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THE STIPITATE HYDNUMS OF THE NETHERLANDS—IV

Auriscalpium S. F. Gray, Hericium Pers. ex S. F. Gray, Hydnum L. ex Fr., and Sistotrema Fr. em. Donk

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A revision is given of the genera *Auriscalpium*, *Hericium*, *Hydnum*, and *Sistotrema*. *Hydnum heimii* is described as a new species.

Auriscalpium S. F. Gray

Auriscalpium S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 650. 1821; P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879. — Type species: *Auriscalpium vulgare* S. F. Gray, see Donk (1956: 71).

Pleurodon 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 ("Quél."). — *Hydnum* subgen. *Pleurodon* (P. Karst.) Forquignon, Champ. Sup. 96. 1886 [1888] ("Q."). — *Hydnum* [sect.] *Pleurodon* (P. Karst.) J. Schroet. *in* Cohn, Krypt.-Fl. Schles. **3** (1): 456. 1888 ("Quélet"). — Type species: *Hydnum auriscalpium* L. ex Fr., see Donk (1956: 108).

Carpophore stipitate, coriaceous. Pileus hairy, cuticulate. Stipe hairy, cuticulate, springing from swollen subiculum, attached to the pileus subapically from a notch on the side of the latter. Context azonate, homogeneous, covered by very firm cuticle. Hymenium covering spines on underside of pileus. Spines greyish at maturity. Basidia tetrasporous. Spores subglobose to broadly ellipsoid, minutely spinulose at maturity, white in mass, amyloid. Hyphae with clamp connections.

The amyloid character of the spores was first pointed out by Romagnesi (1953: 111).

Auriscalpium vulgare S. F. Gray

Hydnum auriscalpium L., Spec. Pl. **2**: 1178. 1753; *ex* Fr., Syst. mycol. **1**: 406. 1821; Epicr. Syst. mycol. 511. 1838; not *Hydnum auriscalpium* Lour., Fl. cochin. **1**: 693. 1790. — *Scutiger auriscalpium* (L.) Paul., Traité Champ., Atl. pl. 33 fig. 4. 1812–1835 ("*aurisealpium*"). — *Auriscalpium vulgare* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 650. 1821; P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879 (name change). — *Pleurodon auriscalpium* (L. 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 ("Quél."). — *Leptodon auriscalpium* (L. ex Fr.) Quél., Ench. Fung. 192. 1886. — *Auriscalpium auriscalpium* (L. ex Fr.) Banker *in* Mem. Torrey bot. Cl. **12**: 178. 1906. — Type: not known to be in existence. — Type locality: Lapland, ". . . copiosus adhuc per Westrobothniam" (Linn., Fl. lappon. 368. 1737).

Hydnum auriscalpium var. ββ. *bicolor* Alb. & Schw., Consp. Fung. 267. 1805. — Type locality: Germany, Oberlausitz.

Hydnum auriscalpium var. *bicolor* Fr., Obs. mycol. **1**: 146. 1815. — Type locality: Sweden.

Hydnum atro-tamentosum Schwalb, Buch d. Pilze 171. 1891. — Type: not known to be in existence. — Type locality: Austria?

Hydnum fechtneri Vel., České Houby **4–5**: 746. 1922 (Latin description by Pilát *in* Op. bot. čech. **6**: 273. 1948). — *Pleurodon fechtneri* (Vel.) Cejp *in* F. Fl. čechoslov. **2**: 86. 1928; *in* Bull. internat. Acad. Sci. Bohême **31**: 308. 1930. — Type: not seen (PRC).

Pleurodon auriscalpium var. *rufus* Cejp *in* F. Fl. čechoslov. **2**: 86. 1928; *in* Bull. internat. Acad. Sci. Bohême **31**: 308. 1930 ("*rufum*"). — *Hydnum auriscalpium* var. *rufum* (Cejp) Vel., Nov. mycol. nov. 88. 1947. — Syntypes: Bohemia centr., distr. Říčany, apud pag. Mnichovice in pineto "Záduší" dicto, VIII 1915 (not VII 1925 as mentioned by Cejp), leg. *J. Velenovský* (PRC); Bohemia centr., distr. Beroun, in silva apud arcem Karlštejn (Karlův Týn mentioned by Cejp is the same), X 1925, leg. *K. Cejp* (PRC); Bohemia occid., distr. Rokycany, in silva "Boreček" dicta apud opp. Rokycany, 18 VIII 1927, leg. *K. Cejp* (PRC).

DESCRIPTIONS.—Bourdot & Galzin, Hym. France 439. 1928 (*Pleurodon auriscalpium*); Coker & Beers, Stip. Hydn. east. U.S. 11. 1951; Donk *in* Med. Nederl. mycol. Ver. **18–20**: 191. 1931.

ILLUSTRATIONS.—(Except where mentioned otherwise, all given as *Hydnum auriscalpium.*) Bolton, Hist. Fung. Halifax **2**: pl. 90. 1788 (good); Bresadola, Icon. mycol. **22**: pl. 1059. 1932 (passable); Bulliard, Herb. France pl. 481 fig. 3. 1790 (very good); Coker & Beers, Stip. Hydn. east. U.S. pl. 10 upper fig. 1951 (*Auriscalpium vulgare*; photogr.); Farlow, Icon. farlow. pl. 96. 1929 (several centrally stiped; good); Gillet, Champ. France pl. 314. 1878–1890 (good); Gramberg, Pilze Heimat **2**: pl. 28 lower fig. 1913 (fairly good); Greville, Scot. cryptog. Fl. **4**: pl. 196. 1826 (fairly good); Harvey *in* Trans. Brit. mycol. Soc. **41**: pl. 18. 1958 (photogr.); Kawamura, Icon. Jap. Fungi **6**: fig. 605. date? (good); Krombholz, Naturgetr. Abb. Beschr. essb. Schw. **7**: pl. 50 fig. 15–17. 1841 (passable); Maublanc, Champ. France, Quatr. éd., **2**: pl. 196 fig. 2. 1952 (*Auriscalpium vulgare*; good); Meneault *apud* Piane *in* Bull. Soc. Nat. Oyonnax **6**: 89. 1952 (*Auriscalpium vulgare*; excellent); Pabst, Cryptog.-Fl. **2**: pl. 22. 1875 (passable); Patouillard, Tab. anal. Fung. **2**: fig. 146. 1883 (passable); Rolland, Atl. Champ. France pl. 99 fig. 219. 1910 (passable); Schaeffer, Fung. Icon. **2**: pl. 143. 1763 (fairly good); Sowerby, Col. Fig. Engl. Fungi **3**: pl. 267. 1803 (very good); Thijsse, Paddestoelen pl. 63. 1929 (fairly good); Velenovský, České Houby **4–5**: pl. 129 fig. 10. 1922 (*Hydnum fechtneri*; fairly good); Wakefield & Dennis, Common Brit. Fungi pl. 103 fig. 6. 1950 (passable).

DIAGNOSTIC CHARACTERS.—Carpophores solitary, occasionally also several springing from common base. Pileus supported by stipe at a notch on the side, rarely centrally stiped, reniform, plano-convex, even or with shallow concentrical depression, not zonate, villose with few bristle-like hairs to entirely hirsute, glabrescent with age, pale yellowish brown when very young, becoming dark rufous brown, finally blackened. Stipe slender, hirsute, dark brown, downwards passing into much swollen, paler brown subiculum with tomentose, matted or dirt-encrusted surface, not infrequently also branching off from previous season's stipe. Spines not decurrent, pale flesh brownish when immature, finally ashy grey with or without violaceous tinge. Context in both pileus and stipe thin, homogeneous, not zonate, whitish, forming a very firm, cartilagineous, black-brown cuticle on the surface under the hairs. Odour none. Taste not noted.

HABITAT.—On fallen, often buried, cones of *Pinus*.

DISTRIBUTION.—Known from pine woods all over the country, common.

ILLUSTRATIVE COLLECTION.—Gelderland: Delden, Twickel, 22 XI 1953, *M. G. J. Meyer* (L).

AUTHENTIC MATERIAL.—*Hydnum fechtneri* Vel.: Bohemia centr., distr. Kladno (apud opp. Slaný) prope opp. Kladno, X 1919, leg. *F. Fechtner*, det. Velenovský (PRC).

EXSICCATI.—(All given under the name of *Hydnum auriscalpium*.) Cavara, Funghi Longobard. exs. 106 (L); Desmazières, Cryptog. France, ser. 1, 954 (K); Ellis & Everhart, North Amer. Fungi, second ser., 2511 (K, L); Fl. exs. austro-hung. 763 (C, K, L); Fl. hung. exs. 10 (C, K, L); Fuckel, Fungi rhen. 1343 (K); Holl, Schmidt & Kunze, Deutschl. Schw. 45 (K); Karsten, Fungi fenn. exs. 245 (K); Klotzsch, Herb. viv. mycol. 126 (L); Lundell & Nannfeldt, Fungi exs. suec. praes. upsal. 159 (C); Mougeot & Nestler, Stirp. cryptog. vogeso-rhen. 777 (K, L); Rabenhorst, Fungi europ. 17 (K, L); Saccardo, Mycoth. ven. 828 (K); Sydow, Mycoth. march. 313 (K); von Thümen, Mycoth. univ. 1106 (K, L).

The present species shows some variation. The fact that the stipe is sometimes attached to the centre of the pileus has attracted the attention. The plate by Farlow is a good example, and *Hydnum fechtneri* was based on a centrally stiped specimen.

Also with regard to its colour, *A. vulgare* is a variable species. Very young specimens may be found to be no darker than pale yellowish, very old ones are nearly black. This pale colour ("pallide luteum") which Villars (Hist. Pl. Dauph. **3**: 1043. 1789) described for his specimen of *Hydnum auriscalpium*, apparently puzzled Fries (Syst. mycol. **1**: 408. 1821), but in my opinion it only characterizes the young fruit body. Later on, Fries (Hym. europ. 607. 1874) described a *Hydnum luteolum*, basing this species partly on Villars's description, partly on a yellow specimen he had once found himself "Ad ramos exsiccatos *Padi*." Since Fries emphatically stated the pileus to be glabrous, and also since the substratum seems very improbable for *Auriscalpium vulgare*, it is obvious that he described a different species. Afterwards it was transferred by Quélet (Ench. Fung. 191. 1886) to *Leptodon* (*L.* "*luteolum*") and by Bourdot & Galzin (Hym. France 439. 1928) to *Pleurodon* (*P.* "*luteolum*"), but in both cases it was left with *Hydnum auriscalpium* in the same genus. Both species were ultimately separated by Bourdot (*in* Bull. Soc. mycol. France **48**: 220. 1932) who made the recombination *Mycoleptodon luteolus* (Fr.) Bourd. ("*luteolum*").

Hydnum auriscalpium var. *bicolor* is a variety which Fries referred to Albertini & Schweinitz. However, what he described is totally different from the thing the German authors had found. Since Fries stated to have found specimens himself, Sweden is chosen as the type locality of var. *bicolor* Fr.

Pleurodon auriscalpium var. *rufus* described by Cejp has a handsome reddish brown colour, but does not require a varietal status.

HERICIUM Pers. ex S. F. Gray

Martela Adans., Fam. Pl. **2**: 5. 1763. — *Martella* Adans. *ex* O.K., Rev. Gen. Pl. **3** (2): 492. 1898; not *Martella* Endl., Gen. Pl. 36. 1836. — Type species: *Agaricum* ordo VI sp. No. 1 Micheli, Nova Pl. Gen. 122, pl. 64 fig. 1 1729 = *Hericium hystrix* Pers., see Donk (1956: 102).

Hydnum trib. *Pleuropus* Fr., Syst. mycol. **1**: 407. 1821. — Type species: *Hydnum erinaceus* Bull. ex Fr. (selected).

Hydnum trib. *Merisma* Fr., Syst. mycol. **1**: 408. 1821. — *Hydnum* sect. *Merisma* (Fr.) Sacc. *in* Fl. ital. cryptog. **1** (fasc. 15): 1077, 1096. 1916. — *Hydnum* sect. *Apus* [subsect.] *Merisma* (Fr.) Killerm. *in* Nat. Pflfam., Zweite Aufl., **6**: 163. 1928. — Type species: *Hydnum coralloides* Scop. ex Fr. (selected).

Hydnum trib. *Merisma* [subtrib.] *Genuina* Fr., Syst. mycol. **1**: 408. 1821. — Type species: as preceding.

Hydnum trib. *Merisma* [subtrib.] *Gomphi* Fr., Syst. mycol. **1**: 409. 1821. — *Hericium* Fr., Syst. Orb. veg. 88. 1825; not *Hericium* Pers. *ex* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 652. 1821; not *Hericius* Juss. *ex* Lam., Tabl. encycl. Bot., Ill. Genres **3**: 494. 1823. — Type species: *Hydnum hystrix* (Pers.) ex Fr., see Donk (1956: 80).

Hericium Pers. *in* Neues Mag. Bot. **1**: 109. 1794. — *Hydnum* [sect.] *Hericium* (Pers.) Pers., Syn. meth. Fung. **2**: 563. 1801. — *Hericium* Pers. *ex* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 652. 1821; not *Hericius* Juss. *ex* Lam., Tabl. encycl. Bot., Ill. Genres **3**: 494. 1823; not *Hericium* Fr., Syst. Orb. veg. 88. 1825. — *Hydnum* sect. *Hericium* (Pers. ex S. F. Gray) L. March. *in* Bijdr. natuurk. Wetensch. **3** (1): 268. 1828. — *Hydnum* sect. *Hydnois* [subsect.] *Hericium* (Pers. ex S. F. Gray) Duby, Bot. gall., Ed. sec., **2**: 777. 1830. — Type species: *Hydnum coralloides* Scop., see Donk (1956: 79).

Hericius Juss. *ex* Lam., Tabl. encycl. Bot., Ill. Genres **3**: 494. 1823; not *Hericium* Pers. *ex* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 652. 1821; not *Hericium* Fr., Syst. Orb. veg. 88. 1825. — Type species: *Hydnum erinaceus* Bull., see Donk (1956: 95).

Medusina Chev., Fl. gén. Envir. Paris **1**: 278. 1826. — Type species: *Medusina patula* Chev., see Donk (1956: 104).

Martella Endl., Gen. Pl. 36. 1836; not *Martela* Adans., Fam. Pl. **2**: 5. 1763. — Type species: *Martella echinus* Scop., see Donk (1956: 103).

Friesites P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879. — Type species: *Hydnum coralloides* Scop. ex Fr., see Donk (1956: 76).

[*Hydnum* trib. *Merisma* (Genus *Dryodon*, Q.) Cooke & Quél., Clav. syn. Hym. europ. 198. 1878] *Dryodon* P. Karst. *in* Rev. mycol. **3** (No. 9): 19. Jan. 1, 1881; *in* Acta Soc. F. Fl. fenn. **2** (1): 34. 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 15. 1881 ("Quél."); Quél., Ench. Fung. 192. 1886; Fl. mycol. 437. 1888. — *Hydnum* [sect.] *Dryodon* (P. Karst.) J. Schroet. *in* Cohn, Krypt.-Fl. Schles. **3** (1): 455. 1888 ("Quél."). — *Hydnum* subgen. *Dryodon* (P. Karst.) Forquignon, Champ. sup. 96. 1886 [1888] ("Q."). — Type species: *Hydnum coralloides* Scop. ex Fr., see Donk (1956: 75).

Manina Banker *in* Mycologia **4**: 275. 1912 ("Scop."); not *Manina* Adans., Fam. Pl. **2**: 5. 1763 = "Clavariaceae". — Type species: *Manina cordiformis* Scop., see Donk (1956: 102).

Hericium "riad" *Alpestriformia* Nikol. *in* Pl. cryptog. **5**: 335. 1950 (no Latin description). — Type species: *Hericium alpestre* Pers. [sensu Bresadola] (selected).

Hericium "riad" *Coralloideformia* Nikol. *in* Pl. cryptog. **5**: 341. 1950 (no Latin description). — Type species: *Hydnum coralloides* Scop. ex Fr. [sensu Fr.] (selected).

Carpophores arboricolous or lignicolous, fibrous-fleshy, without true stipe, laterally attached to the substratum by a (sometimes stipe-like) root, and consisting of an almost solid tuberculous body or a much branched mass. Context homogeneous. Hymenium covering spines. Spines white to pinkish. Basidia tetrasporous. Spores globose to ovoid, smooth or nearly so, white in mass, amyloid. Hyphae with clamp connections. Gloe ocystidia usually present.

Of the present genus, the same three species treated by Coker and Beers as indigenous to the eastern United States, also occur in Europe. Two of these, *Hericium erinaceus* and *H. ramosum*, are known from the Netherlands, but I have been unable to study living material of either. This, in conjunction with the great variability of the species which I do not know from own observation, led me to deviate fr om the practice of giving my own descriptions. A satisfactory monographic treatment can only be reached in two steps. First, all the names need be accounted for, and there are an amazing number of them. Secondly, some characteristics such as the amyloidity of the context, the production of conidiospores, the place of attachment of the spines to the branches, and which way they are pointing in young and old specimens should be observed in the living material. Clearly, it will take many more years before a sufficient number of fresh specimens will have been studied.

With regard to the formation of conidiospores, reference may be made to the papers by Richon (1881) and De Seynes (1891), and to the more recent ones by Nikolaeva (1958) and Boidin (1959).

KEY TO THE EUROPEAN SPECIES

1*a*. Spines not hanging down from the underside of the branches like teeth of a comb.
  2*a*. Spines exclusively borne in terminal tufts. On a longitudinal section the places of insertion of the spines are seen to form a continuous, even line . *H. erinaceus*, p. 123
  2*b*. Spines borne in terminal tufts as well as on short lateral processes, or covering the ultimate branches on all sides. On a longitudinal section, if not already visible from the outside, the places of insertion of the spines never form a continuous line . . . . . *H. coralloides*, p. 119
1*b*. Spines uniformly produced on the underside of the branches throughout the carpophore, at times also in terminal clusters . . . . . H. *ramosum*, p. 126

HERICIUM CORALLOIDES (Scop. ex Fr.) S. F. Gray

Hydnum coralloides Scop., Fl. carniol., Ed. sec. aucta reform., **2**: 472. 1772; not *Hydnum coralloideum* Batsch, Elench. Fung. 113. 1783 = *Hericium ramosum*. — *Hericium coralloides* (Scop.) Pers. *in* Neues Mag. Bot. **1**: 109. 1794 (misapplied); Comm. Fung. clav. 23. 1797. — *Hydnum coralloides* Scop. *ex* Fr., Syst. mycol. **1**: 408. 1821 (misapplied); Epicr. Syst. mycol. 511. 1838 (misapplied); Hym. europ. 607. 1874 (misapplied). — *Hericium coralloides* (Scop. ex Fr.) S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 652. 1821. — *Medusina coralloides* (Scop. ex Fr.) Chev., Fl. gén. Envir. Paris **1**: 279. 1826 (misapplied). — *Merisma coralloides* (Scop. ex Fr.) Spreng., Syst. Veg., Ed. decima sexta, **4** (1): 496. 1827. — *Friesites coralloides* (Scop. ex Fr.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879 ("*corallioides*"). — *Dryodon coralloides* (Scop. ex Fr.) P. Karst. *in* Rev. mycol. **3** (No. 9): 19. Jan. 1, 1881; *in* Acta Soc. F. Fl. fenn. **2** (1): 34. 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 15. 1881 ("*corallioides*"). — *Manina coralloides* (Scop. ex Fr.) Banker *in* Mycologia **4**: 276. 1912. — Type locality: Austria, Krain.

Hydnum crispum Scop., Fl. carniol., Ed. sec. aucta reform., **2**: 473. 1772; not *Hydnum crispum* Schaeff., Fung. Icon. **4**: 97. 1774. — Type locality: Yugoslavia, Idria.

Manina flagellum Scop., Diss. Sci. nat. **1**: 97. 1772. — *Hericium flagellum* (Scop.) Pers., Comm. Fung. clav. 25. 1797. — *Hericium flagellum* (Scop.) *ex* Pers., Mycol. europ. **2**: 152. 1825. — *Hydnum flagellum* (Scop. ex Pers.) Streinz, Nomencl. Fung. 320. 1861. — *Manina flagellum* (Scop. ex Pers.) Banker *in* Mycologia **4**: 276. 1912 (misapplied). — Type: represented by Scopoli, Diss. Sci. nat. **1**: pl. 11. 1772.

Hydnum clathroides Pall., Reise Prov. russ. Reich. **2**: 744. 1773 (not seen; descr. copied by

Pers., Comm. Fung. clav. 23. 1797 and by Weinm., Hym.-Gasteromyc. Imp. ross. obs. 361. 1836). — *Hericium clathroides* (Pall.) Pers., Comm. Fung. clav. 23. 1797. — *Hydnum coralloides* var. β? *Hydnum clathroides* (Pall.) Pers., Syn. meth. Fung. **2**: 563. 1801. — *Hydnum clathroides* Pall. *ex* Fr., Syst. mycol. **1**: 409. 1821; Epicr. Syst. mycol. 511. 1838. — *Hericium clathroides* (Pall. ex Fr.) Pers., Mycol. europ. **2**: 151. 1825; Fr., Syst. Orb. veg. **1**: 88. 1825. — *Merisma clathroides* (Pall. ex. Fr.) Spreng., Syst. Veg., Ed. decima sexta, **4** (1): 496. 1827. — *Dryodon clathroides* (Pall. ex Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 239. 1882. — Type locality: U.S.S.R., Siberia, near river Ob, "in pineto Kasmalensi."

? *Hericium alpestre* Pers., Mycol. europ. **2**: 151. 1825. — *Martella alpestris* (Pers.) O.K., Rev. Gen. Pl. **3** (2): 493. 1898; Lloyd, Mycol. Writ. **3**: 457. 1910 ["*alpestre* (Pers.) McGinty"]. — *Hydnum alpestre* (Pers.) Lloyd, Mycol. Writ. **7**: 1229. 1923. — *Dryodon alpestris* (Pers.) Pilát *in* Mykologia **8**: 54, 57. 1931; Bourd. *in* Bull. Soc. mycol. France **48**: 221. 1932 ("*alpestre*"). — Type: *Hericium alpestre* (Helvetia) (L 910.256–1300 and L 910.256–1313).

Dryodon coralloides var. *crispus* Cejp *in* Hedwigia **66**: 273. 1926; *in* F. Fl. čechoslov. **2**: 98. 1928; *in* Bull. internat. Acad. Sci. Bohême **31**: 319. 1930. — Type: not seen (PRC).

MISAPPLICATIONS. — *Hericium stallactiticum* (Schrank) *ex* Fr., Epicr. Syst. mycol. 520. 1838 ("*stalactitium*"). — *Hericium alpestre* f. *caput-ursi* (Fr.) Nikol. *in* Pl. cryptog. **5**: 337. 1950.

DESCRIPTIONS.—Banker *in* Mem. Torrey bot. Cl. **12**: 115. 1906; Coker & Beers, Stip. Hydn. east. U.S. 14. 1951; Miller *in* Mycologia **27**: 367. 1935 (except for form); Miller & Boyle *in* Univ. Iowa Stud. nat. Hist. **18** (2): 57. 1943 (except for form).

ILLUSTRATIONS.—

The normally developed form: Atkinson, Mushrooms, fig. 185. 1900; Second ed., fig. 196. 1901 (*Hydnum caput-ursi*; photogr., very good); Coker & Beers, Stip. Hydn. east. U.S. pl. 8. 1951 (photogr., very good); Foster & Foster *in* Canad. J. Bot. **29**: pl. 5 fig. 1. 1951 (*Hericium* sp.; photogr.); Gillet, Champ. France pl. 317. 1878–1890 (*Hydnum*; unusual); Krombholz, Naturgetr. Abb. Beschr. essb. Schw. **7**: pl. 51 fig. 4. 1841 (*Hydnum*; very good); Lloyd, Mycol. Writ. **7**: pl. 258 fig. 2563. 1923 (*Hydnum alpestre*; photogr. of detail, good); Lorinser, Essb. verdächt. gift. Schw., Dritte Aufl., pl. 3 fig. 4. 1883 (Korallenschwamm; uncertain); von Strauss, Deutschl. Fl., Abt. 3, Pilze Deutschl., Heft 33: pl. 9. 1853 (*Hericium stalactitium*; upside down, excellent); Velenovský, České Houby **4–5**: fig. 134. 1922 (*Hydnum*; very good).

The '*alpestre* sensu Bresadola' form: Bresadola, Icon. mycol. **22**: pl. 1062. 1932 (*Hericium alpestre*; good); Cordier, Champ., Quatr. éd. rev. augm., pl. 44 fig. 1. 1876 (*Hydnum coralloides*; uncertain); Krombholz, Naturgetr. Abb. Beschr. essb. Schw. **7**: pl. 51 fig. 5–7. 1841 (*Hydnum coralloides*; good); Lenz, Abb. nützl. schädl. Schw. pl. 13 fig. 53. 1831 (*Merisma coralloides*; copied from Schaeffer); Nützl. schädl. Schw., Dritte sehr veränd. Aufl., pl. 9 fig. 43. 1862 (*Hydnum coralloides*; copied from Schaeffer); Nees von Esenbeck, Syst. Pilze pl. 33 upper fig. 1817 (*Hydnum Hericium coralloides*; copied from Schaeffer); Nikolaeva *in* Pl. cryptog. **5**: fig. 2. 1950 (*Hericium alpestre*; good); Pabst, Cryptog.-Fl. **2**: pl. 22. 1875 (*Hydnum coralloides*; fairly good); Schaeffer, Fung. Icon. **2**: pl. 142. 1763 (*Hydnum coralloides*; good).

The contracted form: Moffat *in* Nat. Hist. Survey Bull. **7** (1): pl. 19 fig. 1. 1909 (*Hydnum caput ursi*; photogr., uncertain); Nikolaeva *in* Pl. cryptog. **5**: fig. 3 (*Hericium alpestre* f. *caucasicum*; uncertain), fig. 4 (*Hericium alpestre* f. *caput-ursi*; very good). 1950; Pilát *in* Bull. Soc. mycol. France **49**: pl. 1 fig. 4. 1933 (*Dryodon coralloides* f. *caput-ursi*; photogr., indistinct); A. H. Smith, Mushroom Hunter's Field Guide, figs. on p. 51. 1958 (*Hericium* sp.; photogr., fairly good).

HABITAT.—On decaying wood of deciduous trees (*Fagus*) but also reported on conifers (*Picea* and *Abies*).

EXSICCATI.—(Unfortunately, a number of exsiccati received on loan from Copenhagen and Prague cannot be enumerated, since at the time they were studied I did not yet differentiate *H. coralloides* from *H. ramosum*.) Klotzsch, Herb. viv. mycol. 125 (*Hydnum*; L, PR); Rabenhorst, Herb. mycol., ed. 2, 702 (*Hydnum*; L, PR; in part also *H. ramosum*).

As early as 1906 Banker made it perfectly clear that of the distinctly branched (non-tuberculiform) Hericiums two species may be distinguished which he called *H. coralloides* and *H. laciniatum* (= *H. ramosum* in the present paper). The confusing point, however, is that *H. coralloides* taken in the sense of Banker (the correct one) differs from *H. coralloides* as used in the sense of Fries (which in Europe is the one most adhered to). This fact should be emphasized, since to neglect the difference is certain to lead to misunderstanding. Fries, it should be stated at the outset, misapplied the epithet '*coralloides*' to the species here called *Hericium ramosum*.

Although Banker was followed by Miller (1935), Miller & Boyle (1943), and Coker & Beers (1951), his views do not seem to have received recognition in European mycological literature. Bourdot & Galzin (1928) treated *Dryodon corallcides* in the sense of Fries. Cejp's description (1930) of the species is correct, but that is purely accidental. From the illustrations cited, most of which represent *H. ramosum*, it is clear that the author was ignorant of the existence of two species. Donk (1931: 161) stated that his description was supplemented with that by Bourdot & Galzin. Local floras and check-lists, if they mention branched Hericiums at all, enumerate *H. corallcides* only.

Hericium alpestre Pers. is enumerated questioningly. The material is in a bad state, and glued to the sheet in such a way as to render its identification somewhat uncertain. The size of the spores, however, which in a 3 % solution of KOH measure (5.4–)5.8–6.3 × 5.4–5.6 μ, would seem to point to the probability of *H. alpestre* being identical with *H. coralloides*. The nature of the spines which are long (up to 14 mm) and stout (1 mm), likewise speaks in favour of the latter species.

In outward appearance Persoon's material of *H. alpestre* does not in the least resemble Bresadola's illustration (Pl. 1062) under that name. As far as they are discernible, the tightly packed spines in Persoon's specimens all point in the same direction, whereas those depicted by Bresadola, especially the ones at the tips of the branches, are directed to all sides. Through the courtesy of Dr. S. Ahlner, Stockholm, I was enabled to study the material which Bresadola has left under the

name of *Hericium alpestre*. It consists of five packets, all of which contain *H. coralloides*, albeit in very differently developed forms. Two are typical representatives of the species: branches well developed, wide apart; spines in terminal clusters, although occasionally a single, stout spine may be found on the underside of a smaller branch. Two other packets contain material which will be discussed below. The fifth, labelled "Riva-Valdobbia: 1879. Nei dintorni, su tronco fracido. Ab. Carestia," is the most interesting packet in that it contains what well might have been used for the drawing of Plate 1062. The branches are as plump as depicted, and especially the erect portion in the picture with its bushy tips is very much true to nature. Other branches, however, have the tips covered with multitudes of drooping spines, both solitary and clustered. From the above observations it may be concluded that (i) the way the spines are attached to the branches, as well as the direction they are pointed, are variable characters in *H. coralloides*; (ii) *Hericium alpestre* as understood and depicted by Bresadola (1932) and Nikolaeva (1950) is not specifically different from *H. coralloides*. In the present paper this form is referred to as the '*alpestre* sensu Bresadola' form.

Two of the packets from Herb. Bresadola are of particular interest as the contents show *H. coralloides* to vary in a way not heretofore recognized in literature. One packet, indicated by Bresadola as "*Hericium alpestre* Pers. typicus," is labelled as follows: "*Hydnum coralloides* Scop. An einem Fichtenstamme. Oberammergau: hohe Noth. 8. 89. leg. et comm. *Schnabl.*" The other, "In trunco *Abietis pectinatae*. Val di Sole. aut. 1882. Leg. *G. Bresadola*," is inscribed "*Hericium alpestre* Pers. ["typicus" eraded, and rewritten] f. *crispa* Scop., juvenile!"

The former contains two portions of a medium-sized fruit-body which is best described as: the counterpart of *Hydnum caput-ursi*, but, whereas *H. caput-ursi* undoubtedly is a form of *Hericium ramosum*, Schnabl's specimens are related to *H. coralloides* on account of the lack of spines hanging down from the lower side of the branches like teeth of a comb. The few spines that do emerge from the underside of some of the branches are stouter and longer than are those of *H. ramosum*. This form is well illustrated by Nikolaeva (*in* Pl. cryptog. **5**: fig. 4. 1950) under the name of *Hericium alpestre* f. *caput-ursi*.

The second packet contains a smaller and much more contracted specimen with very short branches, at the tips of which short spines emerge from all sides.

Both collections give evidence of the existence in *H. coralloides* of a form characterized by much shortened branches which for the greater part coalesce to form the main body.

This form is not uncommon, but it was nearly always referred to *Hydnum caput-ursi*. Even in recent times Miller (1935: 367) and Miller & Boyle (1943: 57) stated that *H. coralloides* "merges gradually into the form commonly known as *H. caput-ursi*." Coker & Beers (1951: 14) simply mentioned *Hydnum caput-ursi* as a synonym of *Hericium coralloides*. This is incorrect. *Hydnum caput-ursi* is a form of *Hericium ramosum*, the corresponding form in *H. coralloides* has no name. Whether it deserves a name, I feel unable to decide as yet, but I doubt it.

Hericium coralloides was recorded by Miss Cool (1926: 83) from this country. However, no description was supplied and no material seems to have been preserved.

HERICIUM ERINACEUS (Bull. ex Fr.) Pers.

Martella echinus Scop. *in* Ann. hist.-nat. **4** (4): 151. 1770. — *Hericium echinus* (Scop.) Pers., Comm. Fung. clav. 28. 1797. — *Hydnum echinus* (Scop.) *ex* Fr., Syst. mycol. **1**: 410. 1821; Epicr. Syst. mycol. 520. 1838; Hym. europ. 617. 1874. — *Hericium echinus* (Scop. ex Fr.) Pers., Mycol. europ. **2**: 154. 1825. — *Martella echinus* (Scop. ex Fr.) O.K., Rev. Gen. Pl. **3** (2): 492. 1898. — Type locality: Schemnitz = Selmecz bánya (of former Hungary) = Banská Štiavnica (now Czecho-Slovakia).

Manina cordiformis Scop., Diss. Sci. nat. **1**: 97. 1772. — *Hericium cardium* Pers., Mycol. europ. **2**: 153. 1825 (name change). — *Manina cordiformis* Scop. *ex* Banker *in* Mycologia **4**: 277. 1912. — Type: represented by Scopoli, Diss. Sci. nat. **1**: pl. 10. 1772.

Hydnum erinaceus Bull., Herb. France (legend to) pl. [34]. 1780; Hist. Champ. France 304. 1791; not *Hydnum erinaceus* Retz., Fl. Scand. Prodr. 251. 1779; Ed. alt. 319. 1795 = *Hericium ramosum*. — *Clavaria erinaceus* (Bull.) Paul., Traité Champ. **2**: Index. 1793 ("*erinacea*"). — *Hericium erinaceus* (Bull.) Pers., Comm. Fung. clav. 27. 1797. — *Hydnum erinaceus* Bull. *ex* Fr., Syst. mycol. **1**: 407. 1821. — *Steccherinum quercinum* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 651. 1821 (name change); not *Hydnum quercinum* (Pers.) *ex* Fr., Syst. mycol. **1**: 423. 1821. — *Hericium erinaceus* (Bull. ex Fr.) Pers., Mycol. europ. **2**: 153. 1825. — *Hericium commune* Roq., Hist. Champ. comest. vén. 47. 1832; Deux. éd. rev. augm. 107. 1841 (name change). — *Dryodon erinaceus* (Bull. ex Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 92. 1882 ("Quélet"). — Type: represented by Bulliard, Herb. France pl. [34]. 1780.

Hydnum hystricinum Batsch, Elench. Fung. 113. 1783. — *Martella hystricinum* (Batsch) *ex* O.K., Rev. Gen. Pl. **3** (2): 493. 1898. — Type: represented by Micheli, Nova Pl. Gen. pl. 64 fig. 1. 1729.

Clavaria caput-medusae Bull., Herb. France (legend to) pl. 412. 1788; Hist. Champ. France 210. 1791. — *Hericium caput-medusae* (Bull.) Pers., Comm. Fung. clav. 26. 1797. — *Hydnum caput-medusae* (Bull.) Pers., Syn. meth. Fung. **2**: 564. 1801. — *Hydnum caput-medusae* (Bull.) *ex* Fr., Syst. mycol. **1**: 409. 1821; Elench. Fung. **1**: 133. 1828; Epicr. Syst. mycol. 512. 1838; Hym. europ. 608. 1874. — *Hericium caput-medusae* (Bull. ex Fr.) Pers., Mycol. europ. **2**: 154. 1825. — *Medusina patula* Chev., Fl. gén. Envir. Paris **1**: 279. 1826 (name change). — *Merisma caput-medusae* (Bull. ex Fr.) Spreng., Syst. Veg., Ed. decima sexta, **4** (1): 496. 1827. — *Dryodon caput-medusae* (Bull. ex Fr.) Quél., Ench. Fung. 193. 1886; Fl. mycol. 439. 1888. — *Dryodon erinaceus* var. *caput-medusae* (Bull. ex Fr.) Quél. *apud* A. Mougeot & Ferry, Fl. Vosges 497. 1887. — *Hydnum erinaceus* var. *caput-medusae* (Bull. ex Fr.) Cost. & Dufour, Nouv. Fl. Champ. 161. 1891. — *Dryodon erinaceus* "Forme: *Hydnum caput-medusae* Bull." Bourd. & Galz., Hym. France 443. 1928. — *Hericium erinaceus* f. *caput-medusae* (Bull. ex Fr.) Nikol. *in* Pl. cryptog. **5**: 340. 1950. — Type: represented by Bulliard, Herb. France pl. 412. 1788.

Clavaria conferta Paul., Traité Champ. **2**: Index. 1793 (for descr. see p. 427: "La Houppe des arbres"). — Type: represented by Paulet, Traité Champ., Atl. pl. 195 fig. 3–4. 1812–1835 (*Clavaria multicoma*, La houpe des arbres).

Hericium hystrix Pers., Comm. Fung. clav. 27. 1797. — *Hericium strictum* Pers., Traité Champ. comest. 252. 1818 (name change). — *Hydnum strictum* (Pers.) *ex* Steud., Nomencl. bot. **2**: 205. 1824. — *Hydnum hystrix* (Pers.) *ex* Fr., Syst. mycol. **1**: 410. 1821. — *Hericium hystrix* (Pers. ex Fr.) Pers., Mycol. europ. **2**: 154. 1825. — *Merisma hystrix* (Pers. ex Fr.) Spreng., Syst. Veg., Ed. decima sexta, **4** (1): 496. 1827. — *Martella hystrix* (Pers. ex Fr.) Lloyd, Mycol. Writ. **3**: 457. 1910 ("McGinty"). — Type: represented by Micheli, Nova Pl. Gen. pl. 64 fig. 1. 1729.

Hericium hystrix var. β *H. scoparium* Pers., Comm. Fung. clav. 28. 1797. — Type: represented by Boccone, Mus. Fis. Esperienze pl. 307 fig. [1]. 1697.

Hydnum agaricinum G. F. Hoffm., Veg. Hercyn. subterr. 24. 1811. — Type: represented by G. F. Hoffm., Veg. Hercyn. subterr. pl. 14 fig. 3. 1811.

Hericium grande Rafin. *in* J. Bot., Desveaux, **1**: 236. 1813; Préc. Découv. Trav. somiol. 50. 1814. — *Hydnum grande* (Rafin.) *ex* Steud., Nomencl. bot. **2**: 204. 1824. — Type locality: U.S.A., New Jersey.

Hericium erinaceus var. β. *sulphureum* Thore *apud* Pers., Mycol. europ. **2**: 153. 1825. — Type: none. — Type locality: France?

? *Hericium erinaceus* var. γ. *viridescens* Pers., Mycol. europ. **2**: 153. 1825. — Type locality: France, Lot-et-Garonne, Agen, "dans les bois de Pléneselve" (St. Amans, Fl. agen. 545. 1821).

Hericium unguiculatum Pers., Mycol. europ. **2**: 153. 1825. — *Hydnum unguiculatum* (Pers.) Streinz, Nomencl. Fung. 326. 1861. — Type: none. — Type locality: France, Lyon ("Lugdunum Gallorum").

Hydnum omasum Panizzi *in* Comm. Soc. crittog. ital. **1**: 175. 1862. — Type locality: Italia, Liguria, Ceriana near San Remo.

Hydnum notarisii Inzenga, Funghi sicil. **1**: 5. 1869 (not seen). — *Hericium notarisii* (Inz.) Fr., Hym. europ. 617. 1874. — *Martella notarisii* (Inz.) O.K., Rev. Gen. Pl. **3** (2): 493. 1898; Lloyd, Mycol. Writ. **3**: 457. 1910 ("McGinty"). — Part of type: not seen (UPS, according to Lloyd, Mycol. Writ. **6**: 1081; 1921 & **7**: 1229. 1923).

Dryodon juranus Quél. *in* C.R. Assoc. franç. Avanc. Sci. **30**: 496 (3 of reprint). 1902 ("*juranum*"). — *Hydnum juranum* (Quél.) P. A. Sacc. & D. Sacc., Syll. Fung. **17**: 150. 1905. — Type: represented by Quélet *in* C.R. Assoc. franç. Avanc. Sci. **30**: pl. 3 fig. 10. 1902.

DESCRIPTIONS.—Banker *in* Mem. Torrey bot. Cl. **12**: 119. 1903; Bourdot & Galzin, Hym. France 442. 1928 (*Dryodon*); Coker & Beers, Stip. Hydn. east. U.S. 12. 1951; Miller *in* Mycologia **27**: 368. 1935; Miller & Boyle *in* Univ. Iowa Stud. nat. Hist. **18** (2): 55. 1943.

ILLUSTRATIONS.—

The normally developed form (if not stated otherwise, all given as *Hydnum erinaceus*): Atkinson, Mushrooms fig. 186. 1900; Second ed., fig. 197. 1901 (photogr., good); Boccone, Mus. Fis. Esperienze pl. 307 figs. to the left. 1697 (*Fungus Erinaceus*; recognizable); Boudier, Icon. mycol. **1**: pl. 166. 1904–1910 (sterile form); Bresadola, Icon. mycol. **22**: pl. 1060. 1932 (fairly good); Bulliard, Herb. France pl. [34]. 1780 (good); Coker *in* J. Mitch. sci. Soc. **34**: pl. 8. 1919 (*Manina cordiformis*; photogr., good); Coker & Beers, Stip. Hydn. east. U.S. pl. 7. 1951 (*Hericium*; photogr., good); Cordier, Champ., Quatr. éd. rev. augm., pl. 44 fig. 2. 1876 (fairly good); Dumée, Nouv. Atl. Champ. comest. vén., Prem. éd., sér. 2: pl. 54. 1911 (good); Fl. batava **28**: pl. 2235. 1932–1934 (*Hericium*; good); Gillet, Champ. France pl. 318. 1878–1890 (good); Krombholz, Naturgetr. Abb. Beschr. essb. Schw. **7**: pl. 51 fig. 1–3. 1841 (good); Lenz, Abb. nützl. schädl. Schw. pl. 12 fig. 52. 1831; Nützl. schädl. Schw., Dritte sehr veränd. Aufl., pl. 9 fig. 44. 1862 (passable); Leuba, Champ. comest. pl. 38 fig. 2. 1890 (fairly good); Lorinser, Essb. verdächt. gift. Schw., Dritte Aufl., pl. 3 fig. 6. 1883 (Igelschwamm; passable); Maublanc, Champ. France, Quatr. éd., **2**: pl. 193. 1952 (*Hericium*; fairly good); Micheli, Nova Pl. Gen. pl. 64 fig. 1. 1729 (*Agaricum esculentum, album . . .*; recognizable); Nikolaeva *in* Pl. cryptog. **5**: fig. 5–6. 1950 (*Hericium*; good); Ramsbottom, Mushrooms & Toadst., New ed., pl. XVI fig. b. 1954 (photogr., good); Richon *in* Bull. Soc. bot. France **28**: pl. 4 fig. 1. 1881 (section, good); Richon & Roze, Atl. Champ. pl. 64 fig. 1–2. 1886 (*Dryodon*; good); Rolland, Atl. Champ. France pl. 100

fig. 220. 1910 (good); A. H. Smith, Mushroom Hunter's Field Guide fig. on p. 52. 1958 (photogr.; good); Trattinnick, Fung. Austr., Ed. nova, pl. 18 fig. 35. 1830 (mediocre); Vittadini, Descr. Funghi mang. pl. 26. 1835 (good).

The *'caput-medusae'* form: Boccone, Mus. Fis. Esperienze pl. 303 fig. 6. 1697 (*Fungus setaceus*; recognizable); Bulliard, Herb. France pl. 412. 1788 (*Clavaria*; recognizable); Nees von Esenbeck, Syst. Pilze pl. 33 lower fig. 1817 (*Hydnum Hericium caput-medusae*; copied from Bulliard); Nikolaeva *in* Pl. cryptog. **5**: fig. 8a–8b. 1950 (*Hericium erinaceus* f. *caput-medusae*; uncertain); Roques, Hist. Champ. comest. vén. pl. 2 fig. 3. 1832 (*Hericium*; recognizable).

HABITAT.—On frondose trees, mainly *Fagus* and *Quercus*.

DISTRIBUTION.—Uncommon, reported from various parts of the country.

ILLUSTRATIVE COLLECTION.—Gelderland: Uddel, Uddelermeer, 19 X 1952, H. Koot (L).

EXSICCATI.—(All given as *Hydnum erinaceus*.) Fuckel, Enum. Fung. Nassov., ser. 1: 943 (L); Litschauer & Lohwag, Fungi sel. exs. europ. 174 (PR); Rabenhorst-Winter, Fungi europ. 3641 (L); Roumeguère, Fungi gall. exs. 2106 (L).

While it is true that no other than Bulliard's *Hydnum erinaceus* can be accepted as the basinym for the present species, the attention may be drawn to the fact that the specific epithet had already been used earlier for what may well be the same species. In describing "le Hérisson" which is the French name for *Hericium erinaceus*, Paulet (Traité Champ. **2**: 424. 1793) referred to Breyne ("Cette espèce que J. Breyne a fait connoître . . ."), who was equally mentioned by Dillenius (Cat. Pl. Giss. nasc. 197. 1719) when describing his *Bovista erinacea*: "Fungus barbatus quercinus teterrime foetidus *J. Breyn.* Eph. G. D. 1. A. 4 O. 151. *Breynius* forte jam putrescentem invenit, nobis enim nullus iu recenti foetor animadversus."

Although *Hydnum hystricinum* Batsch and *Hericium hystrix* Pers. were based on the same type, Micheli's plate, there is no evidence that the latter is a name change of the former, and for this reason both are enumerated separately.

Micheli's illustration almost certainly represents a peculiar form of the present species. The description Fries gave of *Hydnum hystrix* which he stated to have found himself, is also in favour of the view that *H. hystrix* is only a form of *H. erinaceus*. But the strange fact remains that practically no one after Fries has seen it. Villinger (1934) published a note on what he considered to be this form, but his description rather suggests the 'alpestre sensu Bresadola' form of *Hericium coralloides*.

Hydnum caput-medusae has in the course of time been evaluated in very different ways, but in conformity with my views regarding the variability in *H. coralloides* and *H. ramosum*, it is here being referred to as the *'caput-medusae'* form which differs from normally developed *H. erinaceus* in the tendency of the fruit-body of being more broken up at its periphery into separate branches, and in its upper surface being densely covered with deformed spines.

Hericium erinaceus var. *viridescens* is enumerated with some doubt. It may well be asked, as did Persoon himself, whether, on account of its colour, it belongs to

the genus *Hericium* at all. Or would it be possible to think of this var. *viridescens* as a specimen of *H. erinaceus* which, after having been killed and quickly dried during a dry spell, has become overgrown with algae or green moulds in the next wet period?

Hericium unguiculatum, indicated with an asterisk, by which Persoon meant to say that he was in doubt as to its proper position, may, with little chance of being mistaken, be regarded as a drought-form on account of its small size and the recurved tips of its spines.

As far as may be judged from Panizzi's description, *Hydnum omasum* seems to be a sessile form of the present species which has already turned yellow in the field. Whether *Hericium botryoides* S. Ito & Ôtani (apud Ôtani, 1957: 306) should be considered conspecific with *Hydnum omasum* and hence with *Hericium erinaceus*, is difficult to say with certainty, but it does not seem too improbable.

On the authority of Boudier (1911: 85), *Clavaria conferta* Paul. ("Houppe des arbres") and *Dryodon juranus* Quél. are included in the synonymy, representing the conidia-bearing state of the present species. As a matter of fact, there is a marked resemblance between Boudier's plate and those of Paulet and Quélet.

Panizzi (1862: 175) believed that *Hydnum ramaria* of Fries (Syst. mycol. **1**: 410. 1821) could be identified as a "bizarre" variety of *H. erinaceus*, on the grounds that he had received a specimen which was intermediate between both. I have no opinion myself.

HERICIUM RAMOSUM (Bull. ex Mérat) Letellier

? *Manina ramosissima* Scop., Diss. Sci. nat. **1**: 98. 1772; not *Hydnum ramosissimum* L. March. & R. Court. *in* Bijdr. natuurk. Wetensch. **3** (1): 268. 1828. — *Hericium nudicaule* Pers, Comm. Fung. clav. 25. 1797 (name change); *ex* Pers., Mycol. europ. **2**: 152. 1825. — Type: represented by Scopoli, Diss. Sci. nat. **1**: pl. 12. 1772.

Hydnum laciniatum Leers, Fl. herborn. 276. 1775. — *Hericium laciniatum* (Leers) *ex* Banker *in* Mem. Torrey bot. Cl. **12**: 114. 1906. — Type locality: Germany, Nassau, Herborn, "in der Hörre."

Hydnum erinaceus Retz., Fl. Scand. Prodr. 251. 1779; Ed. alt. 319. 1795; not *Hydnum erinaceus* Bull., Herb. France (legend to) pl. [34]. 1780 = *Hericium erinaceus*. — Type: represented by Oeder *in* Fl. dan. **3**, Fasc. 8: pl. 450. 1769 (selected).

Hydnum coralloideum Batsch, Elench. Fung. 113. 1783; not *Hydnum coralloides* Scop., Fl. carniol., Ed. sec. aucta reform., **2**: 472. 1772 = *Hericium coralloides*. — Type: represented by Micheli, Nova Pl. Gen. pl. 64 fig. 2. 1729.

Hydnum stallactiticum Schrank, Baier. Fl. **2**: 624. 1789; Reise südl. Gebirg. Bayern 130. 1793 [Fr., Syst. mycol. **1**: 410. 1821 ("*stalactitium*", not definitely accepted)]. — *Hericium abietinum* subsp. β *stallactiticum* (Schrank) Pers., Comm. Fung. clav. 25. 1797 ("*stalactitium*"). — *Hydnum coralloides* var. δ? *Hydnum stallactiticum* (Schrank) Pers., Syn. meth. Fung. **2**: 564. 1801. — *Hericium stallactiticum* (Schrank) *ex* Fr., Epicr. Syst. mycol. 520. 1838 ("*stalactitium*", misapplied). — Type locality: Germany, Bavaria.

Hydnum ramosum Bull., Herb. France (legend to) pl. 390. 1788; Hist. Champ. France 305. 1791; *ex* Mérat, Nouv. Fl. Envir. Paris, Deux. éd., **1**: 37. June 1821; not *Hydnum ramosum* Schw. *in* Schr. naturf. Ges. Leipzig **1**: 104. 1822. — *Hericium ramosum* (Bull. ex Mérat) Letellier, Hist. Descr. Champ. 43. 1826. — Type: represented by Bulliard, Herb. France pl. 390. 1788.

Clavaria cornu-cervi Paul., Traité Champ. **2**: Index. 1793 (for descr. see p. 427: "La Chevelure

des arbres blanche" ou "la Corne du Cerf"). — Type: represented by Clusius *apud* Istvánffi, Étud. Comm. Code Escluse pl. 83. 1900.

Hydnum abietinum Schrad., Spicil. Fl. germ. **1**: 181. 1794. — *Hericium abietinum* (Schrad.) Pers., Comm. Fung. clav. 24. 1797. — *Hydnum coralloides* var. γ? *Hydnum abietinum* (Schrad.) Pers., Syn. meth. Fung. **2**: 564. 1801. — *Hericium abietinum* (Schrad.) *ex* Schleich., Cat. Pl. Helvet., Ed. quarta em. aucta 57. 1821 ("P."). — *Hydnum abietinum* Schrad. *ex* Oudem., Enum. syst. Fung. **2**: 629. 1920; not *Hydnum abietinum* (Pers.) Duby, Bot. gall., Ed. sec., **2**: 778. 1830. — Type locality: Germany.

Hydnum muscoides Schum., Enum. Pl. Saelland. **2**: 394. 1803; not *Manina muscoides* Scop., Diss. Sci. nat. **1**: 99. 1772; not *Hydnum muscoides* Lloyd, Mycol. Writ. **7**: 1227. 1923. — Type locality: Denmark, Sjaelland.

Clavaria madreporaeformis Retz., Diss. Suppl. Ed. secund. Prodr. Fl. Scand. 19. 1805. — Type locality: Sweden, Lund.

Hydnum coralloides var. α. *heteromorpha* Alb. & Schw., Consp. Fung. 272. 1805. — Type locality: Germany, Oberlausitz, "Quizdorf; Moholzer Haide."

Hydnum ramosum Schw. *in* Schr. naturf. Ges. Leipzig **1**: 104. 1822; not *Hydnum ramosum* Bull. *ex* Mérat, Nouv. Fl. Envir. Paris, Deux. éd., **1**: 37. 1821. — Type locality: U.S.A., North Carolina.

? *Hericium mori* Opiz *in* Lotos **1**: 256. 1851. — Type locality: Czecho-Slovakia, Prague, "Marien-Schanz."

Hericium reichii Opiz *in* Lotos **1**: 256. 1851. — Type locality: Czecho-Slovakia, presumably Prague.

Hydnum caput-ursi Fr., Monogr. Hym. Suec. **2**: 278. 1863; Icon. sel. Hym. **1**: 9. 1867; Hym. europ. 608. 1874. — *Hydnum coralloides* var. *caput-ursi* (Fr.) Cooke & Quél., Clav. syn. Hym. europ. 198. 1878. — *Friesites caput-ursi* (Fr.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **5**: 41. 1879. — *Dryodon coralloides* subsp. *Dr. caput-ursi* (Fr.) P. Karst. *in* Rev. mycol. **3** (No. 9): 19. Jan. 1, 1881; *in* Acta Soc. F. Fl. fenn. **2** (1): 34. 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 15. 1881. — *Dryodon coralloides* var. *caput-ursi* (Fr.) Quél., Ench. Fung. 192. 1886; Fl. mycol. 438. 1888 (misapplied). — *Hericium caput-ursi* (Fr.) Banker *in* Mem. Torrey bot. Cl. **12**: 118. 1906 (misapplied); Corner *apud* Balfour-Browne *in* Bull. Brit. Mus. (nat. Hist.) (Bot.) **1**: 192. 1955 (misapplied, material examined). — *Manina caput-ursi* (Fr.) Banker *in* Mycologia **4**: 277. 1912. — *Dryodon coralloides* "Forme tératologique: *Hydnum caput-ursi* Fr." Bourd. & Galz., Hym. France 442. 1928. — *Dryodon coralloides* f. *caput-ursi* (Fr.) Pilát *in* Bull. Soc. mycol. France **49**: 41. 1933 ("Bourd. & Galz.", misapplied, material examined). — *Hericium alpestre* f. *caput-ursi* (Fr.) Nikol. *in* Pl. cryptog. **5**: 337. 1950 (misapplied). — *Hericium coralloides* f. *caput-ursi* (Fr.) Nikol. *in* Pl. cryptog. **5**: 342. 1950 ["(Bourd. & Galz.)"]. — Type locality: Sweden, Södermanland, near Tvetaberg.

[*Hydnum coralloides* "b. subterraneum, undique aculeatum . . ." Fr., Syst. mycol. **1**: 409. 1821.] *Hydnum coralloides* var. β *subterraneum* Kickx, Fl. cryptog. Flandres **2**: 254. 1867; not *Hydnum coralloides* var. *subterraneum* Harz *in* Bot. Centralbl. **37**: 342. 1889. — Type locality: Scandinavia (selected).

Hydnum aciculare Sacc. *in* Michelia **2**: 154. 1880; Syll. Fung. **6**: 447. 1888. — *Dryodon acicularis* (Sacc.) Bourd. *in* Bull. Soc. mycol. France **48**: 221. 1932 ("*aciculare*", misapplied?). — Type: *Hydnum aciculare* (PAD).

Hydnum novae-zealandiae Colenso *in* Trans. Proc. New Zeal. Inst. **21**: 79. 1889. — Type: *Hydnum novae-zealandiae* Col. (part of type, K).

Hydnum coralloides var. *subterraneum* Harz *in* Bot. Centralbl. **37**: 342. 1889 ("*subterranea*"); not *Hydnum coralloides* var. *subterraneum* Kickx, Fl. cryptog. Flandres **2**: 254. 1867. — Type locality: Germany, Oberbayern, in a mine at Hausham.

Hydnum caput-ursi var. *brevispineum* Peck *in* Bull. N.Y. State Mus. **5**: 656. 1899. — Type: not seen (NYS?).

Hericium coralloides f. *confluens* Nikol. *in* Pl. cryptog. **5**: 342. 1950 (no Latin description). — Type: not indicated, represented by Nikol. *in* Pl. cryptog. **5**: fig. 10. 1950.

MISAPPLICATIONS.—*Hericium coralloides* (Scop.) Pers. *in* Neues Mag. Bot. **1**: 109. 1794. — *Hydnum coralloides* Scop. *ex* Fr., Syst. mycol. **1**: 408. 1821; Epicr. Syst. mycol. 511. 1838; Sverig. ätl. gift. Svamp. 23. 1862; Hym. europ. 607. 1874. — *Medusina coralloides* (Scop. ex Fr.) Chev., Fl. gén. Envir. Paris **1**: 279. 1826.

DESCRIPTIONS.—Atkinson, Mushrooms 196. 1900; Second ed. 196. 1901 (*Hydnum coralloides*); Banker *in* Mem. Torrey bot. Cl. **12**: 114. 1906 (*H. laciniatum*); Bourdot & Galzin, Hym. France 442. 1928 (*Dryodon coralloides*); Coker & Beers, Stip. Hydn. east. U.S. 15. 1951 (*H. laciniatum*); Miller *in* Mycologia **27**: 366. 1935 (*H. laciniatum*); Miller & Boyle *in* Univ. Iowa Stud. nat. Hist. **18** (2): 57. 1943 (*H. laciniatum*).

ILLUSTRATIONS.—

The normally developed form: Atkinson, Mushrooms fig. 184. 1900; Second ed., fig. 195. 1901 (*Hydnum coralloides*; photogr., very good); Boccone, Mus. Fis. Esperienze pl. 303 fig. 7 (*Fungus muscosus albus . . .*; recognizable), pl. 304 fig. 2 (*Fungus ramosus abietin.*; juvenile?). 1697; Bulliard, Herb. France pl. 390. 1788 (*Hydnum ramosum*; good); Clusius apud Istvánffi, Étud. Comm. Code Escluse pl. 83. 1900 (passable); Coker *in* J. Mitch. sci. Soc. **34**: pl. 9 (fairly good), pl. 10 (indistinct, juvenile?). 1919 (*Manina flagellum*; photogr.); Coker & Beers, Stip. Hydn. east U.S. pl. 9. 1951 (*Hericium laciniatum*; photogr., juvenile); Cunningham *in* Trans. Roy. Soc. New Zealand **85**: pl. 42 fig. 2. 1958 (*Hericium coralloides*; photogr., good); Favre-Guillarmod, Champ. comest. cant. Neuchâtel, Deux. livr., pl. facing p. 27. 1869 (*Hydnum coralloides*; useless); Fl. batava **28**: pl. 2231a. 1932–1934 (*Hericium coralloides*; uncertain); Fries, Sverig. ätl. gift. Svamp. pl. 34. 1862 (*Hydnum coralloides*; good); Kallenbach *in* Z. Pilzk. **11**: pl. 12 upper fig. 1932 (*Hydnum coralloides*; good; lower fig. not identifiable); Leuba, Champ. comest. pl. 38 fig. 1. 1890 (*Hydnum coralloides*; fairly good); Lloyd, Mycol. Writ. **7**: pl. 340 fig. 3229. 1925 (*Hydnum coralloides*; photogr., upside down, indistinct); Michael-Schulz, Führ. Pilzfr. **3**: fig. 310. 1927 (*Dryodon coralloides*; good); Micheli, Nova Pl. Gen. pl. 64 fig. 2. 1729 (*Agaricum esculentum album . . .*; juvenile?); Nikolaeva *in* Pl. cryptog. **5**: fig. 9 (*Hericium coralloides*; good), fig. 10 (*Hericium coralloides* f. *confluens*; good). 1950; Oeder *in* Icon. Pl. Fl. dan. **3**, Fasc. 8: pl. 450. 1769 (*Agaricum esculentum . . .*; recognizable); Patouillard, Tab. anal. Fung., fasc. 4: fig. 357. 1885 (*Hydnum coralloides*; recognizable); Peck *in* Rep. N.Y. State Mus. **48** (3): pl. 24 fig. 11–12. 1894 (*Hydnum coralloides*; fairly good); Ramsbottom, Mushrooms & Toadst., New ed., pl. XVI fig. a. 1954 (*Hydnum coralloides*; photogr., fairly good); Richon & Roze, Atl. Champ. pl. 64 fig. 6–7. 1887 (*Dryodon coralloides*; good); Rolland, Atl. Champ. France pl. 100 fig. 221. 1910 (*Hydnum coralloides*; passable); Ušak *apud* Pilát, Naše Houby **2**: pl. 153. 1959 (*Hericium coralloides*; uncertain); Sowerby, Col. Fig. Engl. Fungi **3**: pl. 252. 1803 (*Hydnum coralloides*; magnificent).

The '*caput-ursi*' form: Fries, Icon. sel. Hym. **1**: pl. 7. 1867 (*Hydnum caput-ursi*; good); Heim, Champ. fig. 47. 1948 (*Hydnum coralloides*; photogr., uncertain); Krieger, Popul. Guide high. Fungi N.Y. State pl. 18. 1935 (*Hydnum caput-ursi*;

uncertain); Peck *in* Mem. N.Y. State Mus. **3** (4): pl. 67 fig. 8–11. 1900 (*Hydnum caput-ursi*; fairly good); A. H. Smith, Mushroom Hunter's Field Guide figs. on pp. 49–50. 1958 (*Hericium caput-ursi*; photogr., uncertain).

HABITAT.—On frondose trees, mainly *Fagus* and *Quercus*.

DISTRIBUTION.—Very rare, with certainty known from one locality only.

ILLUSTRATIVE COLLECTION.—N o o r d - B r a b a n t: Chaam, "Hondsdonk", X 1932, *B. J. J. R. Walrecht* (L).

EXSICCATI.—(Unfortunately, a number of exsiccati received on loan from Copenhagen and Prague cannot be enumerated, since at the time they were studied I did not yet differentiate *H. coralloides* from *H. ramosum*.) Jaap, Fungi sel. exs. 779 (*Hydnum coralloides*; L); Rabenhorst, Herb. mycol., ed. 2, 702 (*Hydnum coralloides*; L, PR; in part also true *H. coralloides*); von Thümen, Mycoth. univ. 1604 (*Hydnum coralloides*; L).

Manina ramosissima Scop. is enumerated among the synonyms only with great reserve, and mainly because of (i) the intricate ramification, and (ii) the words "corpus . . . aculeos parallelos undique emittens." However, the intricate ramification which is a characteristic feature in normally developed *H. ramosum*, may, in Hymenomycetes in general, well be induced by the fruit-body having grown in the dark. Many will be acquainted with the antler-like structures into which Agarics and Polypores collected in caves or mines have developed. Striking figures are among others to be found in C. Mez, Der Hausschwamm, 1908. With these deformations in mind, one might even think of Scopoli's figure as referable to a 'cave-form' of *H. erinaceus*.

In the same way, it is conceivable that the distribution of the spines on the branches is affected by the lack of light.

The choice of the type of *Clavaria cornu-cervi* calls for some comment. This name is to be found in the Index of Paulet's work (Traité des Champignons **2**. 1793), whereas on p. 427 the species is called "Chevelure des arbres blanche." The sentence "Cette espèce que l'Écluse a fait connoître . . ." shows that Paulet chose the first of four illustrations, cited in Traité Champ. **1**: 540, No. 64a, 1790, to serve as an example of his species. These illustrations were enumerated as follows: *25.um genus fungor. pernicios.* Clusii, p. 287, icon. in append. alter.; *Cornu cervi calcinatum* Sterbeeck, tab. 27, fig. G.; *Fungus abietinus niveus* Boccone, Mus. fisic. icon. p. 304; & *fungus ramosus, abietinus, niveus* Barrelier, icon. 1257. However, Paulet's species was not based on Clusius, Rar. Pl. Hist. Fung. Pann. obs. brev. Hist., Appendix alt., fig. on p. cclxxxvii. 1601, but, as may be inferred from his own figure (Atlas pl. 195 fig. 2. 1812–1835; erroneously called *Clavaria hydnoides*), on that by van Sterbeeck (Theatr. Fung. pl. 27 fig. G. 1675). The latter, again, was *not* drawn from nature, but copied from an unpublished water-colour by Clusius. In this relation it seems appropriate to quote Istvánffi (Étud. Comm. Code Escluse 126–127. 1900): ". . . parceque l'auteur [van Sterbeeck] fait usage des descriptions de l'Escluse et qu'on avait cru jusqu'alors qu'il avait fait lui-même tous ses dessins." Clusius's

water-colour was reproduced later on by Istvánffi (Pl. 83), and it is this plate that must be regarded as the type of Paulet's species.

When choosing the correct epithet for the present species, the name *Hydnum abietinum* Schrad. proved a serious rival of *Hydnum ramosum* Bull. Both were validated in 1821, the former by Schleicher, the latter by Mérat. But, while it is known that Mérat's booklet was registered in the week of June 9–15, the date of publication of Schleicher's catalogue which was printed at Chambéry, France, is a matter of conjecture. The only piece of information avalaible as yet is a letter dated December 18th, 1821, written by Schleicher to Dr. Bonjean at Chambéry and preserved in the 'Conservatoire et Jardin Botaniques' at Geneva. I am greatly indebted to Dr. C. E. B. Bonner, Geneva, for having copied the most important part of this letter which reads: "Je vous avise par ces lignes que jusqu'à cette date je n'ai rien encore appercue de ces catalogues .... J'aurai beaucoup mieux fait d'envoyer mon MS à Turin." From this it may be inferred that Schleicher's publication is of a later date than Mérat's, and it follows that *Hericium abietinum* (Schrad.) ex Schleich. cannot be used for the present species.

Albertini & Schweinitz (1805) stated their *Hydnum coralloides* var. *heteromorpha* to be just a young stage of the species, i.e. of *Hydnum coralloides*. On the title-page they mentioned that their 'Conspectus' was written "e methodo Persooniana," whilst Persoon's 'Synopsis' is quoted on page iii of the introduction. From this, it may be gathered that the authors treated *H. coralloides* in the same sense as did Persoon, which amounts to their species and variety being nothing but *Hericium ramosum*.

Hydnum caput-ursi, if not considered a species of its own, has usually been thought of in relation with *Hericium coralloides*. This is an error. Both Fries's description and plate sufficiently show *H. caput-ursi* to be connected with *H. ramosum*. What rank should be attributed to '*caput-ursi*' is a question, to which I would rather postpone a definite answer. It seems, however, that there is no sharp boundary line dividing '*caput-ursi*' and '*ramosum*'. The specimen depicted by Nikolaeva under the name of *H. coralloides* f. *confluens* may well represent an intermediate form between both.

A form, corresponding to the '*caput-ursi*' form in *H. ramosum*, also exists in *H. coralloides*. Both have the massive body in common from which there emerge much shortened branches, but they differ in the way the spines are distributed.

Species of doubtful position

The following species have been left out of the present revision, some because I fail to recognize them, another because of its lack of a distinct stipe, which renders it unfit for inclusion in a treatise on stipitate Hydnums.

HYDNUM ABIETIS Hubert

Hydnum abietis Hubert, Outline Forest Pathol. 305. 1931. — *Hericium abietis* (Hubert) Nobles *in* Canad. J. Bot. **36**: 96, Table 3. 1958 (no reference to basinym). — Type: represented by Hubert, Outline Forest Pathol. fig. 71. 1931.

The history of this fungus name is somewhat unusual. As may be gathered from a note by Englerth (1942: 11), it was Weir who collected and studied the fungus, considering "it a new species to which he applied the name *Hydnum abietis*, although he never published it as such. Published reference to the fungus was first made by Hubert . . .." Hubert, in enumerating the Hydnums causing diseases in forest trees, referred to the fungus as "*Hydnum* sp. (*H. abietis*)," but was more definite in the legend to Fig. 71 and on p. 306, using the binomial *Hydnum abietis* without brackets. Since he also supplied a description ("It resembles somewhat *H. coralloides* but has finer teeth. The fruiting bodies are white to cream color and measure from four to ten inches wide and six to twelve inches high."), there is no doubt that the species is to be ascribed to Hubert.

The species was subsequently recognized by Foster & Foster (1951: 491, 492) as belonging to the genus *Hericium* (*Hericium* sp.), while the, not validly published, recombination *Hericium abietis* was used by Nobles (l.c.).

From Hubert's description and photograph I would suggest that his species is identical with *Hericium ramosum*, but as long as no material has been examined, no conclusive proof can be given.

The photograph published by Englerth (1942: pl. 5 fig. 3) is too small to allow identification; the picture in the paper by Foster & Foster (1951: pl. 5 fig. 1) almost certainly represents *H. coralloides*. Dr. R. E. Foster, Victoria, whom I wrote concerning *Hydnum abietis*, supplied me with a number of beautiful specimens considered to be this species from various localities in British Columbia. All collections seem to belong to *Hericium coralloides*; morphologically they are indistinguishable from this species, and the spores are only slightly smaller.

HERICIUM BRESADOLAE (Quél.) Malençon

Clavaria bresadolae Quél., Fl. mycol. 458. 1888; *apud* Bres., Fungi trident. **2**: 40 pl. 146 fig. 2. 1892; not *Clavaria bresadolae* Cavara *in* Atti Ist. bot. Univ. Pavia **3**: 8. 1894. — *Ceratella bresadolae* (Quél.) Bigeard & Guill., Compl. Fl. Champ. sup. France 442. 1913. — *Hericium bresadolae* (Quél.) Malençon *in* Bull. Soc. mycol. France **73**: 321 fig. 8. 1958; not *Hydnum bresadolae* Quél. *apud* Bres., Fungi trident. **1**: 14. 1881. — Type locality: France.

There is no doubt that the present species is in its proper place in the genus *Hericium*. However, the unobtrusiveness of the root by which the specimens are fastened to the substratum, and, contrasted with it, the conspicuousness of the subiculum, make it difficult for *H. bresadolae* to be retained in a paper which deals with the stipitate species.

HERICIUM CAUCASICUM Sing.

Hericium caucasicum Sing. *in* Beih. bot. Centralbl. **46** (Abt. 2): 77. 1930. — *Hericium alpestre* f. *caucasicum* (Sing.) Nikol. *in* Pl. cryptog. **5**: 336. 1950. — Type locality: U.S.S.R., Caucasus.

Nikolaeva gave an illustration of *Hericium alpestre* f. *caucasicum* (l. c., fig. 3), apparently drawn from a specimen determined as *H. caucasicum* by Singer (l. c., p. 328). Since Nikolaeva's description in some respects (length of the basal part of the

fruit-body, and size of the spores) deviates from the original one, allowance should be made for the possibility of this specimen not being conspecific with the type. The former might be a form of *Hericium coralloides*; where to place the latter is even less certain (see p. 121).

MANINA MUSCOIDES Scop.

Manina muscoides Scop., Diss. Sci. nat. **1**: 99. 1772; not *Hydnum muscoides* Schum., Enum. Pl. Saelland. **2**: 394. 1803 = *Hericium ramosum*; not *Hydnum muscoides* Lloyd, Mycol. Writ. **7**: 1227. 1923. — *Hericium muscoides* (Scop.) Pers., Comm. Fung. clav. 26. 1797. — *Hericium muscoides* (Scop.) *ex* Pers., Mycol. europ. **2**: 152. 1825. — Type: represented by Scopoli, Diss. Sci. nat. **1**: pl. 16. 1772.

There is no certainty to be had as to what species *Manina muscoides* might be attributed.

HERICIUM PTYCHOGASTEROIDES Nikol.

Hericium ptychogasteroides Nikol. *in* J. Bot. U.S.S.R. **41**: 999. 1956. — Type locality: U.S.S.R., "regio Primorskensis."

In the description, a copy of which I received thanks to the kindness of Mr. D. A. Reid, Kew, Nikolaeva stated that her species is based on an imperfect, i.e. conidia-bearing, state. It is difficult, if possible at all, to ascertain to which species the corresponding perfect state would belong, but with Boudier's plate in mind, *H. ptychogasteroides* may possibly be thought of as the conidial state of *H. erinaceus*.

HYDNUM L. ex Fr.

Hydnum L., Sp. Pl. **2**: 1178. 1753. — *Hypothele* Paul., Mycétol. 43, 47. circa 1812 (avowed name change); *ex* Banker *in* Torreya **4**: 113. 1904. — *Hydnum* L. *ex* Fr., Syst. mycol. **1**: lvi, 397. 1821; Elench. Fung. **1**: 129. 1828; Epicr. Syst. mycol. 505. 1838; Hym. europ. 598. 1874; not *Hydnum* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 650. 1821 ("Dill.") = *Sarcodon* P. Karst. — *Hydnum* sect. *Hydnum* (L. ex Fr.) L. March. *in* Bijdr. natuurk. Wetensch. **3** (1): 269. 1828 (nomen nudum); Beeli *in* Bull. Natur. Belg. **14**: 14 (reprint). 1933. — Type species: *Hydnum repandum* L. ex Fr., see Donk (1956: 97).

Hydnum trib. *Mesopus* Fr., Syst. mycol. **1**: 398. 1821; Elench. Fung. **1**: 130. 1828; Epicr. Syst. mycol. 505. 1838; Hym. europ. 598. 1874. — *Hydnum* sect. *Hydnois* [subsect.] *Mesopus* (Fr.) Duby, Bot. gall., Ed. sec., **2**: 775. 1830. — *Hydnum* sect. *Mesopus* (Fr.) Sacc. *in* Fl. ital. cryptog. **1** (Fasc. 15): 1075, 1078. 1916. — Type species: *Hydnum repandum* L. ex Fr. (selected).

Dentinum S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 650. 1821 ("Micheli"). — Type species: *Hydnum repandum* L., see Donk (1956: 75).

Hydnum sect. *Hydnois* Duby, Bot. gall., Ed. sec., **2**: 775. 1830. — Type species: same as of *Hydnum* L. ex Fr. (selected).

Hydnum trib. *Mesopus* [sect.] *Carnosa* Fr., Epicr. Syst. mycol. 505. 1838; Hym. europ. 598. 1874. — *Hydnum* sect. *Mesopus* subsect. *Carnosa* (Fr.) Sacc. *in* Fl. ital. cryptog. **1** (Fasc. 15): 1075, 1078. 1916. — Type species: *Hydnum repandum* L. ex Fr. (selected).

Tyrodon P. Karst. *in* Rev. mycol. **3** (No. 9): 19. Jan. 1, 1881; *in* Acta Soc. F. Fl. fenn. **2** (1): 33. 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 15. 1881. — *Hydnum* [sect.] *Tyrodon* (P. Karst.) J. Schroet. *in* Cohn, Kryptog.-Fl. Schles. **3** (1): 455. 1888. — *Hydnum* sect. *Mesopus* [subsect.] *Carnosa* [ser.] *Tyrodon* (P. Karst.) Killerm. *in* Nat. Pflfam., Zweite Aufl., **6**: 166. 1928. — Type species: *Hydnum repandum* L. ex Fr., see Donk (1956: 112).

Carpophores terrestrial, stipitate, fleshy. Pileus covered with tomentum, anoderm. Stipe finely tomentose, glabrescent. Context homogeneous, not zonate. Hymenium covering spines on underside of pileus. Spines white to more or less coloured like the pileus. Basidia (in *H. repandum*) (3–)4–5(–6)-spored. Spores subglobose to obovoid, smooth, white in mass.

The American species of the genus have not been taken into consideration. I am not, therefore, in the position to say whether the presence of clamp connections, as found in *H. repandum*, may be regarded as a generic character, and also not whether the spores in general only number four per basidium, as stated by Coker & Beers for some of the species. Incidentally, it may be of interest to note that already R. Maire (1902: 96) found the basidia of *H. repandum* to be 3–5-spored.

In recent times an Australian and New Zealand species was redescribed under the name of *Dentinum crocidens* (Cooke) G. H. Cunn. (*in* Trans. Roy. Soc. New Zealand **85**: 589. 1958). If this is a true *Hydnum*, it would prove the genus to contain also species without clamp connections.

The genus *Hydnum* is in need of a more thorough revision, covering a wider area than could for the present be accomplished. The specimens which in Europe are generally called *Hydnum repandum* and/or *H. rufescens* may well prove to be referable to several more well-defined taxa. In this connection it seems appropriate to point out that Schatteburg (1956: 316) reported on the repulsive, rancid taste of Southern German specimens of *Hydnum repandum* once they had been dried, whereas drying did not change the culinary quality of the Northern German specimens of (supposedly) the same species. However, with my limited experience of European Hydnums, I can as yet recognize but two species, viz. the highly variable *Hydnum repandum* and *Sarcodon abietinus* Heim. For the latter the following new name is proposed, since on transferring the species to the genus *Hydnum*, the recombination would result in a later homonym.

Hydnum heimii Maas G., *nom. & spec. nov.*

Sarcodon abietinus Heim *in* Rev. Mycol. **8** (1, Suppl.): 10. 1943 ("*abietinum*", basinym, no Latin description); *in* Bull. Soc. mycol. France **67** (Atlas): pl. 99. 1952 ("*abietum*", no Latin description); Champ. Europe **2**: 62. 1957 (no Latin description); not *Hydnum abietinum* (Pers.) Duby, Bot. gall., Ed. sec., **2**: 778. 1830; not *Hydnum abietinum* Schrad. *ex* Oudem., Enum. syst. Fung. **2**: 629. 1920 = *Hericium ramosum*, see there. — Type: not seen (PC).

Pileus carnosus, e convexo planus vel depressus, scrobiculatus, superficie tomentosa, tempore humido subviscosa, cremeo-albus vel hinc inde ochraceus, centro olivaceo-luteolo. Stipes subcentralis, compactus, basi incrassatus interdum bulbosus, velutinus, luteolus, apice scrobiculato-tomentosus, parte basali ochracea. Aculei fragilissimi, perlongi, curvati, plus minusve decurrentes, cremeo-roseoli, fistulosi vel medulla subviridi farcti. Caro alba, flavescens, e hyphis fibulatis formata, sapore amarescente. Basidia clavata, gloeocystidiis basidiisque sterilibus deformatis immixta, sterigmata 4 vel interdum 5 gerentia. Sporae obovoideae, apiculatae, hyalinae.

Provenit haec species in Gallia, Grignon, autumno in foliis dejectis *Piceae excelsae*.

The type material which is assumed to be preserved in Prof. Heim's herbarium could not be obtained on loan, but the author very kindly gave me a specimen collected at the type locality in 1953. Some data of the microscopical part in the above description have been taken from this specimen.

The species evidently differs from *Hydnum repandum* in the olivaceous colour of the centre of the pileus, in the surface of the pileus becoming viscid when moist, in the longer spines, and in the narrower spores.

HYDNUM REPANDUM L. ex Fr.

Hydnum repandum L., Sp. Pl. **2**: 1178. 1753. — *Hypothele repanda* (L.) Paul., Icon. Champ. pl. 35 fig. 1–2. 1812–1835. — *Hydnum repandum* L. *ex* Fr., Syst. mycol. **1**: 400. 1821; Elench. Fung. **1**: 130. 1828; Epicr. Syst. mycol. 506. 1838; Hym. europ. 601. 1874. — *Dentinum repandum* (L. ex Fr.) S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 650. 1821. — *Tyrodon repandus* (L. ex Fr.) P. Karst. *in* Rev. mycol. **3** (No. 9): 19. Jan. 1, 1881; *in* Acta Soc. F. Fl. fenn. **2** (1): 33. 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 15. 1881. — *Sarcodon repandus* (L. ex Fr.) Quél., Ench. Fung. 189. 1886; Fl. mycol. 446. 1888 ("*repandum*"). — *Hypothele repanda* (L. ex Fr.) Banker *in* Torreya **4**: 113. 1904. — Type locality: Sweden, "Habitat in vastis sylvis rarius" (Linn., Fl. suec. 383. No. 1098. 1745).

Hydnum rufescens Schaeff., Fung. Icon. **4**: 95. 1774; not *Hydnum rufescens* (Pers.) Poiret, Encycl. méth. (Bot.) **8**: 206. 1808 = *Heteroporus biennis* (Bull. ex Fr.) Laz.; not *Hydnum rufescens* Fr., Syst. mycol. **1**: 401. 1821. — *Hydnum persoonii* Poiret, Encycl. méth. (Bot.) **8**: 204. 1808 (name change). — *Hydnum repandum* var. *denudatum* [f.] b. *rufidum* Fr., Obs. mycol. **1**: 139. 1815 (name change). — *Dentinum rufescens* (Schaeff.) *ex* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 650. 1821; not *Dentinum rufescens* (Fr.) Pouz. *in* Česka Mykol. **10**: 76. 1956. — Type locality: Germany, Bavaria.

Hydnum flavidum Schaeff., Fung. Icon. **4**: 99. 1774; not *Hydnum flavidum* Lloyd, Mycol. Writ. **6**: 957. 1920. — *Hydnum repandum* var. *denudatum* [f.] a. *flavidum* (Schaeff.) Fr., Obs. mycol. **1**: 138. 1815. — *Hydnum repandum* var. *flavidum* (Schaeff.) *ex* Harzer, Naturgetr. Abb. essb. gift. verd. Pilze 112. 1842. — Type: represented by Schaeff., Fung. Icon. **4**: pl. 318. 1774.

Hydnum squamosum Schaeff., Fung. Icon. **4**: 99. 1774; not *Hydnum squamosum* Bull., Herb. France pl. 409. 1788; Hist. Champ. France 310. 1791 = *Hydnellum* sp. indet. — *Hydnum repandum* var. *squamosum* (Schaeff.) Fr., Obs. mycol. **1**: 139. 1815. — [*Hydnum repandum* var. b. Fr., Syst. mycol. **1**: 400. 1821] *Hydnum squamosum* Schaeff. *ex* Fr., Epicr. Syst. mycol. 505. 1838; Hym. europ. 598. 1874 (misapplied); not *Hydnum squamosum* Bull. *ex* G. F. Re, Fl. pedemont. Append. 50. 1821. — *Sarcodon squamosus* (Schaeff. ex Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 103. 1882. — *Phaeodon squamosus* (Schaeff. ex Fr.) P. Henn. *in* Nat. Pflfam. **1** (1**): 149. 1898. — Type: represented by Schaeff., Fung. Icon. **3**: pl. 273. 1770.

Hydnum carnosum Batsch, Elench. Fung. 111. 1783 (in part); Elench. Fung. Cont. prima 197. 1786; not sensu Gmel., Syst. veg. 2: 1438. 1791 = *Hydnum repandum* var. *repandum*; not *Hydnum carnosum* (Banker) Trott. apud Sacc., Syll. Fung. **23**: 472. 1925 = *Bankera carnosa* (Banker) Snell, Dick & Taussig. — Type locality: Germany, surroundings of Jena.

Hydnum clandestinum Batsch, Elench. Fung. 113, 177. 1783; not sensu Gmel., Syst. veg. **2**: 1439. 1791 = *Pseudohydnum gelatinosum* (Scop. ex Fr.) P. Karst. — *Hydnum repandum* var. *clandestinum* (Batsch) *ex* Kickx, Fl. cryptog. Flandres **2**: 251. 1867. — Type: represented by Batsch, Elench. Fung. pl. 10 fig. 44. 1783.

Hydnum medium Pers., Obs. mycol. **2**: 97. 1799. — *Hydnum repandum* var. *denudatum* [f.] c. *albidum* Fr., Obs. mycol. **1**: 139. 1815 (name change). — Type locality: Germany.

Hydnum bicolor Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): 353. 1807; not *Hydnum bicolor* Alb. & Schwein., Consp. Fung. 270. 1805. — Type: represented by Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): pl. 12 fig. 6. 1807.

Hydnum bulbosum Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): 353. 1807. — Type

represented by Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): pl. 12 fig. 7. 1807.

Hydnum pallidum Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): 353. 1807; not *Hydnum pallidum* Cooke & Ellis *in* Grevillea **9**: 103. 1881. — Type: represented by Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): pl. 12 fig. 8. 1807.

Hydnum roseum Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): 354. 1807; not *Hydnum roseum* Saut. *apud* Schiederm. *in* Österr. bot. Z. **27**: 6. 1877 (nomen nudum). — Type: represented by Raddi *in* Mem. Mat. Fis. Soc. ital. Sci. **13** (2): pl. 9 fig. 3. 1807.

Hydnum repandum var. *denudatum* Fr., Obs. mycol. **1**: 138. 1815. — Type: same as of *Hydnum repandum* L.

Hydnum repandum var. *intermedium* Fr., Obs. mycol. **1**: 139. 1815. — Type locality: Sweden.

Hydnum album Pers., Traité Champ. comest. 249. 1818; *ex* Steud., Nomencl. bot. 202. 1824; Pers., Mycol. europ. **2**: 159. 1825; not *Hydnum album* Fr., Obs. mycol. **1**: 148. 1815. — Type: represented by Micheli, Nova Pl. Gen. pl. 72 fig. 2. 1729.

[*Hydnum rufescens* Schaeff. sensu Pers., Obs. mycol. **2**: 95. 1799; Syn. meth. Fung. **2**: 555. 1801] *Hydnum rufescens* Fr., Syst. mycol. **1**: 401. 1821; not *Hydnum rufescens* Schaeff., Fung. Icon. **4**: 95. 1774 = *Hydnum repandum* [var. *repandum*], acc. to Fr., l.c.; not *Hydnum rufescens* (Pers.) Poiret, Encycl. méth. (Bot.) **8**: 206. 1808 = *Heteroporus biennis* (Bull. ex Fr.) Laz. — *Hydnum repandum* var. *rufescens* (Fr.) Barla, Champ. Prov. Nice xlviii, 81, 1859; Peck *in* Rep. N.Y. State Mus. **48**: 406. 1896. — *Hydnum repandum* subsp. *H. rufescens* (Fr.) Fr., Hym. europ. 601. 1874. — *Tyrodon repandus* subsp. *T.* ("*F.*") *rufescens* (Fr.) P. Karst. *in* Rev. mycol. **3** (No. 9): 19. Jan. 1, 1881; *in* Acta Soc. F. Fl. fenn. **2** (1): 33. 1881 & *in* Medd. Soc. F. Fl. fenn. **6**: 15. 1881. — *Sarcodon repandus* var. *rufescens* (Fr.) Quél., Ench. Fung. 189. 1886. — *Tyrodon rufescens* (Fr.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **48**: 349. 1889. — *Dentinum rufescens* (Fr.) Pouz. *in* Česká Mykol. **10**: 76. 1956; not *Dentinum rufescens* (Schaeff.) *ex* S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 650. 1821. — *Sarcodon rufescens* (Fr.) Heim, Champ. Europe **2**: 62. 1957 (incomplete reference to basinym). — Type: non-existing. — Type locality: Germany.

Hydnum diffractum Berk. *in* London J. Bot. **6**: 323. 1847; *in* Grevillea **1**: 71. 1872. — Type: Ohio, Waynesville, Aug. 26. 1844. J. G. Lea (K).

Hydnum rufescens var. (*undulato-*)*repandum* Kickx, Fl. cryptog. Flandres **2**: 251. 1867. — Type locality: Belgium, Flandres.

Sarcodon repandus var. *albus* Quél., Fl. mycol. 447. 1888 ("*repandum* var. *album*"). — *Hydnum repandum* var. *album* (Quél.) Rea, Brit. Basidiomyc. 630. 1922. — Type locality: France.

Hydnum repandum var. *aurantium* Schwalb, Buch d. Pilze 170. 1891. — *Hydnum aurantium* (Schwalb) Schwalb *in* Lotos **13**: 49. 1893; not *Hydnum aurantium* Rafin. *ex* Steud., Nomencl. bot. 202. 1824. — Type locality: Austria?

Sarcodon repandus var. *serotinus* Quél. *apud* Bourd. *in* Rev. sci. Bourbon. Centre France **11**: 233. 1898 ("*repandum* var. *serotinum*"). — *Hydnum repandum* var. *serotinum* (Quél. apud Bourd.) Bourd. & Galz. *in* Bull. Soc. mycol. France **30**: 280. 1914; Hym. France 445. 1928. — Type locality: France, environment of Moulins.

Sistotrema cavinae Vel., České Houby **4–5**: 737. 1922 (Latin descr. by Pilát *in* Op. bot. čech. **6**: 270. 1948). — Type: not seen (PRC).

Hydnum rufescens var. *avellanae* Vel., České Houby **4–5**: 752. 1922. — Part of type: *Hydnum rufescens* var. *avellanae* Vel., Bohemia centr., distr. Říčany u Prahy apud pag. Mnichovice, IX 1918, leg. *Velenovský* (PRC).

Hydnum brunnescens Vel., České Houby **4–5**: 753. 1922 (Latin descr. by Pilát *in* Op. bot. čech. **6**: 275. 1948). — Syntype: *Hydnum brunnescens* Vel., Bohemia centr., distr. Říčany u Prahy apud pag. Mnichovice, VIII 1914, leg. *Velenovský* (PRC).

Hydnum repandum var. *albidum* Cejp *in* F. Fl. čechoslov. **2**: 82. 1928; *in* Bull. internat. Acad. Sci. Bohême **31**: 304. 1930. — Type: *Hydnum repandum* var. *albidum* Cejp, Bohemia centr., distr. Říčany u Prahy, in pineto apud pag. Hrusice, IX 1925, leg. *Velenovský* (PRC).

Hydnum repandum var. *album* Kawamura, Jap. Fungi No. 188. date? (nomen nudum?, see Kawamura, Icon. Jap. Fungi **6**: 609, date?). — Type: not known to be in existence. — Type locality: Japan.

DIAGNOSTIC CHARACTERS.—Carpophores solitary or concrescent. Pileus convex, becoming plane or depressed, surface velvety to finely woolly-felted, glabrescent from centre outwards from collapsing tomentum and becoming somewhat shiny, white, pale flesh colour, salmon or fulvous-orange, margin involute when young, entire or deeply indented, later on expanding, finally undulate. Stipe central to excentric, slender to stocky, equal or fusiform to broadened downwards, minutely tomentose, glabrescent and becoming somewhat shiny with age, cottony at the base from strongly developed mycelial mass, paler than pileus to whitish, ochraceous to rusty yellow-brown at the base and when bruised. Spines lacking in a concentrical zone around top of stipe, or decurrent, white or flesh-coloured when young, nearly concolorous with cap at maturity. Context thick, white in pileus, slowly turning yellowish orange or flesh, yellowish to brownish yellow in base of stipe. Odour indistinct. Taste mild or somewhat acrid or bitter. Hyphae with clamp connections.

Var. REPANDUM

Hydnum repandum L., l.c.
Hydnum rufescens Schaeff., l.c.
Hydnum flavidum Schaeff., l.c.
? *Hydnum squamosum* Schaeff., l.c.
Hydnum clandestinum Batsch, l.c.
Hydnum medium Pers., l.c.
Hydnum bicolor Raddi, l.c.
Hydnum bulbosum Raddi, l.c.
Hydnum roseum Raddi, l.c.
Hydnum repandum var. *denudatum* Fr., l.c.
Hydnum repandum var. *intermedium* Fr., l.c.
Hydnum diffractum Berk., l.c.
Hydnum rufescens var. (*undulato-*)*repandum* Kickx, l.c.
Hydnum repandum var. *aurantium* Schwalb., l.c.
Sistotrema cavinae Vel., l.c.
Hydnum rufescens var. *avellanae* Vel., l.c.

MISAPPLICATION. — *Hydnum imbricatum* sensu Bolt., Hist. Fung. Halifax **2**: 88. 1788; not *Hydnum imbricatum* L., Sp. Pl. **2**: 1178. 1753 = *Sarcodon imbricatus*.

DESCRIPTION.—Donk *in* Med. Nederl. mycol. Ver. **22**: 15. 1933 (*H. repandum*).

ILLUSTRATIONS.—(Except where mentioned otherwise, all given as *Hydnum repandum*.) Atkinson, Mushrooms fig. 187. 1900; second ed., fig. 198. 1901 (photogr.; good); Badham, Escul. Fung. England pl. 12 fig. 3. 1847 (passable); Barla, Champ. Prov. Nice pl. 39 fig. 1–9. 1859 (passable); Batsch, Elench. Fung. pl. 10 fig. 44. 1783 (*Hydnum carnosum*; mediocre); Bel, Champ. sup. Tarn pl. 7. 1889 (passable); Bresadola, Icon. mycol. **21**: pl. 1044 (good), pl. 1046 (*Hydnum rufescens*; good). 1932; Bulliard, Herb. France pl. 172. 1783 (good); Coker *in* J. Mitchell sci. Soc. **34**: pl. 2. 1919 (photogr.); Coker & Beers, Stip. Hydn. east. U.S. pl. 11. 1951 (photogr.); Cordier, Champ., Quatr. éd., pl. 43. 1876 (good); Dumée, Nouv. Atl. Champ. comest. vén., Deux. éd., pl. 52. 1909 (fairly good); Favre-Guillarmod, Champ. comest. **1**: pl. facing p. 43. 1869 (fairly good); Fl. batava **18**: pl. 1430. 1889 (fairly good); Fries, Sverig. ätl. gift. Svamp. pl. 15. 1860 (good); Gillet, Champ. France pl. 322 (fairly good), 323 (*Hydnum rufescens*; fairly good). 1878–1890; Gramberg, Pilze Heimat **2**: pl. 29. 1913 (good); Greville, Scot. cryptog. Fl. **1**: pl. 44. 1823

(good); Haas & Gossner, Pilze Mitteleurop. Speisepilze **1**: pl. 35. 1951 (good); Harzer, Naturgetr. Abb. essb. gift. verdächt. Pilze pl. 23 (mediocre), 64 (*Hydnum repandum* var. *flavidum*; mediocre). 1842; Hussey, Illustr. Brit. Mycol. **1**: pl. 16. 1847 (good); Jaccotet & Robert, Champ. dans la Nature, Quatr. éd., pl. 64. 1948 (good); Jahn, Pilze rundum pl. 1 fig. 5. 1949 (fairly good); Kawamura, Icon. Jap. Fungi **6**: fig. 606. date? (uncertain); Krombholz, Naturgetr. Abb. Beschr. essb. Schw. **7**: pl. 50 fig. 1–9. 1841 (fairly good); Lenz, Abb. nützl. schädl. Schw. pl. 12 fig. 51. 1831 (good); Leuba, Champ. comest. pl. 37 fig. 1–4. 1890 (good); Lorinser, Essb. verdächt. gift. Schw., 3 Aufl., pl. 3 fig. 5. 1883 (good); Maublanc, Champ. France, Quatr. éd., **2**: pl. 192 (larger specimens). 1952 (good); Michael-Schulz, Führer Pilzfr. **1**: pl. 100. 1927 (good except for colour); Nannfeldt & Du Rietz, Vilda Växter i Norden, Andra revider. och komplett. upplagan, pl. 123. 1952 (good); Pabst, Cryptog.-Fl. **2**: pl. 22. 1875 (passable); Peck *in* Rep. N.Y. State Mus. **48**: pl. 38. 1895 (stipe somewhat slender); Pilát & Ušák, Naše Houby pl. 15. 1952 (good); Richon & Roze, Atl. Champ. pl. 65 fig. 1–3. 1888 (passable); Rolland, Atl. Champ. France pl. 100 fig. 222. 1910 (good); Roques, Hist. Champ. pl. 2 fig. 2. 1832 (passable); Schaeffer, Fung. Icon. **2**: pl. 141 fig. 1, 4–10. 1763 (*Hydnum rufescens*; good); **4**: pl. 318. 1770 (*Hydnum flavidum*; passable); Schwalb, Buch d. Pilze pl. 14 fig. 6. 1891 (passable); Schwalb *in* Lotos **13**: 49. 1893 (*Hydnum aurantium*; passable); A. H. Smith, Mushroom Hunter's Field Guide fig. on p. 53. 1958 (photogr.; good); Sowerby, Col. Fig. Engl. Fungi **2**: pl. 17. 1799 (good); Thijsse, Paddestoelen pl. 64. 1929 (fairly good); Trog, Schw. d. Wald. pl. 7 fig. 4–5. 1848 (passable); Velenovský, České Houby **4–5**: pl. 129 fig. 1. 1922 (*Sistotrema cavinae*; upside-down, anomalous); Vittadini, Descr. Fung. mang. Ital. pl. 25 fig. 2. 1835 (zones on pileus incorrect); Wakefield & Dennis, Common Brit. Fungi pl. 103 fig. 4. 1950 (passable); Walty, Schweiz. Pilztaf. **3**: pl. 63. 1947 (good); Zeitlmayr, Knaurs Pilzb. fig. 61. 1955 (good).

DIAGNOSTIC CHARACTERS.—Pileus pale flesh or pale salmon to bright orange. Stipe excentric, stocky. Spines usually stopping at some distance from the stipe. Taste more or less bitter (somewhat acrid, according to Barla, Champ. Prov. Nice 80. 1859).

HABITAT.—On humous or clayey, subacid to probably even basic soils in deciduous woods, especially of *Quercus*, less frequently also under *Pinus*.

DISTRIBUTION.—Known from various parts of the country, including the dunal region, but not common.

ILLUSTRATIVE COLLECTION.—G e l d e r l a n d: Rheden, De Steeg, "Middachten", 7 IX 1957, *Maas G. 12362* (L).

EXSICCATI.—(All given under the name of *Hydnum repandum*.) Brinkmann, Westfäl. Pilze, Lief. 2: 96 (K, L); Klotzsch, Herb. viv. mycol. 229 (L); Kryptog. exs. vindob. 314 (K, L, PR); Lundell & Nannfeldt, Fungi exs. suec. praes. upsal. 354 (C, PR); Petrak, Fl. Bohem. Morav. exs., ser. 2 (1): 6, 48 (PR); Rabenhorst, Herb. mycol. 9 (L); Saccardo, Mycoth. ital. 810 (L, PR); Sydow, Mycoth. germ. 1307 (C, K, L, PR).

Var. RUFESCENS (Fr.) Barla

Hydnum carnosum Batsch, l.c.
Hydnum rufescens Fr., l.c.
? *Sarcodon repandus* var. *serotinus* Quél. apud Bourd., l.c.
MISAPPLICATION.—*Hydnum repandum* sensu Bolt, Hist. Fung. Halifax **2**: 89. 1788.

DESCRIPTION.—Persoon, l.c.

ILLUSTRATIONS.—Barla, Champ. Prov. Nice pl. 39 fig. 10–12. 1859 (*Hydnum repandum* var. *rufescens*; good; scales on pileus exaggerated?); Batsch, Elench. Fung. Cont. prima pl. 26 fig. 136. 1786 (*Hydnum carnosum*; fairly good); Maublanc, Champ. France, Quatr. éd., **2**: pl. 192 (smaller specimen). 1952 (*Hydnum repandum* var. *rufescens*; good); Patouillard, Tab. anal. Fung. **2**: fig. 147. 1883 (*Hydnum repandum* var. *rufescens*; good); Persoon, Icon. pict. pl. 19 fig. 1. 1803–1806 (*Hydnum rufescens*; fairly good); Richon & Roze, Atl. Champ. pl. 65 fig. 5–6. 1888 (*Hydnum rufescens*; fairly good); Schaeffer, Fung. Icon. **2**: pl. 141 fig. 2–3. 1763 (*Hydnum rufescens*; good).

DIAGNOSTIC CHARACTERS.—Pileus fulvous-orange. Stipe central, slender. Spines often decurrent. Taste stated to be mild (Huber *in* Z. Pilzk. **9**: 148. 1930) or acrid (Richon & Roze, Atl. Champ. 209. 1888).

HABITAT.—Probably the same as of var. *repandum*.

DISTRIBUTION.—Definitely rare.

ILLUSTRATIVE COLLECTION.—Gelderland: Rheden, De Steeg, "Middachten", 8 IX 1957, *Maas G. 12372* (L).

AUTHENTIC MATERIAL.—*Hydnum rufescens*, Gallia (L 910.263–1347); *Hydnum rufescens*. var. *H. repandi*?, ex Calabria? (L 910.263–1336); *Hydnum rufescens*, misit Mougeot (L 910.262–635).

EXSICCATI.—Kavina & Hilitzer, Cryptog. čechoslov. exs. 250 (*Hydnum repandum* var. *rufescens*; PR); Kryptog. exs. vindob. 315 (*Hydnum rufescens*; L, PR); Lundell & Nannfeldt, Fungi exs. suec. praes. upsal. 355 (*Hydnum rufescens*; C, PR).

Var. ALBUM (Quél.) Rea

Hydnum pallidum Raddi, l.c.
? *Hydnum album* Pers., l.c.
Sarcodon repandus var. *albus* Quél., l.c.
Hydnum brunnescens Vel., l.c.
Hydnum repandum var. *albidum* Cejp, l.c.
Hydnum repandum var. *album* Kawamura, l.c.
MISAPPLICATION.—*Hydnum repandum* var. *albidum* (Peck) Bres., Icon. mycol. **21**: text to pl. 1045. 1932 (see Coker & Beers, Stip. Hydn. east. U.S. 18. 1951).

DESCRIPTIONS.—Coker & Beers, Stip. Hydn. east. U.S. 17. 1951; Quélet, l.c.

ILLUSTRATIONS.—Bresadola, Icon. mycol. **21**: pl. 1045. 1932 (*Hydnum repandum* var. *albidum*); Coker *in* J. Mitchell sci. Soc. **41**: pl. 55. 1926 (*Hydnum albidum*); Kawamura, Icon. Jap. Fungi **6**: fig. 607. date? (*Hydnum repandum* var. *album*).

DIAGNOSTIC CHARACTERS.—White to creamy in all parts.

HABITAT.—Said to occur in woods.
EXSICCATI.—None.

Of the varieties of *Hydnum repandum* accepted in the present paper, var. *rufescens* is no doubt the most disputed one from a taxonomical point of view. From what I have seen of living material during a short stay in France, I am inclined to regard '*rufescens*' as a variety, with the understanding that even so there may be cases in which it is difficult to place the specimens.

Nomenclaturally, var. *rufescens* is equally difficult. In his 'Observationes' Persoon cited the following synonyms under *Hydnum rufescens*, (1) *Hydnum repandum* Bolt. (wrong number of plate), with the annotation "hujus loci est," (2) *Hydnum carnosum* Batsch, with a question-mark since, apparently, he considered the stipe [too] heavy, and (3) *Hydnum rufescens* Schaeff., pl. 141 fig. 2–3, also with a question-mark. From these quotations it is clear that Persoon, although adopting Schaeffer's specific epithet, had a very definite idea as to how *H. rufescens* should be conceived, which is exemplified by the material in his herbarium. He excluded most of the figures of Schaeffer's plate, referring them to *H. repandum*. One might, therefore, speak of *Hydnum rufescens* Schaeff. sensu Persoon, the type of which would be represented by Schaeffer's Plate 141 fig. 2–3.

Fries (1821: 401) adhered to Persoon's views, which is evidenced by the fact that his diagnosis of *Hydnum rufescens* is almost word for word identical with Persoon's, but, most unfortunately, he excluded the latter's type by citing Schaeffer's plate in its entirety under *H. repandum*. Thus, Fries described a different species, based on a different type. Since he referred to Persoon, this type should be sought with the latter. In Herb. Persoon there are three sheets containing eight specimens, seven of which agree very well with the figures 2 and 3 of Schaeffer's plate. None of these specimens, however, represent the type since the collections (two from France, one probably from Calabria, Italy) were received by Persoon at a time long after his 'Observationes' had been published. Therefore, although the specimens, authenticated by the author, embody Persoon's conception of *Hydnum rufescens*, there seems no solution left, other than to state that there is no type, Germany being the type locality.

Von Keissler (*in* Ann. naturhist. Hofmus. **31**: 108. 1917) who reported on his revision of the fungi of Sauter's herbarium, pointed out that, although *Hydnum roseum* Saut. was quoted by Schiedermayr (*in* Österreich. bot. Z. **27**: 6. 1877), no publication of the name could be traced. Obviously, *H. roseum* is a herbarium name.

For the sake of completeness var. *album* has been included in the present paper, but no finds have ever been recorded for this country. *Hydnum album* Pers. has tentatively been ranged here, but it is impossible to extract conclusive proof from the meagre description, and Micheli's figure to which Persoon refers is of no great help.

Previous to Persoon, Fries had also published a *Hydnum album*, equally based on Micheli's figure. From the fact that no reference was made to Fries, it may be derived that Persoon published his species independently. It is significant that, while Persoon gave a description of his own, and definitely rejected the idea expressed by Haller and Linnaeus of *H. album* being a variety of *H. imbricatum*, Fries only referred to Micheli's description, having no opinion of his own.

Hydnum squamosum Schaeff., on the identity of which I was very much in doubt on an earlier occasion (1956: 57), may very well represent a small, squat form of var. *repandum* hampered in its growth by drought. The colour of the pileus in Schaeffer's plate, as I could ascertain on French material, is by no means unusual, while its ruptured surface suggests the result of a spell of dry weather.

Hydnum diffractum Berk., of which I could study the type thanks to the gracious permission of the Director of the Kew Herbarium, is identical with *Hydnum repandum* var. *repandum*. The general habitus of the fruit-body, the colour and texture of the pileus, the hyaline, broadly ellipsoid spores measuring 7–8 × 5.5–6 μ, and the clamped hyphae prove its identity.

The very short description of *Sarcodon repandus* var. *serotinus*, "Roussâtre; stipe grêle, farci; hyménium déprimé autour du stipe," makes it difficult to decide where this variety should be placed. I chose var. *rufescens* as its nearest relative on account of its slender stipe.

On the strength of an annotation by Pilát (1942: 473, and 1952: text to pl. 15), *Sistotrema cavinae* Vel. is reduced to synonymy as it is nothing but an anomalous form of var. *repandum*.

The type specimen of *Hydnum rufescens* var. *avellanae* which is a fragment of the pileus taken from the marginal region, is pale yellowish. From this it would seem that var. *avellanae* is better placed with var. *repandum*, even if it is true that Velenovský described the fruit-body as having the spines decurrent on a slender stipe.

Various older authors cited '*Hydnum sinuatum* Bull.' under the synonymy of *Hydnum repandum*. The quotation is incorrect, Bulliard never used this epithet. No doubt, however, the error finds its source in the fact that Bulliard apart from the Latin name also mentioned "Hydne sinué" which is the French name for the species.

SISTOTREMA Fr. em. Donk

Sistotrema Fr., Syst. mycol. **1**: 426. 1821; Elench. Fung. **1**: 141. 1828; Epicr. Syst. mycol. 520. 1838; Hym. europ. 618. 1874; em. Donk *apud* D. P. Rogers *in* Univ. Iowa Stud. nat. Hist. **17**: 19. 1935; *in* Fungus **26**: 4. 1956; not *Sistotrema* Pers. *ex* Pers., Mycol. europ. **2**: 191. 1825. — *Hydnotrema* Link, Handb. Gewächse **3**: 298. 1833 (name change). — Type species: *Sistotrema confluens* (Pers.) ex Fr.

Sistotrema S. F. Gray, Nat. Arrang. Brit. Pl. **1**: 648. Nov. 1821 ("Persoon"). — Type species: *Sistotrema confluens* (Pers.) ex Fr. (selected).

Sistotrema [sect.] *Eusistotrema* J. Schroet. *in* Cohn, Krypt.-Fl. Schles. **3** (1): 463. 1888. — Type species: *Sistotrema confluens* (Pers.) ex Fr.

Carpophore resupinate or, rarely, pileate and more or less stipitate, thin to membranous, soft, white to cream or yellowish, darkening with age. Context homogeneous. Hymenium smooth, poroid, or covering lamellate teeth. Basidia urniform at some or the final stage of development, 4–8 (mostly 6–)-spored. Spores subcylindrical to subglobose, smooth to minutely asperulate, white in mass. Hyphae usually with clamp connections.

Apart from the two Sistotremas so differently conceived by Persoon and Fries, there exists a third described by S. F. Gray. This author ascribed his *Sistotrema* to Persoon, but since he removed the type-species *S. cinereum* to the genus *Cerrena*, *Sistotrema* S. F. Gray is not identical with *Sistotrema* Persoon. Both genera have one species in common, viz. *S. confluens*, and this is here selected as the type species for Gray's genus.

The result is that, although *Sistotrema* Fr. and *Sistotrema* S. F. Gray are homonymous, they are no homonyms according to the definition of Art. 64, since they are based on the same type.

SISTOTREMA CONFLUENS (Pers.) ex Fr.

Hydnum sublamellosum Bull., Herb. France (legend to) pl. 453 fig. 1. 1789; Hist. Champ. France 306. 1791; *ex* St.-Amans, Fl. agen. 546. Apr. 1821; G. F. Re, Fl. pedemont. Append. 50. 1821. — *Sistotrema sublamellosum* (Bull. ex St.-Amans) Quél. *in* Assoc. franç. Avanc. Sci. **24**: 621 (6 of reprint). 1896. — Type: represented by Bulliard, Herb. France pl. 453 fig. 1. 1789.

Sistotrema confluens Pers. *in* Neues Mag. Bot. **1**: 108. 1794; Syn. meth. Fung. **2**: 551. 1801. — *Sistotrema confluens* (Pers.) *ex* Fr., Syst. mycol. **1**: 426. 1821; Epicr. Syst. mycol. 520. 1838; Hym. europ. 619. 1874. — *Hydnotrema confluens* (Pers. ex Fr.) Link, Handb. Gewächse **3**: 298. 1833. — *Irpex confluens* (Pers. ex Fr.) Kummer, Führ. Pilzk. 49. 1871. — Type: *Sistotrema confluens*. Prope Gottingam lectum (L 910.270–681).

Sistotrema membranaceum Oud. *in* Nederl. kruidk. Arch., ser. 2, **3**: 250. 1879; **6**: 25. 1892; Revis. Champ. Pays-Bas **1**: 406. 1892; not *Sistotrema membranaceum* C. Nees, Syst. Pilze Schw. 227. 1816 ("*Systotrema*") = *Serpula pinastri* (Fr. ex Fr.) W. B. Cooke. — *Sistotrema confluens* f. *membranaceum* (Oud.) P. Karst. *in* Rev. mycol. **3** (No. 9): 19. Jan. 1, 1881; Killerm. *in* Denkschr. bayer. bot. Ges. Regensburg **15**: 48. 1922. — *Sistotrema confluens* subsp. *membranaceum* (Oud.) P. Karst. *in* Medd. Soc. F. Fl. fenn. **6**: 14. 1881. — *Sistotrema confluens* var. *membranaceum* (Oud.) P. Karst. *in* Bidr. Känn. Finl. Nat. Folk **37**: 84. 1882. — Type: *Sistotrema membranaceum* Oud. Ad folia, ramos, muscos; juxta vias prope Baarn; 17 m. Oct. a° 1878; legi *ipse* (GRO).

Irpex anomalus Wettst. *in* S. B. kais. Akad. Wiss. math.-naturwiss. Cl. **94** (1): 62. 1887. — Type: represented by Wettst. *in* S. B. kais. Akad. Wiss. math.-naturwiss. Cl. **94** (1): pl. 1 fig. 1–9. 1887.

DESCRIPTION.—Coker & Beers, Stip. Hydn. east. U.S. 3. 1951

ILLUSTRATIONS.—(If not mentioned otherwise, all given as *Sistotrema confluens*.) Bail, Syst. Pilze pl. 29 middle row, right hand fig. 1858 (good); Boudier, Icon. mycol. **1**: pl. 169. 1904–1910 (good); Bulliard, Herb. France pl. 453 fig. 1. 1789 (*Hydnum sublamellosum*; very good); Coker *in* J. Mitch. sci. Soc. **41**: pl. 63. 1926; **64**: pl. 22. 1948 (photogr.); Coker & Beers, Stip. Hydn. east. U.S. pl. 1 upper fig. 1951 (photogr.); Fl. batava **26**: pl. 2004. 1924 (passable); Greville, Scot. cryptog. Fl. **5**: pl. 248. 1827 (very good); Konrad & Maublanc, Icon. sel. Fung. **5**: pl. 426

fig. 1. 1935 (fairly good); Patouillard, Tab. anal. Fung., Fasc. 3: fig. 248. 1884 (good); Sowerby, Col. Fig. Engl. Fungi **1**: pl. 112. 1797 (*Hydnum sublamellosum*; very good); von Wettstein *in* S. B. kais. Akad. Wiss. math.-naturwiss. Cl. **94** (1): pl. 1 fig. 1–3. 1887 (*Irpex anomalus*; fairly good).

DIAGNOSTIC CHARACTERS.—Carpophores often confluent, at times resupinate. Pileus depressed to umbilicate, orbicular or, more often, flabelliform, surface finely tomentose, glabrescent, smooth, not zonate, white, becoming yellowish, margin involute, expanding with age, entire or lobed. Stipe central or, more frequently, lateral, slender or very short to nearly absent, tapering downwards, finely tomentose, glabrescent, usually binding vegetable matter, concolorous with pileus. Hymenium at first (always?) irregularly reticulately ridged or poroid, the ridges or dissepiments gradually growing out to decurrent, flattened spines or interrupted plates; whitish to yellowish. Context homogeneous, fleshy-fibrous, shrinking on drying, soft throughout, white. Hyphae with clamp connections.

HABITAT.—Among needles and on humus in coniferous and mixed woods.

DISTRIBUTION.—In central and eastern parts of the country, nowhere common in former days, decidedly rare in recent times.

ILLUSTRATIVE COLLECTION.—G e l d e r l a n d: Apeldoorn, IX 1894, C. A. J. A. Oudemans (*S. membranaceum*; L).

EXSICCATI.—Klotzsch, Herb. viv. mycol. 1117 (L); Oudemans, Fungi neerl. exs. 235 (*S. membranaceum*; GRO); Rabenhorst, Fungi europ. 310, 310b, 1409 (L); Sydow, Mycoth. germ. 1825 (L).

From the collections examined, the impression may be gained that under circumstances at least parts of the carpophore of *Sistotrema confluens* present themselves as a resupinate fungus. Several of the carpophores on which Oudemans based his *Sistotrema membranaceum* appear to be entirely resupinate. Lundell, on the other hand, states (1947: 11) that *S. muscicola* (Pers.) Lundell, which usually develops resupinately, may in exceptional cases form pileate and stipitate carpophores. I would not know how to distinguish these extreme forms of both species except for the fact that the habitat seems to be different.

The odour of *S. confluens* has been variously appreciated. Greville (1827: 248) described the species as scentless, Coker & Beers (1951: 3) found the odour to be faint, Donk (1931: 148) described the odour as rancid, Bourdot & Galzin (1928: 437) and Konrad & Maublanc (1935) as resinous or of salol (see also Gilbert, 1933: 248), Lundell (1947: 11) as of vanilla. As I have never seen fresh specimens, I can offer no opinion myself.

The attention may be drawn to *Polyporus rutrosus* Rostk. (*in* Sturm, Deutschl. Fl., Abt. 3, Pilze Deutschl. **28**: 43, pl. 22. 1848) which Bresadola (*in* Ann. mycol. **14**: 227. 1916) regarded as identical with the present species. Here again I have no opinion of my own.

Sistotrema confluens f. *thelephoroides* Höhn. (*apud* Strasser *in* Verh. zool.-bot. Ges. Wien **68**: 114. 1918) was shown by Lundell (1947: 52) to be identical with *Cotylidia vitellina* (Plowr.) Lundell.

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