

NOTES ON HYDNUMS

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This paper deals with a number of specific and subspecific names omitted from the previous series, "The stipitate Hydnums of the Netherlands". The new combination *Bankera mollis* (P. Karst.) Maas G. is proposed, and *Phellodon carnosus* and *Bankera carnosus* are reduced to its synonymy.

"...sed quis omnes praesumtas opiniones pessundare audet?"—E. M. Fries, Syst. mycol. 2: 19, note. 1822.

The parts of "The stipitate Hydnums of the Netherlands", here referred to as Part I, II, &c., were written in successive steps, and, as indicated by their title, at least originally meant to cover only the indigenous species, or at most also such species as might be expected to be found in this country. Gradually, however, I was made to realize that it was necessary to consider more and more species, whether they had or had not any relation to those found inside our political boundaries. As a result, Part IV looks very different indeed from Part I, whilst the present paper is needed to mend the shortcomings of Parts I to III.

In my attempts to account for the numerous names proposed for species of stipitate Hydnums I have been greatly assisted by information and/or loans from the Herbaria at Beltsville, Coimbra, Geneva, Helsinki, Kew, Lisbon, Moscow (Idaho; College of Forestry), Munich, Padua, Prague, Stockholm, Uppsala, Victoria (British Columbia; Forest Biology Laboratory), and Vienna. It is a pleasure to take this opportunity of once again expressing my deep appreciation. A great debt of gratitude I owe also to Dr. M. A. Donk, without whose help my work would not have been complete. I would also like to thank Mr. J. T. Palmer, Liverpool, for his help in correcting the English text of the present paper.

*abietis*. — *Hydnum abietis* Weir ex Hubert, Outline Forest Pathol. 305. 1931. — Type: "*Hydnum abietis* nov. spec." (BPI 9964).

After having discussed the above binomial (Part IV: 130), and on the advice of Dr. R. E. Foster, Victoria, B.C., I wrote to the National Fungus Collections, Beltsville, and the College of Forestry, Moscow, Idaho, requesting the loan of Weir's and Hubert's material.

The material received from the former institute (BPI) consisted of collections determined by Weir as *Hydnum coralloides*, *H. alpestre*, and *H. abietis*. Considering the confusion in the genus *Hericium*, it may be of interest briefly to report on these collections. Under the name of *H. coralloides*, Nos. 3598, 3599, 3600, 3601, and 11209 are correctly identified, but Nos. 3574, 11210, and one collection without

number are *Hericium ramosum*. What has been called *Hydnum alpestre* is *Hericium coralloides* in No. 16017, and the 'alpestre sensu Bresadola' form of this species in No. Q305. Of *Hydnum abietis*, Nos. 9964, 16019, and 16022 are *Hericium coralloides*; No. 16020 contains, apart from the normally developed form, some specimens referable to what I have called the 'contracted form'; whilst No. 16015 is entirely this form. Number 9964 is the most outstanding collection in that it is the only one to have an additional label which reads: "*Hydnum abietis* nov. spec. / on *Abies grandis* Lindl. / Priest River, Idaho. Sept. 19. 1916. Coll. and Det. by James R. Weir."

Comparing Weir's *Hydnum abietis* with his collections of *Hericium coralloides*, as well as with other specimens of that species of Canadian and European provenance, I have satisfied myself that the only difference lies in the somewhat shorter length of the spines of *H. abietis* (up to 8–9 mm), which to my mind does not provide a basis for the segregation of a new species.

The material of *Hydnum abietis* from Hubert's herbarium, borrowed from the College of Forestry at Moscow, Idaho, consists of some fragments which likewise represent nothing but *Hericium coralloides* with even shorter spines (up to 4 mm).

As far as the choice of the type of *Hydnum abietis* is concerned, the following considerations should be observed:

(i) Hubert, perhaps never intending to describe a new species, was afterwards credited with the authorship of that species, because he happened to be the first to supply a description; (ii) it is very likely that Hubert, in writing "*Hydnum* sp. (*H. abietis*)," meant to indicate that the bracketed name was the one adopted from Weir; (iii) one of the labels accompanying Weir's material is actually marked "*Hydnum abietis* nov. spec." From this it appears appropriate to designate Weir's collection (BPI 9964) as the type. It also follows that the correct author citation of *Hydnum abietis* should be, Weir ex Hubert. Summing up, it appears from the study of the said material that *Hydnum abietis* should be identified with *Hericium coralloides*, not *H. ramosum* as was my former guess.

*a c e r*. — *Phaeodon acer* (Quél.) P. Henn. in Nat. Pflfam. 1 (1\*\*): 149. 1898 ("acris").

An overlooked recombination which should be inserted in Part II: 56. It should also be noted that the ending in the specific epithet of *Sarcodon* "acre" is incorrect as it denotes the neuter form, whereas *Sarcodon* is masculine.

*a c u l e a t u s*. — *Clavaria aculeata* Blonski, Wyniki. Posz. Floryst. 17. 1890 (n.v.). — Type locality: Poland.

The description, as quoted with slight modifications from Corner (*Clavaria* 262. 1950), runs as follows:—

Very much branched, delicate, pinkish white. Branches terete, smooth, erect. Branchlets attenuate, mucronate, toothed with spines on all sides, concolorous or pinker, dense and regular. Spores white. On rotten trunks, in the mountains.

While Corner listed the present species under the dubious *Clavarias*, I have no doubt that *Clavaria aculeata* actually belongs to *Hericium*. Very probably even it is the 'alpestre sensu Bresadola' form of *Hericium coralloides*.

*adpressus*. — *Hydnum adpressum* Lloyd, Mycol. Writ. 4: 552, fig. 757. 1916. — Type: U.S.A., Alabama, Montgomery. No. 16967 (not seen; BPI).

Coker & Beers rightly considered the present binomial synonymous with *Sarcodon imbricatus*, but it should perhaps be added that *Hydnum adpressum* represents the old stage of that species as described and illustrated by Beardslee (1924: 256).

*affinis*. — *Hydnum affine* Lloyd, Mycol. Writ. 7: 1296. 1924 (nomen nudum); see Stevenson & Cash in Bull. Lloyd Libr. 35: 67. 1936. — Type: "*Hydnum affine* / No. 16729" (BPI).

Lloyd thought his species to be near *Hydnum ferrugineum*, in other words a species of the genus now called *Hydnellum*. From the description drawn up from the type specimen, it is apparent that this is not so.

Pileus broken, largest diameter 26 mm, plano-convex, depressed in centre, surface smooth, glabrous, yellowish brown to rufous brown in places, margin involute. Stipe 20 × 5–11 mm, tapering downwards, smooth, glabrous, somewhat shining, paler than pileus above, dark brown below, with remnants of whitish felt at base. Spines decurrent, up to 3 mm long, chocolate brown. Context homogeneous, pallid in pileus (stipe not sectioned owing to scanty material available). Hyphae thin-walled, much inflated in places, without clamp connections. Spores roughly tubercular, irregular in outline, yellowish, 5.4–6.3 × 3.6–4.0 μ (warts not included). Taste neither peppery-acrid nor bitter.

From the colour of the spines, the shape of the spores, and the nature of the hyphae of the flesh it is clear that Lloyd's specimen belongs to the genus *Sarcodon*. Of the groups proposed in Part I: 46, Group 1 may be excluded on account of the pale colour of the flesh. The lack of clamp connections rules out Group 3, which leaves Groups 2 and 4 to be considered. The latter is not very likely, since the only non-scaly species of this group, *Sarcodon amarescens*, is both peppery and bitter, although it is certainly prudent to remember that this character may have disappeared on drying. But then, the stipe of *S. amarescens* is certainly not dark brown at the base. Excluding this possibility, the one group left would be Group 2, but it is at once clear that Lloyd's specimen has nothing to do with either *Sarcodon bubalinus* or *Hydnum badium* sensu Lundell. Obviously, *Hydnum affine* is not identifiable with any European species.

Keying out the specimen with Coker & Beers's work, I find that it comes nearest *Sarcodon stereosarcinon* (= *S. brevipes*), but it differs from that species in the somewhat bigger spores (the spores in our collections of *S. stereosarcinon* from Canada measure 4.0–4.5 × 2.7–3.6 μ, warts not included), and the lack of the peculiar concentric, slightly darker zones near the margin.

Whether the specimen represents an undescribed species must be left undecided for the moment.

*albus*. — *Hydnum album* Raddi in Mem. Mat. Fis. Soc. ital. Sci., Modena 13: 361. 1807 (nomen nudum).

This binomial, which was enumerated by its author in a checklist, but of which no description was given, should have been mentioned in connection with *Hydnum album* Pers. ex Steud. and *H. album* Fr., see Part IV: 135.

*amarescens*. — *Phaeodon amarescens* (Quél.) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898.

To be inserted in Part I: 47.

*aspratus*. — *Hydnum aspratium* Berk. ex Cooke in Grevillea 10: 121. 1882. — *Phaeodon aspratus* (Berk. ex Cooke) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898. — *Sarcodon aspratus* (Berk. ex Cooke) S. Ito, Mycol. Fl. Japan 2 (4): 183. 1955 (n.v.; information Dr. R. Imazeki); Nikol. (publication not seen, reference in Z. Pilzk. 24: 72. 1958). — Type: "Japan. *Hydnum aspratium* B." (K).

The sheet in the type folder bears two blackened halves of a specimen (the same specimen?) from M. C. Cooke's herbarium, as well as an envelope containing a whole specimen. The latter is the type. It agrees in all respects with Berkeley's description, and the handwriting (in pencil) of its label is undoubtedly Berkeley's, closely resembling the handwriting of the label of *Hydnum curtisii* which I had on loan at the same time.

Unfortunately, no spores could be found, while the collapsed and conglutinated hymenium made it impossible to count the number of sterigmata per basidium (4–5–6 in *Hydnum* and *Sistotrema*, 4 in all other stipitate species), but such secondary characters as the brown colour of the pileus and the presence of scales definitely exclude the possibility of the type being a species of either *Hydnum* or *Sistotrema*. Also, the specimen is not likely to be a *Bankera*, as the hymenium in that genus is not known to turn dark brown. The nature of the context which is made up of flexuous, inflated, and, for the most part, badly collapsed hyphae, points in the direction of *Sarcodon*, while the pale colour of the flesh in both the pileus and the stipe, combined with the presence of clamps, proves the type specimen to belong to Group 3. *Sarcodon laevigatus* which is a member of this group may be ruled out on account of the erect position of a number of the scales. While this leaves only *Sarcodon imbricatus* to be considered, it also appears that determination with the key of Coker & Beers to the North American species gives the same result.

The infundibuliform pileus with its centre rotted away to form a hole which reaches far into the stipe clearly indicates that the type specimen was collected at an advanced stage of its development (compare Beardslee, 1924). This also explains the comparatively smooth surface of the pileus, since there is an increased tendency for the scales to collapse with age, disappearing entirely or almost so. Rain may speed up this process. The initial phase to such a disintegration is well shown in the illustration of what is called *Sarcodon aspratus* by Imazeki & Hongo (Col. Ill. Fungi Japan pl. 48 fig. 273. 1957), in which most of the scales are seen to be flush

with the surface, with only a few remaining upright. The pale colour of the pileus in this illustration, and the great number of rather narrow scales are somewhat unusual, but not surprising, for I have come to regard *Sarcodon imbricatus* as a very variable species even in Europe.

Presumably, the variability is so extensive as to include also the odour. While I myself have no recollection of *S. imbricatus* giving off a particular smell on being dried, and Coker & Beers stated the species to be "at times aromatic when drying", the highest appraisal was voiced by a Japanese: "When it [*Phaeodon aspratius*] is dried it emits a sweetish aroma so strong that when a single mushroom is put in a room the air becomes impregnated with its odour" (Kawagoe, 1924: 204).

*aterrimum*. — *Hydnium aterrimum* Opiz in *Lotos* 5: 42. 1855; not *Hydnium aterrimum* Fr., *Syst. mycol.* 1: 416. 1821. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Fugau.

Since the original description is wholly insufficient for the species to be identified, the name should be rejected as a nomen dubium.

*atrospinosus*. — *Fungus atrospinosus* Paul., *Traité Champ.* 2: Index. 1793 (for description, see p. 123: Savatelle-épine). — Type locality: Western France.

The plate to which Paulet refers (as *Scutigera spinosus*) gives the impression of the species being a fleshy *Hydnium*, while the purplish brown colour of the spines clearly point to *Sarcodon*. Although the pileus is depicted as having an ochraceous colour, it is explicitly described as "d'un roux blanchâtre". The latter colour combines with the smooth surface of the pileus and the lateral, white stipe to characterize the species as *Sarcodon laevigatus*.

*aurantius*. — *Hydnium aurantium* Rafin. in *J. Bot.* (ed. Desv.), Paris 1: 237. 1813; *Préc. Découv. Trav. somiol.* 50. 1814 ("aurantinum"); *ex* Steudel, *Nomencl. bot.* 2: 202. 1824. — Type locality: U.S.A., Delaware.

From the original description, with slight alterations repeated in 1814, it is obvious that Rafinesque had collected *Hydnium repandum* var. *repandum*.

*auratilis*. — *Hydnellum auratile* (Britz.) Maas G. in *Persoonia* 1: 111. 1959.

Since my note on *Hydnellum auratile*, I have had the opportunity of revising the *Hydniums* of the Herbarium at Vienna, and part of the collections of Dr. W. H. Snell, Providence, R.I., which yielded three more localities of this apparently Central European species. They are: —

AUSTRIA: Steiermark, Aussee, Sept. 1909, *K. Rechinger* (as *Hydnium* sp.; W 15363).

AUSTRIA: Tirol, Mutteralpe near Innsbruck, 27 Aug. 1922, *V. Litschauer* (as *Hydnium aurantiacum*; W 9924).

GERMANY: Bavaria, Mittelfranken, Kreis Hersbruck, Hersbruck, Kutscherberg, 20 Aug. 1946, *K. Starcs* 2300 (as *Hydnium ferrugineum*; Herb. W. H. Snell).

*badius*. — *Hydnum imbricatum* var. *badium* (Pers.) Duby, Bot. Gall. 2: 775. 1830. — *Sarcodon imbricatus* subsp. *S. badius* (Pers.) Bourd. & Galz. in Bull. Soc. mycol. France 40: 107. 1924 (“*badium*”).

Two recombinations to be included in the synonymy of *Sarcodon imbricatus*, Part I: 53.

*barbatus*. — [*Agaricus barbatus* Batt., Fung. Agri arim. Hist. 67. 1755 (non-binomial name). —] *Hericium barbatum* Pers., Mycol. europ. 2: 155. 1825. — Type: represented by Batt., Fung. Agri arim. Hist. pl. 33 fig. C. 1755.

The species, as described and figured by Battarra, seems to have no stipe. This is why Persoon was in doubt whether the species had not better be placed in *Odontia*. On the other hand, *Hericium barbatum* may have had a hidden root, as is the case in *Hericium bresadolae* (see Part IV: 131). Possibly even both names refer to the same species, but since this cannot be proved, *Hericium barbatum* must remain a nomen dubium.

*barbatus*. — *Hydnum barbatum* Rafin. in Med. Repos., Hexade 2, 5: 363. 1808 (n.v.); in J. Bot. (ed. Soc. Bot.), Paris 1: 234. 1809; ex Steudel, Nomencl. bot. 2: 202. 1824; Sacc., Syll. Fung. 6: 477. 1888 (“*barbarum*”). — Type: represented by Rafinesque, Plates new gen. spec. pl. North Amer. pl. 3 fig. to the left. no date (ined.).

Going by the illustration it seems not an altogether wrong guess that Rafinesque described a comparatively young specimen of a *Hydnellum*. This is all that can possibly be said, for the diagnosis (“pedunculated, whitish, peridium obovated, irregularly truncated, barb slender”) is too incomplete to allow further identification, and Rafinesque’s binomial should be discarded as being a nomen dubium.

The reference cited above in connection with the illustration of Rafinesque’s species is an unpublished collection of plates (Gerard, 1885) now preserved at the Library of the New York Botanical Garden. I owe the perusal of a photocopy of this collection to Dr. M. A. Donk.

*bohemicus*. — *Hydnum bohemicum* Vel., České Houby 752. 1922 (Latin translation by Pilát in Op. bot. čech. 6: 274. 1948). — Part of type: “*Hydnum bohemicum* Vel., Bohemia centr., distr. Ríčany u Prahy: in Piceetis atque Fagetis apud pag. Jevany sparse, IX 1916, leg. *Velenovský*” (PRC).

The specimen I have seen, which on the label bears the annotation “Merotypus”, is a fragment of the pileus, taken from near the margin. The surface is matted, yellowish brown with a purplish tint, blackened in places. A number of the spines are pale chocolate brown. Context pale yellow-brown, not discolouring in a solution of KOH, but pockets of excreted matter staining red-brown. Hyphae with clamp connections. Taste not checked because of scantiness of material. However, the characteristics of the flesh are sufficient proof that *Hydnum bohemicum* is identical with *Hydnellum diabolus*.

*brachypus*. — *Hydnum laevigatum* var. *brachypus* Fr., Obs. mycol. 1: 140. 1815. — Type locality: Sweden.

It is impossible to say what was meant by Fries.

*brevipes*. — *Hydnum brevipes* Opiz in Lotos 5: 42. 1855; not *Hydnum brevipes* (Coker) Snell in Mycologia 37: 48. 1945 = *Sarcodon stereosarcinon* Wehm. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Mergenthal.

It is impossible to identify the species from the meagre information supplied by its author.

*brevipes*. — *Sarcodon brevipes* Coker in J. Mitchell sci. Soc. 55: 375. 1939 (without Latin description). — *Hydnum brevipes* (Coker) Snell in Mycologia 37: 48. 1945; not *Hydnum brevipes* Opiz in Lotos 5: 42. 1855. — Type: Coker 10253 (not seen; NGU).

Since the name of Coker's species was not validly published, *Sarcodon stereosarcinon* Wehm., which Coker & Beers (1951: 54) cited as a synonym, becomes the correct name.

*britzelmayri*. — *Hydnum britzelmayri* Sacc., Syll. Fung. 11: rear side of frontpage. 1895. See under *Hydnum fragrans* Britz.

*brunneo-olivaceus*. — *Phellodon brunneo-olivaceus* Coker & Beers, Stip. Hyd. east. U.S. 28, pl. 18 upper fig. 1951 (without Latin description). — Type: "*Phellodon brunneo-olivaceus*, North Carolina, Highlands. No. 12593" (NGU).

I have seen the type (as well as what was indicated as Hesler No. 5223, from Georgia, Rabun County) which is characterized by the evenly olivaceous tint and the concentrical corrugations of the pileus. Coker & Beers stated the pileus of their species to be zonate, but I am convinced that by it they meant those concentrical wrinkles (which give rise to alternating rings of light and shadow), for there is no trace of colour-zonation. The lack of a white-tomentose margin indicates that the specimens were already old when collected. This also explains why the tomentum, often very thin in *Phellodon melaleucus*, had completely collapsed to a glabrous surface, and there is nothing unusual in the fact that such a surface acquires a certain sheen in the process. Coker & Beers emphasized among others the pre-vaillingly smaller size of the specimens, distinguishing their species from *P. melaleucus*, but, as already pointed out on an earlier occasion, size in *Hydnums* is, in my eyes, of only very limited value. Apart from the colour, I fail to find any fundamental difference between *Phellodon brunneo-olivaceus* and *P. melaleucus*, and I am, therefore, of opinion that the former is nothing more than a colour modification of the latter.

*brunneoroseus*. — *Phellodon brunneoroseus* Snell, Dick, & Jackson *apud* Snell & al. in Lloydia 19: 171. 1956. — Type: "*Phellodon brunneoroseus*, Canada, Quebec,

St. Aubert, 9 Sept. 1951, *Jackson & Snell, No. 2892*" (Herb. W. H. Snell; part of type in L).

A very detailed description was supplied by the authors of the present species, comparing its characters also with those of *P. brunneo-olivaceus*. Similar to that species, I now incline to the view that *P. brunneoroseus* is a colour modification of *Phellodon melaleucus*.

*caerulescens*. — *Hydnum caerulescens* Rafin. in *Med. Repos.*, Hexade 2, 5: 363. 1808 (n.v.); in *J. Bot.* (ed. Soc. Bot.), Paris 1: 234. 1809; ex Steudel, *Nomencl. bot.* 2: 202. 1824 ("*caerulescens*"). — Type: represented by Rafinesque, *Plates new gen. spec. pl. North Amer.* pl. 3 fig. to the right. no date ("*caerulescens*"; ined.).

Like *Hydnum barbatum*, this species probably belongs to *Hydnellum*. The specific epithet suggests *Hydnellum caeruleum*, but juvenile specimens of *Hydnellum alachuanum* are also stated to have a bluish pileus, while very young fruit-bodies of *H. suaveolens*, apart from a bluish pileus, have a dark blue stipe which is even more apt to attract the attention. If *H. alachuanum* is excluded from consideration on the grounds that it has only been recorded from Florida and South Carolina, whereas Rafinesque found his species near Burlington, New Jersey, there still remains to choose between *H. caeruleum* and *H. suaveolens*. In view of the very short diagnosis which gives no information on the colour of the context, it is impossible to make the choice, and *Hydnum caerulescens* must remain a nomen dubium.

*caeruleus*. — *Hydnum suaveolens* var. *caeruleum* (Hornem. ex Pers.) Hornem., *Nomencl. Fl. dan.* 65. 1827 ("*caeruleum* Fr."). — *Hydnum suaveolens* subsp. *H. caeruleum* (Hornem. ex Pers.) Fr., *Epicr. Syst. mycol.* 507. 1838 ("*caeruleum*"). — *Phellodon caeruleus* (Hornem. ex Pers.) R. Nav. in *Natuurwet. Tijdschr.*, Antw. 5: 67. 1923 ("*caeruleum*"). — *Hydnellum caeruleum* (Hornem. ex Pers.) Wehm., *Fungi New Brunsw., Nova Scotia and Pr. Edw. Isl.* 68. 1950 (combination antedated).

These are all recombinations omitted from the list of synonyms under *Hydnellum caeruleum*, Part II: 54. With regard to the reference '*Hydnum suaveolens*  $\beta$  *H. caeruleum* Hornem. ex Fr.', I ought to have indicated that, because of the inadmissible use of a binary combination for a variety, Fries's recombination is not validly published. See also remarks under '*gracilis*'.

*caeruleus*. — *Hydnum caeruleum* Thore; Fr., *Syst. mycol.* 1: 406. 1821; not *Hvdnum caeruleum* Hornem. ex Pers., *Mycol. europ.* 2: 162. 1825 = *Hydnellum caeruleum* (Hornem. ex Pers.) P. Karst.

Fries mentioned this species in small type at the end of his tribus *Mesopus*, together with a few others, of which he was uncertain as to their identity. Since there is no such name like *Hydnum caeruleum* Thore, it seems quite probable that Fries had *Hydnum violaceum* Thore apud Pers. in mind. Contrary to his opinion ("*forsan idem ac H. violascens*"), however, that species has nothing in common with *Hydnum violascens* except the sound of its name. The identity of the former, as pointed out in Part III: 59, is unknown; the latter is *Bankera violascens*.

*caespitosus*. — *Hydnum caespitosum* Valenti-Serini, Tratt. Funghi sosp. vel. terr. Senese p.?, pl. 47 fig. 3. 1868 (n.v.). — Type locality: Italy.

On this species no information can be given.

*candicans*. — *Hydnum cyathiforme* var. *candicans* (Fr.) Cost. & Duf., Nouv. Fl. Champ. 160. 1891. — *Hydnum cyathiforme* f. *candicans* (Fr.) Killerm. in Denkschr. bayer. bot. Ges. 15: 43. 1922.

Two overlooked recombinations to be inserted in Part III: 55. The position of *Hydnum candicans* which I previously considered synonymous with *Phellodon tomentosus*, is actually far from clear. Juvenile specimens of *P. tomentosus* may be found to have the pileus entirely white-tomentose, but Krombholz's illustration on which Fries based his species does not in the least give the impression of representing very young specimens. While, therefore, one may doubt whether *H. candicans* is correctly placed in *P. tomentosus*, it is certainly true that the white stipe, as depicted by Krombholz, agrees with none of the European species. I wonder how *Hydnum candicans* would compare with North American *Phellodon putidus*, of which I have only seen descriptions and illustrations.

*candidus*. — *Hydnum candidum* Schmidt in Mykol. Hefte 1: 89. 1817; ex Fr., Syst. mycol. 1: 400. 1821; not *Hydnum candidum* Willd. in Mag. Bot. (ed. Römer & Usteri) 2 (4): 14, pl. 3 fig. 7. 1788 = *Radulum quercinum* (Pers. ex Fr.) Fr.; not *Hydnum candidum* (Ehrenb.) ex Schlecht., Fl. berol. 2: 197. 1824 = *Irpex candidus* Weinm. = form of *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk. — *Sarcodon candidus* (Schmidt ex Fr.) Quélet, Ench. Fung. 189. 1886 ("candidum"). — *Tremellodon candidus* (Schmidt ex Fr.) Quélet, Fl. mycol. 440. 1888 ("candidum"). — *Malacodon candidus* (Schmidt ex Fr.) Bataille in Bull. Soc. mycol. France 39: 203. 1924 ("candidum"). — Type locality: Germany, Saxonia.

Schmidt described the context as "fleischig-gallertartig", which at once suggests that the present species belongs to the heterobasidiomycetous fungi. Among these, however, I fail to find any species that agrees with Schmidt's description, and for that reason I regard *Hydnum candidum* as a nomen dubium. From this it follows that the monotypic genus *Malacodon*, based by Bataille (l.c., p. 203) on *Hydnum candidum*, is also a nomen dubium.

I would not have treated the present binomial in this paper if it were not for the fact that Quélet at one time regarded the species as a member of the genus *Sarcodon*.

*canus*. — *Hydnum canum* Schw. in Schr. naturf. Ges. Leipzig 1: 103. 1822. — Type locality: U.S.A., North Carolina.

Fries, in his 'Epicrisis' (p. 506), regarded *Hydnum canum* as a synonym of his *Hydnum (laevigatum* subsp. *H.) gracile*, which see for discussion. It is not possible to identify the latter with any degree of certainty, hence *Hydnum canum* is a nomen dubium.

*carnosus*. — *Phellodon carnosus* Banker in *Mycologia* 5: 65. 1913. — *Bankera carnosus* (Banker) Snell, Dick, & Taussig *apud* Snell & al. in *Lloydia* 19: 174. 1956. — Type: New York, Bleecker pond near Gloversville (not seen; NY).

See under 'mollis'.

*catalaunicus*. — *Sarcodon catalaunicus* R. Maire in *Publ. Inst. bot. Barcelona* 3 (4): 34. 1937.

See under 'fuligineo-violaceus'.

*cervinus*. — *Hydnum cervinum* Berk. in *Hook., Fl. Tasman.* 2 (3): 256. 1860 not *Hydnum cervinum* Pers. *ex* Pers., *Mycol. europ.* 2: 158. 1825.

Berkeley's binomial has been omitted in Part I: 53. It has nothing to do with Persoon's *Hydnum cervinum* which is a synonym of *Sarcodon imbricatus*. According to Cunningham (1953: 279), Berkeley's species belongs to *Grandinia*.

*cinereus*. — *Phaeodon cinereus* (Bull. *ex* Fr.) P. Henn. in *Nat. Pflfam.* 1 (1\*\*) 149. 1898.

To be inserted in Part III: 58.

*citrinus*. — *Hydnum citrinum* Rafin. in *Med. Repos., Hexade* 2, 5: 363. 1808 (n.v.); in *J. Bot. (ed. Soc. Bot.), Paris* 1: 234. 1809; *ex* Steudel, *Nomencl. bot.* 2: 203. 1824; not *Hydnum citrinum* Zoll. & Mor. *apud* Zoll. in *Natuur- en geneesk. Arch. Ned. Ind.* 1: 385. 1844; not *Hydnum citrinum* Saut. in *Hedwigia* 8: 64. 1869; in *Mitt. Ges. salzb. Landesk.* 18: 150. 1878. — Type: represented by Rafinesque, *Plates new gen. spec. pl. North Amer. pl.* 7 fig. to the left. no date (ined.).

With regard to the citation of the illustration, I refer to *Hydnum aurantium*. This illustration gives the impression of the fruit-body being excentrically stalked. The stipe is very slender, and the fruit-body is described as light yellow. There are very few *Hydniums* combining these features, in fact the only suggestion I can give at present is that Rafinesque's species might represent *Steccherinum pusillum*.

*citrinus*. — *Hydnum citrinum* Saut. in *Hedwigia* 8: 64. 1869 (name change for *Hydnum sulfureum* Saut.); in *Mitt. Ges. salzb. Landesk.* 18: 150. 1878 (n.v.); not *Hydnum citrinum* Rafin. *ex* Steudel, *Nomencl. bot.* 2: 203. 1824; not *Hydnum citrinum* Zoll. & Mor. *apud* Zoll. in *Natuur- en Geneesk. Arch. Ned. Ind.* 1: 385. 1844. — Type locality: as of *Hydnum sulfureum*.

I have not seen Sauter's publication of 1878, in which, as stated by von Keissler (1917: 108), he seems to have admitted that his species was identical with *Hydnum geogenium* Fr. It is not true, however, that *H. citrinum* is a nomen nudum; it is a name change for *Hydnum sulfureum*, described on an earlier occasion (see there).

*colosseus*. — *Hydnum colosseum* Bres. in *Atti Accad. Agiati, ser. 3,* 8: 130. 1902 ("colossus"; n.v.). — *Sarcodon colosseus* (Bres.) Bataille in *Bull. Soc. mycol. France*

**39:** 207. 1924 ("colossum"). — Type: "*Hydnum colossum* Bres. In pinetis / Setubal / Xbri 1901. *Torrend*" (S).

The type specimen consists of four lumps, two of which are halves of the stipe, and the other two, fragments of the pileus. The brownish, roughly tuberculate spores and the homogeneous context which is made up of inflated hyphae, are certain indications that the present species is a *Sarcodon*. The pale colour of the context throughout the fruit-body and the very large clamp connections make it clear that the species belongs to Group 3 of that genus. Further identification of the species as *Sarcodon laevigatus* gives no difficulties since the purplish brown pileus is devoid of scales. It is not, however, the species as understood by Fries, but *Sarcodon laevigatus* in the sense of Bourdot & Galzin and Konrad & Maublanc on account of "the strong and nauseating odour, and the bitterish taste of the flesh" (translated from Saccardo, Syll. Fung. **17**: 148. 1905). Compare also, however, the remarks under *Sarcodon fragrans*.

Another collection under the name of "*Hydnum colossum*", surroundings (illegible) of Setubal, Dec. 1901, *C. Torrend* (COI), also represents *Sarcodon laevigatus*.

*communis*. — *Hydnum tomentosum* var. *commune* Alb. & Schw., Consp. Fung. 206. 1805.

To be included in the synonymy of *Hydnum tomentosum* in Part III: 54.

*commutatus*. — *Sarcodon commutatus* Bourd. & Galz. in Bull. Soc. mycol France **40**: 109. 1924.

See under '*fuligineo-violaceus*'.

*concrescens*. — *Hydnum concrescens* Pers. ex Schw. in Schr. naturf. Ges. Leipzig **1**: 103. 1822 (validly published?); Opiz, Böh. Gew. 158. 1823.

*Hydnum concrescens*, a synonym of *Hydnellum velutinum* var. *scrobiculatum*, was not, as stated in Part. II: 61, validated by Persoon (1825) but by Opiz, if not by von Schweinitz.

*confluens*. — *Hydnum confluens* Peck in Rep. N.Y. St. Mus. **26**: 71. 1874; not *Hydnum confluens* Pers., Mycol. europ. **2**: 165. 1825. — *Phaeodon confluens* (Peck) P. Henn. in Nat. Pflfam. **1** (1\*\*): 149. 1898. — Type: "*Hydnum confluens* Pk. / New Scotland / *C. H. Peck*" (NYS).

Contrary to his habit, Peck did not mention the locality of this new species, but it can be safely assumed to be New Scotland as indicated on the label of the type box. The word "Gansevoort" must to all appearance have been added afterwards, and in any case the material from that locality which is included in the same box differs from Peck's description in its much smaller size, and in the lack of the "dense mycelioid tomentum" which, as shown in the two accompanying water-colour sketches, surround the stipe. Apart from that, however, the material from Gansevoort agrees with the two type specimens in general colour (which is a fairly pale olive

green, not drab brown as stated by Peck), whitish spines, and tough black core of the context. These characters readily identify *Hydnum confluens* of Peck as *Phellodon niger*.

*confluens*. — *Hydnum conrescens* var. *confluens* Pers.; Fr., Elench. Fung. 1: 131. 1828.

Fries, in enumerating this variety as a synonym under *Hydnum subtomentosum*, and referring to Persoon, Mycol. europ. 2: 165. 1825, made two errors. Persoon, in the preface to his 'Synopsis Plantarum' (p. x) wrote: "Speciebus obscuris, aut quoad sedem dubiis, vel accuratiori indagatori subjiciendis, signa crucis seu asteriscum apposui." This clearly indicates that Persoon had meant his *Hydnum confluens* as an independent species, not as a variety of *Hydnum conrescens*, even if it is true that he tentatively used the word variety to suggest their possible relation (p. 166: "cum antecedente [*H. conrescens*], cujus aetatem nondum plane adultam aut varietatem exhibere videtur"). The following passage quoted from the discussion under *Hydnum \*fuscum* Pers. (Mycol. europ. 2: 189. 1825) may serve as another example: "Ut speciem *incertam* interim indicare, melius esse arbitratus sum . . ."

*Hydnum subtomentosum*, as already pointed out in Part III: 54, is an error for *Hydnum tomentosum*.

*connatus*. — *Hydnum connatum* C. F. Schultz, Prodr. Fl. stargard. 491. 1806; ex Fr., Syst. mycol. 1: 405. 1821. — *Hydnellum connatum* (C. F. Schultz ex Fr.) P. Karst. in Medd. Soc. F. Fl. fenn. 5: 41. 1879. — *Phaeodon connatus* (C. F. Schultz ex Fr.) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898. — Type locality: Germany, Mecklenburg-Strelitz, between Eichhorst and Gliencke, near Stargard.

Fries made the following comment on this species: "Inter numerosas antecedentis formas equidem nullam in hoc quadrantem reperi." By it he meant to say that he had never come across anything resembling *Hydnum connatus* among the numerous forms of what he called *Hydnum cyathiforme*, which, as shown in Part II: 61, comprises *Hydnellum velutinum* var. *scrobiculatum* and var. *zonatum*. Fries's remark, together with the brown colour of the pileus ("pileo . . . spadiceo"), firmly inculcated in me the idea that *H. connatum* was a *Hydnellum*. Of course, there is only myself to be blamed for having overlooked that the original diagnosis of Schultz contains two pieces of information ("subulis . . . ochraceo cinereis", and "stipite nigro nitenteglabro") which leave no doubt as to the identity of the species. The colour of the spines points to *Phellodon*, and the nature and the colour of the surface of the stipe are characteristic of *P. melaleucus*. Where the colour of the pileus is concerned, it should be remembered that *P. melaleucus* is a variable species indeed (compare also '*brunneo-olivaceus*', '*brunneoroseus*', and '*hepaticus*').

It may be worth while to see what became of *Hydnum connatum* in the mind of Fries. This author, in his "Epicrisis" (p. 509) introduced a new feature ("pileo sericeo zonis discoloribus", apparently under the influence of Secretan's *Hydnum*

*varicolor*), and slightly twisted two of the original characters ("stipite . . . fusconigro", and "aculeis . . . carneo-ochraceis"), which is a divergence from the former conception of the species. *Hydnum connatum* sensu Fries (1838, 1874), in my eyes, represents *Phellodon tomentosus*.

*coriaceus*. — *Hydnum laevigatum* var. *coriaceum* Fr., Obs. mycol. 1: 140. 1815. — Type locality: Sweden.

Like *Hydnum laevigatum* var. *brachypus*, I fail to identify this variety. See also under 'gracilis'.

*crispus*. — [*Hydnum octavum* Schaeff., Fung. Icon. 2: pl. 147 fig. 1. 1763. —] *Hydnum crispum* Schaeff., Fung. Icon. 4: 97. 1774 (pr. p.); ex Fr., Syst. mycol. 1: 413. 1821; not *Hydnum crispum* Scop., Fl. carniol., ed. 2, 2: 473. 1772 = *Hericium coralloides* (Scop. ex Fr.) S. F. Gray. — *Irpex crispus* (Schaeff. ex Fr.) Fr., Epicr. Syst. mycol. 521. 1838. — Type locality: Germany, Bavaria.

Fries, and earlier also Persoon in his 'Commentarius' (1800: 58), restricted the present binomial to a non-stipitate, lignicolous or arboricolous species with complicated, overlapping caps which I fail to identify. The reason why the epithet is enumerated here is that Schaeffer in his description also included apparently terrestrial, solitary, stipitate specimens, exemplified by Plate 147 fig. 2-6 which in my opinion represent *Hydnellum velutinum* var. *scrobiculatum*.

*curtisii*. — *Hydnum curtisii* Berk. in Grevillea 1: 71. 1872. — Type: "*Hydnum laevigatum*, Swartz [in pencil] *Curtisii*, B. [in ink]. No. 2809. Car. Inf. Aug." (K).

The type is a very small, badly dried specimen with the entire surface of its pileus glued to a piece of paper. It must have been immature at the time it was collected, for the majority of the basidia of the two spines examined had not even developed sterigmata. The few spores to be seen, however, were already very roughly tuberculate. This fact, combined with the appearance of the hyphae (not strictly parallel, flexuous, thin-walled, very much inflated in some places, collapsed in others), characterizes the specimen as a *Sarcodon*. The additional feature of the presence of clamp connections restricts it as belonging to Group 3. Having been collected in South Carolina, the obvious thing to do is to compare the species with the North American *Sarcodons*, but, unfortunately, there are so many of them, some of which are even imperfectly known from a microscopical point of view. Leaving out the species which are known for certain to have no clamp connections, there are still the following to choose from: *Sarcodon excentricus*, *S. imbricatus*, *S. laevigatus*, *S. scabripes* (hyphae known to possess clamps), and *S. atroviridis*, *S. cristatus*, *S. fumosus*, *S. piperatus*, and *S. underwoodii* (no information on the presence of clamps). Taking into consideration that Berkeley described the pileus as smooth ("pileo . . . laevi"), *S. imbricatus* may be definitely ruled out, since in this species even the youngest stages have their caps crowned with coarse scales. In my opinion, *S. laevigatus* is unlikely, as that species usually possesses very large clamp connections, strikingly different from the ones I observed in *Hydnum curtisii*, and it certainly

would not be described as “fuligineo-fuscum”. However, even with these two species subtracted, the pitiable amount of information supplied by its author renders it impossible to assign *Hydnum curtisii* to any of the remaining species.

*cyathiformis*. — *Calodon cyathiformis* (Fr.) Imaz. *apud* Imazeki & Hongo, Coll. Ill. Fungi Japan 106. 1957 (incomplete reference to basinyum); not *Calodon cyathiformis* (Schaeff. ex St.-Amans) Quélet, Ench. Fung. 191. 1886.

In his reply to my inquiry where the above recombination had first been published, Dr. Imazeki contritely confessed that it should be considered a lapsus calami for “*Calodon cyathiformis* (Fr.) Quélet.” It should be pointed out, however, that Imazeki has fallen a victim to a wide-spread confusion between *Hydnum cyathiforme* Fr. (= *Hydnellum velutinum*) and *H. cyathiforme* Schaeff. ex St.-Amans (= *Phellodon tomentosus*); see also Donk (*in* Taxon 6: 254. 1957). When publishing his *Calodon cyathiformis*, Quélet clearly referred to Schaeffer’s species, so *Calodon cyathiformis* (Fr.) is a recombination to be attributed to Imazeki. A complication is that Fries distinguished two forms of *Hydnum cyathiforme*, a. and b., the former being a synonym of *Hydnellum velutinum* var. *scrobiculatum* and the latter, of *H. velutinum* var. *zonatum*. However, in view of the fact that (i) Imazeki & Hongo also listed *Calodon zonatus*, and (ii) the illustration of *C. cyathiformis* (Plate 49 fig. 277) gives a passable picture of *H. velutinum* var. *scrobiculatum*, it can be suggested that *Hydnum cyathiforme* form a. should be regarded as basinyum of Imazeki’s recombination.

*cyathiformis*. — *Agaricus cyathiformis* (Schaeff.) Paul., Iconogr. Champ. pl. 4 fig. 3. 1812-35.

In the legend to his plate Paulet mentioned the French name “Agaric iris en coupe”, with a reference to “Tom. 2. P. 81”. In this work (Traité Champ. 2: 81. 1793) a description is given which by the words, “dans celle-ci, elle [la partie inférieure] se trouve épineuse” proves the illustration to represent a stipitate *Hydnum*. Since Paulet was acquainted with Schaeffer’s work, it may be assumed that *Agaricus cyathiformis* is a recombination of the latter author’s *Hydnum cyathiforme*, and as such it should be included in the synonymy of *Phellodon tomentosus* in Part III: 54. Very likely, however, the recombination is a misapplication. Dr. Donk kindly drew my attention to the similarity of Paulet’s figure to that shown by van Sterbeeck (Theatrum Fung., 2 ed., pl. 27 fig. I. 1712) which, going by its description on p. 258, represents *Polystictus perennis* (L. ex Fr.) P. Karst.

*decolorosus*. — *Hydnum decolorosum* Britz., Hym. Südbayern 8: 14. 1891 (n.v.); Hym. Südbayern 10 (= *in* Ber. naturh. Ver. Augsburg 31): 213, fig. Hydnei 34. 1894; *in* Beih. bot. Zbl. 26 (Abt. 2): 213. 1910. — Type locality: Germany, Bavaria.

The drawings of the present species (showing six fruit-bodies in colour, and five more in black and white in longitudinal section) at once suggest *Bankera fuligineo-alba*. They are in fact not markedly different from the figure of *Hydnum sparso-aculeatum*

(Fig. 47) which I do not hesitate to identify with that species. Most elements of the description (of 1910) of *H. decolorosum* are equally in agreement with this view. Only the description of the flesh as "beim Anschnitt unt[en] im St[iel] blaugrün anlaufend, von unangenehmem Geschmack" is totally incompatible with *Bankera fuligineo-alba*. The explanation may be that Britzelmayr had mixed up his collection with a few specimens of *Sarcodon amarescens*, accidentally not included in Fig. 34.

*diabolicus*. — *Hydnum diabolicum* J. Rick in Ann. mycol., Berlin 2: 244-1904. — Type locality: "prope Sao Leopoldo, Brasiliae".

The pileus is stated to be fleshy, and the spores brown, strongly verrucose. From this description *H. diabolicum* clearly belongs to *Sarcodon*, but otherwise I fail to identify the species.

*diabolus*. — *Hydnum diabolus* Banker in Mycologia 5: 194. 1913. — *Hydnum diabolus* (Banker) Trott. in Sacc., Syll. Fung. 23: 470. 1925. — *Calodon diabolus* (Banker) Murrill in Lloydia 14: 116. 1951; Snell *apud* Snell & al. in Lloydia 19: 166. 1956.

The above recombinations are given to replace those enumerated in Part II: 58. See also under '*reticulatus*'.

*dilatatus*. — *Hydnum dilatatum* Rafin. in Med. Repos., Hexade 2, 5: 363. 1808 (n.v.); in J. Bot. (ed. Soc. Bot.), Paris 1: 234. 1809; *ex* Steudel, Nomencl. bot. 2: 203. 1824. — Type: represented by Rafinesque, Plates new gen. spec. pl. North Amer. pl. 7 fig. to the right. no date (ined.).

For the citation of the illustration I refer to *Hydnum aurantium*. I can make no suggestion as to the identity of the species.

*dolichopus*. — *Hydnum imbricatum* f. *dolichopus* C. Massal. in Atti Accad. Verona, ser. 4, 3: 73 (reprint). 1902 (n.v., for description, see Sacc. & D. Sacc. in Sacc., Syll. Fung. 17: 148. 1905). — Type locality: Italy, near Tregagno.

Judging from the very brief diagnosis which emphasizes the small scales of the pileus, it is quite possible that forma *dolichopus* actually represents a different species from *Sarcodon imbricatus*. The lateral position of the stipe would suggest *Sarcodon laevigatus*.

*eleosma*. — *Hydnum eleosma* Pers., Mycol. europ. 2: 163. 1825.

See under *Hydnum fraceolens*.

*fennicus*. — *Phaeodon fennicus* (P. Karst.) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898.

To be inserted in Part I: 52.

*ferrugineo-albus*. — *Hydnum ferrugineo-album* Britz., Hym. Südbayern 10 (= in Ber. naturh. Ver. Augsburg 31): 177. 1894; in Beih. bot. Zbl. 26 (Abt. 2):

215. 1910. — Type: represented by Britz., Hym. Südbayern 10: fig. Hydnei 63. 1894.

The consistency and colour of the context (“korkhart . . . dunkelrotbraun, etwas gezont”), and the yellow-brown spores readily identify Britzelmayr’s species as a *Hydnellum* of Group 1. From the words, “H[ut] . . . grob furchig, grubig faserig”, and the figure which shows imbricately overlapping, thin-fleshed, azonate caps, it is further clear that *H. ferrugineo-album* is fully identical with *Hydnellum velutinum* var. *scrobiculatum*.

*ferrugineus*. — *Phellodon ferrugineus* (Fr. ex Fr.) R. Nav. in *Natuurwet. Tijdschr., Antw.* 5: 68. 1923 (“*ferrugineum*”).

This recombination has been overlooked and should be inserted in Part II: 60.

*foetidus*. — *Hydnum foetidum* Rabenh., *Deutschl. Kryptog.-Fl.* 1: 411. 1844; not *Hydnum foetidum* Secr., *Mycogr. suisse* 2: 509. 1833; not *Hydnum foetidum* Vel., *České Houby* 744. 1922 (Latin translation by Pilát in *Op. bot. čech.* 6: 272. 1948) = *Sarcodontia setosa* (Pers.) Donk. — Type locality: Sweden.

Rabenhorst, in taking up Secretan’s epithet (which is a *nomen nudum*), is not to be considered to have validated *Hydnum foetidum* of Secretan, since his description is a true translation of Fries’s diagnosis of *Hydnum squamosum* (Epicr. Syst. mycol. 505. 1838). It follows that Rabenhorst merely published a new name for *Hydnum squamosum* Schaeff. ex Fr. sensu Fr., and also that *Hydnum foetidum* Rabenh. should be typified by the same type as that species. Now it should be recalled that *Hydnum squamosum* as conceived by Fries is a misapplication (cf. Part IV: 134), so that its type is not the same as that of *H. squamosum* Schaeff. Since there is no type of Fries’s species, the type locality only can be indicated, this being Sweden.

*foetidus*. — *Hydnum foetidum* Secr., *Mycogr. suisse* 2: 509. 1833 (*nomen nudum*); not *Hydnum foetidum* Rabenh., *Deutschl. Kryptog.-Fl.* 1: 411. 1844; not *Hydnum foetidum* Vel., *České Houby* 744. 1922 (Latin translation by Pilát in *Op. bot. čech.* 6: 272. 1948) = *Sarcodontia setosa* (Pers.) Donk. — Type locality: Switzerland, Bosquets de Prilly.

Secretan likened his species to Schaeffer’s *Hydnum squamosum* and, questioningly, also to *Hydnum laevigatum*. As pointed out in Part IV: 140, *Hydnum squamosum* may well represent a drought-form of *Hydnum repandum* var. *repandum*. Judging from Secretan’s description, it is improbable that *H. foetidum* should be identified with that species: “. . . le centre [du chapeau] déprimé, même en un trou profond . . . Chair . . . dure . . . L’odeur est fétide, comme d’huile rance.” In contrast to this, Secretan described the consistency of the flesh in *H. repandum* as “ferme”, and the odour as “bonne”. In the older state, the interior of the stipe of *H. foetidum* is described as hollow, blackish brown, and the odour as “plus douce”. The fetid odour, especially, is reminiscent of the odour of *Sarcodon laevigatus* as described by Bourdot & Galzin and Konrad & Maublanc, but in this species the pileus is not known to have a deep depression in the centre which extends into the hollow stipe, and also

the colours of *H. foetidum* are not at all those of *Sarcodon laevigatus*. To me *Hydnum foetidum* remains a dubious species, of which not even the genus can be determined with accuracy.

The specific epithet introduced by Secretan is a nomen nudum, because no specific description, and only two varietal descriptions were given.

*fraceolens*. — *Hydnum fraceolens* Brot., Phitogr. Lusit. sel., Fasc. 1: No. 35. 1801; Fl. lusit. 2: 470. 1804; Phytogr. Lusit. sel. 1: 202, pl. 82 fig. 1, 2. 1816; *ex Fr.*, Syst. mycol. 1: 402. 1821. — *Calodon fraceolens* (Brot. *ex Fr.*) Quél., Ench. Fung. 190. 1886. — *Phaeodon fraceolens* (Brot. *ex Fr.*) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898. — *Hydnum eleosma* Pers., Mycol. europ. 2: 163. 1825 (name change). — Type: not known to be in existence. — Type locality: Portugal, "in pineto de Marrocos, prope Conimbricam."

Neither the original description of 1801, repeated in 1816, which is surprisingly detailed for its time, nor the figures published by its author, agree with any of the species known from Europe or North America. The number of species to choose from is a limited one, for obviously *Hydnum fraceolens* is a *Hydnellum*. This may be gathered from the words, "Pileus . . . demum fuscus, intus farctus et fibrosus, coriaceus, seu spongioso-sublignosus, . . . inferne aculeis concoloribus" as well as from the observation that the "pileus interdum graminum aut aliarum vicinarum plantarum foliis transfixus invenitur." However, the colour description of the pileus as, "primum ex viridi-testaceus" would make the position of the species unique in its genus, the one species coming near it being *Hydnellum geogenium*. But, while *Hydnum fraceolens* is described as having solitary fruit-bodies with an undivided, lentiform pileus which becomes plano-infundibuliform with age, and an odour reminiscent of rancid olive oil, *H. geogenium* differs in that (i) the pileus is thin-fleshed, soon becoming infundibuliform, and often complicated, (ii) the colour of the young specimens is sulphureous, and (iii) the flesh is stated to be almost odourless. It would seem, therefore, that *Hydnum fraceolens* is an independant species which is related to *Hydnellum geogenium*, and thus far only known from Portugal, where it is stated to be common (Camara, 1956: 283). However, I have examined all specimens under the name of *Hydnum (Phaeodon) fraceolens* preserved at Lisbon (LISU), as well as some material (Extremadura, leg. *Welwitsch*, and *Cryptothecia lusitana* No. 14) from Kew. They are all *Hydnellum velutinum* var. *scrobiculatum*. The single specimen of "*Hydnum fraceolens*" at Coimbra deviates from the collections at Lisbon and Kew in that it represents *Phellodon niger*. I do not know whether from this it should be concluded that Brotero gave a misleading description of the colour of the young fruit-body, or that later collectors consistently misapplied the name of the species.

*fragrans*. — *Hydnum fragrans* Britz., Hym. Südbayern 10 (= *in Ber. naturh. Ver. Augsburg* 31): 176, fig. Hydnei 55. 1894; *in Beih. bot. Zbl.* 26 (Abt. 2): 214. 1910; not *Hydnum fragrans* (Chodat & Martin) Sacc., Syll. Fung. 11: 106. 1895. —

*Hydnum britzelmayri* Sacc., Syll. Fung. 11: rear side of frontpage. 1895 (name change). — Type: represented by Britz., Hym. Südbayern 10: fig. Hydnei 54. 1894 (selected).

Judging from the description and the figures, this is a *Hydnellum*, but it has no resemblance to any species I know. I wonder if this could be another forgotten species, as was *Hydnellum auratile*.

*fragrans*. — *Sarcodon fragrans* Chodat & Martin in Bull. Trav. Soc. bot. Genève 5: 222. 189. — *Hydnum fragrans* (Chodat & Martin) Sacc., Syll. Fung. 11. 106. 1895; not *Hydnum fragrans* Britz., Hym. Südbayern 10: 176. 1894. — Type: apparently non-existent (information Dr. C. E. B. Bonner). — Type locality: Switzerland, Pied du Jura (Divonne), near Geneva.

The original description, a photocopy of which I received through the kindness of Dr. C. E. B. Bonner, Geneva, is sufficiently detailed for the species to be identified as belonging to the genus *Sarcodon*. Although no information is given on the presence of clamp connections, I believe the authors were correct in placing their species near *Sarcodon laevigatus*. Most probably, with the latter they meant *S. laevigatus* in the sense of Bourdot & Galzin which at one time I thought to differ from the species as understood by the Scandinavian mycologists. However, it is worth noting that in some of its characters *Sarcodon fragrans* is intermediate between these two. It has the white context of the latter, and the bitter taste of the former, but differs from both in having a pleasant odour. The uncertainty as to how both taxa should be related, stresses the necessity of collecting more detailed data in northern as well as in central European regions. See also remarks under *Hydnum uplandicum*.

*friabilis*. — *Hydnum friabile* Fr. in Nova Acta Soc. Sci. upsal., ser. 3, 1: 106. 1851; not *Hydnum friabile* Rostr. in Medd. Foren. Svampekundsk. Fr. 2: 94. 1920. For discussion, see next epithet.

*friabilis*. — *Hydnum friabile* Rostr. in Medd. Foren. Svampekundsk. Fr. 2: 94. 1920; not *Hydnum friabile* Fr. in Nova Acta Soc. Sci. upsal., ser. 3, 1: 106. 1851.

*Hydnum friabile* Rostr. is a name change for *Hydnum fragile* Fr. which in its turn is a synonym of *Bankera fuligineo-alba* (see Part III: 57). However, Rostrup was not aware of the existence of another *Hydnum friabile* which is a name introduced by Fries for a species related to (Banker, 1906: 135), if not identical with (Coker & Beers, 1951: 8), *Steccherinum pulcherrimum*.

*fuligineo-alba*. — *Bankera fuligineo-alba* (Schmidt ex Fr.) Pouz. in Česká Mykol. 9: 96. 1955.

In general, illustrations omitted from Parts I to IV are not enumerated in this paper, but an exception is made in the case of species of which there exist but few good figures. An excellent figure was published (as *Sarcodon*) by Imler [in Bull. Soc. mycol. France 72 (Atlas): pl. 107. 1957].

*fuligineo-violaceus*. — *Hydnum fuligineo-violaceum* Kalchbr. *apud* Fr., Hym. europ. 602. 1874; Kalchbr., Icon. sel. Hym. Hung. 4: 58, pl. 32 fig. 2. 1877. — *Sarcodon fuligineo-albus* var. *fuligineo-violaceus* (Kalchbr. *apud* Fr.) Quél., Ench. Fung. 189. 1886 (“*fuligineo-violaceum*”). — *Sarcodon fuligineo-violaceus* (Kalchbr. *apud* Fr.) Pat., Essai taxon. Hym. 118. 1900; not *Sarcodon fuligineo-violaceus sensu* Banker in Mem. Torrey bot. Cl. 12: 142. 1906 = *Sarcodon radicans* Banker = *Sarcodon amarescens* (Quél.) Quél. (cf. Coker & Beers, Stip. Hyd. east. U.S. 38. 1951). — Type: “*Hydnum fuligineo-violaceum* Kalchbr. n. sp. / In pinetis Carpatorum ad Olaszi / Sept. 1870 / C. Kalchbrenner” (herb. E. Fries, UPS).

The spores of the type are pale yellowish brown under the microscope, roughly tuberculate, and irregular in outline, which is typical of two genera only, viz. *Hydnum* and *Sarcodon*. Of these, the former may be ruled out on account of the homogeneous context, and the hyphae which are not of uniform diameter. The lack of clamp connections excludes Group 3 of the genus *Sarcodon*, while the colour of the flesh (violet in the pileus, more purplish in the stipe) precludes Groups 2 and 4, leaving Group 1 as the only possibility, of which *Sarcodon commutatus* was described in Part I: 50 as its sole member.

To me Kalchbrenner's figures remained an obstacle for a long time, since their pale colours, and more especially the colours of the flesh, gave rise to serious doubt as to whether or not the specimens I had seen from Uppsala could be considered the material from which the original description had been made. It was not until I had received, also from Uppsala, two drawings, made by Kalchbrenner and sent to Fries, that I learned how true was Bresadola's judgment on Kalchbrenner's published figures: “bene depicta sed male fucata”. The drawings, both water-colours, and representing, each on a different sheet, an identical set of three specimens as reproduced on Plate 32, differ from each other in colour and the way the spines are drawn.

The specimens of the larger sheet are done in a monotonous drab purplish grey, with the context of the pileus in a slate grey that is wholly unlike the colour I have seen in the material from Uppsala. This sheet may be left out of consideration, as the colours are certainly not true to nature.

The specimens of the smaller sheet which, to judge from the manner the spines are drawn, must have served as the example from which the lithographer copied his plate, are more vividly coloured, and, in particular, the colours of the context of pileus and stipe are exactly as I found them in the type. Unfortunately, the same cannot be said of the colours of the surface of pileus and stipe, as the specimens have turned black on drying.

This digression has been necessary to show that (i) as far as the colouring is concerned the published figures of *Hydnum fuligineo-violaceum* are an extremely poor replica of the reality, and (ii) the material at Uppsala is actually the type.

The correct name of the species is *Sarcodon fuligineo-violaceus*, and synonymous with it are *Sarcodon commutatus* and *S. inopinatus*. Very probably also, and contrary to my previous opinion, *Sarcodon catalaunicus* is another synonym.

Under the name of *Hydnum fuligineo-violaceum* the Herbarium at Vienna possesses a specimen collected by Bresadola ("Margone pr. Trento, IX 1903, in pinetis") which agrees in detail with Plate 1048 of this author, and of which the most salient features are the sombre colour of the surface of the pileus and the almost blackish violet of its context. These characters distinguish the specimen from true *Sarcodon fuligineo-violaceus*, but any definite conclusions must be deferred until fresh specimens are available. It would seem that the material described by Nikolaeva (*in* Not. syst. Sect. cryptog. Inst. bot. Acad. Sci. U.S.S.R. **9**: 147. 1953) under the name of *Sarcodon fuligineo-violaceus* is essentially the same as Bresadola's specimen.

*fuliginus*. — *Hydnum fuligineum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 177. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 216. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 59. 1894.

It needs only a few words (context suberose, brown; spores brown in mass) in order to recognize *Hydnum fuligineum* as a *Hydnellum*. Further characteristics such as coalescent fruit-bodies, squat form, and sparingly colliculose brown surface of the pileus, readily mark the present species as identical with a form (common in Western Europe) of what in Part II: 62, was called *Hydnellum velutinum* var. *spongiosipes*.

*fulvocoeruleus*. — *Hydnum fulvocoeruleum* Britz., Hym. Südbayern **10** (= *in* Ber. naturh. Ver. Augsburg **31**): 176, fig. Hydnei 28 b, 52, 53. 1894; *in* Beih. bot. Zbl. **26** (Abt. 2): 213. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 38. 1894 (selected).

Although the glaring colours, especially those of the specimens of Fig. 38, are perhaps the most fantastic ever used to illustrate any *Hydnum*, they are yet unable to disguise the identity of what Britzelmayer described under *Hydnum fulvocoeruleum*, viz. *Hydnellum caeruleum*. Figure 28 b, supplemented in the text of 1910, represents a well-observed and well-drawn specimen of the same species in its first stage of decay.

*glabratum*. — *Hydnum ferrugineum* var. *glabratum* Fr., Obs. mycol. **1**: 133. 1815. — Type locality: Sweden.

The varietal epithet was never taken up again by Fries who by it most probably meant an old stage of *Hydnellum ferrugineum* with the tomentum of the pileus collapsed to a glabrous surface.

*gracilipes*. — *Hydnum gracilipes* P. Karst., Fungi Fenn. exs. 521. 1866 (n.v.); *in* Not. Sällsk. F. Fl. fenn. Förh. **9**: 362. 1868; *in* Bidr. Känn. Finl. Nat. Folk **25**: 291. 1876. — *Hydnellum gracilipes* (P. Karst.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879. — *Calodon gracilipes* (P. Karst.) P. Karst. *in* Rev. mycol. **3**/No. 9: 20. Jan. 1, 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 16. 1881. — Type: "*Calodon gracilipes* Karst." [and, somewhat lower on the same packet, the original label:] "*Hydnum*

n. sp. / Pileo pallido lutescenteferrugineo (gilvo?) tomentosio, aculeis primo albis mox fuscoferrugineis; stipes exc. fragilis / Mustiala in pineto sub muscis cum *Hydno melaleuco* / P. A. Karsten 20 Aug. 1866" (H).

The type material (which may be part of the type distribution) consists of a number of specimens, some of which have their caps fused. The chocolate brown spines, tuberculate spores, and uniformly thin hyphae of the context mark the type material as a *Hydnum*. The purplish brown context of the pileus, immediately staining a dark violet, then olive green, in a solution of KOH, and the lack of clamp connections clearly indicate that the specimens belong to Group 1. The extreme thinness of the pileus and the delicacy of the stipe exclude massive *Hydnum ferrugineum* and *H. velutinum* var. *spongiosipes*. The specimens differ from *H. velutinum* var. *velutinum* on account of the lack of the thick spongiose covering of pileus and stipe. Also, they differ from var. *scrobiculatum* and var. *zonatum* in that the pileus is perfectly smooth and azonate.

The differences mentioned above make it probable that the type represents an independent species, but more collections are urgently needed before anything definite about its position can be said. The following, mainly macroscopic, description drawn up from the type material may be helpful in the identification:—

Carpophores solitary and with central stipe, or confluent with the caps fused into a single one which then appears supported by several stipes. Pileus about 3 cm across (according to Karsten), somewhat depressed in the centre, very thin, soft-coriaceous, tomentose, tomentum on collapse turning into an almost glabrous surface, smooth, azonate, with occasional dots of excreted matter, fairly pale purplish brown (in between "Fawn Color" and "Vinaceous-Fawn" of Ridgway) with a faint ochraceous tinge in the centre. Stipe about 3 cm long (according to Karsten), slender, tapering downwards, thinly tomentose, glabrescent, concolorous with pileus or somewhat darker further down. Spines decurrent, pinkish brown to purplish brown. Context very thin and very little duplex, soft in pileus, somewhat firmer in stipe, purplish brown, staining dark violet, then olive green in a drop of KOH solution. Hyphae without clamp connections.

*gracilis*. — [*Hydnum laevigatum* var.  $\beta$ . *H. gracile* Fr., Syst. mycol. 1: 400. 1821. —] *Hydnum laevigatum* subsp. *H. gracile* (Fr.) ex Fr., Epicr. Syst. mycol. 506. 1838. — *Hydnum gracile* (Fr. ex Fr.) Fr., Summa Veg. Scand. 2: 326. 1849 (no reference to previously published description; nomen nudum); Fr. in Öfvers. Vetensk Akad. Förh., Stockh. 8: 53. 1851. — *Phellodon gracilis* (Fr. ex Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 37: 96. 1882. — *Sarcodon gracilis* (Fr. ex Fr.) Quél., Ench. Fung. 189. 1886 ("*gracile*"). — Type locality: Sweden, Småland.

The first reference containing the epithet '*gracile*' is here put between square brackets, since "the use of a binary combination for an infraspecific taxon [a variety] is not admissible" (Art. 24). While realizing that generally speaking it is equally inadmissible to use a binary combination for a subspecies, I am in favour of a more liberal application of the rule in the case of the 'older authors', since it was an established practice to indicate the subspecies by the repetition of the generic name.

Bearing in mind that Fries (1821: 400) considered '*gracile*' a variety of *Hydnum laevigatum* which, like all Sarcodons, is a soft-fleshed species, his description of the pileus as subtenacious introduces a character which is hard to reconcile with that genus. In my opinion it is even impossible to recognize *H. gracile* as a *Sarcodon*, for there is no species in this genus with a thin and at the same time subtenacious pileus.

In his 'Epicrisis' Fries left out the word "subtenaci", but added "aculeis . . . cano-rufescentibus", from which it may be gathered that a *Hydnellum* was most probably meant. If the pileus should be taken to have the same surface (smooth and practically glabrous) and colour (purplish grey-brown) as *Hydnum laevigatum*, for nothing is stated to the contrary, I can think of no other species than *Hydnellum gracilipes* with which *Hydnum gracilis* might be identified, but the following considerations suggest the use of caution.

In Uppsala there is an unpublished plate of *Hydnum gracile*, drawn by P. Akerlund from dried material [and apparently different from the drawing by H. von Post, which is unknown to me, and to which Lundell referred (Lundell, 1936: 22)], but it would be difficult to prove that the specimens depicted really represent that species as originally described. First, the material was collected in an entirely different region ("Ostrogothiae, Reymyra"), and as late as 1861, so Fries, going by his memory, may have misidentified the specimens, and, secondly, the yellow-brown to ferruginous colour of the pileus looks very different from the colour in *Sarcodon laevigatus*. From this I am inclined to disregard the plate, which leaves *Hydnum gracile* with only its original description—a most incomplete description indeed. In a later description (Mon. Hym. Suec. 2: 276. 1863) Fries introduced still other colours, which only adds to the confusion. I am, therefore, certainly not disposed to identify *Hydnellum gracilipes*, a species of which there exists well-preserved material, with *Hydnum gracile*, a species on which practically no information can be gained, and which had better be abandoned as a nomen dubium.

Fries (1821: 400), rather cryptically referred to an earlier work of his, without quoting a page number. I wonder if he could have meant *Hydnum laevigatum* var. *coriaceum* as published in his 'Observationes', and of which the diagnosis is very similar.

*graveolens*. — *Hydnum cyathiforme* f. *graveolens* Killerm. in Denkschr. bayer. bot. Ges. 15: 43. 1922. — Type locality: Germany, Bavaria, Riegling.

To be included in the synonymy of *Phellodon tomentosus* in Part III: 54.

*graveolens*. — *Hydnum pullum* var. *graveolens* (Pers.) Duby, Bot. Gall. 2: 776. 1830.

To be included in the synonymy of *Hydnum leptopus* var. *graveolens* in Part III: 50.

*griseus*. — *Hydnum cinereum* var. *griseum* Pers., Mycol. europ. 2: 169. 1825. — Type locality: France?

The original diagnosis, fortunately supplemented by the remark that the stipe is glabrous, proves variety *griseum* to be identical with *Phellodon melaleucus*.

*heimii*. — *Hydnum heimii* Maas G. in *Persoonia* 1: 133. 1959. — Type: represented by Heim in *Bull. Soc. mycol. France* 67 (Atlas): pl. 99. 1952 (“*Sarcodon abietum*”).

Rumours have it that authoritative circles are somewhat reluctant to accept *Hydnum heimii* as validly published on the grounds that the type was not clearly indicated. I must admit that the criticism is well-deserved. Indicating the type the way I did, and merely assuming it is still there, is just as bad as not indicating a type at all.

*hepaticus*. — *Hydnum hepaticum* Kalchbr. in *Math. term. Közl.* 3: 223, pl. 1 fig. 3. 1865. — Type: “*Hydnum hepaticum* nov. sp. / Hab. rarius inter muscos silvae Predna . . . [illegible] Olaszinum Scepusii Octob. 1860 / *Kalchbrenner* (herb. E. Fries, UPS).

The type specimens are, unfortunately, in a very bad condition, but still clearly recognizable as belonging to the genus *Phellodon* on account of the very thin pileus, the slender stipe, and the nature of the spores which are subspherical, regular in outline, spinulose, and colourless. The glabrous stipes exclude the possibility of the specimens belonging to either *P. confluens* or *P. niger*, but otherwise the agglutinated specimens are much too blackened to allow further identification. The diagnosis, however, contains two very important indications, viz. “. . . pileis . . . hepaticis”, and “carne fusco-nigra”. Although the term ‘hepaticus’ to describe a colour is far from clear, there is nothing uncertain about “seine grünlich-braune Farbe” in the translation of Kalchbrenner’s annotation (*in Hedwigia* 4: 118. 1865), and it is from this colour of the pileus, as well as from the very dark colour of the context that I conclude that *Hydnum hepaticum* is identical with *Phellodon melaleucus*.

Some of the words in Kalchbrenner’s diagnosis require further explanation, e.g. “[pileis] glaberrimis . . . zonatis . . .” Under circumstances the tomentum of the pileus, already very thin, may collapse so completely as to form a perfectly glabrous surface. The pileus in *Phellodon melaleucus* is not usually zonate, the zonation rather being characteristic of *P. tomentosus*, but the illusion of a zonation may easily be brought about by concentric corrugations. These are still visible in one of the type specimens, and Kalchbrenner’s illustration is also far more suggestive of the pileus being concentrically undulate rather than alternately zoned with dark- and light-coloured bands. In connection with both the colour and the wrinkled surface of the pileus in *Hydnum hepaticum*, I would refer to the discussion under *Phellodon brunneo-olivaceus*.

*hybridus*. — *Calodon hybridus* (Bull. ex Mérat) Lindau, *Kryptog.-Fl. Anfäng.* 1: 44. 1911.

An overlooked recombination to be inserted in Part II: 60.

*h y b r i d u s*. — *Hydnum compactum* f. *hybridum* Killerm. in Denkschr. bayer. bot. Ges. **15**: 41. 1922 (“Pers., Schaeff. 146, 4”). — Type: represented by Schaeffer, Fung. Icon. **2**: pl. 146 fig. 4. 1763.

Killermann referred the present form to Persoon, but the latter never used the epithet ‘*hybridum*’ in a sense other than the original one given by Bulliard, and it must be put down to Killermann’s account for having introduced a new sub-specific epithet. Since this author quoted Schaeffer’s illustration, which represents *Hydnellum aurantiacum*, forma *hybridum* is merely a synonym of that species.

*i m b r i c a t u s*. — *Fungus imbricatus* (L.) Paul., Traité Champ. **2**: Index. 1793 (for description, see p. 127: Chevrotine écaillée ou grande chevrette). — *Phaeodon imbricatus* (L. ex Fr.) J. Schroet. in Cohn, Kryptog.-Fl. Schles. **3** (1): 460. 1888.

These two recombinations should be included in the synonymy of *Sarcodon imbricatus* in Part I: 53. The illustration which Paulet gave of the present species under the name of *Hypothele squammata* (see under ‘*squammatus*’) is a complete failure and it is hard to believe that the specimen depicted was drawn from nature.

*i n a e q u a l i s*. — *Hydnum inaequale* Britz., Hym. Südbayern **10** (= in Ber. naturh. Ver. Augsburg **31**): 175, fig. Hydnei 50. 1894; in Beih. bot. Zbl. **26** (Abt. 2): 213. 1910; not *Hydnum inaequale* Lindbl., Syn. Fung. hyd. Suec. nasc. 16. 1853. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 24c. 1894 (selected).

There are several features in Britzelmayr’s descriptions (of 1894 and 1910) which are suggestive of *Hydnellum diabolus*: pileus convex, . . . depressed in centre, . . . red-brown, . . . always with white margin. Spines . . . flesh-coloured, then red-brown. Context with smell of meal, flesh-coloured in pileus . . . Spores brown in mass, angular . . . On the other hand, there are other features which render such an assumption untenable. The general appearance as shown in Britzelmayr’s drawing is certainly not characteristic of *H. diabolus*, mainly because of the length of the stipe. Also, the colour of the context in the stipe, described as “braunrot und schwarzbraun”, is not known to occur in *H. diabolus*, at least as far as the European specimens are concerned. Finally, however harsh or even unlikely the colours may be in some cases, I have come to regard Britzelmayr’s draughtsmanship as usually quite accurate. The way he would indicate, in a longitudinal section, the tough, stringy, and at the same time zoned context, is sufficiently characteristic for a particular specimen to be recognized as a *Hydnellum*. In the section of *Hydnum inaequale* the context is depicted in an entirely different manner; in fact it is drawn as it is described, being firmer on the outside than inside. From this it is safe to conclude that *H. inaequale* does not belong to *Hydnellum*, but I have to admit that I do not know with what other species it might be identified.

*i n a e q u a l i s*. — *Hydnum graveolens* var. *inaequale* Peck in Rep. N.Y. St. Mus. **40**: 75. 1887. — Type locality: U.S.A., New York, Elizabethtown.

I have not made inquiries about the existence of type material. The description

of the pileus which is stated to be "very uneven and everywhere coated with a whitish villosity or tomentum" suggests *Phellodon confluens*.

*indigoferus*. — *Hypothele indigofera* Paul., Iconogr. Champ. pl. 35 bis. 1812–35 (generic name not validly published). — Type locality: presumably France.

Paulet's figure suggests a *Hydnellum*, and from the blue colour of the pileus I would think it is a grossly exaggerated representation of *Hydnellum caeruleum*. There are, however, two serious objections to this assumption, viz. the bluish stipe, and the "odeur d'iris de Florence". This odour, which is said to be heavy and sweet, would rather point to the possibility of *Hypothele indigofera* being identical with *Hydnellum suaveolens*, but in this species the pileus is never blue, once it has reached the state of maturity as shown in Paulet's figure.

Curiously enough, Paulet's figure has some resemblance to Quélet's illustration of *Sarcodon violaceus* which has been discussed in Part III: 59.

Fries, in his 'Epicrisis' (p. 507), considered the plate to represent *Hydnum* (= *Bankera*) *violascens*, which I am perfectly sure it does not.

I can see no way to identify Paulet's species.

*infundibulum*. — *Hydnum infundibulum* Sw. ex Fr., Syst. mycol. 1: 401. 1821.

In Part III: 58, I regarded the present species as synonymous with *Bankera violascens*. This is an error. Mr. C. Bas, during his stay in Sweden, kindly took the trouble to make a copy in water-colour of the plate of *Hydnum infundibulum* in 'Svensk Botanik'. From a study of this copy, I am now inclined to think that the species represents a *Sarcodon*, which is also in better agreement with the original description, according to which the spines turn from white to brownish or yellow-brown. The fact that *Hydnum infundibulum* is described and depicted as having a funnel-shaped pileus and a strikingly undulate margin suggests that the specimens were already old at the time of collection. This implies that the description of the species was based on specimens of *Sarcodon imbricatus* which had the scales of the pileus collapsed and subsequently washed away during a wet period. For an illustration of the changes that actually take place during the development of the pileus, I may refer to the interesting observations made by Beardslee (1924: 256). Considering that, as pointed out by Beardslee, one is not often in the position to watch the successive stages in the growth of a particular fungus, it seems quite likely that Swartz (and Fries) missed seeing the connection between *Hydnum infundibulum* and *H. imbricatum*. Fries later on did appear to be aware of the various manifestations of *H. imbricatum*, as may be seen from the words "Duplex forma: altera pileo plano squamis crassis persistentibus; altera pileo infundibuliformi squamis rarioribus demum secedentibus" (Epicr. Syst. mycol. 505. 1838), but even then he never suspected the glabrescent form to be the same as *Hydnum infundibulum*.

*inodorus*. — *Hydnum inodorum* Britz., Hym. Südbayern **10** (= in Ber. naturh. Ver. Augsburg **31**): 176, fig. Hydnei 46. 1894; in Beih. bot. Zbl. **26** (Abt. 2): 214. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 70. 1894 (selected).

Britzelmayr himself thought his species allied to *Hydnellum aurantiacum*. Apart from the colour of pileus and stipe which is rather more yellow than orange, there is only the size of the spores ( $6.7 \times 4.5 \mu$ ), if that is a character to be relied upon, to help differentiate both species. For the present I am inclined to regard *H. inodorum* as a pale form of *Hydnellum aurantiacum*.

*inopinatus*. — *Sarcodon inopinatus* Donk in Med. Nederl. mycol. Ver. **22**: 62. 1933. See under '*fuligineo-violaceus*'.

*lignicola*. — *Hydnum nigrum* f. *lignicola* Britz. in Bot. Zbl. **62**: 312. 1895. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 72. 1894.

This is an insignificant form of *Phellodon niger*.

*macrosporus*. — *Hydnum macrosporum* Britz., Hym. Südbayern **10** (= in Ber. naturh. Ver. Augsburg **31**): 176. 1894; in Beih. bot. Zbl. **26** (Abt. 2): 213. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 45. 1894.

Britzelmayr, who was well aware of its relation to *Hydnellum suaveolens*, differentiated the present species on account of its unusually long spores, the length of which was recorded to reach as much as  $8 \mu$ . I am unable to explain this phenomenon except as a freak, possibly a two-spored modification of a normally four-spored species. There is really nothing else in both the description and the drawing to suggest that *H. macrosporum* could be anything but *Hydnellum suaveolens*.

*maculatus*. — *Scutiger maculatus* Paul., Iconogr. Champ. pl. 34. 1812-35 (generic name not validly published).

See under *Fungus sordide-naevosus*.

*maximus*. — *Sarcodon squamosus* subsp. *S. maximus* P. Karst. in Hedwigia **28**: 366. 1889. — *Hydnum squamosum* subsp. *H. maximum* (P. Karst.) Sacc., Syll. Fung. **9**: 208. 1891. — Type: "*Sarcodon squamosus* subsp. *maximus* Karst. / Valkjärvi, mense Aug. 1889. leg. P. A. Karsten" (H).

Already Karsten himself recognized his specimens, of which a small one was sent to me on loan, as belonging to the genus *Sarcodon*. The enormous clamp connections I found on the hyphae readily identify the material as *S. laevigatus*, which is further confirmed by the purplish brown colour of the pileus and the obscurely cracked surface in its centre.

*melaleucus*. — [Unnamed species in a note to *Hydnum pullum* Sw. in K. svenska VetenskAkad. Handl. **31**: 249. 1810. —] *Hydnum melaleucum* Sw. apud Fr.,

Obs. mycol. 1: 141. 1815 ("Swartz in litteris"); ex Fr., Syst. mycol. 1: 406. 1821. — Etc.

Carelessness in reading caused me (Part III: 50) to overlook that Swartz, not Fries, is the original author of *Hydnum melaleucum*. Fries, in his 'Observationes' clearly quoted "*Hydn. melaleucum* Swartz in litteris", referring to a note by that author (l.c.) who had stated: "This may constitute a species of its own which should be determined at a later date" (translated).

The correct author citation, therefore, is *Phellodon melaleucus* (Sw. apud Fr. ex Fr.) P. Karst.

*melilotinus*. — *Hydnum nigrum* var. *melilotinum* (Quél.) Cost. & Duf., Nouv Fl. Champ. 160. 1891.

The above recombination, antedating the one made by Lundell, should be inserted in Part III: 53.

*mirabilis*. — *Hydnum mirabile* Fr., Monogr. Hym. Suec. 2: 349. 1863. — *Hydnullum mirabile* (Fr.) P. Karst. in Medd. Soc. F. Fl. fenn. 5: 41. 1879; Wehmeyer, Fungi New Brunsw., Nova Scotia and Pr. Edw. Isl. 68. 1950; Nikol. in Pl. cryptog. 9: 481. 1954; Snell & Dick in Lloydia 21: 37. 1958. — *Calodon mirabilis* (Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 37: 107. 1882; Snell apud Snell & Jackson in Lloydia 17: 254. 1954. — *Phaeodon mirabilis* (Fr.) P. Henn. in Nat. PilfAm. 1 (1\*\*): 149. 1898. — Type locality: Sweden, "In pinetis locis sabulosis Ostrogothiae detexit von Post." (Fries, l.c.).

In a previous paper (Part II: 58), while discussing the difference between *Hydnullum compactum* and *H. mirabile*, I expressed the opinion that "for the time being" both had best be treated as specifically different. Now that I have seen the superbly dried material distributed in Lundell & Nannfeldt, Fungi exs. suec. praes. upsal. 349 (unknown to me at that time), and some other collections from Vienna, I have satisfied myself that both species are truly distinct. The very conspicuous duplex nature of the context of the pileus of *H. mirabile* is not just a feature of Swedish specimens, becoming increasingly less pronounced in specimens from more southern regions of Europe (where they would be called *Hydnullum compactum*). On the contrary, the character is a reliable one, shown to be invariable in the following examples, and separating them from *H. compactum*, of which we possess specimens from the Netherlands, the Saar, and France. The collections of *H. mirabile* examined are from: —

AUSTRIA: South Tirol, Vahrn, unter d. Taubenbrunn, 20 July 1904, A. Heimerl ("nicht bitter") (W 9899).

AUSTRIA: Tirol, Ödenhaus near Innsbruck, 9 July 1935, V. Litschauer (W 10051).

ITALY: Castelfondo, Aug. 1903, G. Bresadola (W 10048).

*mollis*. — *Hydnum molle* Fr. in Öfvers. VetenskAkad. Förh., Stockh. 8: 53. 1851; Monogr. Hym. Suec. 2: 274. 1863; Icon. sel. Hym. 1: 4, pl. 2 upper fig. 1867;

not *Hydnum molle* Schw. in Trans. Amer. phil. Soc. 4: 162. 1832 = *Irpex* sp., according to Banker in Mem. Torrey bot. Cl. 12: 135. 1906; not *Irpex mollis* Berk. & Curt. in Hook. J. Bot. 1: 236. 1849. — *Tyrodon mollis* (Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 37: 91. 1882. — *Sarcodon cinereus* var. *mollis* (Fr.) Quél., Ench. Fung. 189. 1886 (“*molle*”). — *Phaeodon mollis* (Fr.) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898. — *Sarcodon mollis* (Fr.) R. Nav. in Natuurwet. Tijdschr., Antw. 5: 68. 1923 (“*molle*”); Bourd. & Galz. in Bull. Soc. mycol. France 40: 110. 1924 (“*molle*”). — Type locality: Sweden, “In pinetis Uplandiae, hinc inde.”

The fleshy substance of the context, combined with the whitish colour of the spines, of which Fries later (1867: 4) said “haud decolorantes”, excludes the thought of the genera *Hydnellum*, *Phellodon*, and *Sarcodon*. The genus *Hydnum* may be excluded on the ground of the words, “pileo . . . albo canescente”, for no species of that genus is known to have a pileus turning from white to greyish (for the meaning of the word ‘canescens’, see Kühner, 1950: 28). The one genus that remains is *Bankera*, and it is surprising to see how well both the description and illustration of *Hydnum molle* Fr. agree with what in North America has become known as *Bankera carnosa* (Banker) Snell, Dick, & Taussig apud Snell & al.

The description of the surface of the pileus of that species as “soft, felted, taking the imprint of a finger” (Coker & Beers, 1951: 30, as *Phellodon*) conforms to Fries’s “Pileus . . . ob tomentum densum et compactum . . . tactu mollissimus.” Coker & Beers described the pileus as “pure white at first, . . . later in older parts . . . light brown . . . in the central region or nearly all over”, and Banker (1913: 65) as “light grayish brown at center with . . . whitish or cream colored border . . .”, which conveys the same idea as the words “albo canescente”.

It is no error that the stipe, described by Fries as whitish, is depicted as pale brownish in the plate executed under his direction, since these colours indicate two different developmental stages. A similar change of colour was described by Banker and Coker & Beers.

At first sight there seems to be a significant difference between *Hydnum molle* Fr. and *Bankera carnosa*, as far as the shape of the pileus of the young fruit-body is concerned. Fries stated the pileus to be umbilicate, and a few lines further he remarked: “Pileus formam habet potissimum *Paxilli*, junior convexus, disco profunde umbilicato, demum vero explanatus saepe repandus . . .”, which appears in odd contrast to Coker & Beers’s “caps . . . nearly plane”, and Banker’s “pileus . . . plane to subconvex, slightly depressed”. I fail to explain this discrepancy, but it is the only one I can find, and certainly one which loses its importance with age. I am, therefore, convinced that *Hydnum molle* Fr. and *Bankera carnosa* refer to one and the same species. This shows that *Bankera carnosa* is not exclusively a North American species, but in view of the fact that it does not seem ever to have been reported since the days of Fries, it must be of extreme rarity in Europe.

With regard to the correct name of the present species, the following considerations are advanced.

When Fries published his *Hydnum molle*, the name was a later homonym of *H.*

*molle* Schw. Karsten, however, was free to use Fries's epithet in the combination *Tyrodon mollis* (see Art. 72). This name is legitimate, and of an earlier date than *Phellodon carnosus* Banker (1913), the basynym of *Bankera carnosus*. As the correct name of the species in the genus *Bankera* I herewith propose **Bankera mollis** (P. Karst.) Maas G., *comb. nov.* (basionym, *Tyrodon mollis* P. Karst., l.c.,  $\equiv$  *Hydnum molle* Fr., l.c.), with *Phellodon carnosus* and *Bankera carnosus* as synonyms.

*montellicus*. — *Hydnum montellicum* Sacc. in *Michelia* 1: 4. 1879. — *Phaeodon montellicus* (Sacc.) P. Henn. in *Nat. PflFam.* 1 (1\*\*): 149. 1898. — *Calodon montellicus* (Sacc.) Bataille in *Bull. Soc. mycol. France* 39: 211. 1924 (“*montellicum*”). — Type: “*Hydnum montellicum*” (Italy, “Veneto, Treviso, bosco Montello, in silvis quercinis”, according to Saccardo, 1916: 1091) (PAD; fragment in L).

Bresadola (1920: 69) listed the present species as a synonym of *Hydnum velutinum* “Ld.” I do not quite understand the addition of the author's citation, unless by it Bresadola meant to refer to Lloyd's Note 229 [*Mycol. Writ.* 4 (Lett. No. 56): 5. 1915]. In this note Lloyd persisted in calling a species *Hydnum velutinum*, although he was well aware of the fact that it could not be the species ascribed to Fries, Lloyd's interpretation being *Hydnum spongiosipes* of Peck. In this connection it should be remembered that the figure which Bresadola later gave under the name of *H. velutinum* (*Icon. mycol.* 2: pl. 1054. 1932) also represents what (in Part II: 62) was called *Hydnellum velutinum* var. *spongiosipes*.

Reverting to Saccardo's species, it should be pointed out that *Hydnum montellicum* has no relation whatever with *Hydnellum velutinum* or any variety of that species on account of the fact that in *H. montellicum* the flesh is not purplish brown, and does not turn violet, then olive green, in a drop of KOH solution. The hyphae of the context lack clamp connections, which excludes Groups 4 to 6 of the genus *Hydnellum*. Group 2 needs not be taken into consideration, as there are neither yellowish nor orange colours in the context of pileus or stipe, whilst inclusion in Group 3 appears equally unlikely. For one thing, this group comprises two species, *H. compactum* and *H. mirabile*, with pale to whitish flesh, at least in the pileus, and both are characterized by an acrid taste. In the type specimen of *Hydnum montellicum*, the context of the pileus is fairly dark yellow-brown (in between “Sayal Brown” and “Saccardo's Umber” of Ridgway, which is well in agreement with Saccardo's description of the flesh as being fuscous), and the taste is decidedly not acrid.

Since, furthermore, the present species is not identical with any of the *Hydnellums* described from North America, it would seem that *Hydnum montellicum* is an independent but forgotten species. Also, it is quite likely that it will prove to constitute a seventh group. A redescription must be postponed until fresh material has been collected.

*moschatellinus*. — *Hydnum moschatellinum* Vel., *České Houby* 749. 1922 (Latin translation by Pilát in *Op. bot. čech.* 6: 274. 1948). — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia.

Judging from Velenovský's description, I have little hesitation in identifying the present species with *Bankera fuligineo-alba*. The only obstacle seems to be in the spores which are described as nearly smooth, whereas those in *Bankera* are finely tuberculate. The discrepancy may be explained by assuming that Velenovský must have had immature material. This assumption gains probability from the fact that the spines are stated to be white tinged with pink; the spines in mature specimens would have turned grey.

*m u l t i p l e x*. — *Hydnum multiplex* Fr. in Öfvers. VetenskAkad. Förh., Stockh. 8: 54. 1851; Monogr. Hym. Suec. 2: 277. 1863; Icon. sel. Hym. 1: 8, pl. 6 fig. 2. 1867. — *Calodon multiplex* (Fr.) P. Karst. in Bidr. in Känn. Finl. Nat. Folk 37: 110. 1882. — *Pleurodon multiplex* (Fr.) Ricken, Vadem. Pilzfr. 242. 1918. — Type locality: Sweden, near Uppsala, forest Nosten (Fries, 1863: 277).

While I believe that *Hydnum nanum* (see there), reported from decayed wood of spruce, is identical with *Phellodon melaleucus*, I am not so sure that *H. multiplex* represents the same. Fries, moreover, did not state that his species was found growing on decayed wood, whilst the figure shows a number of stipes springing from an apparently intact piece of bark. In general appearance, too, *Hydnum multiplex* looks different from anything I have ever seen in *Phellodon melaleucus*. I can offer no opinion on the identity of the species.

*m u r i n u s*. — *Hydnum murinum* Vel., České Houby 751. 1922 (Latin translation by Pilát in Op. bot. čech. 6: 274. 1948). — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, "prope Chlumeč nad Cidlinou."

The species described by Velenovský certainly belongs to the genus *Phellodon*, and may well be identical with *P. melaleucus*.

*n a n u s*. — *Hydnum nanum* Saut. in Hedwigia 16: 73. 1877. — Type: not in W (information Dr. K. H. Rechinger). — Type locality: Austria, "Auf morschem Fichtenholz am Dürenberg bei Hallein."

Von Keissler (1917: 108) simply discarded the present species with the words "Ist zu streichen." Yet, I believe it gives little trouble to recognize *Hydnum nanum* as a *Phellodon* on account of its white spines and filiform stipe. The glabrous surface of the stipe excludes *Phellodon confluens* and *P. niger*, whilst the colour ("fusco-cinereum"), and the smooth and glabrous surface of the pileus are characteristic features of *P. melaleucus*.

It is true that I myself have never seen *P. melaleucus* growing on decayed wood, but since in the Netherlands it is quite commonly found among vegetable debris in the sides of dry ditches at the edge of woods, I do not regard the substratum indicated by Sauter as improbable. However, see also remarks under *Hydnum multiplex*.

*n u d u s*. — *Hydnum nudum* Vel., České Houby 747. 1922 (Latin translation by Pilát in Op. bot. čech. 6: 273. 1948); not *Hydnum nudum* Berk. & Curt. apud Berk.

in *Grevillea* 1: 100. 1873. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Říčany.

Velenovský compared his species with *Hydnum cyathiforme* Schaeff., which is a synonym of *Phellodon tomentosus*, but considering that the pileus is described as azonate, perfectly glabrous and smooth, and the flesh as white, *Hydnum nudum* obviously is not a *Phellodon*. Since the spines are said to be white, and the spores hyaline, the species may be thought of as belonging to either *Bankera* or *Hydnum*. The last named genus does not seem very likely, as the stipe is described as dark brown, and the odour as strong and pleasant. This leaves *Bankera* as the one remaining genus, but here, as in *Hydnum moschatellinum*, there is the same difficulty of the spores being smooth. Even if this discrepancy is explained away much in the same manner as in that species, there remains the difficulty of assigning *Hydnum nudum* to any of the three species at present known in *Bankera*. Perhaps, Velenovský's description discords least with *Bankera violascens*.

*occidentalis*. — *Hydnum occidentale* Fr., *Epicr. Syst. mycol.* 510. 1838. — *Auriscalpium occidentale* (Fr.) P. Karst. in *Medd. Soc. F. Fl. fenn.* 5: 41. 1879. — *Leptodon occidentalis* (Fr.) Quél., *Ench. Fung.* 191. 1886 (“*occidentale*”). — Type: represented by Paul., *Iconogr. Champ.* pl. 32. 1812–35 (“*Scutigera spinosus*”).

The present binomial, which is the same as *Fungus atrospinosus* Paul. (see there), refers to *Sarcodon laevigatus*.

*occultus*. — *Hydnum occultum* Britz., *Hym. Südbayern* 8: 14. 1891 (n.v.); *Hym. Südbayern* 10 (= in *Ber. naturh. Ver. Augsburg* 31): 215, fig. *Hydnei* 36. 1894; in *Beih. bot. Zbl.* 26 (Abt. 2): 215. 1910. — Type locality: Germany, Bavaria, Nesselwang.

The description (of 1894) of the context as “faserig-korkig-holzige”, the spines as “weiss, weisslich”, and the spores in mass also as “weiss” marks the present species as an indubitable *Phellodon*. The most salient features of the species, as shown in Fig. 36, are (i) its yellow, azonate, infundibuliform pileus which is radially streaked with brown from the centre outwards, and bordered with a white margin, and (ii) its dark brown, long, and flexuous stipe which seems to have a smooth surface. These characters combined exclude *Phellodon confluens* and *P. niger* (which have no yellow caps, and a spongy tomentum covering their stipes), as well as *P. tomentosus* (which has a conspicuously zoned pileus). This leaves *P. melaleucus* as the only possibility, even if it is true that I have never seen such a striking colour pattern of the pileus in any specimen of that species. It should, however, be remembered that perhaps *P. melaleucus* is the most variable species of its genus as far as colours are concerned, and in this connection I may refer to *Phellodon brunneo-olivaceus* and *P. brunneoroseus*.

*odoratus*. — *Hydnum odoratum* Vel., *České Houby* 748. 1922 (Latin translation by Pilát in *Op. bot. čech.* 6: 274. 1948). — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Mnichovice.

The original account is strongly suggestive of the description of old specimens of *Bankera fuligineo-alba*.

*olidus*. — *Hydnum olidum* Berk. in J. Linn. Soc. (Bot.), London 16: 51. 1877. — Type: “*Hydnum olidum* B. / Japan / F. V. Dickins” (K).

The type consists of two specimens in good condition. The coriaceous pileus and the white spines mark the specimens as belonging to the genus *Phellodon*. From the olivaceous colour of the pileus, the thick tomentum of the stipe, and, above all, the tough and black core in the context of the stipe, there is not the slightest doubt that *H. olidum* is identical with *Phellodon niger*.

*pocillum*. — *Hydnum pocillum* Inz., Funghi sicil. 1: ?. 1869 (n.v.). — *Hydnum cinereum* var. *pocillum* (Inz.) Fr., Hym. europ. 604. 1874. — *Hydnum cinereum* subsp. *H. pocillum* (Inz.) Sacc., Syll. Fung. 6: 440. 1888. — Type: represented by Inzenga, Funghi sicil. 1: pl. 5 fig. 1–5. 1869 (n.v.).

Since I have not seen the original description and illustrations, I can offer no opinion as to its identity.

*politus*. — *Hydnum politum* Fr., Anteckn. Sverige väx. ätl. Svamp. 62. 1836; Epicr. Syst. mycol. 507. 1838; Monogr. Hym. Suec. 2: 277. 1863; Sverig. ätl. gift. Svamp. 52, pl. 90. 1866. — *Tyrodon politus* (Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 37: 90. 1882. — *Sarcodon politus* (Fr.) Bataille in Bull. Soc. mycol. France 39: 205. 1924 (“*politum*”). — Type locality: Sweden, Småland, Femsjö (Fries, 1866: 52).

The description supplied by Fries (1838: 507), while sufficiently clear for the genera *Hydnellum* and *Phellodon* to be excluded (“... pileo carnoso . . . Caro alba.”), also states the spines to be white, which rules out *Sarcodon*. However, the choice between *Bankera* and *Hydnum* is harder to make, on account of some of the characteristics which cannot be reconciled.

The description of the spines leaving a “circulum nudum” around the stipe reminds one of the situation in *Hydnum repandum*, and, more especially, var. *repandum*, but then the colour ‘ferrugineus’ (= “rouillé foncé ou brun rouillé”, according to Kühner, 1950: 29) is wrong for the stipe in that species. In parentheses, it should be noted that in Plate 90 the stipe is depicted as totally white, although both the Latin and Swedish descriptions indicate the stipe to be concolorous with the pileus. Identification of *Hydnum politum* with *Hydnum repandum* var. *rufescens*, which does possess a concolorous stipe, seems equally unlikely on account of the fact that in this variety the spines are also concolorous, not white, whereas the stipe is slender, not stocky and with a bulbous base. As a third possibility, *Hydnum politum* may be compared with *Hydnum umbilicatum* Peck, but here again the differences in the colours of the stipe, spines, and flesh make it difficult to come to a conclusion.

With the failure to recognize *Hydnum politum* satisfactorily as a species of the genus *Hydnum* sensu stricto, the one possibility left seems to be *Bankera*, of which only

*B. fuligineo-alba* would come into consideration. It appears, however, that this species is not likely either, for specimens which are so old as to have turned ferruginous in both pileus and stipe, if this colour exists at all in *B. fuligineo-alba*, would most certainly have their spines grey, not white. Moreover, the bare zone around the top of the stipe devoid of spines is not a feature characteristic of the genus *Bankera*.

Failing to identify the species, I am of the opinion that the name is best disregarded as being a nomen dubium.

*polyceps*. — [*Erinaceus niger, ramosus, non vescus* Mich., Nova Pl. Gen. 132. 1729. —] *Hydnum nigrum* var.  $\beta$ ? *polyceps* Pers., Mycol. europ. 2: 168. 1825. — Type: represented by Micheli, Nova Pl. Gen. pl. 72 fig. 6. 1729.

Very probably, this is a form of *Phellodon niger*.

*portae*. — *Hydnum portae* Brig. *apud Comes in Ann. Scuola Agricolt. Portici* 1: 116. 1878 (n.v.). — Type locality: Italy, around Naples.

As I have been unable to locate a copy of the above mentioned journal, I rely upon the description of the species as published by Saccardo [*in Fl. ital. cryptog.* 1 (Fasc. 15): 1103. 1916]. From this it is obvious that *Hydnum portae* only represents one of the various forms of *Hydnum repandum*, as was also the opinion expressed by Comes.

*pulchrispineus*. — *Hydnum aurantiacum* var. *pulchrispineum* Peck in Rep. N.Y. St. Mus. 54: 171. 1901. — Type locality: U.S.A., New York, near Westport.

Very probably the type material is still at Albany but I made no inquiries. The description which Peck gave of the spines, "a beautiful persistent yellowish orange", is highly characteristic of *Hydnum earlianum*, a species which more than once appears to have been confused with the true *H. aurantiacum*.

*pullus*. — *Hydnum nigrum* var.  $\beta$ . *pullum* (Sw.) Wahlenb., Fl. suec., ed. 2, 2: 1005. 1833.

An overlooked recombination which should be inserted in Part III: 53.

*pulvinatus*. — *Hydnum pulvinatum* C. F. Schultz, Prodr. Fl. stargard. 491. 1806; not *Hydnum pulvinatum* Secr., Mycogr. suisse 2: 513. 1833 = unidentifiable. — Type locality: Germany, Mecklenburg-Strelitz, between Warlin and Rühlow, near Stargard.

Fries, in his 'Systema' (1821: 399) regarded *Hydnum pulvinatum* as a synonym of *Hydnum laevigatum*, but that is most certainly incorrect, as Schultz described the pileus of his species as membranaceous. The colour of the spines, which are said to be ferruginous, and the thin-fleshed pileus mark the species as a *Hydnum*, but further identification appears impossible.

*queletii*. — *Phaeodon queletii* (Fr. apud Quél.) P. Henn. in Nat. PflFam. **1** (1\*\*): 149. 1898.

An overlooked recombination which should be inserted in Part II: 62.

*radiato-rugosus*. — *Hydnum radiato-rugosum* Britz., Hym. Südbayern **10** (= in Ber. naturh. Ver. Augsburg **31**): 178. 1894; in Beih. bot. Zbl. **26** (Abt. 2): 215. 1910. — Type: represented by Britz., Hym Südbayern **10**: fig. Hydnei 64. 1894 (selected).

Although in the original account the colour of the spines is not stated, it is brown in Fig. 64. From the words, "H[ut] . . . rotbraun . . . Fl[eisch] rotbr[ aun] . . . ; dem *H. zonatum* v[erwandt]" it is obvious that *H. radiato-rugosum* belongs to *Hydnellum velutinum*. The words "H[ut] strahlenförmig runzlig, gezont . . ." indicate that Britzelmayer's species represents one of those forms intermediate between *H. velutinum* var. *scrobiculatum* and var. *zonatum*.

Figure 29, originally (Hym. Südbayern **6**: 33. 1890) indicated as an illustration for *Hydnum zonatum*, was in 1894 considered to represent *H. radiato-rugosum*.

*reticulatus*. — *Hydnellum diabolus* f. *reticulatum* Coker & Beers, Stip. Hydn. east. U.S. 72, pl. 44 lower fig. 1951 (no Latin description). — Type: U.S.A., North Carolina, Chapel Hill, No. 14364 (selected).

To be included in the synonymy under *Hydnellum diabolus*, see there.

*rivulosus*. — *Hydnum laevigatum* var. *rivulosum* Fr., Mon. Hym. Suec. **2**: 275. 1863. — Type locality: Sweden.

This varietal epithet refers to an insignificant stage in the development of *Sarcodon laevigatus*, in which the pellicle of the pileus has ruptured into a multitude of areoles or adnate scales.

*roseus*. — *Hydnum roseum* Saut. apud Schiederm. in Öst. bot. Z. **27**: 6. 1877 (nomen nudum); not *Hydnum roseum* Raddi in Mem. Mat. Fis. Soc. ital. Sci., Modena **13** (2): 354. 1807 = *Hydnum repandum* L. ex Fr. var. *repandum*. — Type: not in W (information Dr. K. H. Rechinger). — Type locality: presumably Austria.

This binomial is a herbarium name which does not seem to have been published by Sauter (compare von Keissler, 1917: 108). It was enumerated by Schiedermayer without a description.

*sanguineo-fulvus*. — *Hydnum sanguineo-fulvum* Britz., Hym. Südbayern **8**: 14. 1891 (n.v.); **10** (= in Ber. naturh. Ver. Augsburg **31**): 177, fig. Hydnei 42, 43. 1894; in Beih. bot. Zbl. **26** (Abt. 2): 214. 1910. — *Hydnum ferrugineum* f. *sanguineo-fulvum* (Britz.) Killerm. in Denkschr. bayer. bot. Ges. **15**: 42. 1922. — Type locality: Germany, Bavaria.

I have been unable to trace the diagnosis of 1891, but the description of 1894 clearly indicates that Britzelmayer's species is identical with *Hydnellum velutinum* var.

*scrobiculatum* ("Oberfläche knollig, dabei gefurcht, grubig-faserig; Stacheln . . . unter dem Hutrand weisslich bereift, dann nach unten fleischfarben, rotbraun . . . Fleisch etwas mehr als korkhart, nach Mehl riechend, oben fleischfarben, weisslich rotbraun, dann nach unten rotbraun bis schwarzrotbraun.").

Of the illustrations enumerated by Britzelmayer in 1894 only Figs. 42 and 43 were maintained in 1910, and I consider them a fair enough representation of *H. velutinum* var. *scrobiculatum*, although the colours of the caps are too bright. Figure 58 may be the same, Figs. 56 and 57 seem to me to be *Hydnellum velutinum* var. *spongiosipes*.

*scabrosus*. — *Phaeodon scabrosus* (Fr.) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898.

To be inserted in Part I: 58.

*scrobiculatus*. — *Phaeodon scrobiculatus* (Fr. ex Secr.) P. Henn. in Nat. PflFam. 1 (1\*\*): 148. 1898.

An overlooked recombination to be inserted in Part II: 61.

*scutatus*. — *Hydnum \*scutatum* Pers., Mycol. europ. 2: 170. 1825. — Type: "*Hydnum scutatum* / prope Versalias (Bard)" (L 910.263-897).

The specimen in Persoon's herbarium has been very badly dried, and recognition is seriously hampered by the strangely deformed surface of the pileus. Fortunately, the stipe has been severed from the pileus by an oblique cut, and the context now exposed reveals the identity of the specimen. The dark purplish brown flesh with its numerous pockets of crystalline matter, and the deep violet discolouration in a drop of KOH mark the specimen as belonging to Group 1 of the genus *Hydnellum*. *Hydnellum ferrugineum* and *H. velutinum* var. *spongiosipes* may be ruled out on account of the colour and the general appearance of the pileus. The lack of concentric zones and the comparatively thin spongiose layer of the pileus exclude var. *zonatum* and var. *velutinum*, which leaves *Hydnellum velutinum* var. *scrobiculatum* as the only possibility.

*sericeus*. — *Hydnum sericeum* Vel., České Houby 748. 1922 (Latin translation by Pilát in Op. bot. čech. 6: 273. 1948); not *Hydnum sericeum* Sw., Prodr. 149. 1788 = *Dictyonema sericeum* (Sw.) Berk., a lichen; not *Hydnum sericeum* (Pat. apud Duss) Sacc. & D. Sacc. in Sacc., Syll. Fung. 17: 151. 1905. — Type: "*Hydnum sericeum* Vel., Bohemia centr., distr. Ríčany u Prahy: in Piceetis apud Mnichovice, 1915, leg. Velenovsky" (PRC).

This is fully identical with *Phellodon niger*; I have seen the material.

*serotinus*. — *Hydnum serotinum* Ch. Martin in Bull. Trav. Soc. bot. Genève 7: 194. 1894. — Type locality: Switzerland, Mont Gosse, near Geneva.

Dr. C. E. B. Bonner, Geneva, who kindly supplied me with a photocopy of the original description, also informed me that there is no material to be found. Judging from the description, *Hydnum serotinum* seems to be a form of *Hydnum repandum*.

*sordide-naevosus*. — *Fungus sordide-naevosus* Paul., *Traité Champ.* 2: Index. 1793 (“*sordidè naevosus*”; for description, see p. 125: Escudarde-coulevre). — Type locality: presumably France.

This is another of Paulet’s doubtful species. The description states the pileus to be characterized by “ses taches plus ou moins brunes sur un fond lavé de rouge & de jaune”, but the plate (as *Scutiger maculatus*, see there) shows a scrobiculate surface. The description does not state the nature of the context, but judging from the plate it seems to be fleshy. This, combined with the dark brown colour of the spines, marks the species as a *Sarcodon*. Going by the slate blue colour of the flesh of the pileus, described as “d’un gris de cendre lavée”, one could be tempted at first sight to think of *Sarcodon fuligineo-violaceus*, but the context in that species is purplish to violet.

Fries, in his ‘Epicrisis’ (p. 506), regarded Paulet’s plate as an illustration of *Sarcodon laevigatus*, which opinion is equally difficult to maintain. Later on, in his ‘Hym. europ.’ (p. 600), he thought that Paulet’s species rather represented *Hydnum fragile*. This species, however, is a synonym of *Bankera fuligineo-alba* (see Part III: 57). It is quite certain, considering the dark brown spines shown in Paulet’s figure, that *Fungus sordide-naevosus*  $\equiv$  *Scutiger maculatus* is not a *Bankera*.

*sparso-aculeatus*. — *Hydnum sparso-aculeatum* Britz., *Hym. Südbayern* 10 (= in *Ber. naturh. Ver. Augsburg* 31): 175. 1894; in *Beih. bot. Zbl.* 26 (Abt. 2): 212. 1910. — Type: represented by Britz., *Hym. Südbayern* 10: fig. Hydnei 47. 1894.

In both the original diagnosis and the description of 1910 the words, “Stachel-schicht schön weiss . . . Fl[eisch] weich, weiss . . .” point in the direction of *Bankera*. The brownish colours of the fruit-body, more saturated in the centre of the pileus and towards the base of the stipe, and the absence of scales on the pileus, leave no other choice than *Bankera fuligineo-alba*.

The description of the colour of the spores as yellowish would suggest that *H. sparso-aculeatum* probably represents a *Sarcodon* rather than a *Bankera*. If that was the case, the only European species answering to Britzelmayer’s figure would be *Sarcodon laevigatus*, but the smaller size of the spores ( $4.5 \times 3 \mu$ ) opposes such an identification.

*spinosus*. — *Scutiger spinosus* Paul., *Iconogr. Champ.* pl. 32. 1812–35 (generic name not validly published).

See under *Fungus atrospinosus*.

*spongiosipes*. — *Hydnellum velutinum* var. *spongiosipes* (Peck) Maas G. in *Fungus* 27: 62. 1957. — *Hydnellum spongiosipes* (Peck) Pouz. in *Česká Mykol.* 14: 130. 1960.

Since *Hydnum spongiosipes* was published some years after *H. fuligineum* Britz. (see there), the latter epithet should take precedence over the former in case ‘*spongiosipes*’ is considered an autonomous species.

*squammatu s.* — *Hypothele squammata* Paul., Iconogr. Champ. pl. 35 fig. 3. 1812–35 (generic name not validly published).

See under *Fungus imbricatus*.

*squamosu s.* — *Hydnum squamosum* Bull., Herb. France pl. 409. 1788; Hist. Champ. France 310. 1791; *ex* Nocca & Balbis, Fl. ticin. 341. 1821 (n.v.); G. F. Re, Fl. pedemont. Append. 50. 1821. — Type: represented by Bull., Herb. France pl. 409. 1788.

Incidentally mentioned in Part IV: 134. Bulliard's species represents a *Hydnellum*, but is otherwise unidentifiable.

*Hydnum squamosum* sensu Roques, Hist. Champ. 46. 1832, represents *Sarcodon imbricatus*.

*squarrosu s.* — *Hydnum squarrosum* C. Nees, Syst. Pilze, Ueberblick 61, pl. 32 fig. 240. 1817 (“Pers.”).

Whether this specific epithet was intended as a new name, or just written in error for *Hydnum imbricatum* is hard to say. To be included in the synonymy of *Sarcodon imbricatus* in Part I: 53.

*stereosarcinon.* — *Sarcodon stereosarcinon* Wehm. in Canad. J. Res., sect. C, 18: 102. 1940. — Type locality: Canada, Nova Scotia.

The present binomial and *Sarcodon brevipes* Coker (see there) refer to the same species (Coker & Beers, 1951: 54). Wehmeyer published his species one year after the publication of *S. brevipes*, but since he did provide a Latin description, which Coker omitted, *Sarcodon stereosarcinon* is the correct name for the species.

*stohlii.* — *Phaeodon aurantiacus* f. *stohlii* (Rabenh.) Schatteburg, Höh. Pilze Unterweserraumes 311. 1956 (no reference to basynym).

This recombination, which was not validly published, should be inserted in Part II: 52.

*suavis.* — *Hydnum versipelle* var. *suave* Bres. *apud* Ambrosi in Bull. Soc. veneto-trent. Sci. nat. 3: 43. 1884. — Type: not known to be in existence. — Type locality: Italy, Trentino, Valle di Sella.

The only piece of information contained in the original account is that the present variety would differ from *Hydnum versipelle*, “per un odore forte, gratissimo di liquore.” Even if it is assumed that variety *suave* has any relation to *Hydnum versipelle*, in other words, that it is a *Sarcodon*, it should be remembered that perhaps in no other genus of stipitate Hydnums do the species require a more detailed description, drawn up from the living material, so as to be recognizable. Apart from the odour, however, there is not a single distinctive word in the description. Under these circumstances the name must remain a nomen dubium.

*suberosu s.* — *Hydnum suberosum* Batsch, Elench. Fung. 113, 179. 1783; *ex*

Cobelli in *Michelia* 2: 238. 1881. — Type: represented by Batsch, Elench. Fung. pl. 10 fig. 45. 1783.

The original account is rather inclusive in that Batsch stated the colour to vary from grey, whitish grey, or white to brick red. For, while it is possible with a fair degree of accuracy to identify *Hydnum suberosum* from its figure as *Phellodon niger*, it is equally certain that Batsch with his brick red specimen(s?) was in error and had a totally different species, probably even a species of the genus *Hydnellum*. I am unable to say what species could be meant from the description as whitish grey or white.

*s u b s q u a m o s u s*. — *Hydnum subsquamosum* Batsch, Elench. Fung. 111, 177. 1783. — *Fungus subsquamosus* (Batsch) Paul., *Traité Champ.* 2: Index. 1793 (“*sub-squammosus*”; description on p. 124: Escudarde tigrée). — *Scutiger subsquamosus* (Batsch) Paul., *Iconogr. Champ.* pl. 33 fig. 1. 1812–35 (generic name not validly published; copy of Batsch’s figure). — *Hydnum subsquamosum* Batsch ex Fr., *Syst. mycol.* 1: 399. 1821. — *Hydnum badium* var. *subsquamosum* (Batsch ex Fr.) Pers., *Mycol. europ.* 2: 156. 1825. — *Sarcodon subsquamosus* (Batsch ex Fr.) P. Karst. in *Rev. mycol.* 3/No. 9: 20. Jan. 1, 1881; in *Acta Soc. F. Fl. fenn.* 2 (1): 34. 1881 & in *Medd. Soc. F. Fl. fenn.* 6: 16. 1881. — *Phaeodon subsquamosus* (Batsch ex Fr.) J. Schroet. in *Cohn, Kryptog.-Fl. Schles.* 3 (1): 460. 1888. — Type: represented by Batsch, Elench. Fung. pl. 10 fig. 43. 1783.

As already pointed out in Part I: 49, I fail to identify Batsch’s species.

*Hydnum subsquamosum* sensu Bresadola, as far as the illustration (*Icon. mycol.* 21: pl. 1037. 1932) is concerned, looks very different from the figure of Batsch in that the scales show hardly any contrast with the underground. I did not enquire about the presence of specimens in Herb. Bresadola at Stockholm, but found one collection among the *Hydniums* preserved at Coimbra (“in silvis coniferis in rep. tridentine, leg. J. Bresadola”). This material proves to be a *Sarcodon* (spores yellowish brown, roughly tuberculate; context made up of non-parallel, inflated hyphae) of Group 2 (context whitish in the pileus, somewhat darker in the base of the stipe; hyphae without clamps). The specimen comes nearest *Hydnum badium* sensu Lundell in having more or less free scales, but differs in being paler and more yellowish than that species. I am as yet unable to decide whether this difference is of any consequence since I know *Hydnum badium* as understood by Lundell only from dried specimens.

*s u l f u r e u s*. — *Hydnum sulfureum* Saut. in *Hedwigia* 8: 40. 1869; not *Hydnum sulphureum* Kalchbr. in *Math. term. Közl.* 3: 224. 1865; not *Hydnum sulphureum* Schw. in *Schr. naturf. Ges. Leipzig* 1: 104. 1822; Fr., Elench. Fung. 1: 138. 1828. — Type: not in W (information Dr. K. H. Rechinger). — Type locality: Austria, near Salzburg.

Although the diagnosis is very short, it clearly refers to what is now known as *Hydnellum geogenium*. Probably because Sauter was aware of Kalchbrenner’s epithet, he changed ‘*sulfureum*’ to ‘*citrinum*’ (see there).

*sulphureus*. — *Hydnum sulphureum* Kalchbr. in Math. term. Közl. **3**: 224. 1865; not *Hydnum sulphureum* Schw. in Schr. naturf. Ges. Leipzig **1**: 104. 1822; Fr., Elench. Fung. **1**: 138. 1828; not *Hydnum sulfureum* Saut. in Hedwigia **8**: 40. 1869. — *Calodon sulphureus* (Kalchbr.) Quél., Fl. mycol. 443. 1888 (“*sulfureum*”). — Type: represented by Kalchbr. in Math. term. Közl. **3**: pl. 1 fig. 4. 1865 (if not in UPS, compare Banker in Mycologia **5**: 205. 1913).

A later homonym, and, moreover, a synonym of *Hydnellum geogenium* (Fr.) Banker.

*tessiniensis*. — *Dryodon caput-ursi* var. *tessiniensis*“?” Benzoni in Schweiz. Z. Pilzk. **16**: 180. 1938. — Type: represented by Benzoni in Schweiz. Z. Pilzk. **16**: fig. on p. 181. 1938.

On asking the author for the loan of his material, if there was any, I was informed by his relatives that Mr. Benzoni was a very sick man, suffering from old age.

Neither the macroscopic description, nor the photographs are sufficiently clear to enable one to decide whether the present variety belongs to *Hericium coralloides* or to *H. ramosum*. However, taking into consideration the small size of the spores ( $4\text{--}5.5 \times 3.5\text{--}4.5 \mu$ ), there seems little doubt that variety *tessiniensis* should be referred to the ‘*caput-ursi*’ form of *Hericium ramosum*.

*testaceofulvum*. — *Hydnum testaceofulvum* Britz., Hym. Südbayern **10** (= in Ber. naturh. Ver. Augsburg **31**): 177, fig. Hydnei 60. 1894; in Beih. bot. Zbl. **26** (Abt. 2): 215. 1910. — Type: represented by Britz., Hym. Südbayern **10**: fig. Hydnei 61. 1894 (selected).

The context which is described as “korkigholzige, schmutzig rotbraun . . .”, and the colour of the spores in the mass which is stated to be brown, unmistakably characterize the present species as a *Hydnellum*. From the words, “die Bedeckung des Hutes später faserig, etwas grubig” (1894: 177), and, “H[ut] . . . gewölbt, mit eingedrückter, oft mit Knollen oder anderen Auswüchsen besetzter Mitte” (1910: 215), I do not hesitate to identify *Hydnum testaceofulvum* with *Hydnellum velutinum* var. *scrobiculatum*.

Figure 21, originally indicated (Hym. Südbayern **6**: 33. 1890) as an illustration of *Hydnum velutinum*, was later (1894) considered to represent *H. testaceofulvum*.

*testaceus*. — *Hydnum testaceum* Brig. jun. apud Comes in Ann. Scuola Agricult. Portici **1**: 115. 1878 (n.v.). — Type locality: Italy, around Naples.

As in the case of *Hydnum portae*, the description published by Saccardo has been consulted in default of the original one.

According to Comes, *Hydnum testaceum* would be only a variety of *Hydnum repandum*, but I am not so sure of that. The description of the flesh (“*caro fracta rubella*”) does not agree with that species. However, I am unable to offer a better suggestion.

*tischeri*. — *Hydnum tischeri* Opiz in Lotos **5**: 42. 1855. — Type: non-existent (information Dr. A. Pilát, Prague). — Type locality: Czechoslovakia, near Mergenthal.

The description is suggestive of *Phellodon tomentosus*.

*tomentosus*. — *Hydnum tomentosum* L. *sensu* Oed., Fl. dan. 3 / Fasc. 9: 7, pl. 534 fig. 3. 1770 = *Polyporus adustus*, acc. to Fr., Syst. mycol. 1: 406. 1821; = *Polyporus populinus*, acc. to Hornem., Nomencl. Fl. dan. 23. 1827; but both probably wrong; not *Hydnum tomentosum* Schrad., Spicil. Fl. germ. 1: 177, pl. 4 fig. 2. 1794 = *Caldesiella ferruginosa* (Fr.) Sacc.

For the sake of completeness both denominations, one of which is a misapplication, and neither of which has any relation with *Phellodon tomentosus*, should be added to Part III: 54.

*tuberculosis*. — *Hydnum tuberculosum* Britz., Hym. Südbayern 10 (= in Ber. naturh. Ver. Augsburg 31): 176. 1894; in Beih. bot. Zbl. 26 (Abt. 2): 213. 1910. — Type: represented by Britz., Hym. Südbayern 10: fig. Hydnei 69. 1894.

From the figure it may be safely concluded that this species represents a *Hydnellum*. The colouring, such as shown externally and described internally, makes it probable that Britzelmayer had seen *Hydnellum compactum*. He actually considered his *Hydnum tuberculosum* related with that species (Fig. 68). The only difference lies in the pileus which is comparatively smooth in his illustration of *H. compactum*, densely colliculose in *H. tuberculosum*.

It may be pointed out that Britzelmayer's conception of *H. compactum* is the same as Persoon's and Krombholz's.

*tubiformis*. — *Hydnum tubiforme* Gillet, Hym. 717. 1878. — Type locality: France.

The way the pileus is described, "ombiliqué plus ou moins profondément, puis bientôt percé au centre d'une ouverture qui communique avec l'intérieur du pied", is reminiscent of the situation in old specimens of *Sarcodon imbricatus*, but several other features, such as "Chapeau peu charnu . . . jaunâtre ou nankin-clair . . . Aiguillons . . . jaunâtres. Pied . . . blanchâtre ou blanc-jaunâtre", are convincing proof that Gillet must have had some other species which, very probably, did not belong to the genus *Sarcodon*.

Rea (1932: 47) who stated that he saw living material of this species in Britain, described it much in the same way as did Gillet, but gave the added information that the spores were "white in the mass, subglobose, apiculate,  $7-8 \times 7-7.5 \mu$ , with a large central gutta." This means that Rea's specimens are referable to *Hydnum repandum*. Whether this also holds of Gillet's material is hard to say.

*turbinatus*. — *Hydnum turbinatum* Brig. jun. *apud* Comes in Ann. Scuola Agricolt. Portici 1: 115. 1878 (n.v.). — Type locality: Italy, around Naples.

As in the case of *Hydnum portae*, the description published by Saccardo has been consulted in default of the original one.

Of the present species Briganti stated: "cum praecedente [*Hydnum testaceum*], cuius magnitudinem fere aequat et primo intuitu ejus var. deformata et luxurians videtur." Comes considered it, just like *H. testaceum*, a variety of *Hydnum repandum*.

I have no opinion myself, since there is nothing in the description to suggest whether or not *Comes* is correct.

*undulatus*. — *Hydnum undulatum* Valenti-Serini, Tratt. Funghi sosp. vel. terr. Senese p. ?, pl. 47 fig. 4. 1868 (n.v.). — Type locality: Italy.

On this species no information can be given.

*uplandicus*. — *Hydnum uplandicum* Lundell.

This is a herbarium name suggested by Lundell for a species first collected by himself in Sweden, and afterwards also recognized in material collected by Litschauer and others in Tirol. The name appeared in print and was discussed on the label of Litschauer & Lohwag, *Fungi sel. exs. europ.* 176—“*Sarcodon versipelle* (Fries sensu Bresadola) Litschauer in Herb.”, of which I examined the copy at Vienna. That herbarium also possesses authentic material of *Hydnum uplandicum* (*Flora Suecica*, Upland, parish Lena, “Wald Arby”, Storvreta, 27 VIII 1927, S. Lundell) which had been sent to Litschauer, and four more collections under this name from Tirol. The most interesting one among the last named is a collection determined by Lundell (Ost-Tirol, Tristachersee bei Lienz, VII 1932, K. Lohwag).

The collections are all very similar and may be characterized as follows: pileus purplish grey-brown, in some collections with the pellicle cracked into membranous, adnate squamules; stipe whitish or faintly tinged with the colour of the pileus; context white; hyphae with clamp connections. They all represent one and the same species: *Sarcodon laevigatus*.

The only point which for some time I felt uncertain about is whether *Hydnum uplandicum* should be referred to *Sarcodon laevigatus* s. str. (context remaining white, odour and taste indifferent), or to *S. laevigatus* in the sense of Bourdot & Galzin (context becoming flushed with purple, odour nauseating, taste becoming bitter). Two considerations made me decide in favour of the former.

First, Lundell regarded Bresadola's Plate 1040 as an illustration of his *Hydnum uplandicum*: “Auch er hält den Pilz für die Art, die Bresadola l.c. abbildet.” (label of Litschauer & Lohwag, *Fungi sel.* 176). Here, Bresadola gave the following description of the flesh: “caro pallida, ad stipitis basim fuscescens, odore grato, sapore amaricante. . .” (*Icon. mycol.* 21: text to pl. 1040. 1932). Whether Bresadola's plate really represents the species under discussion is of minor importance in this case (I actually believe it does not), since it only serves to show that it agrees with *Hydnum uplandicum* in having white flesh.

Secondly, one of the Tirolean collections is accompanied with some notes in Litschauer's hand, stating the context to be white.

However, I should add that perhaps the differences between *Sarcodon laevigatus* s. str. and *S. laevigatus* sensu Bourd. & Galz. are less fundamental than I originally thought, for on the same label Litschauer described the odour as “ziemlich intensiv”. In this connection I may also refer to the remarks under *Sarcodon fragrans*.

*variecolor*. — *Hydnum cyathiforme* var. *variecolor* (Secr.) Cost. & Duf., Nouv. Fl. Champ. 161. 1891; not *Hydnum variecolor* Fr., Epicr. Syst. mycol. 516. 1838.  
An overlooked recombination to be included in Part III: 55.

*velutinus*. — *Phaeodon velutinus* (Fr.) P. Henn. in Nat. PflFam. 1 (1\*\*): 148. 1898.

An overlooked recombination to be inserted in Part II: 61.

*velutipes*. — *Hydnum velutipes* G. Beck in Verh. zool.-bot. Ges. Wien 39: 604. 1889. — Type: (not in W, information Dr. K. H. Rechinger) represented by G. Beck in Verh. zool.-bot. Ges. Wien 39: pl. 15 fig. 2. 1889.

The description of the pileus as “suberoso-rigidus”, combined with those of the spines as “albidi serius dilute cinerei”, and of the spores as “globosae, aculeatae”, marks the present species as a *Phellodon*. From the characters of the context which is described as “canus serius subater et in siccitate splendens”, the present species is easily recognized as identical with *Phellodon niger*.

*versipelliformis*. — *Hydnum versipelliforme* Allesch. in Ber. bot. Ver. Landshut 10: 21. 1887. — Type: non-existent (information Dr. K. H. Rechinger). — Type locality: Germany, South Bavaria, around Tölz.

Since the literature may not be easily accessible, the description, a copy of which was received through the kindness of Dr. Rechinger, is here repeated: —

„Fruchtkörper rasig verwachsend. Hut fleischig, unregelmässig, oberseits faserig flockig, rötlich oder bräunlich rostfarbig. Stiel kurz, dick, etwas verzweigt, von den herablaufenden Stacheln fast bis zur Basis bestetzt oder wenigstens von verkümmerten punktiert. Stacheln grau- oder umbrabraun, an der Spitze fast weisslich, weit herablaufend. Sporen klein, hyalin.

Auf der Erde in Nadelwäldern und gemischten Beständen. Um Tölz: Waldungen am Wackersberg, bei Fischbach, am Aufstieg zum Blomberg, bei Reutberg 8. und 9. 87.

Jedenfalls eine Zwischenform von *Hydnum versipelle* und *scabrosum* Fries, welche aber der ersteren Art näher steht.“

The colour of the stipe is not stated in the description, but may be deduced from the following remark, “. . . während die [Fries'sche] Beschreibung des Stieles . . . : “stipite . . . cinerascete . . .” auf den bezeichneten Pilz genau passt“.

Bresadola, in a letter to Killermann (Killermann, 1922: 39), considered *Hydnum versipelliforme* to be identical with *Sarcodon laevigatus*, without stating his grounds however. Considering the inadequacy of the description, I can make no better suggestion.

*versipellis*. — *Sarcodon versipellis* (Fr.) Quél., Ench. Fung. 188. 1886 (“*versipelle*”). — *Phaeodon versipellis* (Fr.) P. Henn. in Nat. PflFam. 1 (1\*\*): 149. 1898.

To be inserted in Part I: 48.

*violascens*. — *Hydnum caeruleum* var.  $\beta$  *violascens* (Alb. & Schw.) Fr., Obs. mycol. 1: 136. 1815.

An overlooked recombination which should be inserted in the synonymy of *Bankera violascens* in Part III: 58.

Although Britzelmayer as an artist was a man of very unequal results, he showed his ability to reach near-perfection in a number of drawings of *Bankera violascens* which he called *Hydnum fusipes* (Hym. Südbayern 10: fig. Hydnei 37. 1894). Illustrations of lesser quality, but still recognizable, are in Hym. Südbayern 6: fig. Hydnei 24a, 24b. 1890, and in Hym. Südbayern 10: fig. Hydnei 48, 49. 1894.

In Part III: 59, I regarded Lundell & Nannfeldt, Fungi exs. suec. praes. upsal. 353 as one of the exsiccati representing *Bankera violascens*. Since that time I have seen many specimens of this species, both fresh and dried, and from various European countries. I have learned how to tell *Bankera violascens* from *B. fuligineo-alba*, even if they are dried, and as a result I do not now hesitate to identify Lundell & Nannfeldt's material as *Bankera fuligineo-alba*. At least it is this species in the copy of the exsiccati at Vienna, but since the Swedish series are distinguished for the homogeneity of their material, I have no doubt that all the material distributed under No. 353 comprises the same species. The smooth and shining pellicle of the pileus, its yellowish brown colour lacking any purplish tinge, the dirt embedded in the pellicle, and the stocky appearance are all unmistakable features.

*zonulatus*. — *Hydnum zonulatum* Valenti-Serini, Tratt. Funghi sosp. vel. terr. Senese p. ?, pl. 47 fig. 5. 1868 (n.v.). — Type locality: Italy.

On this species no information can be given.

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