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NOTES ON HYDNUMS—VII

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(With nine Text-figures)

Nine further species are dealt with. *Hydnum beneolens* is transferred to *Cautinia*, a new genus of Polyporaceae. *Hydnum fuligineo-violaceum* sensu Bresadola is redescribed as a new species, *Sarcodon talpa*. The correct name for *Sarcodon fuligineo-violaceus* is shown to be *Sarcodon joicides*.

In the preparation of this paper I have again drawn heavily on the co-operation of several institutes, and in one case also on the patience. I gratefully record my obligation to the following for the loan of material: National Fungus Collections, Beltsville (BPI); Herbarium of the Komarov Botanical Institute of the Academy of Sciences of the U.S.S.R., Leningrad (LE); The Herbarium, University of Michigan, Ann Arbor (MICH); Istituto e Orto Botanico dell'Università, Padova (PAD); Národní Museum (Mykologické oddělení), Praha (PR); Naturhistoriska Riksmuseet, Botaniska Avdelningen, Stockholm (S); Herbarium of the University of California, Berkeley (UC); Naturhistorisches Museum, Botanische Abteilung, Wien (W).

My sincere thanks are also due to Mrs. E. van Maanen, Amsterdam, for improvement of the English language.

Beneolens. — **Cautinia beneolens** (Bres.) Maas G., *comb. nov.* — *Hydnum beneolens* Bres. in *Mycologia* 17: 72. 1925 (basonym). — Type: "Ex Herbarium of James R. Weir / No. 16363. *Hydnum beneolens* Bres., n. sp. / on dead trunks / Lautaro, Cautin, Chile, VI 1918 / M. R. *Espinosa*" (BPI).

The type consists of a cuneate fragment, measuring about 8 × 6 cm, torn off a massive fruit-body which, according to Weir, may attain a diameter of up to 30 cm. Fruit-body sessile or stipitate, divided into numerous pileoli. Pileoli closely united ("like *Polyporus sulphureus*"), 2-18 cm broad by 2-12 cm long, imbricate, spatulate or flabelliform, glabrous, not zoned (but radially rugulose in dried condition), hygrophanous, at first white, than straw, and finally cream to ochre; soft and elastic when fresh, hard and brittle when dry; margin thin, acute (in the specimen examined found to be sublacerate or running out into lamellar spines). Tubes 3-6 mm long, decurrent on the stipe, with a lamellate aspect resembling *Lenzites*, edges uneven or dentate, the mouths unequal in size, sinuate, daedaloid (in the specimen examined there is a gradual passage from interrupted, lamellar dissepiments to subulate spines, all of which have a horny appearance and are yellow-brown to dull reddish-brown). Context 1-8 mm thick (that is, in the pileoli), soft fibrous (tough-spongy in the specimen examined), homogeneous, without zones, white, not

blackening when bruised or exposed to the air. Odour very sweet, almond-like. Taste pleasant (fungus stated by Weir to be edible).

Context of pileoli monomitic, consisting of generative hyphae and oleiferous hyphae (Fig. 1). Generative hyphae 2.7–10.5 μ wide, not inflating but soon widening, even close behind the margin of the pileus, thin-walled to thick-walled (0.8–2.3 μ), branched, anastomosing, septate, with clamp-connections. Oleiferous hyphae numerous, in places often enormously distended (up to 18 μ) or with irregular excrescences. Farther back the difference between generative and oleiferous hyphae is less apparent, hyphae up to 30 μ wide and often thick-walled ($\sim 3 \mu$). Context of the spines and dissepiments equally monomitic, but most hyphae so thick-walled as to be quite solid. Basidia in most cases collapsed, $\times 8$ –9 μ , clavate, 2–4-spored, with basal clamp-connection (Fig. 2). Sterigmata up to 6.7–7.2 μ long. Spores 6.3–7.6 \times 5–5.5 μ , ellipsoid to broadly ellipsoid, slightly flattened adaxially, smooth, colourless, thick-walled, with oil drops, inamyloid and not cyanophilous, with small oblique apiculus (Fig. 3). Gloecystidia 1.5–4.5 μ wide, numerous, protruding only slightly beyond the (unripe) basidia, flexuous, thin-walled, very probably of tramal origin, remaining unchanged in sulfo-anisaldehyde (Fig. 2).

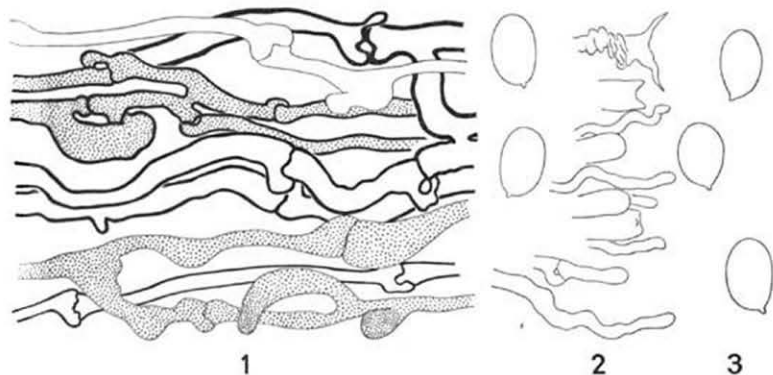
The label of the type packet bears the annotation "preserved in alcohol"; if by this Weir meant to signify that the material had first been preserved in alcohol and subsequently dried, it explains the abominable condition of the specimen. Fortunately, for the macroscopical part the description could draw almost entirely on Weir's excellent field notes. Both the macroscopical and microscopical features make it clear that *Hydnum beneolens* is a species that would not fit well in any of the existing genera, but constitutes a genus of its own.

Cautinia Maas G., *gen. nov.*¹

Sporophorum truncicola, in pileolis divisum. Pileoli numerosi, imbricati, glabri, azonati, hygrophani, ex albo cremei vel ochracei, recentes lenti, sicci duri fragilesque, margine acuti. Tubi in stipitem decurrentes, tuborum dissepimenta interrupta, lamelliformia vel aculeiformia. Caro carnosio-fibrosa, azonata, alba, immutabilis, odore grato, amygdalino, sapore miti. Contextus pilei monomiticus, e hyphis generatoriis et oleiferis, fibulatis, frequenter crasse-tunicatis consistens. Contextus aculeorum similis. Basidia clavata, 4-sporigera, fibulata. Sporae ellipsoideae, laeves, hyalinae, parietibus crassis praeditae. Gloecystidia numerosa, gracilia, tenuitunicata. — Typus generis: *Hydnum beneolens* Bres.

Fruit-body arboricolous, divided into pileoli. Pileoli numerous, imbricate, glabrous, not zoned, hygrophanous, at first white, then cream or ochre, soft and elastic when fresh, hard and brittle when dry, with acute margin. Tubes decurrent, the dissepiments passing from short lamellar plates into subulate spines. Context soft fibrous, not zoned, white, unchanging, with a sweet, almond-like smell and pleasant taste, monomitic, consisting of generative and oleiferous hyphae, both of which have clamps and, frequently, thick cell-walls. Context of the spines and dissepiments similar. Basidia clavate, 4-spored, with basal clamp-connection. Spores ellipsoid, smooth, colourless, thick-walled, inamyloid and neither cyanophilous nor metachromatically stained in Cresyl Blue. Gloecystidia numerous, slender, thin-walled. — Type-species: *Hydnum beneolens* Bres.

¹ Generic name derived from the River Cautin, type locality of the only species.



Figs. 1-3. *Hydnum beneolens* Bres. (type). — 1. Generative and oleiferous (dotted contents) hyphae. — 2. Detail of the hymenium showing basidia and gloecystidia. — 3. Spores. (Figs. 1, 2, $\times 700$; 3, $\times 1400$).

Bresadola believed that his species was close to *Hydnum septentrionale*, the type species of *Climacodon* P. Karst. This genus, however, has an entirely different hyphal make-up (Maas Geesteranus, 1962: 378), while the cystidia are thick-walled, of a different shape, and of hymenial origin.

The thickness of the spore wall is a conspicuous feature, and this character combined with a monomitic context and an irpicoid-hydroid hymenophore recalls a very similar combination, exhibited in *Spongipellis* Pat. among the Polyporaceae (Kotlaba & Pouzar, 1965: 77). Unlike *Cautinia*, however, the species of *Spongipellis*² are characterized by the uniform diameter of the hyphae in general, the inconspicuousness of the oleiferous hyphae, a different ramification (for which as yet no formula has been invented), the lack of an almond-like smell, and a very different gross morphology.

Another genus that on account of the similarity of a number of characters of the two might be connected with *Cautinia* is *Osteina* Donk (1966: 86). The main features that set *Osteina* apart are the oblong and thin-walled spores, the absence of cystidia, the consistently poroid hymenophore, the thin dissepiments, and the lack of odour.

To judge from the characters shown above, *Cautinia* would seem to be a true member of the Polyporaceae, but in this family it holds an isolated position.

Cyanopodius. — *Hydnellum cyanopodium* K. Harrison in Can. J. Bot. **42**: 1221. 1964. — Type: "Smith 9006 / California, Del Norte County, Crescent City / Nov. 22 '37" (MICH).

² For the purpose of comparison *Spongipellis spumeus* (Sow. ex Fr.) Pat. and *S. pachyodon* (Pers.) Kotl. & Pouz. have been examined.

MISAPPLIED NAME: *Sarcodon fuligineo-violaceus* (Kalchbr. apud Fr.) Pat. *sensu* Nikolajeva in Notul. syst. Sect. cryptog. Inst. bot. Komarov. Acad. Sci. U.R.S.S. 9: 147, fig. 2. 1953. — Collection: "*Sarcodon fuligineo-violaceus* (Kalchbr.) Pat. / SSSR, South Sakhalin / 28 VIII 1946 / S. M. Kravčenko" (LE).

The following is, perhaps somewhat freely translated, Nikolajeva's description of her fungus:—

Carpophore fleshy, stipitate. Pileus 6–10 cm, somewhat irregular, flattened to pulvinate, often with the margin crenate to lobed, surface appressed-felted, somewhat smooth with age, radiately rugose where the pileus joins the stipe, scaly towards the margin, dark blue or dark violet, blackish, purplish-violet along the margin, subsequently unicoloured. Spines decurrent, sharp, at first violet, then pinkish-brown, paler towards the apices. Stipe usually eccentric, narrowed at the base, dingy fuscous or with a rusty tinge, 3–5 × 1.5–2 cm. Context of pileus dark violet to purplish-violet, reddish in the stipe. Taste somewhat acrid and bitter, later agreeable. Hyphae thin-walled, with large clamps, colourless or with dense violaceous granular contents. Spores ellipsoid-angular, with scanty fine warts, 3.5–4.5 × 3.5–4 μ.

In the U.S.S.R. found for the first time in South Sakhalin.

It seems a bold statement to claim that the fungus described by Nikolajeva is actually a *Hydnellum* and conspecific with *H. cyanopodium*, for her and Harrison's descriptions differ on several essential points. I wish to make it clear, however, that at least some of the discrepancies may have their origin in the difficulty of finding a translator who combines knowledge of the Russian language and experience with botanical terminology.

Nikolajeva regarded the context as fleshy, and this very probably led her to think that the material belonged in *Sarcodon*. Fleshiness of the context, however, is not a reliable character to be used for the separation of *Sarcodon* and *Hydnellum*. The one important feature is that the context in her fungus is zoned (compare remarks under *Sarcodon ussuriensis*), while an additional feature is the lack of inflated portions in the hyphae. Both characterize the specimen from Sakhalin as a species of *Hydnellum*.

Nikolajeva gave a description of the stipe and the colour of its context. The specimen received on loan lacks a stipe, while the context of the remaining stub attached to the pileus is dark ink-blue.

Contrary to the description reproduced above the spores are exactly as indicated by Harrison, "cruciate with four to six stout processes" (Fig. 4), and measure 4–5 × 3.6–4 μ (including the warts).

The most convincing resemblance between the specimens from California and Sakhalin is to be found in the pileus, but since it does not show sufficiently in the description of either, the following observations are added:—

Pileus heavily radiately wrinkled, with some of the wrinkles running out into acute scales, concentrically zoned with alternating bands of a dull brownish-grey (in places suffused with brown of a warmer hue) and slate-blue, liberally sprinkled with yellowish-brown dots of excreted matter, pale bluish-grey, brownish-grey, or violet-grey along the margin.

The occurrence of *Hydnellum cyanopodium* on both sides of the northern Pacific Ocean stresses the phytogeographical importance of these coastal regions.

There are several species of *Hydnellum* known to possess a blue colour in at least some part of their context. Some have been briefly discussed in a previous paper (Maas Geesteranus, 1957: 51), but the recent introduction of three more species, *H. cruentum*, *H. scleropodium*, and *H. cyanopodium* (Harrison, 1961: 37 and 1964: 1219, 1221), makes it desirable to provide a tentative key.

KEY (BASED ON HERBARIUM SPECIMENS)

1. Hyphae with clamps (although the latter sometimes hard to find).
 2. Surface of pileus not dotted with excretions of crystalline matter.
 3. Tomentum of stipe orange-brown. No odour of cumarine when dry.
 4. Pileus white or bluish when young, turning fairly dark dull brown with age
H. caeruleum (Hornem. ex Pers.) P. Karst.
 4. Pileus cream when young, passing into a rich ochraceous yellow, then warm brown with age (type seen) *H. alachuanum* Murr.
 3. Tomentum of stipe violet-blue. Odour of cumarine when dry
H. suaveolens (Scop. ex Fr.) P. Karst.
 2. Surface of pileus with numerous dots of excreted matter.
 5. Surface of pileus without concentric bluish zones. Context bluish in a zone next to the spines.
 6. Stipe slender, tapering downwards (type seen) *H. cruentum* K. Harrison
 6. Stipe stout, swollen below (type not seen) *H. scleropodium* K. Harrison
 5. Surface of pileus with concentric bluish zones. Context bluish throughout, streaked with pallid lines (type seen) *H. cyanopodium* K. Harrison
1. Hyphae without clamps. Colour pattern as in *H. alachuanum* (type and other authentic material seen) *H. ferrugipes* Coker

F u l g e n s. — *Hydnum fulgens* Fr. in Öfv. k. Vetensk.-Akad. Förh. 9: 13. 1852.

In a previous paper (Maas Geesteranus, 1967: 68), and in connection with *Hydnum salmoneum* R. Heim, I suggested that *Hydnum fulgens* "could well represent just another colour form of *Donkia pulcherrima*." In this connection Prof. Nannfeldt kindly pointed out to me that ". . . —strange to say—the type [of *H. fulgens*] is still in existence . . ." while Dr. S. Lundell, on revising the material, had found it to be identical with *Polyporus fibrillosus* P. Karst.

Fearing that I might have made a mistake in placing *H. salmoneum* in the genus *Donkia*, I examined the hyphal structure of *P. fibrillosus*, only to find that both species are quite unrelated. The context in *P. fibrillosus* is monomitic, consisting of generative hyphae only, lacking oleiferous hyphae and tendril hyphae. Generative hyphae not inflating, without clamp-connections, covered with a pigment that immediately turns red in KOH.

Pelyporus fibrillosus, the type species of *Pycnoporellus* Murrill, is widely different from *Hydnum salmoneum*, which is a true member of *Donkia* and except for its colour indistinguishable from *D. pulcherrima*.

Innovans. — *Hydnum innovans* G. Beck, Itin. Princ. S. Coburgi 2: 145, pl. 16 fig. 1. 1888. — Type: “*Hydnum (Apsis) innovans* G. Beck. / No. 282 / Cantagallo; an Urwald-bäumen / Dr. H. Waura” (W).

The type consists of fifteen fruit-bodies glued to a sheet of paper, some showing pileoli proliferating from the margin, but the upper surfaces of parents and offspring facing in opposite directions. Pileus 25–85 mm long, 18–40 mm wide, laterally attached, either sessile or shortly stipitate, flabelliform, plane or concentrically corrugated, with few to numerous concentric colour zones, one to several of these zones radiately rugulose; originally uniformly pubescent, hairs in the older parts of the pileus subsequently collapsed to form a dense felt, finally disappearing to leave a glabrous surface; yellow-brown along the margin, the darker zones and the area towards the base fulvous or nearly fuscous. Spines up to 1.5 mm long, crowded, subulate to flattened, corneous, yellow-brown to brown, pruinose. Context less than 1 mm thick, tough, fibrous, without apparent zones, yellow-brown.

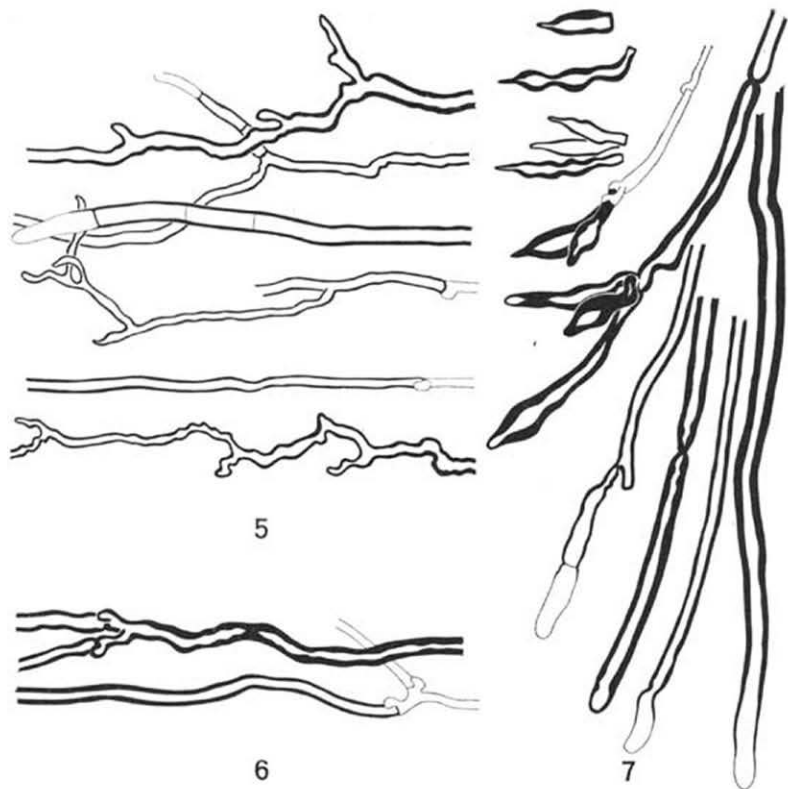
Context of pileus dimitic, made up of generative and skeletal hyphae and an intermediate type. Generative hyphae 2–2.7 μ wide, not inflating, thin-walled, septate, branched, with clamp-connections at all septa. Skeletals 2.7–7 μ wide, moderately to very thick-walled (cell-walls 0.7–2.5 μ), unbranched, straight to somewhat undulating, often thinner-walled at the apex and with 1 to several ‘cloisons de retrait’. Intermediate type of hyphae thick-walled, with or without septa, usually without clamps, often very much kinked, variously branched (Fig. 5). Context of the spines dimitic, the axis of the spines predominantly made up of skeletal hyphae, which towards the sides form the cystidia. Basidia collapsed. Spores not seen. Cystidia near the apex of the spines of tramal origin, passing by gradual steps into hymenial cystidia towards the base of the spines, usually thick-walled (Fig. 7).

The collection described above belongs to *Steccherinum rawakense* (Pers. apud Gaud.) Banker and is characterized by its New World type of thick-walled cystidia (compare also Maas Geesteranus, 1964: 171–176).

The intermediate type of hyphae are very much in evidence, but I do not remember having seen them in other collections of this species from South America. I believe, however, that their presence or absence is hardly of taxonomic significance. Usually it is difficult to decide whether they are modified skeletals or generatives, but in one case I found an unmistakable example of a sclerified generative hypha (Fig. 6).

Joeides. — *Hydnum joeides* Pass. in Nuovo G. bot. ital. 4: 157. 1872. — *Sarcodon joeides* (Pass.) Bourd. & Galz., Hym. France 450. 1928 (“*ionides*”). — Type: “*Hydnum jonides* Pass. / In castaneto Collecchio / Pass.” (Herb. Saccardo, PAD).

The type consists of three slices, two of the pileus, a third of the stipe. The fragments are rather badly pressed and somewhat mouldy, though otherwise in reasonable condition. Pileus about 30 mm across, plano-convex, glabrous and somewhat shiny, fairly dark reddish-brown. Stipe (broken) about 28 mm long, up to 5–6 mm broad above, tapering downward, somewhat curved, solid, smooth, minutely tomentose above, glabrous below, yellow-brown, not darkened at the base. Spines decurrent, up to 2 mm long, crowded, subulate, brown. Context of the pileus dull greyish-brown under the upper surface, dull grey over the spines, suffused with lilac in the centre.



Figs. 5-7. *Hydnum innovans* G. Beck (type). — 5. Detail of the context showing hyphae of a type intermediate between generative and skeletal hyphae. — 6. Sclerified generative hypha and skeletal hypha. — 7. Detail of the hymenium showing tramal and hymenial cystidia. (All figures $\times 700$).

Context of the pileus monomitic. Generative hyphae inflating, thin-walled, branched, septate, without clamp-connections. Hyphae from the context of the spines similar. Basidia collapsed, clavate, 4-spored. Spores $5.4-6.3 \times 4-4.5 \mu$ (warts included), coarsely tuberculate, brown. Cystidia none.

Until recently I was uncertain of the identity of *Hydnum joeides*, mainly because of Saccardo's note in which the spores were stated to be globose, shortly and finely spinulose, $3-3.2 \mu$ diameter, and hyaline (Maas Geesteranus, 1956: 51). Prof. J. A. Nannfeldt kindly drew my attention to the presence of the type in Saccardo's herbarium. Examination of this material proved the note referred to above to be

erroneous. In spite of the differences between the various original descriptions, I am satisfied that *Hydnum joeides* Pass. (1872), *H. fuligineo-violaceus* Kalchr. apud Fr. (1874), *Sarcodon commutatus* Bourd. & Galz. (1924), and *Sarcodon inopinatus* Donk (1933) are all referable to the same species, the correct name of which is *Sarcodon joeides*. A definite opinion about *Sarcodon catalaunicus* P. Maire must be postponed.

Continued experience with later collections of the present species necessitates the insertion of the following emendation to my previous description (Maas Geesteranus, 1956: 50): Context bright pinkish-lilac throughout in young specimens, turning violet in the stipe and over the spines with age, gradually becoming streaked with brown, eventually almost entirely faded into dull brown.

Reconsidering Kalchbrenner's illustration of *H. fuligineo-violaceum* (1877: pl. 32 fig. 2) in the light of my better knowledge of the present species, it is now obvious that the rendering of the colours of pileus and stipe is not at all as bad as I had come to believe. The illustration shows some very young specimens, characterized by their regular shape, smooth surfaces, and pale colours; only the colour of the context is beside the mark, as it should have been of a bright lilac-pink.

Puiggarii. — *Hydnum puiggarii* Speg. in Boln Acad. nac. Cienc. Córdoba 11: 457. 1889. — ? Type: "Irpex | 1.709 | Puiggari [in pencil, and in ink:] *Hydnum Puiggarii* Sp." (LPS).

Since Spegazzini indicated No. 1700 as the specimen he described as *Hydnum puiggarii*, it would follow that the material sent on loan under No. 1709 is not the type, unless Spegazzini was in error. Prof. J. C. Lindquist in his letter explained that this is the only specimen extant, while the pencilled cross on the cover is the characteristic way Spegazzini used to mark his type specimens. However, the above loses all its significance, since the packet contains a few bits of bark, but no fungus.

The description given by Spegazzini suggests that his material was referable to *Steccherinum rawakense* (Pers. apud Gaud.) Banker.

Reisneri. — *Clavaria reisneri* Vel., České houby 781. 1922 (Latin translation by Pilát in Op. bot. čech. 6: 282. 1948). — *Ramaria reisneri* (Vel.) Vel., Novit. mycol. noviss. pl. 1 fig. 5. 1947. — *Clavicornia reisneri* (Vel.) Corner apud Pilát in Acta Mus. nat. Prag. (B) 14: 148. 1958. — Type: "No. 154902 / Velenovský: Fungi bohémici / *Clavaria Reisneri* Vel. / Smíchov, 1916-X / *Reisner*" (PR).

The type specimen is small and has been partly eaten by larvae. The existing descriptions, however, drawn up by Velenovský (1922) and Pilát (1958), are more than adequate, so that it remained only to check up the amyloid reaction of the spores. These are 4.9–5.5 μ in diameter, globose to subglobose, punctate to sparsely dotted with very small warts, strongly amyloid. The information now available (the descriptions by Velenovský and Pilát, Velenovský's illustration, the amyloid reaction of the spores) furnishes a clear picture: *Clavaria reisneri* is the name given to a stunted specimen of *Hericium coralloides* (Scop. ex Fr.) S. F. Gray.

It is important to note that Reisner collected the specimen from a log in a timber-yard. The specimen may have been in a position in which it could do little else but grow upwards. Given time and moisture, however, its branches would no doubt have curved to a drooping position. In one particular forest in Poland, during the Fourth European Mycological Congress, I had ample occasion to study the successive stages in the development of the carpophore of *H. coralloides*. The type of *Clavaria reisneri* is an example of a specimen, the development of which was interrupted in its earliest stage. But even in that stage the specimen is recognizable as a member not of *Clavicornia*, but of *Hericium*, as it lacks some of the features, which Corner (1950: 285) emphasized in his diagnosis of the former genus: the fruit-body is not "pyxidately branched," the branches are not characterized by "sterile cyathiform tops," and there are no "proliferating whorls of . . . branchlets from the margin of the top."

Talpa. — **Sarcodon talpa** Maas G., *spec. nov.*³ — Type: "*Hydnum fuligineo-violaceum* Kalchbr. / In sylva conifera Tertiolasii⁴—Val di Sole—1881 / Leg. G. Bresadola" (S).

MISAPPLIED NAME: *Hydnum fuligineo-violaceum* Kalchbr. apud Fr. *sensu* Bres., *Fungi trid.* 2: 32, pl. 139. 1892; *Icon. mycol.* 21: 1048, pl. 1048. 1932.

For the Latin description the reader is referred to Bresadola's original account published in 1892, of which the following translation is given, augmented with a few data, mainly microscopical, taken from the type:—

The type consists of four specimens, two medium-sized and two smaller ones, all of which have been poisoned and, consequently, ruined. Pileus 60–90 mm across, at first convex, then depressed, with some irregular humps in the centre, without concentric zones, subtomentose, the tomentum as it ages breaking up into small patches and squamules which, at least near the margin, are radiately aligned; "atrocaeruleus" or "atroviolaceus",⁵ becoming blackish; margin often indented or lobed, somewhat rufous. Stipe 30–50 × 15–20 mm, solid, tapering downward, roughened above from abortive spines, otherwise smooth, minutely tomentose, glabrescent, "rufo-fuliginous". Spines decurrent, crowded, subulate, flesh-coloured fuscous, with pale apices. Context fleshy, not zoned, dark violet in the pileus, reddish in the stipe.

Context of the pileus monomitic. Generative hyphae up to 23 μ wide, inflating, thin-walled, branched, septate, without clamp-connections. Hyphae from the context of the spines similar, less wide. Basidia collapsed, clavate, 4-spored, without basal clamp-connection. Spores 5.2–6.3 × 4.2–5.4 μ (warts included), at first rather sparingly set with prominent warts, becoming increasingly coarsely tubercular, brownish, with oblique apiculus (Figs. 8, 9). Cystidia none.

³ Etymology: *Talpa*, mole, an allusion to the colour of the pileus.

⁴ This is the Latinized name for Terzolas.

⁵ Some of the terms denoting a colour, which does not tally with the colour shown in Pl. 1048, are left untranslated. The plate published in 1892 is too poor to be of any service.

FURTHER COLLECTIONS EXAMINED: 1. "In pinetis Maestrangi a S. Antonio—24 Oct. 1901 / Leg. G. Bresadola" (S); 2. "Margone pr. Trento, in pinetis, IX 1903 / G. Bresadola" (W); 3. "Margone in pinetis—Nov. 1903 / Leg. G. Bresadola" (S); 4. "Mendola, Bosco di fronte a Ruffrè / Agosto 1907 / Leg. G. Bresadola" (S); all under the name *Hydnum fuligineo-violaceum*.

Collections 1–4 are in a much better condition than the type. From them the following supplementary details have been drawn up:—

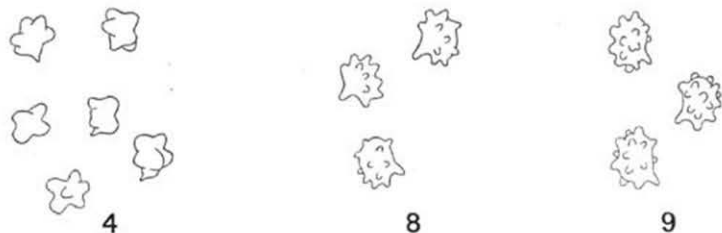


Fig. 4. *Hydnellum cyanopodium* K. Harrison (from South Sakhalin). — Spores ($\times 1400$).
Fig. 8, 9. *Sarcodon talpa* Maas G. (8: type; 9: from Margone, 1903). — Spores ($\times 1400$).

Pileus up to 75 mm across (therefore very likely much larger than 90 mm when fresh), finely radiately fibrillose in some specimens, clearly fibrillose-squamulose in others, the tomentum collapsed to form a glabrous pellicle in most specimens, shiny, dark fuscous to black, the margin apparently remaining tomentose, reddish-brown for a long time. Stipe up to 60 mm long, glabrous and blackish above, the pointed base densely covered with a whitish, creamy to dingy ochraceous velvety tomentum. Spines up to 4 mm long, yellowish-brown to greyish-brown. Context dark slate-coloured or dark violet-grey in the pileus and the upper part of the stipe, pallid with a reddish tint or dingy reddish in the base of the stipe.

A thin slice of the slate-coloured context dropped in a KOH solution immediately stains bright blue-green, but loses its brightness by the subsequent development of a yellow-brown cloud.

Sarcodon talpa is related to two other species with violaceous context, *S. joeides* and *S. fusco-indicus*.⁶ Since they form such a well-defined group, this would seem to be a suitable time to take the first steps towards a subdivision of the genus.

SARCODON sect. SARCODON

Contextus pilei albus vel pallidus, fractus interdum rubescens vel vinaceo-suffusus. Contextus stipitis ad basin concolor vel paulo obscurior. Hyphae fibulatae. — Typus sectionis: *Sarcodon imbricatus* (L. ex Fr.) P. Karst.

Context of the pileus white or pallid, on exposure sometimes becoming flushed with reddish or vinaceous tints. Context in the base of the stipe concolorous or

⁶ *Sarcodon fusco-indicus* (K. Harrison) Maas G., *comb. nov.*; basionym, *Hydnum fusco-indicum* K. Harrison in *Can. J. Bot.* 42: 1213, pl. 1 fig. 3. 1964.

somewhat darker. Hyphae with clamp-connections. — Type species: *Sarcodon imbricatus* (L. ex Fr.) P. Karst.

EXAMPLES: *S. imbricatus* (L. ex Fr.) P. Karst., *S. laevigatus* (Sw. ex Fr.) P. Karst.

SARCODON sect. **Amarescentes** Maas G., *sect. nov.*

Contextus pilei albidus vel pallidus, fractus rubescens vel vinacco-suffusus. Contextus stipitis fuscidulus, ad basin atrovenetus vel atro-ardesiacus. Hyphae efibulatae. — Typus sectionis: *S. amarescens* (Quél.) Quél.

Context of the pileus whitish or pallid, on exposure flushed with reddish or vinaceous tints. Context of the stipe brownish, but blackish-green or dark slate blue in the base. Hyphae without clamp-connections. — Type species: *S. amarescens* (Quél.) Quél.

EXAMPLES: *S. amarescens* (Quél.) Quél., *S. fennicus* (P. Karst.) P. Karst., *S. scabrosus* (Fr.) P. Karst.

SARCODON sect. **Violacei** Maas G., *sect. nov.*

Contextus seu primo roseus, postea violascens, seu ab initio violaceus, saltem in pileo. Hyphae efibulatae. — Typus sectionis: *S. joeides* (Pass.) Bourd. & Galz.

Context either at first pink, later turning violet, or else violet from the beginning, at least in the pileus. Hyphae without clamp-connections. — Type: *S. joeides* (Pass.) Bourd. & Galz.

EXAMPLES: *S. joeides* (Pass.) Bourd. & Galz., *S. fusco-indicus* (K. Harrison) Maas G., *S. talpa* Maas G.

The genus contains several more sections, but these can better be discussed elsewhere.

Harrison (1964: 1214) described a *Hydnum cyanellum*, characterized by "lilac-gray" context, but it is not clear whether it belongs with sect. *Violacei*; I did not examine the material.

The following key should facilitate the differentiation of the three constituent species of this section:—

KEY TO THE SPECIES OF SECT. VIOLACEI

1. Pileus dark grey to blackish, at least centrally.
2. Context dark violet-grey throughout. Taste mild. Stipe dark coloured throughout, the base not covered with a conspicuous whitish tomentum *S. fusco-indicus*
2. Context dark violet-grey in the pileus and upper part of the stipe, reddish farther down the stipe. Taste somewhat acrid, bitterish. Stipe dark coloured above, much paler and reddish in the lower part, the base covered with a conspicuous whitish tomentum *S. talpa*
1. Pileus yellow-brown, flesh-coloured pinkish-brown, fulvous *S. joeides*

In connection with our present knowledge of this section, an old and forgotten species should be reconsidered, *Sarcodon violaceus* (Thore apud Pers. ex Roques) Quél. At the time I was engaged in revising the Hydnums of the Netherlands (Maas Geesteranus, 1958: 59), I failed to identify this species, but it now seems possible that this species represents a fourth member of the section.

Apart from the type of *Sarcodon fusco-indicus*, borrowed from the Herbarium at Ann Arbor, I had the opportunity to study two more collections of the same species from the Herbarium at Berkeley, California. These collections (Washington: Bremer-ton, 25 and 29 October 1933, *J. B. Flett*) supplement the already-extensive list published by Harrison.

Ussuriensis. — *Sarcodon ussuriensis* Nikol. in Notul. syst. Sect. cryptog. Inst. bot. Komarov. Akad. Sci. U.R.S.S. 14: 196, fig. 1961; in Fl. Pl. cryptog. U.R.S.S. 6(2): 295, fig. 225, pl. 71 figs. 2-4. 1961. — Type: "*Sarcodon ussuriensis* Nikol." (LE).

The material received on loan was part of the type collection and represented the lower right hand quadrant of the specimen, a photograph of which is shown in Plate 71 fig. 2 referred to above.

The Latin diagnosis given by Nikolajeva agrees in its general lines with this specimen, but a few additional details seem to be called for.

Pileus depressed in centre, its tomentum collapsed, surface, except for a network of fine wrinkles, fairly smooth, somewhat shiny, fairly dark purplish-brown, with whitish to dingy yellowish remnants of the original tomentum towards the margin, the margin itself blackened. Stipe (of which only a fragment was sent along) with the tomentum collapsed, dark brown. Context of pileus not really fleshy, but rather leathery-corky fibrillose, zoned, in the centre dingy bluish-grey over the spines, brownish pallid near the upper surface, the latter layer gradually thinning out towards the margin. Context of stipe warm brown, passing into brownish-orange towards the base.

Context of pileus monomitic. Generative hyphae 3-5.8 μ wide, not inflating, thin-walled to moderately thick-walled, branched, septate, with occasional clamp-connections, geniculate at regular intervals to form a faint zonation.

The zonation of the context caused by the concurrent genuflexion of the hyphae is typical of the genus *Hydnellum*. The collapsed tomentum and the depressed centre of the pileus show that the specimen was already old when it was collected, but enough is left of the original colours of the context of pileus and stipe to determine the species: *Sarcodon ussuriensis* is hereby formally reduced to the synonymy of *Hydnellum caeruleum* (Hornem. ex Pers.) P. Karst.

Harrison (1964: 1205-1206) opposed the use of a zonation of the flesh as a key character to differentiate between *Hydnellum* and *Sarcodon*. He said that "this may be misleading as the production of zones is a reaction to variations in growing conditions and can indicate either alternating phases of daylight and darkness or periods of high and low humidity." Quite true. A *Hydnellum* responds to certain factors in its environment in a definite way. But a *Sarcodon*, growing in the same environment, gives a different (and equally definite) response. It should be kept in mind, of course, that although certain environmental factors may release certain responses, the latter are genetically conditioned, so that a *Hydnellum* invariably gives the same response, which invariably differs from that of a *Sarcodon*. I maintain,

therefore, that the zonation of the context in *Hydnellum* is a good character, which is not known to occur in *Sarcodon*. If, exceptionally, there is a zonation in the latter genus (Maas Geesteranus, 1962: 390), it is brought about in a very different manner. To know the difference, it is indispensable to tease out the tissue patiently and, with a slight alteration of the now classical dictum (Corner, 1953: 153), I would like to point out that it is wasting time not to do this.

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ADDENDUM

After this paper had gone to the press, one half of a *Sarcodon* was received, kindly sent for identification by Miss G. Gulden, Botanical Museum, Oslo. It was a great surprise to recognize *Sarcodon talpa*.

MATERIAL EXAMINED: "N O R W A Y, Buskerud: Hole, Vik, 15 Oct. 1967, Kjell Kvavik & Gro Gulden 684/67, under *Picea* on Cambro-Silurian soil" (O).

PHOMA EXIGUA DESM. AND ITS VARIETIES

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(With Plates 1-4 and four Text-figures)

Because of its growth features *in vitro*, pathogenicity and host relation, together with the ubiquitous wound- and weak-parasitic strains of *Phoma exigua* Desm. var. *exigua*, three more specialized pathogenic varieties of this species are distinguished: var. *linicola* (Naoum. & Vass.) Maas on flax, var. *foveata* (Foister) Boerema on potato, and var. *sambuci-nigrae* (Sacc.) comb. nov. on elder. The synonymy and the collective and differential diagnostic characteristics are discussed.

In diagnostic mycological work with diseased and dead plant material, quite often a typical pycnidial fungus with continuous and 1- (occasionally 2-) septate, hyaline spores has been isolated. The fungus occurs in association with leaf and stem lesions, rotting of fleshy roots and tubers, and is ubiquitous on dead plant material, especially herbaceous stems. It can be characterized as a weak parasite or a wound parasite, and appears to be soil-borne. The characters of this fungus correspond with the *Phoma*-“Group II” described by Dennis (1946). According to Saccardo’s system of classification, it may be placed in various form-genera of the Deuteromycetes, as appears also from the “current names” listed for it by Dennis (l.c.). However, recent studies on the spore development and other microscopical characters of the type species of these genera (Brewer & Boerema, 1965; Boerema, Dorenbosch & Leffring, 1965; Boerema, 1965) make it certain that the fungus under consideration belongs to the form-genus *Phoma* Sacc. Maas (1965) has pointed out that the oldest valid name of this ubiquitous soil-born species is *Phoma exigua* Desm.

On some plants *Phoma*-like fungi are known to occur which are morphologically indistinguishable from *P. exigua*, but which can be separated by their pathogenicity or special host-relation, and their appearance in culture. This is true, for instance, for the footrot fungus of flax (*Linum usitatissimum*), generally known as *Ascochyta linicola* Naoum. & Vass., which is also included by Dennis (l.c.) in his “Group II” of *Phoma* spp. Apart from their pathogenicity to flax, isolates of this fungus can generally be recognized *in vitro* by their slow compact growth and other cultural characteristics. Maas (l.c.), regarding this parasite of flax as a variety of the ubiquitous soil-borne fungus, named it *P. exigua* var. *linicola* (Naoum. & Vass.) Maas. Another equally specific fungus, occurring on elder (*Sambucus nigra*), can be distinguished from *P. exigua* only by its growth habit *in vitro*. W. B. Grove in his herbarium (K) indicated this fungus as *P. exigua* ‘f. *sambuci*’. A similar case has also been recorded for

a form of dry rot of potato (*Solanum tuberosum*), called "gangrene" in the United Kingdom. In the Netherlands this disease is generally caused by a fungus, currently named *Phoma solanicola* Prill. & Del. (Boerema & van Kesteren, 1962). In no way can this species be distinguished from the ubiquitous *P. exigua*. Apparently in Scotland and Australia, however, gangrene is mostly caused by a *Phoma* which *in vitro* can at once be distinguished by its production of a yellow or red pigment diffusing in the culture medium. Malcolmson (1958a) found that this pigment-producing fungus, originally described as *Phoma foveata* Foister, is morphologically indistinguishable from *P. solanicola* (= *P. exigua*). From monospore isolations from a single pycnidium of *P. foveata*, she also obtained colonies that failed to produce any pigment. Therefore she regarded both types of colonies as referable to one species. In a later publication on gangrene, Malcolmson (1958b) referred to the pigment-producing strains as *P. solanicola* 'f. *foveata*'. Recently, J. M. Todd (Department of Agriculture and Fisheries for Scotland) pointed out (personal communication) that *P. foveata* is much more pathogenic to potato tubers than *P. solanicola* (= *P. exigua*), while the two types also differ in their temperature requirements, the former being more tolerant of lower temperatures. Boerema (1967), confirming the findings of Malcolmson (l.c.) and Todd, named the pigment-forming strains *P. exigua* var. *foveata* (Foister) Boerema.

The species and variety concept

An important criterium for the specific delimitation in the artificial system of the Deuteromycetes should be the possibility of identification independent of substratum or host. In our opinion, this means that a form-species should be based on stable and clear morphological characteristics. In *Phoma*-like fungi the number of dependable morphological characteristics is restricted. The shape and dimension of pycnidia and spores are generally highly variable. In these fungi, therefore, the species concept must be rather broad for a form-species to be readily identifiable by a taxonomist. If desirable smaller units can be distinguished within such a form-species. These can be based on growth characteristics *in vitro*, e.g. the general habitus, the production of chlamydo-spores, pigment, and crystals. However, there is bound to be chaos if these growth-characteristics are used for species delimitation alone. Therefore we endorse the view expressed by Maas (l.c.) and Boerema (1967) that the flax fungus and the pigment-producing gangrene fungus should be regarded as mere varieties of the ubiquitous soil-borne *P. exigua*. In the present paper the elder-fungus is also treated as a variety of *P. exigua*. It is possible that in the course of time it will be necessary to distinguish more varieties.

This concept of *P. exigua* is supported by the following typical biochemical character: it appears that the ubiquitous strains of *P. exigua*, as well as the varieties on flax and elder, are characterized by the production of a colourless metabolite "E" (derived from *exigua*), which can easily be oxidized to pigment "a" and pigment "β" successively. The properties of E, a and β will be discussed more fully in a

separate chapter. In some strains of *P. exigua* var. *foveata* the oxidizable substance *E* could also be demonstrated.

It is likely that in general the occurrence of a certain fungus-metabolite is not restricted to a single species. So far, however, tests on numerous other *Phoma*-like fungi have revealed the substance *E* in cultures of five other species only; morphologically these are quite different from *P. exigua*. This has led us to believe that the oxidation reaction discussed in the next chapter is a valuable diagnostic character of *P. exigua*. The other diagnostic characters of *P. exigua* and the differentiating criteria of its varieties are summarized in Table I.

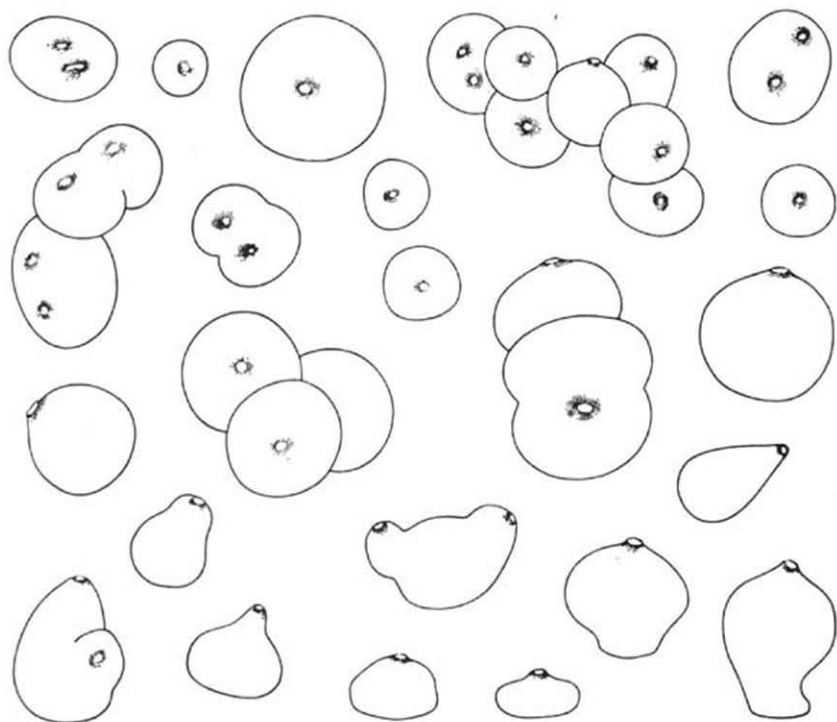
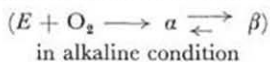


Fig. 1. *Phoma exigua* s.l. — Variation in size and shape of the pycnidia.

TABLE I — DELIMITATING AND DIFFERENTIATING CRITERIA

Pycnidia	Thin-walled, parenchymatous with hyphal elements, brown to black, variable in size and shape, generally globose, occasionally coalesced to large, irregular fructifications (Fig. 1). Ostioles inconspicuous, internally lined with papillate, hyaline cells (Fig. 2).			
Pycnidiospores	Hyaline, occasionally guttulate, in mass dirty white to salmon pink, ovoid to ellipsoid (Fig. 4). Majority continuous: $2.5-12 \times 1.5-5 \mu$, mostly $(4-5)-7(-8.5) \times 2(-2.5)-3(-3.5) \mu$; generally a small number are 1- (occasionally 2-) septate: $5.5-13 \times 2.5-5 \mu$, mostly $(7-7.5)-10(-12) \times (2.5-3)-3.5(-4) \mu$. Arising by a monopolar repetitive budding process on undifferentiated parent cells (Fig. 3, Pl. 2 fig. 1).			
Mycelial characters	Mycelial mat extremely variable (Pl. 3 figs. 1-4).	Mycelial mat relatively uniform.		
	Generally flat and dense, white to black-coloured with various grey tinges.	Also brown tinges occur.		
Mycelial characters	Growth rate variable, very slow to very fast.	Black tinges dominating. Growth rate relatively slow (Pl. 3 fig. 5).		
	Margin of the colonies irregularly scalloped or lobed (compare Pl. 3 figs. 1, 3), each prominence being based on a strongly growing leading hypha.			
Metabolites	Locally loose, whitish or greyish, aerial mycelial tufts (compare Pl. 3 figs. 1, 2, 4, 6), consisting of broadly swollen hyphae.			
	Substance <i>E</i> always produced in various quantities; demonstrable by oxidation with alkali (compare Pl. 4 figs. 1, 2), see text.	Substance <i>E</i> sometimes present (Pl. 4 fig. 9). Several anthraquinone pigments produced; under strongly acid conditions yellow, at higher pH red (Pl. 4 fig. 8); in aging cultures frequently crystallized as yellow needles, see Bick & Rhee (1966).		
Vars.	<i>Phoma exigua</i> var. <i>exigua</i>	var. <i>linicola</i>	var. <i>sambuci-nigrae</i>	var. <i>foveata</i>
Hosts	All kinds of plants.	flax.	elder.	potato.

The characteristic oxidation reaction

From comparative experiments it appears that the production of substance *E* is most abundant on malt agar (formula Ainsworth, 1961: 241). On cherry agar (300 ml juice of 500 g cherries + 1300 ml H₂O + 27.5 g agar) the yield is less, while on oat agar (Ainsworth, 1961: 242) the production is scanty. At a pH lower than 5 there appears to be more *E* in the agar medium than at a higher pH. Further it is found that light (daylight) stimulates the production of this substance.

The oxidation products of *E*, the pigments *a* and *β* both act as pH-indicators. Pigment *a* is red-purple at pH < 10.5 and blue-green at pH > 12.5. Pigment *β* is yellow at pH < 3.5 and red at pH > 5.5.

DEMONSTRATION IN AGAR PLATE CULTURES (Pl. 4 figs. 1, 2)

In agar plate cultures of the ubiquitous *P. exigua* and in cultures of its varieties on flax and elder the oxidation of *E* to *a* and *β* can easily be produced by adding a drop of alkali, e.g. NaOH-N. The production of pigment *a* then promptly starts on this spot. This is shown in alkaline environment by a gradually darkening blue-green colour. The colouring is most intense at the edge of the drop, where there is a larger supply of oxygen. Subsequently pigment *a* passes into pigment *β*, which is reddish under alkaline conditions. The red colour also appears first at the edge of the drop. In the centre of the drop there is at first a mixture of bluish-green *a* and reddish *β*. The colour is, of course, also influenced by the natural colour of the agar medium, being yellow in malt agar, and red in cherry agar.

DEMONSTRATION IN CULTURE-EXTRACTS (Pl. 4 figs. 3-7)

Substance *E* and both pigments *a* and *β* are soluble in water. A crude solution of *E* can be obtained by filtering cultures of the fungus on a liquid malt medium (without agar). A solution of *E* can also be obtained by cutting malt agar plate cultures in small pieces, placing these in water for some days, and subsequently filtering the mixture. By adding a small amount of alkali (e.g. NaOH-N) the solution stains blue-green (*a*); this colour gradually passes into red (*β*). Shaking accelerates the reaction, but this takes place only if oxygen is present, indicating that the reaction is an oxidation process. It is not probable that the reaction is caused by an enzyme, since it is not stopped after heating at 100° C during 1/2 hour (in nitrogen atmosphere). The oxidation from *a* to *β* at first runs as an equilibrium-reaction. Ultimately, however, it becomes irreversible, since the addition of reduction substances (e.g. Na₂S₂O₄) does not change the colour from red (*β*) back into blue-green (*a*) or colourless (*E*). However, it appears possible, by adding a reduction substance, to stop the oxidation in the crude solution at a moment that chiefly only *a* (blue-green) is present. The final red-coloured solution (*β*) stains yellow on the addition

of an acid (e.g. HCl-N). In this acid condition the extraction of pigment β with different extraction solvents was attempted. The process was only partly successful when 1-butanol or butanone were used. Better results were obtained, however, by adsorption in a small column of a mixture of 'Norit' and 'Hyflo Supercel'. This method can also be applied directly on the colourless substance *E*: adsorption in Norit and Hyflo Supercel, elution with aethanol, and subsequent oxidation in alkaline condition. From a purified solution of β it was established that the colour change from yellow [Munsell (1952): 2.5 Y (8/8-8/10)] to red [10. R (5/8-5/10)] and *vice versa*, occurs at the pH range of c. 3.5-5.5. Further it could be established that the pigment α changed its colour from blue-green [5.0 BG (4/4-4/6)] to red-purple [5.0 RP (5/2-5/4)] at the pH range of c. 10.5-12.5. The chemical character of *E*, α , and β has not yet been established.

Taxonomy

The synonymy of the ubiquitous *Phoma exigua* and its more specialized pathogenic varieties is discussed.

The list of synonyms quoted under *P. exigua* var. *exigua* is only provisional; many other possible synonyms are still being studied.

The names of authors are abbreviated as recommended in the 'Index of Plant Diseases in the United States' (Agric. Handb. U.S. Dep. Agric. 165, 1960). Herbaria and culture collections are coded according to Lanjouw & Stafleu (1959) and the list of abbreviations in the catalogue of the American Type Culture Collection (Ed. 7, 1964), respectively.

PHOMA EXIGUA DESM. var. EXIGUA — Pls. 1, 2 fig. 1; Pl. 3 figs. 1-4; Pl. 4 figs. 1-7

Phoma exigua Desm. in *Annls Sci. nat. (Bot.)* III, 11: 282, 283, 1849. — Holotype: Pl. cryptog. N. France, Ed. 1, Fasc. 38, No. 1869a. 1849 on *Polygonum tataricum* L. = *Fagopyrum tataricum* (L.) Gaertn. (PC; isotype K).

Phyllosticta sambuci Desm. in *Annls Sci. nat. (Bot.)* III, 8: 34, 1847.

Phyllosticta hortorum Speg. in *Atti Soc. crittogam. ital.* 3: 67, 1881. — *Ascochyta hortorum* (Speg.) C. O. Sm. in *Bull. Del., Univ. agric. Exp. Stn* 63: 19-23, 1904.

Phyllosticta decidua Ell. & Kell. in *Am. Nat.* 17: 1165, 1883.

Phoma herbarum West. f. *brassicae* Sacc. in *Sylloge Fung.* 3: 133, 1884.

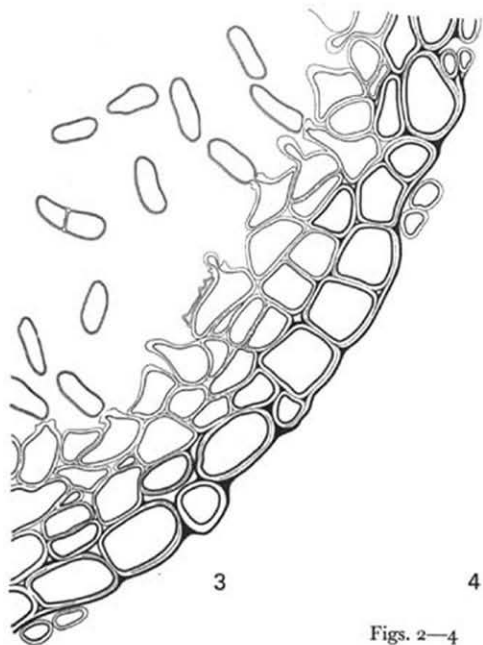
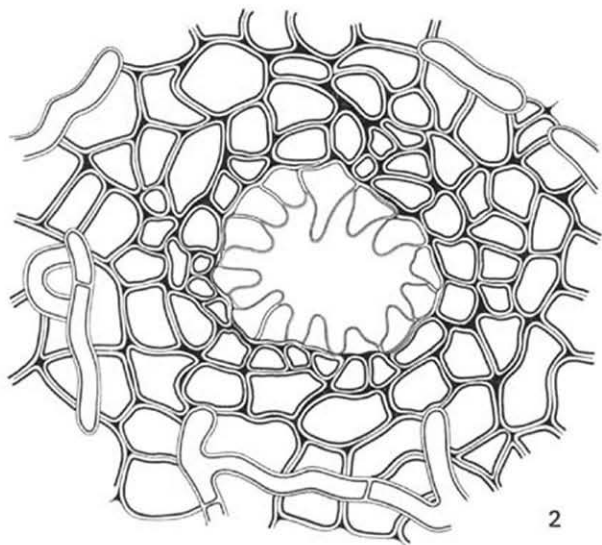
Phoma herbarum West. f. *hyoscyami* Sacc. in *Sylloge Fung.* 3: 133, 1884.

Phoma herbarum West. f. *schobertiae* Sacc. in *Sylloge Fung.* 3: 133, 1884.

Phoma solanicola Prill. & Del. in *Bull. Soc. mycol. Fr.* 6: 179, 1890.

EXPLANATION OF FIGURES 2-4

Figs. 2-4. *Phoma exigua* s.l. — 2. Superficial view of an ostium; note the structure of the wall and the papillous cells surrounding the opening. — 3. Cross section of the pycnidial wall, showing various stages of the spore-forming process (monopolar repetitive budding; compare Boerema, 1965). Diagrams made by camera lucida or drawn after electronmicrographs. — 4. Pycnidiospores, showing variation in shape, size, septation and presence of guttules.



Figs. 2—4

Phoma solaniphila Oud. in Versl. gewone Vergad. wis- en natuurk. Afd. K. Akad. Wet. Amst. 9: 297. 1900.

Phyllosticta vincae-minoris Bres. & Krieger in Hedwigia 39: 325. 1900.

Phyllosticta vincae-majoris Allesch. in Rab. KryptogFlora, Pilze 6: 155. 1901.

Phyllosticta mulgedii J. J. Davis in Trans. Wis. Acad. Sci. Arts Lett. 16: 761. 1909.

Phoma linicola Bub. in Annln naturh. Mus. Wien 28: 203. 1914; not *Phoma linicola* Em. Marchal & Verpl. in Bull. Soc. r. Bot. Belg. 59: 22. 1926 (= *P. exigua* var. *linicola*); not *Phoma linicola* Naoum. in Mater. Mikol. Fitopat. Ross. 5: 3. 1926 (= *Macrophoma* [?], fide Maas, 1965).

Phoma tuberosa Melhus, Rosenb. & E. S. Schultz in J. agric. Res. 7: 251. 1916.

Phoma herbarum West. var. *dulcamaricola* Bub. in Bot. Közl. 1915: 63. 1915.

DESCRIPTIONS & ILLUSTRATIONS.—Köhler in Angew. Bot. 10: 113-139, figs. 1-9. 1928 (*Phoma solanicola*); Dennis in Trans. Br. mycol. Soc. 29: 21-26, text-figs. 1 C-G, 3 E2-7, pl. 1 figs. 4-6. 1946 (group II, strain 2-7); Malcolmson in Trans. Br. mycol. Soc. 41: 415-417, pl. 22 figs. 1, 2. 1958 (*Phoma solanicola*, *P. tuberosa*); Maas in Neth. J. Pl. Path. 7: 114, 115, fig. 1 D-F. 1965 (*Phoma exigua*).

HABITAT & OCCURRENCE.—Ubiquitous soil-born fungus, occurring on various parts of all kinds of plants (see table II). Very often associated with distinct disease symptoms, such as leafspots, lesions on stems and roots (tubers), damping off, dieback, and so on. In all these cases the fungus generally behaves like a weak parasite or a wound parasite, exactly like *Botrytis cinerea*. At the time of leaf fall and natural dying-off of herbaceous plants it is generally the most frequently-occurring pycnidial fungus. In mycological diagnostic work of diseased plants it is also one of the most common fungi isolated.

SPECIMENS EXAMINED.—

EXSICCATA: *Phoma exigua* var. *a*, Desmazières, Pl. cryptog. N. France, Ed. 1, Fasc. 38, No. 1869a, holotype (PC; see Plate 1), and isotype (K); *Phoma linicola*, type (Herb. Bubak, BKL); *Phoma solanicola*, type (Herb. Delacroix, VER¹); *Phoma solaniphila*, type (Herb. Oudemans, GRO); *Phyllosticta decidua*, Ellis, N. Am. Fungi, No. 307, syntype on *Leonurus cardiaca* (NY); N. Am. Fungi, No. 1165, syntype on *Nepeta cataria* (L 910.243-492); *Phyllosticta mulgedii*, type (NY); *Phyllosticta sambuci* Desm., Pl. cryptog. N. France, Ed. 1, Fasc. 33, No. 1638, holotype (PC); Pl. cryptog. France, Ed. 2, Fasc. 25, No. 1238 (PC); *Phyllosticta vincae-minoris*, Petrak, Kryptog. exs. No. 2417 (L 922.54-79).

CULTURES: *Phoma solanicola*, isolate from potato tuber (CBS 236.28); *Phoma tuberosa*, isolate from cysts of *Heterodera rostochiensis* (CBS 369.45); *Phyllosticta hortorum*, isolate made by Togashi, Japan (CBS 289.29).

Desmazières already considered *Phoma exigua* a "polyphagous" species. However, examination of the exsiccata he distributed under *P. exigua* reveal that he used this name in a very wide sense, including quite different *Phoma*-species. He underestimated the sporological characters, paying more attention to the features of the pycnidia; on account of the shape and dimensions of the pycnidia he distinguished two varieties. Only the one first treated, 'var. *a*', should be considered typical to the species *P. exigua* (var. *exigua*). Maas (1965) pointed out that the holotype (PC; Plate 1 above), as well as an isotype (K) of variety *a* on buckwheat refers to the

¹ Station centrale de Pathologie Végétale, Versailles; not listed by Lanjou & Stafleu (1959).

fungus discussed in this paper. As will be clear we completely support this conclusion.

It should be noted that the exsiccata subsequently distributed by Desmazières under the name *P. exigua* var. *a* (on vetchling: Pl. cryptog. France II, Ed. 3, Fasc. 2, No. 57. 1853) represents a quite different species, viz. *Phoma medicaginis* Malbr. & Roum. var. *pinodella* (L. K. Jones) Boerema (see Boerema & al., 1965).

The original exsiccata of the second variety of *P. exigua*, distinguished by Desmazières and indicated as var. 'b' or 'minor'² [Pl. cryptog. N. France, Ed. 9, Fasc. 38, No. 1869b. 1849, holotype (PC; Plate 1 below), and isotype (K) on *Ranunculus* sp.; and Pl. cryptog. France II, Ed. 3, Fasc. 16, No. 759. 1860, specimen on *Thalictrum* sp.] appear to contain a species similar to the ubiquitous saprophyte *Phoma herbarum* West. (see Boerema, 1964).

Phoma exigua and *P. herbarum* have also in later periods often been confused. The latter, however, has substantially smaller spores, which are generally continuous (Boerema, 1964; Sutton, 1964). Further, the species is much less common on herbaceous stems than *P. exigua*. On account of these differences, four forms and one variety taken to belong to *P. herbarum* have been listed above as synonyms of *P. exigua*. Of these infraspecific taxa no original material is known to exist, but their spore-dimensions are too large for *P. herbarum*. Their identity with *P. exigua* is further in accordance with the original opinion that they represent only variants of a single ubiquitous species occurring on different hosts.

The original material of *Phyllosticta sambuci* contains pycnidia, which could not be distinguished microscopically from *P. exigua*. The pycnidia occur on small whitish spots situated along fold lines and lines of rupture in the leaves of elder (injury caused by the wind). From Dutch material with the same type of injury-lesions, strains of the ubiquitous *P. exigua* were repeatedly isolated. The separate particular elder-variety of *P. exigua* (discussed on p. 26), on the other hand, is generally associated with true leaf spots. *Phyllosticta sambuci* antedates the name *Phoma exigua*; however it is not available to replace the latter, since the transfer to *Phoma* would result in a later homonym of *Phoma sambuci* Pass. (in J. Hist. nat. Bord. 1885: 135. 1885).

The synonymy of *Phyllosticta decidua*, *Phoma solanicota*, *Phoma solaniphila*, *Phyllosticta vincae-minoris*, and *Phyllosticta mulgedii* with *P. exigua* is also based on comparative examination of original herbarium material and the study of fresh isolates from the corresponding hosts or related species.

In the literature *Phyllosticta decidua* is reputed to be a polyphagous species with relatively small, continuous pycnidiospores ($3-5 \times 2 \mu$, compare Seaver, 1961). However, in the two original exsiccata of this species the spores were larger — of the same size as those of *P. exigua* — and, moreover, sometimes 1-septate.

The original descriptions of the remaining species are, broadly speaking, in accordance with the characteristics of *P. exigua*, except that the occurrence of 1-septate spores was overlooked.

² Afterwards cited by Saccardo (in Sylloge Fung. 3: 134. 1884) as *P. exigua* var. *ranuncolorum* Desm.

TABLE II

HOSTPLANTS FROM WHICH PHOMA EXIGUA VAR. EXIGUA HAS BEEN ISOLATED

Apocynaceae	3	Cucurbitaceae	7	Polemoniaceae	3
<i>Nerium</i> (1)		<i>Cucumis</i> (7)		<i>Phlox</i> (3)	
<i>Vinca</i> (2)		Cupressaceae	1	Primulaceae	5
Aceraceae	2	<i>Juniperus</i> (1)		<i>Cyclamen</i> (2)	
<i>Acer</i> (1)		Ericaceae	2	<i>Lysimachia</i> (1)	
<i>Anthurium</i> (1)		<i>Rhododendron</i> (2)		<i>Primula</i> (2)	
Begoniaceae	2	Geraniaceae	3	Ranunculaceae	13
<i>Begonia</i> (2)		<i>Geranium</i> (1)		<i>Anemone</i> (6)	
Berberidaceae	2	<i>Pelargonium</i> (2)		<i>Cimicifuga</i> (1)	
<i>Berberis</i> (1)		Gramineae	3	<i>Clematis</i> (2)	
<i>Mahonia</i> (1)		<i>Triticum</i> (3)		<i>Paeonia</i> (1)	
Bignoniaceae	3	Hydrophyllaceae	1	<i>Ranunculus</i> (3)	
<i>Incarvillea</i> (3)		<i>Nemophila</i> (1)		Rosaceae	27
Cactaceae	1	Iridaceae	5	<i>Fragaria</i> (6)	
<i>Cactus</i> (1)		<i>Crocus</i> (1)		<i>Malus</i> (12)	
Campanulaceae	3	<i>Freesia</i> (1)		<i>Prunus</i> (4)	
<i>Campanula</i> (1)		<i>Gladiolus</i> (1)		<i>Pyrus</i> (3)	
<i>Platycodon</i> (2)		<i>Iris</i> (1)		<i>Rosa</i> (1)	
Caprifoliaceae	11	<i>Ixia</i> (1)		<i>Sorbus</i> (1)	
<i>Lonicera</i> (2)		Labiatae	1	Salicaceae	6
<i>Sambucus</i> (3)		<i>Monarda</i> (1)		<i>Populus</i> (2)	
<i>Viburnum</i> (6)		Liliaceae	9	<i>Salix</i> (4)	
Caryophyllaceae	2	<i>Allium</i> (2)		Saxifragaceae	3
<i>Dianthus</i> (2)		<i>Colchicum</i> (1)		<i>Philadelphus</i> (1)	
Chenopodiaceae	3	<i>Hosta</i> (1)		<i>Ribes</i> (1)	
<i>Beta</i> (2)		<i>Lilium</i> (1)		<i>Saxifraga</i> (1)	
<i>Spinacia</i> (1)		<i>Tulipa</i> (2)		Scrophulariaceae	1
Compositae	58	<i>Yucca</i> (2)		<i>Rhinanthus</i> (1)	
<i>Ageratum</i> (1)		Lobeliaceae	1	Solanaceae	21
<i>Buphthalmum</i> (1)		<i>Lobelia</i> (1)		<i>Solanum</i> (21)	
<i>Chrysanthemum</i> (16)		Magnoliaceae	1	Taxaceae	1
<i>Cichorium</i> (15)		<i>Magnolia</i> (1)		<i>Taxus</i> (1)	
<i>Dahlia</i> (13)		Malvaceae	1	Thymelaeaceae	1
<i>Doronicum</i> (1)		<i>Malva</i> (1)		<i>Daphne</i> (1)	
<i>Erigeron</i> (1)		Oleaceae	7	Ulmaceae	8
<i>Lactuca</i> (3)		<i>Forsythia</i> (1)		<i>Ulmus</i> (8)	
<i>Liatris</i> (6)		<i>Ligustrum</i> (5)		Umbelliferae	11
<i>Solidago</i> (1)		<i>Syringa</i> (1)		<i>Anthriscus</i> (3)	
Corylaceae	1	Papaveraceae	3	<i>Apium</i> (2)	
<i>Corylus</i> (1)		<i>Dicentra</i> (1)		<i>Carum</i> (3)	
Cruciferae	9	<i>Papaver</i> (2)		<i>Daucus</i> (3)	
<i>Aubrietia</i> (1)		Papilionaceae	13	Valerianaceae	1
<i>Cheiranthus</i> (1)		<i>Medicago</i> (2)		<i>Valeriana</i> (1)	
<i>Brassica</i> (4)		<i>Phaseolus</i> (3)		Vitaceae	1
<i>Hesperis</i> (1)		<i>Pisum</i> (5)		<i>Vitis</i> (1)	
<i>Lunaria</i> (2)		<i>Trifolium</i> (2)			
		<i>Vicia</i> (1)			

The synonymy of *Phyllosticta hortorum* with *P. exigua* is based on the study of a living culture from leafspots of an eggplant in Japan (obtained from the CBS), which has been compared with the original diagnosis. It must be noted that by Italian workers (see Ciferri, 1957) *P. hortorum* is declared to be identical with the pycnidial state of *Didymella lycopersici* Kleb., the causal organism of tomato stemrot or cancer. However, this is not justified by the original diagnosis of *P. hortorum* and has not been based on a comparative study of fungal isolates.

Regarding *Phyllosticta vincae-majoris* and its variant on *Vinca minor* mentioned above, we may refer to Jansen (1965). The data on *Phoma linicola* are quoted from Maas (1965). For a discussion of *Phoma tuberosa*, see Malcolmson (1958a).

PHOMA EXIGUA Desm. var. LINICOLA (Naoum. & Vass.) Maas—Pl. 3 fig. 5

Ascochyta linicola Naoum. & Vass. *apud* Naoum. in *Mater. Mikol. Fitopat. Ross.* 5: 3. 1926.
— *Phoma exigua* Desm. var. *linicola* (Naoum. & Vass.) Maas in *Neth. J. Pl. Path.* 71: 118. 1965.
Phoma linicola Em. Marchal & Verpl. in *Bull. Soc. r. Bot. Belg.* 59: 22. 1926; not *Phoma linicola* Bub. in *Annln naturh. Mus. Wien* 28: 203. 1914 (= *P. exigua* var. *exigua*); not *Phoma linicola* Naoum. in *Mater. Mikol. Fitopat. Ross.* 5: 3. 1926 (= *Macrophoma* [?] fide Maas, 1965).

Diplodina lini Moez in *Magy. bot. Lap.* 29: 35-38. 1930.

DESCRIPTIONS & ILLUSTRATIONS.—Kerr in *Trans. Br. mycol. Soc.* 36: 61-73. fig. 1, pl. 4 figs. 1-4, 6. 1953 (*Ascochyta linicola*); Breyer in *Wiss. Z. Martin-Luther-Univ. Halle-Wittenb.* 12: 155-164 (Isol. 1, 3, 4), figs. 1, 2, 4-9. 1963; Maas in *Neth. J. Pl. Path.* 71: 114-115, fig. 1 A-C. 1965 (*Phoma exigua* var. *linicola*).

HABITAT.—Associated with damping-off of flax seedlings and brown discoloration of the root collar and stem bases of flax (*Linum usitatissimum*). For description of the disease symptoms, see e.g. Breyer (1963).

SPECIMENS EXAMINED.—

EXSICCATUM: *Phoma exigua* on *Linum usitatissimum* L., Westendorp, Herb. Cryptog. belge, Fasc. 23, No. 1137 (BR).

CULTURES: *Ascochyta linicola*, three isolates made by Dr. H. Diddens, 1929 (CBS 112.28 = culture of Russian herb. material, CBS 113.28, CBS 114.28); isolate made by Dr. A. Kerr, 1953 (CBS 109.49); five isolates made by Dr. J. van der Spek (IPO³).

For a detailed discussion of the synonymy of this footrot fungus of flax, see Maas (1965).

³ Institute of Phytopathological Research, Wageningen.

EXPLANATION OF TABLE II

The ciphers in the table refer to the number of isolates made. In the periode 1961-1965, 260 isolates were made from diseased or dead plant material distributed over 46 families and 99 genera of Phanerogams. These isolates were obtained from stems (156), leaves (52), roots (41), and seeds or fruits (11).

PHOMA EXIGUA Desm.

var. **sambuci-nigrae** (Sacc.) Boerema & Höw., *comb. nov.*—Pl. 3 fig. 6; Pl. 2 fig. 2

Phoma herbarum West. f. *sambuci-nigrae* Sacc. in *Sylogae Fung.* 3: 133. 1884 (basionym).

Phyllosticta sambucina Allesch. ex Mig. in *Thomé KryptogFlora*, Pilze 4(1): 33. 1921.

DESCRIPTIONS.—Allescher ex Migula, l.c. (*Phyllosticta sambucina*); Grove, Br. Coelomycetes 1: 104. 1935 (*Phoma exigua*).

HABITAT.—Associated with leaf spots (Pl. 4) and dead shoots of elder (*Sambucus nigra*).

SPECIMENS EXAMINED.—

EXSICCATA: *Phoma herbarum* f. *sambuci-nigrae*, holotype (Herb. Saccardo, PAD); *Phoma exigua* 'f. *sambuci*' (Herb. Grove, K).

There are various *Phoma* spp. described from branches of elder, but only the spore dimensions of the above cited form of *Phoma herbarum* are in accordance with those of this parasite of elder. Of the leafspot-fungi from elder mentioned in literature, only the name *Phyllosticta sambucina* Allescher as published by Migula can be applied to this fungus. Allescher himself withdrew this name (see Rab. *KryptogFlora*, Pilze 6: 87. 1901), on second thoughts considering that it belonged to *Phyllosticta sambuci* Desm. But after having examined the original material of the latter we have concluded that this is not correct; see further the discussion of *P. exigua* var. *exigua*.

PHOMA EXIGUA Desm. var. FOVEATA (Foister) Boerema—Pl. 4 figs. 8, 9

Phoma foveata Foister in *Trans. Proc. bot. Soc. Edinb.* 33: 66. 1940. — *Phoma solanicola* Prill. & Del. f. *foveata* (Foister) Malcolmson in *Ann. appl. Biol.* 46: 639. 1958. — *Phoma exigua* Desm. var. *foveata* (Foister) Boerema in *Neth. J. Pl. Path.* 73: 192. 1967.

DESCRIPTIONS & ILLUSTRATIONS.—Dennis in *Trans. Br. mycol. Soc.* 29: 17–21, text-figs. 1 A, B, 3 E1, pl. 1 figs. 1, 2. 1946 (group I, *Phoma foveata*); Malcolmson in *Trans. Br. mycol. Soc.* 41: 415–417. 1958 (*Phoma foveata*); Kranz in *Sydowia* 16: 12, 13, figs. 5, 7. 1963 (Isol. 1, 2, 4); Bick & Rhee in *Biochem. J.* 98: 112–116. 1966 (study of the characteristic anthraquinone pigments).

HABITAT.—In certain regions associated with tuber rot ("gangrene") and stem lesions of potatoes (*Solanum tuberosum*). Also occurring incidentally on other plants. For description of the symptoms of potato gangrene, see e.g. *Advis. Leaflet. Minist. Agric. Fish.* 545. 1966.

SPECIMENS EXAMINED.—

CULTURES: *Phoma foveata*, culture of type (CBS 155.45 = NCTC 6113); isolate made by Dr. J. Kranz, 1963, Isol. 4 (IP-BONN⁴); two isolates made by Mr. J. M. Todd, 1963; *Phoma solanicola* f. *foveata*, two isolates made by Dr. J. F. Malcolmson, 1958.

⁴ Institut für Pflanzenkrankheiten der Universität Bonn; not listed by Lanjouw & Stafleu (1959).

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EXPLANATION OF PLATES 1-4

PLATE 1

Phoma exigua, type; var. 'a' on buckwheat, var. 'b' (or 'minor') on *Ranunculus* (PC).

PLATE 2

Fig. 1. *Phoma exigua*, electron micrograph showing characteristic stages of the spore-forming process.

VP = "virginal" parent cell just before the detachment of the first spore; note the thick fold of the wall in the process of abstricting a spore.

RP = parent cell, which has previously produced a series of spores, at a stage just after detachment of a new spore; note the thick collar at the top of the parent cell.

In both cases, the wall of the spore-initial has not yet been differentiated; compare the wall of the mature spore (MSP) produced before by RP. For further details, see Brewer & Boerema (1965).

Fig. 2. *Phoma exigua* var. *sambuci-nigrae*. Leaves of elder showing brown spots with some concentric rings and numerous pycnidia, the leaf tissue encircling the spot being more or less yellow discoloured.

PLATE 3

Figs. 1-6. *Phoma exigua*. — 1-4. Var. *exigua*. — 5. Var. *linicola*. — 6. Var. *sambuci-nigrae*. Cultures showing the variation in growth habit; 1, 2 on malt agar, 3-6 on cherry agar.

PLATE 4

Figs. 1-7. *Phoma exigua* var. *exigua*. — Figs. 1-2. The oxidation-reaction in a two-weeks-old plate culture on cherry agar; 1. photographed five min. after addition of a drop of NaOH-N: conspicuous production of bluish green *a* on the spot; 2. photographed one hour later: *a* completely oxidized to reddish *β*. — Figs. 3-7. The oxidation-reaction in purified extract; 3. nearly colourless *E*; 4. the oxidation-product *a* at a pH of c. 10 (red-purple); 5. *a* in strongly alkaline condition (dark blue-green); 6. the final oxidation-product *β* in strongly alkaline condition (red); 7. *β* in strongly acid condition (yellow).

Figs. 8, 9. *Phoma exigua* var. *foveata*. — Fig. 8. On oat agar (pH c. 6); red discolouration of the medium by the production of anthraquinone pigments. — Fig. 9. On cherry agar (pH c. 5); production of greenish-blue *a* after addition of a drop of NaOH-N.

GYOERFFYELLA KOL 1928, A GENUS OF THE HYPHOMYCETES

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(With Plate 5 and 34 Text-figure)

After a detailed analysis of the accessible data, the authors came to the conviction that *Gyoerffyyella tatrlica* Kol 1928, published as a green alga, is, in fact, the conidia of a fungus belonging to the Hyphomycetes. This led to certain taxonomical and nomenclatural decisions; the scope of the genus *Gyoerffyyella* Kol is proposed as follows: *G. rotula* (Höhn.) Marvanová (syn., *Titaea rotula* Höhn. and *G. tatrlica* Kol), *G. craginiiformis* (R. H. Peters.) Marvanová (syn., *Ingoldia craginiiformis* R. H. Peters.), *G. tricapillata* (Ingold) Marvanová (syn., *I. tricapillata* Ingold), *G. entomobryoides* (Boerema & Arx) Marvanová (syn., *I. entomobryoides* Boerema & Arx), and *Gyoerffyyella* sp. from the High Tatra Mountains (ČSSR) which remains unnamed as only the conidia were found.

Introduction

In 1957, we found in the High Tatra Mountains (ČSSR) conspicuous structures consisting of spirally twisted arms (Figs. 22-27), the taxonomic position of which was not evident at first sight. In the course of further study, it was discovered that similar structures were already described in the literature, partly as conidia of fungi under the names *Titaea rotula* Höhn. and *Ingoldia craginiiformis* R. H. Peters. and partly as a filamentous green alga, *Gyoerffyyella tatrlica* Kol. The similarity in shape of all these organisms is striking and it appeared very doubtful that it could only be an example of morphological convergence, especially as Nilsson (1964: 98) had pointed out, that the last two species were probably synonymous. Therefore, before making a definite decision regarding the correct systematic position of our collection, we considered it necessary to clarify the relationships between the three species.

Some data for this study were obtained during the stay of L. Marvanová at the Centraalbureau voor Schimmelcultures, Baarn, The Netherlands, who expresses her grateful thanks to Dr. J. A. von Arx, the Director of this institute. The authors are further indebted to the Farlow Herbarium, Cambridge, Mass., U.S.A., for the kind loan of the original specimen from the herbarium of F. X. R. von Höhnell.

Historical review

TITAEA ROTULA HÖHNEL 1904

In 1903, von Höhnel found rather peculiar conidia on the decayed lower leaves of *Myosotis alpestris* in the Ötztal Alps (Tyrol, Austria). According to his published description (von Höhnel, 1904: 57) the conidia consisted of four curved, one- or two-celled members ("Glieder"), which were each rounded at one end (called the inner central), where they were 2–3 μ wide, whilst the other external end tapered to a thread-like projection ("Zilie, cauda filiformis"). The "Glieder" lay in the same plane and were attached to each other by their broader ends ("wie die Speichen eines Rades"), while their free, tapering ends were all curved in the same sense.

The author gave no figure of his species and, so far as we are aware, it has not been illustrated (cf. Ingold, 1942: 371). This collection from the *locus classicus* is preserved under collection No. H 113a of the von Höhnel herbarium, in the Farlow Herbarium. Whilst von Höhnel (1904) gave the collection date as "mense Augusto anni 1903", and the exsiccatum has "7. 1903" on the label, we consider that this exsiccatum must be regarded as the type of the species in spite of these two dates.

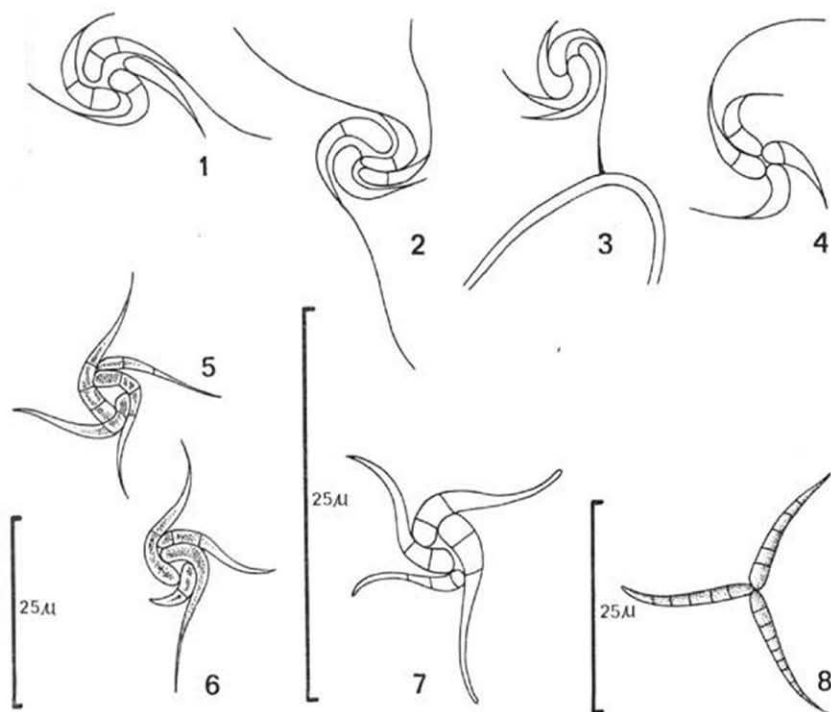
The collection comprises about forty single leaves of *Myosotis alpestris* and three whole leaf rosettes but, in spite of a very thorough microscopical examination, we could find no sign of the conidia described by von Höhnel. However, valuable information is given on the label, namely the description in short hand and four pencil drawings of conidia, probably in the author's hand. These appear to be the only illustrations of this species and a photograph of the label is, therefore, reproduced (Plate 5 fig. 1).

The data on the label differ slightly from the published description; and run: "3 μ breit, 30 μ lang. Fäden 20–25 μ lang; Sporen 2-zellig, hyal., 2–3 μ dick, 8–10 μ lang, halbkreisförmig gekrümmt, alle liegen in einer Ebene! Oft das 'Ganze' (?) nur 25 μ breit". Three of the figured conidia have the characteristic construction, and correspond to the later published illustrations of *Gyöerffvella tatica* and *Ingoldia craginiiformis* (see below), but the fourth is a little anomalous (Fig. 4).

Certain mycological compendia which mention *T. rotula* refer, however, only to the original record of von Höhnel (Lindau, 1904; Migula, 1934), and it does not appear to have been reported again under this name.

GYÖERFFVELLA TATRICA KOL 1928

In 1927, E. Kol observed an organism on snow in the High Tatra Mountains (ČSSR), which she published as *Gyöerffvella tatica* Kol (1928: 618, pl. 17 figs. 23, 24, our Figs. 5, 6). She considered it to be a green alga in the order Chaetophorales. According to her description, this organism forms colonies, consisting of four radiating, slightly curved, sigmoid filaments. The filaments are rounded at their bases (according to the description, even "kopfförmig aufgeschwollen", but this does not correspond to the illustration), and tapering to a fine point on the opposite, free end ("borstenförmig zugespitzt"). The author mentioned that every cell contains



FIGS. 1-8. — 1-4. *Gyoerffyella rotula*, conidia, copied from unpublished drawings on the label of No. H 1113a in von Höhnel's herbarium. — 5, 6. Copied from Kol, 1928: pl. 17 figs. 23, 24. — 7. Copied from Kol, 1957: fig. 48. — 8. "*Gyoerffyella tatrae* Kol" copied from Kol, 1966: pl. 1 fig. 11.

"ein reingrünes, scheibenförmiges Chromatophor ohne Pyrenoid" and considered her species to be a cryosestonic organism. Further data, mostly concerning ecology, are available in the later accounts of Kol (1949: 246; 1957: 206 fig. 48, our Fig. 7; in both cases under the name "*G. tatrae*").

Another, more recent record of *G. tatrae*, again from snow, was reported by Kol (1966: 164 pl. 1 fig. 11, our Fig. 8) from the Polish part of the High Tatras. In this case, it was evidently confused with another organism as neither the description nor the illustration correspond to her own data from 1928 (compare Figs. 5, 6, and 8!). Therefore our further considerations exclude this later collection which the author again placed in the green algae, this time in the Ulotrichales; we think it was probably the conidium of an undescribed fungus. Similar but quadriradiate spores were figured from snow by Tubaki (1960: fig. 3).

INGOLDIA CRAGINIFORMIS R. H. PETERS. 1962

In 1952, Ingold & Ellis (1952: 158 fig. 1d, our Fig. 9) published an illustration of a septate, branched conidium, reminiscent of the figures of *Titaea rotula* and *Gyoserffyyella tatica*, which they had found in scum in a tidal ditch near a wood close to Norwich (England). As neither mycelium nor conidiophores were observed, they refrained from describing it as new. Six years later, Nilsson (1958: 310 fig. 12a, our Fig. 11) published his record of the same conidia from a small pond in the botanical garden at Uppsala (Sweden) also without a name. Subsequently, Petersen (1962: 147 fig. 11A-E, our Figs. 15-17), who found the same fungus in a small river in South Carolina (U.S.A.) and isolated it in pure culture, described it as *Ingoldia craginiformis* R. H. Peters., which he made the type species of his new genus, *Ingoldia*. He identified the English records of Ingold as this species but made no reference to Nilsson (1958). He published the first description of this organism, and gave a detailed explanation of the structure of its conidia as well as data concerning their variability.

The conidia of this species have since been collected on several occasions (Nilsson, 1964: 98 fig. 17c, our Fig. 10; Ingold, 1965: 455; Ingold, 1966: 50 fig. 6) and the fungus is now known from Sweden, England, Scotland, Ireland, France, and North America.

Comparison of the three species

INTERGENERIC DIFFERENCES

The fundamental problem concerns the relationship of *Titaea rotula*, *Gyoserffyyella tatica*, and *Ingoldia craginiformis*. From a rough comparison of their figures, it is evident that they are closely related (cf. Figs. 18-20):

(a) In all three spore types or 'colonies', the same general plan of construction exists. All consist of four 1-5-celled, heteropolar arms, curved in the same sense, with their broader ends approaching each other in the centre and the free, tapered sigmoid ends radiating outwards at angles of approximately 90°.

von Höhnelt (1904: 58) considered this structure a conglomerate of secondarily grown together or adhering spores; Kol (1928: 618) a colony of equivalent filaments; and Petersen (1962: 147), in agreement with Ingold and Nilsson, a branched conidium consisting of a main axis and three laterals of the first and second orders. This last interpretation was proved by the study of living material in culture and is attested by descriptions, illustrations, and photographs. Its correctness is indisputable.

After a more detailed analysis of the drawings of Kol and von Höhnelt, we found that their specimens are in general accordance with the branched conidium described by Petersen, Ingold, and Nilsson. Namely, it is possible to distinguish in their figures an arm corresponding to the main axis (see Figs. 18-20, arms labelled with the letter "a"), which is recognizable by the other two arms ("b" and "c"), which correspond to the branches of the first order, being attached side by side to its con-

came part. The position of the fourth arm ("d") is also exactly in agreement with that of the branch of the second order.

The misunderstanding of the construction by the earlier authors (Kol, von Höhnel) is pardonable. The branches are connected by a narrow isthmus which gives the impression that the arms are separated or secondarily attached, especially when microscopically examining fixed or dried material.

(b) The explanation of the development of the structure as a branched conidium is quite natural and logical, which, however, it is not possible to say about the other two. von Höhnel (1904: 58) suspected that the four single clavate, curved, conidia arose successively from one point on the mycelium and afterwards they either became attached or grew together at their wider apical ends, which consequently became central, and in this way, they remained connected even after they had separated from the mycelium. The thin hair-like extensions ought then to represent stalks on which the spores grew out from the mycelium. A similar manner of conidial attachment by the thin tip of one arm was described for *Tilaea callispora* Saccardo (see Ferraris, 1913). However, Hansford (1946), who studied living material, showed that the conidia of this species are, in fact, joined to the conidiophore by one of the blunt-ended, central cells. The earlier author (Ferraris, 1913: 846 fig. 241: 1, 2) figured conidia accidentally attached to another substrate and something of this kind might probably have been observed by von Höhnel in *Tilaea rotula* (Fig. 3). After all, their subsequent fusion or the attachment of separate conidia could hardly result in such a regular arrangement and be in such exact agreement with the construction of the *I. craginiiformis* conidium. It must rather be considered that the conidia of *T. rotula* are attached to the conidiophore by the basal cell of the main axis, as was described for the conidia of *I. craginiiformis*.

Kol explains her material as a colony of separated algal individuals. She did not mention the number of filaments, but always figured four (cf. Kol, 1928: pl. 17 figs. 23, 24; 1957: fig. 48). Her conception presumes a mode of reproduction which is not known in the filamentous green algae. Either we might consider these structures to be true colonies with an increasing number of filaments (in which case it is difficult to imagine the origin of these new filaments, how the whole colony divides and, after completing division, resumes the characteristic arrangement of four filaments) or that the number of filaments are constant from the beginning, i.e. they might originate simultaneously, something like daughter-coenobia formation in chlorococcal algae, but this way of reproduction is highly improbable in the filamentous algae.

(c) The presence of chromatophores in the cells of *G. tatica* mentioned in the diagnosis (Kol, 1928: 618) is very problematical and it must undoubtedly be an error. In the original figures, there is no possibility to see any distinctly and morphologically limited chromatophore. Moreover, the author later published (Kol, 1957: Fig. 48) a coloured illustration of her supposed alga. There the cell contents are grey-blue-greenish, much more different in colour from the green algae than from either the blue green algae or the cryosestonic fungi, both of which are shown by the author on the same plate. We emphasize again that, with regard to the very small

dimensions of the cells (only 2–3 μ), it is very difficult to distinguish their contents, particularly when the material has been fixed, which is usually the case with cryosectioned specimens.

After a careful consideration of the facts mentioned above, we have reached the conclusion that the three organisms discussed are members of the same genus and belong to the Hyphomycetes. We therefore put forward the following views:

(i) It is clear that the main alleged differences between the three species are based on errors.

(ii) The morphological agreement, especially in the construction of the conidium, is so very conspicuous and characteristic that the classification of these species in two phylogenetically distant groups (Chlorophyceae and Hyphomycetes), where they would represent two quite different states of ontogenetic development (the thallus of an alga and the conidium of a fungus), is highly improbable.

INTERSPECIFIC DIFFERENCES

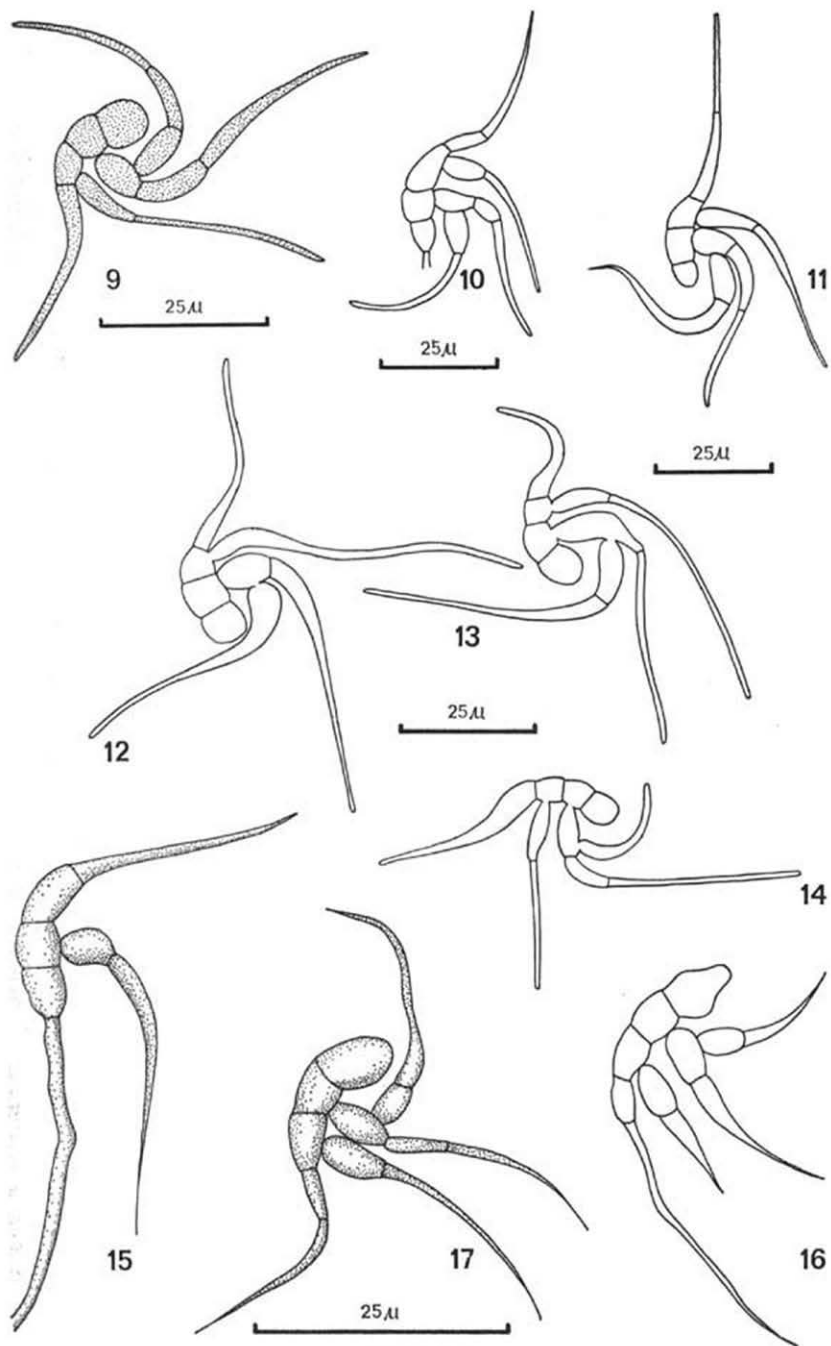
The additional question as to whether the three organisms can be regarded as one species remains to be investigated but some difficulties arise when comparing them. First of all, the descriptions and illustrations of both *T. rotula* and *G. tatica* are inaccurate and we are not acquainted with their range of variability. Only in *Ingoldia craginiiformis*, for which a greater number of observations has been made, is the variability better understood. On the basis of our present knowledge, we consider that there are two different species with the first one represented by *I. craginiiformis* whilst the second includes both *T. rotula* and *G. tatica*. The basis for our opinion is as follows:

(a) The dimensions of the conidia of these two species differ conspicuously, especially in the width (compare Figs. 18, 19 with Fig. 20!). *Ingoldia craginiiformis* has the main axis at the widest part more than twice the width found in either *T. rotula* or *G. tatica* and, whilst the differences in length seem to be less distinct, this is probably attributable to the inaccuracy of the drawings and the difficulties in measuring the sigmoid arms, which may not always lie in the same plane. Nevertheless, according to the authors' data (*T. rotula*: arms 20–40 \times 2–3 μ , ratio *c.* 12; *G. tatica*: arms 20–30 \times 2–3 μ , ratio *c.* 10; and *I. craginiiformis*: main axes 35–50 \times 5–8 μ , ratio *c.* 6.5), the arm length/width ratio would appear to be sufficiently distinct for the separation of two species.

(b) Further differences lie in the compactness of the conidial disc and in the degree of curvature of the arms around the centre. In *I. craginiiformis* the branches are more loosely

EXPLANATION OF FIGURES 9–17

FIGS. 9–17. — *Gyoeffiyella craginiiformis*, conidia. — 9. Copied from Ingold & Ellis, 1952: fig. 1d. — 10. Copied from Nilsson, 1964: fig. 17e. — 11. Copied from Nilsson, 1958: fig. 12a. — 12–14. Copied from Ingold, 1964: fig. 3. — 15–17. Copied from Peterson, 1962: fig. 11B–D.



Figs. 9-17

arranged, their curvature is variable and a continual sequence exists from one-sided, crest-like to spiral, star-shaped forms with strongly curved ends (Figs. 9, 11). The conidia of the other two species are relatively more compact, judging, at least, from the illustrations. The arms in *T. rotula* seem to be more curved than in *G. tetrica*; its diagnosis mentions only a bow-shaped curvature, but the drawing on the label shows at least one sigmoid structure.

(c) The constriction of the cells at the septa is another feature for differentiation. In all figures of *I. craginiiformis*, both the main axis and the branches possess distinctly constricted cells (Figs. 9-17) but, with *G. tetrica* (Figs. 5-7), the constriction is very inconspicuous and rare, whilst it is completely absent in *T. rotula* (Figs. 1-4). However, the only published photograph of *I. craginiiformis* (Ingold, 1966: fig. 6) shows also only inconspicuous constrictions.

The other features seem to be of less taxonomic value:

(d) The number of cells (and, *eo ipso*, the number of septa) differ in the arms, perhaps more according to the data in the literature than in reality. *Ingoldia craginiiformis* has 3-5 cells in the main axis, 1-3 in the branches of the first order and 1-3 in the branch of the second order (Figs. 9-17). In the figures of *G. tetrica*, 3-4 cells are found in the main axis, 2-4 in the branches of the first order and 2-3 in the branch of the second order (Figs. 5-7). In *T. rotula*, only one septum for each arm is mentioned in the diagnosis but the drawings on the label show 1-3 cells (Figs. 1-4). This discrepancy in the latter species can be explained by the indistinctness of the septa, which fact is also mentioned by Kol (1928: 618). Therefore, it is possible that von Höhnelt omitted some septa, having been influenced by his classification of the species in the genus *Titaea*, where two-celled arms are regular, even in the type species, *T. callispora*.

(e) A further problematical feature is the termination of the arms. According to the drawing on the label, the terminal hair-like extensions seem to be thinnest and longest in *T. rotula*. *Gyoeffiyella tetrica* has its extensions shorter and thicker (Figs. 5-7). In *I. craginiiformis*, both shapes are present (compare Figs. 12 and 16), but the more elongated extensions prevail.

(f) Ecological requirements seem to differ, too, according to the published data. *Ingoldia craginiiformis* is probably a representative of the aquatic Hyphomycetes and nearly all its records come from aquatic biotopes. On the contrary, *T. rotula* and *G. tetrica* are reported only from extra-aquatic conditions (see Chapter "Ecology" for a more detailed survey).

From the above comparison of all three species, we conclude:

(i) The organisms published as *T. rotula* and *G. tetrica* are morphologically very similar and, at the present time, we are not able to find any reliable features to separate them. We suppose that they ought to be classified in the same species. If we omit the evidently erroneous data in the diagnoses, only small differences in the spore morphology may be seen in the illustrations: the conidia are more compact in *T. rotula*, which is due to their more curved arms, the number of cells in the arms is lower and the radial extensions are longer. These facts can be explained by the

different characters of the illustrations (von Höhnell's rough drawing on the label and Kol's published figure); whilst, moreover, the authors may have been influenced by having placed their organisms in different groups, i.e. a fungus in the genus *Tilaea* and a green alga.

(ii) The organism named *I. craginiiformis* differs prominently in some morphological features (especially the dimensions of the conidia and the width/length ratio of the arms), and perhaps also in its ecological requirements. In our present level of knowledge, we consider it advisable to keep it as an independent species. However, we are not very far from the idea that those differences which we now regard as important might become insignificant when the full variability of *T. rotula* and *G. tatrica* is understood.

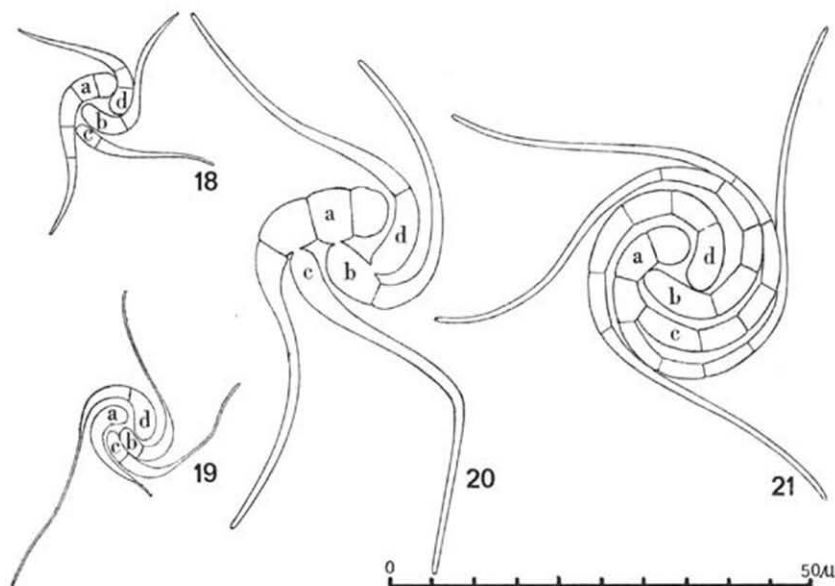
Gyoerffyella spec.

As mentioned above, we have found in the High Tatras structures whose general construction agrees well with the conidia of the three species under discussion but which differ in some characters. We are convinced that they are the conidia of an undescribed species of the genus *Gyoerffyella*. Unfortunately, as we have not succeeded in observing the conidiophores and the mycelium, we do not feel inclined to erect a new species on the basis of conidia alone and we restrict our communication to the illustration and description of all known facts.

DESCRIPTION.—Conidia hyaline, consisting of the main axis, with two branches of the first order arising from the second and third cells of the main axis on its concave side, and one branch of the second order originating from the first cell of the near the basis located branch of the first order. This is in full agreement with the general construction for the conidia of *T. rotula*, *G. tatrica*, and *I. craginiiformis*. The main axis and branches are usually 6–8-celled (the septation is more or less indistinct, so that, especially in the thin parts of the arms, it is often very difficult to ascertain precisely the true number of cells); they are 3–5 μ broad at their wider ends, spirally arranged around the centre with the angles of curvature being up to 360°, which gives the conidium the appearance of being a compact disc. The main axis and branches converge gradually towards the free ends, where they taper to thin, hair-like extensions, sigmoid-recurved (only exceptionally straight) and radiating from the centre, with one of the arms often lying in a different plane. We assume that these conidia are attached to the conidiophore by the basal cell of the main axis, as is found with the fully studied species of the genus. The main axis and the branches are approximately 40–75 μ long, with the diameter of the disc being 15–25 μ (measured without extensions).

LOCALITY.—High Tatra Mountains (ČSSR, Slovakia) only one record (Růžička 8.8.1957) in a moss sample, collected under a waterfall on the peaty bank of a mountain torrent originating from the lake "Batizovské pleso", approximately 1800 m above sea level.

The main difference between the new species and *G. craginiiformis* is in the higher degree of curvature of the arms around the centre in the former, so that the conidium reminds one somewhat of a catherine-wheel firework. This shape seems to be constant in all the conidia so far observed. Further, the arms have a higher number of cells, are narrower and longer, and are only indistinctly constricted at the septa.



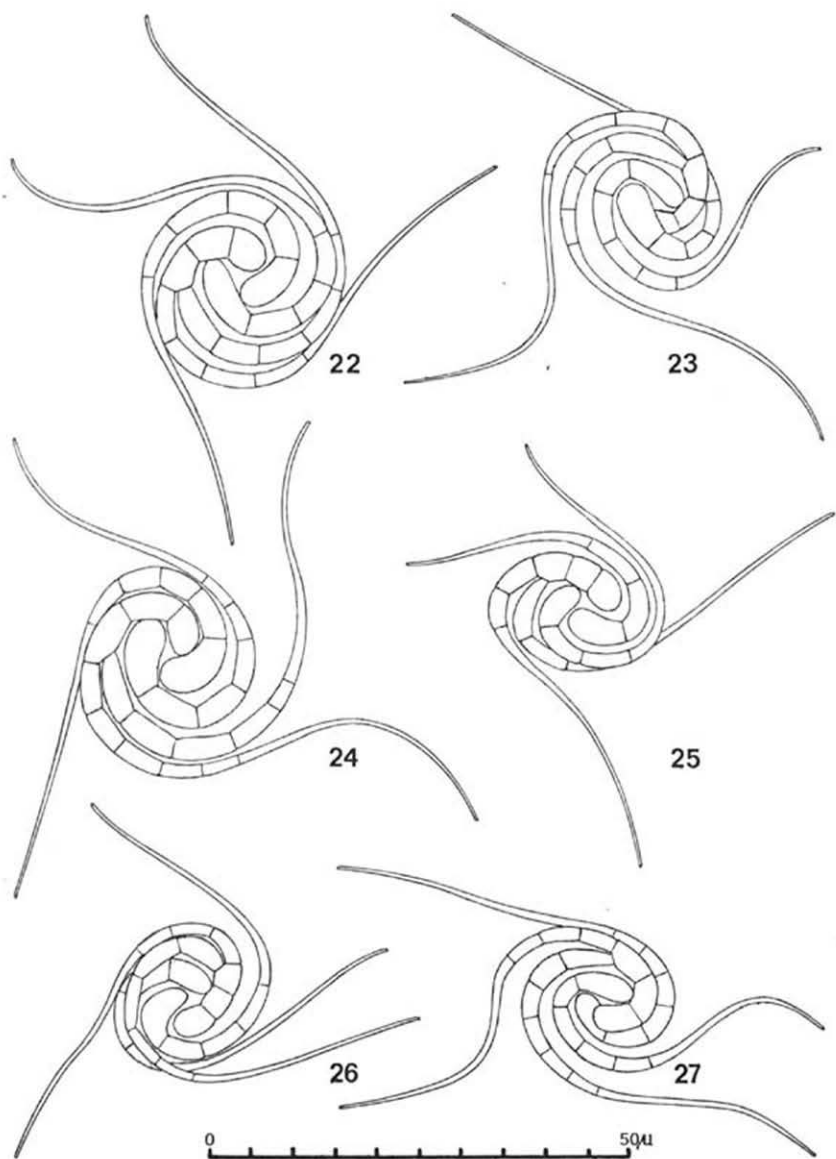
FIGS. 18-21. — Construction of the conidia for the three species under discussion. — 18, *Gyoerffyella rotula*. 18 according to Kol, 1928: pl. 17 fig. 23; 19 according to von Höhnelt's drawing, somewhat enlarged. — 20, *Gyoerffyella craginiiformis*, according to Ingold, 1966: fig. 3. — 21, *Gyoerffyella* spec. — a, main axis; b, c, branches of the first order, adjacently attached to the concave side of the main axis; d, branch of the second order, arising from branch b.

From *T. rotula* and *G. tatrlica*, it differs, apart from the above characters, in the size of the conidia, which are twice as large in the new species. However, some similarity to these two species may be seen in the indistinctness of the septal constrictions.

It is of interest to mention, that in all the conidia studied, we have observed (see Figs. 22-27) that the point of attachment of the near-apex-situated lateral (labelled with "c" in Fig. 21) is a broad septum (see Plate 5 fig. 4) instead of the narrow isthmus found where the branches are attached in other species of *Gyoerffyella*. In agreement with this, the third cell of the main axis, which bears branch "c", has a corresponding pentagonal shape. However, we are not, at the present time, sure of the taxonomic value of this feature. It is neither mentioned nor figured in any other species of the genus and its ultimate evaluation cannot be made until developing conidia have also been studied.

Taxonomy and nomenclature

Since the genera *Gyoerffyella* Kol 1928 and *Ingoldia* R. H. Peters. 1962 are regarded as identical, as has been established above, their names must be treated as taxonomic synonyms. *Gyoerffyella* Kol has priority. It is irrelevant that its description was based



FIGS. 22-27. *Gyoerffyella* spec., conidia.

on an incomplete organism (conidia only), partly confused (organelles are described, which do not occur in cells, i.e. chromatophores) and that the genus was originally classified in the green algae. In addition, the validity of the genus is in no way affected by the original spelling of *Gyöerffyyella*, which is only an orthographic variant and must be corrected to *Gyoerffyyella* (pronounced in English as 'dyerfyella') in accordance with Art. 73 of the Code (Lanjouw & al., 1961).

In our opinion, it is necessary to transfer to the genus *Gyoerffyyella* all the species which have been placed in the genus *Ingoldia*. This also includes *I. tricapillata* and *I. entomobryoides*, both of which fit very well in this genus according to their spore morphology (see Figs. 28–34).

From the genus *Titaea* we remove only one species, *T. rotula*, which departs from the generic conception in the spiral arrangement of the curved arms. However, the name *Titaea* remains available for the type species, *T. callispora*, and the other related species. All these species differ from *Gyoerffyyella* in having a straight main axis without projections, and slightly curved branches on both sides.

The diagnosis published by Kol (1928: 618) is a "descriptio generico-specifica", which is permissible in monotypic genera (Art. 42 of the Code). It was indirectly corrected and completed by Petersen (1962: 147) in his description of the genus *Ingoldia* and it was supplemented by Boerema & von Arx (1964: 298) as regards the conidiophore. The correct name of the genus is, therefore, the name *Gyoerffyyella*.

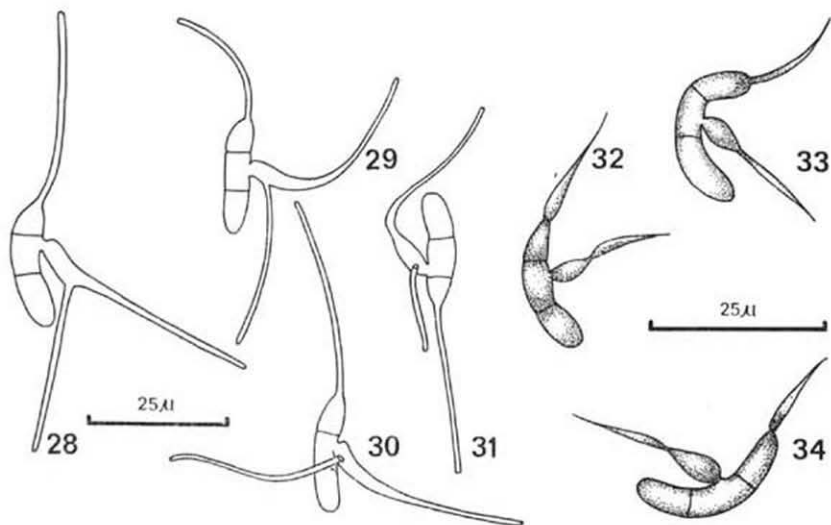
As the two organisms, *Gyoerffyyella tatrlica* and *Titaea rotula* are considered to be conspecific, their names are, therefore, taxonomic synonyms, with the older name having priority, which is *Titaea rotula*. The only specimen which has been located is No. H 1113a in the von Höhnelt collection, preserved in the Farlow Herbarium, Cambridge, Mass., and should be retained as the type because, although we were unable to find the fungus, it is always possible that another student could be more successful. The other species only require transferring from *Ingoldia* to *Gyoerffyyella*.

According to our present knowledge, *Gyoerffyyella* seems to consist two groups of species. The first one comprises *G. rotula*, *G. craginiiformis* and *G. spec.*, and is characterized by four-armed conidia with more or less conspicuously curved arms, which form a relatively compact disc. The arms taper gradually to their long terminal extensions. In the second group, where both *G. tricapillata* and *G. entomobryoides* are to be placed, the conidia consist of only three arms (the near-apex-situated branch of the first order is lacking) which are only slightly bent, so that they never form any disc and their terminal extensions taper abruptly from the apical cells.

KEY TO THE SPECIES OF GYOERFFYYELLA

1. Main axis of conidium bearing two branches of the first order, all arms tapering rather gradually to a thin, long, terminal extension.
2. Main axis and branches of more than 5 cells (usually 6–8), strongly spirally curved around the centre (angles of curvature up to 360°) *Gyoerffyyella spec.*
2. Main axis of merely 5 cells; branches not more than 3-celled, less curved around the centre (angle not exceeding 180°).
3. Main axis 5–8 μ in its widest part; arm length/width ratio *c.* 6 . . . *G. craginiiformis*

3. Main axis only 2–3 μ in its widest part; arm length/width ratio c. 11 *G. rotula*
 1. Main axis bearing only one branch of the first order; all arms tapering abruptly to thin terminal extensions.
 4. Branch of the second order present. Aquatic species *G. tricapillata*
 4. Branch of the second order lacking. Terrestrial species *G. entomobryoides*



FIGS. 28—34. — 28—31. *Gyoeffyyella tricapillata*, conidia, (from Ingold, 1964: fig. 2). — 32—34. *Gyoeffyyella entomobryoides*, conidia (from Boerema & von Arx, 1964: fig. 1).

GYOERFFYELLA Kol

Gyoeffyyella Kol, 1928: 618 [ut "*Györffyyella*"] (diagnosis). — Typus: *Gyoeffyyella tatraica* Kol 1928: 618.

Ingoldia Petersen, 1962: 147; Boerema & von Arx, 1964: 298 char. emend. — Typus: *Ingoldia craginiformis* R. H. Peters.

1. *Gyoeffyyella rotula* (Höhn.) Marvanová, *comb. nov.*

Titaea rotula von Höhnelt, 1904: 57 (diagnosis, sine icone); Lindau, 1904: 545; Migula, 1934: 201. — Typus: Exsiccatum No. H 1113a (herbarium von Höhnelt, Farlow Herbarium, Cambridge, Mass., U.S.A.).

Gyoeffyyella tatraica Kol, 1928: 618, 622 pl. 17 figs. 23–24 ut "*Györffyyella Tatraica*" et "*G. Tatrae*"; Kol, 1929: 416 [ut "*Györffyyella Tatrae*" et "*G. Tatraica*"]; Kol, 1957: 206 fig. 48 [ut "*Györffyyella tatrae*"].

Non: "*Györffyyella tatraica* Kol", Kol, 1966: 164 pl. 1 fig. 11.

2. **Gyoerffyyella craginiformis** (R. H. Peters.) Marvanová,
comb. nov.

Ingoldia craginiformis Petersen, 1962: 147 fig. 11A-E (diagnosis, typus); Ingold, 1964: 106 fig. 3; Nilsson, 1964: 98 fig. 17e; Ingold, 1955: 455; 1966: 50 fig. 6.

Hyphomycetes spec. Ingold & Ellis, 1952: 158, 159 fig. 1d; Nilsson, 1958: 311 fig. 12a; Ingold, 1959: 126 fig. 14 p.p.

3. **Gyoerffyyella tricapillata** (Ingold) Marvanová, *comb. nov.*

Ingoldia tricapillata Ingold, 1964: 103 fig. 1-2, pl. 3 figs. 1-6 (diagnosis, typus).

4. **Gyoerffyyella entomobryoides** (Boerema & Arx) Marvanová,
comb. nov.

Ingoldia entomobryoides Boerema & von Arx, 1964: 298 figs. 1-2 (diagnosis, typus).

5. GYOERFFYYELLA spec.

Sine nomen.

Ecology

The genus *Gyoerffyyella* includes both aquatic and terrestrial species, although the ecological requirements have not yet been fully recognized in all species. *Gyoerffyyella tricapillata* was reported as a true aquatic Hyphomycete which produced and distributed conidia under water. *Gyoerffyyella craginiformis* was collected on submerged leaves, but its conidia also occurred in scum whilst Nilsson (1964: 63, 98) found them among garden leaf litter and considered this fungus to be rather of a semi-aquatic character. *Gyoerffyyella tricapillata* was recorded from low altitudes. *Gyoerffyyella craginiformis* is reported from both low (Nilsson, 1962; 1964) and high altitudes (Ingold, 1965; 1966). *Gyoerffyyella entomobryoides* has never been found in water and occurred on decayed twigs of *Rosa* spec. The locality was at a low altitude.

The ecology of *G. rotula* has not yet been recognized with certainty. Kol reported her species from snow fields at altitudes of 1340 and 2180 m above sea level; further details, mainly concerning the quality of the snow, were added in her later publication (Kol, 1949). von Höhnelt found his fungus near the village Tumpfen, in the Ötztal, a valley in the Tyrolean Alps. Tumpfen lies 946 m above sea level, but the specimen could have been collected in its neighbourhood, where the mountains reach more than 2000 m. This species seems to be of a montane character.

von Höhnelt observed his conidia on the decayed leaves of *Myosotis alpestris*, whereas Kol found them directly on snow. This need not necessarily lead to the conclusion that the ecological requirements of both species must differ. Conidia of a saprophyte or minute parts of plant tissue bearing fungus can easily be transported to snow by wind or water, whilst a cryosestonic organism could accidentally appear to be attached to the leaves of some alpine plant, growing near a field of remaining snow. We must, however, not omit the third possibility, which is that conidia of an aquatic Hyphomycete could easily be transported from water by dispersing spray

from waterfalls or blown by wind from the desiccated leaves (on which they developed) to either *Myosotis* or snow. Tubaki (1960) also lists some conidia of aquatic Hyphomycetes from snow. As to von Höhnel's statement about the connection of conidia with mycelium, this has already been shown to be an error. In any case, *G. rotula* must be a very rare species, or cryoseston is not its natural habitat as it was not found during the ten-year systematic investigation of the cryosestonic microorganisms of the High Tatras (F. Hindák, Brno, ČSSR, personal communication) nor has it been refound in the original locality.

Similar comments as regards ecology could also be made about the unnamed species of *Gyoerffyella*. It was found only once, as free conidia, and its natural substrate is unknown.

Summary

1. The cryosestonic organism, *Gyoerffyella tatraica* Kol 1928, described as a green alga, shows very close morphological conformity with the conidia of fungi published under the names *Titaea rotula* von Höhnel 1904 and *Ingoldia craginiiformis* Petersen 1962, so that the classification of these species in two unrelated groups is untenable. On the basis of a detailed analysis, we consider that they belong to the same genus of Hyphomycetes, the correct name of which is *Gyoerffyella* Kol 1928.

2. The data which we had at our disposal have not produced any reliable feature which would enable us to keep *Titaea rotula* and *Gyoerffyella tatraica* as two independent species. We therefore consider both names to be taxonomic synonyms, with the correct name for this species being *Gyoerffyella rotula* (Höhn.) Marvanová.

3. *Ingoldia craginiiformis* R. H. Peters. differs a little from the above two species, both morphologically and ecologically. We could not justify its identity with *G. rotula*, but do not exclude this possibility in the future. Its specific epithet has been recombined with *Gyoerffyella* as *G. craginiiformis* (R. H. Peters.) Marvanová.

4. Two species of *Ingoldia* have been transferred to *Gyoerffyella* as *G. tricapillata* (Ingold) Marvanová and *G. entomobryoides* (Boerema & Arx) Marvanová.

5. *Gyoerffyella* spec., found in the High Tatras is closely related to *G. rotula* and *G. craginiiformis*. We refrain from naming it, as we have seen neither the conidiophores nor the mycelium. Our description and illustrations therefore deal only with the conidia.

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EXPLANATION OF PLATE 5

- FIGS. 1-4. — 1. Label of No. H. 1113a of von Höhnel's collection (Farlow Herbarium). — 2-4. *Gyoseryella* spec., conidia, in 4, detail of disc. The branch of the first order situated near apex is attached to the third cell of the main axis by a broad septum.

A NEW SPECIES OF CURVULARIA

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(With three Text-figures)

Curvularia papendorfi, isolated from South African soil, is described as a new species. This species is characterized by greater overall dimensions than in any of the known species, and a hilum to the spore that is not protuberant at all.

During his stay at the Centraalbureau voor Schimmelcultures, Baarn, Holland, in 1966, Prof. Dr. M. C. Papendorf, from Botany Department, University of Potchefstroom, South Africa, presented the institute with an isolate of an interesting species of *Curvularia* for identification. Since this isolate differs from all the species of *Curvularia* described so far it is presented here as a new species.

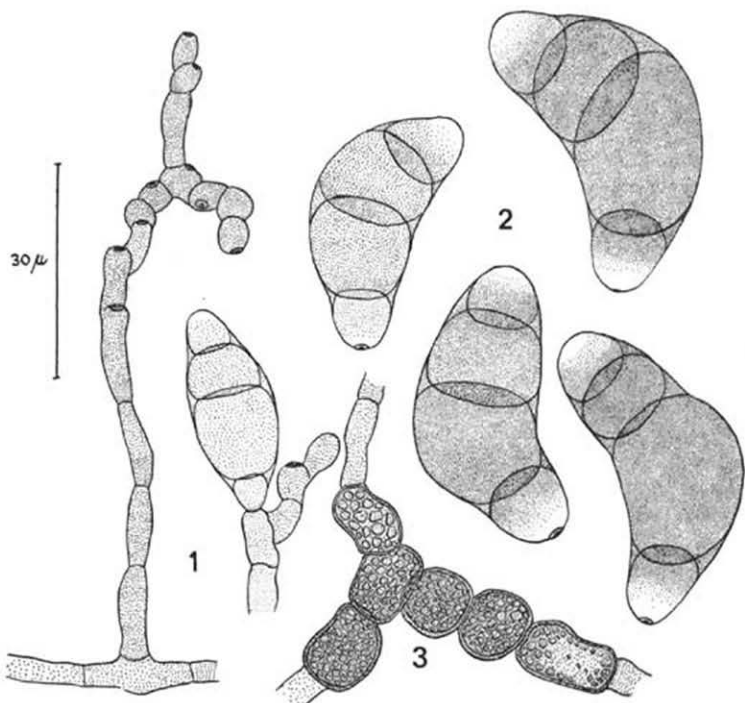
Curvularia papendorfi van der Aa, *sp. nov.*—Figs. 1-3

Hyphae ramosae, septatae, subhyalinae vel brunneae, 2-8 μ diam. Conidiophora brunnea, ramosa, septata, longitudine variabilia. Conidia in apice conidiophori ex poro successive spirally nascentia, cylindracea, inaequalia vel leviter curvulata, 3-(4)-septata, cellula secunda maxima, pallide brunnea vel brunnea, distaliter subhyalina, 28-50 \times 15-30 μ , plerumque 39.16 \times 20.40 μ .

Culta ex terra sub *Acacia Karroo*, Potchefstroom, Transvaal, Africa australis. Typus in herb. C.B.S. Baarn, Holland (cultura CBS no. 308.67).

Colonies on potato-carrot agar fast-growing, plane, grey or black and powdery, sometimes locally white and floccose, reverse greyish blue with many black dots. Hyphae smooth, branched, septate, hyaline to dark-brown, up to 8 μ in diameter, developing locally into more or less rounded, thick-walled, chlamydospore-like cells with brown granular contents. Stromata small, of indefinite shape, frequently produced deep in the agar, in young as well as in old cultures. Conidiophores arising singly, laterally and terminally on the hyphae, simple or branched, septate, geniculate, brown, smooth; the lateral conidiophores from 20 up to 200 μ long, and 4-10 μ thick, the scars dark-brown, up to 7 μ diameter. Conidia acropleurogenous, straight to strongly curved, broadly ellipsoidal, but always more or less inequilateral, 3 (seldom 4)-septate, curved at the second cell from the base, which is often the largest; smooth-walled; hyaline when young, becoming greenish-brown, finally dark-brown; lighter at both the extremities; the hilum not protuberant at all; 28-50 μ (39.16) long, 15-30 μ (20.40) thick at the broadest part. Some abnormal triangular spores were observed.

Isolated from leaf-litter of *Acacia Karroo* in South Africa. Type material is deposited at the Herbarium of the C.B.S. in Baarn. Cultures are maintained in the CBS collection, no. 308.67.



Figs. 1—3. *Curvularia papendorffii*. — 1. Sporophores. — 2. Spores. — 3. Chlamydospore-like cells.

Because of its intermediate position, it is difficult to fit the new species in either the *lunata*-group or the *maculans*-group distinguished by Boedijn (1933). In size, more especially in the width of the spores, *Curvularia papendorffii* is comparable only with *Curvularia andropogonis* (Zimm.) Boedijn (Corbetta, 1965; Ellis, 1966). This species, however, produces unbranched sporophores and spores with a very distinct, protuberant hilum. The width of the spores of all other large-spored *Curvularia* species seldom reaches $20\ \mu$, while in *Curvularia papendorffii* it averages a little more than $20\ \mu$.

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NOTES ON EUROPEAN POLYPORES—II¹Notes on *Poria*

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A note on lampro- and skeletocystidia and the introduction of the new term 'glococplerous hyphae' for the hyphal system that often produces the gloecocystidia in the hymenium is followed by a historical survey of the generic names proposed for resupinate and effused polypores (the so-called porias) and by an enumeration of these names and their type species together with a key to these species as far as they occur in Europe. Emended descriptions are given for *Chaetoporellus* Bond. & S., *Chaetoporus* P. Karst., and *Schizopora* Velen., while the name *Perenniporia* Murrill is re-introduced for the group of *Poria medulla-panis* sensu Pers., the species now often taken as type of the name *Poria* Pers. per S. F. Gray. It is proposed that this last-mentioned name be retained for the as yet unclassified porias. *Amyloporia* Bond. & S. is discussed. Some remarks are made on a redefined genus *Oxyporus*; it is treated as distinct from *Rigidoporus*. The bulk of the paper is made up of discussions on individual species, in alphabetical order. A recapitulation briefly reviews many conclusions about specific names. *Poria romellii* Donk and *Sistotrema eluctor* Donk are new species introduced to replace *Poria byssina* Romell and *Poria onusta* (P. Karst.) Sacc. of modern authors. New combinations are made with *Chaetoporus* (1), *Cristella* (1), *Schizopora* (1), *Perenniporia* (2) and *Rigidoporus* (1).

During the preparation of a check list of the European polypores on the same lines as my "Check list of European hymenomycetous Heterobasidiae" (Donk, 1966a) the number of notes that had accumulated had taken on alarming proportions and I decided to publish a selection of them in separate papers. One of the most intricate subjects is that of the resupinate and effused polypores, better known as the porias.

Although the work on improving species conceptions and interpretations by Eriksson (1949, 1958), Lowe (1966; and previous publications), and Domański (1965b; and previous publications) had eased the situation considerably, many questions still remained to be worked out. The present paper is mainly concerned with 'old' species, especially those of Persoon, and several of Fries. Much of what is stated below had been previously published (Donk, 1933), but in view of the above mentioned recent activities it seemed appropriate to test the results anew and to add more extensive and also fresh information. It must be pointed out at once that of a number of Persoon's species type material is in existence that

¹ Part I appeared in *Persoonia* 4: 337-343. 1966.

still needs closer study. No notes on these are published in this paper but I hope to report on them in the near future.

Another aspect of the study of the porias is their still unsettled natural classification. The work already done on this is so scattered and in need of critical evaluation to such an extent that I thought it worth while to devote a good deal of space to the subject. Following a historical review of the published generic names introduced for porias, an alphabetical list of these names and their type species is given, as well as a key to the species as far as they occur in Europe. It is hoped that in this way a reasonably comprehensive introduction to the taxonomy of the proposed genera has been given. In their undue hurry to replace the huge artificial genus *Poria* by smaller ones, several European authors have introduced quite a number of wholly artificial genera. These must be thoroughly revised before they can be accepted or suppressed. This task can only be performed gradually and must often wait until generic features emerge from a more careful analysis of the species.

NOTE.—In cases of homonymy the swung dash (◡) obviates repetition in full of a preceding name, minus the author's citation. References to publications briefly cited at the end of this paper consist of dates printed in italics.

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Some general remarks

LAMPRO- AND SKELETOCYSTIDIA

A discussion on some porias, treated below in connection with *Chaetoporus* and *Oxyporus*, may be preceded by a few remarks on thick-walled cystidia occurring in euhymenia (Donk, 1964: 210) or in b a r r e n euhymenia. The last of these terms is a recognition of the fact that, in lieu of sporulating basidia, hymenia may be formed consisting of only sterile elements; in that case the normally present sterile elements are found in strongly heightened abundance. Very often typical hymenia contain several elements, varying from sporulating basidia and basidia that will not sporulate (abortive basidia), over more or less 'difformed' abortive basidia to such thin-walled cystidia or leptocystidia as are often called 'basidioles' or 'cystidioles', and finally thick-walled cystidia or lamprocystidia. Frequently the sterile elements originate together with the basidia and these have then been termed inclusively h y m e n i a l cystidia. In other cases the cystidia are ends of the tramal hyphae that penetrate into, and often beyond, the hymenium; these are the t r a m a l cystidia (Donk, 1964: 229). The tramal cystidia, in turn, may be derived from various hyphal systems: generative hyphae, gloeoclerous hyphae,¹ and skeletal hyphae. Where they

¹ These are also called 'gloeocystidial' hyphae, a term which needs correction, *inter alia*, because in certain species these hyphae seldom if ever end in typical (more or less inflated) gloeocystidia. Singer (1962: 34) called the bulk of this kind of hyphae 'gloeo-vessels', a hybrid

belong to the last two systems they have been called tramal gloecystidia and skeletocystidia respectively (Donk, 1964: 232). In short, hymenia may contain as thick-walled elements hymenial lamprocystidia or skeletocystidia or both.

The hymenium—barren or not—is a remarkable morphogenetic field that imposes its own rules on its constituent elements. Among the most important are (i) restricted longitudinal growth, (ii) parallel orientation perpendicular to the hymenial surface, and (iii) a tendency towards becoming inflated. The generative hyphae that continuously produce the basidia as long as the hymenium is actively sporulating are to a certain extent comparable to a telescoped version of the generative hyphae along the margins of a centrifugally growing cap or of hymenophoral edges (like those of the dissepiments of the tubes) or the sterile tips of hymenophoral teeth. If in such margins or tips skeletal or gloecystidial hyphae are produced then it is not surprising if hymenial lamprocystidia and hymenial gloecystidia are formed in the hymenium.

In the case of tramal cystidia penetrating into the hymenium, a change of regimen is imposed on these foreign elements, the regimen of the hymenium. Where tramal cystidia occur with their original direction parallel to the hymenium, they will be seen as though they are forced into a more or less perpendicular direction to conform, often radically, with that of the other hymenial elements; they will stop their 'unlimited' growth; and in very many cases (but there are exceptions) they will also become more or less inflated. Often the bending of the skeletal hyphae into the hymenium may be less complete and they may be seen to traverse the hymenium obliquely. The same is also not rare among Hymenochaetaceae in respect to (tramal) macrosetae.

Moreover, it may also be expected that when they become directed towards, or reach, the hymenium, generative hyphae of trama that produces skeletal along growing edges or in tips may waver between producing 'normal' skeletal and hymenial lamprocystidia, or between gloeoplerous hyphae and hymenial gloecystidia. If such a species is characterized by hymenial lamprocystidia only it will not be surprising if some of these are not typical but suggest skeletocystidia. It is easy to supply examples in which the two extremes are well pronounced and typical, viz. that either only skeletocystidia or else hymenial lamprocystidia are formed, but in certain species intermediate stages of these kinds of thick-walled cystidia occur as a rule more or less abundantly.

word which has little to recommend it and which in any case would be in need of a Latin counterpart. I propose that the hyphae of this 'gloeo-system' be indicated as gloeoplerous hyphae (hyphae gloeopleres, from γλοιός, any sticky substance, and πλήρης, filled by, full). These hyphae should not be confused with septate, thin-walled generative hyphae that in certain species may at first be filled with a similar or even the same contents as gloeoplerous hyphae, although intermediate forms are known to exist. It will be necessary to admit several subtypes of gloeoplerous hyphae, depending on the peculiarities of the contents, which, for instance, may be oily (oleiferous hyphae) and then may be called elaiogloeoplerous hyphae, or, perhaps, preferably gloeoplerous hyphae with oily contents.

In view of the above conclusion it appears profitable to emend and restrict the term lamprocystidia (*λαμπρός* bright) and instead of applying it to thick-walled cystidia in general, reserving it for such as have walls different from those in skeletocystidia; mostly the substance of the walls is more reminiscent of glass (refrigent) and breakable rather than tough, while no skeletal hyphae with walls of the same substance occur in the trama. The hymenial cystidia whose walls agree with those of skeletals could better be referred to the skeletocystidia; these should then be divided in hymenial and tramal skeletocystidia. An example is presumably *Geopetalum carbonarium* (A. & S. per Pers.) Pat. as recently described by Corner (1966: 105 fs. 50-54). Skeletocystidia originating in, or shortly below, the hymenium will as a rule be short and inflated, that is, without the hypha-like appearance of the skeletals formed in the trama.

If a species (for instance, of porias) has a monomitic context (trama) and thick-walled hymenial cystidia with walls agreeing with those of skeletals in related taxa then in certain groups it may be assumed that the skeletals disappeared from the context simultaneously with its reduction.

In hyphidial hymenia or catahymenia (Lemke, 1964: 218; Donk, 1964: 210) the hyphidia may impose some of their characters upon the basidia, probably the reverse of what is discussed above. In certain species of *Aleurodiscus* the hyphidia are remarkable in that numerous prongs are formed. These prongs tend also to form on the other hymenial elements like gloecystidia and even—basidia. In *Aleurodiscus oakesii* many well-developed basidia may be found to produce the prongs over restricted areas, usually in a girdle around their middle.

A historical survey of *Poria* and its segregates

Like so many other fungus genera, *Poria*, as originally conceived, stands out as a superb example of an artificial taxon. It was designed to receive the 'resupinate' polypores in their widest sense (except *Merulius* Fr.), and it is still often used accordingly. Species which are usually effused or resupinate, but may occasionally form cap-like portions, are removed as soon as such conditions come to the mycologist's notice. Another motive for removing species from *Poria* is to find that the hymenophore (tube layer) may become layered. In that case some authors transfer them to *Fomitopsis* or *Fomes*, without explaining why a layered hymenophore is more important than a strictly 'resupinate' fruitbody. It would be equally consistent to keep the strictly 'resupinate' species of *Fomes* sensu lato in *Poria*.

The now often accepted type species selected for the name *Poria* (cf. Donk, 1960: 266-270) is *Boletus medulla-panis* Jacq. sensu Pers. [= *Poria medullaris* S. F. Gray; often erroneously called *Poria unita* (Pers.) P. Karst., see p. 116]. It has been transferred to *Fomitopsis* and *Fomes* on two counts: first, because its fruitbody may occasionally be narrowly reflexed and, secondly, because the hymenophore often becomes layered. However, it should be kept in mind that if it is not only accepted as type of the name *Poria*, but also transferred to *Fomes* (Fr.) Fr. 1849 sensu lato (Lowe,

1955: 222; 1957: 83), or any segregate of this genus, the correct name for the receiving genus would become *Poria*.

Another, and nomenclatively preferable, solution would appear at first sight to be to accept *Polyporus medulla-panis* (sensu Pers.) with a few closely related species as a distinct natural taxon. The implications of this latter conviction have been carried out by Kotlaba & Pouzar (1959: 32, 36), who combined the *Poria medulla-panis* group under the name *Poria* with *Truncospora* Pilát 1953, type species, *Trametes ohioensis* Berk.²

However, neither these authors nor the few who followed them provided provisions or practical suggestions as to how to deal with the more than one hundred remaining species, which thus become deprived of their generic name.

There is no doubt that there are sufficient reasons for stripping the bulk of the 'resupinate' polypores from the name *Poria* and replacing it by another one, but in my opinion (Donk, 1960: 269) the best solution of the problem is not to insist on the prescriptions of the "International Code of Botanical Nomenclature" by way of exception, but to maintain the name *Poria* for the artificial (residual) genus as if it had no type species. A similar solution I have proposed for *Corticium* Fr. and *Odontia* Fr. We shall continue to need these artificial receptacles coupled with their traditional names until our taxonomic knowledge has advanced so far that they will not only have been emptied except for the undisposable nomina dubia, but also until most mycologists have become willing to accept the disposition proposed for the better-known and excluded species. Of course, the co-existence of two genera of the name *Poria*, one for a 'natural' genus and one for the 'residual' genus, would only cause confusion and embarrassment.

I cannot agree with Wright's judgement (1964: 693) that retaining the name *Poria* for the artificial group is not necessary because there are already many generic names that will take care of a large percentage of the other species. That a multitude of generic names based on species of *Poria* sensu lato have been proposed will become obvious from the present paper. What I emphatically deny is that we already know approximately which species should be accommodated under these generic names. Many European species (and luckily as yet very few others) have been forced with a hammer into a number of these genera that are so artificial or so poorly defined that some of the foremost specialists of the resupinate polypores are as yet not prepared to distribute these fungi over the ever-changing modern classifications of the polypores. This attitude will no doubt eventually be abandoned, but the process will proceed slowly.

If one rejects the maintenance of the name *Poria* for the artificial genus by restricting it to a small natural taxon, the correct name for the former will have to be worked out. It would in any case not be *Physisporus* Chev. 1826, which was introduced

² = *Fomes ohioensis* (Berk.) Murrill = *Truncospora ohioensis* (Berk.) Pilát 1942 (generic name not validly published), 1953 (incomplete reference) = *Poria ohioensis* (Berk.) Kotl. & P. 1959, the last recombination impermissible in view of *Poria ohioensis* (Murrill) Sacc. & Trott. 1912.

as a superfluous name (name change) and for that reason follows the name *Poria* as an obligate synonym. I wonder if someone will really have the courage to recombine all porias excluded from *Poria* sensu stricto and of unsettled taxonomic position under the earliest available name—*Junghuhnia* Corda 1842. In that case I am in the position to predict that this name will soon also be restricted to a small group. The next job will then be to make all the necessary new combinations with *Theleporus* Fr. 1847. Of this name, too, however, the correct application can be settled as soon as the hyphal structure of the type species has been made known. (The type specimen is still in existence.) And so on and so on.

In accepting the suggestion that an artificial genus *Poria* be maintained there are various possibilities for dealing with the *Polyporus medulla-panis* group. First, one may transfer the taxon, or its individual species, to other, established, genera such as *Polyporus*, *Fomes*, *Fomitopsis*, or *Truncospora* and so on. Secondly, it may be treated as a genus of its own with renunciation of the name *Poria* for it. It may then be (temporarily) called *Perenniporia* Murrill 1942 rather than *Truncospora* Pilát 1953, which is a later name given to a typically pileate taxon that some authors would now like to combine with the *Polyporus medulla-panis* group.

The time is past when an even more artificial genus was made of *Poria* than it was in the old classification. An example of such needless super-artificiality was the incorporation of *Porotheleum* (Fr. per Fr.) Fr. \equiv *Stromatoscypha* Donk. The acceptance of an artificial genus *Poria* does not imply slackness in distinguishing between *Poria* and *Merulius* Fr. in a broad artificial sense.

The classification of the species of *Poria* has not been left to the care of 'conservative' mycologists. Several attempts at improvement have been made and the present survey aims at presenting a faithful summing up of what has been done so far. In my opinion none of the attempts to break up *Poria* sensu Cooke completely into smaller genera, like those of Karsten, Murrill, and Bondartsev & Singer, has led to satisfactory results.

Poria Pers. 1794³ was never admitted by Fries as a distinct genus, although he accepted the group as an infrageneric taxon which he called *Polyporus* trib. *Resupinatus* (Nees) per Fr. in 1821. Consequently the genus was almost completely suppressed until Cooke (1886: 109) admitted it in his "Praecursores ad monographia Polyporum", an enumeration that formed the basis for the treatment of the polypores in Saccardo's "Sylloge Fungorum" (1888). From that time on *Poria* has been a firmly established receptacle for all or most resupinate polypores. Quélet (1886: 168) accepted *Poria* in about the same sense and nearly simultaneously with Cooke.

Yet it cannot be said that the genus *Poria* was completely forgotten in the preceding

³ For generic names published before 1960 no references to their places of publication are given. These and other nomenclative details will be found in a paper called "The generic names proposed for Polyporaceae" (Donk, 1960).

period, although the publication of *Poria* Pers. by S. F. Gray passed unnoticed and was of no importance until the acceptance of later starting-points for fungi (in 1910) and the arbitrary fixing of the date of the first volume of the starting-point book (Fries's "Systema") on January 1, 1821 (in 1950). It then appeared that Gray was the author who had first validly published the name: *Poria* Pers. per S. F. Gray 1821. For reasons unstated Chevallier replaced *Poria* by *Physisporus* Chev. 1826, a little-used superfluous name subsequently accepted by Gillet (1878: 693) and later, for instance, by Karsten and Costantin & Dufour.

The next generic names introduced for a species that was later on included in *Poria* are *Laschia* Jungh. 1838 (pre-occupied) = *Aschersonia* Endl. 1842 (nomen rejiciendum) = *Junghuhnia* Corda 1842. For some time the type species (*Laschia crustacea* Jungh.) was considered to belong to *Hymenogramme* Mont. & Berk. 1844 as the result of a suggestion to that effect by the authors of the last name. Bresadola (1910: 587) denied the correctness of this disposition and concluded that the type was a species of *Poria*. It is remarkable that no recent full analysis of this species has been published since *Junghuhnia* is an available name and would not only be the correct name for the residual genus if the type of *Poria* were to be excluded and the Code strictly adhered to, but it would also almost certainly soon become the name of a characteristic segregate from *Poria*.

The next generic name based on a species better to be classified now in *Poria* is *Theleporus* Fr. 1847 (also spelt "Thelepora" and in this, the original variant, easily to be confused with *Thelephora* Ehrh. ex Fr.). There is little doubt that the type (*Theleporus cretaceus* Fr.) is a poria, with a nipple at the bottom of each tube; this was made the distinctive generic feature, but it seems to be of only slight taxonomic value. When the type species becomes better known it might be profitable also to answer the question whether or not the presence of the nipples make the generic and specific names nomina monstrositatum.

The first author who attempted a re-arrangement of the resupinate polypores into smaller genera was Karsten. He started out by converting *Trametes* trib. *Resupinati* Fr. into a distinct genus, *Antrodia* P. Karst. 1879. As has already been pointed out (Donk, 1960: 186-187), the type of this name is, rather, *Trametes serpens* (Fr. per Fr.) Fr., which implies that *Antrodia* is the correct name for the modern emendation of *Coriollus* Murrill (1905; type, *Trametes sepium* Berk., a usually pileate species). *Antrodia* thus becomes a genus with a mixed content of resupinate species derived from both *Trametes* and *Poria* and of pileate species (Donk, 1966b: 339). A further consequence of this emendation is that the application of *Antrodia* in the sense of Murrill (1905: 354; 1908: 82), with the pileate species *Trametes mollis* (Sommerf.) Fr. as lectotype, had to be dropped. It was converted into a new genus, *Datronia* Donk.

Shortly afterwards Karsten (1881) broke up the resupinate species of *Polyporus* into several genera. Except for the small segregate *Caloporus* P. Karst., he divided the genus in two, choosing the name *Poria* for the dark- (brown-)coloured species and using *Physisporus* for the white to pale- or bright-coloured ones. This genus

Poria P. Karst. 1881 (a later homonym of *Poria* Pers. per S. F. Gray) consisted mainly of the resupinate species of *Phellinus* Quél. (Hymenochaetaceae).¹ The tearing asunder of the name *Poria* and its isonym *Physisporus* for application to different genera, as well as the restriction of *Poria* to the particular group mentioned, are nomenclatively untenable (Donk, 1960: 256, 266).

The third genus, *Caloporus* P. Karst. 1881 (\equiv *Caloporia* P. Karst. 1893), is in my opinion (Donk, 1962: 227–230) to be identified with *Meruliporia* Bond. & S. \equiv *Meruliopsis* Bond. apud Parm. All these names are actually based on *Poria taxicola* (Pers.) Bres., which was misidentified by Karsten as “*C[aloporus] incarnatus* (Alb. et Schw.)” when he founded the genus. No adequate reason for segregating *Poria taxicola* from *Merulius* Fr. has as yet been advanced (Donk, 1962: 228–229). Apparently an earlier and tentative conclusion (Donk, 1933: 143), reached on the basis of some specimens sent by Karsten to Fries and which would make *Caloporus* a synonym of *Tyromyces* P. Karst. (*Leptoporus* Quél. sensu Bourd. & G. in part), can no longer be defended.

The following extract, limited to the ‘resupinate’ genera discussed above, is taken from Karsten’s “Enumeratio . . . Polyporearum fennicarum, systemate novo dispositarum” (1881a: 16–19) in which he gave a concise survey of the Finnish Polyporaceae in the form of a key:—

Contextus albus, subinde in luteum rarissime in roseum vel alutaceum plus minus vergens. Sporae (omnium?) albae. / Pileus lentus, suberosus coriaceus vel lignosus. / Pileus fere nullus. Resupinati.

VIII. *Physisporus* Chev.

1. *Ph. medulla panis* (Pers.) . . . — 2. *Ph. mucidus* (Pers.) . . . — 3. *Ph. obducens* (Pers.) . . .
— 4. *Ph. callosus* (Fr.) . . . — 5. *Ph. vulgaris* (Fr.) . . . — 6. *Ph. molluscus* (Fr.) . . . — 7. *Ph. sanguinolentus* (Alb. et Schw.) . . . — 8. *Ph. vaporarius* (Pers.) . . . — 9. *Ph. ? sinuosus* (Fr.) . . .
— 10. *Ph. Rostafinskii* (Karst.) . . . — 11. *Ph. varicolor* (Karst.) . . . — 12. *Ph. euporus* (Karst.) . . .
— 13. *Ph. vitellinus* (Karst.) . . . — 14. *Ph. hians* (Karst.) . . . — 15. *Ph. Vaillantii* (Fr.) . . .

IX. *Antrodia* Karst.

1. *Antr. mollis* (Somm.) . . . — 2. *Antr. epilobii* (Karst.) . . . — 3. *Antr. serpens* (Fr.) . . .
— 4. *Antr. serena* (Karst.) . . .

Contextus coloratus. / Contextus subgilvus, cinnabarinus vel incarnatus. / Pileus fere nullus. Resupinati.

XII. *Caloporus* Karst.

1. *C. incarnatus* (Alb. & Schw.) . . .

Contextus ferrugineus, cinnamomeus vel fuscens. / Pileus fere nullus. Resupinati.

XVIII. *Poria* (Pers.)

1. *P. ferruginosa* (Schr.) . . . — 2. *P. contigua* (Pers.) . . . — 2. [!] *P. rixosa* (Karst.) . . .
— 3. *P. obliqua* [!] (Pers.) . . .”

In later publications Karsten segregated two more genera from *Poria*, viz. *Physisporinus* and *Chaetoporus*, and introduced *Trechispora*, *Podoporia*, and *Sarcoportia* for monotypic genera based on new species.

Physisporinus P. Karst. 1889 is based on an as yet undetermined species which was erroneously identified as *Poria vitrea* Pers. According to the key to the

genera of Polyporaceae, Karsten (1889: 286) differentiated the genus from *Physisporus* by the "Fruktlagret skildt från hymenophoret" (fruit-layer separated from basal layer). The generic name was taken up by Pilát (1939: 247) as the correct name for *Podoporia* P. Karst. sensu Donk (see below), certainly in error.

Trechispora P. Karst. 1890 ("a *Physisporo* typico contextu sporisque echinulatis satis distat"—Karsten, 1890: 147) is based on a single species which is now identified with *Poria candidissima* (Schw.) Cooke (cf. Donk, 1960: 288-289), a species currently included by some authors in the corticiaceous genus *Cristella* Pat. emend. (Donk, 1957b: 19) which besides strictly 'corticiaceous' species also contains some 'hydnceous' ones. Bondartsev & Singer (1941: 48) at first accepted the genus in this, its correct sense. Following a suggestion by Rogers (1944: 79) some authors (for instance, Bondartsev, 1953: 51, 588) exchanged the name *Cristella* for *Phlebiella* P. Karst., a not yet validly published name based on another species of *Cristella* (cf. Donk, 1957a: 108; 1963: 163). The rejection of the name *Cristella* in this sense for nomenclative reasons by Rogers (1944: 78) and Liberta (1966: 317) is in my opinion without foundation (Donk, 1952: 485; 1957a: 68; 1957b: 21).

The name *Trechispora* has also been misapplied. Rogers (1944: 73) used it for certain resupinate species with urniform basidia, a group which other authors prefer to merge into *Sistotrema* Fr. (Donk 1956b: 4). This use has been abandoned.

Chaetoporus P. Karst. 1890 ("... Cystidia e basi filiformi cylindraco-clavato, obtusa, superne aspera."—Karsten, 1890: 148). This genus is now accepted by several authors, although with rather variable contents, species with different hyphal construction and different types of cystidia being placed in it. It is separately discussed below (p. 71).

Another innovation by Karsten (1881b: 31; 1882: 65) was his use of the name *Xylodon* "Ehrenb." for the resupinate species of *Irpex* Fr. This was actually a misapplication of *Sistotrema* sect. "... (*Xylodon*)" Pers. = *Xylodon* (Pers.) ex S. F. Gray (1821), which is typified by a non-polyporaceous and still not positively identified species, *Sistotrema quercina* (Pers.) Pers. = *Odontia quercina* Pers. (cf. Donk, 1956a: 113; 1963: 156). Even when it is considered a 'new' genus for nomenclative reasons, *Xylodon* P. Karst. must be rejected as a later homonym. *Irpex paradoxus* (Schrad. per Fr.) Fr. has been considered 'type' of *Xylodon* 'P. Karst.'; this 'species' is now often regarded as one of the many forms of the *Poria versipora* complex and on this basis *Xylodon* P. Karst. has been accepted as the name of a small segregate from *Poria* by Bondartsev & Singer (1941: 49). In view of the fact that this use of *Xylodon* is untenable, it may be pointed out that a member of the same group received another generic name, viz. *Schizopora* Velen. 1922 (cf. Donk, 1960: 278). See further page 76.

Podoporia P. Karst. 1892 ("Pileus resupinatus membranaceus, laeticolor, substrato tuberculo centrali, stipitiformi adfixus . . ."—Karsten, 1892: 297), is based on *Podoporia confluens* P. Karst., which offers another unsolved problem: this species is as yet not definitely identified. The generic name was taken up by Donk (1933: 158) and misapplied because (following von Höhnelt, 1909: 442) he identified the

type species with *Poria sanguinolenta*. As mentioned above the genus in this incorrect emendation has been accepted by several mycologists, either under the name *Podoporia* or under the equally misapplied name *Physisporinus* P. Karst. by Pilát (1939: 247). *Podoporia* sensu Donk is now included by Donk (1966b: 341) in *Rigidoporus* Murrill, a genus introduced for pileate species; and by Pouzar (1966: 367, 369) in *Rigidoporus* subgen. *Rigidoporus*.

Lowe (1956: 116) suggested with reservations that Karsten's type of *Podoporia* might belong to *Poria pannocincta* (Romell) Lowe. Should his suggestion appear to be correct, and if it is not desirable to include *P. pannocincta* in *Gloeoporus*, as Eriksson (1958: 136) and Domański (1966: 151) do, then *Podoporia* would become the correct name for a monotypic genus. In view of Karsten's description and specimen the suggested identity with *P. pannocincta* seems not very likely. The generic name is apparently not based on a strictly effused species: compare "Pileus resupinatus, concavo-planus vel subcupulatus" of the generic description, as well as the name itself.

Finally, the last of Karsten's genera of porias, *Sarcoporia* P. Karst. 1894, must be considered. It has been suspected that the type ("alba tactu rufescens") was conspecific with *Poria sanguinolenta*, hence possibly a synonym of *Podoporia* (cf. Donk, 1933: 158), but Lowe (1956: 122) identified the fungus with *Poria aurantiaca* (Rostk.) Sacc. sensu Bres. (*Physisporus aurantiacus* var. *saloisensis* P. Karst.). The consequences of this identification must still be worked out. It is quite likely that *Sarcoporia* will have to be taken up as a distinct genus instead of being reduced to the synonymy of *Hapalopilus* P. Karst., the pileate genus to which *Poria aurantiaca* is currently referred by some authors, not in the least in view of the presence of an incrusting pigment soluble in KOH solution and turning the solution lilac. If maintained, the scope of the genus will have to be worked out carefully.

It is perhaps surprising that Patouillard did not contribute to the number of genera of porias. The explanation is that he thought that they represented merely degraded forms of genera with more or less well-developed caps; accordingly he distributed them over several 'pileate' genera: *Leptoporus* Quél., *Hexogona* Fr., *Trametes* Fr., *Coriolus* Quél., *Phellinus* Quél., *Xanthochrous* Pat. (Patouillard, 1900). The important aspect of this principle is that he broke with the tradition of considering the presence or absence of a cap an essential generic feature. There will be little hesitation at present in agreeing that he followed out his conviction to the extreme. It is from his work or, rather, from that of his disciples Bourdot & Galzin (1928) that most mycologists now accept the thesis that no preconceived limits should be drawn between resupinate and pileate species. On the other hand it cannot be denied that genera of polypores that are strictly resupinate do exist.

Another important contribution by Patouillard is the recognition of the existence of a number of genera that may contain forms so closely resembling porias that they were formerly included in *Poria*. He pointed out that in these species the hymenium was interrupted by sterile projecting tissue. In a number of species of *Porogramme*

(Pat.) Pat⁴ 1900 this protruding tissue strongly simulates a tube layer, but the hymenium does not line the sides of the dissepiments. He also indicated that the same was true of *Hymenogramme* Mont. & Berk. 1844; and that in *Grammothele* Berk. & C. 1868 an irregular surface that may be "creusée de pores irréguliers, contournés, séparés par des cloisons anastomosées, obtuses" is pierced by projecting sheaves of hyphae surrounded by crystalline matter. Patouillard excluded these genera from the polypores, correctly so, one would conclude. They have recently been temporarily placed in the strongly artificial family of the "Corticaceae" (Donk, 1964: 259). A further member of this set is *Gloiothele* Bres. 1920, based on *Poria lamellosa* P. Henn. The joint exclusion of these genera from the polypores should not necessarily be interpreted as a token of their mutual relationship.

Another important event was Murrill's treatment (1907-8) of the North American polypores, in which he divided the porias with brown fruitbody into nine genera; the full treatment of the white and bright-coloured species was postponed, and never published. Seven of the new genera were based on type species referable to the Hymenochaetaceae, as is a later genus introduced by Murrill as an afterthought. Of these, *Hydnoporia* Murrill 1907 represents the *Irpex*-like element and should be compared with *Hydnochaete* Bres.; *Fuscoporia* Murrill 1907 and *Fomitiporia* Murrill 1907 are referable to *Phellinus* Quél. as currently conceived by European authors; and *Xanthoporia* Murrill 1916 (monotype, *Mucronoporus andersonii* Ell. & Ev.; spores yellow in mass), to *Inonotus* P. Karst. of European authors. The type species of *Fuscoporella* Murrill 1907 (*F. coruscans* Murrill) and *Fomitiporella* Murrill 1907 (*Poria umbrinella* Bres.) are, according to Lowe (1966: 144), conspecific. *Poria umbrinella* seems also to belong to the Hymenochaetaceae and might be placed tentatively in *Phellinus* Quél., but this should still be carefully verified.

Of all these names only one has been used in recent literature. Cunningham (1948: 2; 1965: 208) resurrected *Fuscoporia* mainly for resupinate species now referred to *Phellinus* Quél. by many European authors. Since many species of this latter genus may produce both completely effused and sessile fruitbodies, and since some of its species with sessile fruitbodies are regarded as clearly very closely related to some of the species included in *Fuscoporia*, this re-introduction merely added still another to the already numerous artificial genera among the porias.

⁴ Lowe (1964: 40) stated that the lectotype (*Poria dussii* Pat.) of *Porogramme* does not belong to the genus as it is now conceived. According to him, the type specimen of *P. dussii* consists of *Poria borbonica* Pat. (which he excluded from *Porogramme*) overrun by a white mycelium. In case both his contentions are accepted as correct and *Poria dussii* is retained as type *Porogramme* would either drop out as a nomen confusum (based on two different fungal elements) or it should be so emended as to include *Poria borbonica* but not the rest of *Porogramme*, the correct name of which, in its current sense, would then become *Tinctoporia* Murrill. A still better solution would be to provide *Porogramme* with another lectotype.

Tinctoporia Murrill 1907 is based on a species of *Porogramme* Pat.⁵ *Melanoporella* Murrill 1907 and *Melanoporia* Murrill 1907 have not yet been restored to active duty; they should be kept carefully in mind when the type species, *Poria carbonacea* (Berk. & C.) Cooke and *P. nigra* (Berk.) Cooke respectively, are once more excluded from *Poria*. *Phylloporia* Murrill 1904 is not a resupinate genus, the fruitbody being attached by its vertex.

The generic conceptions behind all these names published by Murrill have little taxonomic value because they are extremely artificial and often based on faulty observation. The features which were primarily used for delimitation may be learned from Murrill's key (1907: 1):

"Tribe 1. Porieae. Hymenophore entirely resupinate, fleshy-tough to corky, annual or perennial; context fibrous to punky, usually very thin, variously colored; tubes usually cylindrical, sometimes irpiciform and rarely somewhat daedaleoid; spores brown or hyaline; cystidia often present.

Hymenophore white or bright-colored. [Not treated in 1907; see below].

Hymenophore brown.

Hymenophore annual; tubes not stratified.

Hymenium irpiciform.

13. *Hydnoporia*.

Hymenium normally poroid.

Spores hyaline.

14. *Fuscoporia*.

Spores brown.

15. *Fuscoporella*.

Hymenophore perennial; tubes stratified.

Spores hyaline.

16. *Fomitiporia*.

Spores brown.

17. *Fomitiporella*.

Hymenophore black.

Hymenophore annual.

Spores hyaline.

18. *Tinctoporia*.

Spores brown.

19. *Melanoporella*.

Hymenophore perennial.

20. *Melanoporia*."

Murrill never supplied a complete treatment of the North American white or bright-coloured porias, although later in life he published three more genera. One of these is *Xanthoporia* (see above); the others are *Perenniporia* Murrill 1942, a later name for the naturally emended genus *Poria* Pers. ex S. F. Gray (see discussion above and also p. 74); and *Meruliporia* Murrill 1942, based on *Poria incrassata* (B. & C.) Burt which is undoubtedly closely related to *Serpula* Pers. per S. F. Gray (Coniophoraceae), where Donk (1948: 474) included it; W. B. Cooke (1957: 222) kept it apart without denying its close relationship with *Serpula*.

The publication of *Schizopora* Velen. 1922 went unnoticed; it occurred in a comment on *Polyporus laciniatus* Velen. Donk (1960: 278) considered it validly published. Pilát (1941: 458) listed the type species as synonym of *Poria versipora* (Pers.) Lloyd. If one concurs with the name *Schizopora* as having been validly published and also accepts the identification of its only species with *Poria versipora*,

⁵ In case the name *Porogramme* has to be abandoned for the genus to which it is now applied (see footnote 4), *Tinctoporia* will have to be taken up for the genus.

then *Schizopora* appears to be the correct name for the genus called *Xylodon* by some modern authors (see above, and also p. 76).

The publication of Bourdot & Galzin's treatment of the Aphyllophorales of France (1925) rang in a new era for the systematics of this group. From then on European authors leaned heavily on this mine of information that contained so many microscopical details, new arrangements of species within the framework of Patouillard's system of 1900, and also suggestions on a close relationship between species artificially distributed over two or more genera. As for the porias, Bourdot & Galzin (1928) compromised for once by admitting a large genus *Poria* (abolished by Patouillard) and by incorporating a minority of porias in genera based on pileate species, such as *Trametes* Fr., *Phellinus* Quél., and *Xanthochrous* Pat. (mainly = *Coltricia* S. F. Gray + *Inonotus* P. Karst.).

In a revision of the Dutch Aphyllophorales, Donk (1933) proposed some deviations from Bourdot & Galzin. He revived *Podoporia* P. Karst. and emended it to make it an equivalent of *Poria* subsect. *Udae* Bourd. & G. As stated above, this emendation attached a wrong generic name to what is now often taken to be a homogeneous group. This was due to a misinterpretation of Karsten's type species. Donk (1966b: 341) now includes the genus in *Rigidoporus* Murrill, which was introduced for pileate species.

Another (unnamed) of Bourdot & Galzin's groups of *Poria* became *Ceriporia* Donk 1933. The group as originally conceived included species both with and without clamps. Those with clamps have now been excluded: compare *Ceriporiopsis* Domański, below.

Poria medulla-panis (erroneously called *Polyporus unitus* Pers.) and related species with truncate spores were attached to *Ganoderma* P. Karst. as an appendix. Recently Donk (1964: 265-266) repudiated this connection and returned them to the artificial family of Polyporaceae. The porias were placed under the name of *Perenniporia* Murrill (op. cit., p. 281).

In other respects Donk followed Bourdot & Galzin's lead by admitting a large artificial genus *Poria* and referring a number of species to *Trametes* Fr., *Ochroporus* J. Schroet. (correct name, *Phellinus* Quél.), and *Inonotus* P. Karst. (a part of *Xanthochrous* Pat.).

Shortly afterwards Donk (*apud* Rogers, 1935: 19) removed the porias with urniform basidia to *Sistotrema* Fr. 1821, which genus was enlarged also to contain effused corticiaceous and hydneous species.

Lindtneria Pilát 1938 was introduced to accommodate *Poria trachyspora* Bourd. & G., an outstanding and isolated species. The genus is now often accepted, but it is still doubtful, I believe, to which family it should be referred; it has been placed in the Thelephoraceae ("Phylacteriaceae") and the "Corticiaceae".

In his treatment of the European polypores, Pilát (1936-42) introduced few taxonomic innovations. As discussed above, *Podoporia* sensu Donk he renamed *Physiporinus* P. Karst., certainly in error. The new genus *Sulphurina* Pilát (1942, name validly published in 1953) was introduced for two species that Bourdot &

Galzin had referred to *Sistotrema*. If it is to be maintained the differential character in regard of *Cristella* Pat. (it is apparently to be included in this genus) must still be more carefully elaborated.

Up to this stage, it had become usage among European authors dealing with the porias to adopt the tactics of starting from Bourdot & Galzin's treatment, to reduce the artificial genus *Poria* piecemeal. As soon as a group was conceived as worthy of separate generic treatment it was cut off the bulk; or individual species were transferred to established genera, most of which were introduced for pileate species. This is a judicious course which does not, however, relieve us from continually criticizing the innovations or from exposing deficiencies. It will not do to admit artificial taxa without remaining constantly aware of their imperfections. Attempting to overcome the horror of the interrogation mark is a matter of sound taxonomic training. Merely crossing out these marks is no real solution. Neither is multiplying the number of artificial genera on a large scale, as was done by Murrill and later by Bondartsev & Singer (1941: 47-51). Relying heavily on Bourdot & Galzin's work Bondartsev & Singer broke up *Poria* completely into many parts, most of which proved to be ill-defined and often artificial. An outline of their system follows.

(1) Poroid species with urniform basidia (*Poria* sect. *Urnigeræ* Donk, 1933: 220) were transferred to *Sistotrema* Fr., as had been done previously.

(2) The name *Trechispora* P. Karst. was taken up for those porias (*Poria* sect. *Subtiles* Bourd. & G. emend. Donk, 1933: 221) that correspond to *Corticium* sect. *Humicola* Bourd. & G., including *Lindtneria* Pilát. For further details on the name *Trechispora* and the correct taxon for which it stands, see above.

(3) *Byssocorticium* Bond. & S. was introduced for the combination of *Corticium* sect. *Byssina* Bourdot & Galzin (1928: 199), which furnished the type species *Corticium atrovirens* (Fr.) Fr., and *Poria* sect. *Byssinae* Bourdot & Galzin (1928: 655), which consisted of *Poria terrestris* ("De Cand.") Bourd. & G. (correct name, *Poria mollicula* Bourd.) and *P. sartoryi* (Bourd. & L. Maire apud Sart. & Maire) Pilát. The French authors considered this section of *Poria* "affines à *Corticium atrovirens*, *byssinum*". *Byssocorticium* now survives in some publications for two corticioid species of which one is *Corticium atrovirens*. The other corticioid species ("*C. byssinum* und Verw.") have been transferred to *Athelia* Pers. (Eriksson, 1958: 84). The correct systematic position of the two porias has, in my opinion, not yet been worked out.

(4) *Poria* sect. *Merulieae* Bourdot & Galzin (1925: 220; 1928: 659) became *Merulioporia* Bond. & S. 1943 (preoccupied; = *Meruliopsis* Bond. apud Parm. 1959). Donk (1962: 227-230) concluded that *Caloporus* P. Karst. (see above) is an earlier name for the genus and that so far insufficient grounds have been mentioned (lack of clamps) for separating the genus from the current and much-restricted emendation of *Merulius* Fr. (clamps present or lacking).

(5) *Fibuloporia* Bond. & S. [ex Sing., 1944], type, *Poria mollusca* (Pers. per Fr.) Cooke sensu Bres. [= *Poria mucida* (Pers. per Fr.) Cooke, original sense, not of Bresadola] was a heterogeneous mixture the character of which has not been satis-

factorily improved upon by subsequent users of the generic name (Bondartsev, 1953: 188; Christiansen, 1960: 337; Domański, 1965b: 34).

(6) *Xylodon* "Karst. (non Ehrenb.)" was the name given to the complex that currently goes under the name of *Poria versipora* (Pers.) Lloyd [= *Poria mucida* (Pers. per Fr.) Cooke sensu Bres.]. It is closely related to at least a part of *Hyphodontia* Eriksson (1958: 101), a genus comprising species derived from the artificial genera *Corticium*, *Peniophora*, *Odontia*, and *Radulum*. If the genus is to be maintained, the untenable name *Xylodon* must be replaced by *Schizopora* Velen., if not by a name published still earlier.

(7) *Podoporia* P. Karst. sensu Donk was retained unaltered; it is briefly discussed above.

(8) *Ceriporia* Donk (as "*Ceraporus*") was retained unaltered.

(9) *Amyloporia* Bond. & S. [ex Sing. 1944] was introduced for the complex called *Poria calcea* (Fr.) Bres. by Bourdot & Galzin (1928: 673). According to my notes the leading feature ("Trama amyloid im erwachsenen Fruchtkörper") is to be found in only one of the four original species, viz. *Poria xantha* (Fr. per Fr.) Cooke. A heterogeneous genus discussed below (p. 67).

(10) *Aporpium* Bond. & S. [ex Sing. 1944]. Another mixed group was thought to lack clamps, evidently on the authority of Bourdot & Galzin. The original species form a very heterogeneous crowd. The type species proved to have clamps after all, as well as tremellaceous basidia, as was pointed out by Teixeira & Rogers (1955). *Aporpium* is now reduced to a monotypic genus of the Tremellaceae.

(11) *Chaetoporellus* Bond. & S. [ex Sing. 1944]. The original species form another heterogeneous lot. The type species is *Poria latitans* Bourd. & G. If it is restricted to this species the taxon is perhaps worthy of generic separation, as will be discussed below (p. 69).

(12) *Chaetoporus* P. Karst. was emended to contain a number of mostly mutually unrelated species. Although the resurrection of the name was long overdue, no satisfactory generic character was provided. In the present paper (p. 71) an emended version of the genus will be proposed.

(13) Following the example of Patouillard and Bourdot & Galzin various odd species were taken to belong to genera introduced for pileate species: *Tyromyces* P. Karst., *Gloeoporus* Mont., *Hapalopilus* P. Karst., *Coriolus* Quél., and *Coriolellus* Murrill. — *Poria luteopora* Bond. (1940: 23; 1953: 592 f. 160, pl. 174 f. 2, as *Vararia*) was referred to *Asterostromella* Höhn. & L. = *Vararia* P. Karst., a corticioid genus characterized by dichohyphidia. A careful reading of the Latin description and a study of the published figures have not satisfied me that the assignment to that genus was correct.

In his magnum opus Bondartsev (1953) closely adhered to this scheme except for a few shiftings of species and the following addition:

(14) *Poria* "(Fr.) Karst." was added to take care of *Poria vulgaris* (Fr.) Cooke sensu Romell 1926, that is, the species so well described by Eriksson (1949: 7 f. 2, pl. 1) under the name of *Poria subincarnata* (Peck) Murrill. It is difficult to explain

this association of the generic name *Poria* with *P. vulgaris* Fr. and the authorship assigned to it. Perhaps the fact that Maire had proposed the conservation of "*Poria* (Fr.) Karst. emend. Sacc." with *Polyporus vulgaris* Fr. (a non-original species) as the type was responsible for the typification. (The proposal was not accepted.) *Poria subincarnata* recently found a place in *Incrustoporia* Domański (see below).

It is a pity that Bondartsev & Singer formulated the generic characters too succinctly and published them in a key only. The following extract from their key is restricted to the new generic names introduced for porias.

... *Corticaceae*:

Basidien normal [nicht oben verjüngt], 2-4 sporig. / Hyphen ohne Ampullen, wenig verzweigt. *Byssocorticium* B.-S.

... *Meruliaceae*:

Sporen farblos. / Fruchtkörperhyphen ohne Schnallen. Hymenophor kurzröhrig-porig. *Meruliporia* B.-S.

... *Polyporaceae*...

A. Fruchtkörper konstant resupinat, einjährig, mit dünnwandigen und oben nicht abgestumpften Sporen, ohne Setae, aber mitunter mit Cystiden. Unterfamilie Porioideae.

I. Hymenophor immer ohne Cystiden. Sporen eiförmig, ellipsoidisch oder fast kugelig. / Myzel- und Fruchtkörperhyphen mit Schnallen. / Gewebe durch KOH nicht veränderlich [verfärbt nicht lila, himbeerrot oder schwärzlich mit Kalilauge]. / Poren dünnwandig, \pm regelmässig. Fruchtkörper anfangs weich oder manchmal wachsartig. *Fibuloporia* B.-S.

II. Hymenophor immer ohne Cystiden. Sporen zylindrisch oder wurstförmig. / Röhrenwandtrama nicht gelatinos. Schnallen vorhanden oder fehlend. / Gewebe durch KOH unverändert. / Poren weiss oder gefärbt, zuletzt weisslich oder gefärbt, aber nicht immer so [wie] oben angegeben [nicht zitronengelb, gelbgrünlich, weinrot, purpurn oder lila], sondern meist gelblich bis leicht bräunlich.

* Trama amyloid im erwachsenen Fruchtkörper. *Amyloporia* B.-S.

** Trama auch im erwachsenen Fruchtkörper nicht amyloid. / Hyphen des Fruchtkörpers ohne Schnallen. *Aporpium* B.-S.

III. Hymenophor mit Cystiden oder mit sterilen Hyphen am Porenrand, die Calciumoxalatkristalle ausscheiden. / Hyphen mit Schnallen. Hymenophor mit spindeligen Cystiden, selten nur mit Calciumoxalat ausscheidenden Hyphen. Konsistenz weich oder brüchig. *Chaetoporellus* B.-S.

During the past two decades the number of genera has increased only slowly. *Echinotrema* Park.-Rh. 1955, based on a single species, is remarkable because of its urniform basidia (by which it suggests *Sistotrema*), claspless hyphae, strongly echinulate spores, and a coarsely maze-like hymenophore ("Corticaceae").

In several other genera stress was laid, *inter alia*, on the chemical nature of the spore-wall. These are *Pachykytospora* Kotlaba & Pouzar 1963: 27 (large, oblong spores with cyanophilous and pitted outer wall; trimitic context) and *Parmastomyces* Kotlaba & Pouzar 1964: 138 and *Strangulidium* Pouzar 1967: 206 (smaller spores with thick cyanophilous walls; context monomitic), *Anomoporia* Pouzar 1966: 172 (spore-walls thin, amyloid, smooth; context monomitic), and *Wrightomyces* Pouzar 1966: 173 (spore-walls thin, non-amyloid, but covered with strongly amyloid ornamentation; context dimitic by skeletal).

Ceriporiopsis Domański 1963a: 731 is in the main a segregate from *Ceriporia* for species lacking the cupular nidulant young pores and possessing clamps. *Incrustoporia* Domański 1963a: 737 is a genus (based on *Poria stellae* Pilát) restricted to the resupinate members of a group first outlined by Eriksson (1958: 151-154), who also included the pileate *Tyromyces semipileatus* (Peck) Murrill (for which *Leptotrimitus* Pouz. was proposed).

The monotypic genus *Cystidiophorus* Bondartsev & Ljubarsky 1963: 125 does not seem to qualify for a poria ("hymenium continuum, tubulorum margines obtegens").

Finally *Muciporus* Juell 1897 [cf. Donk 1957a: 84] may be mentioned as a nomen confusum. The type appeared to consist of *Poria corticola* (Fr.) Cooke ≡ *Oxyporus corticola* (Fr.) E. Komar., a resupinate species overgrown by a species of *Tulasnella* J. Schroet. (Tulasnellaceae).

ALPHABETICAL LIST OF GENERIC NAMES (WITH TYPE SPECIES) BASED ON RESUPINATE SPECIES OF POLYPORES

This list is restricted to validly published generic names based on species that form strictly effused ('resupinate' or only exceptionally effuso-reflexed) fruitbodies and that were, or have been, placed among the resupinate polypores. Where possible the names of type species are listed in combinations with 'Poria'. — A few names based on species that were never referred to *Poria* are added between square brackets. Generic names that can be used as correct names are spaced. For details on matters nomenclative, see Donk (1960).

- Amyloporia* Bond. & S. ex Sing. 1944 — Type: *Poria calcea* (Fr. ex Pers.) Cooke sensu Bond. & S. = *Poria xantha* (Fr. per Fr.) Cooke (cf. p. 67)
- Anomoporia* Pouz. 1966 — Type: *Poria bombycina* (Fr.) Cooke
- Antrodia* P. Karst. 1879 — Type: *Trametes serpens* (Fr. per Fr.) Fr.
- Aporpium* Bond. & S. ex Sing. 1944 — Type: *Poria canescens* P. Karst. = *Aporpium caryae* (Schw.) Teix. & Rog. (Tremellaceae)
- Aschersonia* Endl. 1842 ≡ *Junghuhnia* Corda
- Caloporia* P. Karst. 1893 ≡ *Caloporus* P. Karst.
- Caloporus* P. Karst. 1881 — Type: *Poria incarnata* (Pers. per Fr.) Cooke sensu P. Karst. 1870 = *Merulius taxicola* (Pers.) Duby fide Donk 1962: 229; = *Merulius* Fr. ("Corticaceae").
- Ceriporia* Donk 1933 ("Ceraporia") — Type: *Poria viridans* (B. & Br.) Cooke.
- Ceriporiopsis* Domański 1963 — Type: *Poria gilvescens* Bres.
- Chaetoporellus* Bond. & S. ex Sing. 1944 — Type: *Poria latitans* Bourd. & G. — See page 69.
- Chaetoporus* P. Karst. 1890 — Type: *Poria cupora* (P. Karst.) Cooke = *Poria nitida* (Pers. per Fr.) Cooke — See page 71.
- [*Echinotrema* Park.-Rh. 1955 — Type: *Echinotrema clanculare* Park.-Rh. ("Corticaceae")]
- Fibuloporia* Bond. & S. ex Sing. 1944 — Type: *Poria mollusca* Pers. sensu Bres. = *Poria mucida* (Pers. per Fr.) Cooke sensu stricto
- Fomitiporella* Murrill 1907 — Type: *Poria unbrinella* Bres. (Hymenochaetaceae); = *Fuscoporella* Murrill (simultaneously published)
- Fomitiporia* Murrill 1907 — Type: *Poria langloisii* (Murrill) Sacc. & Trott.; = *Phellinus* Qué. (Hymenochaetaceae)
- Fuscoporella* Murrill 1907 — Type: *Poria coruscans* (Murrill) Sacc. & Trott. (Hymenochaetaceae); = *Fomitiporella* Murrill (simultaneously published)

- Fuscoporia* Murrill 1907 — Type: *Poria ferruginosa* (Schrad. per Fr.) P. Karst. sensu Murrill; = *Phellinus* Quél. (Hymenochaetales)
- Gloiothetele* Bres. 1920 — Type: *Poria lamellosa* P. Henn. ("Corticaceae")
- Grammothetele* B. & C. 1868 — Type: *Grammothetele lineata* B. & C. ("Corticaceae")
- Hydnoporia* Murrill 1907 — Type: *Sistotrema fuscescens* Schw. (Hymenochaetales)
- Hymenogramme* Mont. & Berk. 1844 — Type: *Hymenogramme javensis* Mont. & Berk. ("Corticaceae")
- Incrustoporia* Domański 1964 — Type: *Poria stellae* Pilát
- Junghuhnia* Corda 1842 — Type: *Poria crustacea* (Jungh.) Cooke
- Laschia* Jungh. 1838 = *Junghuhnia* Corda
- Lindtneria* Pilát 1938 — Type: *Poria trachyspora* Bourd. & G. ("Corticaceae"?)
- Melanoporella* Murrill 1907 — Type: *Poria carbonacea* (B. & C.) Cooke
- Melanoporia* Murrill 1907 — Type: *Poria nigra* (Berk.) Cooke
- Merulioportia* Bond. & S. 1943 — Type: *Poria toxicola* (Pers.) Bres.; = *Caloporus* P. Karst. ("Corticaceae")
- Merulioopsis* Bond. apud Parm. 1959 = *Merulioportia* Bond. & S.
- Meruliporia* Murrill 1942 — Type: *Poria incrassata* (B. & C.) Burt; = *Serpula* Pers. per S. F. Gray (Coniophoraceae)
- Pachykytospora* Kotl. & P. 1963 — Type: *Polyporus tuberculatus* Fr.
- Parmastomyces* Kotl. & P. 1964 — Type: *Tyromyces kraetzianus* Bond. & Parm. apud Parm.
- Perenniporia* Murrill 1942 — Type: *Poria unita* (Pers.) P. Karst. sensu Murrill = *Poria medulla-panis* (Jacq.) Pers. sensu Pers. — See page 74.
- Physisporinus* P. Karst. 1889 — Type: "*Poria vitrea* Pers." sensu P. Karst. = ? — Senu Pilát = *Rigidoporus* spp.
- Physisporus* Chev. 1826 = *Poria* Pers. per S. F. Gray
- Podoporia* P. Karst. 1892 — Type: *Poria confluens* (P. Karst.) Sacc. = ?. — Fruitbody apparently not really effused. — Senu Donk 1933 = *Rigidoporus* spp.
- Poria* Pers. per S. F. Gray 1821 — Type: *Poria medullaris* S. F. Gray = *Boletus medulla-panis* Jacq. sensu Pers.
- Poria* P. Karst. 1881 — Type: *Poria ferruginosa* (Schrad. per Fr.) P. Karst.; = *Phellinus* Quél. (Hymenochaetales)
- Porogramme* (Pat.) Pat. 1900 — Type: see foot-note on page 57 ("Corticaceae")
- Sarcoporia* P. Karst. 1894 — Type: *Poria polyspora* (P. Karst.) Sacc. = *Poria aurantiaca* (Rostk.) Sacc. sensu Bres. = *Poria salmonicolor* (B. & Br.) Cooke
- Schizopora* Velen. 1922 — Type: *Poria laciniata* (Velen.) Velen. = *Poria versipora* (Pers.) Lloyd = *Schizopora paradoxa* (Schrad. per Fr.) Donk — See page 76.
- Strangulidium* Pouz. 1967 — Type: *Poria sericeo-mollis* (Romell) Egeland.
- [*Sulphurina* Pilát 1953 — Type: *Sistotrema sulphureum* (Quél.) Bourd. & G.; = *Cristella* Pat. ("Corticaceae")]
- Theleporus* Fr. 1847 ("Thelepora") — Type: *Theleporus cretaceus* Fr.
- Tinctoporia* Murrill 1907 — Type: "*Tinctoporia aurantiotinctens* Murrill" = *Poria aurantiotinctens* (Ell. & Macbr.) Pat.; = *Porogramme* (Pat.) Pat. ("Corticaceae")
- Trechispora* P. Karst. 1890 — Type: *Poria onusta* (P. Karst.) Sacc. = *Cristella mollusca* (Pers. per Fr.) Donk — Senu D. P. Rog. = *Sistotrema* Fr. emend., resupinate species with tubes.
- Wrightoporia* Pouz. 1966 — Type: *Proia lenta* Overh. & Lowe
- Xanthoporia* Murrill 1916 — Type: *Poria andersonii* (Ell. & Ev.) Lloyd; = *Inonotus* P. Karst. (Hymenochaetales)
- Xylodon* P. Karst. 1881 — Type: *Irpex paradoxus* (Schrad. per Fr.) Fr. = *Schizopora paradoxa* (Schrad. per Fr.) Donk.

Key to the poria genera reduced to their type species as far as these occur in temperate northern regions

The following key takes into account only the type species and if the genera include more than one species not generic conceptions. The type species are indicated by the generic names with which they are to be associated; they are mentioned more fully in the preceding enumeration.

Not included are type species (i) that may also produce pileate fruitbodies (exceptions are made for *Caloporus* and typonyms, *Parnastomyces*, and *Perenniporia* and typonyms), and (ii) that do not occur in Europe or the temperate zone in North America. A few genera that also comprise strictly resupinate species have been mentioned between square brackets.

It should be understood that in this key no opinion on the taxonomic status of the genera is provided.

1. Basidia longitudinally septate (*Tremella*-like) *Aporpium*
1. Basidia uniforn. Context monomitic.
 2. Hyphae lacking clamps. Hymenophore coarsely maze-like; dissepiments 1 mm thick. Spore-walls strongly echinulate. *Echinotrema*
 - [2. Hyphae provided with clamps. Pores may be irregular, but not particularly coarse. Spores smooth or rarely asperulate. *Sistotrema* spp.]
1. Hymenium (at least in young hymenophores) continuous over edge of folds. Hymenophore finally appearing poria-like.
 3. Spores colourless, allantoid, small (about 4–6 μ long), thin-walled. Clamps lacking in fruitbodies grown in nature (reported from cultures).—*Merulius* sp. . . . *Caloporus*
Isonym: *Caloporia*. Typonyms: *Merulioporia* Bond. & S. \equiv *Meruliopsis*.
 3. Spores brown, ellipsoid, medium-sized (8–13 μ long), double-walled, the inner wall coloured.—*Serpula* sp. *Merulioporia* Murrill
1. Setae present and/or context conspicuously darkening in KOH solution (xanthochroic). Clamps lacking.—Hymenochaetaeae.
 4. Spores white in a print, colourless under the microscope in KOH solution.
 5. Fruitbody more or less typically perennial.
 6. Setae present.—*Phellinus* sp. *Fuscoporia*
Synonym: *Poria* P. Karst.
 6. Setae (presumably) lacking.—*Phellinus* sp. *Fomitiporia*
 - [5. Fruitbody annual. *Inonotus* spp.]
 4. Spores sulphur-yellow in a print, becoming brownish in KOH solution. Fruitbody annual.—*Inonotus* sp. *Xanthoporia*
1. Spores (outer pore surface) more or less distinctly echinulate and inamyloid. Context monomitic. Pores often irregular or hymenophore *Sistotrema*-like. — Compare also *Wrightoporia* and *Pachykytospora*, for which see below.
 7. Clamps present. Hyphae with ampulliform or onion-like inflations at at least some of the septa, fragile. Spores colourless. Cf. *Sistotrema*.
 8. Fruitbody whitish. Spores smaller.—*Cristella* sp. *Trechispora*
 8. Fruitbody sulphur- to lemon-yellow. Spores bigger, more clongate.—*Cristella* sp.
Sulphurina
 7. Clamps lacking. Hyphae lacking typical inflations located at septa. Spores pale yellowish under the microscope, beset with prominent spines. Pores rather coarse and very irregular. *Lindtneria*
1. Different. Fruit-body white (may become discoloured) to bright-coloured when fresh, not xanthochroic. Spores may be ornamented but in that case they are amyloid.
 9. Spore-walls neither amyloid nor cyanophilous, thin.
 10. Context monomitic, but hyphae may become more or less thick-walled (and septa often remote). Clamps lacking or present.

11. Clamps lacking in fruitbodies collected in nature (reported as rare in cultures of *Ceriporia* spp. and *Rigidoporus* spp.).
12. Spores allantoid. Pores originating as disks, then cup-shaped (nidulant), soon tube-shaped. Fruitbody soft and fragile, the hymenial region waxy when fresh, white, discolouring reddish, or bright-coloured. . . . *Ceriporia*
- [12. Spores oblong (faintly flattened adaxially), ovoid, or subglobose, usually guttulate. Hyphae may become thick-walled.—Cf. *Oxyporus* spp. and *Rigidoporus* spp.]
11. Clamps present.
14. Fruitbody soft-fibrillose, whitish. Hyphae of dissepiments equally thin-walled.
15. (Sub)hymenial gloeocystidia present, resembling inconspicuous leptocystidia; no gloeoclerous hyphae in the context. Spores narrowly allantoid, 3–5 μ long. . . . *Chaetoporellus*
15. Gloeocystidia lacking. Spores broadly ovoid, 2–4 μ long. *Fibuloporia*
14. Fruitbody (tubes) rather waxy when fresh, distinctly coloured or discolouring. Hyphae in part more or less thick(er)-walled.
16. Encrusting matter from surface of hyphae discolouring lilac in KOH solution. Spores oblong, somewhat flattened adaxially. . . . *Sarcoporia*
16. Encrusting matter of this kind lacking. Spores cylindrical, slightly curved. . . . *Ceriporiopsis*
10. Context dimitic by skeletal. Clamps present.
17. Hyphae amyloid (discolouration may be faint). Small spindle-shaped hymenial leptocystidia. . . . *Amyloporia*
17. Hyphae (presumably) inamyloid.
18. Skeletocystidia present: club-shaped, thick-walled, encrusted terminations of skeletal hyphae bending towards the hymenium and often protruding beyond it. . . . *Chaetoporus*
18. Skeletocystidia lacking; also no undifferentiated skeletal bending into the hymenium. Hymenial leptocystidia often present, small.
19. Spores cylindrical.
20. Spores cylindrical, flattened adaxially. Part of the generative hyphae becoming thick-walled, the thickening irregular. . . . *Antrodia*
20. Spores narrowly allantoid. Generative hyphae presumably not as above, encrusted terminally over some length in the edge of the dissepiments by small crystal bodies. . . . *Incrustoporia*
19. Spores ovoid-ellipsoid, indistinctly flattened adaxially, guttulate. Skeletals somewhat congophilous. . . . *Schizopora*
Synonym: *Xylodon* P. Karst.
9. Spore-wall and/or -ornamentation amyloid or cyanophilous.
21. Spore-wall and/or -ornamentation amyloid.
22. Spore-wall smooth, thin, amyloid. Context monomitic; hyphae thin-walled, with clamps. . . . *Anomopora*
22. Spore-wall appearing smooth in phloxine-KOH solution, somewhat thick, in Melzer's reagent perhaps slightly amyloid and covered with strongly amyloid matter which suggests a dense, granular ornamentation.⁶ Context dimitic by dextrinoid skeletal. . . . *Wrightomyces*

⁶ Observations made from the type collection. They are at variance with Pouzar's (1966: 173): "The spores . . . with thin, . . . inamyloid . . . walls which are covered by strongly amyloid warts or ridges."

21. Spore-walls cyanophilous. Spores lacking superficial spines (outer surface smooth); walls somewhat or rather thick, distinctly dextrinoid.
 23. Ornamented inner spore-wall lacking. Spores small, subglobose to only shortly elongate, 4-7 μ .
 24. Spores subglobose or ovoid, often somewhat truncate at apex. Thick-walled hyphae (apparently 'skeletal') present, may be branched.

Perenniporia

Synonyms: *Poria* Pers. per S. F. Gray emend.; = *Physisporus*.

24. Spores more elongate, Context monomitic.
 25. Spores ellipsoid. Basidia utriform (conspicuously constricted at the middle) *Strangulidium*
 25. Spores short ellipsoid-cylindrical. Basidia not utriform. Hyphae thick-walled in a thin, darker layer of the context. *Parmastomyces*
 23. Ornamented inner spore-wall present, the projections penetrating into the outer layer. Spores oblong-cylindrical, 10-17 μ long, Context trimitic.

Pachykytospora

1. Not included: *Physisporinus*, *Podoporia*.

Notes on genera

AMYLOPORIA Sing.

When Bondartsev & Singer (1941: 50) published this generic name they did so without a validating Latin description of it (cf. p. 62). The genus was placed in the subfamily Poroideae. They listed four species, viz. *Poria calcea* (Fr. per Pers.) Cooke, indicated as type species, *Poria crassa* (P. Karst.) Sacc., *P. xantha* (Fr. per Fr.) Cooke ["(Lind.)"], and *P. lenis* (P. Karst.) Sacc. These species were mentioned by name only, and all these names, without exception, had been variously applied. Considering the chaotic state of knowledge about these species at that time it is not surprising that a reconstruction of Bondartsev & Singer's conceptions of them is no easy matter. What actually happened, I believe, was that after an amyloid reaction⁷ of the fruitbody context was established in one or a few collections that were thought to belong to that intricate complex that Bourdot & Galzin (1928: 673) had called *P. calcea*, it was automatically assumed that the test would hold true for the whole of the complex, which Bondartsev & Singer broke up into four species.

Later on both authors separately and independently published Latin descriptions in order to publish the generic name validly:—

"Poriae acystidiatae amyloideae, sporis cylindricis v. allantoideis. Species typica: *A. calcea* (Fr.) B.-S."—Singer (1944: 67).

"Fungi resupinati fam. Polyporacearum; hymenio cystidiis carente; trama mollicoriaceo; hyphis carpophori crassotunicatis vel plenis, fibuligeris, amyloideis; poris minutis, tenueparietalibus, albis vel sulphurescentibus, rarius subfulvidis; sporis cylindricis, hyalinis. / Typ. gen.: *A. calcea* (Fr.) c.n. / [Other species]: *A. xantha* (Fr.) c.n., *A. lenis* (Karst.) c.n., *A. turkestanica* (Pil.) Bond."—Bondartsev (1953: 36).

⁷ The possibility that 'amyloid' was inclusively conceived must be ruled out because Singer (1938: 191) had previously introduced the term 'pseudoamyloid' (now often replaced by 'dextrinoid').

These quotations show that Singer accepted the original conception unaltered. Bondartsev, on the other hand, introduced several alterations. *Poria crassa* was omitted from the examples; it is not very pressing in this connection to discuss how it fared, which would require extensive comment. A new example, *Poria turkestanica* Pilát, made its appearance. This may also be ignored as a later addition to the genus, except for stating that it does show an amyloid reaction of the hyphae to some extent and that it is a synonym of *Poria viridans* (B. & Br.) Cooke *vide* Domański (1964: 169). Another alteration will be found on inspection of the full treatment of the genus farther on in Bondartsev's book (1953: 149): "*Poria calcea* (Fr.) Bres." is not separately treated but the name is listed as a synonym of *Amyloporia lenis* (P. Karst.) Bond. & S. ex Sing. Some of these changes were undoubtedly caused by the publication of an important paper by Eriksson (1949) called "The Swedish species of the *Poria vulgaris*-group".

Before deciding about the status of the name *Amyloporia* it will be necessary to solve the riddle of the correct identity of the type species passing under the name of *P. calcea*. Donk (1960: 185) tried to find an answer and from circumstantial evidence he would conclude that the type species was *P. lenis*; "however", he added, "it should be remarked (i) that neither the fruit-bodies nor the hyphae of *Poria lenis* are amyloid as is expressed in the generic name, and (ii) that one of the other species Bondartsev & Singer listed is the same *Poria lenis*."

Not only is there a discrepancy between *P. lenis* and the amyloidity required by the generic character of *Amyloporia*, but the requisite absence of cystidia also conflicts with *P. lenis* since this species does have cystidia (cf. Eriksson, 1949: 11 f. 3). However, in this discussion the cystidia are better completely ignored; they had been overlooked by Bourdot & Galzin (1928: 673) for all components making up the complex they then called *Poria calcea* (inclusive of *P. lenis*, *P. xantha*, and other species) so that the presence of cystidia may be taken as having been unknown to the authors of *Amyloporia*.

This simplification does not alter the conclusion that the only one of the original species answering to both the original German and the abbreviated Latin description published by Singer is *P. xantha*; as far as my knowledge goes it is the only species with amyloid context (trama) the authors could possibly have had in mind. There are at least four alternative solutions and perhaps each will find its supporters.

(i) Until more conclusive information becomes available it may be concluded that the evidence published is not sufficient for solving the correct application of *Amyloporia*, which name thus becomes a nomen dubium.

(ii) Perhaps some authors will identify the original *P. calcea* with *P. xantha*. This would be a *tour de force*, but Eriksson (1949: 2) may be invoked. He wrote: "As there is no authentic material left of [the basionym] *P. vulgaris* β . *calceus* Fr. I think it is impossible to clear up the right sense of this name. Romell was perhaps right in his opinion [1926: 21] that *P. vulgaris calceus* is identical with *P. xantha* (Fr.) Cke." The protologue of 'calceus' (Fries, 1821: 581) gives little (but perhaps just enough) support to this identification. However, it should not be forgotten that it was a long-

current practice to apply the name *P. calcea* to *P. lenis*, an interpretation sponsored by Bresadola and followed by Bondartsev himself when he reduced *P. calcea* to the synonymy of *P. lenis*. Adoption of this second course would salvage the name *Amyloporia* as available, with *P. xantha* as acting type species.

(iii) It may be assumed that an easily surmountable error crept in when *P. calcea* was designated as type and that we are merely confronted with a misidentification and accordingly must correct the name of the type species as follows: "*A. calcea* (Fr.) B.-S." (Singer, 1944: 67) = *Poria calcea* (Fr. per Pers.) Cooke sensu Bond. & Sing. = *Poria xantha* (Fr. per Fr.) Cooke. This, too, would rescue the name *Amyloporia* as available, with *P. xantha* as acting type species.

(iv) It may be emphasized that, since Bondartsev himself (1953: 149) in later work believed the name of the type in the form of "*Poria calcea* (Fr.) Bres. in Ann. Myc. VI, p. 11 [= 41] (1908)" to be a synonym of *Amyloporia lenis* (P. Karst.) Bond. = *Poria lenis* (P. Karst.) Sacc., the true *Poria lenis* must stand as type even though the generic character disagrees. To accept this would mean that the name *Amyloporia* would become tied up with a non-amyloid species. This would be most confusing as soon as it appeared that *Poria lenis* was acceptable as the type of a good genus that does not include *Poria xantha*. Such a genus is not inconceivable.

Personally, I would conclude that it would be best to abide by solution (iii) and let the application of the name *Amyloporia* depend upon the disposition one wishes to allot to *Poria xantha*. I have not yet made up my mind whether to separate *Poria xantha* from the rest of the porias as representative of a genus of its own or not. The amyloidity of the hyphae by itself is not very impressive if such genera as *Lentinellus* P. Karst. and other agaric genera are called to mind; in these, species with and others without amyloid hyphae occur. If the amyloidity of the hyphae is considered to be of less importance and the emphasis is shifted to the dimitic context with skeletal, then *Amyloporia* could be maintained as an artificial genus (exclusive of the earlier published genera *Chaetoporus* P. Karst., see p. 71, and *Schizopora* Velen., see p. 76) with a very inappropriate name, but this would not be an improvement. At present I am not at all prepared to regard the dimitic species associated by its authors with *P. xantha* as congeneric.

CHAETOPORELLUS Sing.

As introduced, and accepted and emended by some European mycologists, this is a very artificial genus; in my opinion none of the species included is congeneric with any of the others.

Chaetoporellus was first published, without a validating Latin description, in a key (see this paper p. 62); its contents were briefly mentioned thus: "Type: *C. latitans* (B.-G.) B.-S. Ferner: *C. Greschikii* (Bres.) B.-S., *C. Krawtzevi* (Pil.) B.-S."

Both Singer and Bondartsev provided Latin descriptions in order to publish the generic name validly.

"... Porioidae . . . / Poriae cystidiatae v. hyphis excreticibus instructae, molles v. fragiles, fibuligerae. Species typica: *C. latitans* (Bourd. & Galz.) B.-S."—Singer (1944: 66, 67).

"Fungi resupinati fam. Polyporacearum; hymenio cystidiis fusiformibus instructo; trama satis molli vel fragili; hyphis fibuligeris, tenuitunicatis vel crassotunicatis, haud amyloideis; poris tenuiparietalibus; sporis cylindraccis. / Typ. gen.: *C. latitans* (Bourd. & Galz.) c.n. / [Other species]: *Ch. Greschikii* (Bres.) c.n., ? *Ch. Simani* (Pil.) Bond., *Ch. aureus* (Peck) Bond., *Ch. Litschaueri* (Pil.) Bond., *Ch. luteo-albus* (Karst.) Bond."—Bondartsev (1953: 37).

The gloecystidia found in the hymenium look like leptocystidia of an unobtrusive type; these are not (or only with difficulty) comparable to the different kinds of cystidia occurring in the other species assigned to the genus. They seem to be of hymenial origin, although in older hymenia they appear to penetrate from the subhymenium into the active hymenium; they are thin-walled and appear to be set off normally by a cross-wall at the base. If the presence of these gloecystidia in combination with a number of other, by themselves trivial, features is regarded as sufficient to maintain the genus, then the generic character might read as follows:—

Fruitbody strictly effused, and adnate, annual, whitish-pallid throughout, toughish; tube-layer tubulose, the pores small, the thin dissepiments rigid and fragile when dry; subicular layer thin, soft. — Context monomitic; generative hyphae thin-walled, not becoming inflated, remaining distinct after the contents have disappeared, with abundant and distinct clamps, the walls not coloured, acyanophilous. Gloecystidia inconspicuous until, for instance, coloured in cresyl blue, narrow, inflating, irregularly cylindrical with blunt apices, thin-walled, often somewhat protruding. Basidia club-shaped, 2–4-spored. Spores narrow cylindrical, curved, small (3.5–5 μ long), colourless; walls thin, non-amyloid, smooth.

Type-species.—*Poria latitans* Bourd. & G. \equiv *Chaetoporellus latitans* (Bourd. & G.) Sing.

Poria latitans was for some time identified by Lowe (1959: 101, 108) with *Poria versipora* (= *Schizopora paradoxa*), with the remark "allantoid spores as described by Bourd. & Galz. almost certainly in error." However, he has since admitted the species as distinct (Lowe, 1966: 72 f. 50) and his description agrees so closely with the original one that there should be little hesitation in accepting his interpretation as correct. I am much indebted to Dr. J. L. Lowe for the sample that has served for this study.

A few words on the species that have been referred to *Chaetoporellus*. The following species all have skeletal hyphae. *Poria greschikii* Bres. is listed as synonym of *P. xantha* (Fr. per Fr.) Cooke by Lowe (1959: 101, 104; 1966: 88), but compare the description by Bourdot & Galzin (1928: 666). — *Poria krawtzevii* Pilát = *Poria subincarnata* (Peck) Murrill *vide* Eriksson (1949: 7) \equiv *Incrustoporia subincarnata* (Peck) Domański. — *Poria luteo-alba* (P. Karst.) Sacc. \equiv *Chaetoporus luteo-albus* (P. Karst.) M. P. Christ. (cf. p. 71). — *Poria varicolor* (P. Karst.) Cooke (cf. p. 119) *sensu* Parm. = *Chaetoporus luteo-albus* (P. Karst.) M. P. Christ.

The following species also previously referred to *Chaetoporellus* are considered to have a monomitic context and as far as I can judge are also not congeneric with the type: *Poria simanii* (Pilát) Gilb. & Lowe; *P. aurea* Peck; and *Leptoporus litschaueri*

Pilát (not *Poria litschaueri* Pilát) = "*Polyporus*" *sericeo-molis* Romell *vide* Kotlaba & Pouzar (1965: 76) and Lowe (1966: 84), this species with cyanophilous spore-wall is the type of *Strangulidium* Pouz.

It is difficult to suggest a relationship for such genera as *Chaetoporellus* that consist of species with strongly reduced fruitbodies. When looked at in phloxine-KOH solution, the generative hyphae call to mind those of *Schizopora* Velen. (see p. 76) and *Chaetoporus* P. Karst. (see below).

CHAETOPORUS P. Karst. emend.

Chaetoporus P. Karst. in Hedwigia 29: 148. 1890. — Cf. Donk in Persoonia 1: 198. 1960. *Poria* [subsect.] *Cystidiatae* Pilát in Bull. Soc. mycol. Fr. 48: 45. 1932 (nomen nudum). — Lectotype: *Poria eupora* (P. Karst.) Cooke.

Poria [subsect.] *Euporae* Pilát in Atl. Champ. Eur. 3: 374, 455. 1942 (lacking Latin description). — Lectotype: *Poria eupora* (P. Karst.) Cooke.

Fruitbody effused, annual; hymenophore typically tubulate (pores small or fairly so), rarely tending to more or less irpicoid configurations, not becoming layered. Context pallid (whitish, cream, &c.) to distinctly coloured (pinkish tan), tough, dimittic by skeletal. — Generative hyphae thin-walled, non-inflating, with clamps. Skeletal hyphae thick-walled, unbranched (with few exceptions), lacking true septa, often more or less tortuous and kinky toward their bases, hence context-elements not readily dissociated by tapping on cover-glass, averaging about 2–4 μ in diam.; walls cyanophilous in some species; a number of skeletal elements bending towards the hymenium, which they traverse obliquely, often projecting considerably, the apical portion more or less inflated club-shaped and strongly encrusted, very thick-walled except at the rounded apex where the wall abruptly becomes thinner. Hymenial leptocystidia often present, somewhat spindle-shaped. Hyphal pegs present or lacking. Basidia club-shaped (about 9–14 μ long), 4-spored. Spores subglobose to ellipsoid, or cylindrical (may appear somewhat curved), small (3–7 μ long); walls colourless, smooth, thin, non-amyloid.

On rotten wood and bark.

Monotype.—*Chaetoporus tenuis* P. Karst.

Examples.—

1. Generative hyphae with clamps.

2. Spores subglobose or ovoid, may appear subtriangular to ellipsoid (more or less adaxially flattened). Walls of skeletal hyphae not cyanophilous.—*Chaetoporus nitidus* (Pers. ex Fr.) Donk [synonyms, *C. euporus* (P. Karst.) P. Karst., *C. tenuis* P. Karst.], *C. pseudozilingerianus* Parm., *C. seperabilimus* Pouz. (= *Poria radula* Pers. sensu Bres.), *C. fimbriatellus* (Peck) Parm.

2. Spores cylindrical, usually slightly to distinctly curved. Walls of skeletal hyphae cyanophilous.—Sect. *Cyanochaetoporus* Pouz.

3. Context distinctly coloured (pinkish tan). — *Chaetoporus collabens* (Fr.) Pouz. [synonym, *C. rixosa* (P. Karst.) P. Karst.], cf. p. 107.

3. Context pallid (pale cream to yellowish).—*Chaetoporus luteo-albus* (P. Karst.) M. P. Christ.

1. Generative hyphae lacking clamps.—*Chaetoporus vinctus* (Berk.) J. E. Wright is apparently to be excluded.

The discussion on lampro- and skeletocystion on pages 48–50 was prompted by a recent study of the genus *Chaetoporus* P. Karst. During the past few decennia this genus has grown out considerably into an artificial one. The tendency has been to

refer to it species that possess thick-walled, encrusted cystidia, without taking into consideration that these cystidia represent different types and also that the hyphal structure of the context is not the same in all these species.

The question that arises after separating the species into groups each with its own type of cystidia is whether or not it will be possible to find supporting characters for generic separation, since in principle it is not feasible to rely on the hard and fast rule that different types of cystidia or the lack of them, automatically make sound characters for separating genera.

In the case of *Chaetoporus* sensu lato at least a few groups can be easily marked. In the first the context is dimitic with skeletal, while several skeletal deviate toward and even penetrate into, or protrude beyond, the hymenium while transforming themselves into big tramal skeletocystidia. Moreover, some species show orthochromatic colouring of the hyphal walls with cotton and methyl blue, a feature first reported by Eriksson (1949: 17) for *Poria luteo-alba*. It is this group with which the name *Chaetoporus* should be kept associated. In another group the context is monomitic without clamps and the hyphal walls are not colourable with methyl blue. The cystidia may either resemble tramal skeletocystidia or they are more or less thin-walled hymenial cystidia, both kinds being capped by crystal or other matter. Its species constitute a portion of *Oxyporus*, a genus which beside pileate species also contains several resupinate ones. As will be seen below there are still other features to help characterize these groups. Finally, *Poria vineta* (Berk.) Cooke lacks clamps altogether and has different skeletal.

Fruitbodies (i) with a dimitic hyphal system, (ii) with non-inflating generative hyphae and (iii) with a number of skeletal bending into the hymenium, (iv) with skeletocystidial endings (v) with more or less modified (often more or less inflated) and encrusted tips, and (vi) with smooth, non-amyloid, acyanophilous, and thin, colourless spore-walls, these occur not only among polyporaceous genera (as *Chaetoporus* does), but also among hydneaceous ones (for instance in *Steccherinum* S. F. Gray) and in some groups in which the hymenophore is 'intermediate' as far as its configuration is concerned (for instance *Irpex* Fr. sensu stricto). Of the last two categories careful hyphal studies have been recently published of *Steccherinum ochraceum* (Pers. per Fr.) S. F. Gray (Maas Geesteranus, 1962: 403 fs. 61-65), *S. rawakense* (Pers. apud Gaud.) Banker (Maas Geesteranus, 1964: 171 fs. 35-45), *Irpex lacteus* (Fr. ex Fr.) Fr. (Maas Geesteranus, 1963: 453 fs. 11-13).

The feature of a number of skeletal bending everywhere into the hymenium and ending in 'cystidia' appears to be of considerable taxonomic importance among polyporaceous and hydneaceous species. In *Mycorrhapium* Maas Geesteranus (1962: 394 fs. 35-50), in certain species of *Hyphodontia* with toothed hymenophore (Eriksson, 1958: 101 fs. 26, 30, 32), and in *Schizophora* Velen. (see p. 76) all the features listed above agree, except for the skeletal; these remain unaffected by the attraction of the hymenium. This not bending toward, and into, the hymenium is associated in all the examples just mentioned with the more or less congophilous nature of the walls of the skeletal. This suggests that these fungi belong to a distinct series.

In the above listing of features common to *Chaetoporus* and similar genera, some features of the spores will also be found. This was done to differentiate them from certain Auriscalpiaceae and Hericiaceae (Donk, 1964: 245, 269), such as the recently described genus *Gloeodontia* Boidin (1966: 22 *textpl.* 1)⁸ which differs in shorter, less distinctly adaxially flattened, minutely warty spores with amyloid walls and in the context which in addition to the hyphal system of skeletal has a third hyphal system, of gloeoplerous hyphae which likewise end in the hymenium.

Cunningham (1965: 69, 70) was in error when he stated that *Chaetoporus euporus* (= *C. nitidus*) and *C. "radula"* [sensu Bres.] lack clamps. Of the species mentioned above as examples of *Chaetoporus* only *C. vincatus* does not form these organs in the fruitbody; it is to be excluded also for other reasons.

When Karsten published the generic name *Chaetoporus* its only species was called *Chaetoporus tenuis* P. Karst.; this taxon was referred by Donk (1960: 198) to *Poria eupora* (P. Karst.) Cooke. Romell (1911: 12) also concluded that *Chaetoporus tenuis* seemed to be the same species, "and a note on the envelope shows that Karsten himself suspected the identity."

OXYPORUS (Bourd. & G.) Donk

This genus was originally published for a small group of pallid or whitish perennial species with fruitbodies varying from sessile [as in the type species, *Polyporus connatus* Weinm., sensu auctt., Bourd. & G., = *Oxyporus populinus* (Schum. per Fr.) Donk] to effused. In order to differentiate the genus from *Fomes* (inclusive of *Fomitopsis*) stress was laid on the anoderm surface of the cap and on microscopical characters, "Cystiden vorhanden, an der Spitze mit einer Kappe von Kalziumoxalatkrystallen. Sporen eiförmlich-ründlich, glatt, farblos, klein (3.5-5 μ)" (Donk, 1933: 119, 202). The genus was accepted by Pilát (1941: 341) unaltered; by Bondartsev & Singer (1941: 63), who added an annual species, *Polyporus ravidus* Fr.; and by Kotlaba & Pouzar (1957: 158, 159) and other authors. The addition of annual species (effused as well as pileate) appears fully acceptable, and at present species like *Poria corticola* (Fr.) Cooke and *P. late-marginata* (Dur. & Mont. ex Mont.) Cooke (the latter better known as *P. ambigua* Bres.) make up a conspicuous portion of the genus.

Concurrent with the growth of this genus it was found that some further microscopical characters hold true through the whole of the extended conception, viz. the monomitic context of acyanophilous hyphae, the absence of clamps, and the inamyloid and acyanophilous spores. These features make it possible to distinguish sharply between the pileate species of *Oxyporus* and such genera as *Fomitopsis* P. Karst. and *Coriolus* Qué. (where Bourdot & Galzin placed them), and the effused species from *Chaetoporus* P. Karst. and other porias with di- or trimitic context. The hyphae of the context (trama) are often somewhat firm-walled and they may even be thick-walled. As to the cystidia, these vary considerably within the genus; they

⁸ Not to be confused with *Gloeodon* P. Karst. The introduction of a name bearing so much resemblance is unfortunate.

may be of tramal origin, and then resemble skeletocystidia, or they are hymenial with thin to somewhat thickened walls. The cystidia may be rare but are perhaps never completely absent. (I could not find them in the two collections of *Poria millavensis* (Bourd. & G.) Overh. studied; it seems to come close to "*Chaetoporus*" *philadelphi* Parm.) Even without taking the cystidia into account it appears that the species of *Oxyporus* (in its current sense) are usually easily recognizable as such.

In Nobles's classification based on cultural characters (1958), two of the species of this genus that were included in her scheme stand far apart; they are *Poria ambigua* [= *Oxyporus late-marginata*] and *Fomes connatus* (Weinm.) Gillet [= *Oxyporus populinus*]; the first is classed as being 'oxidase negative' and the second as 'oxidase positive'. However, in a more recent publication Lombard & al. (1961: 287) concluded that although the oxidase reaction was weak, *Poria ambigua* was nevertheless a white-rotter; this bridged the gap between the two. According to Nobles (1958: 917) *Poria corticola* is another 'oxidase positive' species but it was listed in her key-section 64 with species that can better be placed in *Rigidoporus* Murrill. This association of *P. corticola* with the other species raises some doubt about its being correctly named. Judging from recent descriptions, *Poria pearsonii* Pilát also falls within the genus *Oxyporus*; it has even been reduced by Lowe (1966: 19) to the synonymy of *P. corticola*. However, according to Nobles (1958: 901) cultures of it have fiber hyphae and clamped septa; these features in combination with its place in the 'oxidase negative' key-section 24 also suggest incorrect determination. All of these porias (as well as all species of her key-section 64) were omitted from her latest keys for the identification of wood-inhabiting Hymenomycetes (Nobles, 1965).

Pouzar (1966: 368) found that *Poria late-marginata* (*P. ambigua*) has amyloid hyphae. He also fused *Oxyporus* and *Rigidoporus* into a single genus, a conclusion I find difficult to accept. In view of our very incomplete knowledge of microscopical and chemical details of the many tropical and subtropical species it seems premature. If the microscopical features mentioned above for *Oxyporus* are strictly adhered to and are combined with other features such as the whitish or cream fruitbody, which is furthermore completely effused (against appressed-peltate and separable) and not contracting upon drying (hence, of a different consistency), then I can see no reason for giving up *Oxyporus*. In any case, the European porias of *Rigidoporus* can easily be distinguished from it, although they agree in the monomitic context and the lack of clamps (which may be present in cultures) and several other features.

PERENNIPORIA Murrill

Perenniporia Murrill in *Mycologia* 34: 595. 1942. — Lectotype (cf. Donk in *Persoonia* 1: 251. 1960): *Polyporus unitus* Pers. sensu Murrill.

Poria Pers. in *Neues Mag. Bot.* 1: 109. 1794 = Tent. 29. 1797 (devaluated name) per S. F. Gray, *Nat. Arr. Br. Pl.* 1: 639. 1821; not *Poria* Pers. per P. Karst. in *Rev. mycol.* 3/No. 9: 19. 1881 & in *Meddn Fauna Fl. fenn.* 6: 10. 1881. — Lectotype (cf. Donk in *Persoonia* 1: 266. 1960): *Poria medullaris* S. F. Gray ≡ *Boletus medulla-panis* Jacq. sensu Pers.

This generic name is reintroduced solely to serve the temporary purpose of distinguishing between the artificial genus *Poria* and its 'natural' emendation. The reasons why I am not yet prepared to abandon the name *Poria* for a large, artificial assemblage of species have been stated above (p. 51). This attitude makes it morally binding that I myself provide a solution for *Poria medulla-panis* (lectotype of the name *Poria*) and related species when they are taken as the kernel of a distinct genus from the artificial namesake; in my opinion this is certainly desirable. Realizing that although *Perenniporia* ought really to be cited as a synonym under *Poria* Pers. per S. F. Gray, I nevertheless take up the former name as that of a segregate of *Poria*.

The exact limits of this generic taxon are still under discussion. Some authors, for instance Kotlaba & Pouzar (1959: 32, 36), have extended the scope also to include *Truncospora* Pilát 1953, a genus of pileate species. Their characterization of the genus was very concise:—

"... strange spores ... generally ... truncate at the apex and also the spore wall is brown colourable in Melzer's reagent. [*Poria medullaris*] is always resupinate [?], whereas [*Truncospora ochroleuca*, like other species allied to it] is pileate."

This example is not followed in the present paper, where *Perenniporia* is retained only for the 'resupinate' species, one of which may occasionally form cap-like portions. On the other hand there appears to be no cogent reason for limiting the genus to species with truncate spores and not including such species as *Poria subacida* (Peck) Sacc., which has long since been placed in the immediate neighbourhood of *P. medulla-panis* and allies. In these species the spore-wall is fairly thick and perhaps double, and not only dextrinoid but also cyanophilous (cf. Kotlaba & Pouzar, 1964: 138).

Wright (1964: 694) extended the limits still more radically by adding some tropical species (for instance, *Polyporus ligneus* Berk.). Some of his other contributions to the genus are surprising and do not agree with his generic description (*Poria lenis* P. Karst.); some of his statements are incorrect: thus *Trametes ochroleuca* Berk. is not "consistently resupinate"; *Poria obliqua* (Pers. per Fr.) P. Karst. of modern authors belongs to a different family (Hymenochaetaceae) and has certainly nothing to do with *Poria* sensu stricto = *Perenniporia*; *Polyporus fraxinophilus* Peck and *Trametes ohimensis* Berk. are typically pileate so that the qualification "sometimes pileate" is misleading; *Poria tenuis* (Schw.) P. Karst. and *P. subacida* (Peck) Sacc. are as far as I know consistently 'resupinate' rather than "rarely pileate"; and the inclusion of *Poria subargentea* Spg.⁹ is highly questionable. Briefly, Wright converted *Poria* 'sensu stricto' into another artificial assemblage.

⁹ "... which according to Bresadola [1916: 229], is *Poria carneopallens* Berk., which in turn is antedated by *Poria vineta* (Berk.) Cooke according to Dr. J. L. Lowe (personal communication) ..."—Wright (1964: 695). However, according to Lowe (1966: 123) *Poria subargentea* belongs to *Poria epimiltina* (B. & Br.) Lloyd, a quite different species. *Poria vineta* is briefly mentioned above in connection with *Chaetoporus*.

Examples ('resupinate' species only):—

1. Spores often appearing truncate.—**Perenniporia medulla-panis** (Jacq. per Fr.) Donk, *comb. nov.*, basionymum, *Polyporus medulla-panis* (Jacq.) per Fr., *Syst. mycol.* 1: 380. 1821 = *Boletus medulla-panis* Jacq. in *Miscnea austr.* 1: 141 pl. 11. 1778 *sensu* Pers., *Syn. Fung.* 544. 1801 et Donk in *Persoonia* 1: 266. 1960. — The autonomous status of the following species is now being studied anew: *Poria fulviseda* Bres., *P. pulchella* (Schw.) Cooke, *P. tenuis* (Schw.) Cooke.
1. Spores not truncate, or appearing so only indistinctly.—**Perenniporia subacida** (Peck) Donk, *comb. nov.*, basionymum, *Polyporus subacidus* Peck in *Rep. New York St. Mus.* 38: 92. 1885.

SCHIZOPORA Velen.

Schizopora Velen., *České Houby* 638. 1922, alternative name, in obs.

Irpex trib. *Resupinatus* Fr., *Elench.* 1: 146. 1828. — Lectotype: *Irpex obliquus* Fr.; → *Irpex* sect. *Resupinati* P. Henn.

Xylodon P. Karst. in *Acta Soc. Fauna Fl. fenn.* 2 (1): 31. 1881 & in *Bidr. Känn. Finl. Nat. Folk* 37: 65. 1882 ("Ehrenb."); not *Xylodon* (Pers.) ex S. F. Gray, *Nat. Arr. Br. Pl.* 1: 649. 1821 (nomen dubium; "Corticaceae"). — *Sistotrema* sect. *Xylodon* (P. Karst.) J. Schroet. in *Krypt.-Fl. Schles.* 3 (1): 462. 1888; not *Sistotrema* sect. *Xylodon* (Pers. ex S. F. Gray) Pers., *Mycol. europ.* 2: 191. 1825. — *Coriolus* sect. *Xylodon* (P. Karst.) Pat., *Essai taxon. Hym.* 94. 1900. — Lectotype (W. Cooke, *Gen. Homobas.* 100. 1953): *Irpex paradoxus* (Schrad. per Fr.) Fr. — Cf. Donk 1956: 113-115 & 1963: 156.

Irpex [sect.] *Resupinati* P. Henn. in *Nat. Pflfam.* 1 (1**): 149. 1898 = *Irpex* trib. *Resupinatus* Fr.

Coriolus [subject.] *Versiporae* Bourd. & G. in *Bull. Soc. mycol. France* 41: 237. 1925. — Monotype: *Poria mucida* Pers. *sensu* Bres.

Poria [subject.] *Subglobisporae* Pilát in *Atl. Champ. Eur.* 3: 374, 458. 1942 (without Latin description). — Lectotype: *Poria versipora* (Pers.) Lloyd.

Fruitbody effused, annual, whitish to cream; context toughish; hymenophore tubulose to irpicoid, the pores medium-sized. — Context dimitic by skeletal; generative hyphae thin-walled, remaining distinct, with clamps at the septa, non-inflating; skeletal firm- to thick-walled, those in the trama of the dissepiments or flattened teeth slightly spindle-shaped, not bending into the hymenium, the walls hyaline, somewhat congophilous. Hymenial leptocystidia present; thin-walled hyphal ends building up the growing edge of the dissepiment encrusted by spaced, small crystal bodies. Basidia often slightly constricted in the middle (utriform), 4-spored. Spores ovoid, adaxially only slightly flattened, small (4-6 μ long), colourless; walls thin, smooth, non-amyloid.

On dead wood, bark, &c.

TYPE.—"*P[olyporus]* *laciniatus* sp. n. (*Poria lac.*, *Schizopora lac.*" = *Poria versipora* (Pers.) Lloyd, *vide* Pilát 1941: 458 = *Schizopora paradoxa* (Schrad. per Fr.) Donk (sec p. 104).

It is with some reluctance that I venture to introduce this genus. The name was published somewhat obscurely, but since it was definitely accepted as an alternative name and was accompanied by a description of its own in my opinion (Donk, 1960: 278) it cannot be suppressed. The contents are as yet made up of only a single,

but versatile, species that is now currently known as *Poria versipora* (Pers.) Lloyd and which for reasons of priority (see p. 104) I now call *Schizopora paradoxa* (Schrad. per Fr.) Donk. Its circumscription is the wide one sponsored by Bourdot & Galzin (1928: 680) under the name *Poria mucida* Pers. [sensu Bres.].

Schizopora is in my opinion related to the "*Odontia*" *barba-jovis* group which has been placed in *Hyphodontia* Eriksson (1958: 101). I shall not be surprised if it proves difficult to draw a clear line of distinction between *Schizopora* and the axially-cystidiate species of *Hyphodontia*, although I am optimistic about the possibility. These species of *Hyphodontia* have 'cystidia' that are quite similar to what is called above skeletal in the dissepiments; the walls are also somewhat congophilous. I have little hesitation in interpreting these organs as homologous, also with the scattered 'cystidia' of such species as "*Peniophora*" *subalutacea* (P. Karst.) Höhn. & L. *Mycorrhaphium* Maas G. is another genus to be mentioned in this connection; it contains pileate species with monomitic context, except for the teeth, which are dimitic by skeletal that are comparable to the axial cystidia of the *Odontia barba-jovis* group, although they are firmly glued together and thus cause the stiffness of the teeth in *Mycorrhaphium*.

Notes on individual species

Many of the species discussed below belong to the more common European species of *Poria* sensu lato and were described before Fries's "Systema", Volume 1 (1821), appeared. In quite a number of cases we are not, or not sufficiently, informed about his interpretations of these species as they have been treated in this work; in other cases we know that his interpretations were inconsistent or erroneous. Under these circumstances it may be seriously doubted whether stability in the use of revalidated names will be possible if we do not cling rigorously to the types—the real types—of the revalidated names. The following has been written on the basis of the thesis that the revalidation of a name does not change the type but merely establishes the date from which the name has become available for priority considerations. In cases in which the revalidation author strongly hesitated definitely to include, or in which he even simultaneously excluded, the type, however, the above defended principle should be abandoned. This is all strictly in accordance with the present wording and the spirit of the 'Code' (Donk, 1957c).

In each of the separate discussions the most important facts about interpretations and misapplications, types, and similar subjects are briefly reviewed in order to facilitate understanding of the various uses of the name. In general I have thought it desirable to leave out considerations on interpretations of authors other than Persoon and Fries from before the period inaugurated by Bresadola. He was the first author who earnestly took the trouble to find out the correct interpretations of these fungi by combining sufficiently reliable microscopical details with the study of types or other authentic material. Some of his conclusions have now been abandoned, partly for reasons that were not his fault. I am more firmly

convinced than ever that the importance of this great mycologist to the modern study of the Aphyllophorales can hardly be overrated. Without Bresadola's pioneer research the work of Bourdot & Galzin would almost certainly have been less valuable.

albobrunneus. — *Polyporus albobrunneus* Romell 1911: 10 pl. 1 f. 6; *Poria albobrunnea* (Romell) Lloyd 1912.

When Romell described *Polyporus albobrunneus* he stated that the hyphae were "undulatae, non fibulatae, 3-4 μ crassae, aliae molliores, 2-3 μ crassae." From these few words I would conclude that he saw two types of hyphae, thick-walled skeletal hyphae and apparently also thin-walled generative hyphae in which the presence or absence of clamps was not noticed, the lack of clamps being mentioned only in connection with the first kind of hyphae. Baxter (1939: 172-175) studied the (lecto)type but added little to the knowledge of microscopic details. The current interpretation represents a species with dimittic context and possessing clamps on the thin-walled generative hyphae.

The species has been badly confused with other fungi. Karsten mixed it freely with *Trametes squalens* P. Karst., as was pointed out by Romell (1911: 10) and Lowe (1956: 122-123). The latter author even assumed that the correct name for *Polyporus albobrunneus* was *Poria squalens* (P. Karst.) Lowe, but Donk (1962: 235-237) concluded that this was a misapplication of the basionym *Trametes squalens*.

Bresadola (1920: 67) identified *Polyporus albobrunneus* with resupinate *Polyporus mollis* Pers.; and Romell (1926: 5) admitted that his species probably did not differ from *P. mollis* sensu Fries (1884: 81 pl. 182 f. 3), which presumably leads to the same conclusion, as does Bourdot & Galzin's renaming (1928: 542) of Romell's species as *Leptoporus fragilis* var. *resupinatus* Bourd. & G. The correct name for the pileate species these authors had in mind is a puzzle which will not be further discussed here. However, there can be little doubt that *Polyporus albobrunneus* is always poria-like and never pileate, and that it must be accepted as a distinct species.

Kotlaba & Pouzar's early interpretation (1956: 59; as *Tyromyces*) is now considered by these authors to have been based on *Tyromyces gloeocystidiatus* Kotlaba & Pouzar (1964: 208). Their original statement "fibulis hypharum absentibus" (1956: 63) is thus an error, since *T. gloeocystidiatus* is provided with clamps.

Nobles (1958: 901) placed *Poria albobrunnea* in the key-section 27 of her classification based on cultural characters; this section is defined thus: "Results of test for extracellular oxidase in cultures negative. / Thin-walled hyphae simple-septate or with rare single or multiple clamp connections. / Hyphae simple septate." The lack of both fiber hyphae and clamps suggest that her fungus was incorrectly identified.

The most recent study of *Polyporus albobrunneus*, by Lombard & Gilbertson (1965: 46 fs. 1A, 5A), describes both fruitbodies and cultures. The presence of thick-walled, rarely branched, aseptate hyphae in the fruitbody in addition to the thin-walled with clamps; the presence in cultures of irregularly thickened walls in certain

hyphae; the "wart-like projections fairly common on the smaller, more closely branched hyphae in the older parts of the mat", as well as the association with a brown cubical rot, are strongly reminiscent of *Coriolellus* Murrill emend. Sarkar (1959) = *Antrodia* P. Karst. emend. Donk (1966b: 339).

Baxter (1939: 172) was the first author to indicate a lectotype. It is a specimen from Lakaträsk, one of the localities mentioned in the protologue, and (cf. Lowe, 1966: 105) the illustration accompanying the original description was made from it. Lundell annotated it as the collection that must be considered type. Lowe (l.c.) replaced it by a specimen from Nattavara on the ground that the protologue states "I [Romell] found it quite frequent . . . at Nattavara . . . and also at Lakaträsk and Jörn." In my opinion this is insufficient ground for replacing the first selection.

albolutescens. — *Polyporus albolutescens* Romell 1911: 11; *Poria albolutescens* (Romell) Bourd. & G. 1914.

Bourdot & Galzin (1928: 658) suggested that *Polyporus albolutescens* might belong to *Poria onusta* (P. Karst.) Sacc. sensu Bourd. & G. [= *Sistotrema eluctor* Donk, see p. 102]. The original description in no way supports this: compare, "Basidia 4-spore, clavata, 15–20 × 4½–6 μ. Sterigmata 3–8 μ longa." *Sistotrema eluctor* has broader and typically urn-shaped basidia, with more than four (about six) tiny sterigmata about 4.5 μ long.

The explanation would seem to be that when publishing *Polyporus albolutescens* its author mentioned a collection from Rydbo near Stockholm, which differed in several respects and which might well be identical with *S. eluctor*, as was suggested by Romell himself ("The specimen from Rydbo might belong to *Poria onusta* Bres. Fungi Gall. p. 41"). When he stated that the 'authentic' collection of *Trechispora onusta* P. Karst. (UPS) seemed to contain two species, viz. *Polyporus hymenocystis* B. & Br. [= *Cristella mollusca*, q.v.] and *Polyporus albolutescens*, he evidently also had this non-typical collection in mind, the second species in Karsten's collection being the one with urn-shaped basidia.

Recently it was found that the spores of *P. albolutescens* have amyloid walls, which prompted the transfer to the genus *Anomoporia* Pouzar (1966: 172).

aneirinus. — *Polyporus aneirinus* Sommerf. 1826: 278; Fr. 1828: 122; *Poria aneirina* (Sommerf.) Cooke 1886.

Some authors added 'non Fries' to the author's citation of this name. This is misleading. What actually happened was that Fries (1828: 122) described the species from a portion of the original collection on *Populus* from 'Nordland', but afterwards he attributed some specimens, now in his herbarium, to *Polyporus aneirinus* and he named these incorrectly. In reality they belong to *Poria* [*Oxyporus*] *corticola* (Fr.) Cooke (cf. Bresadola, 1903: 78; Romell, 1911: 21).

argenteus. — *Poria argentea* Ehrenb. 1818: 19, 31 (devalidated name).

What may be taken as a portion of the type is to be found in Persoon's herbarium in the form of two pieces of resupinate *Polyporus* [*Bjerkandera*] *adusta* (Willd.) per Fr., an identification already made by Persoon (in herb.) and by Fries (1821: 364).

Type in Herb. Persoon.—L 910.263-294. "*Poria argentea* Ehrenb. | Est var. *Pol. adusti*" (written by Persoon).

aurantiacus. — *Polyporus aurantiacus* Rostk. 1838: 119 pl. 58, not ~ Lasch 1853, not ~ Peck 1873; *Poria aurantiaca* (Rostk.) Sacc. 1891; & *Polyporus aurantiacus* Lasch 1853: No. 1714, not ~ Rostk. 1838, not ~ Peck 1873.

No type material of *Polyporus aurantiacus* Rostk. is known to be in existence and the interpretation of the species must therefore be based on the protologue. As described and depicted the fruitbody is a thickish, fleshy-leathery, flat growth with thick, obtuse, not appressed margin growing on "altem beschagenem fichtenem Holze". The colour of the surface as well as of the context and the "Sporidien" are stated to be orange-yellow. The pores do not appear to be very minute.

The current interpretation was adopted by Bresadola (*apud* Egeland, 1914: 155) and accepted by Bourdot & Galzin (1925: 225; 1928: 665), who furnished a revised description. This fungus had been previously known under a few misapplied names. Quélet (1888: 381) called it *Poria xantha* (Fr. per Fr.) Cooke; and Bresadola (1903: 77), *Poria nitida* (Pers. per Fr.) Cooke, with *Poria aurantiaca* and *Physisporus aurantiacus* var. *saloisensis* P. Karst. as synonyms. Microscopically this interpretation is characterized by the partly thick-walled hyphae of the subiculum, the presence of clamps, and an incrustation on the hyphae that is apparently responsible for the initial lilac discolouration of sections in KOH solution and the transfer of the species to *Hapalopilus* P. Karst.

The synonymy of *Poria aurantiaca* sensu Bres. has been rapidly increasing during the past few years. Thus Domański (1965a: 515, 528; 1965b: 163) referred here *Poria placenta* (Fr.) Cooke sensu Bres. (1903: 77), which he was able to study from two specimens in Bresadola's herbarium (S). It would be interesting to know which species Bourdot & Galzin (1928: 664) described as *Poria placenta*.

According to Lowe (1956: 101, 122) two of Karsten's species belong to the *Poria aurantiaca* of modern European authors, viz. *Bjerkandera mollusca* P. Karst. (1887) and *Sarcoporia polyspora* P. Karst. (1894). His identification of the former is separately discussed in this paper (p. 98). Later on Lowe (1961: 206) concluded that *Poria aurantiaca* Rostk. sensu Bres. had also been named from North American collections: *Polyporus salmonicolor* B. & C. (1849) and *Poria rubens* Overh. & Lowe (1946). He soon added (Lowe, 1962: 185) *Polyporus oxydatus* B. & C. (type sterile).

In accepting Lowe's conclusions the question arises as to which name should be taken as the correct basionym for the species, *Polyporus aurantiacus* Rostk. (1838) or *Polyporus salmonicolor* (1849). In my opinion it is not permissible to assume that the margin of the fruitbody may vary from thick and obtuse to appressed and narrow, but thinning out. It appears advisable to reject the current European interpretation, as was done by Lowe (1966: 79, 86) who now calls the species *Poria salmonicolor*

(B. & C.) Cooke. His reasons for abandoning the name *P. aurantiaca* are that "identifications by many competent mycologists are very variable; many, however, applied this name to the plant here called *P. placenta*", although he agrees that Bresadola and Bourdot & Galzin appear to have included his conception of *P. salmonicolor* under their *P. aurantiaca*. He voiced no objection to the identity of the fungus described by Rostkovius. It is essential first to agree upon this point.

Without real conviction Fries (1874: 548) placed *Polyporus aurantiacus* Rostk. in the synonymy of **Polyporus spongiosus* Fr., a taxon appended to *Polyporus* [*Hapalopilus*] *nidulans* Fr. as an 'effused' form. There is little agreement about precisely what this *Polyporus spongiosus* might be. Identification of Rostkovius's fungus with sub-resupinate *Hapalopilus nidulans* should be carefully considered.

There is another species of poria with a homonymous and later name, viz. *Polyporus aurantiacus* Lasch. Its author may have aimed at an interpretation of *P. aurantiacus* Rostk., but when the name was published it was clearly marked as a new species. The type collection distributed shows this fungus to be the same as *P. aurantiacus* Rostk. sensu Bres.

The transfer of *Poria salmonicolor* to *Hapalopilus* P. Karst. (cf. Pouzar, 1967: 205) is perhaps not the best solution. The generic name *Sarcoporia* P. Karst. (see p. 64) is available for this complex.

blyttii. — *Polyporus blyttii* Fr. 1874: 571; *Poria blyttii* (Fr.) P. Karst. 1882.

It has long since been known that the material of *Polyporus blyttii* in Fries's herbarium (UPS) consists of two species, viz. the species commonly called *Poria rixosa* (P. Karst.) P. Karst. and the other *P. eupora* (= *Chaetoporus nitidus*, q.v.). What Bresadola (1897: 82) considered to be forma typica ("juxta specimina cel. Blytt") is *Poria rixosa*. Moreover he remarked "Notandum quoque quod cum forma typica *Polypori Blyttii* omnino concordant specimina authentica *Polypori emolliti* Fr., *Polypori collabentis* Fr. et *Polypori rixosi* Karsten."

Lloyd (1910: 472) was of a different opinion. He listed *Polyporus blyttii* "p.p. (non Bresadola)" as synonym of *Poria nitida* (which was to him the correct name for *P. eupora*); he appended this note:

"On trouve dans l'herbier de Fries deux plantes différentes remises par Blytt et dénommées: *Poria blyttii* . . . Celle qui pousse sur bois acériné est rare . . . ; celle qui pousse sur les bois feuillus est beaucoup plus commune. C'est manifestement cette dernière 'avec bord pâle' que Fries décrit sous le nom de *Poria Blyttii*, et c'est celle là aussi que Persoon appelle *Poria nitida*, tandis que Karsten le denomme: *Poria eupora*."

Assuming that Fries had had the two collections mentioned before him when he published the name *Poria blyttii*, the selection of one of these as the type must be guided by the protologue. If one of them agrees better than the other then that specimen must be chosen. If no such decision can be made, then the author who first singled out one of the specimens as type (or as typical) must be followed; this would be Bresadola and the result would be that *Poria blyttii* would replace *P. rixosa*.

After carefully comparing Fries's two specimens (UPS) with the original description I have decided to follow Lloyd. The *P. rixosa* element is labelled "*Polyporus Blyttii*. Fr. / Christiania, Blytt"; the *P. nitidus* element, "*Polyporus Blyttii* Fr. / Norwegia. M. Blytt." The second label agrees more closely with the protologue ("Norvegiae; misit M. N. Blytt"), but this is merely suggestive rather than conclusive. Although the description is rather brief, the words "... lacte cinnamomeus, margine subnudo pallidiore . . . Ad ligna indurata . . ." may be taken as supporting Lloyd's choice. To me also this makes *Poria blyttii* a synonym of *P. nitida* (*P. eupora*).

For some time Bresadola (1897: 82) thought that *Poria eupora* was merely a variety of his interpretation of *Poria blyttii*. This is certainly not the case; the error was corrected by Romell (1911: 13) when he pointed out that *Poria rixosa* had differently coloured fruitbodies and also different spores.

b y s s i n u s. — *Boletus byssinus* Schrad. 1794: 172 pl. 3 f. 1 (devalidated name); *Poria byssina* (Schrad.) Fr. 1832 Ind.: 149 (as synonym), Secr. 1833: 175 (as a species of *Boletus*: not validly published); *Poria byssina* (Schrad.) per Quél. 1888: 383, misapplied; &

Poria byssina (Schrad.) Pers. sensu Pers. in herb., in part; *Poria byssina* Romell 1926: 8, 20, not ~ (Schrad.) per Quél. 1888.

Polyporus molluscus var. *f i s s u s* Pers. 1825: 109.

Persoon hesitated to make up his mind about *Boletus byssinus* Schrad. In the "Synopsis" (Persoon, 1801: 548) he compiled the species but added the note "An satis distincta a *Bol. fimbriato*?", viz. from *Porotheleum fimbriatum* (Pers. per Fr.) Fr. ≡ *Stromatoscypha fimbriatum* (Pers. per Fr.) Donk. In the "Mycologia europaea" (Persoon, 1825: 108) he finally decided to list Schrader's name as a synonym of *Polyporus fimbriatus* (Pers.) per Fr., adding in parentheses "fungus junior". Fries at first (1821: 506) also regarded Schrader's species as a synonym of *Polyporus fimbriatus*, but afterwards (Fries, 1832 Ind.: 149) he referred it to *Peziza porioides* A. & S. per Pers. This latter species was often identified with *Solenia poriaeformis* (DC. per Mérat) Fuck., incorrectly so according to Donk (1959: 81, 82), who concluded that *Peziza porioides* was a synonym of *Stromatoscypha fimbriatum* after an inspection of type material. He also concluded that there should be little hesitation in accepting *Boletus byssinus* Schrad. as another synonym of the last-mentioned species.

When Quélet resurrected the name he evidently applied it to a species of *Poria* that according to Bourdot & Galzin (1928: 691) is "vraisemblablement le *Poria subtilis*" Schrad. = *Poria candidissima* (Schw.) Cooke = *Poria mollusca* sensu stricto (see p. 95).

A very different interpretation was launched by Romell (1926: 8, 20) and accepted by Eriksson (1946: 3 f. 1) who also furnished an excellent description of this interpretation. Romell construed a *Poria byssina* "Pers." which he identified with *Poria vulgaris* (Fr.) Cooke sensu Bres. (see p. 123); the latter denomination he rejected as incorrect. "What Schrader's species [*Boletus byssinus*] is, seems doubtful. Persoon,

however, has in his herbarium several specimens of a *Poria*, which he referred to *P[olyporus] byssinus*. And though this may be another than that of Schrader, I think we ought to accept the name in the sense of Persoon and call the plant *Poria byssina* Pers." I quote this remark in full because it provides the basis of the thesis that Romell introduced in it the species *Poria byssina* Romell by excluding *Boletus byssinus* Schrad. It is true that he ascribed the name to Persoon, but it is equally true that this was merely a reference to herbarium specimens rather than to a published use of the epithet 'byssinus' in any combination in a work published by Persoon; the reference to Persoon connects the name *Poria byssina* Romell with a specimen from Persoon's herbarium, viz. the type specimen to be selected from the material admitted by Romell as belonging to his species. It is unfortunate that '*Poria byssina* Romell' is not available on account of the earlier name *Poria byssina* (Schrad.) per Quél. 1886.

When Eriksson (1949: 3) transferred Romell's species to *Poria* he made a technical error by citing a wrong name as basionym, viz. "*Polyporus byssinus* Pers., Myc. Eur. II, p. 101 (1825)",¹⁰ Romell being cited merely as the author of the recombination '*Poria byssina* (Pers.)'. Technically this makes the *Poria byssina* of Eriksson a recombination with *Polyporus byssinus* (Scop.) per Pers. as basionym rather than with *Polyporus byssinus* Romell. The recombination *Tyromyces byssinus* "(Pers.) Bond. c.n." (Bondartsev, 1953: 164) was not validly published since no full bibliographic reference to any basionym was added. Later publications of the recombination (for instance, Domański, 1963b: 308; 1965b: 154; Parmasto, 1963: 278) are also defective because of citation of the wrong basionym (Persoon, 1825: 101, or/and Eriksson, 1949). I have not been able to locate a correct recombination of Romell's specific name (excluding that of Persoon of 1825) that would have established a priorable form of '*Poria byssina* Romell'.

As discussed by Eriksson (1949: 5), the specimens that Persoon associated in his herbarium with the name *Boletus byssinus* Schrad. and that were studied by Eriksson actually form a mixture of several species; they represent *Poria candidissima* (Schw.) Cooke [= *Poria mollusca* sensu stricto], *Poria vulgaris* sensu Bres. = *Poria byssina* Romell, and a part that is indeterminable.¹¹ As mentioned above, *Poria byssina* Romell was actually based on specimens in Persoon's herbarium. Romell left no determinations on the sheets he saw, but these are recognizable by their loan-

¹⁰ The cited number of the page (101) is apparently an error for '122' on which page *Fungus byssinus* Scop. was revalidated as *Polyporus byssinus* (Scop.) per Pers., a different fungus from the one Eriksson had in mind. On page 101 Persoon listed *Polyporus vulgaris* Fr., which could not have been meant.

¹¹ Of the collections in Persoon's herbarium bearing the denomination "*Boletus byssinus* Schrad." on their labels three are listed in this paper under *Poria mollusca* (p. 97), viz. L 910.262-868, L 910.262-887, and L 910.263-959. Of the following, Romell saw the first four; Eriksson (1949: 5) referred them to *Poria byssina* "Pers."

L 910.262-883. "*Boletus byssinus* Schrad. (Fungus nascens)" (written by Persoon).
L 910.262-886. "*Bol. byssinus* Schrad. / *fimbriatus* Myc. Europ." (written by Persoon).
Specimen sent by Delastre [!] and annotated by him: "Vienne [Delastre] sur les branches Cariées enfouies." — Persoon wrote on this label, "*Boletus byssinus* Schrad." [P.T.O.]

number in the 23.911 series. L 910.262-883 (see foot-note 11) is selected herewith as type of *Poria byssina* Romell.

Polyporus molluscus var. *fissus* Pers. is represented in Persoon's herbarium by two specimens which were both determined by Bresadola as '*Poria vulgaris* Fr.', determinations which should be read as '*Poria vulgaris* Fr. sensu Bresadola (1897: 86) in part, viz. α . forma typica'; it then would make it the same species as the one described by Bourdot & Galzin (1928: 679) as *Poria vulgaris* and for which the name *Poria byssina* Romell was introduced. (I am not yet convinced that the naming is correct.)

I was forced to conclude that no specific name was available to replace it. Hence, one is provided: **Poria romellii** Donk, *nom. nov.*; basionymum, *Poria byssina* Romell in Svensk bot. Tidskr. 20: 8. 1926; lectotypus, L 910.262-883. As will be discussed presently the specific status of this taxon has been questioned, but there will be mycologists (including myself) who have their doubts about this.

What happened is that Lowe (1959: 103) has come to the conclusion that "*Polyporus semisupinus* B. & C. apud Berk. 1872¹² is "apparently the same as *P[oria] byssina* (Pers.) Rom. of Eriksson determinations". More recently Lowe (1966: 126 f. 114) repeated this statement in words to the same effect: "Morphologically the specimens here described [under the name *Polyporus semisupinus*] do not differ from those named *Poria byssina* (Pers.) Rom. by Eriksson and fully described in Sv. Bot. Tidskr. 43: 4. 1949."

I have seen quite a number of collections of the resupinate taxon named by Bresadola, Bourdot, Romell, and Eriksson and also of the pileate *Polyporus semisupinus* but still do not wish to subscribe to Lowe's conclusion. Assuming that Overholt's interpretation of *Polyporus semisupinus* (1953: 376 pl. 17 f. 102, pl. 18 fs. 108, 109, pl. 95 f. 541, pl. 106 f. 589, pl. 124 f. 675, pl. 132 fig.) is correct then the two species seem different enough. In *P. semisupinus* the fruit-body is "sessile or distinctly substipitate at the base, sometimes in the form of a rosette" and apparently at most exceptionally resupinate: this last condition is not even mentioned by Overholts. In *Poria romellii* the fruit-body appears strictly resupinate and Bresadola, Bourdot, and Eriksson, who have all seen many collections, do not even hint that it is occasionally distinctly effuso-reflexed to substipitate.

It is interesting to note that Bourdot & Galzin had previously considered the same question. A fungus originally published as *Poria vulgaris* var. *pileata* Bourdot & L. Maire (1920: 84) they afterwards renamed *Coriolus hoeheleii* subsp. *C. genistae* Bourdot & Galzin (1925: 145) and *Coriolus genistae* (Bourd. & G.) Bourdot & Galzin

L 910.262-1051. "*Polyporus (Poria) byssinus* ? / Satis frequens, autumnno, prope Parisios" (written by Persoon).

L 910.262-1052. "*Poria denudata* / *Boletus byssinus* Sch. / Prope Parisios" (written by Persoon).

L 910.262-877. "*Polyporus* / *Boletus byssinus* Schrad." (written by Persoon). — The fruitbody is destroyed and indeterminable. This is the indeterminable specimen mentioned by Eriksson under the (erroneous) number "910.262-887; 23.911-8".

¹² This species is now often referred by European mycologists to *Tyromyces* P. Karst. It does not really seem to fit in that genus.

(1928: 569 f. 164). According to Pilát (1939: 212-213) this is *Polyporus semisupinus*. Bourdot & Galzin (1925: 146; 1928: 569) remarked:

"Nous avons d'abord supposé que *C. genistae* pouvait être le *Poria vulgaris* a bord réfléchi: la structure est à peu près la même, quoique les hyphes de *Poria vulgaris* soient un peu plus coriaces. Mais cette supposition n'a pas été confirmée: nous n'avons pas encore vue de forme de passage entre les deux plantes."

Specimens of *Polyporus molluscus* var. *fissus* in Herb. Persoon:—

Type.—L 910.270-434. "*Polyporus molluscus* β. *fissus* Mycol. Europ. 2. p. 109." — Determined by Bresadola as "*= Poria vulgaris* Fr. vetusta." Lectotype of *Polyporus molluscus* var. *fissus* Pers.

Other specimens.—L 910.277-280. "*Boletus molluscus* β. *fissus* | *Polyporus molluscus* β. *fissus*." — Annotated by Bresadola, "*= Poria vulgaris* Fr."

L 910.277-272. "*Boletus molluscus*" (first word written by J. B. Mougeot, second, by Persoon). — Filed in the "*Polyporus molluscus* Pers. var. *fissus*" cover. Annotated by Bresadola: "*= Poria vulgaris* Fr."

calceus. — [*Polyporus vulgaris* var. [?] "*β. P. calceus*" Fr. 1821: 381]; *Polyporus vulgaris* var. *calceus* Fr. ex Pers. 1825 (nomen dubium); *Polyporus calceus* (Fr. ex Pers.) Schw. 1832, not ~ B. & Br. 1873; *Poria calcea* (Fr. ex Pers.) Cooke 1886, not ~ (B. & Br.) Cooke 1886, simultaneously published.

There is only one currently accepted interpretation of *Poria calcea*, and that is the one sponsored by Bresadola (1908: 41) and adopted in a much wider sense by Bourdot & Galzin (1928: 673). In Bresadola's sense the species is identical with *Poria lenis*. Bourdot & Galzin's varieties of *Poria calcea* (1928) may be identified as follows:

Variety A & B = *Poria lenis* (P. Karst.) Sacc.

Forma Ac = *Poria alutacea* Lowe apud Overh. & Lowe (fide Lowe 1962: 182).

Variety C = *Poria subincarnata* (Peck) Murrill.

Variety D = *Poria xantha* (Fr. per Fr.) Cooke.

Romell (1926: 13, 21) protested against Bresadola's use of the name. In his opinion "*Pol. vulgaris* β *calceus* is only the oblique form of *Poria xantha* Lind [q.v.], growing on vertical surfaces."

The best solution appears to be to eliminate *Poria calcea* as a nomen dubium and to use the name *Poria lenis* for Bresadola's fungus, as is now consistently done. Compare also some remarks under 'vulgaris'.

cellaris. — *Polyporus cellaris* Desm. 1826: No. 72, with description.

The type distribution in Desmazières series of exsiccati has a printed label with a description. The copy studied (L) shows this species to be the same as *Phellinus contiguus* (Pers. per Fr.) Pat.

When Fries (1828: 110) distinguished *Polyporus ignarius* forma "d. effusus, subspongiosus, ferruginascens. In cryptis", he remarked in connection with it, "Huic simillimus est *P. cellaris* Desmaz. exs. n. 72."

The following collections will be found in Herb. Persoon.

L 910.262-962. "*Polyporus cellaris* Desmaz. / lectus prope Lille, a Desmazieres" (written by Persoon). The note commencing "No. 11 Polypore ? . . ." and mentioned in connection with *Polyporus megaloporus* (p. 94) under L 910.263-903 might originally have accompanied this specimen.

L 910.249-1295. A copy of Desmazieres, "Plantes cryptogames du nord de la France" No. 72, the type distribution.

A specimen (L 910.262-907) sent by de Chaillet from Neuchâtel, Switzerland and determined by him as *Boletus spongiosus* Pers. was named by Persoon "*Polyporus cellaris* (dubius)". I determined it as *Polyporus expansus*. It seems possible that *Polyporus dryadeus* var. *cellaris* (Chaill.) ex Fr. 1828: 108 (*Boletus cellaris* Chaill. "in litt.") was based on a portion of this collection which I have not seen.

cerasi. — *Polyporus cerasi* (Pers.) per Fr. sensu Fr. 1821: 382.

There is no type to be found, but from the good original description as well as from evidence on labels in Persoon's herbarium I do not doubt that *Odontia cerasi* Pers. (1799: 16) is the same as the fungus now often called *Radulum orbiculare* Fr. ≡ *Radulum radula* (Fr. per Fr.) Nannf. ≡ *Hyphoderma radula* (Fr. per Fr.) Donk ≡ *Basidiaradulum radula* (Fr. per Fr.) Nobles.

Fries misapplied Persoon's name when he revalidated it in the "Systema"; he continued to do this for some time. In the "Epicrisis" (1838: 523) he admitted his error and stated that the fungus he had described in 1821 (as *Polyporus cerasi*) and in 1828 (pp. 149-151, as *Irpex cerasi*) belonged to *Irpex paradoxus* (see p. 102), and that in the "Elenchus" he had erroneously included that species with *Radulum orbiculare*.

In later work Persoon (1825: 196) mentioned his own *Odontia cerasi* as a doubtful synonym of *Sistotrema leucoplaca* Pers., which according to its type is synonymous with *Radulum orbiculare*. He originally called the specimen on the labels "*Sistotrema Cerasi*" but crossed out 'Cerasi' and replaced it by 'leucoplaca Myc. Eur. 2. p. 196.', adding "*Radulum orbiculare* Fries. El. videtur".

colliculosus. — *Boletus tuberculatus* (Pers.) Pers. sensu DC. 1815: 40; *Polyporus colliculosus* Pers. 1825: 103.

According to the original description *Polyporus colliculosus* was described from a specimen (still preserved in Persoon's herbarium) collected near Neuchâtel, Switzerland. This means that it was collected by de Chaillet. I would also conclude that the specimen is a portion of the same collection ("dans le Jura") which de Candolle (1815: 40) received from de Chaillet and used as the basis of his interpretation of *Boletus tuberculatus* Pers., cited by Persoon in 1825 as synonym of his *Polyporus colliculosus*. The piece in Persoon's herbarium answers very well to de Candolle's description: the knobs mentioned and described at some length (also present in Persoon's share of the specimen) are a response to the substratum; they may have induced de Candolle to identify the specimen with *Boletus tuberculatus* Pers.

Bresadola (in herb. Pers., 1912) recognized *Polyporus colliculosus* as the fungus he called *Trametes micans* (Ehrenb. per Fr.) Bres. (see also p. 95); and Romell (1926:

6) identified it with *Polyporus albo-carneo-gilvida* Romell, which he considered the same as Bresadola's interpretation of *T. micans*.

As to the correct name, this will be discussed below under 'tuberculosis'.

Type.—L 910.262–884 in Herb. Persoon. "*Boletus colliculosus* / Mycol. Europ. 2." — Annotated by Bresadola (1912), "= *Boletus micans* Ehrenb. 1818 . . . / *Polyporus albo-carneo-gilvidus* Romell". — Annotated Romell, "= *Pol. albocarneo-gilvidus*".

c o n t i g u u s. — *Boletus contiguus* Pers. 1801: 544 (devalidated name); *Polyporus contiguus* (Pers.) per Fr. 1821: 378; *Poria contigua* (Pers. per Fr.) P. Karst. 1881; *Phellinus contiguus* (Pers. per Fr.) Pat. 1900.

Bresadola (1897: 79) considered *Poria contigua* and *Polyporus ferreus* Pers. to be conspecific; he listed the latter name as synonym and "status junior". However, the two are certainly different species. For good descriptions of *Phellinus contiguus*, see Bourdot & Galzin (1928: 624) and Jahn (1967: 68 fs. 2a, 3i, Abb. 6, 7, 28, 31, 37, 53); & compare Donk (1933: 257, 258).

Specimens in Herb. Persoon. The following appeared correctly named.

Type.—L 910.277–276. "*Polyporus contiguus*" (written by Persoon). — Left-hand specimen, a portion of which was studied by Bresadola (1895).

Other specimens.—L 910.263–89. "*Boletus (Polyporus) continuus*" (written by Persoon). — Lower specimen on sheet.

L 910.263–503. "*Polyporus continuus* / presentim ad ligna sicca *Pini sylvestris*" (written by Persoon).

The use of 'continuus' on the labels of the two preceding specimens is considered a mere variant spelling of 'contiguus'.

c r i b r o s u s. — *Boletus fuliginosus* Schleich. 1821: 56. (nomen nudum; "Schr."); *Polyporus cribrosus* Pers. 1825: 96 (nomen monstrositatis).

Correctly identified from the description by Bourdot & Galzin (1928: 625) as a 'myriadoporous' form of *Phellinus contiguus* (Pers. per Fr.) Pat. Donk (1933: 258) confirmed this determination. A recent re-examination yielded no spores, but the presence of macrosetae in the marginal mycelium and the length of the setae in the hymenium, often more than about 45 μ , suggest that these previous determinations are correct.

It is recommended that in view of the 'myriadoporous' development of the tubes the name *Polyporus cribrosus* be treated as a nomen monstrositatis.

Persoon received the material from Schleicher under the name "*Boletus fuliginosus* Schr." In Schleicher's list "Schr." is the abbreviated author's citation for 'Schrader'. This implies that 'fuliginosus' is an error for 'ferruginosus'; the latter epithet agrees much better with the colour of the fungus.

Type.—L 910.277–260 in Herb. Persoon. "*Boletus fuliginosus*" (written by Schleicher), to which Persoon added "Schleicher". "*Polyporus cribrosus* / Helvetia prope Bex" (written by Persoon). Two interrogation marks, one after each of the names, added by a third person, long ago.

cruentus. — *Polyporus cruentus* Pers. 1825: 92 pl. 16 f. 9 (nomen confusum).

Fries (1828: 119) concluded, apparently from Persoon's protologue only, that this was a synonym of *Polyporus* [*Poria*] *incarnatus* (Pers.) per Fr. This was an incorrect guess, as is shown by the type specimen. From its label it can be seen that Persoon disagreed with Fries's disposition and also that he nearly hit the truth by further annotating it "An var. *P. scalaris*?" (For *Polyporus scalaris*, see p. 111.) Both Bresadola (1916: 223) and Romell recognized the true nature of the specimen: *Trametes serialis* Fr. discoloured by a parasitizing fungus, viz. a species of *Hypomyces* Tul. Donk (1933: 193) accepted this conclusion. I have often found *Antrodia serialis* (Fr.) Donk in The Netherlands and also in Germany more or less completely or only partially red-coloured, presumably from the parasite mentioned above. There is every reason to consider *Polyporus cruentus* a nomen confusum.

Lloyd (1910: 471) incorrectly referred *Polyporus cruentus* to *Poria aurantiaca* (Rostk.) Sacc.

Type.—L 910.262-895 in Herb. Persoon. "*Boletus cruentus*. / (Diversus a *B. incarnato*.) / An var. *P. scalaris*?" (written by Persoon). — One piece studied by Bresadola (1895), who added the following note: "Vix dubie = *Trametes serialis* Fr. (*scalaris* Pers.) f. *resupinata* a mycelio *Hypomyces roselli* Alb. et Schw. sanguinea evasa. Structura quoque identica! Certe non *Polyporus aurantiacus* Rostk. ut vult Lloyd. / Bresadola." — Note added by Romell: "... *Boletus cruentus* Pers. est *Trametes serialis* Fr. a fungo parasitico colorata ..."

dentiporus. — *Polyporus dentiporus* Pers. 1825: 104; *Poria dentipora* (Pers.) Cooke 1886, not ~ Pilát 1941; &

Poria dentipora (Pers.) Cooke sensu Bres. 1897: 82; *Coriolus dentiporus* Bond. & S. 1941: 60; & *Poria dentipora* Pilát 1941: 440 f. 206, pl. 281 f. a (typonym of preceding name), not ~ (Pers.) Cooke 1886.

The type specimen of *Polyporus dentiporus* is still in existence and represents a resupinate condition of *Polyporus* [*Hirschioporus*] *abietinus* (Pers.) per Fr. according to Romell (1911: 10; *apud* Bourdot & Galzin, 1928: 673) and Donk (1933: 168, 169).

Type.—L 910.277-262 in Herb. Persoon. "*Bolet. dentiporus*. / *P. dentiporus* / Ex Helvetia (Schleicher)" (written by Persoon). — Annotated by Romell, "Est *Polyp. abietinus* var. *resupinata pallidior*."

Bresadola (1897: 82) tried to interpret the species from the protologue and published a description that shows that his conception is different from *Hirschioporus abietinus*. A remark to this effect published by Bourdot & Galzin and Donk (ll. cc.) has culminated in the publication of two new specific names by exclusion of the type, viz. *Coriolus dentiporus* Bond. & S. ["(Bres. non Pers.)"] and *Poria dentipora* Pilát ["Bresadola ... (non ... Persoon ...)"]. The two were validly published by reference to Bresadola's Latin description. Pilát gave an amplified description with figures from a specimen that was "peut-être le cotype", but concluded with the remark, "Espèce douteuse, qui doit encore être étudiée." If it proves to be a good species, the name *Coriolus dentiporus* Bond. & S. is available for it as basionym.

dermatodon. — *Sistotrema dermatodon* Pers. 1825: 195.

Fries (1832 Ind.: 157) identified this with "*Irpex obliquus*". It dropped completely out of circulation.

The type has been preserved and is now in very poor condition. It shows a completely resupinate, poorly developed portion of a fruitbody. Spores broadly ovoid, with one large central oil-drop, smooth, colourless, $5-6.25(-7) \times 4.75-5.5-6 \mu$. Basidia $5-6.5 \mu$ wide; sterigmata $5-6 \mu$. Hyphae $2.5-4 \mu$, parallel in the teeth, fasciculate, afterwards subagglutinate, with clamps, in the subicular layer interwoven with more numerous clamps. In my opinion, a still undeveloped, resupinate specimen of *Hydnum pachyodon* Pers. = *Irpex pachyodon* (Pers.) Quél. = *Spongipellis pachyodon* (Pers.) Kotl. & P.

Type.—L 910.270-428 in Herb. Persoon. "*Hydnum Radula* fries 2. S. 271 = 230. / Je n'ai jamais pu avoir l'*h. flexuosum* de Schleicher. / Il me parait très rapproché mais cependant différent de votre [*Hydnum*] *Niveum*. / No. 85. Chene gbre." (written by de Chaillet). Persoon wrote "*[Hydnum] dermatodon*" on this label. On a second label he wrote "*Sistotrema dermatodon*."

expansus. — *Boletus expansus* Desm. 1823: 18; *Polyporus expansus* (Desm.) Desm. 1825; *Poria expansa* (Desm.) H. Jahn 1967.

Shortly after the species had been described as *Boletus expansus* Desm. it was also published as *Polyporus megaloporus* Pers. (1825: 88), some of Persoon's original specimens (including the lectotype) having been received from Desmazières. When Persoon published his species (or rather, perhaps, finished the manuscript) he did not yet know that Desmazières had named it: Desmazières's specimens did not bear a herbarium name. Two collections in Persoon's herbarium (L) show that he soon concluded that the two names were synonyms.

Boletus expansus may be known from the distribution in Desmazières series of *exsiccati* (No. 16). There is also an ample specimen from him in Persoon's herbarium (L 910.263-99) which he labelled as follows:—

"No. 12. *Polyporus* or *Boletus expansus* de mon Cat. des pl. omises page 19 (petit fragment). / Vous pouvez voir que cette espèce diffère considérablement du No. 11. Je désire connaître ce No. 11, parceque je l'ai en nombre pour les fascicules pour Vous faciliter son étude, je vous en ai donné plusieurs beaux échantillons, et une description aussi détaillée que possible."

The detailed description mentioned by Desmazières is now attached to a sheet with a specimen of *Polyporus megaloporus* Pers., apparently in error, since it appears to be the draft of the original description of *Boletus cellaris* Desm. (cf. p. 85) = *Phellinus contiguus* (Pers. per Fr.) Pat. It does not agree with the actual situation: the specimens attached to the labels bearing the above numbers look very much alike and are in fact the same species, if not parts from the same collection.

Fries (1838: 466) considered Desmazières's species an effused and resupinate monstrosity of *Polyporus fomentarius*. He had seen a package of the type distribution.

For an excellent recent study on this species, see Jahn (1967: 100 fs. 11, 12, Abb. 59-61).

ferreus. — *Polyporus ferreus* Pers. 1825: 89; Fr. 1832 Ind.: 146, not ~ Berk. 1847; *Poria ferrea* (Pers.) Bourd. & G. 1925; *Phellinus ferreus* (Pers.) Bourd. & G. 1928.

This was referred to *Poria contigua* (q.v.) by Bresadola (1897: 79). It was restored to the status of a distinct species by Bourdot & Galzin (1925: 247) and by Romell (1926: 10) on the basis of a specimen named by Persoon himself (S). An excellent account of *Phellinus ferreus* was recently published by Jahn (1967: 63 fs. 2b, 3e, 6, Abb. 2, 29, 46, 51).

There are three sheets in Persoon's herbarium from which the type must be selected; portions of the specimens were studied by Bresadola in 1895. The protologue contains, "Ad ramos semel inveni fungum, forsitan nondum satis adultum. Longitudine palmari est et 1½ latus . . ." This points, rather, to nos. L 910.263-528 and L 910.263-525.

The specimens named without an interrogation mark in Herb. Persoon are:

Type.—L 910.263-528. "*Polyporus ferreus* / Mycol. Europ. 2. p. 89" (written by Persoon). — Annotated by Bresadola in 1895, "Typus! sed vix dubie = status juvenilis *Poriae contiguae* Pers."

Other specimens.—L 910.263-525. "*Polyporus ferreus*. Myc. Europ. 2. p. 89" (written by Persoon). "Ce polypore constamment sessile se développe en automne sur le bois mort dans les haies" (written by Delastre). — Studied by Bresadola in 1895, but not annotated.

L 910.263-1015. "*Polyporus ferreus* Myc. Europ." (written by Persoon). "130. / Del. / Dept de la Vienne / Sur les branches cariées de chêne" (written by Delastre). — Studied by Bresadola in 1895, but not annotated. This has macrosetae in the marginal mycelium and may perhaps be referred to *Phellinus ferruginosus* (Schrad. per Fr.) Pat. sensu Bres.; no spores seen. This material is remarkably like that of the preceding two numbers.

ferruginosus. — *Boletus ferruginosus* Schrad. apud Gmel. 1791: 1437 & Schrad. 1794: 172 (devalidated name); *Polyporus ferruginosus* (Schrad.) per Fr. 1821; *Poria ferruginosa* (Schrad. per Fr.) P. Karst. 1881; *Phellinus ferruginosus* (Schrad. per Fr.) Pat. 1900.

The earlier descriptions are inconclusive, and the name is now applied in accordance with Bresadola's interpretation (1897: 78); he clearly outlined the microscopical character. For more extensive descriptions of *Phellinus ferruginosus* sensu Bres., see Bourdot & Galzin (1928: 625 f. 177) and Jahn (1967: 60 fs. 2d, e, 3f, Abb. 3-5, 39).

Donk (1933: 256) thought that Schrader's fungus could hardly be the same species as the one described by Bresadola; in the absence of a type he judged from Schrader's protologue; compare, for instance, "... Hab. ad traves et ad ligna putrida . . . substantia durissima, crassa, semiunciam fere diametro aequante". Also Fries's conception (1821: 378) accompanying the revalidation of the name does not readily suggest the current interpretation. Compare Bresadola (1897: 78-79): "*Poria ferruginosa* Fr. et Pers. prouti e speciminibus originalibus [?] nobis elicit tantum ceu forma *Poriae contiguae* consideranda." According to Egeland (1914: 158, 159, 162) several specimens in Blytt's herbarium determined by Fries as *Polyporus ferruginosus* are *Poria rixosa* (P. Karst.) P. Karst. [= *Chaetoporus collabens* (Fr.) Pouz.]. On the other hand

Donk found that *Polyporus salicinus* (q.v.) was introduced for the same fungus as *Poria ferruginosa* sensu Bres., and for reasons mentioned and rejected on page 109 of this paper he preferred a new denomination, *Ochroporus confusus* Donk, an isonym of *Polyporus salicinus*. If it is agreed that *Poria* [*Phellinus*] *ferruginosa* is a nomen dubium, and *Polyporus salicinus* is not to be treated as a nomen ambiguum, then the correct name for Bresadola's fungus is *Poria salicina*, or *Phellinus salicinus*. *Polyporus macouni* Peck 1879 is the name next in line. Personally I now prefer to adhere to the use of the epithet 'ferruginosus'.

fimbriata Pers., *Poria*, see *Stromatoscypha fimbriatum* (Pers. per Fr.) Donk (1959: 81).

frustulatus. — *Polyporus frustulatus* Pers. 1825: 91.

Fries (1828: 93) referred this to *Polyporus* [*Antrodia*] *serialis* Fr. as a form, on the basis of a specimen he had received, "Dedit Cel. Chaillot pro *Bol. interrupto* Pers. Mscr., quem vero in Mycol. Eur. frustra quaesivi."

The type as represented in Persoon's herbarium is something quite different from *Antrodia serialis*. It was annotated "= *Poria undata* Pers. omnino!" by Bresadola (& cf. 1920: 67). Donk (1933: 159, 160, sub *Podoporia*) referred it to *Poria vitrea* (q.v.), but his conception of this species is that of a different fungus (see p. 122). *Polyporus frustulosus* possesses thick-walled, subclavate terminal bodies which are lacking in *Poria vitrea*.

The names *Polyporus frustulatus* Pers. and *P. undatus* Pers. were published simultaneously. When Bresadola (1920: 67) referred the former to the latter as a synonym, *P. undatus* (q.v.) became the name to be preferred where the two taxa are united.

Type.—L 910.263-535. "*Polyporus frustulatus*" (written by Persoon), sent by de Chaillot in 1821 (no. 62), "May, dans une cuve servant de citerne dans les montagnes, qui en étoit, toute ouverte intérieurement, & que l'on defaisoit, je n'en ai peu, malheureusement, sauver que quelques échantillons, il a quelque rapport avec celui de 1818 = 39, que vous avez appelé [*Boletus*] *undatus* mais il m'en paroît distinct." Persoon's protologue remarked, "Etiam¹³ prope Neocomium, mense Majo, in cupa seu cisterna, quam interne totam explevit, observatus, hinc, uti duae antecedentes species [*Polyporus scalaris* Pers., *P. undatus* Pers.], similem amare videtur locum . . ."

fuliginosus, *Boletus*, Schleich., see *Polyporus cribrosus* Pers.

laneus. — *Polyporus laneus* Pers. 1825: 112.

The type is still in existence and has been studied by several mycologists, for instance Lloyd (1910: 472, as "laurens"), who stated that, "It is resupinate *Polyporus amorphus*", a conclusion also accepted by Donk (1933: 166, 167, sub *Gloeoporus*). The species is now often called *Skeletocutis amorphus* (Fr. per Fr.) Kotl. & P.; it usually forms pileate fruitbodies.

¹³ In this case 'etiam' is to be translated as 'like the preceding species, *Polyporus undatus*'.

Type.—L 910.277-263 in Herb. Persoon. "*Polyporus laneus*. Myc. Europ. 2 / Prope Neuchatel (Chailliet)" (written by Persoon). "*Boletus vitraeus* Pers.? [non] / Seroit ce le Veritable: / Entre le bois et l'Écorce d'un Sapin. 1882 = 29" (written by de Chailliet). Persoon placed "non" after de Chailliet's determination. — Annotated by Lloyd, "This is same as resupinate *Polyporus amorphus* Fr. or [*P.*] *aureolus* Pers." — Annotated by Romell, "... *Pol. laneus* Pers. est probabiliter *Polyp. amorphus*..."

medulla-panis. — *Boletus medulla-panis* Jacq. 1778: 141 pl. 11 (devaluated name); *Poria medulla-panis* (Jacq.) Pers. 1794: 109 (devaluated name), *Polyporus medulla-panis* (Jacq.) per Fr. 1821: 380; *Poria medulla-panis* (Jacq. per Fr.) Cooke 1886; *Perenniporia medulla-panis* (Jacq. per Fr.) Donk, this paper p. 76; ≡ *Poria medullaris* S. F. Gray 1821.

When Jacquin published the name *Boletus medulla-panis* he thought that he recognized his fungus in one described by Micheli in pre-Linnaean times: "Est *Agaricum terrestre, medullam panis referens*, Micheli pag. 121. tab. 63 fig. 2, nomen triviale mutuavi." The identity of Micheli's and Jacquin's fungus has never been satisfactorily established and it may well be doubted whether they belong to the same species. Donk (1960: 266) has chosen Jacquin's fungus (represented by Jacquin's plate) as type of the binomial *Boletus medulla-panis* Jacq.

The species is generally understood in the sense of Persoon; according to Donk (l.c.) it is not unlikely that this is the correct interpretation. He is also of the opinion that Fries definitely included Jacquin's fungus in his conception when he revaluated the name, which, therefore, retained its type. This opinion was a reaction against another one (subscribed to, for instance, by Donk, 1933: 234) that it was both impossible to form an opinion about the identity of Jacquin's fungus and to guess what species Fries had in mind in 1821. In view of Fries's text this latter point is of little importance in this case.

When accepting Persoon's genus *Poria* (and revalidating this generic name) Gray changed the specific name used by Persoon into *Poria medullaris* S. F. Gray. As this is a mere change of name, without exclusion of the type, it must be added to the string of isonyms of which *Boletus medulla-panis* Jacq. is the ultimate (devaluated) basionym.

The modern conception started with Bresadola (1897: 84), who used the name "*Poria medulla-panis* Pers. Syn. p. 544! (nec Fr.)", based, *inter alia*, on a study of several specimens in Persoon's herbarium: he clearly indicated that he took the species in Persoon's sense. The limits of the species vary with the author; Bourdot & Galzin (1928: 684) favoured a broad conception, others (Lowe, 1966: 110) exclude as distinct *Poria tenuis* (Schw.) Cooke, and as a variety of it *Poria pulchella* (Schw.) Cooke, with *P. vitellinula* (P. Karst.) Egeland and other names as synonyms. It is, therefore, important to know what precisely Bresadola had in mind, and consequently which of Persoon's specimens will have to be selected as neotype. His 'observation' follows:—

"Species haec, omnium comunissima in Europa media, videtur in Succia deesse, nam neque in Herbario Friesii, neque in collectione Romellii inveni. ¹⁴ Perennans est, stratosae, poris angulatis, mediis, integris, saepe obliquis; sporis obovatis, uno apice truncatis, hyalinis, $5-6\frac{1}{2} = 5\frac{1}{2}-5\ \mu$ una alterave etiam subangulato-polygonali; hyphis subhymenialibus, $1\frac{1}{2}-2\ \mu$. [. . . ad ligna et truncos *Quercus* et *Populi tremulae* pr. Prencov.] Ego legi in *Fraxino*, *Ceraso*, *Olea* etc. In Herbario personiano plura adsunt specimina cum nostris prorsus identica."—Bresadola (1897: 84).

During the past few decades this species has also been called *Poria unita*, incorrectly so it would appear (see p. 116).

It is not surprising that the name *Boletus medulla-panis* has been variously applied. One of the first obvious misapplications is by Sowerby (1801: pl. 336); it was named *Polyporus rangiferinus* Persoon (1825: 114). To Fries (1828: 122) Sowerby's fungus was *Polyporus vaillantii* (DC.) per Fr., "optime"; this identification I cannot share and to me *P. rangiferinus* remains a nomen dubium.

According to Bourdot (1932: 231):—

"Romell pensait que la plante de Fries pouvait représenter des formes réupinées de *Trametes* [= *Heterobasidion*] *annosa*: il y a, en effet, déterminés par Fries comme *P. medulla-panis*, des spécimens de *Tr. annosa* envoyés par Karsten [cf. Romell, 1912: 639]. Mais comment concilier cette interprétation avec le mot *annuus* et le synonyme *P. bibulus* Pers., cité par Fries ?"

Some additional information on Fries's conception was published by Lundell (1953: 3 No. 2103):

"There is only one specimen of *Polyporus medulla-panis* in the Fries herbarium named by Fries himself, viz. one collected by H. v. Post at Rejmyra and thus dating from the period 1852-1869, when v. Post lived there. This specimen is *P. pubescens* Schum. ex Fr. — The illustration in Fries, Icon. sel. II tab. 190: 2, looks very strange. I guess it represents an aberrant form of *P. annosus* Fr."

These 'post-starting-point' determinations by Fries are of little importance as long as they fail to elucidate what he had attributed to *Polyporus medulla-panis* in the "Systema".

Bourdot (1932: 231) published a British interpretation as *Poria medulla-panis* "Fr. non Pers." As far as I am aware there is little, if any, evidence that this was really a 'Friesian' interpretation and the conception was later on rechristened *Poria pearsonii* Pilát. It is close to, if not conspecific with, *Poria* [*Oxyporus*] *corticola* (Fr.) Cooke according to Lowe (1966: 19).

The following enumeration lists the specimens (except one, L 910.263-835) in Herb. Persoon, portions of which were sent to Bresadola in 1895; they agree with Bresadola's conception 'sensu stricto'.

L 910.263-832. "*Polyporus Medulla Panis*."

L 910.263-837. "*Polyporus Medulla Panis*. Mycol."

L 910.277-211. "*Boletus Medulla Panis* (mihi) / Prope Parisios."

¹⁴ But compare Romell (1912: 639): "There is no doubt, however, that Persoon's plant occurs in Sweden. I have collected it at least four times, viz. at Femsjö . . . In all these places it grew on old stubs of oak."

L 910.263-895. "*Polyporus medulla Panis* ? var. / (Prope Parisios)." — There are two pieces glued to the sheet, a thin one ("junior") and a thicker ("magis adulta") piece. Of each a fragment was sent to Bresadola.

L 910.263-833. "*Polyporus Medulla Panis*" (written by Persoon). "Sur les Planches cariées des..." (written by Delastre). — A myriadoporous form.

L 910.263-831. "*Polyporus [Medulla Panis (mih)]* / Sur bois de charpente; souvent dans les serres sur les bois qui se pourrissent" (written by Desmazières, except for the determination between square brackets, which is an addition by Persoon).

medullaris, see medulla-panis.

megaloporus. — *Polyporus megaloporus* Pers. 1825: 28; not ~ Mont. 1854; *Poria megalopora* (Pers.) Cooke 1886.

The material cited with the original description was mentioned as "Ad trabes in cryptis repertus in Vogesia a cl. Mougeot, et Lilloae plerumque ad portas cellarum, passim quoque ad ligno sub dio a D. Desmazières." Specimens from both collectors have been preserved. It is quite likely that when Persoon prepared the account of this species for publication he had received only one lot sent by Desmazières, and that this (L 910.263-903) was not named by its collector. Later on a second lot was sent by Desmazières (L 910.263-99) bearing the name *Boletus expansus* Desm. (q.v.) which apparently induced Persoon to enter this denomination together with the name *Polyporus megaloporus* on the labels of his specimens. In any case it is quite evident that he fully accepted the identity of the two names. Donk (1933: 228) and recently Jahn (1967: 100) recognized the priority of Desmazières's name.

The inclusion of the species in *Phellinus* Quél. (Hymenochaetaceae) is not easily defended. Except for the dark colour and perhaps the general aspect there is nothing in respect to microscopical characters even remotely suggestive of that genus.

Specimens in Herb. Persoon are:—

Lectotype.—L 910.263-903. "*Polyporus megaloporus*" / "Inventus ad ligna tignaria (charpente) a Desmazières / Lilloae" (written by Persoon). — A fragment was seen by Bresadola (1895). One of the labels accompanying this specimen is a rather lengthy note by Desmazières; it begins thus, "No. 11. Polypore ?..." There are certain discrepancies between this note and the specimen, particularly if Desmazières's note to his "No. 12" is taken into consideration (see next specimen). Finally I recalled where I had read it before: the note reappears slightly reworded on the printed label of the type distribution of *Polyporus cellaris* Desm. (q.v.). Note and material evidently got mixed up; the former should not be taken into account in connection with the material it accompanies.

Other specimens.—L 910.263-99. "No. 12. *Polyporus* ou *Boletus expansus* de mon Cat. des pl. omises page 19 (petit fragment)" (written by Desmazières). Desmazières added some remarks on his "No. 11", for which see under 'expansus'. — In the comment on the preceding specimen, it is explained that the note pertaining to "No. 11" is attached to the wrong sheet and that it belongs to *Boletus cellaris* Desm. (q.v.) = *Phellinus contiguus* (Pers. per Fr.) Pat. The present specimen ("No. 12") may be considered part of the type collection of *Boletus expansus* Desm. — Not annotated by Persoon.

L 910.263-907. "*Boletus [Speluncae] / Polyporus megaloporus* / in lignis putridis Cryptarum / [E Vogesia]" (written by J. B. Mougeot; the words between brackets added by Persoon). — One piece was sent to Bresadola for study (1895). — This is *Poria expansa*.

L 910.263-901. "*Polyporus megaloporus* Myc. Europ. 2. p. 88. / *Boletus expansus* Desmaz." / "In Vogesis" (both labels written by Persoon). — A piece cut off from the fruitbody was studied by Bresadola (1895). — This is *Poria expansa*.

L 910.263-826. "*Polyporus megaloporus* P. / *extensus* Desmaz." (written by Persoon). — Two small pieces were studied by Bresadola (1895). The epithet "extensus" must have been a slip of the pen for 'expansus'. Annotated by Donk (ca. 1930) "*Poria megalopora* (P.) Bres." — This is also *Poria expansa*.

L 910.263-526. "*Polyporus extensus* Desm. / *megaloporus*" (written by Persoon). — Here again the epithet "extensus" must have been a slip of the pen for 'expansus'. The portion studied by Bresadola (1895) was annotated by him thus: "Videtur fragmentum hymenii *Polyperi vegeti*, atquia sporae nullae vix determinandus." Old pieces of hymenophore showing, at least in one piece, two distinct layers. The hyphae as well as the complete lack of *Ganoderma* or other spores suggest that this is again *Poria expansa*.

L 910.277-271. "*Polyporus megaloporus* ? / seu *expansus* Desmaz. ?" (written by Persoon). — The portion studied by Bresadola (1895) he annotated thus: "*Polyporus contiguus* Pers. forma ? certe non *megaloporus*." — *Phellinus* cf. *ferruginosus* (Schrad. per Fr.) Pat. sensu Bres. (no spores seen).

L 910.263-905. "Dept de la Vienne / Sur les planches d'un vieux banc exposé a l'air" (written by Delastre, not "mis. Desmaz." as was written by the person who mounted Persoon's herbarium at Leiden). — A very poor initial stage of a fruitbody was sent to Bresadola (1895), who did not annotate it. — This is *Phellinus contiguus* (Pers. per Fr.) Pat.

m i c a n s. — *Poria micans* Ehrenb. 1818: 19, 30 (devaluated name); *Polyporus micans* (Ehrenb.) per Fr. 1821; *Poria micans* (Ehrenb. per Fr.) Cooke 1886.

Bresadola (1897: 93) used the name *Trametes micans* (Ehrenb. per Fr.) Bres. for the species that has also been known as *Polyporus albo-carneo-gilvidus* Romell, and that is now often called *Pachykytospora tuberculosa* (Fr.) Kotl. & P. This conception Bresadola defended thus: "Ego specimina authentica ex herbario Ehrenberg in Museo berolinensi asservata et ad *Quercus* quoque lecta vidi, quae cum nostris exacte conveniunt, saltem cum speciminibus junioribus, nam exemplaria originalia omnia statum juniorem sistunt."

Romell (1926: 22) disagreed: "... I have microscopically studied one of the poor fragments still existing of Ehrenberg's specimen of *Poria micans*. It has cystidia, and these and the hyphae agree with those of *Poria nitida* Pers. (... = *eupora* Karst.)." In accepting this conclusion, *Polyporus micans* (Ehrenb.) ex Fr. and *P. nitidus* (Pers.) per Fr. appear to be simultaneously revaluated names for the same species. By listing the former as synonym of the latter (see p. 100) *Polyporus nitidus* becomes the correct basionym for the species so often called *Poria eupora*.

Fries merely compiled Ehrenberg's species, without having seen it himself; however, in later work he added a few words which indicate that he misapplied it (cf. Romell, 1926: 6, 13).

m o l l u s c u s. — *Boletus molluscus* Pers. 1801: 547 (devaluated name); *Polyporus molluscus* (Pers.) per Fr. 1821; *Poria mollusca* (Pers. per Fr.) Cooke 1886.

According to the type and two additional specimens Persoon's species is to be taken as conspecific with *Poria candidissima* (Schw.) Cooke. The same species has

also been called *Poria subtilis* (q.v.), a tradition based on Bresadola (1897: 88) and accepted by Bourdot & Galzin (1928: 656).

In my opinion Bresadola committed an error when he annotated the type of *Boletus molluscus* (L 910.270-437) thus: "typus, sed non *Poria subtilis* (Schr.) Bres. ut vult Romell." Romell (1926: 23) suggested another of Persoon's specimens as type (L 910.262-887); this also represents *Poria candidissima* = *P. mollusca* in the sense of the type, but it was determined by Persoon long after he had published the name *Boletus molluscus* so that it cannot be accepted as type.

The currently accepted interpretation of *Poria mollusca* was established by Bresadola (1897: 86; 1903: 79). It may have been based on specimens in Persoon's herbarium other than the specimen marked 'type' by Bresadola himself and wrongly determined by him, as stated above. Bresadola's conception became firmly entrenched, not in the least because it was accepted by Bourdot & Galzin (1928: 671), who published an amplified description. It is regrettable that further use of the name *Poria mollusca* in this sense is untenable. The correct name for *Poria mollusca* sensu Bres. under *Poria* appears to be *Poria mucida* (q.v.), another name misinterpreted by Bresadola. What he called *Poria mucida* is the species now often referred to as *Poria versipora* (Pers.) Lloyd; in this paper it is called *Schizopora paradoxa*.

It appears from specimens in Persoon's herbarium that for some time he considered *Boletus byssinus* Schrad. to be the same as his own *B. molluscus*. In at least four cases he wrote '*Boletus byssinus*' on herbarium labels of specimens he actually identified as *Boletus* (or *Polyporus*) *molluscus* (cf. L 910.262-887, L 910.262-868, and L 910.263-959, all listed below). The first two of these confirm the interpretation of *B. molluscus* in the sense of the type since they again represent *Poria candidissima*. Bresadola's application of the name *Poria byssina* for the same species may well have been influenced by this material.

Persoon's conception of his own *Boletus molluscus* and of *B. byssinus* was not consistent throughout his long career as an active mycologist. Some of his specimens represent *Poria vulgaris* sensu Bres. and since Persoon associated these specimens not only with the name *Boletus molluscus* but also with *B. byssinus* as indicated above, the denomination *Poria byssinus* "Pers." has occasionally been used for *Poria vulgaris* sensu Bres.; this is discussed more fully under *Poria byssina* Romell (q.v.). It would seem that when he published for it the name *Polyporus molluscus* var. *fissus* Persoon (1825: 108) Persoon finally wished to separate this second element more clearly from his original conception.

There seems to be no information available as to the identity of the specimens Fries (1821: 384) had seen ("v.v.") when he revalidated Persoon's name as *Polyporus molluscus* in the "Systema". The accompanying description was evidently drawn up mainly as a modification of Persoon's original one and it is just vague enough to make recognition of *Poria candidissima* in it possible if this is desired. I can see no objection to retaining Persoon's type for the revalidated name. According to Lowe (1966: 61), a collection at Kew, identified by Fries, is mixed and is probably *Poria luteo-alba* (P. Karst.) Sacc. and *P. vaillantii* (DC. per Fr.) Cooke.

Lowe (l.c.) has chosen for "lectotype" a specimen "that agrees most closely with the published account of the microscopic characters" (apparently by Bresadola, 1903: 80), viz. "Eichler No. 38, in the Bresadola material at the Riksmuseum (S; BPI; SYRF)." This selection of a neotype had in view the conservation of a misapplied name, a practice not favoured by the Code, particularly when type material of the name is still in existence.

From the preceding remarks it follows that *Poria candidissima* \equiv *Polyporus candidissimus* Schw. 1832 is not the earliest published name for the species for which it now stands. One of the earlier names is *Polyporus molluscus* (Pers.) per Fr. 1821, and the other is *Polyporus subtilis* (Schr.) per Fr. 1821 (q.v.), if one is inclined to accept Bresadola's interpretation of it. Both were published simultaneously in the starting-point book. A choice between these two has to be made. I have long hesitated about whether or not to reject *Polyporus molluscus* as a nomen ambiguum. However, it is convenient to have resource to an early name that is associated with a type specimen. This cannot be said of *P. subtilis*; in addition its true identity may well be doubted (see p. 111). It is with great reluctance that I renounce the name *P. candidissimus* and select *P. molluscus* to replace it. An extenuating circumstance is that the species is now often kept separate from *Poria* and in the new combination to be introduced for it will perhaps not at once call to mind *Poria mollusca* sensu Bres. The genus in which the species has found a place is *Cristella* Pat. 1887, which comprises a considerable range of hymenophore configurations, from 'smooth', granular, toothed, to poroid. It is conceivable that in the future the poroid species will be segregated from *Cristella*, in which case the name *Trechispora* P. Karst. 1890 (see p. 64) is perhaps available. I am not prepared to accept this last course, hence the name ***Cristella mollusca*** (Pers. per Fr.) Donk, *comb. nov.*, basionymum, *Polyporus molluscus* (Pers.) per Fr., *Syst. mycol.* 1: 384. 1821 \equiv *Boletus molluscus* Pers., *Syn. Fung.* 547. 1801; synonyma, *Polyporus subtilis* (Schr.) per Fr. 1821 et *Polyporus candidissimus* Schw. 1832.

The following specimens represented in Herb. Persoon may be listed:—

Type.—L 910.270-437. "*Boletus (Poria) molluscus* Syn. Fung. p. 547" (written by Persoon). — Both Lloyd and Bresadola took this specimen as type, as is shown by their accompanying annotations. Lloyd: "This is the type." Bresadola: "typus! sed non = *Poria subtilis* (Schr.) Bres. ut vult Romell." Annotated by Donk (1932), "= *Poria candidissima* (Schw.) . . .".

Other specimens.—L 910.262-868. ("*Boletus byssinus* Schrad. ?) / *Polyporus molluscus* Mycol. Europ. 2. p. 108. / Omnia haec individua varietates unius ejusdemque speciei videntur" (written by Persoon). — Determined by Donk (1931) and by Eriksson (1946: 5) as *Poria candidissima*.

L 910.262-887. "*B. byssinus* Schrad. / *Boletus molluscus*. Syn. fung." (written by Persoon). "Sapin. May: 1823 = 38. / *Boletus subtilis* Syn. . . ." (written by de Chaillat). Rather copious material, well preserved in some places, of *Poria candidissima*; so annotated by Donk (1931) and so named by Eriksson (1949: 5).

L 910.277-272. "*Boletus molluscus*" (the first word written by J. B. Mougeot, the second, by Persoon). — Evidently a specimen that reached Persoon after he published his "Synopsis Fungorum". Determined by Bresadola (1912) "= *Poria vulgaris* Fr.", which means *Poria vulgaris* Fr. sensu Bres.

L 910.277-1040. "*Polyporus molluscus*" (written by Persoon), "forêt de Châtellerault" & "Poitou / a. sur le bois nud [!] du chêne. / b. Sur l'écorce. id." (written by Delastre). — Annotated by Bresadola, "a) = *Poria viridans* Berk. / b) = *Poria mucida* Pers. ? / Iste specimen non *typus*, qui ad ligna *Pini* (Cfr. Syn. fung.!) vigit." Specimen b is in my opinion *Poria versipora* (Pers.) Lloyd = *Schizopora paradoxa* (Schrad. per Fr.) Donk.

L 910.263-959. "*Polyporus trivialis* (Poria) / a. *B. molluscus*. Syn. fung. / β. *B. mucidus* Syn. fung. / Huc [?] *Boletus byssinus* Schrad. / Frequens prope Parisios ad ramos dejectos autumnis." — It is not indicated whether this specimen is representative of the first or the second 'variety'. At this stage Persoon had apparently given up attempting to distinguish between the two species mentioned as varieties, and (in herbario) he combined them under a new name, *Polyporis trivialis*. — A rather mature specimen of *Poria vulgaris* sensu Bres.

There are still other specimens with labels bearing the name *Polyporus molluscus* but on these the name is followed by interrogation marks. For the specimens named *Polyporus molluscus* var. *fissus* Pers., see under 'byssinus'.

m o l l u s c u s (bis). — *Bjerkandera mollusca* P. Karst. 1887a: 9; 1887b: 80.

Lloyd (1915: 382) thought that this "from description appears to be the white form of *Polyporus* [*Skeletocutis*] *amorphus*." This suggestion seems reasonable and was accepted by many subsequent authors.

A quite different identification was made by Lowe (1956: 101): "The type packet contains several pieces of a small polypore, much discoloured and deformed on drying. . . . The specimens are abundantly fertile and the fungus appears to be the same as *Physiporus aurantiacus* var. *saloisensis*", which is the same as *Poria aurantiaca* (Rost.) Sacc. sensu Bres. (p. 80). Here, I believe, an error crept in. Karsten not only described the species as pileate (a condition *sine qua non* for species he placed in *Bjerkandera* P. Karst.) while *P. aurantiaca* is 'resupinate', but in many other points also his description does not agree with Lowe's suggestion; compare, "Alba. Pileus carnosus, gelatinoso-mollis, effuso-reflexus . . . *Bjerkandera chioneae* (Fr.) affinis."

m u c i d a. — *Poria mucida* Pers. 1796: 87 (devalidated name); *Boletus mucidus* (Pers.) Pers. 1801 (devalidated name); *Polyporus mucidus* (Pers.) per Fr. 1821; *Poria mucida* (Pers. per Fr.) Cooke 1886.

Bresadola (1897: 84) started a tradition of using the name *Poria mucida* for the species now often known as *Poria versipora* [= *Schizopora paradoxa*; cf. p. 104]. It was in this sense that the name was applied by Bourdot & Galzin (1928: 680), who furnished a full description and outlined its variability. As has been pointed out by Romell (1926: 14) and Donk (1933: 224-227) this use of the name is untenable. Persoon's type of *Poria mucida* belongs to a quite different species, now often called *Poria mollusca* (Pers. per Fr.) Cooke sensu Bresadola (1897: 86). I am under the impression that this confusion was somehow a slip of the pen caused by a transposition by Bresadola of the epithets 'mucida' and 'mollusca'.

Romell (1926: 23) did not like the epithet 'mucida' for the last-mentioned of these species since to him it meant mucous, slimy. Clearly Persoon wanted to indicate some other quality of the fungus the fruitbody of which he described in the original

description as "carnoso-suberosa". It is thus evident that he attached a different meaning to the word, such as 'soft'.

Restoring Persoon's name in its correct sense (as I do here) will undoubtedly be a source of confusion for a long time to come. Yet during the past thirty years the use (in the incorrect sense introduced by Bresadola) of the name *Poria mucida* has declined surprisingly rapidly with the almost general acceptance of the name *P. versipora* for the fungus Bresadola had in mind; at present the name *P. mucida* is perhaps felt to be far less of a nomen ambiguum.

American mycologists have considered *Poria myceliosa* Peck to be distinct, although closely related. Overholts (1942: 33) remarked that it is "quite similar to *P. mollusca* but differs in the abundant development of rhizomorphs and in lacking the incrustations on the hyphae of that species", hardly impressive features for specific distinction if it is borne in mind that *P. mollusca* may produce rhizomorphs. Lowe (1946: 70, 73) stated that *P. myceliosa* was so similar to *P. mollusca* sensu Bres. that it was difficult to maintain the segregation. North American material determined as *Poria myceliosa* by Lowe, however, is quite different from *Poria mollusca* sensu Bres. (= *P. mucida* sensu originario). For instance, the spores do not agree; they are distinctly amyloid, as was pointed out by Wright (1964: 785). This induced the transfer of *Poria myceliosa* to *Anomoporia* Pouzar (1966: 172).

The difficulty that arises if the name *Poria mucida* is rejected as a nomen ambiguum is that there appears to be no other name available for the species. To continue the use of the name *Poria mollusca* Pers. sensu Bres. would be untenable, the more so as in this paper the name *Poria mollusca* (q.v.) is restored (as *Cristella mollusca*) for what has often been called *Poria candidissima*.

Poria mollusca Pers. sensu Bres. [= *Poria mucida* (Pers. per Fr.) Cooke in the sense of the type] is the type species of *Fibuloporia* Bond. & S. ex Sing.

Specimens in Herb. Persoon worth mentioning are:—

Type.—L 910.277-281. "*Poria mucida* Obs. Mycol. 1. / *Polyporus mucidus* Mycol. Europ. 2. p. 107. An diversus a *P. fimbriato*?" — Studied by Bresadola (1895). Annotated by Donk (1931): "non *Poria mucida* Pers. sensu Bres.! sed *Poria mollusca* Pers. sensu Bres."

Other specimens.—See L 910.263-959 quoted under *Polyporus mollusca*.

L 910.277-261. "*Polyporus (Poria) mucidus* γ. *subreflexus*. / Prope Parisios (Sylv. Vincennes)" (written by Persoon). — Studied by Bresadola (1895), but not annotated by him. The specimen dates from long after the publication of the name, after Persoon had moved from Germany to France. It is poorly dried and badly preserved. This seems to be *Poria vulgaris* Fr. sensu Bres. = *Poria romellii* Donk.

nitidus. — *Poria nitida* Pers. 1799: 15 pl. 14 f. 1 (devaluated name); *Polyporus nitidus* (Pers.) per Fr. 1821; *Poria nitida* (Pers. per Fr.) Cooke 1886.

Persoon's protologue (including a coloured figure) as well as the specimen cited below in his herbarium leave no doubt about the identity of *Poria nitida*. According to Romell (1911: 12) and Bourdot & Galzin (1928: 690) this name was applied by Quélet (1888: 581) to the species that is now usually called *Poria eupora* (P. Karst.) Cooke and that appears to be the same fungus as Persoon's species. Lloyd (1910:

472), Bresadola (in herb.), and Donk (1933: 217, 226), who all studied the type of *Poria nitida*, agree in considering *P. eupora* the same species. Romell (1926: 10) showed that he was also aware of the identity of the type.¹⁵ Egeland (1914: 150) returned to the use of the name *Poria nitida*, citing *P. eupora* as synonym.

Fries's account in the "Systema" (1821: 379) does not oppose keeping up the type. According to Romell (1911: 12; 1926: 11) the few specimens in Fries's herbarium that were referred to *Polyporus nitidus* are a diverse lot; none of them is *Poria eupora*. In later years Fries confused *Poria nitida* with the related *Polyporus collabens* Fr. (see p. 107); compare also Fries (1874: 571) under *Polyporus blyttii*, "Species pulchra, *P. nitido* (ut videtur) proxima", a remark that still holds good since the types of these two names belong to the same species.

Some misinterpretations are worth mentioning. The identity of *Poria nitida* sensu Boudier (1904-11: 82 pl. 160) is in my opinion not yet satisfactorily solved. [Compare *Oxyporus obducens* (Pers.) Donk ?] Bresadola (1903: 77) used *Poria nitida* for the species that is now generally called *Poria aurantiaca* (Rostk.) Sacc. (q.v.), but after he had studied in 1912 the type and the other specimen in Herb. Persoon cited below he finally applied the name correctly (Bresadola, 1920: 68).

Considering that there is no serious objection to typifying the name *Polyporus nitidus* (Pers.) per Fr. by the type of the devaluated basionym, and that it has been correctly (although sparingly) interpreted thus throughout its existence, I feel no hesitation in maintaining it against *Poria eupora*, and also against the simultaneously published (revalidated) *Polyporus micans* (Ehreb.) per Fr. (q.v.). Since I recognize *Chaetoporus* P. Karst. as a good genus (see p. 71) the following recombination is proposed: **Chaetoporus nitidus** (Pers. per Fr.) Donk, *comb. nov.*, basionym, *Polyporus nitidus* (Pers.) per Fr., Syst. mycol. 1: 379. 1821 ≡ *Poria nitida* Pers., Obs. mycol. 2: 15 pl. 4 f. 1. 1799.

Type.—L 910.277-324 in Herb. Persoon. "*Boletus (Poria) nitida*. / *Polyporus nitidus*. Mycol. Europ. 2. p. 95. / Germania" (written by Persoon). — Annotated by Bresadola in 1912: "*Polyporus (Poria) nitidus* Pers. 1799 typus ! / Idem: *Poria eupora* Karsten 1868!" Lloyd added, "This is *Poria eupora* Karst. It has abundant cystidia !! Not *nitidus* of Fries but is the type of *nitida* Persoon which name can [be] maintained on this specimen." Determined by Donk (1932) as *Poria eupora*. A good specimen in good condition.

Other specimens.—There are a few collections Persoon referred with an interrogation mark to *Poria nitida*. One of these may be separately mentioned:

L 910.277-270. "*Polyporus nitidus* ? / — *molluscus* var. ?" (written by Persoon). — Annotated by Bresadola in 1912, "*Poria nitida* Pers.! prorsus = typus!"; by Romell, "... = *Poria eupora* Karst."

o b d u c e n s. — *Polyporus obducens* Pers. 1825: 104; *Poria obducens* (Pers.) Cooke 1886; *Oxyporus obducens* (Pers.) Donk 1933.

¹⁵ Romell (1911: 12) had previously studied two collections in Persoon's herbarium; these he referred to *Polyporus euporus*; one of them was labeled "*Polyporus nitidus* ? / — *molluscus* var. ?", the other shows no indication that Persoon had thought of *P. nitidus*. However, on that occasion Romell missed the type of *Poria nitida*.

No specimen could be located in Persoon's herbarium; the type collected by "Schwägrich" [C. F. Schwaegrichen], presumably in Germany, may be considered lost unless a portion of it is still present in UPS. Fries (1874: 577) wrote, "*P[olyporus] obducens*. . . Pers. Myc. Eur. 2. p. 104 (fide specim.)"; his phrase agrees well with the modern conception and he thought it was related to *Polyporus connatus*.

Although not quite conclusive, Persoon's protologue is sufficiently detailed to make it possible to accept Bourdot & Galzin's broadened interpretation (1928: 570 f. 165) as almost certainly correct. These authors, like Fries, were aware of the close relationship with *Coriolum connatus* (Weinm.) Quél. [= *Oxyporus populinus* (Fr.) Donk] and they even made it a subspecies of this usually pileate taxon. They advanced several indications by which the two could be kept apart.

Donk (1933: 203) considered Bourdot & Galzin's 'forma *annosa*' to be the typical one: Persoon stressed that the fruitbody was widely effused and thick (hence apparently many-layered) without formation of a subiculum ("ex solis tubis teneribus densis, 1½ lin. altis formatis"). It is likely that apart from Fries's interpretation Bresadola's (1897: 85) also agrees with this form ("Fungus annosus stratosus rudimenta pilei fere semper ostendit"), but he gave the spores as globular and 4 µ in diameter, rather than somewhat ellipsoid and slightly longer, as is normal for *Oxyporus obducens*.

ONUSTUS. — *Trechispora onusta* P. Karst. 1890: 147; *Poria onusta* (P. Karst.) Sacc. 1895.

It is now agreed that *Trechispora* must be so typified that the type specimen conforms with the generic protologue, which mentions the spores as echinulate; this is clearly substantiated by the meaning of the generic name. This lectotype has been chosen by Rogers (Lowe, 1956: 123) and *Trechispora onusta* is now identified with *Poria candidissima* (Schw.) Cooke (= *Cristella mollusca*; cf. p. 97). Authors who include this species in one genus with Bourdot & Galzin's 'Humicola' groups (e.g. of *Corticium* Fr. sensu lato) now usually call the genus *Cristella* Pat. emend. Donk (1957b: 19). Replacement of *Cristella* by *Trechispora* in the sense of the type has been advocated by Liberta (1966), but this is nomenclatively not defensible (Donk, 1952; 1957b: 21). If *Trachyspora* Fuck. 1861 (Uredinales) is regarded as a mere 'variant spelling' this would also make *Trechispora* P. Karst. a later homonym.

Misnamed material distributed by Karsten, from which Rogers (1944: 82) chose a (now rejected) lectotype, has given rise to serious confusion. To Bresadola (1908: 41) *Trechispora onusta* was a species with smooth spores ("minutissime asperulae vel laeves") and apparently uniform basidia; accordingly he identified material from France collected by Galzin as *Poria onusta*. Bourdot & Galzin (1928: 658) published an improved description under this name, which came to be accepted for a poroid species belonging to *Sistotrema* Fr. emend. Donk, until Rogers and Lowe (see above) appointed an improved lectotype that was in agreement with the protologue. In the meantime the generic name *Trechispora* was applied by Rogers (1944: 73) and others to the resupinate species of *Sistotrema* only, an emendation that lost its support when the new lectotype was designated.

On a previous occasion Donk (1956b: 8) had concluded that the species with uniform basidia that is erroneously identified with *Trechispora onusta* has no correct name. As far as I am aware none has as yet been published. To fill this gap one is provided herewith. The new species is so modelled that it closely agrees with Roger's account of it, the Latin phrase given below being an adaptation from that part in his key where the species is differentiated from the other resupinate porias with uniform basidia, viz. *Poria albopallens* Bourd. & G. and *P. albolutea* Bourd. & G. He also depicted some details of the type.

Sistotrema eluctor Donk, *nov. sp.*, a speciebus aliis *Poriam* aemulantibus et basidiis uniformibus instructis combinatione characterum sequentum differt: basidia parte distali breviter cylindrica, sporae subglobosae vel late ellipsoideae, $5-7 \times 4.5-6.5 \mu$, pori laete flavidi. — Typus: Finland (Mustiala, in Salice capr., P. A. Karsten, FH in herb. Patouillard (cf. Rogers in *Mycologia* 36: 82 f. 1a-c).

DESCRIPTIONS & ILLUSTRATIONS.—Bourd. & G. 1928: 658 (as *Poria onusta*), D. P. Rog. 1944: 80 f. 1 (as *Trechispora onusta*).

Confusion of *Sistotrema eluctor* with *Poria albolutescens* is discussed under the latter name.

orthoporus. — *Polyporus orthoporus* Pers. 1825: 91 (not definitely accepted as a distinct species).

Persoon introduced this name in an observation on *Polyporus undatus*. The type also came from de Chaillet, which means that it was found in Switzerland, presumably from near Neuchâtel. A 'description' of the 'species' is given by contrasting it with *P. undatus*, but the observation ends, "... (*Polyp. orthoporus*), quique aut junior est, aut aliam habuit positionem in tuborum directionem non ita agentem." These final remarks show that *P. orthoporus* was not really accepted as a distinct species. The type shows it to be *Polyporus undatus* Pers.

Type in Herb. Persoon.—L 910.263-843. "*Boletus orthoporus* / var. *Polypori undati*?" (written by Persoon).

paradoxus. — *Hydnum paradoxum* Schrad. 1794: 179 pl. 4 f. 1 (devalidated name); *Hydnum paradoxum* Schrad. per Fr. 1821: 424; *Irpex paradoxus* (Schrad. per Fr.) Fr. 1838; = *Sistotrema digitatum* Pers. 1801 (devalidated name).

There is no hesitation among modern mycologists about the species described by Schrader ("status vetustus", *vide* Bresadola, 1897: 101) and by Fries when he revalidated Schrader's name. In keeping with tradition, Bresadola (l.c.) tried to distinguish it from *Irpex deformis* (the latter with "*Polyporus radula* Autor. pl." as synonym), but he was well aware that the two were very closely related: "Species haec valde *Irpici deformi* Fr. proxima et vix e speciminibus siccis distinguenda." Under *Irpex deformis* he remarked (op. cit. p. 102): "Sporae ut in *Irpice paradoxo*, a quo vix specificè distinctus." He also tried, though not wholeheartedly, to keep *Irpex obliquus* apart: "... tamen vix vel parum ab *Irpice paradoxo* et ab *Irpice deformi* diversa. Specimina

vetusta vix distinguuntur." This was not all; in connection with *Poria mucida* Pers. [sensu Bres.] he (Bresadola, op. cit. p. 85) added one more 'species' to this aggregate: "In statu vetusto poris laceris ad *Irpicem deformem* Fr. transit, cui valde affinis." He added microscopical details, principally of the spores, of all these forms. His use of the name *Poria mucida* (q.v.) was an error. Modern mycologists now call it *Poria versipora* (q.v.).

Bourdot & Galzin (1928: 680) went one step further. They concluded from their enormous experience that these so-called species all belonged to a single species, *Poria mucida* [sensu Bres.]. To this species they appended a "Var. *radula*" (discussed in this paper under 'radula') and as mere forms, *Irpex deformis*, *I. obliquus*, and *I. paradoxus*.¹⁶ This new conception has been generally accepted in Europe, although the misapplied name *Poria mucida* was gradually but rapidly replaced by *Poria versipora*. This is the conception to which I subscribe. The hymenophore is notoriously very variable, its configuration wavering between typically poroid and typically irpicoid to nearly hydroid (but the 'teeth' are always flattened); microscopically there is surprising uniformity. Lowe expanded Bourdot & Galzin's conception still further by adding a few more European synonyms and others based on extra-European material. A number of these additions are not acceptable and recently Lowe (1963: 468; 1966: 62, 63) has again excluded some of them (as *Poria hypolateritia* Berk.), apparently reluctantly so. One reason for his increasing of the synonymy is that he has misunderstood the hyphal structure of *Poria versipora*, which is undoubtedly dimitic with skeletals (see p. 76).

The modern European conception of *Poria versipora* Pers. 1825 creates a nomenclative problem, for it is evident that it received many earlier specific names. The complex is treated in Fries's "Systema" (1821) under at least four different names. They are:—

- (i) *Polyporus cerasi* (Pers.) per Fr. sensu Fr. 1821: 382
- (ii) *Polyporus radula* (Pers.) per Fr. 1821: 383
- (iii) *Hydnum paradoxum* Schrad. per Fr. 1821: 424
- (iv) *Hydnum obliquum* Schrad. per Fr. 1821: 424.
- (v) *Hydnum pseudo-boletus* DC. per Fr. 1821: 424?

Of these, *Polyporus cerasi* (p. 86), a misapplied name, needs no further consideration. Of only one of the species has type material been preserved (*Polyporus radula*), but its name is currently used in two quite distinct interpretations (see p. 104). Of the remainder, *Hydnum paradoxum* and *H. obliquum* were both so well described by their author and by Fries that I feel that one of them should be selected. For a species often referred to *Poria*, the latter of these two names would become impriorable when transferred to this genus because of *Poria obliqua* (Pers. per Fr.) P. Karst. 1881. *Hydnum pseudo-boletus* is listed above because Fries (1828: 147) mentioned it as synonym of *Irpex deformis* on the occasion of the publication of the latter taxon.

¹⁶ *Poria mucida* subsp. *millavensis* Bourd. & G. is certainly a quite distinct species, with monomitic context and lacking clamps.

The description of *I. deformis* leaves little doubt about its specific identity with 'species' (i)-(iv). However, from a discussion it appears that Fries had his (apparently well-founded) misgivings about the correct identity of *Hydnum pseudo-boletus*, and had also thought of *Polyporus* [*Hirschioporus*] *abietinus* (Pers.) per Fr. in this connection. To my knowledge there is as yet no '*Poria paradoxa*' published; what is more, *Hydnum (Irpex) paradoxum* has not led to any far-reaching confusion. These few considerations are mentioned in support of the following recombination: **Schizopora paradoxa** (Schrad. per Fr.) Donk, *comb. nov.*, basionymum, *Hydnum paradoxum* Schrad. per Fr., *Syst. mycol.* 1: 424. 1821 ≡ *Hydnum paradoxum* Schrad., *Spic. Fl. germ.* 179 *pl.* 4. *f.* 1. 1794. — For the genus *Schizopora*, see page 76.

p u l c h e r. — *Xylomyzon pulchrum* Pers. 1825: 32 *pl.* 14 *f.* 1.

The type has been preserved: it shows *Poria taxicola* (Pers.) Bres. ≡ *Merulius taxicola* (Pers.) Duby with the hymenophore still in a more or less typical meruloid stage.

Fries (1828: 62) apparently did not know *Poria taxicola* at that time. His guess was that *Xylomyzon pulchrum* was *Merulius molluscus* Fr.

Specimens in Herb. Persoon are the following:—

Type.—L 910.277-359. "*Xylomyzon pulchrum.* / Neuchatel" (written by Persoon). "*Merulius rufus* [?] Pers. S. 498: 24. Seroit ce plutot le [*Merulius*] *serpens* Tod: Je l'ai trouvé en 8bre 1794. Depuis plus: je l'avait pris pour votre [*Merulius*] *destruens*" (written by de Chaillet). — Named by Romell: "*= Polyyp. haematodes* Rostk."

Other specimen.—L 910.277-368. "Neuchatel (Chaillet) / An *Xylomyzon pulchrum* junius ? (written by Persoon). — A fine specimen of *Merulius taxicola*.

r a c o d i o i d e s. — *Polyporus racodioides* Pers. 1825: 113; *Poria racodioides* (Pers.) Bres. 1897.

According to Bourdot & Galzin (1928: 625) and Donk (1933: 257, 258) this is a form of *Phellinus contiguus* (Pers. per Fr.) Pat.

Of two specimens in Persoon's herbarium the one taken as type shows some areas with pores, but the label does not bear an indication of the locality where it was found. The protologue states "Hab. in Gallia, prope Rouen. Béhéré". The locality indicated for the other specimen is in agreement with these data, but it does not bear pores. It is likely that the two came from the same collector.

Type.—L 910.263-484. "*Polyporus Racodioides.* Mycol. Europ. 2. p." (written by Persoon). — Annotated by Bresadola, "typus!"; and by Lloyd, "This the type".

Other specimens.—L 910.263-914. "*Boletus (Poria) Racodioides.* Mycol. Europ. / Ex Normannia / Prope Raltromagam (Rouen)" (written by Persoon). — Annotated by Bresadola, "*Polyporus racodioides* Pers. mycelium."

One other specimen (L 910.263-398) is here left out of account.

r a d u l a. — *Poria radula* Pers. 1799: 14 (devaluated name); *Polyporus radula* (Pers.) per Fr. 1821: 383; *Poria radula* (Pers. per Fr.) Cooke 1886; &

Poria radula Pers. sensu Bres. 1897: 87; *Chaetoporus radula* Pers. per Fr.) Bond. & S. 1941 ["*C. radulus* (Pers.) B.-S."] sensu Bres.; &

Poria radula Pers. sensu Quél. in herb.; *Poria mucida* var. *radula* Bourd. & G. 1925: 237; &

Poria radula Romell 1926: 16 ["Bres. (non Pers.)"; nomen provisorium]; = *Poria eupora* var. *subfimbriata* Romell 1926: 16.

Poria radula Pers. has given rise to at least two widely divergent interpretations. Bourdot & Galzin (1925: 237; 1928: 679, 681) reported under *Poria mucida* [sensu Bres. = *Poria versipora* = *Schizopora paradoxa*, q.v.] that "Les formes porées nous étaient communément déterminées par Quélet comme *Poria radula* et *Poria vaporaria*." On this basis they accepted a variety *Poria mucida* var. *radula*, citing as synonym, "*Poria radula* Quél. et Auct. pl., nec Bres." It is not evident from this citation that they excluded *Poria radula* Pers.; that this was in fact the case follows from their acceptance of a different species, which they called (Bourdot & Galzin, 1925: 235; 1928: 678), "*P[oria] radula* Pers., Syn., p. 547. — Bres. . . ." In this connection they remarked that, "Le *Poria radula* Quél. et Auct. Gall. est une espèce toute différente. Toutes les déterminations que Quélet nous a données comme *P. radula* tombent sur une simple forme de *Poria mucida* à pores élargis et dentés, qui mérite, mieux que la plante ci-dessus [*Poria radula* sensu Bres.], le nom de *radula*." In this way they established a new taxon, '*Poria mucida* var. *radula* Bourd. & G., non *Poria radula* Pers.', in which the hymenophore is not typically 'raduloid': compare, "Forme à pores alvéolaires, larges, à la fin dentés, passant à *Irpex paradoxus* ou *deformis*."

Another interpretation was launched by Bresadola (1897: 87) for a cystidiolate species close to *Chaetoporus nitidus* (q.v.). Anticipating some remarks made below I should like to emphasize that the species Bresadola had in mind has not typically 'raduloid' hymenophore either: "Species haec generatim cum formis junioribus *Irpicis deformis* Fr. confunditur; sed in *Poria radula* Pers. [sensu Bres.] pori magis regulares et molles . . ." Bourdot & Galzin (1925: 235; 1928: 678) accepted this taxon; their description of the pores shows that they correctly interpreted Bresadola's species, "pores 0,15–0,3 mm., anguleux, inégaux, à orifice entier ou brièvement cilié, mais bientôt à parois minces, flexueuses, élargis jusqu'à 1 mm. et déchirés . . .".

In discussing Bresadola's conception of *Poria radula* according to specimens Bresadola placed under this name, Romell (1926: 15) not only concluded that during the course of time various species had been included, but also that the one collection cited by Bresadola in 1897 ("ad truncos *Populi tremulae*, folia faginea" from near Prencov, labelled in the herbarium as "ad ligna *Populi* et folia *Fagi*" from Baniska) seemed "not to differ essentially from *Poria eupora* and it is not raduloid." In addition he introduced a taxon called *Poria eupora* var. *subfimbriata* Romell with "almost irpicoid" hymenophore and a margin of the fruitbody like that of *Porothelium* [= *Stromatoscypha*] *fimbriatum*; a taxon about which he stated that "In my opinion it should rather be held as an autonomous species, which could be called *Poria radula* Bres. (non Pers.)". This last name is evidently a nomen provisorium, hence, not validly published. These conclusions need comment.

From a nomenclative point of view it is not essential that, after having introduced his conception of *Poria radula*, Bresadola's determinations were inconsistent when

compared with what is undoubtedly the 'type' of his conception, viz. the above specified collection. It also appears that Romell incorrectly thought that the hymenophore of Bresadola's conception should be typically raduloid, and that he was in error when he tried to shift '*Poria radula* Bres.' to his new *Poria eupora* var. *subfimbriata*; the alternative specific name he proposed (but did not publish validly) for this variety should be readjusted to '*Poria radula* Romell, non Pers., non Bres.' This is not the occasion to judge the merits of the variety; however, it may be mentioned that the specimens on which Romell based it were referred by Lowe (1966: 114), unfortunately without comment, and by Bresadola himself (in herb.) to *Poria radula* sensu Bres.

Romell (1926: 15) already had concluded from a study of Persoon's specimens that the true *Poria radula* was apparently none other than *Polyporus versiporus*, a conclusion confirmed by Donk (1933: 226). This means that of the applications discussed above Quélet's came nearest to the truth.

As to Fries's conception in the "Systema" of *Poria radula* Pers. (in the sense of the type), Donk (1933: 226) once stated 'Was *Polyporus Radula* „Pers.” sensu Fr. (Syst. Myc. 1: 383) eigentlich ist bleibt fraglich'. This remark was due to the fact that, to his knowledge, Fries had not preserved specimens. A careful reading of Fries's description leaves very little room for doubt that at least he did include Persoon's species. In fact, it looks very much like a passable description of *Poria versipora* [= *Schizopora paradoxa*]. In any case, I can see no reason for not maintaining the type of Persoon's name for the name as revalidated by Fries as well.

As to *Poria radula* sensu Bres., this has recently been renamed *Chaetoporus separabilimus* Pouzar (1967: 210). This is a 'new' species; its author did not appoint as type the collection that was selected by Lowe (1966: 99) as "lectotype" [!] of "*Poria radula* (Pers. ex Fr.) Cooke": Baniska, 11 Aug. 1891, leg. A. Kmet, ad ligna *Populi* et folia *Fagi* (in herb. Bres., S), portions of which are also in BPI, NY, and SYRF. This would have made Bresadola's original conception identical with that of the *Poria radula* of many modern authors and with the new species as well. In this connection it should be pointed out that Bresadola (1903: 80; & cf. Lowe, 1966: 115, in obs.) had later corrected his original measurements of the spores (1897: 88).

As to the correct name of Persoon's fungus see p. 103-104.

Specimens in Herb. Persoon are:—

Type.—L 910.277-305. "*Poria radula* (written by Persoon). — Well-preserved material, the hymenophore rather strongly radula-like.

Other specimens.—L 910.277-304. "*Polyporus radula*" (written by Persoon). — Fruitbody almost completely destroyed.

L 910.277-319. "*Poria Radula* ? / Fungillus dubius nondum bene evolutus videtur. / Gallia."

The above mentioned three collections were referred to *Polyporus versiporus* by Donk; compare also Romell (1926: 15).

L 910.277-311. "*Boletus Radula* / *Poria Radula* ?" (written by Persoon). "*Sistotrema spathulatum* . . . ? . . . No. 179" (written by de Chaillat). — Romell (1926: 15): "may possibly be an hydroid form of *Polyporus abietinus*." Fide Donk (1933: 226), *Hirschioporus abietinus* (Pers. per Fr.) Donk.

A specimen from "Portorico" labelled "*Poria Radula* / *Bol. radula* ?" (L 911.18-107) is left out of consideration.

rixosus. — *Poria rixosa* (P. Karst.) P. Karst. 1881.

The above is not the earliest name for the species that received it. Bresadola (1897: 82) used *Poria blyttii* Fr. instead, but as explained above (p. 81) the typification adopted in this paper makes the name *Poria blyttii* a synonym of *Chaetoporus nitidus* (Pers.) Donk. However, there is another name that antedates the combination *Poria rixosa*, viz. *Polyporus collabens* Fr. = *Chaetoporus collabens* (Fr.) Pouz. Many recombinations are omitted from the following synonymy:

Polyporus collabens Fr., Hym. europ. 572. 1874.

Polyporus laevigatus [subsp.] **P. emollitus* Fr., Hym. europ. 571. 1874. — *Polyporus emollitus* (Fr.) Cooke in Trans. Proc. bot. Soc. Edinb. 13: 138. [1878].

Polyporus contiguus subsp. *P. rixosus* P. Karst. in Bidr. Känn. Finl. Nat. Folk 25: 272. 1876. — *Poria rixosa* (P. Karst.) P. Karst. in Revue mycol. 3 / No. 9: 19. 1881. — *Chaetoporus rixosus* (P. Karst.) P. Karst., Finl. Basidsv. 136. 1899; Bond. & S. in Annls mycol. 39: 51. 1941.

Poria dodgei Murrill in Mycologia 13: 87. 1921.

DESCRIPTIONS & ILLUSTRATIONS of *Chaetoporus collabens*.—Bourd. & G., Hym. Fr. 676. 1928; Lowe, Polyp. N. Am., *Poria* 95 f. 77. 1966; Lomb. & Gilb. in Mycologia 58: 840 fs. 3, 4, 10. 1967;—all as *Poria rixosa*.

roseomaculatus. — *Bjerkandera roseomaculata* P. Karst. 1891: 247; *Polyporus roseomaculatus* (P. Karst.) Sacc. 1895.

Lowe (1956: 102, 110) considered that this represented the same fungus as *Physisporus albolilacinus* P. Karst. ("a younger thinner condition of the same plant"), *Poria monticola* Murrill, and *Poria microspora* Overh., all of which he (Lowe, 1966: 81) included in his conception of *Poria placenta* (Fr.) Cooke. He does not mention that what he considers the type specimen is pileate; on the contrary it is safe to conclude that it is strictly resupinate since in his conception *Poria placenta* is always 'resupinate'.

It is evident that some error crept in. I have shown on another occasion in connection with *Trametes squalens* P. Karst., a species Karsten soon transferred to *Bjerkandera* P. Karst., that this genus was introduced by its author for pileate species (Donk, 1962: 235). Consultation of the protologue of *Bjerkandera roseomaculata* shows once more that this inference is correct, and I conclude that Lowe took the wrong specimen as type. It seems correct to delete *Bjerkandera roseomaculata* from the synonymy of *Poria placenta*.

It would seem possible to identify *Bjerkandera roseomaculatus* correctly, perhaps even without studying the original material. First, the specific epithet 'roseomaculata' is suggestive; secondly, Karsten's description somehow suggests *Trametes* [*Antrodia*] *serialis* (Fr.) Fr. and it is significant that he remarked "Ut *Bjerkandera squalens* Karst., cui maxime affinis, ad *Pycnoporum* facile trahi potest; habitu, modo crescendi, consistentia satis cum *Pycnoporo seriali* (Fr.) [= *Antrodia serialis*] convenit." Thirdly, in later work Karsten (1899: 129) even made it a variety of *Pycnoporus serialis* (Fr.) P. Karst. ("Porerne här och hvar rosenröda"). All this leads to the conclusion that *Bjerkandera roseomaculata* is presumably none other than *Antrodia serialis* (Fr.) Donk

parasitized by another fungus, as was the case with the type of *Polyporus cruentus* Pers. (q.v.). If this conclusion is acceptable then the name *Bjerkandera roseomaculata* must be rejected as a nomen confusum.

Judging only from the description, Lloyd (1915: 385) thought that *Bjerkandera roseomaculata* was "the flesh colored-pore form of *Polyporus* [*Skeletocutis*] *amorphus*", an opinion adopted by several other mycologists, but certainly untenable.

rufus. — *Boletus rufus* Schrad. *apud* Gmel. 1791: 1435 & Schrad. 1794: 172 (devalidated name); *Polyporus rufus* (Schrad.) per Fr. 1821; *Poria rufa* (Schrad. per Fr.) Cooke 1886.

A nomen dubium.

According to Lundell (1941: 3 No. 1004) it was on Romell's authority that *Polyporus haematodes* Rosk. [= *Poria taxicola* (Pers.) Bres.] passed for some time in Swedish literature as *Polyporus rufus*. In his opinion it is incorrect to attribute this interpretation to Fries. I cannot share this view.

In 1874 Fries (p. 573) changed his previously published descriptions (which were adapted from Schrader's, since he had not seen the species himself) and published one that recalls *Poria taxicola* ("sanguineo-rufus") while citing *Polyporus haematodes* Rostk. as synonym. Again he had not seen material himself, but this time he indicated that he had seen a figure (or figures) of it. In any case he had seen Rostkovius's plate, but it may also be that he had still another plate in mind, viz. an unpublished one (UPS) that both Lundell and I have referred to *Polyporus haematodes* (*Poria taxicola*). This drawing Fries named *Merulius rufus* Pers. and it is possible that by accident he connected it erroneously with *Polyporus rufus*.

It seems acceptable to distinguish a *Polyporus rufus* Schrad. sensu Fr. 1874, as Romell did, and to refer it to *Poria taxicola*. When Bresadola (1897: 80), under *Poria taxicola*, made the remark, "Huic valde quoque accedit *Pol. rufus* (Schrad.) et forte non satis distinctus", he must have written this on the basis of Fries's revised description.

salicinus. — *Boletus salicinus* Pers. *apud* Gmel. 1791: 1437 & Pers. 1801: 543 (devalidated name), not ~ Bull. 1789 per Hook. 1821 (devalidated name); *Poria salicina* (Pers.) Pers. 1794 (devalidated name); *Polyporus salicinus* (Pers.) per Fr. 1821; *Phellinus salicinus* (Pers. per Fr.) Quél. 1886, misapplied; ≡ *Ochroporus confusus* Donk 1933.

This species has been thoroughly confused with *Phellinus conchatus* (Pers. per Fr.) Quél., which has even often been divided into two forms, varieties, or species, of which one was identified with *Polyporus salicinus*. For instance, Bresadola (1897: 75) replaced the name *Fomes conchatus* (Pers. per Fr.) Gillet by that of *Fomes salicinus* (Pers. per Fr.) Kickx. Persoon confused the two himself in some instances, as did Fries as well.

However the original fungus Persoon had in mind is a different one and well

represented in his herbarium. According to Donk (1933: 254) Persoon's typical material resembles that form of *Phellinus ferruginosus* (Schrad. per Fr.) Pat. sensu Bres., which Bourdot & Galzin (1928: 627) called *Phellinus ferruginosus* subsp. *P. umbrinus* ("Fr. typus primarius non Pers., sensu Bres. in litt.!",) non-stratified specimens. This form is often said to resemble more or less 'resupinate' forms of *Phellinus torulosus* (Pers.) Bourd. & G. In this connection it may be mentioned that Bresadola determined Dutch specimens strongly resembling *Boletus salicinus* Pers. (sensu stricto) as *Polyporus torulosus* "resupinatus"; compare also one of the specimens (L 910.263-115) listed below. Then and now my conception of *Poria ferruginosus* sensu Bres. agrees with the whole of Bourdot & Galzin's conception (1928: 625), inclusive of their subspecies, described under the name *Phellinus ferruginosus*.

Given this circumscription, and regarding the name *Boletus [Phellinus] ferruginosus* Schrad. (q.v.) as a nomen dubium, and also accepting the name *Polyporus salicinus* Fr., as misapplied in the starting-point book, as not available, Donk (1933: 256) decided to introduce a new name, *Ochroporus confusus*.¹⁷ He committed two errors at that time: (i) the name *Polyporus macounii* Peck (cf. Overholts, 1919: 86) was available as basionym and overlooked, and (ii) no one suspected that Fries had not misapplied *Polyporus salicinus* in 1821!

Persoon's phrase (1801: 543) under *Boletus salicinus* runs: "resupinatus suberosus late effusus undulato-rugosus cinnamomeus". This was copied by Fries (1821: 376) only with negligible alteration: "durus, late effusus, resupinatus, submarginatus, undulato-rugosus, cinnamomeus. — Pers. syn. p. 543. (Bol.)". Although Fries called the fungus 'resupinatus' he did not include it in *Polyporus* trib. *Resupinatus*, but in—*Polyporus* trib. *Apus*. It is my considered opinion that Fries absorbed Persoon's original conception lock, stock, and barrel in his own of 1821. Therefore there is no valid reason for not taking Persoon's type also as type of the revalidated name.

It was in later work that Fries started to confuse the issue. In 1838 (p. 467) *Polyporus salicinus* has become a quite different species: "pileo [!] lignoso durissimo undulato glabro, ex maxime parte resupinato . . . Hic a praeced. [*P. conchato*] distinctissimus magis ad *P. igniarium*, crusta ebenea [!] accedit. . ." So far the identity of this fungus has not been established, but there is little doubt that it belongs in that difficult complex around *Phellinus nigricans* (Fr.) P. Karst. It is out of the question that this interpretation might form the basis for replacing the name *Phellinus conchatus* (Pers. ex Fr.) Quéf. by that of *Phellinus salicinus*!

To cut a long story short, the confusion between the two species may be briefly explained by pointing out (i) that Persoon himself confused resupinate material of *Phellinus conchatus* with his *Poria salicina* (Bresadola was aware of this; see below under specimens listed); and (ii) that in Fries's posthumously published "Icones" (1884: pl. 185 f. 1) the figure named *Polyporus salicinus* is a recognizable representation of *Phellinus conchatus*.

¹⁷ The generic name *Ochroporus* J. Schroet. in the emendation used should have been dropped in favour of *Phellinus* Quéf.

The answer to the question whether the circumstances sanction rejection of the name *Polyporus salicinus* (Pers.) per Fr. as a nomen ambiguum or not will no doubt be answered differently. Current usage is preserved if the answer is 'yes', in which case continued use of the name *Poria* [*Phellinus*] *ferruginea* (q.v.) is recommended.

The following enumeration is a selection from specimens in Herb. Persoon.

Type.—L 910.262-822. "*Boletus salicinus* Syn. fung." (written by Persoon). — A portion was sent to Bresadola (1895). Selected type.

Other specimens.—

The following are referred to *Poria ferruginea* sensu Bres.

L 910.263-112. "*Polyporus salicinus* Mycol. Europ. 2. p. / *Boletus* — Syn. fung." (written by Persoon).

L 910.263-115. "*Polyporus salicinus*. Mycol. Europ. 2. p. 90" (written by Persoon).

L 910.263-114. "*Polyporus salicinus*" (written by Persoon). — A portion was sent to Bresadola (1895).

L 910.263-919. "*Polyporus salicinus*" (written by Persoon). — A portion was sent to Bresadola (1895).

L 910.262-821. "Sur un Saule creux" (unidentified handwriting). "*Boletus salicinus* (written by Persoon). — A portion was sent to Bresadola (1895).

A number of specimens were referred by Persoon to *Polyporus salicinus* with doubt (indicated by interrogation marks). These are L 910.263-109, L 910.263-113, and L 910.263-118; they represent *Phellinus conchatus* in (almost) resupinate condition. Portions of these were sent to Bresadola (1895).

sanguinolentus. — *Boletus sanguinolentus* A. & S. 1805: 257 (devalidated name); *Polyporus sanguinolentus* (A. & S.) per Fr. 1821; *Poria sanguinolenta* (A. & S. per Fr.) Cooke 1886; *Rigidoporus sanguinolentus* (A. & S. per Fr.) Donk 1966: 341.

The devalidated protologue is sufficiently detailed for recognition of the fungus that was described; during the past two decennia there has been no hesitation on this point. For a good description, see Bourdot & Galzin (1928: 682).

However, there was a period that the 'reddening' porias were badly confused in Europe, even to the extent that North American authors preferred to use another name to avoid being misunderstood. This name was *Poria decolorans* (Schw.) Cooke; compare Overholts (1923: 213 *fs.* 8, 9, *pl.* 22 *f.* 4) and Lowe (1946: 53 *f.* 12).

Bresadola (1897: 83) first took up the name *Poria terrestris* Pers. (q.v.) for *P. sanguinolenta*. He accepted the identification of *P. terrestris* with the species that is currently called *P. sanguinolenta*, but at the same time he thought that the true *P. sanguinolenta* was a different species. In later work (Bresadola, 1908: 41) he admitted his error and referred his conception of *P. terrestris* to the modern conception of *P. sanguinolenta*.

At the same time Bresadola tried to find an application for the name *Poria sanguinolenta*. These attempts resulted in two other species becoming involved. The one he described first (Bresadola, 1897: 84), with spores 5-6 μ long, later on became "4. *Poria* n. sp.?" of von Höhnelt (1907: 92) and *Poria gilvescens* Bresadola (1908: 40 & cf. Bourdot & Galzin, 1928: 662). The second, with spores 6-8 μ long, (Bresadola, 1903: 79, exclusive of "Forma vero . . .", the later *Poria gilvescens*) became "3. *Poria*

n. sp.?" of von Höhnel (op. cit.) and *Poria bresadolae* Bourdot & Galzin (1925: 222; 1928: 662).

The current interpretation of *Poria sanguinolenta* came into its own slowly and was generally rather late in being accepted. Secretan's description (1833: 505; as *Sistotrema*) is good. One of the first authors to indicate the correct spores ("Sporen hyalin, kugelig 5-6 μ ") was Hennings (1899: 125). von Höhnel (1907: 94) found that the fresh fruitbodies are not really resupinate, but peltate and only centrally attached, facts that are difficult to assess from dried specimens. That the current interpretation is now generally accepted is certainly due initially to his remarks. When Bresadola and Bourdot & Galzin followed, the question was decided.

A few years later von Höhnel (1909: 442) also concluded from the description that *Podoporia confluens* P. Karst. was another synonym of *Poria sanguinolenta*. This led to the misapplication of the generic name *Podoporia* to the 'resupinate' species of *Rigidoporus* Murrill (cf. p. 59); it has been proven that *Podoporia* has nothing to do with these fungi.

s c a l a r i s. — *Polyporus scalaris* Pers. 1825: 90.

This was described as a resupinate species. Fries (1828: 93) referred it as a form to *Polyporus* [*Antrodia*] *serialis* Fr. and Donk (1933: 192, 193), who studied the type, agreed. This species may form pileate fruitbodies and is not a *poria*.

Type.—L. 910.263-911 in Herb. Persoon. "*Boletus (Polyporus) scalaris* repertus à Molai. / *Polyporus scalaris*" (written by Persoon). — Annotated by Bresadola (1912), "= *Trametes serialis* Fr. f. *scalarm-resupinata* / *intus alba*, *extus luride ex aetate*"; and by Romell, "*Pol. scalaris* = *Trametes serialis* Fr. probabiliter." The original publication states, "In Helvetiae confinibus ad aquaeductum detectus a D. Gay."

s u b t i l i s. — *Boletus subtilis* Schrad. 1794: 173 pl. 3 f. 2 (devaluated name); *Polyporus subtilis* (Schrad.) per Fr. 1821, misapplied; *Poria subtilis* (Schrad. per Fr.) Bres. 1897.

Schrader's protologue is accompanied by a figure which for that time is rather detailed. I am not surprized that both Persoon and Bresadola thought they could recognize in it the same species that Persoon called *Boletus molluscus* (q.v.) and Bresadola (1897: 88), *Poria subtilis*. The species I have in mind has also been called *Poria candidissima* (Schw.) Cooke and, in the present paper, has received the name *Cristella mollusca* (Pers. per Fr.) Donk. Through the work of Bourdot & Galzin (1928: 656) Bresadola's interpretation gained some currency. There are details in the protologue, however, that do not strongly favour this interpretation. For instance, the lack of a well-developed margin (see Schrader's figure) which is not byssoid or forming rhizoid strands, warns against a too-confident identification with *Cristella mollusca*.

When Fries (1821: 506) revalidated Schrader's name he included his conception of it in *Polyporus* subgen. *Porothelium* (Fr.) per Fr. = *Stromatoscypha* Donk, and his description strongly suggests that he was indeed dealing with that genus; in that case he must have referred to it a stage of *Stromatoscypha fimbriatum* (Pers. per Fr.) Donk, the only European species.

taxicola. — *Xylomyzon taxicola* Pers. 1825: 32 pl. 14 fs. 4, 5; *Merulius taxicola* (Pers.) Duby 1830; *Poria taxicola* (Pers.) Bres. 1897.

The identity of this species was in doubt over a long period. Fries (1828: 62; 1874: 594) thought that it was related to *Merulius umbrinus* Fr., a species of *Serpula* (Pers.) per S. F. Gray. It was Bresadola (1897: 80) who, after having studied the type, established the current interpretation. A modern description completing Bresadola's succinct observations was published by Bourdot & Galzin (1928: 659). The specific epithet raised some doubt about the correctness of the interpretation. Thus, Lundell (1941: 3 No. 1004) preferred another name (*Polyporus haematodes* Rostk.) mainly because he had never found the species on any substratum other than *Pinus*. The fungus is not rare in Europe and it has now been reported from various coniferous substrata and even from *Populus* and *Quercus* (Hansen, 1956: 253). The possibility remains that the collector of the type (de Chaillet) erred in naming the host. In this connection *Polyporus sorbicola* Fries (1874: 570) is called to mind. Although it was said to be collected on fallen branches of *Sorbus*, Bresadola (1897: 80) nevertheless cited it as a synonym of *Poria taxicola*.

That *Poria taxicola* is not a good poria was already indicated by Bourdot & Galzin who placed it in their Section *Merulieae* ("Pores mérulioides, fertile sur la tranche, puis plus profonds tubuliformes à orifice entier..."), and this was confirmed by Hansen (1956: 252). The type of *Caloporus* P. Karst. 1881 = *Caloporia* P. Karst. 1893 was called "*C[aloporus] incarnatus* (Alb. & Schw.)" by the author of these generic names. Donk (1962: 227-230) concluded that the name of the type species was misapplied to *Poria taxicola*, and that, if one decided to place the species in a genus of its own, the correct name to be used was *Caloporus*. Other generic names based on the same species are *Merulioporia* Bond. & S. 1943 (preoccupied) = *Meruliopsis* Bond. apud Parm. 1959.

Donk preferred another disposition. Like Lundell he had seen several fruitbodies with a pronounced tendency to form a cap-like reflexed upper margin. The microscopical features as well support the conclusion that no real distinguishing generic characters had been brought forth to exclude *Poria taxicola* from *Merulius* Fr. of modern authors. Compare also page 54.

Persoon described this species twice; the second time as *Xylomyzon pulchrum* Pers. (q.v.).

Type.—L 910.277-277 in Herb. Persoon. "*Sistotrema taxi* / la couleur n'a presque pas changé / ... / les jeunes Echantillons en juillet les vieux en 7bre sur la même branche qui étoit à terre et moitié pourrie / 1820 = 59" (written by de Chaillet). "*Merulius taxicola*" (written by Persoon). — Studied by Bresadola (1895). A good specimen, fairly advanced in development.

terrestris. — *Poria terrestris* Pers. 1805: 35 pl. 16 f. 1 (devalidated name); *Polyporus terrestris* (Pers.) per Fr. 1821; *Poria terrestris* (Pers. per Fr.) Cooke 1886; not ~ Bourd. & G. 1925; &

Boletus terrestris (Pers.) DC. *sensu* DC. 1815: 39; *Poria terrestris* Bourd. & G. 1925, not ~ (Pers. per Fr.) Cooke 1886.

Fries (1821: 383) included *Boletus terrestris* Pers. in the "Systema" without having seen specimens of it; the indication "v. ic." refers to the figure of the protologue published by Persoon, but Fries's brief descriptive phrase and observation is mainly a translated extract from de Candolle's French account of an application of the Persoonian name. There is no *Boletus terrestris* DC., merely a *Poria terrestris* Pers. *sensu* DC. By explicitly citing Persoon as the author and admitting the figure Fries clearly indicated that he did not wish to exclude the type, viz. Persoon's depicted specimen. These few observations form an obstacle to follow Lowe (1966: 38) in admitting a species with the following basionym and isonyms: *Boletus terrestris* DC. = *Polyporus terrestris* DC. ex Fr. = *Polyporus terrestris* DC. ex Duby (a synonym that apparently crept in by error) = *Poria terrestris* (DC. ex Fr.) Sacc.

No type could be located in Persoon's herbarium. The first author definitely to segregate de Candolle's fungus was Persoon himself (1825: 112), who stated that *Boletus terrestris* as interpreted and described by de Candolle was different from his species. Fries (1828: 122) accepted this verdict and in addition he concluded that, "*P. terrestris* Pers. Myc. Eur. II p. 111. certe ad *P. sanguinolentum* referendus." From that time on mycologists have faithfully distinguished between two 'different' species of the 'same' name.

At first Bresadola (1897: 83; 1903: 79) followed Fries's disposition of *Poria terrestris* Pers., but for a reason unstated he exchanged *Poria sanguinolenta* for *P. terrestris*. Simultaneously he referred the basionym to de Candolle, certainly in error, for the description published by this author does not at all suggest the species Bresadola had in mind. The specimens distributed by Krieger (1889: No. 421, as *Polyporus sanguinolentus* [n.v.]) he referred to "*Poria terrestris* (Dec.) Fr. Syst. Myc. I, 383": they are *Rigidoporus sanguinolentus* (cf. von Höhnelt, 1907: 93 & Bresadola, 1908: 41).

Bourdot & Galzin (1925: 153) considered that Persoon's species represented a thin, interrupted, resupinate form of *Daedalea* [*Abortiporus*] *biennis* (Bull.) per Fr., "formé de pores oblongs, tendres et fugaces, blanc prumineux, puis rosé roussâtre". This conclusion is now generally accepted.

After the publication of *Poria mollicula* Bourdot (1916: 543 f. 744) Bourdot & Galzin (1925: 215) thought that they could recognize this species in de Candolle's description of *Boletus terrestris* (Pers.) DC. and they decided to replace the name *Poria mollicula* by *Poria terrestris sensu* DC. Since, in contradistinction to Fries and Duby, they excluded the type (viz. Persoon's species) from de Candolle's conception, they actually published a new name, viz. *Poria terrestris* Bourd. & G. 1925, not *Poria terrestris* (Pers. per Fr.) Cooke 1886. Apart from the correctness of the identification of *Poria mollicula* with de Candolle's fungus, the name *Poria terrestris* Bourd. & G. must in any case be dropped since on account of the earlier homonym it is impriorable. I can see no reason for not returning to the use of *Poria mollicula*.

tuberculosis. — *Boletus tuberculosis* (Pers.) Pers. sensu DC. 1815: 40; *Polyporus tuberculosis* Fr. 1821: 380, not ~ (Pers.) per Pers. 1825; &

Poria tuberculosa Pers. 1795: 14 & 1796: 14 (devaluated name); *Boletus tuberculosis* (Pers.) Pers. 1801: 545 (devaluated name), not ~ Baumg. 1798 (devaluated name), not ~ Gmel. 1791 (devaluated name); *Polyporus tuberculosis* (Pers.) per Pers. 1825, not ~ Fr. 1821; *Poria tuberculosa* (Pers. per Pers.) Cooke 1886.

When Fries published the name *Polyporus tuberculosis* he had not seen this fungus. He adopted de Candolle's interpretation of the species that had previously been published as *Boletus tuberculosis* (Pers.) Pers. At the same time Fries excluded Persoon's fungus from the conception he chose to follow: "*Poria tuberculosa* Pers. Obs. 1. p. 14, in fodinis lecta, dubia". By excluding the type he converted what was originally a misapplication into a new name for a new species based exclusively on the fungus described by de Candolle.

Persoon recognized the fact that de Candolle had attributed the wrong fungus to his *Boletus tuberculosis* and introduced the name *Polyporus colliculosus* Pers. (q.v.) for it, which makes this name a typonym of *Polyporus tuberculosis* Fr. Under the present "Code" Fries's publication of *Polyporus tuberculosis* in the "Systema" provided the earliest validly published name available for the fungus, which is now often called *Pachykytospora tuberculosa* (Fr.) Kotl. & P. It is the type species of the name *Pachykytospora* Kotl. & P. (1963: 27).

As to the fungus that was originally named *Poria tuberculosa* Pers. and later *Boletus tuberculosa* (Pers.) Pers., this was collected in mines in an apparently more or less abnormal condition, difficult to determine from the protologue. No type specimen could be located. The name can better be dropped as a nomen dubium.

undatus. — *Polyporus undatus* Pers. 1825: 90 pl. 16 f. 3; Fr. 1828: 111; *Poria undata* (Pers.) Quél. 1886.

Fries received a fragment of *Polyporus undatus* (presumably a portion of the type collection) from de Chaillet (cf. Lundell, 1946: 12 No. 1324); he incorrectly listed the name as synonym of *Polyporus cryptarum* (Bull.) per Fr. [= *Heterobasidium annosum* (Fr.) Bref.] many years later (1874: 566).

Bresadola (1897: 82) studied what was undoubtedly the type; he did not furnish any descriptive details, but the fact that the specimen he referred here had been found in mines and also the listing of *Polyporus broomei* Rab. as synonym suggest that he interpreted Persoon's species correctly. He did not give any descriptive information either when he next mentioned the species (Bresadola, 1903: 78). On this later occasion a further synonym was added, "Species haec genuinum *Polyporum vitreum* Fr. sistere vix dubitandum si diagnoses in Syst. Myc. l.c., Elenc. 1. p. 119 et Hym. Europ. p. 577 comparantur. Specimina originalia non adsunt. *Poria vitrea* Pers. forte distincta . . ." The correctness of reducing *Poria vitrea* to the synonymy of *P. undata* will be discussed separately (p. 121). A modern description under the name of *P. undata* was published by Bourdot & Galzin (1928: 682) but so far it is not certain that they were dealing with the same species that Bresadola had in mind. When

Donk (1933: 159, 160) accepted Bresadola's conclusions he preferred to use as basionym the name *Polyporus vitreus* "Fr." which had been published at a date earlier than *Polyporus undatus*. At that time he did not realize that the taxon that he described was different from the one Bresadola had in mind. Lloyd (1910: 473) referred *Polyporus undatus* to *P. broomei*; the latter name was published at a much later date than the former.

Several years ago I studied the type anew and to my surprise found that it has thick-walled, narrowly club-shaped cystidia; Lowe (1966: 43) has since confirmed this fact. These organs had not been mentioned or properly described anywhere in any published description of either *Poria undata* or *P. vitrea*. From sketches and annotations on two collections of *Poria undata* in Bresadola's herbarium (S) it appears that he also saw the thick-walled cystidia. They do not occur in the material that I determine as typical *Poria vitrea* (q.v.), a taxon that I now consider to be specifically distinct.

I am inclined to conclude from Lundell's description (1946: 12 No. 1324) that he saw still different bodies: "Hyphae . . . often somewhat wider and covered with crystals just below the basidia and thus simulating cystidia (10—16 × 6—8 μ)." This is hardly suggestive of the much longer, often very thick-walled bodies I have in mind; these are end-portions of thick-walled hyphae without being distinctly set off from them. Nevertheless his material does show thick-walled, long, almost cylindrical terminal hyphal portions that protrude beyond the hymenial surface, the free ends being crystal-encrusted. It may be conspecific with *P. undata*, but of this I am not yet certain; it apparently represents a different species from what I call *P. vitrea* Pers.

The same bodies Bresadola saw are also found in the type of *Polyporus frustulatus* Pers. (q.v.) and *Polyporus broomei* and for the present I would treat them like the same species as *P. undatus*. As to the correct basionym for the species, this remains *P. undatus*, to which Bresadola (1920: 67) referred the simultaneously published *P. frustulatus* as synonym. So far I am not prepared to divide *Rigidoporus* on the basis of the presence or absence of thick-walled hyphae that may terminate in 'cystidia'. I am now also convinced that *Rigidoporus vitreus* (q.v.) is distinct. Hence: **Rigidoporus undatus** (Pers.) Donk, *comb. nov.*, basionym, *Polyporus undatus* Pers., Mycol. europ. 2: 90 pl. 16 f. 3. 1825.

It is not always easy to conclude from descriptions under the name *Poria undata* whether *P. vitrea* (q.v.) was involved or not; I suggest that Bourdot & Galzin's above mentioned description might have been drawn up from *P. vitrea*. The same seems to be the case with Lowe's descriptions; the fact that he concluded that the type of *P. undata* was a different species from what he had previously called *P. undata* but now *P. vitrea* (Lowe, 1966: 41) points in this direction.

This revised conception of *Poria undata* raises still more questions. It is suggested that American mycologists look into the reasons why Overholts (1953: 308) identified *Polyporus undatus* with *P. rigidus* Lév. Another species needing comparison is *Leptoporus moeszi* Pilát ≡ *Rigidoporus moeszi* (Pilát) Pouz.

Type.—L 910.263-141 in Herb. Persoon. "*Polyporus undatus*. Myc. Europ. 2." (written by Persoon). A note by de Chaillet states: "C'est la meme plante que je vous ai envoyé sous un No. 354: je l'ai trouvé sur un tuyau de fontaine pourri, Pin ?, Elle le couvroit dans toute sa longueur . . ." The original publication mentions, "Lectus a D. Chaillet supra tubum aquaeductentem, sed destructum et putridum, quem late obtegit." The figure of the protologue might well have been made from the preserved material. — According to Lundell (1946: 12 No. 1324) a fragment of what is presumably the type collection is also in Fries's herbarium (UPS); it came from de Chaillet, "*Boletus undatus* Pers. in litt. Sur des tuyaux pourris de fontaine: en pin."

u n i t u s. — *Polyporus unitus* Pers. 1825: 93; Fr. 1828: 116; not ~ Lloyd 1917; *Poria unita* (Pers.) P. Karst. 1881.

According to the protologue the type was found in the Vosges, "in lignis abietinus". Bresadola (1897: 78, "[*Poria*] *unita* Pers. non Fr."; 1920: 69) disposed of *Polyporus unitus* thus: "Etiam *Poria unita* Pers. meo sensu, tantum statum juniorem *Poriae megalopora*." This is surprising if it is recalled that he had studied what in view of the accompanying label was considered the type in 1895; the specimen was annotated by Bresadola, "Prorsus = *Polyporus medulla panis* Pers." The same specimen was later studied by Romell (1912: 644), who agreed about the identity of the specimen; however, he concluded that it did not agree with the original description.

Donk (1933: 234) apparently did not really doubt that *Polyporus unitus* was the same as *Poria medulla-panis* 'sensu Pers.'; and because at that time he did not wish to use the latter name he replaced it by the former. Several mycologists have since followed this example. Donk (1960: 266) later returned to the use of *Poria medulla-panis* (q.v.) and by oral communication he also advised disuse of the name *Polyporus unitus* altogether. Lowe (1966: 108) also thought "the name *Poria unita* (formerly used for this fungus) seems inapplicable, because of a specimen in the Bresadola collection at Stockholm, annotated by Bresadola as 'fragm. type', is *P. megalopora* Pers." It is not stated where the fragment came from or of what collection it once formed a part.

The discrepancy between the label (which certainly belongs to the type of *Polyporus unitus*) in Persoon's herbarium and the specimen that accompanies it is big enough to justify the thesis that a confusion of labels occurred. So far I have not been able to locate the counterpart sheet on which the specimen is pasted that would be the real type of *Polyporus unitus*.

Bresadola (see above) once wrote *Poria unita* Pers. "non Fr." I have no other information about Fries's use of the name except a note by Romell (1912: 644):

"The specimens collected by Sommerfelt, to which Fries refers in El. p. 116, I have not seen. There exists, however, in Fries' herbarium a specimen from Blytt, and this belongs probably to Rostkovius' *Pol. aurantiacus*, while a specimen from Weinmann appears to be Karsten's *Pol. ferrugineo-fuscus*."

Specimen in Herb. Persoon.—L 910.277-214. "*Polyporus (Poria) unitus*. Mycol. Europ. / In Vogesia" (written by Persoon). "les troncs pourris des Sapin" (written by J. B. Mougeot). — A portion was sent to Bresadola in 1895, who annotated it thus: "Prorsus = *Polyporus medulla panis* Pers. . . ." Annotated by Romell ". . . = *Poria medulla panis* Pers."

vaiillantii. — *Boletus vaiillantii* DC. 1815: 38 (devalidated name); *Polyporus vaiillantii* (DC.) per Fr. 1821; *Poria vaiillantii* (DC. per Fr.) Cooke 1886.

The original description of *Boletus vaiillantii* DC. was drawn up from specimens found by de Chaillet. The specific epithet was given with a view to *Corallo-Fungus argenteus*, *Omenti forma* Vaillant (1727: 41 pl. 8f. 1), of which de Candolle remarked, "La description de Vaillant est très-exacte á commencer de ces mots: á travers de des gros pelotons, etc. . .", without actually completely identifying Vaillant's fungus with the one he described. The current interpretation was founded by Bresadola (1897: 88); it is apparently the correct one and was adopted by Bourdot & Galzin (1928: 677). There are many misnamed specimens in the European herbaria.

It should be pointed out that Fries's description was based on a quite different fungus. Romell (1911: 22) suggested that the species Fries had in mind might well be *Poria mollusca* sensu Bres. [= *Poria mucida* sensu typi]. There is little reliable material evidence left by Fries to substantiate this view. Persoon (1825: 114) also concluded that Fries's description did not cover de Candolle's fungus.

vaporarius. — *Poria vaporaria* Pers. 1794: 38 = 1797: 70 (devalidated name); *Polyporus vaporarius* (Pers.) per Fr. 1821: 382, misapplied; *Poria vaporaria* (Pers. per Fr.) Cooke 1886, not ~ Bres. 1897; &

Polyporus vaporarius (Pers.) Fr. sensu Fr. 1818: 260; 1821: 382; *Poria vaporaria* Bres. 1897, not ~ Pers. 1784 & ~ (Pers. per Fr.) Cooke 1886.

Persoon's fungus was found in 'vaporariis', as is also indicated by the specific epithet. What may be taken as the type collection is still preserved in his herbarium. Bresadola (1897: 88) did not study it, but he did not seriously question that the Persoonian species was the same as *Poria vaiillantii* (DC. per Fr.) Cooke. A careful inspection of Persoon's descriptions raises considerable doubt on this point: compare, "ad ligna . . ., quibus immersus, substantia tener", and the fact that nothing was mentioned about a membranous and more or less rhizomorphic margin. The type consists of a rotten piece of wood ("ad ligna cariosa in vaporariis") with only few and minute remnants of the fungus; these are built up of thin-walled, fragile hyphae only. All this definitely excludes *Poria vaiillantii*, but I am not yet prepared to propose a correct identification.

Fries's interpretation calls for a free-air fungus and accordingly the Persoonian name has been applied to various quite different species, of which Bresadola's conception ("cum specimine cl. Friesii concordat", 1897: 88, no microscopical details; 1903: 78) has been adopted by Bourdot & Galzin (1925: 232; 1928: 673), who concluded that it was very close to, and hardly more than a subspecies of, *Poria sinuosa* (Fr.) Cooke [= *Antrodia sinuosa* (Fr.) P. Karst.], differing principally in the more regular pores. Several authors now consider the two to be merely forms of a single species, the correct name of which (when retained in *Poria*) is *P. sinuosa* (Donk, 1966: 340). As already stated, Bresadola considered Fries's and Persoon's fungi to be different species. He retained Fries's conception, and excluded

Persoon's fungus (type): "*Poria vaporaria* Fr. . . . (vix Pers.)" sensu Bresadola thus became *Poria vaporaria* Bres., non Pers. In this way a new name was introduced which on account of the earlier homonym *Poria vaporaria* (Pers. per Fr.) Cooke is improriorable.

Another interpretation of Persoon's fungus was introduced by Hennings (1899: 125 fs. 1-9 on p. 177, as *Polyporus*). It was described as a species that formed extremely variable fruitbodies, from resupinate (and resembling *Poria vaillantii*) to sessile and even spuriously stalked, often accompanied by a '*Ceratomyces*' state. I am certain that Hennings's conception is also untenable. One modification of these fruitbodies (the flabellate) was described by Bresadola (*apud* Saccardo, 1891: 167) as *Polyporus henningsii* Bres. What Pilát (1938: 199 f. 57, pls. 116-119) described as *Leptoporus fodinarum* (Velen.) Pilát = *Polyporus fodinarum* Velen. 1922 is strongly reminiscent of Hennings's fungus. Domański (1965b: 139) referred *Leptoporus fodinarum* ("pr. max. p.") to *Tyromyces destructor* (Schrad. ex Fr.) Bond. & S. (The correct interpretation of *Boletus destructor* Schrader, 1794: 166, has still to be worked out, I think.)

Since Fries himself, when revalidating Persoon's name as *Polyporus vaporarius*, ascribed it to Persoon, there is no reason to assume that he did not wish to include Persoon's fungus: he merely misapplied the name *Poria vaporaria* Pers. without excluding the type. He may even have included at random in his conception still other species of which no specimens have been preserved. Persoon (1825: 106) was convinced that Fries's conception had included a different fungus and proposed the denomination *Polyporus incertus* Pers. for it. This apparently would be the correct name for *Poria vaporaria* Bres. if that taxon were to be treated as a distinct species.¹⁸ Other names introduced for Fries's conception are *Poria friesii* Romell (1926: 24), a provisional name, and *Poria sylvestris* Romell (1911: 25, provisional name, as "*silvestris*") ex Baxter (1932: 200).

Poria vaporaria was the name that for a long time was used almost unanimously in France, England, and The Netherlands for much of the material belonging to *Poria mucida* sensu Bres. = *Poria versipora* = *Schizopora paradoxa* (q.v.), Europe's most common and extremely variable poria. Bourdot & Galzin (ll. cc.) demonstrated that this was also Quélet's interpretation. It may have arisen with Persoon himself since there are several specimens of this species in his herbarium that he referred to his *Poria vaporaria*.

Specimens in Herb. Persoon:

Type.—L 910.277-303. "*Boletus vaporarius* Syn. fung. / Prope Gottingam collectus" (written by Persoon). — Specimen almost completely destroyed, not yet determined.

Other specimens.—L 910.277-284. "*Poria vaporaria* Syn. fung. et *Trichoderma aureum*. / Specimen vetustum incompletum" (written by Persoon). — There is almost nothing left of the two fungi.

¹⁸ Persoon copied Fries's phrase of *Polyporus vaporarius*, and added an observation taken from von Albertini & von Schweinitz (1805: 256) to which Fries had referred. He made no use of a specimen now in his herbarium labelled (by a handwriting which I do not recognize), "*Polyporus vaporarius*. Fries (ex ipso) pour Mr. Persoon / les poutres de Lamachine de Marly. 10 germinal XII". Persoon added "(vix)" / *Sistotrema quercinum*, var. ?" This determination ('sensu Bres.') seems correct.

The following numbers represent *Poria versipora* = *Schizopora paradoxa*. In all only fragments of the fungus are left.

L 910.277-289. "*Polyporus vaporarius* / Ad trabes corruptas lectus in Vindario Mousseau" (written by Persoon).

L 910.277-288, L 910.277-292, L 910.277-289. All referred to *Poria vaporaria* with an interrogation mark.

variecolor. — *Physisporus variecolor* P. Karst. in Thüm. 1881: No. 1803 & P. Karst. 1881c: 10; *Poria variecolor* (P. Karst.) Cooke 1886.

Lowe (1956: 115) found that the "material distributed in the exsiccati set [by von Thümen] is of varied identity"; in it he came across *Poria luteo-alba* (P. Karst.) Sacc., *Poria candidissima* (Schw.) Cooke [= *Poria mollusca* sensu stricto], and *P. lenis* (P. Karst.) Sacc., and he added that additional material labelled as *Physisporus variecolor* by Karsten in Helsinki and New York are *Poria* [*Perenniporia*] *subacida* (Peck) Sacc. That still other species had been referred to *Physisporus variecolor* by Karsten follows from the fact that Bresadola (*apud* J. Rick, 1898: 137) listed this name as synonym of *Polyporus medulla-panis* var. *pulchellus* (Schw.) Bres., and later (Bresadola, 1920: 69) as synonym of *Poria pulchella* (Schw.) Cooke; Egeland (1914: 150) followed Bresadola but called the species *Poria vitellinula* (P. Karst.) Egeland. As to Pilát (1941: 444), he not only entered Karsten's species (as distributed by von Thümen) with an interrogation mark as synonym of *Poria xantha* (Fr. per Fr.) Cooke but also listed it under *Poria medulla-panis* (Jacq. per Fr.) Cooke, "teste Bresadola".

This confused situation can be straightened out only by a careful selection of a lectotype. According to Lowe, "The predominant material in the Karsten exsiccati is *Poria luteoalba*. These specimens agree with the original description, and appear to be the plant to which Karsten's name should apply. If correctly interpreted *P. variecolor* is the prior and valid name [for *Poria luteo-alba*]." This remark did not pass unnoticed and the epithet 'variecolor' was soon taken up for *Poria luteo-alba* in combinations with *Chaetoporellus* and *Chaetoporus* by Parmasto (1959: 224 f. 4; 1961: 120), Domański (1963b: 303 fs. 5, 6), Bondartseva (1964: 189) and Pouzar (1967: 211). Lowe himself (1966: 106) seemed more reluctant to follow these examples and still adhered to *Poria luteo-alba* as a correct name.

It is not easy to follow Lowe when he states that *Poria luteo-alba* agrees with the original description of *Physisporus variecolor*. An important discrepancy is found in regard to the spores, "Spores sphaeroideae vel subsphaeroideae, diam. 3-6 mmm." Karsten's microscopical data have usually been found to be reliable. Accepting them as roughly correct, then *Poria luteo-alba*, *P. lenis*, and *P. xantha* are ruled out because they have differently shaped spores, as is *P. candidissima*, which has ellipsoid and distinctly echinulate spores. The spores as described by Karsten agree with those of *P. subacida*. *Poria pulchella* is another contender of which Overholts (1919: 220 f. 17) described the spores from type material as oblong-ellipsoid, 5-6 × 3-4 μ; he overlooked the usually somewhat truncate apical ends and Karsten may well have done the same.

It would seem prudent to leave it at that until a renewed study of Karsten's material brings a definite answer. If this should be *Polyporus subacidus* Peck 1885 (see p. 76) the name would have to be replaced by that of *Physisporus varicolor* P. Karst. as basionym; if it were *P. pulchella*, the long-standing tradition of *Physisporus varicolor* as merely a later synonym of *Poria pulchella* would be maintained.

versiporus. — *Polyporus versiporus* Pers. 1825: 105, not ~ Lloyd 1915 (error for 'versisporus'); *Poria versipora* (Pers.) Lloyd 1910; = *Polyporus versiporus* var. *immutatus* Pers. 1825: 105, name for the type variety.

Lloyd (1910: 473), Romell (1926: 19), and Donk (1933: 224-227), who all studied material that Persoon had referred to *Polyporus versiporus*, found that this species was the same as what was called *Poria mucida* by Bresadola and his followers, and by a multitude of other names. Somehow the name *Polyporus versiporus* became rapidly and almost generally accepted, mostly in the form of *Poria versipora* (Pers.) Lloyd. This recombination is usually ascribed to other authors: Romell (1926: 15, 19, 20) and Baxter (1932: 201). However, Lloyd seems to have been the first to use it.

Donk (1933: 226, who was then unaware of the pre-existence of the recombination *Poria versipora*) preferred to use the form *Polyporus versiporus* because he did not like to make the new combination, 'im Hinblick auf den zweifelhaften Wert des Genus "Poria" . . . und [um] die Synonymik nicht überflüssig zu vermehren', several earlier published names being available. For a discussion of what I think is the correct name, see under 'paradoxus'.

Specimens of the main-variety in Herb. Pers. are:—

Type.—L 910.277-315. "*Polyporus versiporus* a. *immutatus* seu poris aequalibus integris. / Prope Parisios" (written by Persoon). — Lectotype of both *Polyporus versiporus* Pers. and *P. versiporus* var. *immutatus* Pers., chosen by Donk (1933: 225).

Other specimens.—The following five specimens are conspecific with the type.

L 910.277-318. "*Polyporus versiporus* a. *immutatus*. / Ad sepes prope Parisios" (written by Persoon). Duplicate L 910.277-320.

L 910.277-286. "*Polyporus versiporus* (junior)" (written by Persoon).

L 910.277-322. "*Polyporus versiporus* var. / *Sistotrema fasciculare* var. *Polyph. versipori* / Prope Parisios" (written by Persoon).

L 910.277-326. "*Polyporus versiporus* var. ?" (written by Persoon).

L 910.277-331. Collected by Delastre after 1825 and named by him *Polyporus versiporus* Pers., collections from different substrata. — Not annotated by Persoon. At least two (out of three) specimens are conspecific with the above.

L 910.277-332. "*Polyporus versiporus* (junior) ? *Sistotrema sepium*" (written by Persoon). — A resupinate hydnaceous species.

Persoon distinguished a number of varieties of *Polyporus versiporus*; these are briefly reviewed:

Polyporus versiporus var. (γ) *angulatus* Pers. 1825: 105.

No specimen could be found under this name in Persoon's herbarium, but I think the following specimen may well be the collection on which the name was based.

Type?—L 910.277-335 in Herb. Persoon. "*Polyporus versiporus* γ . *immarginatus* / Vide Mycol. Europ. Sect. 2" (written by Persoon). — Named *Polyporus versiporus* by Donk (1932).

Polyporus versiporus var. *deflexus* Pers. 1825: 106.

Fide Donk (1933: 226) the type would seem to be "*Radulum*" [*Hyphodontia quercinum* Fr. (sensu Bres.) in poor condition.

Type.—L 910.277-330 in Herb. Persoon. "*Polyporus versiporus* δ . *deflexus*" (written by Persoon).

Polyporus versiporus var. *farinosus* Pers. 1825: 106.

According to Donk (1933: 226) this is a form of *Polyporus versiporus*.

Type.—L 910.277-334 in Herb. Persoon. "*Polyporus* / *versiporus* / *Boletus farinaceus* / var. ζ . *farinosus*. Myc. 2. p. 106" (written by Persoon).

Polyporus versiporus var. *immutatus* Pers.—See above.

Polyporus versiporus var. *lanuginosus* Pers. 1825: 106.

According to Donk (1933: 226) a form of *Polyporus versiporus* with strongly rhacodioid margin.

Type.—L 910.277-328 in Herb. Persoon. "*Polyporus versiporus* β . *lanuginosus*" (written by Persoon).

Polyporus versiporus var. *sistotremoides* Pers. 1825: 105.

Donk (1933: 225) determined the one specimen he studied as "eine Form von *Radulum quercinum* Fr." Another collection was overlooked at that time because it had been mislaid in the herbarium. When found this second collection answered to the original description and it is here considered type. It consists of a mixture of two species, '*Polyporus versiporus*' and a hydneaceous fungus which Bresadola named "*Radulum molare* Pers." By selecting the first-mentioned part of this collection as type, *Polyporus versiporus* var. *sistotremoides* becomes a synonym in the *Poria versipora* complex.

Specimens in Herb. Persoon are:—

Type.—L 910.264-918. "*Polyporus versiporus* β . *sistotremoides*" (written by Persoon). — One piece was sent to Bresadola (1895), who annotated it "est *Radulum molare* Pers. forma aculeis compactioribus". Three other pieces also belong to this species, but in addition there are two pieces of *Poria versipora* and these are here selected as *typus* 'sensu stricto'.

Other specimen.—L 910.277-323. "*Sistotrema fasciculare* juniore adhuc in statu ? / *Polyporus versiporus* var. *Sistotremoides*" / Prope Parisios" (written by Persoon). — Annotated by Donk (1932): "= *Radulum quercinum* Fr. sensu Bres. sp. 6.5-9.2 μ ". L 910.277-321 is a duplicate.

vitreus. — *Poria vitrea* Pers. 1795: 14 & 1796: 15 (devalidated name); *Boletus vitreus* (Pers.) Pers. 1801: 545 (devalidated name); *Polyporus vitreus* (Pers.) per Fr. 1821: 381; *Poria vitrea* (Pers. per Fr.) Cooke 1886; *Rigidoporus vitreus* (Pers. per Fr.) Donk 1966.

Bresadola (1903: 78) referred "*Polyporus vitreus* Fr. (an Pers.?)" as synonym to *Poria undata* (Pers.) Quél. (q.v.). He added "Specimina originalia non adsunt. *Poria vitrea* Pers. forte distincta, at ego frustra hucusque identitatem comprobare potui." Recently Donk (1966: 341) protested against the dissociation of the original name

from Persoon as author; after comparing Persoon's protologue with Fries's phrase of 1821 he concluded that there was no reason to assume that Fries described a different species in 1821. In any case he copied so much from Persoon's protologue that Persoon's type must be accepted as an integral part of his conception, even if he confused the original fungus with other species. It is likely that in later years Fries described a different fungus, but that is of little importance in this connection.

Another problem is the correct identity of *Poria vitrea*. There are two species to be primarily taken into consideration. In one of these the context of the hymenophore contains a fair amount of thick-walled hyphae which often end in blunt somewhat club-shaped, often crystal-encrusted cystidia. The other one does not have particularly thick-walled hyphae. The former received several names: *Poria undata* (q.v.), *Polyporus orthoporus* (q.v.), ? *Poria frustulata* (q.v.), *Polyporus broomei* Rab., &c. The latter is very close to *Poria sanguinolenta* (A. & S. per Fr.) Cooke, if not a form of it. *Poria sanguinolenta* may often occur in a habitat similar to that of the second fungus, viz. vertical surfaces of very old, rotten stumps, but the production of nodules (often in rows) from which the rather long tubes hang down is not typical; its tubes dry up largely as more or less typically reticulate pores. It is this fungus, close to, but distinct from, *P. sanguinolenta*, for which I had previously reserved the name *Poria vitrea*. The qualifications "undulata, subinterrupta; poris obliquis" from Persoon's descriptions, as well as the habitat that he indicated ("in sylvis autumnno super truncos") strongly support this conclusion. Judging from descriptions this conception appears to be the same as what Lowe (1966: 41) described as *Poria vitrea*, and Bourdot & Galzin (1928: 682) as *Poria undata*; these authors do not mention the cystidia of *P. undata*.

What species Fries had in mind in his later publications is not very evident. He soon widened the description: "Legi inter corticem et lignum individua sistencia membranam subcoriaceam albam (optimum xylostroma!) sed locis minus arcte clausis protuberant noduli distantes fertiles omnino hujus fungi!" (Fries, 1828: 119). In 1874 (p. 577) "mycelio xylostromeo tenaci separabili" even became part of the specific phrase. These mycelial sheets Fries (1838: 485) identified with *Xylostroma candidum* Pers. and later he also included *Polyporus xylostromeus* Pers. as synonym in his conception of *Polyporus vitreus* (Fries, 1874: 577). It is doubtful whether these xylostromoid forms really belonged to the species as originally conceived. Such mycelial sheets are also known in *Polyporus* [*Skeletocutis*] *amorphus* Fr., certain forms of which at least Quélet (1888: 383) may have included in his conception of *P. vitreus* ("bordé d'une frange byssoïde blanche"). It is quite likely that he had named such forms for Bourdot accordingly, since Bourdot & Galzin (1928: 549) consider "*Poria vitrea* sensu Quélet!" to be a mere form of *P. amorphus*.

It is not yet known what species Karsten (1889: 324; as *Physisporinus vitreus*) understood by his conception, which is the type of the generic name *Physisporinus* P. Karst.: "... Sporerna ovala, spetsade, stundom sneda och stötande n.i. gult, 6-9 = 4 mmm. . . . Murkna björkstamm . . ." This can be neither *Polyporus amorphus* nor *P. vitreus*, the spores being quite evidently different from those of both species.

Bresadola's first interpretation (1897: 85) was based on a fungus that Bresadola (1903: 78; "absque dubio") and Bourdot & Galzin (1928: 679) reduced to a mere form of *Poria vulgaris* (Fr.) Cooke [sensu Bres. = *Poria romellii* Donk].

Type.—Not known to be in existence.

Specimen.—L. 910.277-327 in Herb. Persoon. "*Poria vitrea* ?" (written by Persoon). — Annotated by Bresadola: "Non typus Personii ! = *Polyporus chioneus* Fr. var. *resupinatus*". The latter taxon is now called *Polyporus semipileatus* Peck (usually with caps) or *Poria subincarnata* (Peck) Murrill (a completely effused species). The fruitbodies are almost completely destroyed.

vulgaris. — *Polyporus vulgaris* Fr. 1821: 381; *Poria vulgaris* (Fr.) Cooke 1886, not ~ S. F. Gray 1821.

Fries reported his *Polyporus vulgaris* as "pervulgatus", extremely common, in southern parts of Sweden, presumably around Lund (where he studied) and/or around Femsjö (where he lived when the "Systema" was published). There are enough indications to conclude that in 1821 he mixed up several species; compare, "ad ligna dejecta pinea &c.; etiam supra folia".

The most important interpretation has been that by Bresadola (1897: 86, in part, only as to forma *typica* Bres.), fully described by Bourdot & Galzin (1928: 679). The best recent account of this species was published by Eriksson (1949: 3 f. 1) under the name "*Poria byssina* (Pers.) Romell". The denomination *Poria romellii* Donk is introduced on p. 84 as the correct name under *Poria* for the fungus that Bresadola called *Poria vulgaris*.

Romell (1911: 25) originally applied the name *Polyporus vulgaris* to the species that is currently called *Poria xantha*. Later he changed his mind (Romell, 1926: 20) and used the name for *Poria biguttulata* Romell [= *Poria subincarnata* (Peck) Murrill].

Neither Bresadola nor Romell seems to have known that Fries had kept a specimen labelled in his own handwriting "*Polyporus vulgaris* Fr. Femsjö". Eriksson (1949: 4-5) studied this collection and reported that it consisted of three pieces glued to a sheet. The upper two fragments (which had evidently once formed a single piece) are *Poria lenis* (P. Karst.) Sacc., while the third piece seems to be *Poria subincarnata*. The part consisting of *P. lenis* is browned with age but otherwise in good condition; the part referred to *P. subincarnata* is not so well preserved (the fruitbody probably having been old when collected); Eriksson, therefore, was not disposed to determine it quite definitely. He remarked that "Fries' reporting about the occurrence of *Polyporus vulgaris*: 'Pervulgatus at ligna pinea etc.' fits well for *Poria lenis* and [*P.*] *subincarnata* together." Both species have been repeatedly collected around Femsjö by Romell and Dr. J. A. Nannfeldt.

Thus, it seems possible after all to fix a type for the name *Polyporus vulgaris* Fr.: the part of the above mentioned collection agreeing with *Poria lenis* is herewith selected as lectotype. This is not to say that it is advisable to apply the name accordingly. It appears preferable to waive the use of the name *Polyporus vulgaris* as a nomen ambiguum, at least as long as the species is left in the artificial genus *Poria*, where it is preoccupied by *Poria vulgaris* S. F. Gray 1821.

Recapitulation:—

Sensu typi	= <i>Poria lenis</i> (P. Karst.) Sacc.
Sensu Bresadola (f. <i>typica</i>)	= <i>Poria romellii</i> Donk
Sensu Romell 1911	= <i>Poria xantha</i> (Fr. per Fr.) Cooke
Sensu Romell 1926	= <i>Poria subincarnata</i> (Peck) Murrill

xantha s. — *Polyporus xanthus* Fr. 1815: 128 (devalidated name) per Fr. 1821: 379; *Poria xantha* (Fr. per Fr.) Cooke 1886; &

Polyporus xanthus Fr. per Fr. sensu Lind 1913: 389.

Every yellow species of *poria* has been determined either incidentally or more consistently as *Poria xantha*. For what may be accepted as the correct interpretation, see Eriksson (1949: 18 f. 5); his is the most widely accepted conception.

Both Bresadola (1903: 77) and Romell (1926: 21, 22) report on a specimen in Fries's herbarium; both authors found it to be sterile and Romell was not quite certain that it belonged to the species now called *Poria xantha*. I assume that they studied the specimen from Femsjö, "Leg. et det. E. Fries" (UPS), which Eriksson included without comment under his conception of *Poria xantha*.

Many mycologists ascribed *Poria xantha* to Lind (1913: 389), or even "Lindau", "Lindbl[ad]", or "Lindl[ey]", or state that they conceive it to be in agreement with his interpretation. Presumably this practice is to be traced back to Romell (1926: 22). It is confusing. What Lind described from Denmark is often taken to be an exceptional growth-form occurring on *Larix*, not the thin form common in Sweden. The species in Lind's sense has also been found in Sweden. The modern application of the name *Poria xantha* to the common 'thin' form and eventually including the 'thick' form, goes back not to Lind but to Bresadola (1903: 77).

Poria xantha may be very similar to *Poria crassa* (P. Karst.) Sacc. and the two have been repeatedly confused, even by foremost specialists, like Bresadola and Overholts (1942: 53). Eriksson (1949: 30 f. 5) claimed that cystidioles are lacking in *Poria xantha*, but both Lowe (1946: 34 f. 6) and Domański (1965b: f. 27) report hymenial leptocystidia ('cystidioles') not unlike those of *Poria crassa*. In certain mounts I found that these bodies may even be very numerous. The two species are easily distinguishable on account of the non-amyloidity of the hyphae, the walls of the skeletal becoming gelatinously swollen in KOH solution, and the wider, oblong-ellipsoid spores in *P. crassa*.

Several forms with thick or/and often nodular fruitbodies from *Larix* and other coniferous trees have been attributed to *Poria xantha* during the past few decades. They were described under various names, for instance *Poria xantha* f. *crassa* (P. Karst.) Baxt. sensu Baxt.; *Poria xantha* sensu Lind, *Trametes cinereo-sulphurea* Ferd. & Winge 1943, and *Poria xantha* f. *pachymeres* Eriksson (1949: 22), all from *Larix* (the last two names not validly published, lacking Latin descriptions); *Poria calcea* var. *bulbosa* (Fr. apud Weinm.) Pilát sensu Pilát and *Poria calcea* f. *stratosa* Pilát, both *vide* Domański (1964: 171) = *Poria xantha* f. *pachymeres*; and in North America even as resupinate *Fomes* [*Laricifomes*] *officinalis* (Vill. per Fr.) A. Ames.

Of these, *Poria xantha* f. *crassa* (P. Karst.) Baxt. (1936: 255) appeared to be a misapplied name. Baxter cited "*Poria crassa* Karst. non Fr. in European herbaria" and as its only "important specimen" studied the portion of the type collection of *Physisporus crassus* P. Karst. in Romell's herbarium. The portion of this collection in Karsten's herbarium was selected as type by Lowe (1956: 110-111). Romell's share was previously studied by Litschauer (1939: 145) who considered it "eine Probe des Urstückes dieser Art". It was also cited by Eriksson (1949: 24) when he published the first full description of *Poria crassa*. Not only the application of the name *Physisporus crassus* by Baxter, but also the "non Fr." in his citation of the basionym are incomprehensible to me.

According to Lombard & Gilbertson (1965: 53) the above-mentioned form described by Baxter as *Poria xantha* f. *crassa* (based on a series of North American collections) as well as the material referred to *Fomes officinalis* by Weir (1917: 135; "often fruiting in *Poria*-like form") represent a different species from *Poria xantha*. They hold that these agree with *Poria alpina* Litschauer (1939: 143) described from Europe. It would be interesting to determine which of the other denominations listed above for the 'thick' form fall within their interpretation of Litschauer's species. A careful comparison of Litschauer's protologue with Lombard & Gilbertson's conception of his species has raised some doubt in my mind about the complete identity of the two taxa involved.

REGAPITULATION

The following recapitulation embodies a liberal selection from the correct names and synonyms as they are accepted in this paper. Where no generic names are mentioned the epithets actually form combinations with '*Poria*'. Where in the right-hand column no author's citations are given, it will be possible to supply these by looking up the name (epithet) in the left-hand column.

<i>albobrunneus</i> (Romell) Lloyd	= <i>Tyromyces gloeocystidiatus</i> Kotl. & P.
— sensu Kotl. & P. 1956	= dubious determination
— sensu Nobles 1958	
<i>albolutescens</i> (Romell) Bourd. & G.	= <i>Sistotrema eluctor</i>
— sensu Romell, in part	
<i>alpina</i> Litsch. (p. 125)	
<i>aneirinus</i> (Sommerf.) Cooke	= <i>Oxyporus corticola</i> (Fr.) E. Komar.
— sensu Fr. in herb., in part	= <i>Bjerkandera adusta</i> (Willd. per Fr.) P. Karst.
<i>argentea</i> Ehrenb.	= nomen dubium,
<i>aurantiaca</i> (Rostk.) Sacc.	= <i>Poria salmonicolor</i>
— sensu Bres.	= <i>Poria salmonicolor</i>
<i>aurantiacus</i> Lasch, <i>Polyporus</i>	= <i>Chaetoporus nitidus</i>
<i>blyttii</i> (Fr.) Cooke	= <i>Stromatoscypha fimbriatum</i>
<i>byssina</i> (Schrud.) per Quél.	= <i>Poria romellii</i>
— sensu Pers. in herb., in part	Cf. <i>Cristella mollusca</i>
— sensu Quél.	= <i>Poria romellii</i>
<i>byssina</i> Romell ("Pers.")	= nomen dubium
<i>calcea</i> (Fr. ex Pers.) Cooke	

- sensu Bres.
 — sensu Romell (as syn.)
candidissima (Schw.) Cooke (p. 95)
cellaris Desm., *Polyporus*
cerasi (Pers.) per Fr., *Polyporus*, sensu Fr.
collabens (Fr.) Cooke (p. 107)
colliculosus Pers., *Polyporus*
confusus Donk, *Ochroporus* (p. 108)
contiguus (Pers. per Fr.) P. Karst
cribrosus Pers., *Polyporus* (nomen monstrosi-
 tatis)
cruentus Pers., *Polyporus* (nomen confusum)
deformis Fr., *Irpex* (p. 104)
dentipora (Pers.) Cooke
 — sensu Bres.
dentipora Pilát
dentiporus Bond. & S., *Coriolus*
dermatodon Pers., *Sistotrema*
digitatum Pers., *Sistotrema* (p. 102)
eluctor Donk, *Sistotrema* (p. 102)
eupora (P. Karst.) Cooke (p. 100)
expansa (Desm.) H. Jahn
ferrea (Pers.) Bourd. & G.
ferruginosa (Schrad. per Fr.) P. Karst.
fimbriata Pers.
frustulatus Pers., *Polyporus*
fuliginosus Schleich., *Boletus* (nomen nudum)
 — sensu Schleich.
incerta (Pers.) Murrill (p. 118)
laneus Pers., *Polyporus*
medulla-panis (Jacq. per Fr.) Cooke
 — sensu Sow.
medullaris S. F. Gray
megalopora (Pers.) Cooke
micans (Ehrenb. per Fr.) Cooke
 — sensu Bres.
mollicula Bourd. (p. 113)
mollusca (Pers. per Fr.) Cooke
 — sensu Bres.
 — var. *fissus* Pers., *Polyporus*
mollusca P. Karst., *Bjerkandera*
mucida (Pers. per Fr.) Cooke
 — sensu Bres.
 — var. *radula* Bourd. & G.
nitidus (Pers. per Fr.) Cooke
 — sensu Boud.
 — sensu Bres. 1903
obducens (Pers.) Cooke
obliquus (Schrad. per Fr.) Fr., *Irpex* (p. 103)
onusta (P. Karst.) Sacc.
 = *Poria lenis* (P. Karst.) Sacc.
 = *Poria xantha*
 = *Cristella mollusca*
 = *Phellinus contiguus*
 = *Hyphoderma radula* (Fr. per Fr.) Donk
 = *Chaetoporus collabens* (Fr.) Pouz.
 = *Pachykytospora tuberculosa*
 = *Phellinus ferruginosus*
 = *Phellinus contiguus* (Pers. per Fr.) Pat.
 = *Phellinus contiguus*
 = *Antrodia serialis* (Fr.) Donk, parasitized
 = *Schizopora paradoxa*
 = *Hirschioporus abietinus* (Pers. per Fr.) Donk
 = "Coriolus" *dentiporus*
 = "Coriolus" *dentiporus* (typonym)
 = nomen dubium
 = *Spongipellis pachyodon* (Pers.) Kotl. & P.
 = *Schizopora paradoxa*
 = *Chaetoporus nitidus*
 = *Phellinus ferreus* (Pers.) Bourd. & G.
 = *Phellinus ferruginosus* (Schrad. per Fr.) Pat.
 sensu Bres.
 = *Stromatoscypha fimbriatum* (Pers. per Fr.) Donk
 = *Rigidoporus undatus*
 = *Phellinus ferruginosa*
 = *Phellinus contiguus*
 = *Antrodia sinuosa* (Fr.) P. Karst.
 = *Skeletocutis amorphus* (Fr.) Kotl. & P.
 = *Perenniporia medulla-panis* (Jacq. per Fr.)
 Donk sensu Pers.
 = unidentified
 = *Perenniporia medulla-panis* sensu Pers.
 = *Poria expansa*
 = *Chaetoporus nitidus*
 = *Pachykytospora tuberculosa*
 = *Cristella mollusca* (Pers. per Fr.) Donk
 = *Poria mucida*
 cf. *Poria romellii*
 = nomen dubium
 = *Schizopora paradoxa*
 = *Schizopora paradoxa*
 = *Chaetoporus nitidus* (Pers. per Fr.) Donk
 cf. *Oxyporus obducens*
 = *Poria salmonicolor*
 = *Oxyporus obducens* (Pers.) Donk
 = *Schizopora paradoxa*
 = *Cristella mollusca*

- sensu Bourd. & G.
orthoporus Pers., *Polyporus* (not validly published)
paradoxus (Schrad. per Fr.) Fr., *Irpex pseudo-boletus* DC., *Hydnum* (p. 104)
pulchrum Pers., *Xylomyzon racodioides* (Pers.) Bres.
radula (Pers. per Fr.) Cooke
 — sensu Bres.
rangiferinus Pers., *Polyporus* (p. 93)
rixosa (P. Karst.) P. Karst.
romellii Donk (p. 84)
roseomaculata P. Karst., *Bjerkandera* (nomen confusum)
rufus (Schrad. per Fr.) Cooke
 — sensu Fr.
salicinus (Pers.) per Fr., *Polyporus*
- sensu Fr. 1838
 — sensu Fr. 1884
salmonicolor (B. & C.) Cooke (p. 80)
sanguinolentus (A. & S. per Fr.) Cooke
- sensu Bres. 1897
 — sensu Bres. 1903, in part
scalaris Pers., *Polyporus*
squalens (P. Karst.) Lowe sensu Lowe (p. 78)
subtilis (Schrad. per Fr.) Bres.
 — sensu Fr.
taxicola (Pers.) Bres.
tenuis P. Karst., *Chaetoporus* (p. 73)
terrestris (Pers. per Fr.) Cooke
- sensu DC., Bourd. & G.
 — sensu Bres. 1897
terrestris Bourd. & G.
tuberculosa Pers.
tuberculatus Fr., *Polyporus*
undata (Pers.) Quél.
 — sensu auctt. nonn.
unita (Pers.) P. Karst.
 — sensu Donk
vallantii (DC. per Fr.) Cooke
vaporaria (Pers. per Fr.) Cooke
 — sensu Fr.
 — sensu P. Henn., in part
 — sensu auctt. pl.
vaporaria Bres.
varicolor (P. Karst.) Cooke
 — sensu Bres. (as syn.)
 — sensu Lowe
versipora (Pers.) Lloyd
- = *Sistotrema eluctor*
 = *Rigidoporus undatus*
 = *Schizopora paradoxa* (Schrad. per Fr.) Donk
 = nomen dubium
 = *Merulius taxicola*
 = *Phellinus contiguus*
 = *Schizopora paradoxa*
 = *Chaetoporus separabilimus* Pouz.
 = nomen dubium
 = *Chaetoporus collabens*
- = *Antrodia serialis* (Fr.) Donk, parasitized
 = nomen dubium
 = *Merulius taxicola*
 = nomen ambiguum; = *Phellinus ferruginosus* sensu Bres.
 = *Phellinus* sp. (pileate)
 = *Phellinus conchatus* (Pers. per Fr.) Quél.
- = *Rigidoporus sanguinolentus* (A. & S. per Fr.) Donk
 = *Poria gilvescens* Bres.
 = *Ceriporia bresadolae* (Bourd. & G.) Bond. & S.
 = *Antrodia serialis* (Fr.) Donk
 = *Poria albobrunea*
 = *Cristella mollusca*
 cf. *Stromatoscypha fimbriatum*
 = *Merulius taxicola* (Pers.) Duby
 = *Chaetoporus nitidus*
 = *Abortiporus biennis* (Bull. per Fr.) Sing., thin, effused form
 = *Poria mollicula*
 = *Rigidoporus sanguinolentus*
 = *Poria mollicula*
 = nomen dubium
 = *Pachykytospora tuberculosa*
 = *Rigidoporus undatus* (Pers.) Donk
 cf. *Rigidoporus vitreus*
 = nomen dubium; cf. *Poria expansa*
 = *Perenniporia medulla-panis* sensu Pers.
- sensu typi = nomen dubium
 = *Antrodia sinuosa* (Fr.) P. Karst.
 = "Polyporus" henningsii Bres.
 = *Schizopora paradoxa*
 = *Antrodia sinuosa* (Fr.) P. Karst.
 = nomen dubium
 = *Poria* [*Perenniporia*] *pulchella* (Schw.) Cooke
 = *Chaetoporus luteo-albus* (P. Karst.) M. P. Christ.
 = *Schizopora paradoxa*

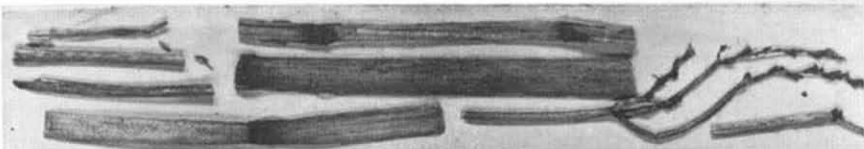
- var. *angulatus* Pers., *Polyporus* = *Schizopora paradoxa*
 — var. *deflexus* Pers., *Polyporus* = *Hyphodontia quercina* (Pers. per Fr.) Jo. Erikss. sensu Fr.
 — var. *farinosus* Pers., *Polyporus* = *Schizopora paradoxa*
 — var. *immutatus* Pers., *Polyporus* = *Schizopora paradoxa*
 — var. *lanuginosus* Pers., *Polyporus* = *Schizopora paradoxa*
 — var. *sistotremoides* Pers., *Polyporus vitrea* (Pers. per Fr.) Cooke = *Schizopora paradoxa*
 — sensu Quéf. = *Rigidoporus vitreus* (Pers. per Fr.) Donk
 — sensu P. Karst. = *Skeletocutis amorphus* (Fr.) Kotl. & P.
 — sensu Bres. 1897 = dubious determination
vulgaris (Fr.) Cooke = *Poria romellii*
 — sensu Bres. = nomen ambiguum; = *Poria lenis* (P. Karst.) Sacc.
 — sensu Romell 1911 = *Poria romellii*
 — sensu Romell 1926 = *Poria xantha*
xantha (Fr. per Fr.) Cooke = *Incrustoporia subincarnata* (Peck) Domański
 — sensu Quéf. = *Poria salmonicolor*
 — sensu Lind = *Poria xantha* f. *pachymeres* Jo. Erikss. (not validly published)

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379.

A var. a,

(400 échantillons.)

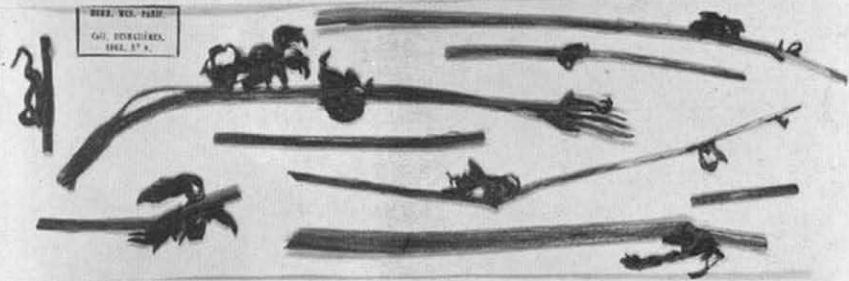
Phoma

Phoma exigua, Desmaz. Voy. nos. tab. p. 175

Je vois cultiver tous les ans, dans toute comme plante d'ornement, dans un coin du jardin de l'évêché, un *Soragor* dont les tiges s'élevaient de sept à huit pieds. Ce n'est probablement qu'une variété de *Polygonum papaverum* de L. Quoiqu'il en soit, ces tiges et leurs divisions sont l'habitat de six à douze espèces cryptogamiques au moins: il y en a de quatre faire tourner une tête aussi peu solide que la mienne. Deux-uns, vous n'avez rien à craindre de semblable, parce que je ne puis vous dire qu'un chose à la fois. — Le premier est et un *Uromyces*, et un de petite taille, que je crains qu'elle ne soit que propre à servir de nourriture, mais tout pis, mortelle. Vous pourriez m'en dire une autre fois.

Elle habite également les tiges, les branches et les racines. Les endroits où elle se développe sont humectés, parce qu'elle en a fait probablement l'attraction. Sur les tiges, elle forme des tâches grises, étalées dans le sens longitudinal du support, de plusieurs lignes de long, sur une largeur double, trois ou quatre fois moindre; formées par de petits réceptacles assez rapprochés les uns des autres. Sur les racines, on ne distingue plus de tâches: les réceptacles paraissent éparpillés, quoiqu'ils soient également rapprochés, et sont souvent disséminés tout autour du support, quelquefois même sur les racines. Les réceptacles sont arrondis, toujours recouverts par l'épiderme sous lequel ils sont nichés. Ils sont très

HERB. NO. 1812
GÉN. DESMAZIERE.
1812. 87 a.



372.

(300 échantillons.)

Phoma minuscula (Kob.) *Phoma exigua*, b. Voy. nos. tab. p. 175

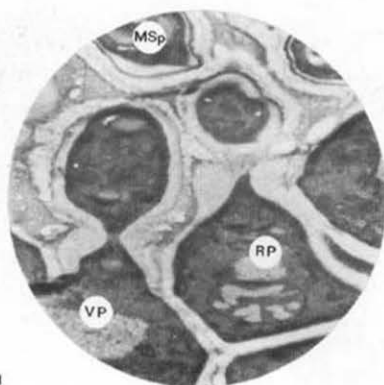
Il faut de bons yeux, mon bon ami, pour apercevoir cette petite espèce. Dans le discours de la longue, il faut une bonne loupe pour la voir d'une manière satisfaisante; il faut une bonne loupe de coraille pour voir les yeux, perdre son temps et laisser la patience avec une patience médiocre. C'est la cryptogamie pour la patience et le temps perdu!

Cette espèce, puisqu'elle vit sur les tiges et les feuilles mortes de *Ranunculus nemorosus*: elle vit sur le *Ranunculus bulbosus*; mais je l'ai remarquée sur le *R. acris*. Dès que les tiges commencent à s'élever, on voit l'hyphes de place en place des tâches d'un rouge terne, sur lesquelles se montrent bientôt les réceptacles, qui s'étendent avec elles, et finissent par envahir les branches, les racines et les pieds entiers, et la face inférieure des feuilles. Le support a parcouru alors le cours de son existence, car les grains sont morts et tombent: il ne paraît plus exister que pour le parasite, qui s'adapte de toutes parts. Il brèche en ce delà haut, et alors les réceptacles, plus dans

1869 PHOMA EXIGUA, Desmaz. Ann. des Sc. nat. 1849.

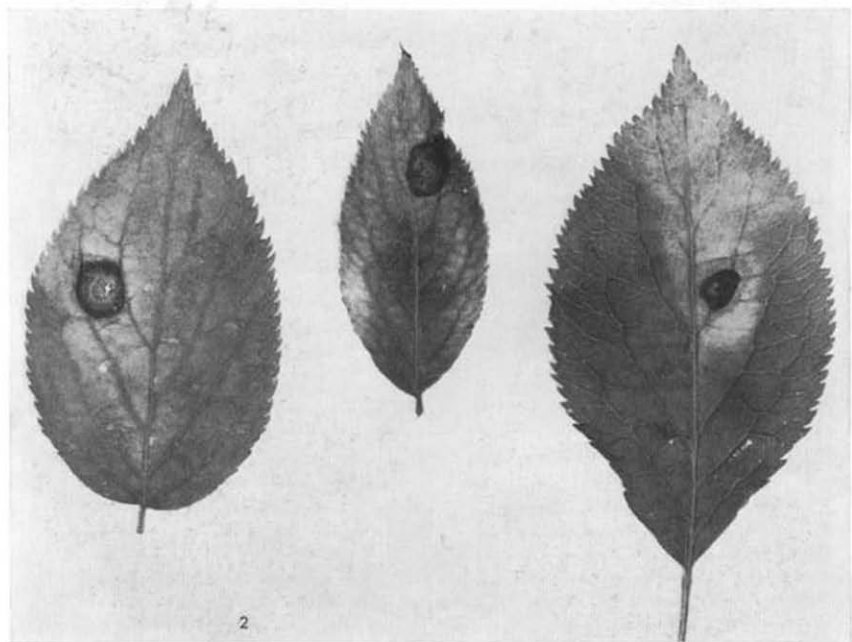
- a. *Peritheciis rotundatis*. Occurrit in foliis Polygoni tatarici?
- b. *Minor*; peritheciis sepe oclatis. Occurrit in foliis Ranunculi.

Cette espèce est quelquefois caulicole; on la distinguera alors et au premier coup d'œil, du *Phoma Desmazieri*, Dur. et Mont. Fl. d'Alg., en ce qu'elle est beaucoup plus petite dans toutes ses parties.

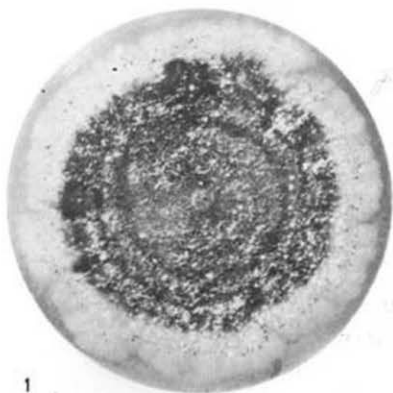


1

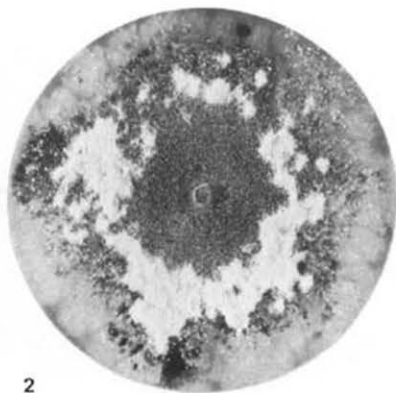
Photo Electron microscopy section of the Service Institute for Applied Mechanics and Technical Physics in Agriculture, Wageningen



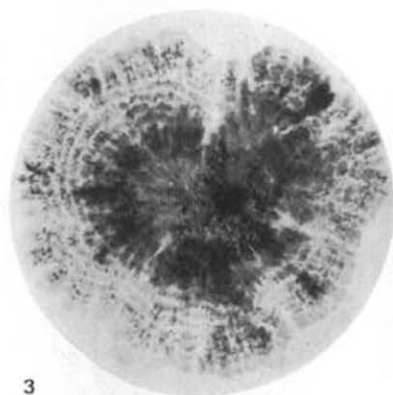
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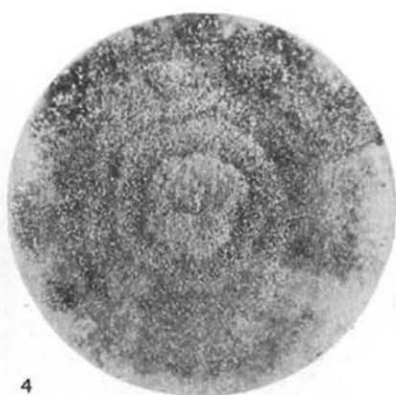
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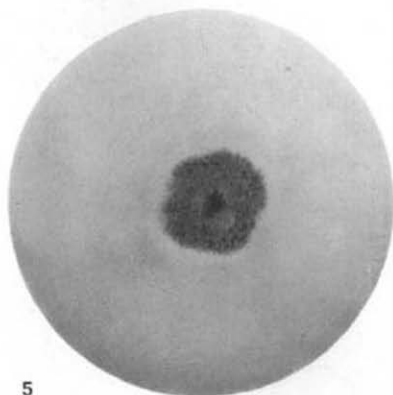
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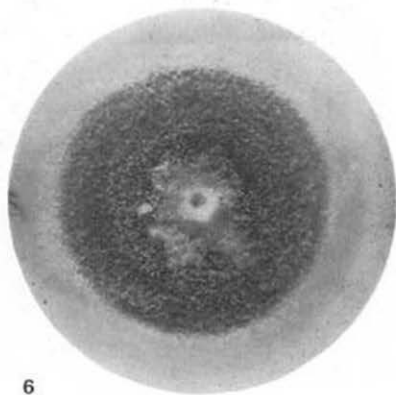
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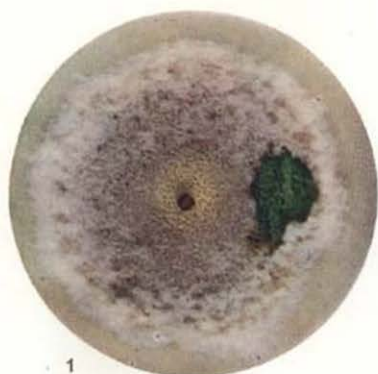
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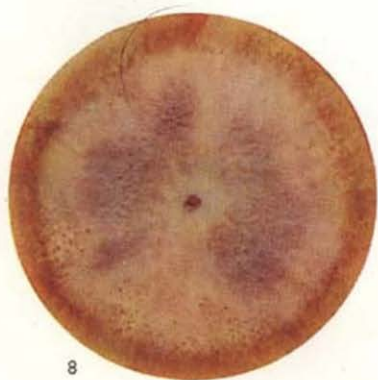
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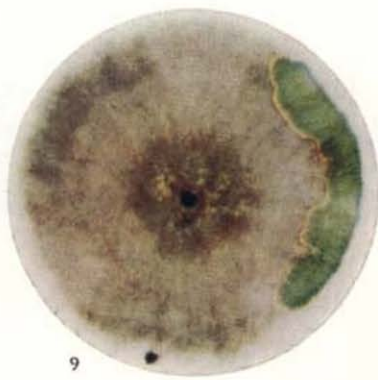
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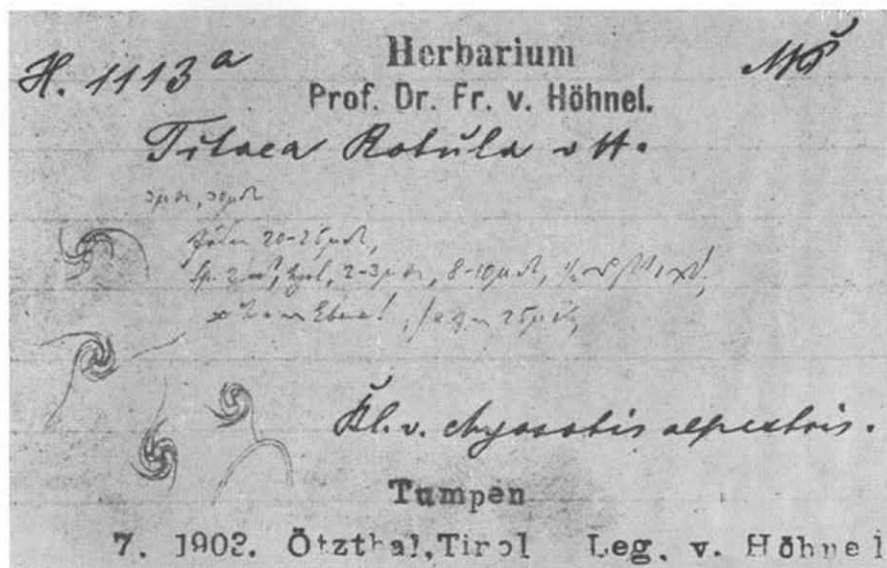
7



8



9



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4