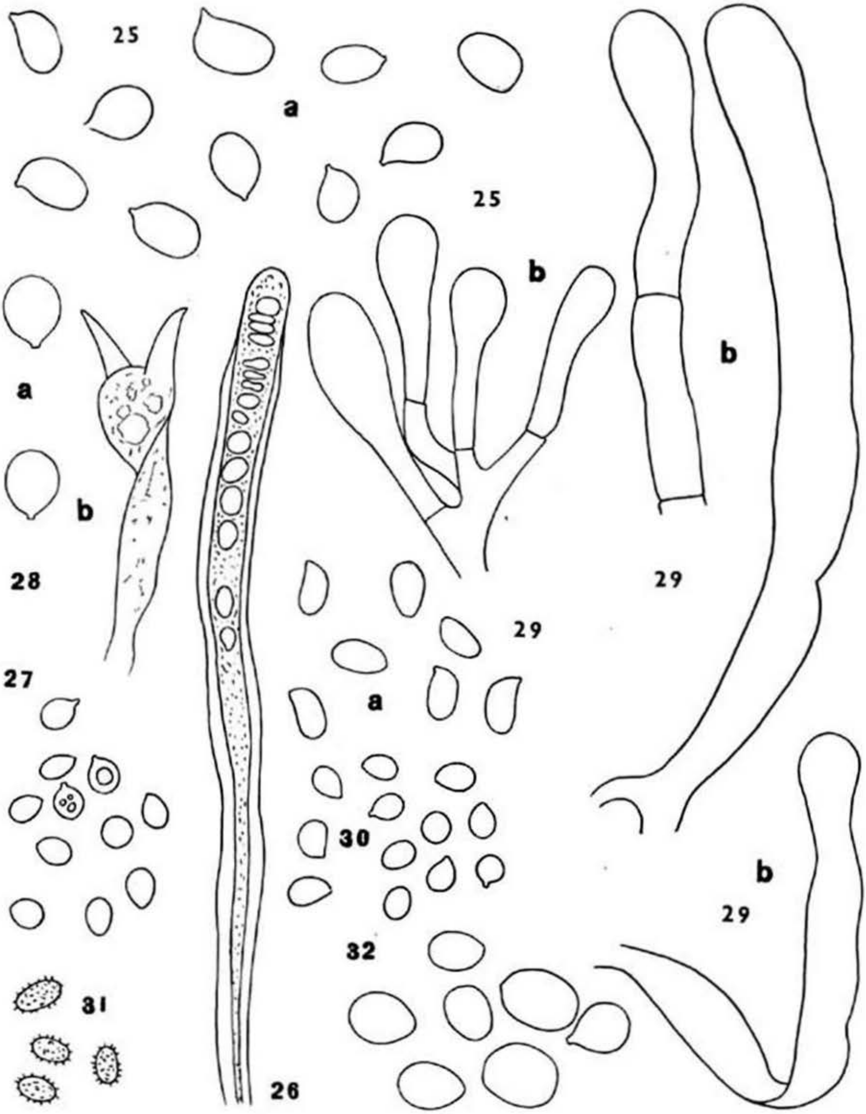
THELEPHORA BIDENTATA Pat. — FIG. 28

Thelephora bidentata Pat. *in* Ann. Jard. bot. Buitenz. (Suppl.) **1**: 115. 1897.
Type: Buitenzorg, Java, coll. Massart (FH).

Sporophores branched and clavarioid, with the main branches arising either from the extreme base or from a well developed stipe. Repeated branching leads to the formation of a rather dendroid fruitbody in which the branches are distinctly flattened and in which the ultimate branchlets tend to have bifurcate tips. The branching is often polychotomous, and at each of the main points at which branching occurs there is pronounced flattening and dilation. The entire fungus is now brownish, although originally described as reddish. *Stipe* 3–4 cm high, 4 mm wide, cylindrical, with a villose base. *Flesh* white and corky. *Hyphal structure* monomitic, consisting of hyaline, scantily branched, generative hyphae, 2.5–3.5 μ in diam., which lack clamp-connexions at the septa. These hyphae have thin or slightly thickened walls. There is no distinct cuticular layer, but the upper surface of the branches may appear distinctly 'hairy' in section due to projecting hyphal ends. Transverse sections through the branches reveal a central core of loosely arranged hyphae and an outer zone in which the hyphae are more densely compacted. The branches would appear to have a radial construction with a certain degree of superimposed flattening. Hymenium confined to the lower surface of the branches (Patouillard stated that it was amphigenous). *Cystidia* and *gloeocystidia* absent. *Basidia* up to 41 μ in length (probably more) and up to 13 μ wide (Patouillard described them as 30 × 10–12 μ).

EXPLANATION OF FIGURES 25–32

Figs. 25–32. — 25. *Stereum sinense*. a. Spores. b. Basidia. — 26. *Stereum tjibodense*. Conducting organ. — 27. *Thelephora anastomosans*. Spores. — 28. *Thelephora bidentata*. a. Spores. b. Basidium. — 29, 30. *Thelephora decolotans*. 29 [No. 234]. a. Spores. b. Cystidia, one of which shows transverse septa. 30 [No. 428]. Spores. — 31. *Thelephora dewevrei*. Spores. — 32. *Thelephora diamesa*. Spores.



Figs. 25–32

Some at least of the basidia are 2-spored with sterigmata up to 8 μ in length. *Spores* scanty, thin-walled, hyaline, globose, 8 μ in diam. (9 × 8 μ including the apiculus) (according to Patouillard 6–8 μ in diam.).

HABITAT: on the ground.

ILLUSTRATION: Patouillard, *1897*: pl. 24 fig. 11.

Thelephora bidentata belongs in the Clavariaceae and is a synonym of *Aphelaria dendroides* (Jungh.) Corner, as indicated by Corner (*1950*).

THELEPHORA BRAUNII P. Henn.

Thelephora braunii P. Henn. *in* Bot. Jb. **30**: 41. 1901.
Stereum braunii (P. Henn.) Beeli *in* Bull. Soc. Bot. Belg. **58**: 208. 1926.
Type: Gr. Batanga, Kamerun, coll. J. Braun, 1888 (BPI).

Sporophores up to 4 cm high, consisting of numerous, erect, flattened branches arising from the apex of a short, stout stipe. These branches were described as "flabellatis apice palmatifidis vel cristatis" but this description does not agree very well with the material or with the drawing on the packet containing the type specimen. Examination of this specimen shows the branches to be narrow and strap-like with bidentate apices. The whole fungus was stated to be yellowish-ferruginous and pruinose, but it is now entirely ochraceous-hoary. *Stipe* up to 1.5 cm high, 5 mm wide, somewhat compressed. *Hyphal structure* monomitic, consisting of thin-walled, slightly branched generative hyphae, 1.5–4 μ (mostly 3 μ) in diam., with clamp-connexions at some of the septa. *Hymenium* poorly preserved, but apparently thickening since hyphae have grown up through the first formed hymenial layer to give rise to a new stratum in which the hyphae are loosely arranged and intertwined. *Cystidia* and *gloeocystidia* not seen. *Basidia* not seen. Spores not seen. (Hennings described them as subglobose, 3.5–5 μ and stated that they were smooth and brown. This information was probably based on *spores* of extraneous origin.)

HABITAT: on trunks.

The material of this species is too poor to enable one to make any suggestion as to its possible affinities. All that can be stated with some degree of confidence is that it is very unlikely to be a member of the genus *Thelephora* Ehrh. ex Fr. sensu stricto.

For a list of the published records of this species see Hendrickx (*1948*).

THELEPHORA DECOLORANS Berk. & Curt. — FIGS. 29, 30

Thelophora decolorans Berk. & Curt. *in* J. Linn. Soc. (Bot.) **10**: 328. 1868.
Stereum decolorans (Berk. & Curt.) Cooke, Handb. Austr. Fungi 183. 1892.
Podoscypha decolorans (Berk. & Curt.) Pat. *in* Duss, Enum. méth. Champ. 20. 1903.
Cotylidia decolorans (Berk. & Curt.) Welden *in* Lloydia **21**: 41. 1958.
Type: Cuba, coll. C. Wright (Nos. 234, 248), May.

ILLUSTRATION: Burt, *1920*: pl. 3 fig. 234 ("Type" of *Stereum decolorans*—presumably part of collection No. 234 but not a photo of the Kew material).

Recent authors (Lloyd, *1913b;* Burt, *1920;* Welden, *1958*) have recognised *Thelephora decolorans* as a distinct species which they considered to belong with the other stipitate stereoid fungi. Despite this the name *T. decolorans* has to be rejected under Art. 70 of the Code (1961) since the original description is based on two collections, one of which (No. 248) is *Hydnopolyporus* (*Polyporus*) *fimbriatus* (Fr.) Reid and the other (No. 234) *Cotylidia aurantiaca* (Pers.) Welden. Furthermore the original account of the species is mostly drawn from the *H. fimbriatus* component, including the statement that it was white when fresh. (A note to this effect was found on the back of collection No. 248.) Burt (*1920*) appears to have completely misinterpreted the species—unless there is a mixture of three fungi under Nos. 234 and 248 in the Curtis herbarium—for he describes it as having "flexuous gloeocystidia, 45–90 × 3–6 μ, between the basidia or curving into the hymenium", indicating that he had a species of *Podoscypha* Pat. under consideration. The fact that he found the spores to be "subglobose, 4–4.5 × 3–4 μ" would be compatible with this view, although they could equally well have belonged to the *Hydnopolyporus fimbriatus* since sporophores of collection No. 248 bear very broadly elliptical or subglobose spores 4–4.5 × 3–3.5 μ. Welden (*1958*) has published a quite inexplicably confused account of *T. decolorans* (as *Cotylidia*). Firstly he lists *Stereum burtianum* Peck in synonymy under this species, despite an examination of the types of both fungi, and despite the fact that *S. burtianum* has spores 3.5–5 × 2.5–3.5 μ [as correctly noted by both Peck (*1904*) and Burt (*1920*)] and hyphae which are thin-walled and 2.5–3.5 μ in diam., whereas the spores of the *Hydnopolyporus fimbriatus* component of *T. decolorans* are shorter and broader, and the hyphae mostly about 8 μ in diam. with very thick walls, sometimes appearing almost solid. He makes no mention of cystidia in his description and his spore measurements: –6–8(–13) × 5–7 μ bear no relation to any of the fungi involved (i.e. *Cotylidia aurantiaca*, *Hydnopolyporus fimbriatus* or *Stereum burtianum*). A further extraordinary point is that Welden has only examined one other collection, apart from the type numbers of *T. decolorans* and *S. burtianum*, and that was from Japan where there is no evidence of a *Cotylidia*-like fungus with such odd spores.

Because of the confusion surrounding *T. decolorans* and because there has recently been a tendency toward misinterpretation of *Cotylidia aurantiaca* [see Welden (*1958*) and Boidin (*1960b*)] an account of both components of *T. decolorans* is given below.

(1) Collection No. 248.

Sporophores forming small rosettes 1–2 cm high and up to 3 cm in diam., consisting of numerous broad flabelliform lobes and narrow strap-like segments. *Pilei* glabrous, white when fresh, but in herbarium specimens becoming ochraceous-fawn with several obscure or rather distinct zones which vary in colour from pale brown to dark chestnut brown. *Hymenial surface* similar in appearance to that of the upper portion of the pileus, and varying from smooth to somewhat poroid when examined under a lens. The pores are mostly rather rudimentary and difficult to detect but on some of the sporophores they are easily visible. *Hyphal structure* monomitic, consisting of generative hyphae, up to 8 μ in diam., which develop very strongly thickened walls. These hyphae, which lack clamp-connexions are branched, the branches being narrower and often thin-walled. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* thin-walled hyaline, 4–4.5 × 3–3.5 μ, varying in shape from very broadly elliptical to ovate, with a small apiculus.

HABITAT: on wood.

This is *Hydnopolyporus fimbriatus* (Fr.) Reid (see page 151).

(2) Collection No. 234.

Sporophores up to 2.5 cm high and 3.0 cm wide, flabelliform, narrowed behind into a distinct stipe. *Pileus* radiately lineato-striate and purplish brown in colour (specimens have been treated with mercuric chloride); margin fimbriate. *Hymenial surface* ochraceous, appearing somewhat veined under a lens but in fact really much split due to age. *Stipe* up to 4 mm high and 0.5 mm wide, tomentose and pale buff in colour. *Hyphal structure* monomitic, consisting of thin-walled, hyaline, generative hyphae, 3–9 μ in diam., which lack clamp-connexions at the septa. *Hymenium* thickening, reaching 91 μ in width at a point 10 mm in from the margin of the pileus. *Cystidia* present, but scanty. These organs are long cylindrical or clavate bodies and some of them have one or more transverse septa. They are thin-walled and may either arise in the trama immediately above the hymenium or at various levels within the thickened hymenium itself and they frequently project for a considerable distance beyond the basidia. *Basidia:* mature basidia not seen. *Spores* 6–7.5 × 3.5(–4) μ, thin-walled, hyaline, elliptical and non-amyloid.

HABITAT: on wood.

This is *Cotylidia aurantiaca* (Pers.) Welden.

It should be noted that the Kew collections of *T. decolorans* issued in "Fungi cubenses Wrightiana" as No. 374 are a mixture of *H. fimbriatus* and *C. aurantiaca.*

THELEPHORA DEWEVREI Bres. — FIG. 31

Thelephora dewevrei Bres. *in* Bull. Soc. Bot. Belg. **38**: 156. 1899.

Type: Congo, coll. A. Dewèvre (S).

Sporophores 4.5–5 cm high and wide, caespitose, branched and clavarioid in appearance. The branches, which are flattened, have dilated, fimbriate or rarely dentate-furcate apices and arise from a distinct or deformed, subtuberous stipe. In the original description the fungus was stated to be dark amber in colour with white tips to the branches, but this probably refers to dried material. *Stipe* often deformed, subtuberous, 7–8 mm long, 4–5 mm wide. *Hyphal structure* monomitic, consisting of generative hyphae 2.5–3.5 μ in diam., with thin but distinct walls. These hyphae bear clamp-connexions at the septa. *Hymenium* poorly developed. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen. *Spores* elliptical, 5–6 × 2.5–3 μ, varying from hyaline to very pale ochraceous, and appearing minutely echinulate. Bresadola described the spores as globose or globose-angular, and stated that they were punctate, dark and 8–10 μ in diam. However, these observations were probably based on mould spores of which there are large numbers on certain portions of the fruitbody.

HABITAT: on the ground in woods.

This fungus belongs in the Clavariaceae and is a synonym of *Scytinopogon angulisporus* (Pat.) Corner. For a list of the known collections of *Thelephora dewevrei* see Hendrickx (*1948*).

THELEPHORA DIAMESA Ricker — FIG. 32

Thelephora diamesa Ricker *in* Philipp. J. Sci. **1** (Suppl. 4): 284. 1906.

Type: Lamao, Province of Bataan, Luzon, Philippine Islands, coll. Merrill (No. 3510), Oct. 1903 (BPI).

Sporophores 4–7 cm high, 2–4 cm wide, tubular or funnel shaped, tapering into a hollow central stipe, up to 2.5 cm in length. *Upper surface* glabrous and of a lemon yellow colour when fresh, becoming cream coloured in the herbarium; margin lobed. *Hymenial surface* smooth, glabrous and orange-yellow when fresh becoming tawny-yellow on drying. *Hyphal structure* monomitic, consisting of branched hyaline, generative hyphae, 5–10 μ in diam., which have thin but distinct walls, and lack clamp-connexions at the septa. There is no distinct cuticle, although the hyphae which are loosely and irregularly arranged throughout the trama become more densely compacted and horizontally orientated near the surface of the fructification and just above the hymenium. However, these zones are not clearly defined. *Hymenium* thickening, reaching 156 μ in width, but this thickening does not result in a definite layering. *Cystidia* and *gloeocystidia* absent. *Basidia* 33.8–39 × 7.5 μ, clavate, with pale yellowish-brown granular contents and bearing 4-sterigmata. (Corner in a note with the type material states that the basidia have 4–5 sterigmata.) *Spores* 7–9.5 × 5–8 μ, hyaline, varying from broadly elliptical to ovate. (Ricker erroneously described them as "globose, hyaline, 2.5–3 μ, in diam." but Corner in a note with the specimen indicated that he found the spores to be 7–8.5 × 6–7.5 μ.)

HABITAT: on damp soil in forests during the rainy season.

Thelephora diamesa belongs in the genus *Craterellus* Pers. sensu stricto and was transferred to that genus by Patouillard as *Craterellus diamesus* (Ricker) Pat. *in* Ann. Cryptog. exot. **1**: 18. 1928. Corner (*1957*), however, is of the opinion that this fungus should be regarded as a synonym of *C. aureus* Berk. & Curt.

It should be noted that Patouillard (1928) described a collection of *C. diamesus* from Annam and indicated that it occurred in tufts of 6–12 sporophores, and reached a height of 5–10 cm.

THELEPHORA DISSECTA Lév. — FIGS. 33–35

Thelephora dissecta Lév. *in* Ann. Sci. nat. (Bot.) III **5**: 146. 1846.

Type: Gaudeloupe, coll. Beaupertuis, 1839 (K, PC).

Sporophores up to 3 cm high and 3 cm wide, consisting of a large number of very narrow linear branches which are united below into a short stipe. The branches which are flattened tend to be slightly incurved along their margins and often have an inrolled apex. They also bear numerous short, lateral, spinose-branchlets in a pectinate manner along their entire length. Some of these apparently lateral branchlets, however, actually arise from the lower surface of the main branches. The entire fungus is now ochraceous and hoary. *Hyphal structure* monomitic, consisting of scantily branched, hyaline, generative hyphae 4–7 μ in diam., which have walls up to 2 μ in thickness. These hyphae have abundant septa but lack clamp-connexions, and their ultimate branches may be as narrow as 2.5 μ in diam. *Hymenium* confined to the undersides of the main branches but covering the entire surface of the lateral spinose branchlets. *Cystidia* and *gloeocystidia* absent. *Basidia* present, but mostly collapsed and difficult to distinguish. *Spores* 4–4.5 × 3–3.5 μ, smooth, thin-walled, hyaline, elliptical and non-amyloid.

HABITAT: on bark.

This is synonymous with *Hydnopolyporus hartmannii* (Mont.) Reid (see page 150). It has already been regarded as a synonym of *T.* (*Stereum*, *Cotylidia*) *hartmannii* Mont. by Bresadola (*1926*), Lloyd (*1913b*), Burt (*1920*) and Welden (*1958*).

THELEPHORA FISSA P. Henn. — FIG. 36

Thelephora fissa P. Henn. *in* Hedwigia **36**: 193. 1897.

Type: Sta. Catharina, Brazil, coll. A. Möller (No. 538) (BPI).

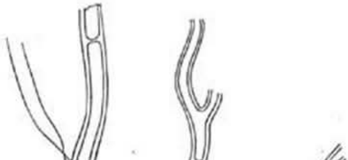


Fig. 33. *Thelephora dissecta.* Hyphae (× 650).

Sporophores up to 2 cm high, thin membranous, varying in shape from flabellate to almost infundibuliform, but becoming split into very numerous, thin, hair-like or cuneate segments with laciniate margins. The surface which is radiately striate is now pale ochraceous with a number of rather obscure darker zones, but it was originally described as pale yellowish. *Hymenial surface* similar in appearance to the upper surface but said by Hennings to be subvenose. *Stipe* up to 1.5 cm long, 1 mm wide, lateral, white, villose. *Hyphal structure* monomitic, consisting of sparingly branched, generative hyphae, 4–9 in diam., which are mostly thin-walled except toward the base of the pileus where they often develop strongly thickened walls up to 2.5 μ in width. These hyphae are septate but lack clamp-connexions. The hyphae forming the tomentum of the stipe are 2.5–5 μ in diam. *Hymenium* apparently lacking. *Cystidia* and *gloeocystidia* not seen. *Basidia* not seen. *Spores* not seen.

This is probably an immature collection of *Hydnopolyporus fimbriatus* (Fr.) Reid (see page 151). It was originally compared by Hennings with *Thelephora decolorans* and subsequently Bresadola (*1916*) and Lloyd (*1913b*) considered it to be a synonym of this species. Perhaps not surprisingly in view of the fact that *T. decolorans* is a mixtum compositum and consists in part of *H.* (*Polyporus*) *fimbriatus*.

THELEPHORA GELATINOIDEA Lloyd — FIG. 37

Thelephora gelatinoidea Lloyd *in* Mycol. Writ. **6**: 890. 1919.
Type: Darjeeling, India, coll. G. H. Cave, Oct. 1918 (BPI, Lloyd Catalogue No. 31333).

Sporophores consisting of a number of irregular, flabelliform pileate lobes, each of which may be up to 5 cm in height and 5 cm in width. These lobes may be narrowed behind to form a short, flattened, stipe-like base or merely reduced to a broad point of attachment. The general growth form of the fructification resembles that of *Thelephora terrestris* Ehrh. ex Fr. *Pileus* creamy-fawn with dark greyish-brown

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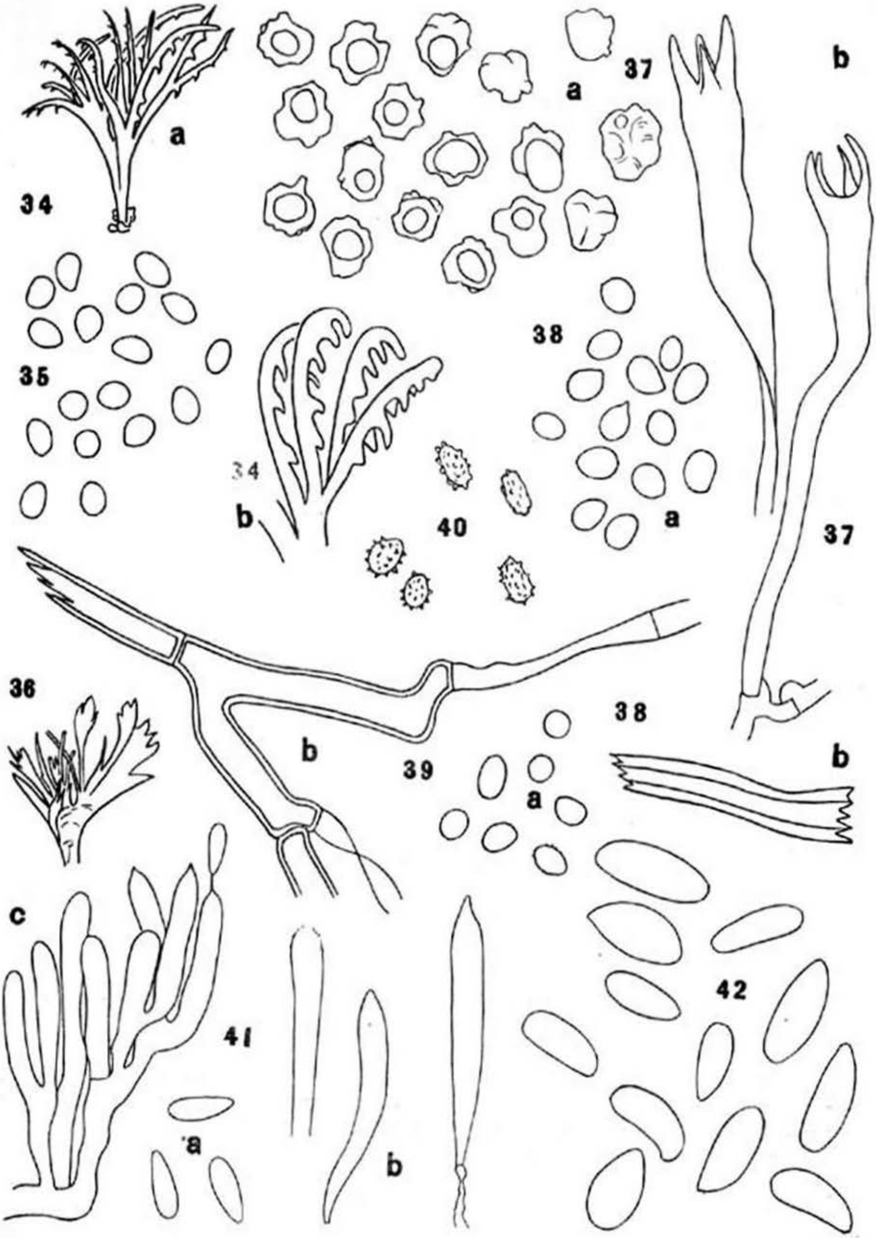
EXPLANATION OF FIGURES 34–42

Figs. 34–42. — 34, 35. *Thelephora dissecta.* 34. a. Habit sketch of type material (natural size). b. Portion of fruitbody enlarged. 35. Spores. — 36. *Thelephora fissa.* Habit sketch of type material (natural size). — 37. *Thelephora gelatinoidea.* a. Spores. b. Basidia. — 38, 39. *Thelephora hartmanni.* 38. [Type]. a. Spores. b. Portion of a thick-walled hypha. 39. [St Kitts, Britton & Cowell No. 706]. a. Spores. b. Hypha. — 40. *Thelephora lactea.* Spores. — 41. *Thelephora liliputiana* Mont. a. Conidia (× 2300). b. Conidiophores (× 2300). c. Group of conidiophores. — 42. *Thelephora lilliputiana* Speg. Spores.



Figs. 34–42

concentric zones. The surface is strongly radiately ridged and wrinkled giving it a fibrillose appearance. *Hymenial surface* grey-brown (putty coloured), becoming more yellowish toward the margin. The surface is densely covered by granular warts and obtuse spines. *Flesh* soft, cottony and of a dirty white colour. In the original description the context was said to be gelatinous, but there is not the slightest evidence to support this statement. *Hyphal structure* monomitic, consisting of thin-walled, hyaline, branched, generative hyphae, 3–5 μ in diam., with clamp-connexions at most of the septa. In addition there are certain hyphae which become very thick-walled and more highly refractive than the remainder. These thick-walled hyphae are also septate, clamped and branched (although perhaps less freely branched than the thin-walled hyphae) and have contents which appear faintly brownish in 10 % potassium hydroxide solution. In the ordinary generative hyphae branching from the clamp-connexions is frequent, especially in the region of the hymenium. There is no distinct cuticular zone. *Hymenium* not thickening. *Cystidia* and *gloeocystidia* absent. *Basidia* 52–80 × 6–8 μ, clavate, tapering to a narrow clamped base and bearing 4, more or less incurved sterigmata which are 6–8 μ in length. These basidia, which have brownish contents, are mostly found on the warts and spines of the hymenial surface. They do not form a dense palisade, and are often separated by colourless sterile (?) or immature basidia. The areas of the hymenial surface between the warts are often devoid of basidia. *Spores* abundant, pale brown, irregularly angular tuberculate, 6–8(–9) μ in diam., and frequently containing a single guttule.

HABITAT: on the ground at about 6,000 ft. alt.

ILLUSTRATION: Lloyd, *1919*: pl. 132 fig. 1546 (photo of type material).

This fungus belongs in the genus *Thelephora* Ehrh. ex Fr. sensu stricto. It was said by Lloyd to have a gelatinous context formed of gelatinized hyphae and because of this supposed character Lloyd named it '*T. gelatinoidea*'. However, there is not the slightest evidence that this fungus was ever gelatinous and indeed it is difficult to imagine how a sporophore which has a soft cottony flesh could be thought to have been gelatinous. Nevertheless, Lloyd went further and suggested that it might be made the type species of a new genus because of its "peculiar gelatinous" structure. Then, assuming the nom-de-plume of McGinty which he used when wishing to be facetious or when unsure of himself, he proposed the binomial *Pseudothelephora gelatinosa*. He thereby created a new and invalid generic name (see Donk, *1957*) and at the same time introduced a new invalid specific epithet.

THELEPHORA HARTMANNII Mont. — FIGS. 38, 39

Thelephora hartmannii Mont. *in* Ann. Sci. nat. (Bot.) II **20**: 366. 1843.
Stereum hartmannii (Mont.) Lloyd *in* Mycol. Writ. **4** (Syn. stip. Stereums): 34. 1913.
Cotylidia hartmannii (Mont.) Welden *in* Lloydia **21**: 41. 1958.
Thelephora dissecta Lév. *in* Ann. Sci. nat. (Bot.) III **5**: 146. 1846.
Thelephora anastomosans Berk. & Curt. *in* J. Linn. Soc. (Bot.) **10**: 329. 1868.
Stereum anastomosans (Berk. & Curt.) Lloyd *in* Mycol. Writ. **4** (Syn. stip. Stereums): 35. 1913.
Thelephora sebacinoides P. Henn. *in* Hedwigia **36**: 193. 1897.
Type: Carolina, U.S.A., coll. Hartmann (K, PC).

Sporophores up to 2.5 cm high, arising from a very thin, white, mycelial film, and consisting of narrow strap-like or broad flabelliform pilei. When broad and fan-shaped the pilei are split into a large number of linear or cuneate segments. The ultimate segments which tend to have circinate apices, bear a number of short lateral spinose branches along their length and these are arranged in a pectinate manner. The whole fungus is now pale ochraceous. *Hymenial surface* bearing a number of warts, spines, and ridges of tissue. *Stipe* rather short, rudimentary. *Hyphal structure* monomitic consisting of hyaline, branched, generative hyphae 2.5–7 μ in diam., which lack clamp-connexions at the septa. These hyphae have thin to distinctly thickened walls. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen. *Spores* 4–4.5 × 3–3.75 μ, smooth, hyaline, non-amyloid, and varying in shape from broadly elliptical to ovate.

HABITAT: on bark.

ILLUSTRATIONS: Burt, *1920*: pl. 3 fig. 21. — Lloyd, *1913b*: fig. 553.

This fungus presents a number of difficulties when attempts are made to assign it to a natural position in any system of classification. It is certainly not possible to retain it in the genus *Thelephora* or *Stereum* and it does not show any affinity with the "stipitate stereoid" fungi. However, it is extremely closely related to *Polyporus fimbriatus* Fr. and is undoubtedly congeneric with this species, but neither *T. hartmannii* or *P. fimbriatus* would seem to have any other close allies. These two species have therefore been made the basis of a new genus—*Hydnopolyporus*.

Hydnopolyporus Reid, *gen. nov.*

Sporophora lignicola, distincta vel caespitosa. *Pileus* albus, coriaceus, irregulariter integro-flabelliformis vel ramosior, ramis complanatis, apice saepe incurvo-circinato, demum dentato-incisis pectinatisque. *Superficies hymenialis* aut verrucis, spinis, vel dentibus foliiformibus interrupte radiantibus aut dentibus obsoletis, reticulato-connexis deinde poroideis ornatis. *Hyphae* 2.5–10 μ diametro, hyalinae, ramosae, septatae, sine fibulis, tenuiter vel crasse tunicatae. *Cystidia* et *gloeocystidia* absentia. *Sporae* hyalinae, leves, haud amyloideae, late ellipsoideae vel ovoideae 4–5 × 3–3.75 μ. — Typus: *Polyporus fimbriatus* Fr.

Sporophores lignicolous, discrete or caespitose, often forming small rosettes consisting of numerous, irregular flabelliform pilei. When discrete the fruitbodies usually consist of a large number of narrow, flattened, strap-like segments united behind into a short stipe. Sometimes, however, there may be very few segments and the fructification may be reduced to a single linear branch. Alternatively there may be a flabelliform pileus divided into numerous hair-like or cuneate segments. When dissected the narrow segments bear short, lateral spinose branches along their length and these are arranged in a pectinate manner. The fruitbodies are white. *Hymenial surface* bearing isolated warts, spines or ridges or becoming tardily poroid. *Hyphal structure* monomitic, consisting of hyaline, branched, generative hyphae which tend to be rather broad (2.5–10 μ in diam.) and which lack clamp-connexions at the septa. These hyphae have thin but distinct or strongly thickened walls. *Cystidia* and *gloeocystidia* absent. *Spores* smooth, thin-walled, hyaline and non-amyloid, varying in shape from very broadly elliptical to ovate, 4–5 × 3–3.75 μ.

Accordingly both *P. fimbriatus* and *T. hartmannii* are hereby transferred to the genus *Hydnopolyporus* Reid as **Hydnopolyporus fimbriatus** (Fr.) Reid, *comb. nov.* (basionym, *Polyporus fimbriatus* Fr. *in* Linnea **5**: 520. 1830) and **Hydnopolyporus hartmannii** (Mont.) Reid, *comb. nov.* [basionym, *Thelephora hartmannii* Mont. *in* Ann. Sci. nat. (Bot.) III **20**: 366. 1843].

The systematic position of the genus *Hydnopolyporus* also presents something of a problem. It cannot be retained in the Thelephoraceae but could be placed in either the Polyporaceae or Hydnaceae on the basis of the hymenial configuration of the two species. If a choice had to be made I would be inclined, at least temporarily, to place *Hydnopolyporus* in the Polyporaceae.

Hydnopolyporus hartmannii differs from *H. fimbriatus* in having a more highly dissected pileus in which the segments are narrow strap-like and bear short lateral spinose processes arranged in a pectinate manner along their length. The hymenial surface of *H. hartmannii* is covered with isolated warts, spines and short ridges, but unlike *H. fimbriatus* these do not seem to become united into pores. The hyphae of *H. hartmannii* are also narrower on average [mostly 4–5(–7) μ] than those of *H. fimbriatus* (8–10 μ).

Lloyd (*1913b*) grouped *H. hartmannii* with the stipitate stereoid fungi as did Burt (*1920*). Both these authors attempted to distinguish between this fungus and *Stereum anastomosans* (see page 141). Burt (l.c.) suggested that this could be done on the basis of whether the plants were laterally stemmed or merismatoid respectively, but this is quite unsatisfactory in practice. Martin (*1944*) writing of *Stereum hartmannii* stated that "There is no suitable genus to receive such a fungus . . .", but Welden (*1958*) transferred it to the genus *Cotylidia* Karst. However, this choice of genus is unfortunate since to retain *Cotylidia* as a natural genus it has to be restricted to those stipitate stereoid fungi with monomitic hyphal construction in which the hyphae lack clamp-connexions and in which there is a thickening hymenium. In addition the species of *Cotylidia* should all possess long, cylindrical, protruding cystidia and elliptical (not broadly elliptical to ovoid) spores.

Hydnopolyporus hartmannii is known from the Southern United States, the West Indies and Bolivia. *Hydnopolyporus fimbriatus* has a similar distribution and is known from the Southern United States, the West Indies, Bolivia, Venezuela, Brazil and the Argentine.

For an account of the species listed in synonymy under *H. hartmannii* see pages 141, 147, 162, and compare also *Thelephora pulvinulata* Speg. on page 158.

THELEPHORA LACTEA Pat. — FIG. 40

Thelephora lactea Pat. *in* Bull. Soc. mycol. Fr. **39**: 47. 1923.

Type: Réserve Forestière de Compong Chhnang, Cambodia, coll. M. Petelot, July 1921 (FH).

Sporophores 5–10 cm high, branched, clavarioid, consisting of a common trunk which divides several times into flattened triangular segments. The fungus was said to be entirely white and to resemble minute bushes. *Hyphal structure* monomitic, consisting of thin-walled, hyaline, generative hyphae, 2–4 μ in diam., which bear clamp-connexions at the septa. These hyphae which are scantily branched are arranged more or less longitudinally although they are also somewhat entwined. *Hymenium* confined to the lower surface of the branches and becoming distinctly thickened, reaching 80 μ in width. The thickening occurs in such a way that the hymenium is formed of a number of strata each delimited by a layer of buried spores. *Cystidia* and *gloeocystidia* absent. *Basidia:* mature basidia not seen but evidently varying from clavate to shortly cylindrical and bearing four short sterigmata; the immature basidia are up to 15.6 × 4–5 μ. Patouillard, however, stated that the basidia were 18–20 × 10 μ but these measurements would seem to be far too wide! *Spores* 4.5–6 × 2.5–3 μ (mostly 5 × 3 μ) thin-walled, hyaline or faintly yellowish, and minutely echinulate. (Patouillard erroneously described them as colourless or faintly coloured, angular, echinulate, 8 × 6 μ.)

HABITAT: on the ground.

This fungus belongs in the Clavariaceae and is a synonym of *Scytinopogon angulisporus* (Pat.) Corner.

THELEPHORA LACTEA var. OBSCURA Pat.

Thelephora lactea var. *obscura* Pat. *in* Bull. Soc. mycol. Fr. **39**: 48. 1923.

This is also *Scytinopogon angulisporus* (Pat.) Corner.

THELEPHORA LILIPUTIANA Mont. — FIG. 41

Thelephora liliputiana Mont. *in* Ann. Sci. nat. (Bot.) II **13**: 205. 1840 (nec *T. lilliputiana* Speg. *in* Bol. Acad. Cien Córdoba **11**: 80. 1889).

Type: Cayenne, French Guiana, coll. Leprieur (No. 658), Oct. 1836 (K, PC).

Sporophores up to 6 mm high, arising from a very dark brown basal pad of mycelium and consisting of a stipe-like portion which almost immediately branches to give rise to an intricate, tufted structure formed of thin, flattened lobes with crenulate margins. The fructifications which were originally described as dirty white are now ochraceous. *Hymenium* consisting of a palisade of conidiophores with acute or obtuse apices. These organs which are 2 μ in diam., resemble basidia but they each appear to give rise to a single conidium, borne at the apex of a very fine terminal sterigma. *Conidia* thin-walled, hyaline, and narrowly tear-shaped, 3–5 × 1.5–2 μ.

HABITAT: on wood.

This is an imperfect fungus which is synonymous with *Isaria flabelliformis* (Schw.) Lloyd. It is almost certainly the conial state of some species of *Xylaria* (*Xylosphaera* Dumort.).

Ellis & Everhart (*1892*) stated that *Isaria flabelliformis* was an abortive form of *X. corniformis* Fr. but according to Lloyd, Ellis & Everhart were merely following Fries in this respect. Lloyd (*1916*) wrote, "Fries, who was no doubt only guessing from Schweinitz' figure, started the story that it is the conidial state of *Xylaria corniformis*, and while there is not the slightest possibility of that being true, it was accepted and published by Ellis in his N.A. Pyrenomycetes." However, I can find no reference to Fries having stated that *Sphaeria flabelliformis* was the conidial state of *X. corniformis*. Lloyd (*1912b*) wrote of this fungus "Ellis referred it as a conidial form of *Xylaria corniformis*, but I think without any evidence, and I do not believe it has anything whatever to do with any *Xylaria*. I have often seen it, and watched it to see if it develops into a '*Xylaria*', which is quite improbable. I have never found any perithecia." Later Lloyd (*1916*) changed his mind for he wrote "That *Isaria flabelliformis* is the conidial state of a *Xylaria* is possible, even probable, but the ascigerous form is not known. . . ." By 1918 Lloyd (*1918a*) was of the opinion that *I. flabelliformis* was in fact the conidial state of *Xylaria corniformis* but he maintained that the conidia and perithecia were borne on different stromata. Finally in *1920* he wrote, "Prof. Petch has succeeded in getting the *Xylaria* from *Isaria flabelliformis* and sends a mature specimen and those partially developed. The *Xylaria* is *Xylaria allantoidea*. Father Rick has shown that a similar *Xylaria* develops into *Xylaria* *corniformis*, hence there are two species that have similar *Isaria* forms." Petch (*1924*) also published the statement that "It has now been determined that, in Ceylon, this conidial form (i.e. *Isaria flabelliformis*) belongs to *Xylaria allantoidea*, though it is possible that other species may have the same type of conidial fructification. The conidial stage does not develop into the perithecial stage but the two grow side by side from the same piece of wood."

According to Berkeley & Curtis (*1868*), who refer the fungus to the genus *Xylaria*, *Isaria flabelliformis* is pink when young.

THELEPHORA LILLIPUTIANA Speg.

Thelephora lilliputiana Speg. *in* Bol. Acad. Cienc. Córdoba **11**: 80. 1889 [nec *T. liliputiana* Mont. *in* Ann. Sci. nat. (Bot.) II **13**: 205. 1840].

Thelephora helvola Sacc. & Syd. *in* Sacc., Syll. Fung. **14**: 215. 1899.

Type: Apiahy, Brazil, coll. J. Puiggari (No. 2372), May 1888. — It seems as though the number (2372) cited in the original diagnosis may have been an error for 2373, for there is no trace of a specimen of *T. lilliputiana* in the La Plata herbarium bearing the number 2372 but there is a specimen with the number 2373! It is this latter collection and an additional unnumbered gathering which have been examined.

Sporophores forming dense caespitose clusters, 5–6 mm high and 10 mm wide. *Pilei* spathulate or flabellate and often lobed but sometimes forming sterile, elongated linear segments. The pilei appear to bear short lateral spines along the sides of their reduced stipe-like bases but when the fruitbodies are soaked up in 10 % potassium hydroxide solution some at least, of the spines can be seen to arise from the hymenial surface. The fruitbodies, therefore, resemble *Hydnopolyporus fimbriatus* (Fr.) Reid and *H. hartmannii* (Mont.) Reid (see page 150) in so far as the external morphology is concerned. The pilei, which are thin, papery and rigid, are either flattened or convex, and can be seen to have a glabrous but minutely fibrillose surface when examined under a strong lens. They were originally stated to have a uniformly pale reddish surface which at length becomes dirty whitish, but the herbarium material is now pale beige. *Hymenial surface* pale reddish or flesh-coloured, at first pruinose then glabrous, and bearing isolated spines. *Stipes* arising in a densely fasciculate manner from a thick, whitish, woody nodule and becoming much branched or lobed above. *Flesh* thin, compact and pale wood-coloured. *Hyphal structure* dimitic, consisting of generative and skeletal hyphae. The generative hyphae, 2–3 μ in diam., are thin-walled, hyaline and branched with clamp-connexions at the numerous septa. The skeletal hyphae, 3–5 μ in diam., have thick walls, although there is always a distinct lumen, and scanty septa mostly toward the thin-walled obtuse apices which may be slightly narrowed. These skeletal hyphae may show occasional branching. There is no distinct cuticular layer.

Hymenium poorly developed. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* 9–16 × 3.5–5(–6) μ, thin-walled, hyaline, non-amyloid, varying in shape from subcylindrical to elliptical.

HABITAT: erumpent through cracks in the bark of fallen, rotting branches.

It has not been possible to reach a satisfactory conclusion as to which family this fungus is best assigned, neither has it been possible to suggest a suitable genus to which it might be transferred. It does not belong in the genus *Thelephora* Ehrh. ex Fr. and is not even a member of the Thelephoraceae sensu stricto. Furthermore, it does not show any relationship with the stipitate stereoid fungi.

As already indicated above it would seem probable that when Spegazzini published the collection data of this species the collector's number was inadvertently given as 2372 instead of 2373. Thus in the Spegazzini herbarium at La Plata there is no specimen of *T. lilliputiana* bearing the number 2372 but there is a collection with the number 2373. Further when Spegazzini described *T. lilliputiana* he indicated that it resembled *Hymenochaete aspera* Berk. (which, incidentally, it certainly does not!) and on each of the two packets sent on loan from La Plata, Spegazzini has himself written "*Hymenochaete aspera?*" and later "*Hym. aspera* peraff." This again suggests that they were probably the collections on which Spegazzini based his descriptions of *T. lilliputiana.*

The second problem concerning Spegazzini's publication of *T. lilliputiana*, which is a later homonym of *T. liliputiana* Mont., is whether he really intended to publish a new species or merely a new variety of *T. liliputiana* Mont. The evidence strongly suggests that he was intent on the latter course of action. Thus on the two packets of *T. lilliputiana* in his herbarium he had written, "*Thelephora liliputiana* Montgn. var. *rubescens*" and "*Thelephora liliputiana* Montgn. var." showing that he was well aware of the existence of Montagne's species. That being so it is difficult to imagine that he would deliberately duplicate the name for a fungus which he at one time regarded as so close to Montagne's own species that he assigned it to varietal rank under that very taxon. Furthermore, since he had written '*Thelephora liliputiana* var. *rubescens*' on one of his herbarium specimens and '*Thelephora liliputiana* var.' on the other, it seems logical to assume that he probably intended to publish a taxon—*T. liliputiana* var. *rubescens*, especially as his *T. lilliputiana* was described as "helvola" and "superne pallescenti-rufescentes". Spegazzini's species was later renamed *Thelephora helvola* by Saccardo & Sydow.

THELEPHORA LUTOSA Schw. — FIG. 43

Thelephora lutosa Schw. *in* Trans. Amer. phil. Soc. II **4** (8): 166. 1832.

Type: Burt (*1914a*) has designated as type a specimen in Herb. Schweinitz from Salem, North Carolina. The specimen sent on loan from the Herbarium of the Academy of Natural Sciences in Philadelphia (PH) bears the information "Carolina".

Sporophores consisting of several closely adpressed, erect, flabellate lobes which are narrowed behind into very short stipe-like bases. The lobes, which arise from a sheet of mycelium, have a buff-coloured tomentose surface and a darker ochraceous hymenium. *Hyphal structure* monomitic, consisting of branched, hyaline, generative hyphae, 2.5–5 μ in diam. with prominent clamp-connexions at the septa. These hyphae have thin but distinct walls. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* found toward the extreme base of the fruitbodies. These spores are 5.5–7.5 × 4.5–5.5 μ, pale yellowish brown and angular-tuberculate. When heated in aniline blue in lactic acid they are each seen to contain a single small guttule.

HABITAT: on the ground.

This fungus is a member of the genus *Thelephora* Ehrh. ex Fr. sensu stricto.

Burt (*1914a*) in his account of the species reiterated Schweinitz's original description of the macroscopic characters but added that "the pilei were crowded together into a small buff-coloured cluster about 1.5 cm high and broad, somewhat as in *Tremellodendron pallidum* (Schw.)". He also stated that he was unable to find stems at the base of the pilei. Burt (l.c.) noted that the hyphae were 3 μ wide, and that the spores were "olive-buff under the microscope, angular, 5–6 × 3.5–4 μ". Since Burt (*1926*), when subsequently recording a further gathering of *T. lutosa*, made by W. A. Murrill in 1914, wrote "This rare species has been known only from the type collection from Salem, North Carolina", the presumption is that the collection sent on loan from the Schweinitz Herbarium in Philadelphia represented the material designated as lectotype by Burt in 1914.

THELEPHORA OUBANGUIENSIS Pat. & Har.

Thelephora oubanguiensis Pat. & Har. *in* Bull. Mus. Hist. nat., Paris **17**: 365. 1911.
Type: Fort Sibut, Krébedgé, Haute Oubangui, Chari-Tchad, French Congo, coll. M. A. Chevalier (No. 11393), 8 Sept. 1902 (FH).

Sporophores 2–3 cm high, branched, clavarioid, consisting of a main trunk which soon becomes irregularly divided by 2 or 3 dichotomies into rigid, white, villose, rugulose, bifid branches, 1–1.5 mm in width with acute, pellucid, rufescent apices. *Stipe* cylindrical, 2–3 mm wide, with the surface broken up into fibrils. *Hyphal structure* monomitic, consisting of thin-walled hyaline, branched, generative hyphae, 2.5–4 μ in diam., which lack clamp-connexions at the septa. *Hymenium* poorly developed, but confined to the lower surface of the branches. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen, but said by Patouillard to be 4-spored. *Spores* hyaline, globose, 6–8 μ in diam. (Patouillard erróneously described them as cylindrical, obtuse, hyaline, numerous, 6–7 × 2 μ.)
HABITAT: this fungus was said to have grown on wood, but the dried specimens look as if they had grown on the ground.

This fungus is a member of the Clavariaceae. It is identical with *Aphelaria dendroides* (Jungh.) Corner, and was listed in the synonymy of this species by Corner (*1950*).

THELEPHORA PADINAEFORMIS Mont.

Thelephora padinaeformis Mont. *in* Ann. Sci. nat. (Bot.) IV **1**: 138. 1854.
Type: French Guiana, coll. Leprieur (No. 914) [K, PC].

Sporophores up to 7 cm high and 6 cm wide, consisting of a stipe which divides into narrow strap-like segments. These dilate toward the apex and again branch to form short segments which expand into broad flabellate pilei with crenulate or lobed margins. The pilei, which are very dark chestnut brown above with a paler yellowish brown margin, often fuse one with another to form a thin, flattened, glabrous fan-shaped structure which appears to be torn into holes (formed during fusion of pilei and branches). In some respects it is reminiscent of the growth form of some red marine algae (*Chondrus*, *Rhodomenia*, etc.) The fungus was originally described as infundibuliform but there would seem to be little evidence of this judging from herbarium specimens. *Hymenial surface* pale creamy-ochre or brownish, appearing quite smooth to the naked eye but under a lens it is seen to be densely granular or papillose. *Flesh* possibly gelatinous. The entire fruitbody tends to have a shiny varnished appearance which suggests that it may have been gelatinous when fresh. *Hyphal structure* difficult to make out since the hyphae are thin-walled and rather agglutinated. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* thin-walled, aculeate, elliptical, 3.75–4.5 × 2.2–3 μ and either pallid straw-coloured or pale brown.

HABITAT: on the ground.

This fungus belongs in the Hydnaceae, and is synonymous with *Hydnodon thelephorus* (Lév.) Banker.

THELEPHORA PAPYRACEA Jungh.

Thelephora papyracea Jungh., Praem. Fl. crypt. Javae Ins. *in* Verh. Bataviaasch Genoot. **17** [2]: 36. 1838.
Lloydella papyracea (Jungh.) Bres. *in* Ann. mycol., Berlin **8**: 588. 1910.
Thelephora friesii Lév. *apud* Zollinger, Syst. Verz. indischen Arch. 17. 1854.
Stereum friesii (Lév.) Sacc., Syll. Fung. **6**: 566. 1888.
Stereum percome Berk. & Br. *in* J. Linn. Soc. (Bot.) **14**: 65. 1873.
Cladoderris pritzelii P. Henn. *in* Hedwigia **42** (Beibl.): 74. 1903.
Type: A specimen in Herb. Leiden bearing the label "Herbarium F. Junghuhn in H.L.B. No. 98 *Thelephora papyracea* Jungh. (*Stereum*)" was selected as lectotype by Reid (*1957a*).

This fungus has been described in detail by Reid (*1957a*) who transferred it to the genus *Lopharia* Kalchbr. & McOwan as *Lopharia papyracea* (Jungh.) Reid. But see this paper pages 118, 131.

THELEPHORA PARADOXA Lév.

Thelephora paradoxa Lév. *in* Ann. Sci. nat. (Bot.) III **2**: 206. 1844; *in* Gaudichaud, Voyage autour du monde . . . sur la corvette la Bonite . . .. Botanique **1**: 190. 1844–6.
Type: Manila, Philippine Islands, coll. Gaudichaud. Unfortunately this specimen was not available in the Paris Herbarium but a collection from Java, named by Léveillé and preserved at Paris provides the basis for the following observations.

ILLUSTRATION: Léveillé, *1844–6*: pl. 139 figs. 4, 4a (drawing of the type collection).

This fungus consists of a sheet of sterile tissue with a series of deep, inverted cone-like depressions, each having steep, striated sides. It is highly probable that it is merely an immature condition of some fungus—possibly a polypore—which grew over a woody plant, such as *Caesalpinia bondicella* or *Ceiba pentandra*, with short conical spines. On being detached from one of these plants, both of which occur in Java, the specimen would have exactly the pitted appearance of *Thelephora paradoxa*.

Reference to Léveillé's figure of the type specimen shows it to be very like the material discussed above and it too, may have had a similar origin.

THELEPHORA PROLIFERA Berk. — FIG. 44

Thelephora prolifera Berk. *in* Hook. J. Bot. **8**: 272. 1856.
Stereum proliferum (Berk.) Lloyd *in* Mycol. Writ. **4** (Syn. stip. Stereums): 34. 1913.
Type: Brazil, coll. Spruce (No. 17).

Sporophores up to 5.5 cm high and 6.5 cm wide, consisting of a repeatedly branched, clavarioid fruitbody, which is white when fresh. The branches are narrow, 0.5–1.0 mm in width, and somewhat flattened especially in the region of a dichotomy where they are distinctly dilated. An extraordinary feature of several of the fructifications is that many of the ultimate branchlets instead of becoming increasingly fine, in fact become broader and terminate in a fan-shaped expansion up to 1.3 cm in diam. These terminal expansions may be more or less entire with a fimbriate margin or they may be palmately divided at the margin. *Hymenial surface* confined to the lower sides of the branches. On one of the fruitbodies the hymenial surface is densely covered with very minute papillae which are only visible under a lens. *Hyphal structure* monomitic, consisting of generative hyphae, 2–3 μ in diam., bearing clamp-connexions at the septa, and having thin but distinct walls. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* 3–3.75 × 2–3 μ, thin-walled, hyaline and minutely echinulate, varying in shape from broadly elliptical to subglobose.

HABITAT: on the ground amongst fallen leaves and vegetable debris.

ILLUSTRATION: Lloyd, *1913b*: fig. 554 (photo of type material).

This fungus is a member of the Clavariaceae and belongs in the genus *Scytinopogon* Singer. It would appear to be synonymous with *S. scaber* (Berk. & Curt.) Reid (see page 161). The type collection of *T. prolifera* differs from that of *S. scaber* only in its very slightly smaller spores and its somewhat different growth form.

When Berkeley described this fungus he was under the impression that it was of a creeping habit and that the terminal expansions represented points of anchorage to the substratum. This interpretation of the material, however, is unlikely to prove correct. There is a record of *Stereum* (*Thelephora*) *proliferum* from the Belgian Congo (Beeli, *1926*).

THELEPHORA PULVINULATA Speg. — FIG. 45

Thelephora pulvinulata Speg. *in* Ann. Mus. nac. B. Aires, **19**: 276. 1909.

Type: Rio Caramillo, Salta, Argentina, March, 1905 (LPS).

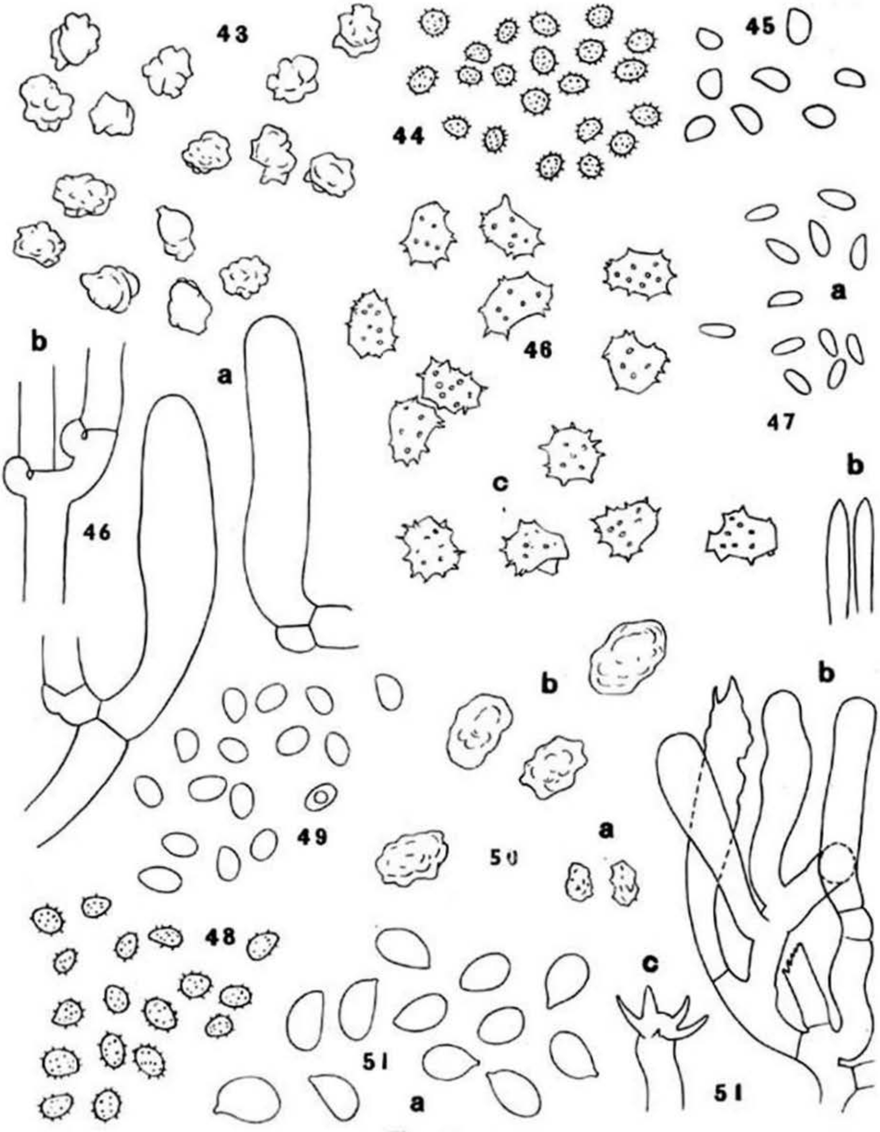
Sporophores consisting of dense caespitose clusters of white pilei, 1–5 cm in length, 1–2 cm in width and 1.5 cm in height. These clustered fructifications may be either hemispherical or more or less elongated, and are formed of thin, flabellate, crowded, anastomosing pilei with laciniate or fimbriate margins. *Hyphal structure* monomitic, consisting of thin-walled, hyaline, generative hyphae, 2–3 μ wide which, lack clamp-connexions at the septa. *Cystidia* and *gloeocystidia* presumably absent. *Basidia* not seen. *Spores* smooth, thin-walled, hyaline, elliptical, 3.5–4.2 × 2–2.75 μ (according to Spegazzini 4–5 × 2–3 μ).

HABITAT: on rotten trunks and branches.

The type material of this species is entirely covered by sand particles and is in such a poor condition that it is impossible to decide to what family it is best assigned. It is doubtful if it belongs in the Thelephoraceae sensu lato; it may possibly belong in either the Polyporaceae or the Hydnaceae. In many respects it suggests *Hydno-*

EXPLANATION OF FIGURES 43–51

Figs. 43–51. — 43. *Thelephora lutosa*. Spores. — 44. *Thelephora prolifera*. Spores. — 45. *Thelephora pulvinulata*. Spores. — 46. *Thelephora regularis*. a. Immature basidia. b. Hyphae with clamp-connexions. c. Spores. — 47. *Thelephora rosella*. a. Conidia. b. Conidiophores. — 48. *Thelephora scabra*. Spores. — 49. *Thelephora sebacinoides*. Spores. — 50. *Thelephora serrei*. a. Spores (× 1300). b. Spores (× 2300). — 51. *Thelephora subundulata* [Bronx Park]. a. Spores. b. Basidia. c. Basidium bearing five sterigmata.



Figs. 43–51

polyporus Reid (see page 151) but it differs from the two known species of this genus in its narrower hyphae and slightly smaller spores. However, since the material is so poor I have refrained from formally transferring the species to this genus.

THELEPHORA REGULARIS Schw. — FIG. 46

Thelephora regularis Schw. *in* Schr. naturf. Ges. Leipzig **1**: 79. 1822.

Type: None cited in the original description but Burt (*1914a*) has selected as lectotype a specimen in the Schweinitz Herbarium from Salem, Carolina, U.S.A. What is possibly this collection was borrowed from the Herbarium of the Academy of Natural Sciences in Philadelphia (PH) and forms the basis of the following description.

Sporophores solitary, up to 2.3 cm high, and 1.1 cm wide. *Pileus* flabelliform, radiately fibrillose-striate, reddish or rusty-buff in colour, and with a slightly lobed, laciniate margin. *Hymenial surface* buff-coloured with a pinkish tinge, but brownish toward the base of the largest fruitbody, and minutely radiately grooved particularly near the margin. *Stipe* up to 1.5 cm high, covered with a dark reddish-brown, matted tomentum, especially toward the base. *Hyphal structure* monomitic, consisting of generative hyphae, 2.5–4.5 μ in diam., which bear clamp-connexions at the septa. These hyphae are branched and the branching frequently occurs from the clamp-connexions. Further the hyphae of one of the fruitbodies have very pale brown walls and appear twisted and ribbon-like while in another fructification of the same gathering they are distinctly brownish and have thicker walls, thus appearing more rigid. The tomentum of the stipe is formed of hyphae, 2.5–3 μ in diam., with thick brownish walls, and obtuse apices. These hyphae bear clamp-connexions at the primary septa but not at the abundant secondary septa. *Cystidia* and *gloeocystidia* absent. *Basidia*: mature basidia not seen, but when immature these organs are up to 57.2 μ in length, and 8–10.5 μ in width and appear cylindrical. *Spores* 7.5–8.75 × 4.5–6 μ (up to 9.5 μ in length with the spines included), brown, angular and echinulate, with a prominent apiculus visible in some planes. The shape of the spores varies from elliptical to ovate but in certain views they may appear almost trilobate or even subglobose.

HABITAT: on the ground in moss on banks of springs.

ILLUSTRATION: Burt, *1914a*: pl. 4 figs. 6, 7b (fig. 6 is a sketch of one of the sporophores of the type collection).

This fungus belongs in the genus *Thelephora* Ehrh. ex Fr. sensu stricto.

In the original account of *T. regularis* the sporophores were said to be infundibuliform or rarely subdimidiate, silky shining, testaceous and dark banded while the hymenium was described as pale and subpapillose. Furthermore the pileus was stated to vary from ¼ to ¾ of an inch in height. Fries (*1828*) supplemented this description by noting that the pileus was fuscescent when dry and that the hymenium was longitudinally striate and subcostate.

The first modern account of *T. regularis* was published by Burt (*1914a*). This was based on a collection in the Schweinitz Herbarium which Burt designated as the lectotype of the species. He stated that the type "consists of three fructifications, two of which are infundibuliform, the third and largest, flabelliform." The fungus was said to be "infundibuliform or divided to the stem into triangular divisions or flabelliform, . . . drying pallid or tawny-olive, darker at centre of the cup or at base of the divisions . . .; hymenium usually hair-brown, sometimes pallid; spores melleus to umbrinous under the microscope, angular-tuberculate, 6–7 × 4½–5 μ."

The collections described in the current paper also consisted of three fructifications, one of which was larger than the others. However, in contrast to Burt's statement all three fruitbodies appear to be flabelliform. It is, therefore, by no means certain that the collection which forms the basis of the above description is the same as that designated as lectotype by Burt.

THELEPHORA ROSELLA Peck — FIG. 47

Thelephora rosella Peck *in* Rep. New York St. Mus. No. 35: 136. 1885.
Type: Sandlake, U.S.A. (NYS).

Sporophores consisting of small cushion-like rosettes of much divided pallid lobes arising from a black basal tubercle. These lobes, which are white or flesh coloured in the living plant have a dentate or fimbriate margin. Hymenium formed of a palisade of narrow, pointed, thin-walled, conidiophores, 2.5 μ in diam. *Conidia* apparently borne singly at the apex of the conidiophores as small, elliptical, thin-walled, hyaline bodies, 3–4.5 × 1.5–2 μ.
HABITAT: on dead branches of *Alnus incana*.

This is almost certainly the conidial state of some species of *Xylaria* (*Xylosphaera* Dumort.) and Lloyd (*1913b*) stated that it is the same as *Isaria flabelliformis* (Schw.) Lloyd. It would certainly appear to be the same fungus as that described from the United States by Montagne as *Thelephora liliputiana* which Lloyd also regarded as being synonymous with *I. flabelliformis*. For further details concerning the latter species and its possible connexion with various species of *Xylaria*, see page 154.

THELEPHORA SCABRA Berk. & Curt. — FIG. 48

Thelephora scabra Berk. & Curt. *in* Amer. J. Sci. II **11**: 94. 1851.
Thelephora prolifera Berk. *in* Hook. J. Bot. **8**: 272. 1856.
Stereum proliferum (Berk.) Lloyd *in* Mycol. Writ. **4** (Syn. stip. Stereums): 34. 1913.
Type: Ovolau, Fiji Islands (BPI).

Sporophores up to 2.7 cm high, white, clavarioid, consisting of a number of flattened branches which are dilated and incised above, with the lobes incised or furcate. Hymenial surface rough with little granular warts. *Hyphal structure* monomitic, consisting of thin-walled hyaline, branched, generative hyphae, 2.5–3 μ in diam., which bear clamp-connexions at the septa. *Basidia* not seen. *Spores* 3.5–4 × 2.5–3.5 μ, thin-walled, hyaline or subhyaline, distinctly echinulate and varying in shape from ovate to broadly elliptical.
HABITAT: on the ground.
ILLUSTRATION: Curtis & Berkeley, *1862*: fig. 6.

This fungus is a member of the Clavariaceae and evidently belongs in the genus *Scytinopogon* Singer. It is accordingly transferred to that genus as **Scytinopogon scaber** (Berk. & Curt.) Reid, *comb. nov.*

This species differs from *S. angulisporus* (Pat.) Corner in its smaller and more rounded spores and its papillose hymenium. From *S. echinosporus* (Berk. & Br.) Corner it differs not only in the above mentioned features but also in colour.

Thelephora prolifera Berk. (see page 157) would seem to be a synonym of *S. scaber*.

The type specimen of the former species has an almost identical microstructure to that of *S. scaber*, although the spores, while of similar shape, are fractionally smaller. In addition the type material of *T. prolifera* has a papillose hymenium like that of *S. scaber*. However, it must be admitted that the growth form of the two collections is somewhat different but judging from the other species of *Scytinopogon* this might be expected to vary within fairly wide limits.

It should be noted that the type material of *S. scaber* consists of a mass of fragments which are insufficient to give any clear idea of the shape of the fungus.

THELEPHORA SEBACINOIDES P. Henn. — FIG. 49

Thelephora sebacinoides P. Henn. *in* Hedwigia **36**: 193. 1897 ("*sebacioides*").
Type: Sta. Catherina, Brazil, coll. E. Ule (No. 1260) (S).

Sporophores white, consisting of caespitose, flabellate pilei which are variously and often deeply divided and lobed. The segments themselves are usually also lobed and frequently have an almost pectinate margin which is somewhat enrolled. *Hymenial surface* not smooth as stated by Hennings but covered with fertile spines and ridge-like plates of tissue. *Hyphal structure* monomitic, consisting of branched, generative hyphae, 2.5–7 μ in diam., which often become very thick-walled (–2 μ wide) especially toward the base of the fruitbody. These hyphae lack clamp-connexions at the septa. There is no distinct cuticle. *Hymenium* apparently not thickening. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* 4–4.75 × 2.75–3.5 μ, thin-walled, hyaline, varying in shape from broadly elliptical to ovate.
HABITAT: on tree-bark.

Thelephora sebacinoides is a synonym of *Hydnopolyporus hartmannii* (Mont.) Reid (see page 150), and was listed as such by Bresadola (*1926*).

This fungus was originally published as *T. sebacioides* but it is clear that Hennings, by his choice of the epithet 'sebacioides', intended to convey the impression that his new fungus resembled members of the genus *Sebacina* for he indicated that it had a certain similarity with *Sebacina* Tul. (mis-spelled as *Sebacinia*). As a result Saccardo (*1899*) corrected the spelling of the specific epithet to 'sebacinoides'.

THELEPHORA SERREI Pat. & Har. — FIG. 50

Thelephora serrei Pat. & Har. *in* Bull. Soc. mycol. Fr. **22**: 116. 1916.
Type: Java, coll. P. Serre (FH).

Sporophores white, arising from a spreading sheet of mycelium as erect densely gregarious, wedge-shaped lobes or narrow branches which become variously fused together to form more or less shapeless, sponge-like masses. *Hyphal structure* monomitic, consisting of branched, hyaline, generative hyphae, 2–3 μ in diam., which have

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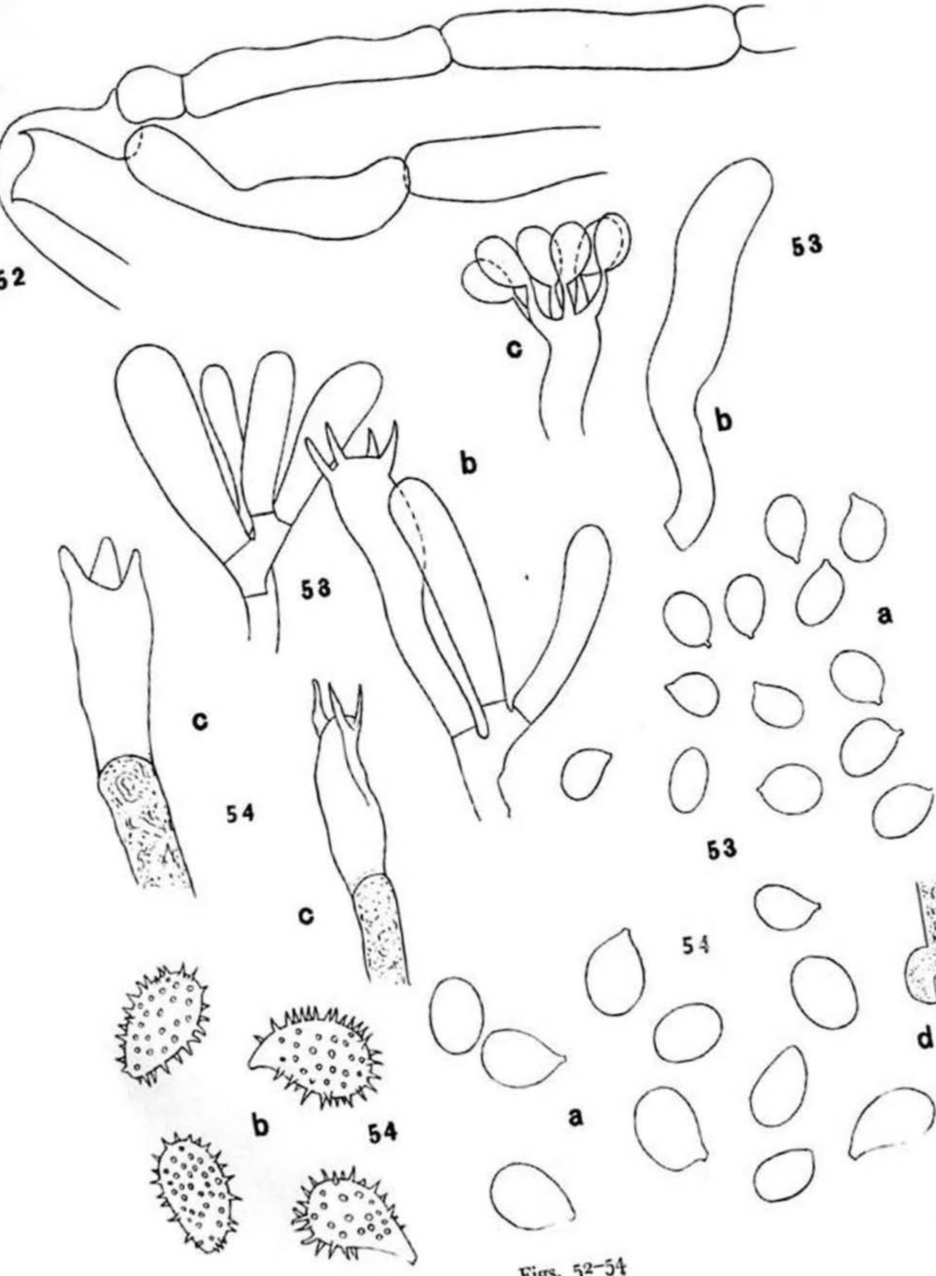
EXPLANATION TO FIGURES 52–54

Figs. 52–54. — 52, 53. *Thelephora subundulata*. 52. [Bronx Park]. Hyphae. 53. [Delaware, coll. A. Commons]. a. Spores. b. Basidia. c. Basidium bearing six spores. — 54. *Thelephora viridula*. a Spores of the fungus. b. Extraneous spores of a species of *Ramaria*. c. Basidia which have become secondarily septate after spore discharge. d. Hypha showing a clamp-connexion.



Figs. 52–54

thin but distinct walls and bear clamp-connexions at the septa. *Hymenium* smooth, probably thickening, reaching 39–52 μ in width at a point 4 mm in from the margin of a very young lobe, and confined to the lower surface of the fruitbodies. *Cystidia* and *gloeocystidia* absent. *Basidia* not seen. *Spores* 5–5.5 × 3 μ, thin-walled, faintly yellowish in colour, distinctly verrucose-echinulate and varying in shape from elliptical to broadly elliptical.

HABITAT: on the ground.

Thelephora serrei is a member of the Clavariaceae and is synonymous with *Scytinopogon angulisporus* (Pat.) Corner.

It should be noted that the type material of *T. serrei* is in very poor condition.

THELEPHORA SUBLILACINA Ell. & Ev.

Thelephora sublilacina Ell. & Ev. *in* Bull. Labs nat. Hist. Univ. Ia No. 13: 67. 1896.

Type: Catillos el Viejo, Nicaragua, coll. B. Shimik and C. L. Smith, 1893 (NYS).

This species belongs in the genus *Septobasidium* Pat. and was transferred to that genus by Burt as *Septobasidium sublilacinum* (Ell. & Ev.) Burt *in* Ann. Mo. bot. Gdn **3**: 331. 1916. In this paper Burt published a full account of the species, but it was redescribed some years later by Couch (*1938*).

THELEPHORA SUBUNDULATA Peck — FIGS. 51–53, 59

Thelephora subundulata Peck *in* Bull. Torrey bot. Cl. **22**: 492. 1895.

Craterellus subundulatus (Peck) Peck *in* Bull. Univ. St. New York No. 286: 27. 1903; *in* Bull. New York St. Mus. No. 67: 27. 1903.

Type: Wilmington Delaware, U.S.A., coll. A. Commons (No. 2718) (NY).

Sporophores gregarious or caespitose, 1.7–2.0 cm high and 1.3 cm wide, thin, coriaceous and centrally stipitate. *Pileus* varying from somewhat depressed to almost infundibuliform and with an undulating, plicate margin in which the lobes or folds sometimes overlap. The surface of the pileus is slightly floccose-squamulose or fibrillose and varies in colour in the dried condition from "Isabella Color" to "Light Brownish Olive" of the Ridgway Colour Chart, but it was originally described as subcinereous or greyish-brown. *Hymenial surface* uneven or slightly folded at the margin, varying from "Cinnamon Buff" to "Clay Color" in dried material but originally described as being "paler than the pileus, grayish or grayish-yellow" *Stem* solid, rarely branched. *Hyphal structure* monomitic, consisting of subhyaline, thin-walled, branched, generative hyphae, 4–10.5 μ in diam. These hyphae lack clamp-connexions at the septa, at which points they are often distinctly constricted and the individual segments vary from 23.4 to 60 μ in length. *Cystidia* and *gloeocystidia* absent. *Basidia* 33.5–46.8 μ long and up to 10 μ wide, bearing up to 6 sterigmata. *Spores* 5.5–8 × 4–5.0 μ, thin-walled, hyaline or subhyaline and varying in shape from broadly elliptical to ovate with a small lateral apiculus.

HABITAT: on the ground.

EXPLANATION OF FIGURES 55–59

Figs. 55–59. — 55. *Cladoderris funalis*. Fruitbody, type. — 56. *Cladoderris pritzelii*. Fruitbody, type. a. Upper side. b. Hymenial surface. — 57. *Stereum guadelupense*. Fruitbody. — 58. *Stereum miquelianum*. Fruitbody, type. — 59. *Thelephora subundulata*. Fruitbodies from type collection.

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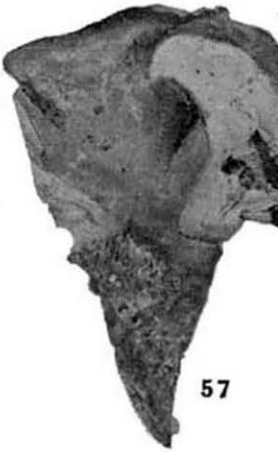

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Figs. 55–59

This fungus belongs in the genus *Pseudocraterellus* Corner and is accordingly transferred to that genus as **Pseudocraterellus subundulatus** (Peck) Reid, *comb. nov.*

Peck (*1903*) subsequently reported a second gathering of this species from the New York Botanic Garden and specimens of this collection are preserved in the Herbarium of the New York Botanic Garden and also in the Herbarium of the New York State Museum, Albany. Sporophores preserved in the latter institution were examined and these are obviously conspecific with the type material of *P. subundulatus*. They differ from the type, however, in having a slightly more felty surface when examined under a lens, since the hyphae are often united into prominent rope-like strands giving a minutely reticulate or even minutely strigose effect. The hyphal structure shows close agreement with that of the type, except that the hyphae are 3–8.5 μ wide. The hymenium does not appear to thicken but there is a very broad subhymenial zone varying in width from 40 μ near the margin to 90 μ near the base of the fruitbody. The basidia are 33.8–52 × 6–8 μ and bear 4–5 sterigmata while the spores are 6–7.75 × 3.75–4.2(–5) μ [Peck (*1903*) described them as 8 × 4.5 μ].

Burt (*1926*) published an account of this species in which he stated that the two collections of the species each consisted of about 30 fructifications. He also found the spore range to be 6–9 × 4.5–6 μ.

Initially, when Peck first described the species, he was struck by its resemblance to *Thelephora undulata* Fr. but subsequently when he realized it was more naturally placed in the genus *Craterellus* Pers., he indicated that it was closely related to *C. sinuosus* Fr., differing chiefly in its smaller size and slightly smaller spores (Peck, 1904). It should, however, be noted that *Pseudocraterellus pertenuis* (Skovst.) Reid (see page 120) is very closely related to this American fungus as is *C. pusillus* Fr.

THELEPHORA VIRIDULA Bres. — FIG. 54

Thelephora viridula Bres. *in* Ann. mycol., Berl. **5**: 240. 1907.
Type: Java, coll. E. Heinricher (S).

Sporophores up to 2 cm high and broad, consisting of a number of erect flattened branches, which are themselves branched but not markedly so. These branches, which have dilated, subfimbriate apices, become connate below, but there is no well developed stipe. *Hyphal structure* monomitic, consisting of thin-walled, branched, generative hyphae, 3–4 μ in diam., which bear clamp-connexions at the septa and have densely granular contents. *Hymenium* thickening, reaching 130 μ in width. *Cystidia* and *gloeocystidia* absent. *Basidia* more or less clavate and mostly 2-spored but some were observed to bear 3 sterigmata. The basidia which are up to 12 μ wide and of uncertain length (probably exceeding 35 μ) become secondarily septate after spore discharge. *Spores* (8–)9–10 × (4.75–)5.5–7.5 μ, thin-walled hyaline or sometimes stained yellowish brown, and varying considerably in shape from pip-shaped to very broadly elliptical or ovate and with a distinct apiculus. There are in addition extraneous spores present which would seem to belong to a species of *Ramaria*. These are 14.6–15.6 × 8–8.5 μ, echinulate, and brown in colour.

HABITAT: on the ground.

This fungus is a member of the Clavariaceae and belongs in the genus *Clavulina* Schroet. It is accordingly transferred to that genus as **Clavulina viridula** (Bres.) Reid, *comb. nov.*

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A REASSESSMENT OF BELONIDIUM MONT. & DUR.

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(With five Text-figures)

A study of the sole original species of *Belonidium* Mont. & Dur. revealed that this generic name has been misapplied by subsequent authors. The taxon is redefined as a subgenus of *Dasyscyphus* S. F. Gray. A brief account is given of the latter genus and its subdivisions and of other genera assigned to the Hyaloscyphaceae trib. Lachneae (*Psilachnum* Höhn., *Diplocarpa* Massee) and subfam. Trichocyphelloideae (*Lachnellula* P. Karst., *Perrotia* Boud.) transferred from the Helotiaceae to the Hyaloscyphaceae, as well as of some other genera, *Trichodiscus* Kirschst., *Lasiobelonium* (Sacc.) Sacc. and *Zoellneria* Vel. The taxonomic significance of lanceolate paraphyses, characteristic in the Hyaloscyphaceae of the Lachneae, and in other families of Helotiales is discussed, with notes on *Cenangiopsis* Rehm, *Mollisiopsis* Rehm and other genera. The species previously referred to *Belonidium* by De Notaris and later authors are reviewed and suggestions are made as to their taxonomic positions and status with incidental notes on such genera as *Belonopsis* (Sacc.) Rehm, *Calycellina* Höhn., *Strossmayeria* S. Schulz., *Allophylaria* Karst., and the introduction of *Nipterella* Starbäck ex Dennis, gen. nov. *Hymenoscyphus* S. F. Gray is taken up for the bulk of species currently referred to *Helotium* Pers. New combinations are made with *Allophylaria* (1), *Belonopsis* (2), *Calycellina* (1), *Cenangiopsis* (2), *Dasyscyphus* (12), *Hymenoscyphus* (3), *Lachnellula* (17), *Lasiobelonium* (1), *Nipterella* (2), *Perrotia* (3), *Pezizella* (1), *Psilachnum* (2), *Strossmayeria* (1), *Unguicularia* Höhn. (1).

The generic name *Belonidium* Mont. & Dur. (Fl. Alger. *tab. 28 fig. 8.* ?1846) was proposed for a single species, *B. aeruginosum* Mont. & Dur., which was carefully figured with analyses. Captions but no formal diagnosis of either genus or species appeared in the text to the Atlas volume, 1868. The plate constitutes effective publication of both genus and species but the genus was first brought to the general notice of mycologists by De Notaris (*1864*). He ascribed it to Montagne and Durieu, cited the above plate, and gave the following generic diagnosis:

> "Ascomata cupularia sessilia, vel breviter stipitulata, cyathoidea, vel infundibuliformia, ore in sicco saepius coarctata. Excipulum cellulis elongatis, arctis contextum subceraceum. Asci 8-spori. Paraphyses filiformes. Sporidia teretiuscula, utrinque obtusa 4–6, locularia, hyalina."

It will be observed that there is no mention of hairs and that the paraphyses are stated to be filiform. De Notaris referred to his extended genus seven species, viz:

Belonidium aeruginosum Mont. & Dur., without comment.

B. moliniae De Not. with short diagnosis. Rehm took this to be a synonym of *B. vexatum*.

B. vexatum De Not., currently referred to *Belonioscypha* Rehm, in Helotiaceae.

B. campanula (Nees ex Fr.) De Not., chosen by Nannfeldt as lectotype of *Belonioscypha*.

B. tami (Lamy) De Not., referred by von Höhnel to his genus *Pezizellaster*, in Hyaloscyphaceae.

B. hystrix De Not., referred by von Höhnel and by Nannfeldt to *Belonium* in Dermateaceae.

B. aurelia (Pers.) De Not., referred by Fuckel to his genus *Arachnopeziza*, in Hyaloscyphaceae.

De Notaris' contributions to the genus have thus been distributed by subsequent authors among three families of the Helotiales.

Saccardo (*1884*) seclected as lectotype of *Belonidium* Mont. & Dur. *B. campanula* (Nees) De Not. but this is obviously an impossible choice, especially as he clearly ascribed the genus to Montagne and Durieu, not to De Notaris. By the time he compiled volume 8 of the "Sylloge fungorum" (*1889*) he had either forgotten or repented of his earlier selection and seems to have fixed instead on *B. moliniae* De Not., though he still ascribed the generic name to its original authors and dated it 1846. *Belonidium moliniae* appears in 1889 as the first species of subgenus *Eubelonidium* whereas *B. campanula* and *B. vexatum* are referred to subgenus *Podobelonium*, *B. aurelia* to subgenus *Arachnoscypha* and *B. tami* with *B. aeruginosum* to subgenus *Lasiobelonium*. *Belonidium hystrix* has been transferred to *Belonium*, under the name *B. graminis* (Desm.) Sacc. Clements and Shear selected as type species *B. lacustre* (Fr.) Phill., an even more ridiculous suggestion as this does not appear in De Notaris' list of 1864 and is not by modern ideas congeneric with any of his species nor, as we shall see, with that of Montagne and Durieu.

There would seem to be no doubt that the generic name must be interpreted in conformity with the characters of *B. aeruginosum*, the sole foundation species. By courtesy of M. R. Heim I have been permitted to examine the excellent material in the type collection of this at Paris and find it to be a Hyaloscyphaceous fungus with long granulate hairs and narrow but distinctly lanceolate paraphyses. It is most unfortunate that the manuscript diagnosis attached to the type collection was not published as it clearly indicates the essential characters and would have obviated a century of misapplication of the name:

> *Belonidium* aut qualicumque nomen. Nov. Gen. Tribus Patellarieae.
>
> Cupula ceracea libere evoluta extus villosa, margine siccitate involuta, hymenium carneum tandem frustulatim fatiscens, cupula explanata remanente. Asci cylindrici paraphysibus tenuibus continuis acutis parcissimis (non nisi augmento maximo conspicuis) mixti. Sporidia acicularia transversim pluriseptata.

The hairiness of the apothecia led to a comparison with *Volutella* Tode in the notes appended to this manuscript diagnosis. Examination of the type shows the hairs to be cylindrical or very slightly tapered to obtusely rounded tips, up to 175 × 4–5 μ, their walls thick, hyaline, not pseudoamyloid, with a finely granulate surface, multiseptate. The asci measure 60 × 7 μ, with pore blued by Melzer's reagent; ascospores hyaline, cylindric-fusoid, 17–21 × 1.5–2 μ, 3-septate; paraphyses lanceolate, 70 × 2–2.5 μ (Fig. 1). It appears probable that *Erinella ilicina* Urries is a synonym.

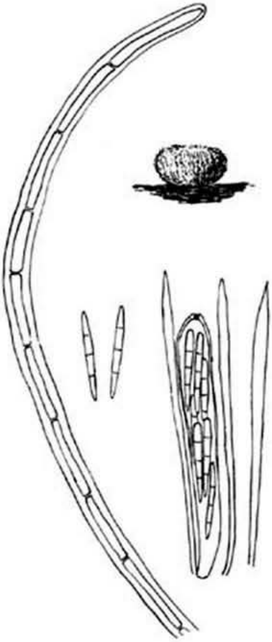

Fig. 1. *Belonidium aeruginosum*. Apothecium (× 10), hair, ascus and paraphyses, spores (× 660).

Belonidium is therefore to be regarded as a synonym of *Dasyscyphus* S. F. Gray, when that genus is taken in the wide sense of *Lachnum* emend. Nannfeldt. For those who prefer to separate the sessile species of the genus it offers a legitimate name in place of *Lachnella* auct. non Fries and an earlier name than either *Trichopeziza* Fuckel (*1870*) or *Dyslachnum* Clents (1909), based on *Peziza mollissima* Lasch.

* * *

It may be appropriate here to consider also the application of *Trichopeziza* Fuck. This was proposed by Fuckel (*1870:* 295) as a genus of twelve species, defined as, "Cupulae carnoso-coriaceae, plerumque minutissimae, sessiles subsessilesve, siccatae globosae, clausae, humectatae plus minusve apertae, extus undique pilosae. Discus concavus. Asci octospori. Sporidia cylindracea oblongave, continua, hyalina. Paraphyses adsunt.

Meist sehr kleine, fast oder ganz sitzende, trocken fast kugelrunde oder am Scheitel genabelte, mitunter lebhaft gefärbte oder schneeweisse, aussen behaarte Becherpilze. Dürre, weiche Pflanzentheile bewohnend".

Comparison with the unpublished diagnosis of *Belonidium* shows the chief difference to be one of ascospore septation, a character no longer regarded as necessarily of generic significance in the Helotiales. The genus was adopted by Saccardo in "Sylloge fungorum" volume 8 but has been ignored by most later authors, presumably because they thought it indistinguishable from *Dasyscyphus*, *Lachnum* or *Lachnella*. Boudier (*1907*), indeed has a genus "*Trichopeziza* Fuck." but, as he excluded from it every one of Fuckel's original twelve species his usage evidently cannot be accepted. No type species was indicated by Fuckel but Saccardo (1884) selected as lectotype for *Trichopeziza* as a subgenus of *Lachnella* "*L. sulfurea* Pers." At least seven of the original species have at some time been referred to *Dasyscyphus* and it seems clear from the diagnosis the name was intended to apply to a genus of Hyaloscyphaceae. There seems no good reason to reject Saccardo's choice but it may be worth while briefly to consider the fate of Fuckel's foundation species in subsequent systems.

1. *Trichopeziza punctiformis* (Fr.) Fuck. As illustrative of this species Fuckel quoted his "Fungi rhenani" No. 1194, which consists of dead oak leaves bearing apothecia of *Dasyscyphus capitatus* (Peck) Le Gal (= *D. scintillans* Massee). Fuckel identified his fungus with Fries' form "a. nivea" of *Peziza punctiformis*, but probably in error, for Fries gave the substrata of *P. punctiformis* as "Ad folia decidua putrescentia *Myricae*, *Alni* &c." His form "c" was "in foliis quercinis reperitur circa Parisios" but this was "fusca, badia" whereas *D. capitatus* is pure white throughout. *Peziza punctiformis* Fr. is considered by modern authors to have been a cyphellaceous fungus.

2. *T. nivea* (Hedw.) Fuck. Hedwig's fungus is interpreted today, by those who recognise it at all, as a species of *Dasyscyphus*.

3. *T. villosa* (Pers.) Fuck. *Peziza villosa* Pers. is generally assumed to be a basidiomycete, *Cyphella villosa* (Pers. ex Fr.) Karst. or *Lachnella villosa* (Pers. ex Fr.) Gillet.

4. *T. mollissima* (Lasch) Fuck. *Peziza mollissima* Lasch is a *Dasyscyphus* when the genus is interpreted in a comprehensive sense, see below.

5. *T. sulphurea* (Fr.) Fuck. This, too, is a *Dasyscyphus* of the same group as *D. mollissima*. Saccardo selected it as lectotype of *Lachnella* subgenus *Trichopeziza* and listed it as the first species of *Trichopeziza* in "Sylloge fungorum". There is, unfortunately a little uncertainty about the correct interpretation of the species. Rehm recognised three species of similar aspect on dead herbaceous stems, distinguished partly by ascospore characters, partly by the reaction of the hair cells to alkalis. These were:

Erinella nylanderi Rehm with ascospores 25–33 × 2 μ, hair sap violet with alkali. This is the interpretation of *P. sulphurea* favoured by Karsten and Saccardo.

Lachnum sulfureum (Pers.) Karst. sensu Rehm with ascospores 8–10 × 1.5–2 μ, hair sap violet with alkali.

Lachnum leucophaeum (Pers.) Karst. with ascospores 10–18 × 1.5–2 μ, hair sap not coloured by alkali. This differed principally in the yellow sap of its hair cells from a fourth species, *L. mollissimum* (Lasch) Karst. and in my opinion these two are not specifically distinct.

In practice the distinction between *Lachnum sulfureum* sensu Rehm and *L. leucophaeum* is also much less clear cut than indicated above. Kirschstein (*1938*) came to a similar conclusion, "Unter den *Lachnum*-Arten gibt es zwei, die beim Bestimmen grosse Schwierigkeiten machen. Es sind dies *Lachnum sulphureum* (Pers.) Rehm und *L. leucophaeum* (Pers.) Karst. . . . Die gleiche Ansicht spricht auch Rehm aus. Er führt aber dann doch ein sicheres Unterscheidungsmerkmal an, das ist die verschiedene Reaktion der Haare auf Ätzammoniak. Da mir dieses Unterscheidungsmerkmal doch zu sehr an den Haaren herbeigezogen zu sein scheint; denn ich halte eine chemische Reaktion zur Feststellung von Verwandtschafts-verhältnissen für durchaus ungeeignet und lehne sie ab. Wenn man im Aussehen und Bau der Pflanzen keine Unterscheide finden kann, so muss man sie für identisch erklären." Whilst I would not be quite so dogmatic in rejecting colour reactions as taxonomic characters I agree that in this instance the reaction is often difficult to observe and may not be constant. I therefore agree with Kirschstein in uniting *L. leucophaeum* and *L. sulphureum* sensu Rehm.

The problem then is to decide between the conflicting interpretations of the latter species. Unfortunately the specimens surviving in the Persoon herbarium under the name *Peziza sulphurea* are not in good enough condition to settle the question finally. Of four collections so labelled one, on *Atropa*, was queried by Persoon and is evidently of no authority. One, number L 910.256-900, no longer bears apothecia. The other two carry apothecia but they are so immature that I was unable to recover asci from them. One, number L 910.256-897, labelled *Peziza sulphurea* var., has hairs in which the yellow sap is certainly not discoloured by ammonia. In the other, number L 910.261-594, labelled *Peziza sulphurea*, the reaction is uncertain. In the absence of ascospores I do not feel the evidence is clear enough to justify rejecting the first precise definition of the species by microscopic characters, that by Nylander (*1869*). He recognised three species in the group:

Peziza sulphurea Pers. with ascospores 14–24 × 2–2.5 μ, up to 3-septate, hairs violet with ammonia.

P. leucophaea (Pers.) Nyl. with ascospores 6–15 × 1–1.5 μ, hairs yellow in ammonia.

P. mollissima Lasch with ascospores 7–11 × 1.5 μ, hairs colourless.

I would accept this interpretation with the modification that I doubt if *P. leucophaea* and *P. mollissima* be specifically distinct and therefore adopt the latter name as the older in specific rank. Nylander stated his concept of *P. sulphurea* to be based on Fries, Scler. Suec. 453. In the Kew example of this number I can obtain no violet colour in the hairs with alkali and find ascospores only 12–14 × 1–2.5 μ. This whole species complex evidently deserves further critical study but for the time being I call Rehm's *Erinella nylanderi Dasyscyphus sulphureus* and unite his *Lachnum sulfureum*, *L. leucophaeum* and *L. mollissimum* under the last name. The problem is still further complicated by the existence of *Erinella discolor* Mouton. I have seen the type of this, Mouton 304, on *Urtica* stems, which has light yellow hairs with no colour change in alkali and ascospores which vary from 3-septate 25 × 3 μ to 6-septate 67 × 2 μ. If one rejects the colour reaction this can be regarded as only an extreme variant of *D. sulphureus*.*

6. *T. relicina* (Fr.) Fuck.

7. *T. nidulus* (Schmidt & Kunze) Fuck. Species 6 and 7 are sessile Hyaloscyphaceae with brown smooth-walled hairs, generally referred to *Dasyscyphus* or *Lachnella* auct. non Fries.

8. *T. pulverulenta* (Lib.) Fuck. This, too is a *Dasyscyphus* in the wide sense.

9. *T. pulveracea* Fuck. This is a *Pyrenopeziza*, without true hairs.

10. *T. stipae* Fuck. is *Phialea stipae* (Fuck.) Rehm and it is difficult to account for its inclusion in *Trichopeziza* since Fuckel himself described it as "glabris".

11. *T. hexagona* Fuck. This is an *Unguicularia* or *Urceolella*, with cupulate sessile apothecia about 200 μ diameter, bearing glassy, hyaline, white hairs, densely massed around the rim and extending in bands down the flanks. The hairs measure 50–60 × 4–5 μ, with thick walls stained purple in Melzer's reagent; asci 35 × 4 μ, paraphyses filiform, obtuse, as long as the asci; ascospores not seen but described as 4 × 2 μ. The substrate is rotting stalks of *Aspidium filix-mas*. It may be renamed **Unguicularia hexagona** (Fuck.) Dennis, *comb. nov.* (basionym, *Peziza hexagona* Fuck., Fungi rhenani No. 2076. 1867, with description) (Fig. 2). Whether *U. winteriana* (Rehm) Nannfeldt on *Asplenium filix-femina* is distinct depends on the range of ascospore size in *U. hexagona*.

12. *T. aspidii* (Lib.) Fuck. According to "Fungi rhenani" No. 2287 this is an extremely minute, sessile, cupulate, cream-coloured species on dead fronds of *Aspidium aculeatum*. The apothecia are about 200 μ across, their margin white with very heavily encrusted, obtuse, thinwalled, cylindrical hairs about 30 × 5 μ; asci 20 × 4 μ, pore blued by Melzer's reagent, 8-spored, ascospores clavate, 5–6 × 1 μ; paraphyses filiform, obtuse, no longer than the asci. In spite of the marginal hairs I doubt if this be Hyaloscyphaceous. The incrustation is peculiar and the filiform obtuse paraphyses exclude any otherwise suitable genus of that family. Its affinities may be rather with *Pezizella chrysostigma* (Fr.) Sacc., which also has a hairy margin and grows on ferns. It may stand, therefore, as **Pezizella aspidii** (Lib.) Dennis, *comb. nov.* (basionym, *Peziza aspidii* Lib., Pl. crypt. Arduennae, Fasc. III, No. 226. 1834, with description) (Fig. 3). Alternatively *P. aspidii* may have affinity with *Trichopeziza viridula* Grelet (*1953*) which has similar hairs but occurs on rotten wood (Fig. 4). I have seen a collection on *Fagus* from Yorkshire (Bramley K61/13) which is probably not specifically distinct from this though somewhat smaller in all its dimensions. The apothecia are scattered on the surface

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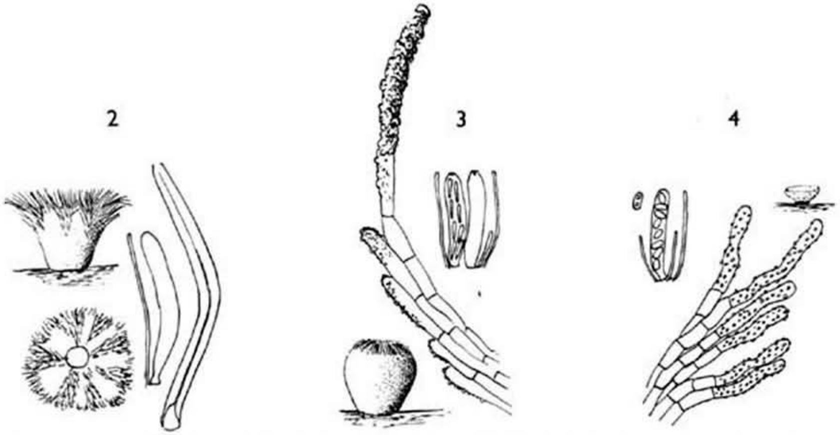
* The only other collection I have seen referable to *Erinella discolor* is one, also on *Urtica*, by W. G. Bramley, Pickering, Yorkshire, 15 Nov. 1938.

of the decorticated wood, subsessile $\frac{1}{3}$–$\frac{1}{2}$ mm diameter, with dark brown base, paler with a hint of yellow or green towards the margin, disc grayish. The excipular cells are thinwalled, prismatic, about 10 × 3 μ and bear thinwalled, cylindrical, flexuous, obtusely rounded, mostly nonseptate hairs, up to 45 × 2.5–3 μ, with rather coarse yellowish-brown granules deposited on their walls. Asci 20–25 × 3–4 μ, 8-spored, sessile, apex rounded, pore not blued by Melzer's reagent; ascospores mostly uniseriate, elliptic-cylindric or slightly allantoid, 3–4 × 1.5–2 μ, with polar guttules; paraphyses cylindric, 1 μ thick, often shorter than the asci.



Figs. 2–4. — 2. *Unguicularia hexagona.* Apothecium (× 80), ascus, paraphysis and hair (× 660). — 3. *Pezizella aspidii.* Apothecium (× 15), hairs with excipular cells, asci and paraphyses (× 660). — 4. *Trichopeziza viridula.* Apothecium (× 15), hairs, ascus, paraphyses and spores (× 660).

I do not see the second type of pointed smooth hair figured by Grelet but mounts show large numbers of loose pointed bodies, up to 45 × 2.5–3 μ broad at the base, which appear to be conidia, perhaps borne on basal hyphae. This fungus would evidently fall in *Cistella* Quél. sensu Nannfeldt. *Trichopeziza coerulescens* (Rehm) Sacc. is perhaps something similar.

* * *

It is now possible to subdivide the comprehensive genus *Dasyscyphus* S. F. Gray into a number of apparently natural smaller genera and subgenera, taking as primary characters the nature of the paraphyses and hairs. Nineteenth century mycologists, notably Karsten and Rehm, impressed by the conspicuous lanceolate paraphyses of *D. virgineus* S. F. Gray and its allies, regarded the presence or absence of these organs as a generic character. Subsequent authors, finding it difficult to draw a sharp distinction between lanceolate and cylindrical paraphyses, have questioned the validity of this character and have even claimed that the same species can exist in states with cylindrical and with lanceolate paraphyses respectively. After studying well over 100 species of Hyaloscyphaceae trib. Lachneae, however, I believe that in all true species of this tribe the paraphyses, if not distinctly lanceolate, are at least pointed at the tip and that there is a real distinction to be drawn between such slender cylindrical paraphyses with pointed tips and those with obtusely rounded tips. Such difficult cases as do occur are easily referred to *Dasyscyphus* in the strict sense by their obvious close resemblance to species with clearly lanceolate paraphyses. On this basis I propose the following arrangement:

1\. Paraphyses lanceolate, sometimes apparently cylindrical but then with distinctly pointed tips . . . . Hyaloscyphaceae trib. Lachneae
2\. Hairs cylindrical or at least obtuse, hyaline or, if coloured, thinwalled or colour in the sap, their walls covered with granules throughout at least the greater part of their length or else tipped by crystal masses:
3\. Apothecia mostly distinctly stipitate, hairs without coloured sap or else with the surface minutely and evenly granulate . . . . *Dasyscyphus* subgen. *Dasyscyphus*
3\. Apothecia sessile, hairs often with coloured sap or covered with loose fine coarse granules or coloured matter, ascospores often septate . *Dasyscyphus* subgen. *Belonidium*
2\. Hairs smooth, not tipped by crystal masses:
4\. Hairs hyaline or nearly so, thinwalled:
5\. Hairs long, thinwalled, sharp-pointed . . . . *Dasyscyphus*, series *Acutipilae*
5\. Hairs shorter, thinwalled, cylindrical and obtuse or rudimentary:
6\. Paraphyses lanceolate . . . . *Psilachnum*
6\. Paraphyses filiform with lanceolate septate tips . . . . *Diplocarpa*
4\. Hairs brown, very long or stiff, with thick walls and glandular tips *Dasyscyphus* subgen. *Trichopezizella*
1\. Paraphyses cylindrical, slender, with' obtuse tips:
7\. Hairs having granulate walls:
8\. Hairs pointed, excipular cells rounded . . . . *Trichodiscus*
8\. Hairs obtuse:
9\. Hairs brightly coloured, often with a coarse incrustation of coloured granules, ascospores characteristically cylindrical and septate (except in *P. succinea*), not on conifers . . . . *Perrotia*
9\. Hairs light coloured or with finely granulate walls, ascospores very variable in shape but usually nonseptate (except in *L. pseudofarinacea*), many species on conifers . . . . *Lachnellula*
7\. Hairs smooth:
10\. Hairs hyaline . . . . *Lasiobelonium*
10\. Hairs brown and glandular-tipped . . . . *Zoellneria*

DASYSCYPHUS S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 670. 1821.

This includes a rather homogeneous group of over 80 species plus a number of small fairly well defined groups for which I am not at present prepared to propose generic or even subgeneric rank. These are:

1\. Series *Bicolores*, typified by *D. bicolor* (Bull. ex Mérat) Fuck., characterised by their more rigid thickwalled hairs.

2\. Series *Niveae*, typified by *D. niveus* (Hedw. ex Fr.) Sacc. emend. Le Gal, in which a hair with the cylindrical granulate type of shaft is tipped by a smooth glandular cell.

3. Series *Acutipilae*, typified by *D. acutipilus* (Karst.) Sacc., with smooth-walled, pointed, hyaline hairs.

Tropical species tend to have elongated, multiseptate, fasciculate ascospores and for these a genus, *Dasyscyphella* Tranzschel, has been proposed but I doubt if it be possible even to separate them as a clear-cut series within the subgenus *Dasyscyphus*. To the latter belong:

Dasyscyphus acuum (A. & S. ex Fr.) Sac..
D. albidoroseus (Rehm) Dennis
D. albidulus Penz. & Sacc.
D. albidus (Penz. & Sacc.) Dennis
D. albocitrinus (Cooke) Sacc.
D. albopileatus (Cooke) Sacc.
D. apalus (Berk. & Br.) Dennis
D. apiculatus Dennis
D. arundinariae (Berk.) Sacc.
D. avellaneo-melleus (Starb.) Dennis
D. bambusae Rick
D. bambusinus (Bres.) Dennis
D. brasiliensis (Mont.) Le Gal
D. brevipilus Le Gal
D. callimorphus (Karst.) Sacc.
D. calosporus (Pat. & Gaill.) Dennis
D. calycioides Rehm
D. calyculiformis (Schum. ex Fr.) Rehm
D. candidus Rodway
D. carneolus (Sacc.) Sacc.
D. cassandrae (Tranzschel) Dennis
D. cerinus (Pers.) Fuck.
D. ciliaris (Schrad. ex Fr.) Sacc.
D. clandestinus (Bull. ex St. Amans) Fuck.
D. clavisporus Mouton

Dasyscyphus concinnus (Kirschst.) Dennis, *comb. nov.* (basionym, *Lachnum concinnum* Kirschst. *in* Ann. mycol., Berl. **36**: 384. 1938).

D. controversus (Cooke) Rehm
D. corticola (Massee) Dennis
D. diminutus (Rob.) Sacc.
D. dumorum (Rob.) Massee
D. dussii Dennis

Dasyscyphus eburneus (Kirschst.) Dennis, *comb. nov.* (basionym, *Lachnum eburneum* Kirschst. *in* Ann. mycol., Berl. **36**: 385. 1938).

D. ellisianus (Rehm) Sacc.

D. *emerici* (Berk. & Phill.) Sacc.
D. *enzenspergerianus* (P. Henn.) Dennis
D. *eriophori* (Quél.) Dennis
D. *espeletiae* Dennis
D. *fascicularis* (Vel.) Le Gal
D. *filiceus* Cooke & Phill.
D. *fimbriiferus* (Berk. & Curt.) Sacc.
D. *flavidulus* Rehm
D. *fugiens* (Bucknall) Massee
D. *fuscescens* (Pers. ex Fr.) S. F. Gray
D. *gaultheriae* (Ell. & Ev.) Sacc.
D. *glabrescens* (Cooke & Phill.) Sacc.
D. *grevillei* (Berk.) Massee
D. *hyalopus* (Cooke & Massee) Dennis
D. *imbecillis* (Karst.) Sacc.
D. *lachnodermus* (Berk.) Rehm
D. *lanariceps* (Cooke & Phill.) Sacc.
D. *lasseri* Dennis
D. *mapirianus* (Pat. & Gaill.) Dennis
D. *martini* Dennis
D. *melanophthalmus* Dennis
D. *minutissimus* (Crouan) Le Gal [= D. *rhytismatis* (Phill.) Sacc.]
D. *misellus* (Rob.) Höhn.
D. *nudipes* (Fuck.) Sacc.
D. *orinocoensis* (Pat. & Gaill.) Dennis
D. *palearum* (Desm.) Massee

Dasyscyphus palmae (Kanouse) Dennis, *comb. nov.* (basionym, *Dasyscyphella palmae* Kanouse *in* Mycologia **33**: 464. 1941)

D. *papyraceus* (Karst.) Sacc.
D. *pritzelianus* (P. Henn.) Dennis
D. *pteridicola* Dennis
D. *pteridis* (A. & S. ex Fr.) Massee
D. *pteridophyllus* Rodway
D. *pudibundus* (Quél.) Sacc.
D. *pudicellus* (Quél.) Sacc.
D. *pulverulentus* (Lib.) Sacc.
D. *pygmaeus* (Fr.) Sacc.

Dasyscyphus radotinense (Vel.) Dennis, *comb. nov.* (basionym, *Lachnum radotinense* Vel., Monogr. Discom. Bohem. **1**: 261. 1934)

D. *rehmii* (Staritz) Sacc.
D. *rhaphidophorus* (Berk. & Curt.) Dennis
D. *rhodoleucus* (Sacc.) Sacc.
D. *roridus* (Wallr.) Sacc.

D. salicariae Rehm
D. schroeterianus (Rehm) Dennis
D. singerianus Dennis
D. soppittii Massee
D. subcorticalis (Pat.) Dennis
D. sulphurellus (Peck) Sacc. [= *D. cruciferus* (Phill.) Sacc.]
D. sydowii Dennis
D. uleanus Dennis
D. ulei (Wint.) Sacc.
D. varians Rehm
D. virginellus (Cooke) Sacc.
D. virgineus S. F. Gray

Of these *D. calyculiformis*, *D. cerinus*, *D. pulverulentus* and *D. ulei* are somewhat anomalous in possessing hairs with coloured sap but in structure of the hair they appear to belong here rather than with subgenus *Belonidium*. *Dasyscyphus acuum* is a greatly reduced species for which a separate generic name is available, *Clavidisculum acuum* (A. & S. ex Fr.) Kirschstein (*1938:* 379).

Series *Bicolores* includes *D. bicolor* (Bull. ex St. Amans) Fuck, *D. capitatus* (Peck) Le Gal, *D. patulus* (Pers. ex Fr.) S. F. Gray and *D. scabro-villosus* (Phill.) Sacc (= *D. bicolor* var. *indicus* Müller & Dennis).

Series *Niveae* includes *D. crystallinus* (Fuck.) Sacc., *D. distinguendus* (Karst.) Sacc., *D. dryinus* (Karst.) Sacc. and *D. niveus* (Hedw. ex Fr.) Sacc.

Series *Acutipilae* includes *D. acutipilus* (Karst.) Sacc., *D. albotestaceus* (Desm.) Massee, *D. laetius* (Karst.) Sacc. and probably *D. andinus* (Pat.) Dennis, though this approaches subgenus *Belonidium* in its ascospore characters.

Subgenus **Belonidium** (Mont. & Dur.) Dennis, *stat. nov.* (basionym, *Belonidium* Mont. & Dur., Fl. Alger. *tab. 28 fig. 8.* ?1846).

Though too closely linked with species of subgenus *Dasyscyphus* to justify reviving the old genus *Lachnella* auct. non Fries this group of species seems to me a rather natural one fairly easily recognised even if difficult to define logically. It differs from *Perrotia* in its lanceolate paraphyses. The species included are:

Dasyscyphus aeruginosus (Mont. & Dur.) Dennis, *comb. nov.* (basionym, *Belonidium aeruginosum* Mont. & Dur., Fl. Alger. *tab. 28 fig. 8.* ?1846)

Dasyscyphus albolabra (Ell. & Ev.) Dennis, *comb. nov.* (basionym, *Lachnella albolabra* Ell. & Ev. *in* Bull. Torrey bot. Club **24**: 467. 1897)

Dasyscyphus columbinus (Kalchbr. & Cooke) Dennis, *comb. nov.* (basionym, *Peziza columbinus* Kalchbr. & Cooke *in* Grevillea **10**: 144. 1882)

D. corticalis (Pers. ex Fr.) Massee
D. elegantulus (*Karst.*) Rehm

Dasyscyphus fuscus (Müller & Dennis) Dennis, *comb. nov.* (basionym, *Perrotia fusca* Müller & Dennis *in* Sydowia **13**: 46. 1959)

Dasyscyphus himalayensis (Müller & Dennis) Dennis, *comb. nov.* (basionym, *Perrotia himalayensis* Müller & Dennis *in* Sydowia **13**: 48. 1959)

Dasyscyphus lonicerae (A. & S. ex Fr.) Dennis, *comb. nov.* (basionym, *Peziza lonicera* A. & S. *ex* Fr., Syst. mycol. **2**: 115. 1822)

D. mollissimus (Lasch) Dennis

D. sulphureus (Pers.) Massee

D. triseptatus Dennis.

Subgenus *Trichopezizella.*

The type species is *Dasyscyphus nidulus* (Schmidt & Kunze) Massee, other species are **Dasyscyphus badiellus** (Karst.) Dennis, *comb. nov.* (basionym, *Peziza badiella* Karst. *in* Not. Sällsk. Fauna Fl. fennica **10**: 201. 1869), *D. barbatus* (Kunze) Massee, *D. horridulus* (Desm.) Massee, **Dasyscyphus hystriculus** (Karst.) Dennis, *comb. nov.* (basionym, *Lachnum hystriculum* Karst., Myc. fenn. **1** *in* Bidr. Kánn. Finl. Nat. Folk **19**: 182. 1871) and *D. relicinus* (Fr.) Boud.

DIPLOCARPA Massee, Brit. Fungus-Fl. **4**: 307. 1895.

There is a single species, *D. bloxami* (Berk.) Seaver (*1937*).

PSILACHNUM Höhnel *in* Mitt. bot. Inst. techn. Hochsch. Wien **3**: 73. 1926.

Von Höhnel's genus is distinguished by its apothecia with rudimentary or narrowly cylindrical, obtuse, thinwalled hairs free from the external granulation so characteristic of those of *Dasyscyphus* species. The type species is *P. lateritio-album* (Karst.) Höhn. and he referred to it also *P. lanceolato-paraphysatum* (Rehm) Höhn., which I have not seen, *P. suspectum* (Rehm) Höhn. and *P. granulosellum* Höhn. [*Urceolella chionea* (Massee & Crossland) Rehm sensu Rehm non Massee & Crossland]. I would refer here also **Psilachnum helotioides** (Rehm) Dennis, *comb. nov.* (basionym, *Lachnum helotioides* Rehm *in* Rabenh. Krypt.-Fl. **1** (3): 884. 1893) and **Psilachnum inquilinum** (Karst.) Dennis, *comb. nov.* (basionym, *Helotium inquilinum* Karst., Myc. fenn. **1** *in* Bidr. Känn. Finl. Nat. Folk. **19**: 147. 1871), also *Lachnum acutum* Vel. (Mon. Discom. Bohem. **1**: 254. 1934) if I have interpreted it correctly. Von Höhnel referred *P. inquilinum* to *Dyslachnum* Clements but that was based on *Peziza mollisssima* Lasch, with quite different hairs.

PERROTIA Boud. *in* Bull. Soc. mycol. France **17**: 24. 1901.

The type species is *P. flammea* (A. & S. ex Fr.) Boud. I have discussed this genus in "Kew Bulletin" (*1958*: 323) and there transferred to it two Australian species, *P. aurea* (Massee) Dennis and *P. lutea* (Phill.) Dennis. I would now also transfer to *Perrotia* the following: **Perrotia atrocitrina** (Berk. & Br.) Dennis, *comb. nov.* [basionym, *Peziza atrocitrina* Berk. & Br. *in* J. Linn. Soc. (Bot.) **14**: 106. 1873], **Perrotia phragmiticola** (P. Henn. & Ploettner) Dennis, *comb. nov.* (basionym, *Dasyscypha phragmiticola* P. Henn. & Ploettner *in* Verh. bot. Ver. Prov. Brandenburg **41**: 97. 1899) and **Perrotia succinea** (Phill.) Dennis, *comb. nov.* (basionym, *Peziza succina* Phill. *in* Grevillea **5**: 116. 1877).

TRICHODISCUS Kirschst. *in* Verh. bot. Ver. Prov. Brandenburg **46**: 25. 1924.

The type species is *T. prasinus* (Quel.) Kirschst. (l.c.) and a second species recently described is *T. sedi* E. Müller & *al.* Kirschstein referred also to this genus two other German species and three from Java, none of which I have seen. Judging from the published figures I doubt if the Javanese species be congeneric with *T. prasinus*. *Trichodiscus marchicus* (Kirschst.) Kirschst. seems to be the same as *Peziza trichodea* Phill. & Plowr.

Another possible candidate is *Trichopeziza virescentula* Mouton but I have no note on the excipular structure of this fungus. *Phialea subciboria* Rodway may perhaps also fall in *Trichodiscus* but its hairs are not pointed and have a finely granulated surface like those of *D. elegantulus* (Karst.) Rehm.

LACHNELLULA Karst. *in* Medd. Soc. Fauna Fl. fennica **11**: 138. 1884.

Trichoscyphella Nannfeldt *in* Nov. Acta Soc. Sci. upsal., Ser. 4, **8**: 298. 1932.

The diagnosis of *Lachnellula* reads simply "Est. *Lachnella* sporis sphaeroideis", with a reference to the type species "*L. chrysophthalma* (Pers.) Karst." and the genus has, in fact, been distinguished from *Trichoscyphella* solely by its spherical ascospores. Nannfeldt has also shown that the true *Peziza chrysophthalma* Pers. was actually a '*Trichoscyphella*' and that the correct name of the type species of *Lachnellula* is *L. suecica* (Fuck.) Nannfeldt.

The type species of *Trichoscyphella* is *T. calycina* (Schum. ex Fr.) Nannfeldt, with small fusoid ascospores. It is difficult to distinguish these two genera because there are a number of species with minute subglobose or ovoid ascospores and the most logical course seems to be to unite them. This unfortunately involves changing the names of a few fungi of economic importance but it has the incidental advantage of eliminating the epithet 'calycina Schum. ex Fr.', the correct application of which has always been doubtful.

The typical species of *Lachnellula* are saprophytes or parasites on conifers, with yellow discs and white excipular hairs but a few coniferous species have brown hairs and red or brownish discs. The genus may also be extended to cover a few fungi of nonconiferous substrata which seem more akin to *Lachnellula* than to any other genus known to me. Of these, *L. pulveracea*, at least, is accompanied by a microconidial state similar to that described for *L. willkommii* (Hartig) Dennis.

To *Lachnellula* as emended above I refer:

Lachnellula abietis (Karst.) Dennis, *comb. nov.* (basionym, *Helotium abietis* Karst., Mycol. fennica **1** *in* Bidr. Känn. Finl. Nat. Folk **19**: 154. 1871)

Lachnellula agassizii (Berk. & Curt.) Dennis, *comb. nov.* (basionym, *Peziza agassizii* Berk. & Curt. *in* Grevillea **1**: 5. 1872)

Lachnellula arida (Phill.) Dennis, *comb. nov.* (basionym, *Peziza arida* Phill. *in* Grevillea **5**: 117. 1887)

L. calycina Sacc.

Lachnellula ciliata (G. G. Hahn) Dennis, *comb. nov.* (basionym, *Dasyscypha ciliata* G. G. Hahn *in* Mycologia **32**: 141. 1940)

Laçhnellula flavovirens (Bres.) Dennis, *comb. nov.* (basionym, *Dasyscypha flavovirens* Bres., Fungi tridentini **1**: 92. 1887)

Lachnellula fuscosanguinea (Rehm) Dennis, *comb. nov.* (basionym, *Dasyscypha fuscosanguinea* Rehm *in* Ber. naturh. Ver. Augsburg **26**: 30. 1881)

Lachnellula gallica (Karst. & Har.) Dennis, *comb. nov.* (basionym, *Lachnella gallica* Karst. & Har. *in* Rev. mycol. **12**: 170. 1890)

Lachnellula hahniana (Seaver) Dennis, *comb. nov.* (basionym, *Lachnella hahniana* Seaver, N. Amer. Cup Fungi, Inoperc. 245. 1951)

Lachnellula inspersa (Berk. & Curt.) Dennis, *comb. nov.* (basionym, *Peziza inspersa* Berk. & Curt. *in* J. Linn. Soc. (Bot.) **10**: 368. 1868)

Lachnellula phyllocladi (Dennis) Dennis, *comb. nov.* (basionym, *Trichoscyphella phyllocladi* Dennis *in* Kew Bull. **15**: 302.

Lachnellula pini (Brunch.) Dennis, *comb. nov.* (basionym, *Lachnella pini* Brunch. *in* Bergens Mus. Aarbog **8**: 8. 1911)

Lachnellula pseudofarinacea (Crouan) Dennis, *comb. nov.* (basionym, *Peziza pseudofarinacea* Crouan, Fl. Finistère 52. 1867)

Lachnellula pseudotsugae (G. G. Hahn) Dennis, *comb. nov.* (basionym, *Dasyscypha pseudotsugae* G. G. Hahn *in* Mycologia **32**: 118. 1941) 138

Lachnellula pulveracea (A. & S. ex Fr.) Dennis, *comb. nov.* (basionym, *Cenangium pulveraceum* A. & S. *ex* Fr., Syst. mycol. **2**: 181. 1822)

L. resinaria (Cooke & Phill.) Rehm

Lachnellula subtilissima (Cooke) Dennis, *comb. nov.* (basionym, *Peziza subtilissima* Cooke *in* Grevillea **3**: 121. 1871)

Lachnellula tricolor (Sow. ex Fr.) Dennis, *comb. nov.* (basionym, *Peziza tricolor* Sow. *ex* Fr., Syst. mycol. **2**: 134. 1822)

Lachnellula willkommii (Hartig) Dennis, *comb. nov.* (basionym, *Peziza willkommii* Hartig, Wicht. Krankh. Waldbaume 98. 1874)

Trichoscyphella calycina (Schum. ex Fr.) Nannfeldt = *Lachnellula subtilissima* as it is antedated in *Lachnella* by *L. calycina* Sacc. *Lachnellula schumannii* Rehm, *L. rehmii* Ferdinandsen & Jørgensen and *Trichoscypha vuillemini* Boud. are other names for *L. calycina* Sacc.

LASIOBELONIUM (Sacc.) Sacc. *in* Syll. Fung. **14**: 789. 1899.

At the place of publication cited there is no generic diagnosis. Instead a single species is described, *L. subflavidum* Ell. & Ev., with reference to its place of publication (*1897*), and also a reference to Saccardo's subgenus *Lasiobelonium* of *Belonidium* Saccardo, *1889*: 502). Clements and Shear (*1931*) accepted the genus as based on the subgenus of 1889 and selected as lectotype one of the three species there referred to it, viz. *Belonidium amoenum* Speg., on dead culms of *Rostkovia grandiflora* (Juncaceae) in Staten Island. The type material of this in Spegazzini's herbarium is in poor condition but appears to me to have smooth hairs and filiform paraphyses and thus to be distinct from *Dasyscyphus apalus* (Berk. & Br.) Dennis, which one might expect to find on this host family. If this be correct the genus, so typified, forms a convenient home for a few species with cylindrical paraphyses, smooth hyaline hairs and elongated ascospores. These include *L. aquilinellum* Höhn. and **Lasiobelonium miniopsis** (J. B. Ell.) Dennis, *comb. nov.* (basionym, *Peziza miniopsis* J. B. Ell. *in* Bull. Torrey bot. Club **8**: 66. 1881).

ZOELLNERIA Vel., Mon. Discom. Bohem. **1**: 298. 1934.

Lectotype, *Z. rosarum* Vel. (l.c.). I have redescribed this species in "Kew Bulletin" (*1959*) and on page 324 (*1958*) of the same volume have transferred to the genus two Australian species, *Z. eucalypti* (Berk.) Dennis and *Z. clelandii* (Hansford) Dennis.

In considering the affinities of the above genera it is clear that *Dasyscyphus*, *Psilachnum* and probably *Diplocarpa* belong to the Hyaloscyphaceae trib. Lachneae. I would place *Perrotia* beside *Lachnellula* in the Trichoscyphelloideae but transfer the subfamily from the Helotiaceae to the Hyaloscyphaceae. *Zoellneria* I suspect belongs to Helotiaceae or possibly even to Sclerotiniaceae near *Rutstroemia*. Kirschstein referred his genus *Trichodiscus* to Mollisiaceae, i.e. Dermateaceae subfam. Mollisioideae of Nannfeldt and I think he was right, in spite of the granules on the hairs. Before placing *Lasiobelonium* I would like to see better material of the lectotype.

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In view of the importance attached above to lanceolate paraphyses of the Hyaloscyphaceae it may be worth while briefly to consider how much significance attaches to their occurrence in other families of Helotiales. It does not follow that a character accorded generic value in one family will be of equal importance in a different context. Nevertheless some authors have been sufficiently impressed by the lanceolate paraphyses of certain Dermateaceae to propose on their account several small genera, most of which have not been generally accepted.

In Helotiaceae one finds paraphyses of this kind in *Phialea* (Fr.) Gill., most conspicuously in *P. incertella* Rehm on leaves of *Koeleria*. There would seem to be a case for segregating in a separate genus the small group of dark coloured species of *Phialea* on Gramineae but they are not fungi with which I am very familiar and I do not propose to do so here.

Sometimes placed in a genus referred to Helotiaceae are the very peculiar *Heterosphaeria chlorospleniella* (Rehm) Rehm and *H. oxyparaphysata* (Rehm) Rehm, both at some time placed in *Lachnum* or *Lachnella* but both referred by von Höhnel (*1917*) to his genus *Pyrenopezizopsis*, without printing the necessary combinations. *Pyrenopezizopsis* Höhn. was based on *Lachnum noppeneyanum* Feltgen and it is therefore most unfortunate that M. Reichling, who has kindly searched for the type in the Feltgen herbarium at Luxembourg had to report that though the packet so labelled by Feltgen still exists there it is empty. According to Feltgen his fungus was on *Quercus* twigs but von Höhnel asserted that the type, still extant in his day, was on *Rubus* and in this Rehm followed him. I see no real structural difference between

Trichopeziza chlorospleniella Rehm and *Cenangiopsis aureola* (Rabenh.) Rehm and von Höhnel was of a similar opinion regarding *L. noppeneyanum*. Rehm has already transferred *L. noppeneyanum* to *Cenangiopsis* Rehm and it appears to me that this whole group of species is best placed there though, admittedly, *C. quercicola* (Romell) Rehm which Nannfeldt selected as type species of *Cenangiopsis* has a much more scurfy excipulum than the others, more like that of an *Encoelia*. If this view be adopted *Cenangiopsis* contains the following European species:

Cenangopsis quercicola (Romell) Rehm, the type species, on *Quercus*, with ascospores 7.5–9 × 2–3 μ.

C. noppeneyanum (Feltg.) Rehm, on *Rubus* (?), with ascospores 7–8 × 2–3 μ.

C. aureola (Rabenh.) Rehm, on *Eupatorium*, with ascospores 12–15 × 3–5 μ.

Cenangiopsis oxyparaphysata (Rehm) Dennis, *comb. nov.* [basionym, *Mollisia oxyparaphysata* Rehm *in* Rabenh. Krypt.-Fl. **1** (3): 535. 1891], on Compositae, with ascospores 7–10 × 2–2.5 μ.

Cenangiopsis chlorospleniella (Rehm) Dennis, *comb. nov.* (basionym, *Trichopeziza chlorospleniella* Rehm *in* Hedwigia **21**: 100. 1882), on *Aconitum*, with ascospores 6–8 × 1–2 μ.

The two last named are possibly not distinct and not host limited for Dr. E. Müller has sent me a very similar fungus on *Polygonatum* stems from the Alps.

If all these belong to Dermateaceae then so, I think, does *Heterosphaeria*. A more obviously Dermateaceous genus with lanceolate paraphyses is *Mollisiopsis* Rehm (*1908:* 315) with type species *M. subcinerea* Rehm, on dead *Thalictrum* stems in North America. Here the structure apart from the paraphyses is exactly that of a *Mollisia* and Nannfeldt is certainly mistaken in uniting *Mollisiopsis* with *Lachnum*. I have not seen the later species *M. lachnoides* Rehm, on stems of *Chamaenerium angustifolium*, but according to Nannfeldt the third species, *M. euparaphysata* (Schroeter) Rehm, on *Eriophorum* and *Juncus*, is a synonym of *Hysteropezizella diminuens* (Karst.) Nannfeldt, which is a *Hysterostegiella*. Presumably *Mollisia lanceolata* Gremmen (*1956*) on *Ulmaria palustris*, also belongs in *Mollisiopsis* and possibly also *Pyrenopeziza heteroparaphysata* Grelet & Crozals, on *Urtica*, if the lanceolate paraphyses were not immature asci.

Von Höhnel's genus *Hysterostegiella* was differentiated from *Hysteropezizella* by its lanceolate paraphyses. In accordance with his policy of treating hymenial characters as of subordinate value Nannfeldt united these two genera under the latter name. I would be disposed to keep them distinct but, on the other hand, there seems little but the wide difference in substrate to separate *Stegopeziza* Höhn., based on *Naevia lauri* Cald. on dead leaves of *Laurus nobilis*, from *Hysterostegiella*.

* * *

A genus *Belonidium* has remained in use up to quite recent years by mycologists still fascinated by Saccardo's delusively simple system of Discomycete genera differentiated on a basis of ascospore shape and septation. Now that the name has been eliminated it is necessary to consider how to dispose of the elements of this *Belonidium* auct. non Mont. & Dur. The fate of the species added by De Notaris has been indicated above. *Belonidium pruinosum* (Jerd.) Massee has become the type species of *Polydesmia* Boud. *Belonidium jerdoni* Massee is *Pseudohelotium pineti* (Batsch ex Fr.) Fuck. The fungus called by British authors *Belonidium minutissimum* (Batsch ex Berk. & Br.) Phill. is *Strossmayeria basitricha* (Sacc.) Dennis. A group of species with dark coloured mollisioid apothecia with elongated multiseptate ascospores can be accomodated in *Belonopsis* (Sacc.) Rehm, as already shown by Nannfeldt. Combinations in *Belonopsis* are apparently still required for:

Belonopsis pullum (Phill. & Keith) Dennis, *comb. nov.* (basionym, *Belonidium pullum* Phill. & Keith *in* Grevillea **6**: 75. 1877).

Belonopsis rhenopalaticum (Rehm) Dennis, *comb. nov.* [basionym, *Belonidium rhenopalaticum* Rehm *in* Rabenh. Krypt. Fl. **1** (3): 565. 1877], which is perhaps the same as *Mollisia ventosa* subsp. *mediella* Karst. (*in* Medd. Soc. Fauna Fl. fennica **9**: 111. 1883).

After all the above have been eliminated, however, there remain a number of species for which it is less easy to find appropriate genera.

One of these fungi, on rotten, decorticated wood of *Fagus*, has lain undetermined in Kew herbarium since 1925 but it seems to be identical with, or very closely allied to, *Belonidium ochraceum* Grelet & Crozals. The yellow sessile apothecia are urceolate, with minutely pruinose surface and concave disc 0.5 mm diameter. The excipulum is composed of thinwalled prismatic cells, running out into short, thinwalled, obtuse, cylindrical hairs, with finely granulate walls. The clavate asci, 75–85 × 8–10 μ, have the pore blued by Melzer's reagent and contain eight biseriate, elliptic-fusoid, straight or slightly curved, hyaline ascospores, 15–20 × 3 μ, which ultimately become three-septate. The paraphyses are filiform, enlarged to 2 μ at the obtusely rounded tip. There is no change of colour with ammonia.

In structure, habit and stature this is a *Cistella* Quél. emend. Nannfeldt but the recognised species of that genus consistently have small unicellular ascospores. Moreover *Cistella* Quél. 1886 is a later homonym of *Cistella* Blume 1825, though the latter is a moribund genus of Orchidaceae which has never been taken up, so that there would be no serious objection to conservation of Quélet's genus. On the other hand if the latter were extended to include species on coniferous needles the name *Clavidisculum* Kirschstein (*1938:* 379) might be acceptable, though I have chosen above to interpret the species of *Clavidisculum* as extremely reduced species of *Dasyscyphus* subgen. *Dasyscyphus*. An alternative genus for *B. ochraceum*, however, is *Calycellina* von Höhnel 1918, in which the anatomy is again similar and the ascospore shape and tendency to septation more so but the recognised species occur on dead leaves. In our complete ignorance of the life histories of these minute Helotiales it is difficult to assess the importance to be attached to the kind of substrate. As *Cistella* remains at present an illegitimate name and the ascospores agree better with those of *Calycellina* it appears best to refer *B. ochraceum* to the latter genus, as **Calycellina ochracea** (Grel. & Croz.) Dennis, *comb. nov.* (basionym, *Belonidium* *ochraceum* Grelet & Crozals *in* Bull. Soc. mycol. France **44**: 336. 1928), in spite of its occurrence on rotten wood.

A rather more difficult problem is that of *Belonidium clarkei* Massee & Crossland (*1901*). Here pulvinate sessile apothecia, light greenish yellow when fresh but drying greenish black, are produced on the surface of damp rotten wood, sometimes at least, of *Quercus*. The general appearance, with convex disc and downcurved margin, is suspiciously like that of some lichen apothecia but there seems to be no associated thallus, no gonidia in the apothecial base and no blue or red reaction of the hymenium with iodine. The flesh is composed throughout of soft, almost colourless, somewhat agglutinated hyphae, closely woven in the flesh, undulating but more or less parallel at right angles to the surface through most of the excipulum, more slender and curved upwards nearly parallel with the surface towards the obtusely rounded margin. The asci measure 90 × 8 μ, with the pore not blued by iodine, and contain eight biseriate, narrowly elliptic-cylindric, straight or slightly curved, 3-septate ascospores, 12–15 × 2.5–3 μ. The paraphyses are filiform. Judging by the description *Belonidium viridi-atrum* Sacc. & Fautr. is an earlier name for the same fungus. The structure is distinctly reminiscent of *Calycella* but the ascospores are not and with some hesitation, perhaps still with a hang over from the Saccardo era, I refer the species to *Strossmayeria* S. Schulz. as **Strossmayeria viridi-atra** (Sacc. & Fautr.) Dennis, *comb. nov.* (basionym, *Belonidium viridi-atrum* Sacc. & Fautr. *in* Bull. Soc. mycol. France **16**: 22. 1900). Then probably *Belonidium sphenosporum* Kirschst. (*in* Ann. mycol., Berl. **36**: 375. 1938) is also a *Strossmayeria*, **Strossmayeria sphenospora** (Kirschst.) Dennis, *comb. nov.* On the other hand *B. funiculatum* Kirschst., (*in* Ann. mycol., Berl. **36**: 376, 1938), seems to be a species of *Allophylaria* P. Karst., **Allophyllaria funiculata** (Kirschst.) Dennis, *comb. nov.* It may be noted that the ascospore may become three-septate in the type species, *A. sublicoides* (Karst.) Nannfeldt.

The type of *Belonidium incanescens* Kirschstein (*1939*) was apparently lost, at least Dr. J. Kohlmeyer tells me it cannot be found in Kirschstein's herbarium at Berlin. It grew on pine cones and it seems possible it may have been a state of *Pseudohelotium pineti*, though the ascospores were described as a little broader than is usual in that species.

A species with still another kind of structure is *Belonidium parksii* Cash. Here the receptacular anatomy is like that of *Cenangium*, with subparallel hyaline hyphae bearing chains of dark brown, pyriform to globose, thinwalled cells at the surface but the asci are very different, with large pore plug stained deep blue by iodine while the ascospores are from one to three septate. Near the margin the chains of excipular cells run out into short, cylindrical, dark brown hairs. The paraphyses are cylindrical with rounded tips, not capitate as in *Cenangium*. *Belonidium parksii* bears a marked resemblance to *Niptera duplex* Starb. which Starback (*1895*) was at first disposed to make the type of a genus, *Nipterella*, but eventually decided not to do so. It appears to me best to validate *Nipterella* as a genus of Helotiaceae subfam. Encoelioideae, distinguished from *Cenangium* by the iodine reaction of its asci and by the septate ascospores, from *Cenangiopsis* by the cylindrical, not lanceolate, paraphyses and from *Heterosphaeria* by having more than one layer of dark cells on the outside of the receptacle and by the septate ascospores.

Nipterella Starbäck *ex* Dennis, *gen. nov.*

Apotheciis subsuperficialibus, sessilibus, cupulatis; hypothecio crasso, homogeneo filamentis hyalinis composito; excipulo distincto, fusco, grosse celluloso-parenchymatico. Ascis octosporis, inoperculatis, apice jodo coerulescentibus; ascosporis hyalinis, 1–3-septatis; paraphysibus filiformibus. — Typus: *Niptera duplex* Starbäck.

Nipterella duplex (Starbäck) Dennis, *comb. nov.* [basionym, *Niptera duplex* Starbäck *in* Bihang svensk Vet.-Akad. Handl. (Afd. 3) **21** (5): 27. 1895]. (Fig. 5b).

On dead wood of *Juniperus* in Sweden, ascospores 9–16 × 2.5–4 μ, becoming 1-septate.

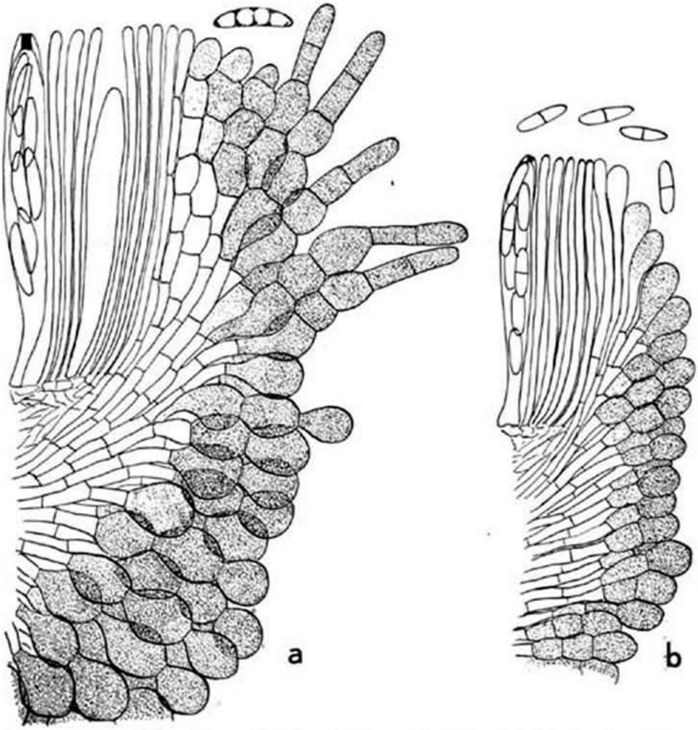

Fig. 5. — a. *Nipterella parksii* (× 660). — b. *Nipterella duplex* (× 660).

Nipterella parksii (Cash) Dennis, *comb. nov.* (basionym, *Belonidium parksii* Cash *in* Mycologia **28**: 248. 1936) (Fig. 5a).

On dead twigs of Ericaceae, Cornaceae, Cupuliferae, Rhamnaceae, Rosaceae in western North America, ascospores 11–17 × 2–4 μ, 1–3-septate.

There remain a few tropical fungi with apothecia resembling those commonly referred to *Helotium* Pers. ex St. Amans 1821 (non *Helotium* Tode ex Fries 1825), but with multiseptate ascospores. They have not the phialeoid structure of *Belonioscypha* Rehm but it would appear at first sight possible to refer them to *Podobelonium* (Sacc.) Sacc. This, however, was founded on four species, two of which have been referred to *Belonioscypha*, one to *Strossmayeria*, while the fourth, *Belonidium capense* (Kalchbr. & Cooke) Sacc., has ascospores which are multiguttulate but appear to me consistently nonseptate. In any case as ascospore septation is not an entirely reliable character there would seem to be little justification for recognising a genus parallel with *Belonioscypha* but with helotioid excipulum. The problem then becomes involved in the larger issue of the dismemberment of the comprehensive genus *Helotium* auct. Here the type species, *H. acicularis*, falls in the smallest segregate, already recognised as such by Boudier but under the name *Cudoniella* Sacc. which he mended in *1907* by in effect selecting as lectotype *Cudonia queletia* Fr. "Le type est fondé sur l'*Helvella acicularia* de Bulliard qui est identique au *Cudonia queletii* de Fries qui pousse sur les vieilles souches pourries." To this restricted genus belong *H. aciculare* Pers., *H. clavus* (A. & S. ex Fr.) Gillet and *H. vernalis* Dennis. *Helotium clavus* is the type species of *Haplocybe* Clements (*1909*), if the commonly accepted synonym be correct. *Haplocybe* was perhaps illegitimate from the outset as it was rather obscurely stated to include *Moellerodiscus* Henn. 1902, perhaps because the latter name was too difficult for Clements to pronounce.

For the bulk of the species currently referred to *Helotium* Pers. the obvious generic name would appear to be *Hymenoscyphus* S. F. Gray, if this can be typified by *Peziza fructigena* (Bull. ex Merat) S. F. Gray. In later years this genus was taken up in a rather comprehensive sense by Phillips and by Schroeter and emended as a subgenus of *Helotium* Pers. by Rehm. It was also unfortunately adopted in a comprehensive sense by O. Kuntze who printed in it a large number of combinations some of which prove objectionable homonyms. As Rehm admits for his subgenus *Hymenoscypha* of *Helotium*, "Sporen . . . später durch Quertheilung zwei- bis vierzellig" there would seem to be no objection to admitting to *Hymenoscyphus:*

Hymenoscyphus lasiopodium (Pat.) Dennis, *comb. nov.* (basionym, *Belonidium lasiopodium* Pat. *in* Bull. Soc. mycol. France **16**: 184. 1900) = *Belonidium hirtipes* A. L. Smith 1901 but not *Hymenoscyphus hirtipes* (Mout. & Sacc.) O.K.

Hymenoscyphus sclerogenus (Berk. & Curt.) Dennis, *comb. nov.* [basionym, *Peziza sclerogena* Berk. & Curt. *in* J. Linn. Soc. (Bot.), Lond. **10**: 369. 1868].

Hymenoscyphus musicola (Dennis) Dennis, *comb. nov.* [basionym, *Belonidium sclerogenum* (Berk. & Curt.) Sacc. var. *musicola* Dennis *in* Kew. Bull. **13**: 461. 1959].

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ON XYLARIA SPATHULATA BERK. & BR.

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The Hague

In the Malayan region an interesting ascomycete occurs, which in general appearance resembles a species of *Xylaria*. It was described from Java by Penzig & Saccardo as *Xylaria polysticha* (3) and again some years later as *Xylaria xanthophaea* (4). This may be explained by the fact, that the first name was given to old, discoloured material, whereas the second name refers to fresh well developed specimens exhibiting the typical brown colour.

During my long stay in Indonesia I had ample opportunity to collect and study this species, which grows especially in the mountainous regions. One of the most striking characters is the consistency of the stromata, which are conspicuously fleshy and not hard as in *Xylaria*. Penzig & Saccardo in describing the fungus state in the diagnosis of *Xylaria polysticha* that it is "carnoso-coriacea" and in that of *Xylaria xanthophaea* (described from the fresh material) they use the expression "carnosulo-molli". The perithecia are arranged in the stroma in several layers and the asci and spores are extremely small. The ascospores are typical almond-shaped and have a minute germ-pore at the pointed end. All these features clearly indicate, that this fungus is not a species of *Xylaria* and not even a member of the Xylariaceae. In this family the consistency of the stromata is tough and the ascospores are provided with a long, lateral germ-slit. This led me (1) to establish the family Sarcostromellaceae with the genus *Sarcostromella* to accomodate such fungi.

Recently Dennis (2) mentioned an older name for the Java species, viz. *Xylaria spathulata* Berk. & Br., based on material collected in Ceylon.

Through the kindness of the Director of the Herbarium, Royal Botanic Gardens, Kew, I was able to study the type of this species and found it completely identical with *Xylaria polysticha*.

Dennis, furthermore, thinks that the new genus is superfluous and that the fungus can be placed in *Peridoxylon* Shear. However, it does not at all fit this genus, which was based by Shear on a Xylariaceous fungus, formerly described as a species of *Hypoxylon*, having the perithecia disposed in several layers in a fleshy to coriaceous stroma-tissue. Between the asci occur filiform paraphyses which are lacking in *Sarcostromella*. But the most prominent character of *Peridoxylon* consists of what Shear called the peridium. This is a layer covering the immature stromata and gradually flaking away in the mature fruitbodies. Such a layer is never formed in *Sarcostromella*. Therefore I prefer to maintain the family Sarcostromellaceae with the single genus *Sarcostromella*. However, the name of the type species has to be changed; the full synonymy now is as follows:

Sarcostromella spathulata (Berk. & Br.) Boedijn, *comb. nov.*

Xylaria spathulata Berk. & Br. *in* J. Linn. Soc. (Bot.) **14**: 118. 1873. — *Sarcoxylon spathulata* (Berk. & Br.) Petch *in* Ann. R. bot. Gdns Peradeniya **8**: 145. 1924. — *Peridoxylon spathulata* (Berk. & Br.) Dennis *in* Bull. Jard. bot. Bruxelles **31**: 150. 1961.

Xylaria polysticha Penzig & Sacc. *in* Malpighia **11**: 500. 1897. — *Sarcostromella polysticha* (Penzig & Sacc.) Boedijn *in* Persoonia **1**: 16. 1959.

Xylaria xanthophaea Penzig & Sacc. *in* Malpighia **15**: 226. 1902.

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(3) PENZIG, O. & P. A. SACCARDO (1897). Diagnoses fungorum novorum in insula Java collectorum. Series secunda. *In* Malpighia **11**: 500–501.

(4) —— (1902). Ibid. Series tertia. *In* Malpighia **15**: 226.

Correction

In my paper, entitled "Myriangiales from Indonesia" (*in* Persoonia **2**: 63–75. 1962), the name *Micularia merremiae* Boedijn was not validly published because no type collection was indicated. This omission is herewith corrected: **Micularia merremiae** Boedijn *in* Persoonia **2**: 67. 1962, *nov. sp.*, typus, Java, Hortus Bogoriensis, June 1953, leg. Boedijn (in herb. Boedijn).

The name *Elsinoe fici* Boedijn *in* Persoonia **2**: 70. 1962 was validly published because it was based on a single collection (monotypus) indicated as "Java, Hortus Bogoriensis, July 1953, Boedijn", which is also preserved in my herbarium.

K. B. BOEDIJN

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STUDIES ON DISCOMYCETES—I
Types of species of Ascobolus and Saccobolus in Spegazzini's herbarium

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The type collections of *Ascobolus laevisporus* Speg., *A. stictoideus* Speg. and *Saccobolus aparaphysatus* Speg. are redescribed. *Ascobolus immersus* var. *andinus* Speg. is reduced to the synonymy of *A. immersus*, and *Saccobolus aparaphysatus* Speg. to that of *S. depauperatus*, while *A. megalospermus* Speg., *A. viridis* subsp. *microspermus* Speg. and *A. hansenianus* Speg. are regarded as nomina inquirenda.

The present paper, which is the first of a series of studies on Discomycetes, is concerned with type material of *Ascobolus* and *Saccobolus* from Spegazzini's herbarium, deposited at La Plata (LPS). The author is indebted to Dr. J. C. Lindquist, for sending the herbarium specimens on loan.

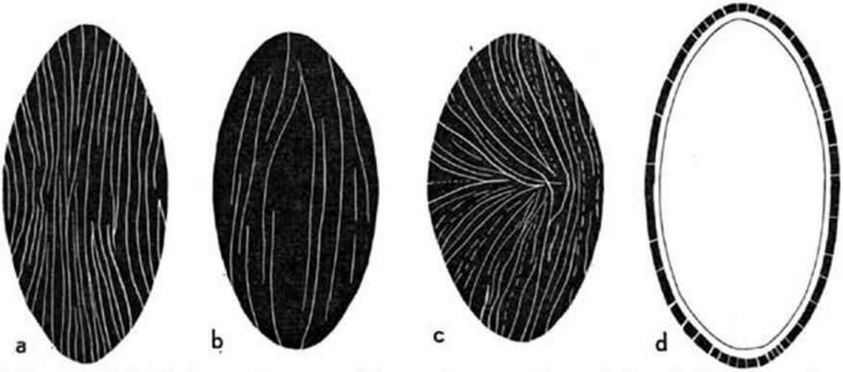

Fig. 1. *Ascobolus laevisporus*. Ascospores (× 2000). — a–c. Lateral view. d. Optical section.

The work for this paper was facilitated by a grant from the Netherlands Organization for the Advancement of Pure Research (Z.W.O.).

Ascobolus laevisporus Speg. — Fig. 1

Ascobolus laevisporus Speg. *in* An. Mus. nac. Buenos Aires **6**: 307. 1899. — Holotype: LPS 26117.

Apothecia scattered or in small coherent groups, superficial, sessile, 3–8 mm in diameter. Receptacle at first globular, then expanding, and becoming scutellate, externally coarsely white-furfuraceous, greenish; margin acute, more or less denticulate. Disk slightly concave or flat, becoming dirty greenish, the surface becoming dotted with the protruding ends of ripe asci. Hymenium about 175 μ thick. Hypothecium 20–25 μ thick. Flesh about 270 μ thick, of subglobular cells, 16–40 μ in diameter, accompanied by irregular undulating hyphae 6–10 μ thick. Excipulum 30–45 μ thick, composed of globular cells 10–25 μ in diameter, with round, cylindrical or pear-shaped cells only 7–12 μ wide near the margin and on the outside of the furfuraceous particles. Asci cylindric-clavate, 200–250 × 30 μ, 8-spored, the wall blue in Melzer's reagent. Ascospores ellipsoid, at first hyaline, then pinkish-violet, becoming violet, 21.8–27.7 × 12.0–13.4 μ, ornamented with closely spaced, extremely fine subparallel ridges which only rarely anastomose and of which usually fifteen to twenty five are visible on each view of the spore, with lateral mucilaginous substance. Paraphyses slender, hyaline, often branched near the apex, about 3 μ thick, near the tip slightly enlarged up to 3–5 μ, embedded in a greenish mucus.

On cow dung, La Plata, Argentina, 23.VIII.1888, C. L. Spegazzini (holotype, LPS 26117).

The difference between this species and *A. furfuraceus* (which is closely related) is evident because of the much finer sculpture of the ascospores and the larger apothecia.

ASCOBOLUS STICTOIDEUS Speg. — FIG. 2

Ascobolus stictoideus Speg. *in* Michelia **1**: 474. 1879. — Holotype: LPS 26119.

Apothecia scattered or gregarious, completely immersed in the substratum with only the extreme top and some mature asci protruding, 350–600 μ in diameter. Receptacle globular, opening by irregular rupturing of the wall, thinly tomentose, without true hairs, watery-white. Disk concave or flat, with the ripe asci strongly protruding, pale olivaceous. Hymenium about 280 μ thick, with 30–40 asci. Hypothecium very thin. Flesh not sharply differentiated. Excipulum about 15 μ thick, composed of more or less isodiametric, polygonal cells, 15–25 μ wide (textura angularis), covered with a thin layer of interwoven cylindric, irregularly branched,

Fig. 2. *Ascobolus strictoideus*. — a, b. Ascospores (× 2000), a. lateral view, b. optical section. c. Diagrammatic section of apothecium (× 80).

4–9 μ thick hyphae. Asci clavate-saccate, gradually tapering downward into a rather thick base, 150–160 × 40 μ, 8-spored, the wall blued with iodine. Ascospores biseriate or irregularly disposed, ellipsoid, at firrst hyaline, smooth, then violet and sculptured, 25.3–28.0 × 15.8–17.5 μ, the spore-sculpturing taking the form of rather coarse, rounded warts, the pigment in a rather thick layer, 0.7–1.5 μ thick. Paraphyses very slender, not thickened above, not branched, septate, hyaline, about 3 μ thick, embedded in a yellowish mucilaginous substance.

On dog dung, Conegliano, Italy, IV.1879, C. L. Spegazzini (holotype, LPS 26119).

This well-characterized species belongs to *Ascobolus* section *Dasyobolus*. It is difficult to find the small fruit-bodies on account of their hidden growth.

ASCOBOLUS IMMERSUS var. ANDINUS Speg.

Ascobolus immersus var. *andinus* Speg. *in* An. Mus. nac. Buenos Aires **19**: 452. 1909. — Type: represented by a small drawing and some notes on a cover paper (LPS 26115). — Type locality: Mendoza, Cacheuta, Argentina.

A. immersus var. *andinus* was said to differ from the type variety of *A. immersus* only by the possession of 4-spored instead of 8-spored asci. In typical *A. immersus* the number of spores developed in one ascus may vary from eight to one, even in the same fruit-body. Therefore, I consider the two taxa conspecific. Spegazzini may have studied only one fruit-body, the one he used for his description.

SACCOBOLUS APARAPHYSATUS Speg. — FIG. 3

Saccobolus aparaphysatus Speg. *in* An. Mus. nac. Buenos Aires **6**: 308. 1899. — Holotype: LPS 26139.

Apothecia scattered or gregarious, superficial, sessile, 150–200 μ in diameter. Receptacle at first globular, later expanding and becoming turbinate-hemi-

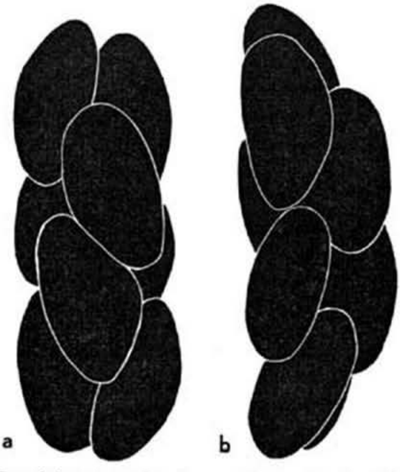

Fig. 3. *Saccobolus aparaphysatus*. — Spore-clusters (× 2000).

sphaerical or discoid with narrow base, externally smooth, at first whitish, becoming violet. Disk flat or convex, becoming violet, soon dotted with the protruding ends of asci. Hymenium 80–100 μ thick. Hypothecium rather thin. Flesh not differentiated. Excipulum at the base consisting of small isodiametric cells which give rise above to a thin layer of parallel hyphae resembling paraphyses, with intercellular amorphous pigment. Asci very broadly clavate, with strongly truncate apex, 65–70 × 18–20 μ, 8-spored, the wall staining blue with iodine. Spore-clusters compact, elongated, up to 32–37(–40) μ long and 11–13 μ in diameter. Ascospores more or less arranged in two rows of three and one of two spores, ellipsoid or fusiform-ellipsoid with blunt ends, at first hyaline, then pinkish, becoming dark-violet, 12.5–14.5 × 5.8–7.0 μ, pigment-layer smooth or with an accidental small crack, sometimes with granules of pigment near the lines of contact of the spores. Paraphyses rather scarce, slender, not branched, slightly enlarged above, hyaline or faintly coloured, about 2 μ thick, near the tip up to 2.5–3 μ.

On horse dung, La Plata, Argentina, V. 1888, C. L. Spegazzini (holotype, LPS 26139).

According to Spegazzini (1899), *S. aparaphysatus* is related to *S. depauperatus* but is said to differ from this species by the lack of paraphyses. However, in species of *Saccobolus* paraphyses are often scarce, especially in old fruit-bodies. Therefore, it is easy to understand that Spegazzini overlooked the few paraphyses present among the remains of the emptied asci. This fungus fully agrees with *Saccobolus depauperatus* (Berk. & Broome) E. C. Hansen, the following collection of which is here considered lectotype: Broome (No. 319), 31.X.1864, on horse dung, Hanham, Great Britain (K, BM, E). Since *S. depauperatus* is an earlier name, Spegazzini's species falls into the synonymy of it.

Nomina inquirenda

The following species of *Ascobolus* and *Saccobolus* described by Spegazzini are known to the writer only from their original descriptions. No specimens are known to him to be in existence. None of them has ever been found again. The descriptions are insufficient to place the species correctly.

ASCOBOLUS MEGALOSPERMUS Speg.

Ascobolus megalospermus Speg. *in* An. Mus. nac. Buenos Aires **6**: 307. 1899. — Type specimen: non-existing. — Type locality: near Colonia Resistencia, Chaco, Argentina.

This fungus would differ from all other species of *Ascobolus* thus far described by its enormous ascospores (50–60 × 25–28 μ) formed in large apothecia (5–8 mm in diameter).

ASCOBOLUS VIRIDIS Curr. subsp. MICROSPERMUS Speg.

Ascobolus viridis Curr. subsp. *microspermus* Speg. *in* An. Soc. cient. argent. **12**: 88. 1881. — Type specimen: non-existing. — Type locality: near la Recoleta, Argentina.

This fungus is certainly not a subspecies of *A. viridis* Curr., which has very characteristic ascospores. It might be a somewhat eroded *Ascobolus denudatus* Fr.

SACCOBOLUS HANSENIANUS Speg.

Saccobolus hansenianus Speg. *in* Michelia **1**: 234. 1878. — Type specimen: not known to be in existence. — Type locality: Conegliano, Italy.

Probably a good species of *Saccobolus* with very big ascospores (35–40 × 25 μ). The description is, however, insufficient to place this species accurately.

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THE GENERIC NAMES PROPOSED FOR POLYPORACEAE
Additions and corrections

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This paper contains some additional information and discussions as well as corrections of statements and of facts recorded in a previously published paper entitled "The generic names proposed for Polyporaceae".

Introduction.—This paper forms part of a series entitled "The generic names proposed for Hymenomycetes" and contains additions and corrections related to "The generic names proposed for Polyporaceae" (Donk *in* Persoonia **1**: 173–302. 1960) which represents the tenth part of the series.[1]

Shortly after the publication of "The generic names proposed for Polyporaceae" another paper appeared that to a large extent covered the same field: W. B. Cooke, "The genera of pore fungi" (*in* Lloydia **22**: 163–207. "1959" [June 30, 1960]). The reader who compares the two publications as to details will find many discrepancies, but he also will soon find that most of them were repetitions from Cooke's previous publications and that I already dealt with them in my above mentioned paper, so that there is no need to return to these. Other discrepancies will be indicated below. I have also added cross-references to those generic names that Cooke mentioned but that I left out altogether because the names are actually based on species not referable to the 'Polyporaceae'.

Ad *Agarico-carnis* Paul. — When I discussed Paulet's mycological publications in connection with this and several other names he coined, I forgot to take into account a publication by that author which appeared at an earlier date than his "Traité des Champignons" (1793) and which is entitled, "Tabula plantarum fungosarum", Parisiis, 31 pp. with 1 table. 1791. In this paper Paulet established the genera he was to use in the "Index" of the "Traité des Champignons" and which

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[1] This is Part XIV of the series. The parts already published or in press are as follows: Part I ("Cyphellaceae") *in* Reinwardtia **1**: 199–220. 1951; Part II (Hymenolichenes) *in* Reinwardtia **2**: 435–440. 1954; Part III ("Clavariaceae") *in* Reinwardtia **2**: 441–493. 1954; Part IV (Boletaceae) *in* Reinwardtia **3**: 275–313. 1955; Part V ("Hydnaceae") *in* Taxon **5**: 69–80, 95–115. 1956; Part VI (Brachybasidiaceae, Cryptobasidiaceae, Exobasidiaceae) *in* Reinwardtia **4**: 113–118. 1956; Part VII ("Thelephoraceae") *in* Taxon **6**: 17–28, 68–85, 106–123. 1957; Part VIII (Auriculariaceae, Septobasidiaceae, Tremellaceae, Dacrymycetaceae) *in* Taxon **7**: 164–178, 193–207, 236–250. 1958; Part IX ("Meruliaceae" and *Cantharellus* s. str.) *in* Fungus **28**: 7–15. 1958; [Part X] "The generic names proposed for Polyporaceae" *in* Persoonia **1**: 173–302. 1960; [Part XI] "The generic names proposed for Agaricaceae", in press; Part XII (Deuteromycetes), in press; Part XIII (Additions and corrections to Parts I–IX), in press.

registered the scientific names of the genera and species he described under French names in the preceding text. All generic names were accompanied by descriptions (in Latin).

The following corrections in the places of publications are to be made.

Agarico-carnis Paul., Tab. Pl. Fung. 11. 1791 (devalidated name).
Agarico-igniarium Paul., Tab. Pl. Fung. 10. 1791 (devalidated name).
Agarico-pulpa Paul., Tab. Pl. Fung. 12. 1791 (devalidated name).
Agarico-suber Paul., Tab. Pl. Fung. 9. 1791 (devalidated name).

Apus (C. Nees) ex S. F. Gray.—'Agaricaceae' (see Part XI, in press).

Ad *Agaricon* [Tourn.] Adans. — The remark (p. 181), "I have not come across a valid publication of *Agaricus* Tourn. after the starting-point date (1821) of these fungi", is to be crossed out and the following changes to be made.

Agaricus [Tourn.] Rafin., Medic. Fl. N. Amer. **2**: 186. 1830. — VALID PUBLICATION. This is Rafinesque's account in which he took up this early name in its original (Tournefortian) sense:

"AGARICUS. *Punk*. Many species, growing on decayed trees. All more or less styptic and bitter, useful to make the Agaric, a soft powder . . .. Punk is the Indian name for all perennial fungi growing on trees and of a spongy nature: useful to make spunk or touch wood . . .."—Rafinesque (op. cit. pp. 186-187).

Although there is no reference to De Tournefort's work, it is clear that Rafinesque had *Agaricus* Tourn. in mind and not *Agaricus* L., which he called "*Amanita* Lam." The above quoted account contains just sufficient descriptive matter to ensure valid publication of the name.

It should be pointed out that Rafinesque in the same work also accepted a restricted genus *Boletus* L. the differences of which with *Agaricus* Rafin. are not well stated:

"BOLETUS, L. *Touchwood*. Fungi with pores beneath; we have nearly 200 species: those with cells beneath are my G. *Phorima* [cf. Donk *in* Persoonia **1**: 254. 1960]; *Polyporus* has a central stem, *Dedalea* [!] a labyrinth beneath, *Fistulina* hollow tubes beneath. The true *Boletus* are sessile, equivalent to *Agaricus* to make tinder and styptic lint. *A. cinnabarinus* dies red. *B. suberosus* . . . *B. igniarius* and *B. fomentarius* . . . *B. marginatus*. *B. odoratus* and *B. suaveolens* . . . The *B. laricis* . . .."—Rafinesque (op. cit. p. 201).

STATUS. Impriorable on account of the earlier homonym *Agaricus* L. per Fr. (1821).

Asterostromella Höhn. & L.—'Thelephoraceae' (see Donk *in* Taxon **6**: 20. 1957 & Part XIII, in press).

Ad *Boletus* S. F. Gray. — The name *Boletus* L. was also used in a strongly emended and reduced sense by Rafinesque (Medic. Fl. N. Amer. 201. 1830). His use of the name may be considered a mere monadelphous homonym of *Boletus* S. F. Gray with which it would seem roughly to agree. For an excerpt from Rafinesque's account on his genus, see above under *Agaricus* [Tourn.] Rafin.

Ad *Boudiera* Lázaro. — W. B. Cooke (*in* Lloydia **22**: 174. 1960) and Donk (*in* Persoonia **1**: 191. 1960) list the same type, which Cooke cites as "*B. connata* (Batr.)" and Donk as "*Polyporus connatus* Weinm., not *Polyporus connatus* Schw." The latter author remarked further, "If Lázaro correctly interpreted *Polyporus connatus* = *P. populinus* Fr. (of which I am not yet sure), then *Oxyporus* (Bourd. & G.) Donk . . . is a typonym". Cooke's conclusion in this regard is widely at variance since he states that *Boudiera* Lázaro is, "Possibly a synonym of *Coltricia* S. F. Gray." I would conclude that he confused Lázaro's type species with the completely unrelated *Coltricia connata* S. F. Gray ≡ *Boletus perennis* L. ≡ *Polyporus perennis* L. per Fr.

Byssocorticium Bond. & Sing. ex Sing.—'Thelephoraceae' (see Donk *in* Taxon **6**: 23. 1957).

Caloporia P. Karst. and
Caloporus P. Karst.—See "Additions and corrections to Parts I–IX" ('Meruliaceae').

Cristella Pat.—'Thelephoraceae' (see Donk *in* Taxon **6**: 68. 1957).

Ad *Daedalea* Pers. per Fr. — As stated, Quélet (1876) remarked that he considered *Daedalea quercina* (L.) per Fr. a species of *Lenzites* Fr., but he was not the first actually to make the combination *L. quercina:* this was done before 1886 by Karsten [*in* Bidr. Känn. Finl. Nat. Folk **37**: 54. 1882 ("Quél.")].

Ad *Daedaloides* Lázaro. — VARIANT SPELLING: "*Daedaleoides*"; W. B. Cooke *in* Lloydia **22**: 179. 1959.

Ad *Echinodontium* Ell. & Ev. *in* Bull. Torrey bot. Cl. **27** : 49. Feb. 1900 (corrected reference). — Add under 'TYPONYMS': See also under *Hydnophysa* P. Henn., additional remark inserted below. — The genus was recently excluded from the Polyporaceae and made the type genus of a new family, Echinodontiaceae Donk (*in* Persoonia **1**: 405. 1961).

Ad *Elmeria* Bres. & *Elmerina* Bres. — Originally W. B. Cooke listed *Poria setulosa* P. Henn. as type species of both *Elmeria* and *Elmerina*. More recently (W. B. Cooke *in* Lloydia **22**: 180. 1960) he partly returned on this and gave *Polyporus vespaceus* Pers. as type species of *Elmeria*, but retained *Poria setulosa* for *Elmerina*. By his remark under *Elmerina*, "Neither species cited with *Elmeria* is mentioned except by implication", one is forced to conclude that he considered *Poria setulosa* the only original species of the generic name, because it was the only species Bresadola dealt with separately when introducing *Elmerina*. In fact, he makes it quite clear that he regards *Elmeria* Bres. (1912, not 1911 as Cooke states) and *Elmerina* Bres. as two distinct genera, the first "being a segregate of *Hexagona*, the other of *Poria*". In addition, he does not consider *Elmeria* Bres. a homonym (orthographic variant) of *Elmera* Rydb. (1905; Saxifragaceae) and hence emphasizes that *Elmeria* Bres. is "valid and usable".

As to the typification of *Elmeria* Bres., *Polyporus vespaceus* ("the better known" of the two original species) should not be accepted as long as the inadequacy of the earlier choice, *Hexagona cladophora* Berk., has not been demonstrated.

Cooke's surprising conclusion that we are dealing in this case with two different genera can be easily unnerved: *Elmerina* owes its valid publication to a reference to the earlier published *Elmeria* Bres. (there is no accompanying generic description) and hence is a pure isonym of that name, and its original species as well as its type completely coincide with those of the basionym. If one would interpret *Elmerina* as a new monotypic genus it would not be validly published because there were no accompanying descriptions, not even a descriptio generico-specifica, and because its only species (*Poria setulosa*) was not a new one.

If one wants to go so far as to accept *Elmera* Rydb. and *Elmeria* Bres. as non-homonymous names, then it should be remembered that Bresadola's name is impriorable (illegitimate) on account of *Elmeria* Ridl. (1909; Zingiberaceae).

Ad *Favolaschia* (Pat.) Pat. apud Pat. & Lagerh. — W. B. Cooke (*in* Lloydia **22**: 181. 1960) admits two genera *Favolaschia*, one of which is "*Favolaschia* Pat. in Morat [!] Journ. Bot. 1887: 231. 1887". The correct citation of this name is '*Laschia* sect. *Favolaschia* Pat. *in* J. Bot. (ed. Morot), Paris **1**: 231. 1887'. Why it should be typified by *Laschia auriscalpium* Mont. is not clear to me.

Ad *Fomes* (Fr.) Fr. — I have been unable to verify W. B. Cooke's statement that "Cunningham has chosen *Fomes salicinus* (Fr.) Kickx as the type of the genus *Fomes* Kickx". As previously indicated, I am aware that Cunningham chose *Polyporus igniarius*, and in addition I may point out that he (Cunningham *in* Trans. roy. Soc. New Zeal. **82**: 895. 1955) even remarked: "*F. salicinus* and *F. igniarius* . . . as the former has not been proposed as a type it may be disregarded further".

Cooke also stated that he had previously chosen *Fomes igniarius* as type of *Fomes* Kickx. I have been unable to verify this; in any case he wrote on previous occasions that "*Fomes* Kickx" was "Based on *Boletus fomentarius* L."

Ad *Fomitiporia* Murrill. — VARIANT SPELLING: "*Formitiporia*"; W. B. Cooke *in* Lloydia **22**: 182. 1960.—Evidently a misprint.

Ad *Gloeophyllum* P. Karst. — The authors' citation of the generic name should read '(P. Karst.) P. Karst.'

Add: BASIONYM: *Lenzites* subgen. *Gloeophyllum* P. Karst. *in* Acta Soc. Fauna Fl. fenn. **2** (1): 15. 1881.—Introduced in a paper entitled "Hymenomycetes fennici" with three species in this order: *Lenzites sepiaria* (Wulf. per Fr.) Fr., *L. abietinus* (Bull. per Fr.) Fr., and *L. septentrionalis* P. Karst. — HOMONYM: *Gloeophyllum* Korsikov (1953; Protococcineae, Chlorophyta; lacking Latin description).

Gyrophana Pat.—'Meruliaceae' (see Donk *in* Fungus **28**: 9. 1958).

Gyrophora Pat.—'Meruliaceae' (see Donk *in* Fungus **28**: 10. 1958).

Ad *Haploporus* Bond. & Sing. ex Sing. — Replace the given account by the two following.

Haploporus Bond. & Sing. *ex* Sing. *in* Mycologia **36**: 66, 68. 1944. — Etymology: ἁπλόος simple; πόρος pore. Gender: m. — Type species (by original designation): *Trametes odora* (Sommerf.: Fr.) Fr. sensu Nikol. and Bond. & Sing.—According to Bondartsev (Trutov. Griby 300. 1953) this is *Fomitopsis odoratissima* Bond. — Protonym: *Haploporus* Bond. & Sing. *in* Ann. mycol., Berl. **39**: 60. 1941.—Not validly published: no Latin description. Two species were mentioned thus: "Typ: *H. odorus* (Fr.) B.-S. Ferner: *H. Ljubarskyi* (Pil.) B.-S." — Remark. When Singer (l.c.) validly published the generic name he indicated as its type: "*H. odorus* (Fr.) B.-S.", the same species given as type when the protonym was published. When Bondartsev (see below) validly published the name at a later date (without reference to Singer's publication) he appointed the other one of the two original species, viz. *Trametes ljubarskyi* Pilát, in this way creating a later homonym. — Homonym: *Haploporus* Bond. 1953 ('Polyporaceae').

Haploporus Bond., Trutov. Griby 47, 523. 1953. — Etymology: ἁπλόος, simple; πόρος, pore. Gender: m. — Type species (by original designation): *Trametes ljubarskyi* Pilát. — Remarks. See also under preceeding name. — When Bondartsev, independently of Singer's valid publication of *Haploporus* Bond. & Sing., took up the latter name ("g.n."), he excluded the type (indicated when the latter was published and which had also been indicated by Singer) under the name *Fomitopsis odoratissima* Bond. and proceeded to appoint as type the other one of the two originally included species (*Trametes ljubarskyi*) thus creating a later homonym. This generic name should be known as *Haploporus* 'Bond.' rather than as 'Bond. & Sing. ex Bond.' The supposition that Bondartsev had identified the two original species appeared quite erroneously (Donk *in* Persoonia **1**: 222. 1960). — Homonym: *Haploporus* Bond. & Sing. ex Sing. (1944), q.v. — Status. Impriorable on account of the earlier homonym.

Ad *Henningsia* A. Möll. — The name was first validly published *in* Bot. Mitth. Tropen **8**: 44. 1895. I qualified this use as a nomen nudum but now have to reconsider this view. Möller wrote: "In *Henningsia geminella* nov. gen. et nov. spec., einem Typus der Polyporeen, werden wir eine Form antreffen, welche regelmassig einen verhältnissmässig hochorganisirten Thelephoreenzustand durchlauft, ehe die Röhren des höher entwickelten Fruchtkörpers in die Erscheinung treten." Technically this represents sufficient description to assure valid publication of both the generic and the specific name.

Hydnochaete Peck.—'Hydnaceae' (see Donk *in* Taxon **5**: 96. 1956).

Hydnochaetella Sacc.—'Hydnaceae' (see Donk *in* Taxon **5**: 96. 1956).

Ad *Hydnophysa* P. Henn. — Add under 'TYPE SPECIES': Imazeki (*in* J. Japan. Bot **11**: 519. 1935) concluded that *Echinodontium tinctorium* and *Hydnofomes tsugicola* were different, although congeneric species.

Ad *Hydnoporia* Murrill. — W. B. Cooke (*in* Lloydia **22**: 186. 1960) listed as type: "*Hydnum squalidum* Fr. (Synonym: *Sistotrema fuscescens* Schw., *Irpex cinnamomeus* Fr.)". This is an error: *Hydnum squalidum* Fr. (Syst. mycol. **1**: 420. 1821) is certainly different from *Sistotrema fuscescens* Schw. Presumably Cooke relied on Fries (Elench. **1**: 139. 1828) who included Schweinitz's species as variety *β*. under *Hydnum squalidum*.

Ad *Inodermus* Quél. — Add the following at the end of the discussion on "TYPIFICATION": It should be pointed out that the year following the introduction of this genus Patouillard (Hym. Eur. 143. 1887) accepted it and listed as "Espèces principales: *I. hispidus*, *I. cuticularis*, *I. rheades*, etc.", without mention of *Polyporus radiatus* (Sow.) per Fr. in this connection or under any other generic name, however.

Ad *Inonotus* P. Karst. — Add the following REMARK. Patouillard's emendation (Hym. Eur. 140. 1887) of the genus to a group of which he merely cited as "Espèces principales: *I. nidulans*, etc." must be qualified a downright misapplication since the species mentioned was not an original one. Karsten never considered it typical of *Inonotus* and already in 1881 he based *Hapalopilus* P. Karst. on it.

Ad *Irpicochaete* J. Rick. — VARIANT SPELLING: "*Irpiciochaete*"; W. B. Cooke *in* Lloydia **22**: 187. 1960.—Presumably an unintentional error.

Ad *Melanopus* Pat. — Add under 'TYPIFICATION' at the end: When Patouillard (*in* Ann. Crypt. exot **1**: 8. 1928), decided to incorporate *Polyporus scopulosus* Berk. into the genus *Melanopus*, he remarked: "On est donc amené à diviser ce dernier genre ainsi qu'il suit: / 1° *Carnosi: M. squamosus, M. radicatus.* / 2° *Lenti: M. varius* et analogues (série typique, à chapeau mince). / 3° *Lignosi: M. scopulosus* (. . .)." This shows that Patouillard himself did not regard *Polyporus squamosus* (Huds.) per Fr. as typical of the genus. His "série typique" contained *Polyporus varius* (Pers.) per Fr., "et analogues", which presumably also covers *Polyporus melanopus* (Pers.) per Fr.; Patouillard perhaps considered the latter species synonymous with *P. varius*.

Merulius Haller (non *Merulius* Fr.), *Merulius* Fr., *Merulius* S. F. Gray.—See Donk *in* Fungus **28**: 10, 11. 1958 under *Merulius* Fr. and *Merulius* [Haller] St.-Am. See also Part XIII of the present series (in press).

Ad *Microporus* P. Beauv. per O.K. — Add under 'VALID PUBLICATION', after the remark concerning Hariot, the following paragraph.

Perhaps the first author to accept the generic name definitely was Patouillard [*in* Ann. Jard. bot., Buitenzorg (Suppl. **1**): 111. 1897]. He did not mention it separately but used it exclusively as the generic appellation in three specific combinations; it was not validly published by him on that occasion by the lack of a generic description or a valid reference.

Ad *Mucronoporus* Ell. & Ev. — Add to TYPIFICATION the following note: If no previous indications of type species had occurred, one would not hesitate to select *Polyporus tomentosus:* it was the only species fully described and illustrated (*pl. 8*). Of all other species listed (eleven in number) no descriptions were added except some details of the setae. First species, *Polyporus circinatus*, last species, *Polyporus balansae*. Of these two, Murrill (1903) selected the former and W. B. Cooke (1940) the latter. This later indication may perhaps be explained by a remark the authors of the generic name made in the introductory paragraph: "The only described species having this character [viz. having the inner surface of the pores studded with reddish-brown spines exactly as in the hymenium of *Hymenochaete*], so far as we know, is *Polystictus balansae*, Speg., of which Saccardo (in Syll.) remarks that it might well be the type of a new genus ('facile novum genus')." However, this does not imply that it must also be considered type of the generic name *Mucronoporus*.

Myxomyces Mont. *in* Ann. Sci. nat. (Bot.) IV **1**: 137. 1854 (incidental mention). — When publishing *Laschia auriscalpium* Mont., its author mentioned a generic name for it as follows: "La structure est d'ailleurs si différente, que j'avais d'abord été tenté d'en faire un nouveau genre sous le nom de *Myxomyces*. . . ." However, he did not definitely accept this name and, hence, it was not validly published even as an alternative name. *Laschia auriscalpium* will be found mentioned in connection with *Favolaschia*, q.v.

Ad *Ochroporus* J. Schroet. — TYPIFICATION. On the previous occasion I left the choice of the type species undecided between *Polyporus contiguus* (Pers.) per Fr. and *P. igniarius* (L.) per Fr. If the genus *Phellinus* Quél. is taken in the broad sense of Bourdot & Galzin (Hym. France 613. 1928), inclusive of resupinate species, then *Ochroporus* with either species as type becomes a synonym of *Phellinus*. If the resupinate species are excluded then, with *Polyporus contiguus* as type, *Ochroporus* becomes the correct name for the genus which Cunningham (*in* Bull. Dept. sci. ind. Res., Pl. Dis. Div. No. 73: 1. 1948) and other authors have called *Fuscoporia* Murrill (1907); if *P. igniarius* is to be preferred, *Ochroporus* remains a synonym of *Phellinus*.

Moreover, if in the future it appears necessary to split up *Phellinus* sensu Bourd. & G. into smaller genera and at the same time one wants to retain *Polyporus rubriporus* Quél. as its type species, then presumably *Ochroporus* might be a convenient name for a genus typified by *Polyporus igniarius*. The next name to be considered for the *P. igniarius* group would be *Scindalma* [Hill] O.K. (1898) based on a somewhat dubious cushion-shaped (resupinate) species or form of that group. Next in succession would perhaps be *Pseudofomes* Lázaro (1916), but in this case, too, some degree of diversity in opinion on the correct taxonomic interpretation of the type species might be expected.

After a renewed careful examination of the question, I now believe that *P. igniarius* may be retained as type species of *Ochroporus*, and *P. contiguus*, rejected, for the following reasons. The original description reads, "Substanz der Fruchtkörper braun. Sporenpulver weiss; Membran der Sporen farblos. Die übrigen Charactere dieselbe wie bei *Polyporus*." Schroeter mentioned neither the colour of the spore print nor of the spores for *Polyporus contiguus*; in fact nothing is said of either in the description of that species. Also, it is not explicitly mentioned that the context was brown. In contrast, the description of *Polyporus igniarius* states: "Substanz, innen rostbraun" and of the spores, "... Membran farblos ...". It thus may be assumed that *P. contiguus* was placed in *Ochroporus* by implication rather than by exact knowledge of certain essential generic characters, and that for this reason, it is not a suitable lectotype. These considerations leave *P. igniarius* as the preferable type species.

Ad *Pelloporus* Quél. — Add following the first paragraph under "TYPIFICATION": Patouillard (Hym. Eur. 143. 1887) took up Quélet's genus immediately after Quélet had introduced it, listing as "Espèces principales: *P. perennis*, *P. Montagnei*, *P. fimbriatus*, etc."

Ad *Phaeoporus* J. Schroet. — I left the choice of the type species undecided between *Polyporus obliquus* (Pers.) per Fr. and *P. cuticularius* (Bull.) per Fr. Recently it became necessary to make a decision, and I now prefer *P. cuticularis* because it is the species which agrees best with the generic description. The latter contains, *inter alia*, "Conidien auf der Oberfläche der Fruchtkorper an kurzen Hyphen abgeschnürt; Membran braun." The only species for which Schroeter described conidia is *P. cuticularis:* "Auf der Oberfläche werden an den jungen Fruchtkörpern oft elliptische Conidien mit glatter brauner Membran abgeschnürt."

Phlebiella P. Karst.—'Thelephoraceae' (see Donk *in* Taxon **6**: 108. 1957 & Part XIII, in press).

Ad *Phyllodontia* P. Karst. — W. B. Cooke (*in* Lloydia **22**: 194. 1960) called the type "*P. magnus* Karst." This is an error for '*Phyllodontia magnusii* P. Karst.'

Phylloporus Quél.—Boletaceae (see Donk *in* Reinwartia **3**: 297. 1955).

Ad *Polystictus* Fr. — Insert the following paragraphs immediately after the word "TYPIFICATION".

Fries (*in* K. svenska Vet.-Akad. Handl. **1848**: 127) had conceived the taxon already before he decided to treat it as a distinct genus: originally he fused it with *Trametes* Fr.:

> "*Trametes* .... Post editam Synopsin Hymenomycetum hoc genus valde dilatavimus, huc referentes omnes species suberosas l. lignosas, nec instar *Polypori* genuini e carnosolentas fibrosas, poris haud stratosis in quibus omnibus re ipsa trama a pileo formata adest, licet in diversis speciebus plus minus distincta appareat. — Ad hoc genus, quod majorem partem Polypororum exoticorum sibi vindicat ...."

> "Ad stirpem *Tr. perennis* pertinent sequentes species sub *Polyporo* descriptae: a) *poris amplis trama crassa: P. maximus, Schweinizii, rufescens, radicatus* (Schwein.!) *connatus* (Schw.); b) *poris minutis, trama tenui: Tr. circinatus, tomentosus, bulbipes* (= *P. oblectans* Be[r]k.? . . .) *Cladonia* Berkl. etc. . . ..
>
> "Alteram *Trametum mesopodium* stirpem representat *Polyporus sacer* . . ., cujus plurimas quoque habemus species. — Utraque haec series a *Polyporis* mesopodibus genuinis clare differt; et sub singula *Trametum* tribu redeunt cum his analogae species. Tantum proba distinctione *Trametum* et *Polyporum* facilem proponere licit specierum conspectum."

These remarks tend to show that the later genus *Polystictus* started with the conception of a stirps typified by *Polyporus perennis* (L.) per Fr., in the first place, and a stirps typified by *P. sacer* Afz. ex Fr.

Porodon Fr., Syst. mycol. **1**: 459. 1821 (nomen nudum); *in* Nova Acta Soc. Sci. upsal. III **1**: 92. 1851 (nomen nudum). — When looking back on the Hymenomycetes in a brief survey of the genera, Fries introduced this generic name as a nomen nudum: "POLYPORUS abiens in Hydnum = *Porodon*. (Sistotremat. sp. Pers. Daedalea sp. Mihi.)". It is not clear which species he had in mind, but it might have been, for instance, *Daedalea biennis* (Bull.) per Fr., which he accepted on the basis of its original account (Bulliard, Champ. France *pl. 449 f. 1.* 1789; "v.i."). — I know of only one other mention of the name (cited above): when discussing *Polystictus versatilis* (Berk.) Fr., Fries remarked about it: "Forsan P. venusto proprior vel ad novum genus *Porodon* (typo *P. Acanthoide*) referendus." No generic description was given and the name only provisionally accepted. *Polyporus acanthoides* (Bull. per Mérat) Fr. sensu Fr. (Epicr. 448. 1838) is a form of *Polyporus biennis* (Bull. per Fr.) Fr. as was pointed out by O. Fidalgo (*in* Bull. Torrey bot. Cl. **86**: 134. 1959), and closely related to (if not conspecific with) *Polyporus distortus* (Schw.) Steud.: Fr., the type species of the name *Abortiporus* Murrill.

Ptychogaster Corda.—Deuteromycetes (see Part XII of the present series, in press).

Ad *Rigidoporus* Murrill. — Variant spelling: "*Rigidiiporus*"; W. B. Cooke *in* Lloydia **22**: 199. 1960.—Presumably an unintentional error.

Rodwaya H. & P. Syd.—Boletaceae (see Donk *in* Reinwardtia **3**: 299. 1955).

Ad *Trametes* Fr. — The type species should be cited as '*Polyporus suaveolens* (L.) per Fr. sensu Fr.' Eriksson [*in* Symb. bot. upsal. **16** (1): 140–146 *fs. 44, 45* . 1958] has shown that the original *Boletus suaveolens* L. must be equated with *Polyporus odorus* Sommerf.: Fr. ≡ *Trametes odorata* (Sommerf.) Fr. while Fries's interpretation of it agrees with what is now currently called *Trametes suaveolens*.

Vararia P. Karst.—'Thelephoraceae' (see Donk *in* Taxon **6**: 121. 1957).

Ad *Xanthochrous* Pat. — Add under "Typification": Gosselin (*in* Farlowia **1**: 526. 1944) remarked that, "In 1900, Patouillard made a new genus *Xanthochrous* based on *P. circinatus*. He described the setae as being straight. Apparently his

X. circinnatus is *P*[*olyporus*] *tomentosus* Fr." This statement is misleading in several respects: there is no indication that Patouillard 'based' the name on that species. In both the original account (1897) and that of 1900 (Essai taxon. Hym. 100) he listed as examples, *inter alia*, *Polyporus tomentosus* Fr. as well as *P. circinatus* (Fr.) Fr., without adding descriptions. However, in 1900 (*f. 56: 4*) he depicted a straight seta for *P. circinatus*, but this may be an error and a seta of this species is perhaps depicted in figure 56: 3 as "Cystide de *X. vulpinus* (Fr.)".

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NOTES ON THE BASIDIUM—II*

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Some critical remarks are made on the treatment of the basidium in a recently published handbook on cryptogams by M. Chadefaud.

INTRODUCTION.—The following has been written as a comment on a recently published treatise on the basidium occurring in a handbook on non-vascular plants (Chadefaud, *1960*).

CHADEFAUD'S BASIDIAL TYPES.—Three basidial types are distinguished (pp. 690–695): (i) the basidium of the Archeobasidiae ("la basidie des Archéobasidiés"), (ii) the basidium of the Neobasidiae-Heterobasidiae ("la baside des Néobasidiés-Hétérobasidiés"), and (iii) the basidium of the Neobasidiae-Homobasidiae ("la baside des Néobasidiés-Homobasidiés"). To simplify these somewhat cumbersome indications they may be reduced as follows: (i) the archeobasidium, (ii) the divided neobasidium, and (iii) the undivided neobasidium. It must be understood that Chadefaud himself does not make use of these simplifications, except in the case of archeobasidium which term he defines in a somewhat restricted sense although he applies it in the circumscription here given.

In the archeobasidium the probasidial cell, generally short, sprouts a single basidial tube ("boyau basidial") which becomes transversally divided. (It is this divided tube which Chadefaud defines as archeobasidium.) In the divided neobasidium the probasidial cell itself becomes longitudinally divided and each resulting cell sprouts a basidial tube which itself remains undivided. The dividing walls in both these types are formed across mitotic division spindles of the diploid nucleus of the probasidial cell (probasidium). In the undivided neobasidium there is neither wall formation in the probasidium nor any striking sprouting of basidial tubes.

Setting aside the possibility of polytopic origin of the same basic ideas, I think it is clear that Chadefaud has taken up Neuhoff's conception of the basidium (*1924*) embellishing it with some new terms. The 'boyaux basidiaux' are Neuhoff's epibasidia. The omission of any direct mention of Neuhoff's publications devoted to the same subject attracts attention. The existence of other conceptions is not even hinted at. The reference "Rogers (A. H.), Mycologia, 28, 1936" (D. P. Rogers, "Basidial proliferation through clamp-formation in a new Sebacina"), does not lead even indirectly either to the work of Neuhoff (*1924*; *1935*: *Schwarzt. 1*) supported by Rogers (*1934*), or to that of Donk (*1931*); and no references are given to later

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* The first paper was published *in* Blumea (Suppl.) **4**: 96–105. 1958.

publications in which different conceptions from Neuhoff's are defended: Talbot (*1954*), Donk (*1954*, *1956*, *1958*), Martin (*1957*).

It is not my intention to enter upon a critical examination of the basic principles of Neuhoff's—and Chadefaud's—conception: this was already done by myself and more recently *in extenso* by Talbot (*1954*) now several years ago. What I aimed at on this occasion was to find out if there was something new linked up with the introduction of still more new terms like Archeobasidiae and Neobasidiae. The answer is short: Very little.

CHADEFAUD'S CLASSIFICATION.—After having defined the main basidial types, Chadefaud proceeds to present a concise treatment of the classification of the basidiomycetes.

His Archeobasidiae comprize the Uredinales (inclusive of the Graphiolaceae), the Ustilaginales (inclusive of the Tilletiales), the Septobasidiales, and the Auriculariales. The association of these orders is one currently accepted. What is remarkable is that the Tremellales are not included but referred to the Neobasidiae, thus significantly divorced from the Auriculariales. Many authors, even those who adhere to Neuhoff's conception of the basidium, regard the Auriculariales and Tremellales as closely related and the two are sometimes even combined into one order.

Another peculiarity of Chadefaud's classification that leaps to the eye is that several groups are kept within the Archeobasidiae in accordance with current tradition although they do not answer to his definition: they lack the persistent probasidium which was made part of the definition of the group. For instance, among the Uredinales, the Coleosporiae 'form their archeobasidia inside the teleutospore'. The same situation (viz. that the probasidium itself is transformed into a transversally divided metabasidium) is also more or less completely realized in certain Auriculariales and Septobasidiales. Although Chadefaud acknowledges this situation for both the Uredinales and the Auriculariales, these facts seem not sufficiently to have disturbed his faith in his definition of 'the basidium of the Archeobasidiae': it would appear that although theoretically this basidial type ought to be characterized by a persistent probasidium, Chadefaud is disposed not to emphasize this point where convenient and to call by the same term any transversally divided metabasidium whether it replaces the probasidium or sprouts from it as a distinct outgrowth. A similar view has been accepted for some time by Donk, Talbot, and others. Chadefaud's archeobasidium is nothing else but one of the many aspects into which the metabasidium may develop: the transversely septate metabasidium.

The Neobasidiae-Heterobasidiae comprize only one order, the Tremellales. That this includes the Tremellales in the restricted current sense (longitudinally divided basidia only) is comprehensible in regard with the definition of the basidium characterizing the group. However, it will be difficult to digest that the Tremellales have also become the receptacle for the genus *Tulasnella*, the Dacrymycetales, and the genera *Vuilleminia* and *Brachybasidium*. The disaccord between definitions and classification based on it will be confusing to the uninitiated reader; for it appears that the actual definition of the divided neobasidium in its adjusted form should read rather: any basidium (even undivided ones) that forms basidial tubes with the exclusion of those cases in which the metabasidium becomes transversally septate.

The Neobasidiae-Homobasidiae include all other basidiomycetes (inclusive of the Gastromycetes) as well as the Sporobolomycetaceae as a distinct order. A few words will be devoted below to this latter group.

ARCHEOBASIDIUM AND ASCUS.—According to Chadefaud (pp. 690–691 & *f. 509*) the archeobasidium (that is, the transversally divided metabasidium) 'is an ascus in which spore-formation has been transformed into a segregative division, and the ascospores, into ascosporal cells which are spore-producing segments.' This conclusion is presented as plain fact rather than pure speculation: Chadefaud knows precisely what happened to the ascus when it became the basidium, and the ascus that performed the feat was one sprouting from the equivalent of a probasidium.

To begin with, asci sprouting from a 'pro-ascus' are rare if they exist at all. What looks like one, for instance, the 'ascus' of *Taphrina* (where the 'pro-ascus' may be lacking), may even not really be an ascus (Lohwag, *1934:* 247). In any case it is chiastic (Juel, *1921:* 38–39) and the archeobasidium, stichic.

Further, I would contest that it is evident that 'the septation of the archeobasidium into sporiferous part-cells is equivalent to the delimitation of the ascospores in the ascus'. The cross-walls dividing the metabasidium into cells are formed in connection with nuclear divisions and perpendicular to and across spindles, while the formation of the ascospore walls depends on each of the individual nuclei irrespective of the spindles. The division of a metabasidium into four cells requires only three walls (1 + 2 division spindles), while the formation of four ascospores requires four. In my opinion, two quite different processes and types of wall formation are here equated without supplying any argument in support of the thesis. I would meet Chadefaud's derivation with greater accommodating spirit if he could have pointed to an ascus that first becomes divided into four cells and then forms a spore inside each of these part-cells. In such an ascus the spores would have become trapped (for they cannot be shot away from the ascus top) and they would perhaps have to germinate through the sides of the ascus producing secondary spores to be discharged violently from the germination tubes. Such an ascus or one coming near to it is not known to me, but in phylogenetic discussions it can easily be postulated.

Without the existence of such an ascus type, Chadefaud's derivation of the transversally septate metabasidium from the ascus is as speculative as any other one deriving the basidium from the ascus, for instance, the one now more currently favoured and which derives an undivided basidium from an undivided ascus.

Chadefaud's choice of the terms 'Archéobasidiés' and 'Néobasidiés' is evidently determined by his assumption that the transversally septate metabasidium is primitive, but he has not contributed any argument that would let this view prevail over the one which considers the holobasidium as primitive. It is also arguable whether it is really necessary to derive the basidium from the ascus or the reverse.

CALOCERA.—Chadefaud (p. 691) stipulates as the one basic difference between the archeobasidium and the neobasidium that the former sprouts before the basidial diploid nucleus divides and that the neobasidium does so after this process has occurred.[1] Evidently, he homologizes these two types of sprouting, like Neuhoff did previously. This means homologizing certain sterigmata with metabasidia and in Chadefaud's case mixing the cytological processes occurring in the two organs. This homologizing of strongly developed sterigmata (cf. Donk, *1954*) with metabasidia has lead Chadefaud not only to postulate possible ancestral *Tremella* basidia with sterigmata behaving like archeobasidia by becoming one-septate and developing an extra lateral sterigma (*f. 510: 5, 6*) but also to present a truly remarkable version of the *Calocera* basidium.

Chadefaud's interpretation of the basidium of the Dacrymycetales (which order he sinks into the Tremellales) agrees with that of Neuhoff's, with one not too profound difference, viz. that he calls "boyaux basidiaux" what Neuhoff called epibasidia (and Donk, sterigmata). To illustrate these organs some remarkable figures of basidia of *Calocera* are offered, showing 'a non-septate probasidium and only two basidial tubes in which the second mitosis is staged and which are transversally divided by a cross-wall'; Chadefaud adds 'after R. Maire' (*f. 511: 4*). This is an erroneous representation of the actual situation, at least as far as published facts go. Maire (*1902:* 78) reported of *Calocera cornea* that the diploid nucleus of the basidium divides once or twice resulting into two or four daughter nuclei; each spore receives one nucleus which soon divides mitotically followed by the formation of a cross-wall. There is nothing in Maire's account that would suggest that the sterigmata are the seat of a nuclear division: if a second division occurs this is in the 'probasidium' (after it has become the metabasidium). Consequently division of the sterigmata by a true cross-wall across a division spindle was not reported by Maire, and as far as I know no one else has observed the true cross-wall Chadefaud depicts.

What is known is that, for instance, in the *Tulasnella* basidium a nuclear division may occur in the sterigmata (Juel, *1897*; Rogers, *1932*), but exactly from this example it can be deduced that no cross-wall formation need occur as a consequence of such a mitotic division. In fact formation of true cross-walls (cf. Donk, *1958:* 96–98) is rather a minority phenomenon: it is known only in the Uredinales and some comparative small groups, Septobasidiales, Auriculariales, and Tremellales, thus in the metabasidia of the Phragmobasidiae.

VUILLEMINIA AND BRACHYBASIDIUM.—Another unexpected representation of facts occurs in connection with these two genera (Chadefaud, p. 739 *f. 511: 3, 6*): the apical portion of the 'neobasidium' of *Vuilleminia* is interpreted as a single basidial

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[1] 'As a consequence', he writes, the divided neobasidium becomes longitudinally divided (p. 691). I cannot follow this reasoning.

tube representing four fused ones, while the metabasidium of *Brachybasidium* is similarly derived from two fused basidial tubes, each of the fused tubes being indicated by a sterigma producing a spore. Chadefaud derives his knowledge of these basidial types from the work of Maire (*1902:* 81–82 *pl. 2 fs. 5–13, pl. 8 f. 3*) as to *Vuilleminia*, and from a publication by Gäumann (*1922*) as to *Brachybasidium*.

His interpretation implies that four (*Vuilleminia*) or two (*Brachybasidium*) daughter nuclei of the diploid nucleus migrate from a persistent probasidium through a single basidial tube into the spores, in the case of *Brachybasidium* apparently after having divided once more on their way judging from Chadefaud's figure 'after Gäumann' but which Gäumann never published. The published facts are quite different: in both genera it is the diploid fusion nucleus itself that migrates into the tubes (metabasidia) and there enters upon its first and second division(s). There is no reason to interpret the metabasidia of these genera as: basidial tubes homologous to the sterigmata of *Calocera* 'except that the basidial tubes have united into one'.

THE SPOROBOLOMYCETACEAE.—This group (of which Chadefaud mentions only *Sporobolomyces*) is considered to belong to the Neobasidiae (p. 737 *f. 516: 5*), the individual yeast cells becoming transformed into monosporous basidia. A considerable amount of literature has accumulated around *Sporobolomyces* and some other genera (*Tilletiopsis* Derx, *1930*; *Itersonilia* Derx, *1948*) from which it appears that no author has really definitely defended the above mentioned view although most authors seem to be inclined to consider all these genera basidiomycetous. Donk (*apud* Derx, *1948:* 468) found it necessary to propose the term ballistospore to replace the use of the term basidiospore in these instances and to avoid, *inter alia*, the short-circuiting to which Chadefaud has succumbed. It may appear in the future that Chadefaud is correct but some semblance of proof now would undoubtedly have been appreciated. In any case there is no sufficient cytological basis to support the view that the individual cells producing (sometimes more than one) spores may be homologized with basidia (Guillermond, *1928*). Or has Chadefaud taken Sainclivier's observations and theoretical suggestions (*1951a*; *1951b*; *1952*) as sufficient evidence and gospel?

HIRSUTELLA VARIANS.—This species (originally described as *Matruchotia varians*) is considered by Chadefaud (*f. 526: 1*) to represent a species of Cortiaceae producing not only conidia on conidiophores analogous in appearance to the phialides of imperfect Ascomycetes but also intermediate organs that show these conidiophores in reality to be homologous with basidia so that they should be regarded as basidia with single sterigmata. This view of Boulanger (*1893*) has been carried from handbook to handbook, but there is reason to believe that the species is non-basidiomycetous and nothing but an imperfect state, even though some of the conidiophores closely imitate two-spored basidia.

STICHIC CLAVARIACEAE.—Chadefaud (p. 694) contends that all Clavariaceae have stichic basidia. This is not the case. Although Juel (*1916*) and Bauch (*1927*) found that the species since referred to *Clavulina* and perhaps one other species had stichic basidia, it clearly appeared from Juel's publication that the basidia of other Clavariaceae in the wide sense he investigated were chiastic; the latter species are now referred to *Clavariadelphus* and *Ramaria*. I should not be surprised if the great majority of the clavarias proved to be chiastic or hemichiastic; the outstanding examples known of the stichic clavarias are nearly all species of *Clavulina*. *Clavaria falcata* of Juel which that author reported as being stichic does not belong to *Clavulina* but its identity is still an unsolved problem.

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NOTES ON RESUPINATE HYMENOMYCETES—VI

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1. The conidiophores which caused the publication of the genus *Tomentella* J.-Olsen apud Bref. bear no relation to the basidiferous states with which they were associated. They belong to *Ostracoderma* Fr. The names based on these associations are nomina confusa. — 2. *Peniophorella* P. Karst. is an other instance of a nomen confusum: it was based on *Hyphoderma puberum* to which species foreign spores were ascribed. These two-celled spores induced the introduction of the genus. Some additional species are referred to *Hyphoderma* Wallr. emend. (two new combinations). — 3. The name *Phanerochaete* P. Karst. is re-introduced for an as yet not sharply delimited genus, the possible characters and limits of which are discussed. — 4. It would appear that the correct name for *Meruliopsis* Bond. apud Parmasto is *Caloporus* P. Karst. The taxon is considered as yet ill-defined; it had better be included in *Merulius* Fr. for the time being. Karsten's type species is identified with *Merulius taxicola* (Pers.) Duby. — 5. The genus *Hericium* Pers. per S. F. Gray, as now sometimes conceived, is broken up into three genera, *Hericium* s. str., *Creolophus* P. Karst., and *Dentipellis* Donk, gen. nov. (two new combinations), the latter a resupinate genus. Two of its species are discussed in some detail. — 6. It is concluded that Lowe misinterpreted *Trametes squalens* P. Karst., which is a pileate rather than a *Poria* species, conspecific with *Polyporus anceps* Peck, of a later date.

Acknowledgement.—It is a pleasant duty to tender my thanks to the Director of the Botanical Museum, Helsinki, Finland for the loan of specimens from Karsten's herbarium necessary for an understanding of the genera *Peniophorella* P. Karst. and *Caloporus* P. Karst.

1.—The form-genus Ostracoderma Fr. in connection with Hymenomycetes

It is well known that Brefeld emphasized secondary fructifications or imperfect states (anamorphoses) of Basidiomycetes for taxonomic purposes. He did not hesitate, in certain cases, to make the occurrence of particular imperfect states the main character of new genera. Examples are *Heterobasidion* Bref., introduced for *Fomes annosus* (Fr.) P. Karst. of which he found an *Oedocephalum* state; and *Tomentella* J.-Olsen apud Bref. ("Pers."; not *Tomentella* Pat., not *Tomentella* P. Karst.; cf. Donk *1957a:* 118–120). In the latter case, Brefeld (*1888:* 9) plainly stated: "Die Verschiedenheit zwischen [*Tomentella* und *Hypochnus*] besteht allein in der bei *Tomentella* gefundenen Conidien-Fructification." (Spacing is of the original.)

The two imperfect states which he ascribed to the two species he admitted to *Tomentella*, appear to belong to the same form-genus. Recently Donk (*1958:* 24) expressed the opinion that both perfect states, too, would fit in a single 'perfect' genus of a few species only, viz. *Botryohypochnus* Donk. Of one of the species (*Tomentella* *granulata* Bref.) no material was studied and it was solely judged from Brefeld's protologue. Of *T. flava* Bref., its author indicated in the original account that both states were observed to arise from the same hyphae: "Der Ursprung beider Fruchtformen, die nach einander, die Basidien zuletzt, auftreten, lässt sich hier in bestimmter Zeit des Herbstes an denselben Mycelfäden sicher beobachten" (Brefeld, *1888:* 11). On the figure (*pl. 1 f. 11*) the connection between the two spore-types is strongly suggested. Of the second species, *T. granulata*, the connection between the two states was inferred from circumstantial evidence: conidiophores and basidia were not actually seen to develop from the same hyphae. The spiny-spored *T. flava* was taken to correspond to a spiny-spored imperfect state, and the smooth-spored *T. granulata*, to a smooth-spored one. Other similarities of the spores of each pair of states, such as of shape and colour, were remarkable, too.

von Höhnel (*1907:* 86–87) also reported of a similar connection, in this case between "*Botrytis* (*Phymatotrichum*) *carnea* Schum. im Sinne der Sylloge fungorum" and a perfect state, which he thought to belong "sehr wahrscheinlich zur so häufigen *T*[*omentella*] *fusca* (P.)." The imperfect state he described rather fully, but of the basidiferous one he merely stated that he could find 'also' four-spored basidia, which might indicate that the basidia were seen mixed with the conidiophores. Since *Tomentella fusca*, as currently understood, is now often regarded as not closely related to *T. flava* = *T. isabellina* (Fr. per Fr.) Höhn. & L., one might conclude that von Höhnel made an error of determination (lack of clamps!) and that he studied the same species as Brefeld, viz. *T. isabellina*.

Many years later Juel (*1920*) described two imperfect states which he identified with *Hyphelia terrestris* Fr. and *Ostracoderma pulvinatum* Fr. and which closely resembled in essential features the imperfect states described by Brefeld. Juel was not able to establish the hymenomycetous nature of these fungi beyond doubt. In fact no basidiferous hyphae were encountered. Yet, in *O. pulvinatum* the arrangement of the nuclei in pairs was thought to be perhaps significant and on the whole he inclined to consider at least one of Brefeld's imperfect states possibly identical with *Hyphelia terrestris*. Some later authors (Nannfeldt, *1934:* 456–458) concluded like Juel, especially in view of the characters of the hyphae, that Juel's two form-species might well belong to the hymenomycetes and more in particular to *Botryobasidium* Donk and *Botryohypochnus* Donk, genera to which Brefeld's perfect states had been referred (Donk, *1931:* 118).

It looked as if sufficient indications had accumulated firmly to support Brefeld's conclusion. On the other hand it was significant that modern mycologists found no new instances of these connections, although at least one of the species (*T. isabellina*) proved to be common throughout Europe and North America. Even Litschauer, who studied extensive series of tomentellas (and who kept *T. isabellina* in *Tomentella*), was at a loss how to connect conidial states like those Brefeld had described. In naming material for Pilát (*1937:* 335) he remarked about a certain collection:

> "... ist ein Pilz der *Tomentella flava* Bref.[1]ähnlich ist. Ich habe bei diesem Pilz nie 4-sporige Basidien gefunden, sondern nur immer die Conidienträger mit den vielen Conidien. Auch Ihr Pilz zeigt keine 4-sporigen Basidien, sondern nur solche Conidienträger .... Ich halte diese Pilze nur für Nebenfruchtformen, aber nicht von *Tomentella*-arten, denn ich habe [sie] noch nie an solchen beobachten können. Man kann vielleicht den Pilz in die Imperfekten-Gattung *Zygodesmus*[2] einreihen, in die Gattung *Tomentella* jedenfalls nicht."

It is perhaps merely a remarkable coïncidence that in another instance, and apparently again on the instigation of Johan-Olsen, Brefeld accepted the connection of *Sebacina incrustans* (Pers. per Fr.) Tul. and an imperfect state which, too, is almost certainly not genetically related with the tremellaceous fungus (cf. Holtermann, *1898:* 71). For this '*Spicularia*'-like contamination, compare Arnaud (*1951:* 195 *fs. 4D, E*), who remarked of the only species of his genus *Flahaultia* (*F. hyalina* Arnaud), "Venant en compagnie du *Sebacina incrustans* (Trémellacées), de *Tomentella* sp. et autres champignons saprophytes dont il est probablement parasite. ... (Brefeld a décrit et figuré ce champignon comme forme conidienne de *Sebacina*, relation peu probable)."

The uneasy feeling that I nursed gradually changed into the conviction that Brefeld (or Olsen) was wrong after all and that he had brought completely unrelated fungi into connection with each other under *Tomentella*. What turned the scales was that Schneider (*1954*) described an imperfect stage from Germany which she did not identify, but of which she definitely established the connection with a discomycete, *Plicaria fulva* Schneider. This hyphomycete was well depicted and closely agreed with my conception of the form-genus *Ostracoderma*. This is the taxon Juel (*1920*) called *Hyphelia* Fr. and the correct name of which appears to be *Ostracoderma* (cf. Donk, *1956b:* 18; Nannfeldt, *1959:* 40 no. 2693). The resemblance is so strong that I now believe that Brefeld's two imperfect states ascribed to *Tomentella* belong to the discomycetes rather than the 'Corticiaceae' and this conclusion I expressed in connection with *Botryohypochnus:* "Conidial stages belonging to *Ostracoderma* Fr. (*Phymatotrichum* Bonord.) reported but presumably not belonging here" (Donk, *1958:* 24). Quite recently Korf (*1961:* 650) transferred *Plicatura fulva* to *Peziza* which necessitated a name change: *Peziza ostracoderma* Korf. He also reported that Dr. S. J. Hughes suggested that its imperfect state is best referred to the genus *Ostracoderma*.

It must be pointed out that Lohwag (*1934:* 254) had come to a similar conclusion but along a different way: "Da Brefeld seine *Tomentella*-Konidienträger als *Botrytis*-Stadien erklärt hat und bei *Sclerotinia* unter den Pezizales solche *Botrytis*-Stadien bekannt sind, so wird wohl Brefelds Konidienträger [nicht] zu *Tomentella* gehört haben ...."

Malençon's conclusion (*1960:* 234) is at variance with the above: "... il ne reste plus guère de raison de douter que les *Hyphelia* [sensu Fr. 1849] et *Ostracoderma*, selon la pensée de Juel, et le *Lycoperdellon* selon notre idée et celle de R. Heim, ne

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[1] Rather, 'the imperfect form ascribed to *Tomentella flava* by Brefeld'.

[2] Hardly. Compare Rogers (*1948*).

répresentent bien des états conidiens de Basidiomycètes, et non d'Ascomycètes comme le voulait H. Lohwag." The great resemblance of *Lycoperdellon* Torrend in habit and habitat makes it quite probable that it belongs to *Ostracoderma*, and, hence, is rather discomycetous, too, as had been tentatively stated by Lohwag (*1934:* 255): "*Lycoperdellon* ist kein Gastromyzet, sondern wahrscheinlich ein Imperfektstadium eines Askomyzeten."

As soon as it is accepted that all species referable to *Ostracoderma* are not imperfect states of Basidiomycetes, the names *Tomentella* J.-Olsen apud Bref. (preoccupied), *T. flava* Bref., and *T. granulata* Bref. become nomina confusa and as such impriorable (illegitimate), in my opinion.

In a publication now in press (Donk, *1962*) the following generic names related to *Ostracoderma* are discussed. Of these, *Hyphelia* Fr. 1825 has nothing to do with this genus, but *Hyphelia* [Fr. sensu] Fr. 1849 emend. Juel, *Phymatotrichum* Bon., and *Lycoperdellon* all seem synonymous.

(i) *Hyphelia* Fr., Syst. Orb. veg. 149. 1825; Elench. **1**: 161. 1828 (in obs.); Syst. mycol. **3** (1): 211. 1829.—The expressly designated type (as Fries conceived it) excludes this name from further consideration in this connection. It is presumably a nomen anamorphosis synonymous with *Laeticorticium* Donk (*1956b:* 1618).

(ii) *Ostracoderma* Fr., Syst. Orb. veg. 150. 1825; Syst. mycol. **3** (1): 213. 1829.—Monotype: *Ostracoderma pulvinatum* Fr.

(iii) *Hyphelia* [Fr. sensu] Fr., Summ. Veg. Scand. **2**: 447. 1849; emend. Juel *in* Svensk bot. Tidskr. **14**: 217. 1920.—This genus with this misapplied (or homonymous) name has *Hyphelia terrestris* Fr. = *Ostracoderma terrestre* (Fr.) Nannf. as its central species (type). The generic name is in any case not available in view of *Hyphelia* Fr. 1825. Juel combined *Hyphelia terrestris* and *Ostrocoderma pulvinatum* and formed a single genus of them.

(iv) *Phymatotrichum* Bon., Handb. allg. Mykol. 116. 1851.—Lectotype: *Phymatotrichum laneum* Bon. In my opinion based on a species of *Ostracoderma*.

(v) *Lycoperdellon* Torrend *in* Broteria (Sér. bot.) **11**: 92. 1913.—Monotype: *Lycogala torrendii* Bres. apud Torrend. Presumably another species of *Ostracoderma* and very close to its type.

2.—Additional notes on Hyphoderma Wallr.

For the re-introduction of the genus in a strongly emended form, see Donk (*1957b:* 13). The genus has been accepted in its new circumscription by Eriksson (*1958:* 95) and Christiansen (*1960:* 199). The following names are to be added as synonyms.

Peniophorella P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **48**: 427. 1889 (nomen confusum), in part. — Holotype: "*Peniophorella pubera* (Fr.?) Karst." sensu P. Karst. = *Peniophora puberula* Sacc., Syll. Fung. **9**: 238. 1891 (nomen confusum).

Gloeocystidiellum sect. *Stephanocystis* Boidin *in* Rev. Mycol. **21**: 122, 125. 1956 (nomen nudum; lacking any description). — *Corticium* sect. *Stephanocystis* Boidin, Essai biotax. (*in* Rev. Mycol., Mém. hors sér. **6**:) 333, 339. 1958 (lacking Latin description). — Holotype (1958): *Corticium tenue* Pat.

Boidin (*1958:* 339) has found that the structures called stephanocysts by him on an earlier occasion (Boidin, *1950:* 209 *f. 3*) may occur in abundance in the fruit-body of certain collections of *Hyphoderma tenue* (Pat.) Donk and closely related forms. These organs which induced Litschauer (*1928:* 126 *f. 4*) to segregate such collections under the name of *Gloeocystidium caliciferum* Litsch., may also appear in cultures of several other species according to Boidin, for instance of *Hyphoderma pallidum* (Bres.) Donk, *Peniophora pubera* (Fr.) Sacc. and "le *Corticium* 364 affine à *C. gemmiferum*". He proposed to assemble them into a distinct section which he called *Corticium* sect. *Stephanocystis*. It may well appear that still more species are able to produce these stephanocysts.

However, in extensive studies of several other species of *Hyphoderma*, like *H. heterocystidium* (Burt) Donk, *H. populneum* (Peck) Donk, and *H. mutatum* (Peck) Donk, by McKeen (*1952*) these remarkable organs were not reported. The species of this second set all form *Oedocephalum* states, viz. capitate conidiophores producing conidia simultaneously over the upper portion of the apical swelling. It would seem that the production of stephanocysts and of *Oedocephalum* conidiophores in cultures are mutually exclusive and may provide a welcome basis for future characterizing of sections. On the other hand it must be remembered that *Oedocephalum* conidiophores are produced by several apparently not closely related hymenomycetes: *Fomes annosus* (Fr.) P. Karst. (Brefeld, *1888:* 163–171 *pl. 10 fs. 10–16, pl. 11*), *Laurilia sulcata* (Burt) Pouz. (Maxwell, *1954:* 265 *fs. 1-7, 23–28*; Davidson *& al.*, *1961:* 272 *f. 5*; as *Stereum sulcatum* Burt), *Vararia "granulosa* (Fr.)" Laurila (Maxwell, *1954:* 268 *fs. 8–11, 29–31*), and *Corticium furfuraceum* Bres. (Maxwell, *1954:* 269 *fs. 12–15, 32–34*). Since no conidiophore formation could be demonstrated in species supposed to be related to some of these examples, the taxonomic value of these apparently erratic structures is questionable.

Of the type of *Hyphoderma*, viz. *H. setigerum* (Fr.) Donk, neither stephanocysts nor conidiophores have been reported. Boidin (*1958:* 134) did not find them in his cultures. Conceivably *Hyphoderma setigerum* might represent a third group, lacking both kinds of organs.

Peniophora pubera which Boidin refers to his section *Stephanocystis* is undoubtedly a good species of the present genus if the latter is conceived inclusive of such species as *Hyphoderma tenue*, although its vertical hyphae are often more strongly compacted than usual (fruit-body more waxy) and its cystidia (apart from the incrustation) are definitely more thick-walled than in the other cystidia-bearing species hitherto included. These two characters led Bourdot & Galzin (*1928:* 316) to place it in *Peniophora* sect. *Ceraceae* Bourd. & G. along with *Peniophora roumeguerii* (Bres.) Höhn. & L., *P. gigantea* (Fr. per Fr.) Mass., and other species, most of which are foreign to *Hyphoderma* I believe. I cannot follow Christiansen (*1960:* 171, 172), who quite recently transferred *Peniophora pubera* and *P. guttulifera* (P. Karst.) Sacc. to *Phlebia* Fr. One of the hall-marks of that genus as emended by Donk (*1957b:* 8) is the small spores. The spores of these two species are far bigger, in fact medium-sized, about 8–11 μ long, against 3.5–7 μ in most species of *Phlebia*, and they show all characters of typical spores of *Hyphoderma*. The hyphae, too, especially the loosely interwoven ones of the basal layer of the fruit-bodies are typical of *Hyphoderma* rather than of *Phlebia*. The following additions to the emended genus are proposed:

Hyphoderma guttuliferum (P. Karst.) Donk, *comb. nov.* (basionym, *Gloeocystidium guttuliferum* P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **48**: 430. 1889); *Hyphoderma puberum* (Fr.) Wallr.; **Hyphoderma typhicola** (Burt) Donk, *comb. nov.* (basionym, *Peniophora typhicola* Burt *in* Ann. Missouri bot. Gdn **12**: 319. 1926; description, Slysh, Genus Penioph. New York State 33 *f. 20.* 1960).

The genus *Peniophorella* P. Karst. was based on a single collection, preserved in Karsten's herbarium at Helsinki and labelled thus: "*Corticium puberum* Fr. / Helsingfors, d. 11 febr. 1867, ad ligna *Sorbi* / leg. W. Nylander." The contents of the package consists of two pieces of wood one with a paler and one with a darker, older fruit-body. The substratum is old decorticated wood that must have been sodden and soft when collected; its surface is covered with algal cells.

Sections through the fruit-bodies showed that they belonged to *Hyphoderma pubera* (Fr.) Wallr.; the hymenium is now collapsed and no fully developed basidia could be made out although a few quite typical spores that undoubtedly belong to the fungus could be found (about 9 × 3.75 μ) among clouds of algal cells and spores of an alien fungus. The latter are cylindrical, slightly curved, and of very unequal lengths (many, 6.25–10 × 1.5–2.5 μ), the poles truncately rounded, many divided into two cells with indications that each daughter-cell might finally become once more divided (perhaps after it has broken up into two). In KOH-ploxine solution the walls of these spores appeared to be thin; the contents of the daughter cells strongly absorbed the red colour but the broad, medial cross-wall remained uncoloured and made the impression, as if it were a narrow, linear, empty space dividing the spore into halves.

It was in the first place these two-celled spores that induced Karsten to introduce the monotypic genus *Peniophorella* as appears from his key to the genera of the "Thelephoreae" (*1889b:* 392):

α Cystiderna icke framstickande . . . . *Peniophora*
β Cystiderna framstickande
  1 Sporerna encelliga. Läderartade . . . . *Phanerochaete*
  2 Sporerna tvåcelliga. Vaxartade . . . . *Peniophorella*

The spores themselves he described thus, "Sporerna cylindriska, trubbiga, raka, vanl. ensepterade, 6—8 = 2 mmm." This is an accurate characterization of the spores described in some greater detail above and which I believe to be undoubtedly foreign although I am unable to suggest to which fungus they belong. Some of the spores agree exactly with the drawing of a single spore made by Karsten on the package at a later date accompanied by the note, "Cystid. hyalina, setaeformes." This conclusion renders the generic name *Peniophorella* as well as *Peniophora puberula* Sacc. based on *Peniophorella pubera* (Fr.) P. Karst. sensu P. Karst. illegitimate as nomina confusa: Karsten conceived a taxon based on elements supposed to form a single plant, rather than that he brought together in one taxon individual plants of different species.

3.—On Phanerochaete P. Karst.

PHANEROCHAETE P. Karst. emend.

Corticium Fr., Fl. scan. 340. 1835; Gen. Hym. 15. 1836; Epicr. 556. 1838; not *Corticium* Pers. *per* S. F. Gray, Nat. Arr. Brit. Pl. **1**: 653. 1821. — Lectotype (Donk *in* Taxon **6**: 26. 1957): *Thelephora velutina* (DC. per Pers.) Fr.

Xerocarpus P. Karst. *in* Rev. mycol. **3**/No. 9: 22. 1881; not *Xerocarpus* Guillerm. & P. Perrot 1832 (Papilionaceae). — Lectotype (Donk *in* Taxon **6**: 132. 1957): *Stereum alneum* (Fr.) Fr. sensu P. Karst. = *Peniophora coccineofulva* (Schw.) Burt.

Xerocarpus [subgen.] *Euxerocarpus* P. Karst. *in* Rev. mycol. **3**/No. 9: 22. 1881 (nomen nudum) ≡ *Xerocarpus* P. Karst.

Corticium "Pers." subgen. *Eucorticium* Wint. *in* Rab. Krypt.-Fl., 2. Aufl., **1** (1): 330. 1882. — Type species (selected): *Corticium velutinum* (DC. per Pers.) Fr.

Phanerochaete P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **48**: 426. 1889.

? *Peniophora* subgen. *Scopuloides* Mass. *in* J. Linn. Soc., Lond. (Bot.) **25**: 154. 1890. — *Scopuloides* (Mass.) Höhn. & L. *in* Wiesn. Festschr. 57, 58. 1908. — Lectotype (Donk *in* Taxon **6**: 112. 1957): *Peniophora hydnoides* Cooke & Mass. apud Cooke.

? *Grandiniella* P. Karst. *in* Hedwigia **34**: 8. 1895. — Lectotype (Clem. & Shear, Gen. Fungi 346. 1931): *Grandiniella livescens* P. Karst. — Cf. Donk *in* Taxon **6**: 72. 1957.

Peniophora sect. *Radicatae* Bourd. & G. *in* Bull. Soc. mycol. France **28**: 393. 1913 ("Groupe"); Hym. France 311. [1928]; not *Peniophora* sect. *Radicatae* G. Cunn. *in* Trans. roy. Soc. New Zeal. **83**: 253, 283. 1955 (lacking Latin description). — Lectotype: *Peniophora radicata* (P. Henn.) Höhn. & L.

Peniophora sect. *Membranaceae* Bourd. & G. *in* Bull. Soc. mycol. France **28**: 395. [1913] ("Groupe"); Hym. France 303. [1928]; not *Peniophora* sect. *Membranaceae* Killerm. *in* Nat. PflFam., 2. Aufl., **6**: 138. 1928. — Type species (selected): *Peniophora cremea* (Bres.) Sacc. & Syd.

? *Peniophora* sect. *Ceraceae* Bourd. & G. *in* Bull. Soc. mycol. France **28**: 400. [1913] ("Groupe"); Hym. France 314. [1928]. — Lectotype (Donk *in* Fungus **27**: 9. 1957): *Peniophora molleriana* (Bres.) ex Sacc.

? *Peniophora* sect. *Membranaceae* Killerm. *in* Nat. PflFam., 2. Aufl., **6**: 138. 1928; not *Peniophora* sect. *Membranaceae* Bourd. & G., Hym. France 303. 1928. — Lectotype (Donk *in* Fungus **27**: 9. 1957): *Peniophora gigantea* (Fr. per Fr.) Mass.

Membranicium John Erikss. *in* Symb. bot. upsal. **16** (1): 115. 1958 ("ad int."; lacking Latin description). — Type species (selected): *Peniophora cremea* (Bres.) Sacc. & Syd.

Corticium sect. *Subeffibulata* Boidin *in* Rev. Mycol. (Mém. hors-Sér.) **6**: 339. 1958 (lacking Latin description). — Type species (selected): *Peniophora cremea* (Bres.) Sacc. & Syd.

DESCRIPTIONS.—None published, the limits of the genus being as yet insufficiently established. The 'typical' species coincide with *Peniophora* sect. *Membranaceae* Bourd. & G., *1928:* 303, the description of which is quoted below. And compare Boidin, *1958:* 339 under *Corticium* sect. *Subeffibulata*, also quoted below.

LECTOTYPE (W. Cooke, Gen. Homobas. 73. 1953, as "*P. alnea* Karst.").—*Stereum alneum* (Fr.) Fr. sensu P. Karst. = *Peniophora Karstenii* Mass. = *P. coccineofulva* (Schw.) Burt. — Compare Donk (*1957a:* 108).

EXAMPLES.—*Peniophora affinis* Burt., *P. cacaina* Bourd. & G., *P. coccineofulva* (Schw.) Burt, ? *Odontia corrugata* (Fr.) P. Karst., *Peniophora cremea* (Bres.) Sacc. & Syd. = *P. sordida*, *P. eichleriana* (Bres.) Bourd. & G. sensu Bourd & G., *P. erinacea* Bourd., *P. filamentosa* (Berk. & C.) Burt, ? *P. gigantea* (Fr. per Fr.) Mass., ? *Odontia hydnoides* (Cooke & Mass. apud Cooke) Höhn., *Peniophora leprosa* (Bourd. & G.) Wakef. & Pears., *P. macrospora* Bres. apud Bourd. & G., *P. martellianum* Bres., *P. pelliculosa* Talbot, *P. sanguinea* (Fr.) Höhn. & L., *P. sordida* (P. Karst.) Höhn. & L., *P. sulphurina* (P. Karst.) Höhn. & L., *Corticium tuberculatum* P. Karst., *Peniophora velutina* (DC. per Pers.: Fr.) Cooke, &c.

Some authors have felt the desirability to treat *Peniophora* sect. *Membranaceae* Bourd. & G. as a distinct genus, although after the exclusion of the species of group B, which partly belong to *Hyphoderma* Wallr. [*Peniophora setigera* (Fr.) Höhn. & L., *P. mutata* (Peck) Höhn. & L.], partly to *Amylocorticium* Pouz. [*Peniophora subsulphurea* (P. Karst.) Höhn. & L.]. The genus would thus almost coincide with section *Membranaceae* group A of Bourdot & Galzin (*1928:* 303), which these authors defined as follows:

> "Hyphes basilaires sans boucles, généralement à parois épaisses, paraissant subarticulées aux cloisons et à ramification presque à angle droit."

Its species may be indicated as the group of *Peniophora cremea* (Bres.) Sacc. & Syd. If raised to generic level the correct name for it is *Phanerochaete* (cf. Donk, *1957a:* 108).

Eriksson (*1958:* 115) introduced for this *Peniophora cremea* group the generic name *Membranicium* in a tentative manner, "ad int." At the same time he slightly extended the scope of the taxon and also referred here "some species of the heterogeneous section *Radicatae* Bourd. & Galz. of *Peniophora*", such as *Peniophora sanguinea* (Fr.) Höhn. & L. He also remarked that perhaps non-cystidiate species like *Corticium tuberculatum* P. Karst. should be included.

What amounts to practically the same taxon was conceived by Boidin (*1958:* 339) under name *Corticium* sect. *Subeffibulata* Boidin:

> C'est la section *Membranaceae* "A" des *Peniophora* (*P. cremea, affinis, velutina, eichleriana, macrospora*) grossie du *P. sanguinea* et du *C. tuberculatum*. Nous sommes aussi tenté d'en rapprocher *Odontia corrugata*. Les boucles sont souvent rares, et opposées ou verticillées sur les hyphes les plus larges.

I had come to similar conclusions, but hesitated to discuss them in print for various reasons. For instance it appeared difficult to defend and define a genus *Phanerochaete* in this too restricted sense. The problem was which of the several presumably closely related groups were to be included and which to be left out. Although I still have not made up my mind in several respects it seems in any case time to launch the genus *Phanerochaete* for a second time and thus draw attention to it and to invoke critical consideration.

The emended genus should apparently not only contain the *Peniophora cremea* group but at least also some other elements of *Peniophora* Cooke sensu Bourd. & G., all with membranous fruit-bodies. Most of the species then will be cystidiate and completely lack clamp-connections in the fruit-body or these are restricted to subicular hyphae and lacking at the base of the basidia and in the subhymenium. Starting from such a premise I would include, for instance, also *Peniophora gigantea*, which I previously referred to *Phlebia* Fr. (cf. Donk, *1957b:* 8–12) and *Odontia hydnoides*. The latter species may appear to be conspecific with *Grandiniella livescens* P. Karst., the type of the generic name *Grandiniella* P. Karst., and it is the type of the still later generic name *Scopuloides* (Mass.) Höhn. & L. In both species the hyphae required for section *Membranaceae* according to Bourdot & Galzin's diagnosis are represented in some modified form: in *P. gigantea* firmly compacted and agglutinated into a well developed subicular layer of hyphae parallel to the substratum (as in *P. affinis*, in which species, however, they are less compacted and not agglutinated), and in *O. hydnoides* as some vestigial basal hyphae and as axial hyphae (one or a few only) in the teeth. If these species are admitted then perhaps more species with more waxy to gelatinous context should follow and *Phanerochaete* would coincide to a considerable extend with *Peniophora* section VII of Slysh (*1960:* 58).

Of the species mentioned above as examples of *Phanerochaete*, Boidin (*1958*) provided information on cultural characters of the following: *Peniophora cremea*, *P. macrospora*, *P. eichleriana* sensu Bourd. & G., *P. affinis*, *P. velutina*, *P. leprosa*, *P. sanguinea*, *P. gigantea*, *Odontia corrugata*, *O. hydnoides*. Most of these produced clamp-connections in culture at least on the biggest hyphae, where some may be in pairs (opposed) or in whorls. Exceptions: no clamp-connections at all were found in '*P. eichleriana*', while the situation in *P. leprosa* was not clear.

The presence of clamp-connections in pairs or whorls at the biggest hyphae has been known for a long time to occur also in *Coniophora* D.C. per Mérat in particular in *C. puteana* (Schum. per Fr.) P. Karst. These Coniophoraceae are not easily confused with *Phanerochaete* and in my opinion not related to it.

More interesting is the occurrence of this character in *Stereum* sections *Stereum* (= sect. *Luteola* Bourd. & G.) and *Cruenta* Bourd. & G. (cf. Boidin, *1958:* 187–194 *fs. 69, 70, 72, 73*). This may point to relationship between *Stereum* Pers. per S.F. Gray and *Phanerochaete*, but the differences between the two are quite obvious, especially as to the context which is dimitic with skeletals in *Stereum*.

The clamp-connection pattern typical of *Peniophora cremea* and several other species of *Phanerochaete* (viz. clamp-connections in the fruit-body scarce and formed only at the basal and widest hyphae where they may be found in pairs or whorls) may appear, or is known, to occur in quite a number of other resupinate 'Corticiaceae' with monomitic context. Those listed below may all prove to be taxonomically closely related: all have a continuous, membranous fruit-body with more or less thickening hymenium, too. It is difficult to draw exact limits between them and *Phanerochaete* 'sensu stricto' and it may be necessary in the future, when these groups are more carefully studied, to transfer some of them to *Phanerochaete*, as is already done here for a few species in a tentative manner. The groups I have in mind are:

(a) Hymenophore smooth; cystidia lacking.—*Corticium tuberculatum* P. Karst. and, perhaps, also *C. avellaneum* Bres. apud Bourd. & G. and *C. rhodoleucum* subsp. *C. galactitum* Bourd. & G. Placed in *Corticium* sect. *Subceraceacea* Bourd. & G. (*1928:* 187), lectotypus, *Corticium lacteum* (Fr.) Fr. sensu Bourd. & G. = *C. tuberculatum* P. Karst. This section was made up of various not too closely related elements like *Corticium lepidum* (Romell) Romell apud Egeland ≡ *Peniophora laurentii* Lundell and *Corticium rhodoleucum* Bourd. (genus *Amylocorticium* Pouz.). I strongly incline to include *Corticium tuberculatum* in *Phanerochaete* with which it agrees in all essential characters except that it lacks cystidia. Its relationship with the *Peniophora cremea* group has already been stressed by Eriksson and Boidin, as will appear from the quotations above.

(b) Hymenophore smooth; cystidia lacking.—*Corticium* sect. *Laeta* Bourd. & G. (*1928:* 189), lectotypus (cf. Bourdot, *1932:* 210!): *Corticium laetum* (P. Karst.) Bres. sensu Bourd. & G., viz. *C. laetum* f. *coriigena* Bourd. & G. This section ("à boucles rares et peu normales") apparently should be extended to include also *Corticium laetum* (P. Karst.) Bres. (but cf. Bourdot, *1932:* 210) and *Corticium salmonicolor* Berk. & Br., a tropical species. Of *Corticium anthracophilum* Bourd. its author stated that clamp-connections were rare, but Boidin (*1958:* 58) remarked: "Contrairement à celui-ci, le *C. anthracophilum* Bourdot (ex Herbier Bourdot no 25.131, in Herbier Gilbert) possède des boucles à toutes les cloisons de ses hyphes basilaires, sous hyméniales et au pied des basides." I found clamp-connections throughout the fruit-body also in two other collections from Bourdot's herbarium. Clamp-connections in pairs or whorls have not yet been reported for these species none of which has been studied in cultures in this respect, as far as I know. Like the foregoing group, section *Laeta* seems related to the *Peniophora cremea* group, although it has more voluminous spores than is usual for the cystidiate species listed as examples above. *Corticium auratum* Bourd. & G. (*1928:* 190) was brought into connection with one of the few larger-spored cystidiate species by its authors: "Par sa structure et ses spores, ce champignon semble se rapprocher un peu de certaines formes méridionales de *Peniophora macrospora* Bres. . . . ."

(c) Hymenophore merulioid; cystidia lacking. Fruit-body may be more or less typically effuso-reflexed.—For a discussion, see under *Caloporus* P. Karst. (p. 227).

(d) Hymenophore toothed; cystidia lacking or inconspicuous.—Examples, *Hydnum chrysorhizum* Torrey apud Eaton ex Eaton [syn., *Odontia fragillissima* (Berk. & C. apud Berk.) C. A. Brown], *Odontia krakatavi* Boedijn. In these species clamp-connections are rare. Boedijn (*1940:* 381) reported of *O. krakatavi* that on the wider hyphae of the mycelium "clamp connections are present, often arranged in whorls, just as in the genus *Coniophora*." By the context and loose attachment of the fruit-body and the conspicuous mycelial strands this group recalls *Peniophora filamentosa*. In any case, it is out of place in *Mycoacia* Donk.

(e) Hymenophore toothed; cystidia conspicuous.—Examples, *Peniophora hydnoides* Cooke & Mass. apud Cooke = *Odontia hydnoides* (Cooke) Höhn., *Odontia corrugata* (Fr.) Bres. The former has been considered related to *Peniophora gigantea* and I think it should be placed in the neighbourhood of that species in the same genus. According to Boidin (*1958:* 235–237) clamp-connections are rare in the margin and the subiculum of the fruit-body and lacking elsewhere, while in cultures clamp-connections in pairs and whorls were observed on the widest hyphae. In *Odontia corrugata* clamp-connections seem to vary in number in the fruit-bodies of different collections; Boidin (*1958:* 235) found them to be very rare in cultures where they occur on the widest hyphae, rarely in pairs. He suggested that it may be allied to the *Peniophora cremea* group (see quotation above). Although these two '*Odontia*' species are perhaps not mutually akin, they seem both referable to *Phanerochaete*.

One remark on *Peniophora filamentosa:* its hyphae are encrusted with matter dissolving crimson or wine-red in KOH solution. In this respect it recalls *Polyporus rutilans* (Pers.) per Fr. (genus *Hapalopilus* P. Karst.), and Talbot (*1951:* 25) concluded that there is surely a very close relationship between the two, which in present classifications are held so far apart.

Although I was tempted to make the presence of cystidia and the above discussed clamp-connection pattern prominent characters of an emended genus *Phanerochaete*, I am not disposed to do so any more. It is difficult to keep such species as *Corticium tuberculatum* out. It also appears difficult not to admit such species as *Peniophora eichleriana* lacking clamp-connections completely (see above) and, in the case of *Corticium* sect. *Laeta*, not to admit forms with clamp-connections throughout (cf. the example of *Corticium anthrocophilum*). A cystidiate species possessing clamp-connections throughout and presumably close to the *Peniophora cremea* group may be *P. ludoviciana* Burt. These and similar considerations would lead to an unwieldy but possibly more natural genus than the one restricted to only section *Membranaceae*. A diligent search for characters that will permit splitting up this broadly conceived genus is urgently needed.

4.—On the genus Caloporus P. Karst.

The following names are all based on the same species:

Caloporus P. Karst. *in* Rev. mycol. **3**/No. 9: 18. 1881; not *Caloporus* Quél., Ench. Fung. 164. 1886 (Polyporaceae). — Monotype: "*C*[*aloporus*] *incarnatus* (Alb. et Schw.)" sensu P. Karst. — Cf. Donk *in* Persoonia **1**: 192. 1960 & see below. → *Caloporia* P. Karst.

Caloporia P. Karst., Krit. Öfvers. Finl. Basidsv. Tillägg 2: 23. 1893 (= *in* Bidr. Känn. Finl. Nat. Folk **54**: 177. 1894) ≡ *Caloporus* P. Karst.

Poria sect. *Meruliae* Bourd. & G. *in* Bull. Soc. bot. France **41**: 220. 1925. — Type species (selected): *Poria taxicola* (Pers.) Bres.

Merulioporia Bond. & Sing. *in* Ann. mycol., Berl. **39**: 48. 1941 (lacking Latin description); *in* Sovetsk. Bot. **1943** (1): 38; not *Meruliporia* Murrill *in* Mycologia **34**: 596. 1942 (Coniophoraceae). — Holotype: *Poria taxicola* (Pers.) Bres. — Cf. Donk *in* Fungus **28**: 12. 1958 → *Meruliopsis* Bond. apud Parmasto.

Meruliopsis Bond. *apud* Parmasto *in* Eesti NSV Tead. Akad. Toim. **8** (Biol. 4): 274. 1959; *in* Notul. syst. Sect. crypt. Inst. bot. Acad. Sci. URSS **14**: 206. 1961 ≡ *Merulioporia* Bond. & Sing.

Some European authors now prefer to treat *Poria* sect. *Meruliae* Bourd. & G. as a distinct genus. As will be discussed below the correct generic name for this taxon is *Caloporus* rather than *Meruliopsis*. The species now attributed to it (under the name *Meruliopsis*) by Bondartsev (*1961:* 206) are *Merulius taxicola* (Pers.) Duby = *Poria taxicola* (Pers.) Bres. [syn., *Poria haematodes* (Rostk.) Egeland]; *Poria purpurea* (Fr.) Cooke; *Merulius violaceus* (Fr. per Fr.) Pat. = *Poria violacea* (Fr. per Fr.) Cooke sensu Bres.; and *Poria semitincta* (Peck) Cooke (cf. Parmasto, *1959:* 274 *fs. 7, 8, photogr. 5–7*). In the following lines only *Merulius taxicola* will be discussed. No opinion on the taxonomic position of any of the other species is given. The correct identification of *Poria purpurea* and *P. violacea* is still under discussion. Lowe (*1959:* 105) reduced *Poria semitincta* to the synonymy of *Poria fatiscens* (Berk. & Rav.) Cooke.

Both *Caloporus* and *Merulius* differ from the polypores by the 'merulioid' hymenophore, with the edges of the folds fertile (at least in not too old portions). It is less easy to formulate the differences between *Caloporus* and *Merulius* themselves. Bondartsev & Singer's key (*1941:* 48) give for *Merulius*, "Fruchtkörperhyphen mit Schnallen. Hymenophor netzig-wabig", and for *Merulioporia* (= *Caloporus*), "Fruchtkörperhyphen ohne Schnallen. Hymenophore kurzröhrig-porig." Shortly afterwards Bondartsev & Singer (*1943:* 38) somewhat diluted the character of lacking clamp-connections by stating, "hyphis haud fibuligeris vel fibulis rarissimis instructis". None of the subsequent authors accepting *Merulioporia* (or *Meruliopsis*) has improved upon the generic character. Both features emphasized are insufficient to distinguish the genus from *Merulius* in its current sense. As to the 'pores', it is rather surprising that *Merulius taxicola* has ever been transferred to *Poria:* the young hymenium is definitely merulioid. For instance Persoon (who described the species in *Xylomyzon*) and Berkeley (as *Merulius ravenelii* Berk.) did not consider it to belong to *Polyporus* sensu lato. As to the clamp-connections, these do occur although rarely in some of the species referred to this taxon even on the hyphae of the fruit-body (*fide* Parmasto, l.c., in *Poria semitincta*). In cultures the mycelium of *M. taxicola* is characterized by some hyphae having multiple clamp-connections like those present in cultures of certain species of *Coniophora* and *Stereum* (Nobles, *1958:* 902) and in certain species of *Phanerochaete* P. Karst. emend. (this paper, p. 223). Hansen (*1956:* 252) previously reported that in fruit-bodies of '*Poria*' *taxicola* clamp-connections were wanting but occurred in cultures on very wide and thin-walled mycelial hyphae.

None of the supporters of the generic status of the present group seems to have carefully studied the occurrence of clamp-connections in the 'true' *Merulius* species. A similar situation as in '*Poria*' *taxicola* is known to exist in other species of that genus: Boidin (*1958:* 177 *f. 63*) found that in *Merulius corium* (Pers. per Pers.) Fr.[3] clamp-connections are lacking in the fruit-body at the base of the basidia and in the subhymenium, and that they are extremely rare in the subiculum and the upper portion of the cap; in cultures rare clamp-connections do occur and then they may be in twos on the wider hyphae. Nobles (l.c.) noted that in cultures the mycelium of *Merulius ambiguus* Berk. also behaved as in '*Poria*' *taxicola* by forming multiple clamp-connections on some of the hyphae. I found rare clamp connections in the fruit-body in the abhymenial layer of both *M. corium* and *M. ambiguus*. In contrast to this situation clamp-connections occur at all septa in the fruit-body of *Merulius tremellosus* Schrad. per Fr., the type species of *Merulius* Fr.

Although it has been usually classed by modern authors as a species of *Poria*, *Merulius taxicola* is by no means a strictly resupinate species: like most 'true' species of *Merulius* the fruit-body may (exceptionally) form reflexed portions.

In view of this situation it must be concluded that no really diagnostic characters have been brought forward to distinguish *Caloporus* (in the sense of *Merulioporia* and *Meruliopsis*) from *Merulius* Fr. One might simply transfer such species with few

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[3] Nobles (*1958:* 913) apparently studied a different species under this name.

clamp-connections to *Caloporus*, but this seems at present hardly a well-founded solution. Not until *Merulius* will have been critically re-studied does it seem wise to break up the genus on the basis of the occurrence of clamp-connections only.

Already for a considerable time I inclined more and more to the conclusion that Karsten's genus *Caloporus* was an earlier name for *Merulioporia* ≡ *Meruliopsis*. Careful study of his publications and additional distributed specimens pointed into that direction. Apparently a tentative conclusion reached on the basis of some specimens sent to Fries early in his mycological career by Karsten (Donk, *1933:* 143) and which would make *Caloporus* a synonym of *Tyromyces* (in the sense of *Leptoporus* Quél. sensu Bourd. & G.) cannot be defended any more.[4] Patouillard's conclusion that *Polyporus incarnatus* (Pers.) per Fr. sensu P. Karst. belonged to *Merulius ravenelii* Berk. = *M. taxicola* (cf. Donk, *1960:* 192–193) proved to be correct and agrees with Romell's opinion (*1912:* 638) that *Polyporus incarnatus* sensu P. Karst. was *Polyporus haematodes* Rostk., the name Romell preferred to indicate *Merulius taxicola*.

Supplementary evidence to support this conclusion may now be supplied. Karsten distributed *Merulius taxicola* in *1870* (no. 904) under the name *Polyporus incarnatus* and it is likely that Patouillard and Romell based their interpretation on this material. Some years later Karsten (*1876:* 273) adnotated *Polyporus incarnatus* thus: "Usque ad 2 cm. longus, saepe confluens, ambitu primo albo, dein incarnata, poris obscurioribus." This shows again that he had *Merulius pinicola* in mind. Again some years later, Karsten (*1882b:* 62) published a rather full and completely personal description (although lacking microscopical details) from which the same fungus can be easily recognized. Finally I have recently been in the position to study three specimens from Finland named by Karsten himself. All belong to *Merulius pinicola*; they are listed below.

When Karsten published the generic name *Caloporus* (*in* Rev. mycol. **3**/No. 9: 18. 1881) he gave an insufficient and misleading generic description in a key: "Contextus coloratus. / Contextus subgilvus, cinnabarinus vel incarnatus. / Pileus fere nullus. Resupinatus." No description of the only original species was added, but next year Karsten (*1882b:* 62) supplied the above mentioned full description of this species to make clear what precisely he had had in mind when introducing the generic name: "*Caloporus incarnatus* (Alb. & Schw.) Karst. in Revue Mycologique, 1881, p. 18, qualis saltem in Fennia obvenit, quare novam plenioremque hic dare liceat: [follows description]." It is thus clear that *Caloporus* was published in the period that its author referred *Merulius pinicola* to *Polyporus incarnatus*. The imperfections of the generic description become evident from the specific description: the context itself it not coloured in this genus ("Receptaculum . . . album, demum

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[4] The specimens were on pine, (i) Kyto, 6. Oct. 1866 and (ii) Mustiala, m. Octobri 1866 and Donk referred them to *Polyporus erubescens*. Fr. sensu Bourd. & G. These determinations may appear subject to rectification but the specimens were in any case not *Merulius taxicola*. My notes on them were lost. It is likely that, if Karsten retained specimens of these collections, they will be found in his herbarium under an altered name.

dilute incarnatum . . .") but the hymenophore is (". . . pori . . . carneo-brunnei vel sanguineo-atri, subinde incarnati").

It would appear that Karsten himself soon realized that he had acted somewhat hastily because he gave up *Caloporus* the next year and included its type species in *Physisporus* Chev. emend. (*1882a:* 57), a genus he distinguished from "*Poria* (Hill.) Karst." by its white, pallid, or bright colours of the context against dark colours in *Poria*. When Karsten (*1893:* 177) reintroduced the genus (as *Caloporia*, with a reference to *Caloporus incarnatus* as described by him in *1882b:* 62) he did not stress the colour of the context as he had done when he first published *Caloporus*, his generic description being, "Porerna vaxartade; for öfrigt som *Physisporus*" (Pores waxy; apart from that like *Physisporus*).

In order to understand the latest determinations of Karsten's herbarium specimens the following digression is necessary, although it has little to do with the application of the name *Caloporus*.[5] When Karsten (*1893*: 177) reintroduced the genus as *Caloporia* he referred to his description of *Caloporus incarnatus* (*1882b:* 62) and presumably admitted only one species (no description), which this time he called *Caloporia violacea* (Fr. per Fr.) P. Karst.[6] In an observation to the latter species, he referred to *Polyporus incarnatus* as *Physisporus incarnatus*, which seems to indicate that he did not admit it to the genus any more. The clue to understand this new situation is in my opinion that he wanted to announce that the species he had previously called *Polyporus* (*Caloporus*, *Physisporus*) *incarnatus* (1870–1889) should correctly be known as *Caloporia violacea* and that he returned to Fries's description (*1874:* 573) for *Physisporus incarnatus*, which he distinguished from *Caloporia violacea:* "genom blekare, köttröda, enkla porer och kork-läderartad consistens samt är mindre allmänt förekommande" (by paler, flesh-coloured, simple pores and corky-leathery consistency as well as less common occurrence). Finally, Karsten (*1896:* 44; *1898:* 76) described a new interpretation of *Polyporus incarnatus* under the name *Caloporia incarnata* (A. & S. per Fr.) P. Karst. which may belong to the genus but is hardly his former *Caloporus incarnatus:* compare, "Pori . . . carneo-pallidi, demum subrufi."

The following specimens named by Karsten (H) were recently studied and belong to *Merulius taxicola*.

(i) "*Polyporus incarnatus* (Pers.) / Finlandia media, Asikkala. / J. P. Norrlin / m. martio, 1863", from Nylander's herbarium.

(ii) "*Polyporus violaceus* / Tyrvis Sept. 1859", from Karsten's herbarium.

(iii) "*Poria violacea* Fr. (Sacc. Sylll Fung. VI. 319) / Ta[mmela], Mustiala, in ligno Pini / 21/XI 1878 / leg. P. A. K." An earlier label reads: "*rixosus* Karst. (crossed out) / Mustiala, in ligno pini, 21 Nov. 1878" with corrected determination, "*Polyporus violaceus* Fr. *P. purpureus* Rostk." From Karsten's herbarium.

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[5] Karsten's description of *1889b* (p. 315–316) of *Physisporus incarnatus* (Pers. per Fr.) Gillet contains some microscopical details: "Basiderna n. klotrunda. Cystiderna äggrunda. Sporerna äggrunda". I am completely at a loss to explain this incomprehensible addition and now consider it inserted by error.

[6] Specimen cited: Lapland, leg. Nylander. Not studied by me.

5.—A segregate from Hericium

Bourdot & Galzin (*1928:* 442) made of *Dryodon* Quél. [ex P. Karst.] a well-defined taxon of hydnaceous fungi characterized microscopically by short-ellipsoid to subglobose spores with amyloid walls and copious gloeocystidia. The correct name for this taxon proved to be *Hericium* Pers. per S. F. Gray. I believe this to be a natural series of closely related genera, two of which received a name but for the resupinate species no name is available and, hence, one is provided here. The three genera may be keyed out thus:

KEY TO THE GENERA INCLUDED IN HERICIUM

1. Fruit-body membranous, wholly resupinate or effuso-reflexed, a subicular layer bearing the teeth. Context non-amyloid. *Dentipellis* Donk
1. Fruit-body typically rooting, branched or pileate.
   2. Fruit-body pileate; pileus dorsiventrally applanate, marginate, sterile above (where scattered abortive teeth may occur as thick 'hairs'), bearing the fertile teeth on underside. Context non-amyloid. *Creolophus* P. Karst.[7]
   2. Fruit-body more or less branched, the branching loose to strongly contracted; teeth pendent or spreading in all directions, terminal on the branches or also along their sides. Context amyloid. *Hericium* Pers. per S. F. Gray

Although *Hericium* and *Creolophus* have nothing in their appearance that would suggest typical 'Corticiaceae', this cannot be said of *Dentipellis* with its resupinate fruit-body: the latter genus seems to be the connecting link between these genera and such corticiaceous genera with smooth or granular hymenial surface like in *Gloeocystidiellum* Donk (*1956b:* 8, 12), which has both gloeocystidia and amyloid spores and seems not only connected with the *Hericium* series but also with other still more typical genera of the Corticiaceae. If one restricts the Hydnaceae to *Hydnum* L. per Fr., type *H. repandum* L. per Fr. (and perhaps a few more stalked genera), then this series of *Hericium* would be best included '*par enchainement*' in the Corticiaceae (cf. Donk, *1931:* 160). In case one wants to take this series out of that family one will have to solve the problem how to draw its limits with the remainder. Merely adding *Gloeocystidiellum* to the series would not really be a satisfactory solution.

The following note in which *Hericium* is mentioned is a remark made by Corner when he introduced *Amylaria* Corner, a clavariaceous genus.

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[7] The use of the name *Creolophus* here is tentative. In view of the meaning of the name and the generic description I think that Karsten had primarily *Hydnum cirrhatum* Pers. per Fr. in mind when introducing the genus. However, its present lectotype is the first species listed, viz. *Hydnum corrugatum* Fr. per Fr. (cf. Donk, *1956a:* 74): when he published the genus, Karsten listed it thus, "*Cr. corrugatus* (Fr.), extra Sveciam solum in Fennia (in regione Mustialensi hoc anno ad truncum Betulae lect.)". This species, at least as conceived by Karsten, is in my opinion closely related to *H. cirrhatum*, if not a mere form of it. In his description Karsten (*1882a:* 93) described the spores as "klotrunda, 2–3 mm. i diam." He gave the same spore characters for his next species, *H. cirrhatum*, which is the only species of this group I am well acquainted with.

> "Its affinity is with *Hericium* of the Hydnaceae. The two genera have in common the amyloid spore of very uniform size and shape: no other clavarioid genera have amyloid spores. It may seem trifling, but this is the clue which connects the erect, flabellate branched fruit-bodies of *Amylaria* with the horizontal and decurved ones of *Hericium*. The spines of *Hericium* are, in fact, the positively geotropic branchlets of a clavarioid fruit-body, and *Hericium* stands to *Amylaria* as *Deflexula* to *Pterula*. . . . The spores [of *Amylaria*] resemble those of *Polyporus berkeleyi* Fr. and *P. montanus* (Quél.) R. Ferry, which are placed by Singer in his genus *Bondarzewia*. The echinulate character may be generic in *Amylaria*. The spores of *Hericium* are mostly smooth, but slight indications of asperities occur in some species. The gloeocystidia of *Hericium* are lacking from *Amylaria*, as they are from *Bondarzewia*. This genus has, also, the dimitic construction of *Amylaria*, which *Hericium* lacks. These three genera, clavarioid, hydnoid and polyporoid, show remarkable resemblance and suggest that in the Himalayan region, which I have long regarded as the most critical in the world for systematic mycology, connexions will be found with *Lactarius*, *Russula* and the asterosporous Gastromycetes."—Corner (*1955:* 199).

No doubt this note induced the publication of the family Bondarzewiaceae Kotlaba & Pouzar (*1957:* 163, 170) characterized in the English text by nothing else but "with fleshy context and amyloid spores", and including the genera *Amylaria*, *Hericium*, and *Bondarzewia* Sing., all mentioned by Corner in the quoted note. These two characters by themselves even in combination appear to be insufficient for indicating true relationship at the family level. Moreover, the question arises immediately why *Mucronella* Fr. (at least in part) and several other species of Clavariaceae are not included. The former genus has some species with amyloid and others with non-amyloid spores. Among the 'true' Clavariaceae (viz. exclusive of *Ramaria* and *Clavulina*) several species exist with weakly amyloid (cf. Singer, *1936:* 155) and even with strongly amyloid spores (unpublished). Singer had previously suggested relationship of *Hericium* sensu lato with the Clavariaceae precisely on the basis of the weakly amyloid spored species he had come across in that family, and the not yet positively geotropic youth stages he had observed in '*Dryodon coralloides*'.

In am unable for the present to consider *Amylaria*, *Hericium*, and *Bondarzewia* really so closely related as to merit inclusion in a single family. I would admit the Bondarzewiaceae with only a single genus: *Bondarzewia*.

Hericium bresadolae (Quél.) Malençon (*1958:* 321 *fs. 8, 8 bis*), or, rather, *Mucronella fasciculare* (A. & S. per Fr.) Fr. sensu Bresadola (*1903:* 90), in my opinion does not belong to the *Hericium* series because it lacks the prominent gloeocystidia and the spores, too, are not precisely those of that series. The presence of some oleiferous hyphae does not prevent its inclusion in *Mucronella*, a genus of which at least one other species is known to me to produce amyloid spores (unpublished).

Dentipellis Donk, *gen. nov.*[8]

Hericium subsect. *Fragilia* Nikol., Hydnac. *in* Fl. Pl. crypt. URSS **6** (2): 234. 1961. — Holotype: *Hericium fragile* (Pers. per Fr.) Kotlaba.

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[8] From Lat. dens, tooth and pellis, skin. Gender: f.

Saprobica. Receptaculum resupinatum, effusum, indeterminatum, rariter effuso-reflexum, separabile, membranaceum, albidum, spinulosum, spinulis longis (–1.5 cm), gracilibus, fragilibus. Hyphae fibulatae. Gloeocystidia adsunt. Basidia aseptata, clavata, sterigmata 2–4 gerentia. Sporae globosae, ovoideae vel ellipsoideae, subminutae (4.5–6 μ), incolores, parietibus levibus, amyloideis. — Typus: *Hydnum fragile* Pers. per Fr.

Fruit-body wholly resupinate, rarely effuso-reflexed, more or less separable especially after drying, consisting of a membranous, soft basal layer from which the teeth develop; teeth often long (– 1.5 cm), slender, rather densely crowded, fragile; context non-amyloid. Hyphae with clamp-connections. Gloeocystidia present. Basidia undivided, clavate, with 2–4 apical sterigmata. Spores globose, broadly ovoid, or short-ellipsoid, small (3.5–6 μ); wall smooth, amyloid.

On rotten wood.

TYPE SPECIES.—*Hydnum fragile* Pers. per Fr.

EXAMPLES.—*Dentipellis fragilis* (Pers. per Fr.) Donk, *D. separans* (Peck) Donk, see below; and two other species as yet undetermined.

Dentipellis fragilis (Pers. per Fr.) Donk, *comb. nov.*

Hydnum fragile Pers., Syn. Fung. 561. 1801 (devalidated name). — *Hydnum fragile* Pers. *per* Fr., Syst. mycol. **1**: 417. 1821; Pers., Mycol. europ. **2**: 179. 1825; not *Hydnum fragile* Fr. *in* Öfvers. K. svensk VetAkad. Förh. **8**: 53. 1852; not *Hydnum fragile* Petch *in* Ann. R. bot. Gdns, Peradeniya **7**: 287. 1922. — *Dryodon fragilis* (Pers. per Fr.) Bourd & G., Hym. France 444. [1928]. — *Hericium fragile* (Pers. per Fr.) Kotlaba *in* Ochrana Přírody **15**: 73. 1960; Nikol., Hydnac. *in* Fl. Pl. crypt. URSS **6** (2): 234 *fs. 179, 180, pl. 51.* 1961.

MISAPPLICATIONS.—*Hydnum mucidum* Pers. per Fr. *sensu* Fr., Syst. mycol. **1**: 418. 1821; Elench. **1**: 138. 1828; Quél., Ench. Fung. 193. 1886 (*Dryodon*).

Hydnum nodulosum Fr. *sensu* Pilát *in* Mykologia, Praha **2**: 52 *figs.* 1925 (*Acia*); Cejp, Monogr. Hydn. Ceskosl. 315. 1928 (*Dryodon*); Nikol. *in* Bot. Zh. **41**: 993 *fs. 1, 2.* 1956 (*Hericium*).

Hydnum macrodon Pers. per Fr. *sensu* Lundell *in* Lund. & Nannf., Fungi exs. suec. Fasc. 21–22: 13 No. 1019. 1941 (*Odontia*).

DESCRIPTIONS & ILLUSTRATIONS.—Bourd. & G., Hym. France 444. 1928 (*Dryodon*); Nikol., Hydnac. *in* Fl.Pl. crypt. URSS **6** (2): 234 *fs. 179, 180, pl. 51.* 1961 (*Hericium*).

Fries revalidated the name *Hydnum fragile* without having seen any specimens himself. The monotype has been preserved at Leiden in Persoon's herbarium and represents the fungus described by Bourdot & Galzin as *Dryodon fragilis*. It has copious gloeocystidia and amyloid spores. The late Rev. H. Bourdot (*in lit.*) confirmed the identity. The specimen was also studied by Bresadola [*1897:* 94 (30)]. Bresadola also indicated that he had studied 'authentic' material of *Hydnum macrodon* Pers. (which, incidentally, was sent to Persoon by Ludwig, who also sent to him *Hydnum fragile*). I have been unable to locate authentic material of *H. macrodon* and incline to the opinion that Bresadola committed an error in indicating he had seen the type. Judging from the description I conclude that *H. macrodon* was something quite different from *H. fragile*. The original description (Persoon, *1801:* 560, re-published by Fries, *1821:* 415) calls for a fungus without subicular layer: "pileo oblitterato . . . Subiculum fere nullum." This feature Persoon took very seriously, for later on (*1825:* 178) he placed *H. macrodon*, together with two species of the future genus *Mucronella* Fr. (*Hydnum fasciculare* A. & S. and *H. calvum* A. & S.), in a special group characterized, "*subiculo* (pileo) *obsolete aut nullo.*" If Bresadola did not err in stating he had seen Persoon's specimen of *H. macrodon*, he still might have erred as to the identity of the specimen, for on one other occasion at least he confused *H. fragile* with an entirely different species. Although it is most likely that the true *H. macrodon* is a species of *Mucronella* [cf. *M. fasciculare* (A. & S. per Fr.) Fr. sensu Bres., *1903:* 90 = *Hericium bresadolae* (Quél.) Malençon, *1958:* 321 *f. 8*] it is difficult to accept this without a strong measure of hesitation: in my opinion the name *H. macrodon* should be rejected as a nomen dubium.

The species described by Bourdot & Galzin (*1928:* 426) as *Odontia macrodon* (Pers. per Fr.) Bourd. & G. is something quite different from *H. fragile*, too. The French authors based their interpretation on a determination by Bresadola of a collection from Iseure, France, and which he labelled "*H. macrodon* — *fragile* — *mucidum* Fr." This species is not congeneric with *Dentipellis fragilis*. I studied the specimen from Iseure and compared it with Persoon's description of his *H. macrodon* and believe it quite unlikely that Bourdot & Galzin correctly applied the Persoonian name.

For remarks on what Fries (after 1821) called *H. fragile*, see Lundell (*1941:* 13 no. 1019): the specimens preserved have nothing to do with *H. fragile*. Later on Fries (*1874:* 616) renamed one of his interpretations (*1863:* 279) *Hydnum nodulosum* Fr. Of this species the original drawing has been preserved: according to Lundell it represents "no hydnacea at all, but a juvenile polypore, either *Trametes serialis* (Fr.) Fr. or *Polyporus radiatus* Sow. ex Fr. var. *nodulosus* (Fr.)." This *Hydnum nodulosum* has been differently interpreted, first, as a variety of *Mycoacia stenodon* (Pers.) Donk by Bourdot & Galzin (as *Acia*), and, secondly, the name was used for *Dentipellis fragilis* by Pilát and other authors.

Still another name brought into connection with the present fungus is *Hydnum mucidum* Pers. However, the specimen in Persoon's herbarium shows a quite different fungus from *H. fragile*. The author who identified *H. mucidum* with what is here called *Dentipellis fragilis* was Fries: compare Lundell (l.c.): "Fries himself mistook our species for *Hydnum mucidum* Pers., under which name there is a gathering of it from Femsjö in his herbarium. In 'Stirpes agri femsionensis' (p. 62) it is listed as 'frequens'."

The species which Miller and some subsequent North American authors have identified with *Hydnum macrodon* Pers. per Fr. is quite distinct and treated below as *Dentipellis separans*.

A collection from the U.S.A., annotated "reflexed, leathery", seems to be closely related to *D. fragilis* but may still appear specifically distinct.

In addition to what may appear typical chlamydospores several species of *Hericium* sensu lato produce 'microconidia' (de Seynes, *1891*; Bourdot & Galzin, *1928:* 442, 443). In *Dentipellis fragilis*, too, many gloeocystidia become regurlarly constricted towards their apices and thus assume the appearance of strings of beads (Nikolajeva, *1956* & *1958*, under *Hericium nodulosum*; *1961:* 234 *fs. 9, 11*). Nikolajeva introduced the term schizocystidia for them and called the beads microschizospores. I am not convinced that the latter are really conidia.

Dentipellis separans (Peck) Donk, *comb. nov.*

Hydnum separans Peck *in* Rep. New York St. Mus. **50**: 112. 1897 (description copied by C. A. Brown *in* Bot. Gaz. **96**: 663. 1935). — *Odontia separans* (Peck) C. A. Brown *in* Bot. Gaz. **96**: 663 *f. 12.* 1935.

MISAPPLICATIONS.—*Hydnum macrodon* Pers. per Fr. *sensu* L. W. Mill. *in* Mycologia **25**: 365. 1933 (*Oxydontia*); L. W. Mill. & Boyle *in* Stud. nat. Hist. Univ. Iowa **18** (2): 39. 1943 (*Mycoacia*).

DESCRIPTIONS & ILLUSTRATIONS.—L. W. Mill. *in* Mycologia **25**: 365 *pl. 43 f. 7.* 1933 (*Oxydontia macrodon*); C. A. Brown *in* Bot. Gaz. **96**: 663 *f. 12.* 1935 (*Odontia*); L. W. Mill. & Boyle *in* Stud. nat. Hist. Univ. Iowa **18** (2): 39 *textpl. 6 f. 37.* 1943 (*Mycoacia macrodon*).

Differs from *Dentipellis fragilis* in the smaller, more ellipsoid spores; in the presence (in KOH-phloxine solution) of thick-walled hyphae in addition to thin-walled hyphae, which in the teeth are very conspicuous mainly in the axes, and in microscope squashes remind of slender nematodes because of the often swollen hyaline walls (the lumina being often capillary but still discernible as they absorb phloxine); and perhaps in the fruit-body which seems to be less developed, with shorter teeth, and with softer, still more cottony-membranous subicular layer. Distinctly beaded gloeocystidia seen, but none breaking up.

TYPE.—U.S.A., New York, Adirondack Mts. (NYS).

This species in some respects (thick-walled hyphae) recalls *Gloeocystidiellum heterogeneum* (Bourd. & G.) Donk, and like that species may deserve to be placed in a distinct taxon (section), but such action must be postponed until a third still undetermined and rather aberrant species has been more fully studied.

The species seems rare in the U.S.A. Miller confused it with the distinct European species called *Dentipellis fragilis* in this paper. I am not quite sure that the specimen he sent to me is fully identical with the one described by Brown because I could study only an insignificant fragment of Brown's material.

6.—Trametes squalens not a Poria

In his revision of the types of Karsten's polypores, Lowe (*1956:* 123), made of the pileate species *Trametes squalens* P. Karst. a wholly resupinate one which he transfered to *Poria* Pers. per S.F. Gray. This invites some comment.

Trametes squalens as originally described (Karsten, *1886a:* no. 3528; *1887a*: 30) was a pileate species: "Pilei stuppeo-suberosi, triquetri, seriatim elongati, confluentes, azoni, glabri, pallescentes, dein rufescentes, rufi vel brunnei, saepe resupinati. . . ." Karsten (*1887b:* 79) soon transferred the species to *Bjerkandera* P. Karst. The description was somewhat augmented: "Pilei . . . molliusculi (in statu udo), . . . dein . . . rufi vel brunneo-nigrescentes, 2 mm.–2 cm. crassi, margine subacuto, saepissime effuso-reflexi vel toti resupinati. . . ." It may be pointed out in this connection that at that time he restricted *Trametes* Fr. to pileate species only, and that *Bjerkandera* P. Karst was introduced by him as, and ever remained to him, another genus of pileate species. Moreover, it is worthwhile to remark that if Karsten considered a species resupinate he carefully avoided the use of the word 'pileus' in the cited publications.

Romell (*1911:* 10) was well aware that Karsten had mixed up *Trametes squalens* with a completely resupinate polypore: "Karsten's herbarium contains several collections of *Polyporus albo-brunneus* Romell, all named 'squalens'. The original *Pol. squalens*, distributed in Rabenhorst-Winter, Fungi Eur. No. 3528, is, however, another species." A considerable time afterwards Romell (*1926:* 7) repeated this statement, somewhat differently phrased. There can be no doubt that on both occasions the resupinate element was unequivocally excluded and provided with a name; and that the name *Trametes squalens* was retained in strict agreement with the original description and intention, since the pileate element determined the classification of the species when it was published.

These two facts, Karsten describing and classifying a pileate species that may occur resupinate, and Romell excluding the resupinate admixture would seem to secure the name's future application. Romell has been followed until recently by all subsequent mycologists, like Bourdot & Galzin (*1928:* 593), Pilát (*1940:* 312), and Eriksson & Lundell (*1953:* 2 no. 2102). The last mentioned authors specified the Uppsala copy of the type distribution as the specimen by which they interpreted the type distribution.

Lowe's argument to change all this is as follows. (i) Most copies of the type distribution contain *Poria albobrunnea* (Romell) Baxter, a strictly resupinate species. (ii) Karsten's illustration (*1889a:* 5 *pl. 2 f. 65*) applies to the resupinate species. (iii) Karsten's comment (*1891:* 247), "comparing *Bjerkandera roseomaculata* with it and with *Trametes serialis* Fries, indicates that he did not have a clear concept of the species",[9] and Lowe concludes that "there should be little question of Karsten's original concept of this species", meaning that it is a resupinate one. (iv) The reflexed plant is "unfortunately uniformly sterile" and "a satisfactory determination can scarcely be made". It is unknown to Lowe. He finishes with transferring the name to *Poria albobrunnea* as *Poria squalens* (P. Karst.) Lowe.

I would raise the following objections to the argument. (i) The copies of the type distribution at Uppsala and some other herbaria do consist or contain the pileate species. (I may add the Leiden copy as one of these.) There is no foundation in the Code that in selecting types the amount of the mixed up elements should be decisive. (ii) The decisive element in selecting a type is the original description, and, from what has already been stated above, it will be difficult to agree that Karsten's concept was primarily based on the poria. Moreover, Karsten did not alter his original concept in 1889a; although his figure depicts a resupinate fungus, the accompanying description is mainly that of 1887b, with slight additions; for instance, to 'triquetri' was added 'et effusi', and some microscopical details were supplied. In no way the species (still placed in *Bjerkandera*) had become a resupinate one as Lowe's comment would suggest. (iii) The comparison of *Bjerkandera roseomaculata* P. Karst. with *B. squalens* (P. Karst.) P. Karst. and *Trametes serialis* (Fr.)

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[9] And compare Karsten (*1889b:* 298); here he remarks under *Bjerkandera squalens*, "Påminner mycket om *Trametes serialis*."

Fr. is readily understandable when one accepts the pileate element as typical. (iv) The reflexed plant is apparently not completely sterile, at least not in the copy at Uppsala: Eriksson & Lundell (l.c.) remark, "our gathering agrees, as to details, with the type material distributed in Rabenhorst exsiccatum, which material—at least in the Uppsala copy—is rather poor, however." The copy at Leiden shows all microsopical elements in an excellent state of preservation. For these microscopical details one is referred to the description and fine analytical drawings of Muddus material recently published by Eriksson (*1958:* 146 *f. 64*).

Lowe also states that Karsten's pileate element "seems quite certainly . . . not the same as *P. anceps*." Romell (*1926:* 7), however, remarks that *Trametes squalens* "seems to be identical" with *Polyporus anceps* Peck (*1895:* 207), and Bourdot & Galzin (*1928:* 593) list a "Spécim. comm. par M. Romell: sur Tsuga, Massachusetts, (leg. Burt) *P. anceps* orig.!" as belonging to *Trametes squalens* (1886). As to Overholts's description (*1953:* 279 *pl. 15 f. 87, pl. 121 f. 662, pl. 128 fig.*) of *P. anceps*, it agrees well with European material of *Trametes squalens*, more in particular as to the hymenial elements and the dendritically branched hyphal elements in the dissepiments.

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REVIEW

E. F. GUBA, *Monograph of Monochaetia and Pestalotia*. (Harvard University Press. Cambridge, Mass. 10 June 1961.) Pp. vii + 342, 125 text-figures. Price: U.S. $ 10.00.

The appearance of a monograph is always of great interest to the mycologist, as it gives him a survey of all the species of the group dealt with as well as various important data. Information on too many taxa is till scattered throughout the literature or they are lying undescribed in the herbaria and collections all over the world.

The present monograph deals with the genera *Monochaetia* and *Pestalotia*, as mentioned in the title. After a short introduction, in which it is stated that the author spent nearly forty years on the compilation of this volume, there follows a chapter devoted to nomenclatural questions. It appears that *Monochaetia* (Sacc.) Allescher 1902 is not the oldest name since *Seiridium* Nees 1831 has priority. Therefore, Guba wants to conserve the name *Monochaetia* against the name *Seiridium*. The genus *Pestalotia* De Not. was dedicated by De Notaris to Fortunato Pestalozza, and thus this name was clearly a slip of the pen. Saccardo, who noted the error, changed the name into *Pestalozzia*. However, according to Guba this violates Article 72 of the International Code of Botanical Nomenclature. It is regrettable that such quibbling is allowed and that names of persons must be deformed to enforce the sacred rules. Surely it can hardly have been intended that the rules should be carried through *ad absurdum*.

Pestalotia was split by Steyaert into *Pestalotia*, *Truncatella*, and *Pestalotiopsis*, whereas the genus *Monochaetia* was incorporated into *Truncatella* and *Pestalotiopsis*. Guba does not accept these genera, but maintains the single genus *Pestalotia*.

In the next chapter cultural studies are discussed. The work of La Rue and Bartlett is mentioned who made 35 isolations of *Pestalotia* from different tropical plants. They arranged their isolates in 14 distinct groups, which they considered to represent strains of *Pestalotia Guepini*. It is now obvious, that they dealt with different species of *Pestalotia*. Variations in cultures are of common occurrence, but they are also found in nature. Marked aberrations are seldom met with and have no taxonomical value.

The next chapter concerns pathological considerations. For some time the genera in question were considered to contain many plant pathogenic species. The work of several plant pathologists has shown, that most species are saprophytes, but there are still a few species that must be considered parasitic, especially on woody plants. Other species are associated with the deterioration of wood, paper, and fabrics.

The fourth chapter is named "Ascigerous forms". In the old literature the reports on ascigerous stages were based on the occurrence of two stages on the same substratum, but, of course, only cultural experiments can show the true relationships. Bonar mentioned that he was able to show from cultures that the ascigerous stage of *Pestalotia gibbosa* was a species of *Dermatea*. Seaver, recognizing that the species did not fit into the genus *Dermatea*, introduced the genus *Pestalopezia* for it. However, Hansen & *al.* were able to demonstrate that the perfect stage of *Pestalotia palmarum* was a species of *Leptosphaeria*. They denied that there was any connection between *Pestalopezia* and *Pestalotia*.

The next item treated is appendages or setulae. It would have been better to incorporate this in the chapter on examination of species and use of the keys The fructifications of the species of *Monochaetia* and *Pestalotia* are acervuli and in general they are not considered significant in defining species. Most characters which serve to distinguish the different species are derived from the conidia. According to the septation of the conidia in both genera the following sections designated by Klebahn may be used, viz. conidia 4-celled, *Quadriloculatae*, conidia 5-celled, *Quinqueloculatae* and conidia 6-celled, *Sexloculatae*.

Follows the revision of the genus *Monochaetia*. The number of species recognized in this monograph is 41, for which keys wholly based on conidial characters are given. In my opinion too much importance is attached to the dimensions of the conidia. Is it possible, for instance, to differentiate between conidia measuring 12–16 × 4–5 μ and those measuring 13–18 × 3–5 μ or between a group 25–35 × 6.5–9.5 μ and another 30–35 × 7–10 μ? Besides, many so-called species had better be discarded. *Monochaetia monorhincha* is described in six lines, whereas *M. Saccardiana* is allotted a whole page and *M. monochaeta* even four pages. In describing *M. unicornis*, for which species five pages are used, the last page ends with a diagnosis of *Cryptostictis cupressi* Guba sp. nov.

The largest part of the work is devoted to the genus *Pestalotia*. Here Section *Quinqueloculatae* is by far the biggest, followed by Section *Quadriloculatae*, whereas Section *Sexloculatae* contains only four species. The observations made above on the treatment of *Monochaetia* also apply to that of *Pestalotia*. A large number of species of which the descriptions proper range from three to five lines would have been better transferred to the chapter "Indefinite species of *Pestalotia*" which follows the revision of the genus. Why *P. versicolor* var. *polygoni* is placed on page 211 while *P. versicolor* comes on page 227 after the descriptions of 20 other species is not clear.

In the already mentioned chapter "Indefinite species of *Pestalotia*" 24 species are listed, but considering the insufficiently described species in the preceding chapter, this number could easily have been increased. The chapter might have been fused with the next, "Excluded species". In the latter numerous species are mentioned, most of which do not belong to the genus *Pestalotia* but to other genera such as *Cryptostictis*, *Ceratophorum*, *Diploceras*, *Monoceras*, *Mastigonetron*, *Coryneum*, *Neobarclaya*, *Morinia*, *Sphaerocista*, *Hyalotia*, *Pestalozzina*, *Robillarda*, *Mastigosporella*, *Bartalinia*, *Pleiochaeta*, *Heteropatella*. Species of the genus *Cryptostictis* are especially numerous. There follows a chapter "Miscellanea" in which several fungi are discussed which have conidial forms showing a remote resemblance to those of *Monochaetia* and *Pestalotia*. It would have been better, perhaps, to consolidate the account of related genera such as *Cryptostictis*, *Morina*, *Neobarclaya*, *Bartalinia*, *Hyalotia*, and *Pestalozzina* in separate chapters of the monograph.

The book is illustrated with 125 figures depicting mostly conidia. It is a pity that those conidia are not arranged in rows, which would greatly fascilitate comparison. Furthermore they are not drawn at the same magnification, so that species with small conidia are often depicted on a bigger scale than those with large conidia.

The books ends with an index but lacks a list of literature, because the papers in question are to be found listed under the discussion of the species. Notwithstanding the above criticisms the book will doubtless prove to be of great help in the study of the genera treated.

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