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Lachnum pygmaeum and the Status of the Genus *Helolachnum*

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Studies in the Genus *Helotium*—II.

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W. Lawrence White*

The taxonomic literature on the inoperculate Discomycetes has always been, and still is, so unorganized, and the published species descriptions are so incomplete, that for the general student or even one more or less specialized in the group to find himself confronted with the alternatives of giving his material a new name or not recording it at all appears to be the rule. Attributable perhaps in equal measure to both is the status—taxonomic, nomenclatural, and distributional—of the single species under consideration in the present paper. Though this species very probably is common and widely distributed and certainly is possessed of a combination of characters that should place it among the most easily recognizable of species, it nevertheless has been described as new at least fourteen times and through generic transfers has accumulated some forty-five synonyms, while the total number of collections recorded would doubtless equal little more than half the latter number. For the most part these specific epithets have been preserved from oblivion through the efforts of such compilers as Boudier,¹ Saccardo, and a few others who have perpetuated them in the literature merely as such, and fortunately in a surprisingly large number of cases—in all save two out of the fourteen—by the preservation of the type specimens which have been available for reexamination either by the writer or by some other modern worker, Nannfeldt in particular.

The present study is largely one of synonymy. The generic disposition of the single species involved is largely by arbitrary choice, and until a better basic systematology of the inoperculates permits a more acceptable disposition of the numerous forms now badly placed, perhaps the taxonomic placement of this one species is not important. Many writers, regardless of the name under which they considered it, have commented upon the similarity of certain of its characters to those of species of *Helotium* on the one hand and to those of *Lachnum* or the Lachneae on the other. In general aspect it immediately would be referred to *Helotium*. On turning the beautiful and accurate plates of Boudier and finding it among such species as *H. fructigenum* (Bull.) Karst., *H. consobrinum* Boud., and *H. tuba* (Bolt.) Fr. one would scarcely be led to doubt that in a sound phylogenetic scheme it belonged there. Torrend (Broteria 9:53. 1910), believing that he was working with a new species, and noting independently the same characters which had brought so many puzzled comments from previous workers, erected for his form a new genus, *Helolachnum*, and

described the species as *H. aurantiacum*. Should future phylogenetic arrangement necessitate the segregation of this species, either with or without allied forms, then Torrend's generic name will still be available for consideration; its recognition at present however, as distinct from *Helotium* or *Lachnum*, does not appear to serve any useful purpose. On close examination the apothecia are found to be clothed with the rough clavate hairs of the Lachneae, however sparse and inconspicuous they may be under a hand lens, to exhibit a pronounced tendency toward the development of long lance-pointed paraphyses, and to have small narrow asci, and small narrow spores—a combination of characters which, together with certain others, set apart those species usually placed in the genus *Lachnum*. Because of these characters the writer supports Nannfeldt's (Morph. Syst. Discom., p. 260. 1932) relegation of *Helolachnum* to synonymy under *Lachnum*, the species to be known as *L. pygmaeum* (Fr.) Bres.

This raises a question of phylogeny and generic concepts in the inoperculates, or more particularly in the families Hyaloscyphaceae and Helotiaceae of the system of Nannfeldt. The problem that is involved in connection with the formidably large genus *Helotium* might be illustrated by an example from the lower Hymenomycetes where evolutionary and taxonomic criteria appear to be less obscure or else where because of greater interest and effort they have come to be better understood. Rogers (Univ. Iowa Stud. Nat. Hist. 17:3. 1935), working with the Basidiomycetes, notes that "the genus *Corticium* has perhaps more than any other genus of the hymenomycetes been made up of a heterogeneous accumulation of species having little in common but the lack of any character sufficiently obvious and striking to furnish the basis for segregation." It appears that after obvious characters had been found for the segregation of such genera as *Stereum*, *Peniophora*, *Odontia*, *Radulum*, *Grandinia*, *Sistotrema*, and others—some of them natural and others merely form genera—there was left over a heterogeneous mass of elements of relatively simple morphology which were formerly thrown together in *Corticium*. More recently additional fundamental characters have been found which separate *Corticium* into several series with lines leading into such genera as those mentioned above. It is highly probable that within a certain large group of the inoperculate Discomycetes, *Helotium* occupies a position comparable to that occupied by *Corticium* in the lower Hymenomycetes. That is, it comprises a large assemblage of species, almost surely a heterogeneous lot, held together by a lack of characters: lack of any conidial stage, obvious sexual structures, stromata, hairs or markings on the apothecium, teeth or setae on the margin of the disc, tissue differentiation in the context of the disc, differentiation of the paraphyses, or color, septation or sculpturing of the ascospores. The writer has spent some time in studying the lower Hymenomycetes and an even greater amount of time in the helotiaceous fungi, but has failed to find in the latter group any equally valid basis for speculation on the subject of phylogeny and relationships. Assuming that in the systematology of the Helotiales *Helotium* offers to the student of that group problems comparable to those offered by *Corticium* to the student of the Hymenomycetes, it seems that actually the key to their solution is relatively more obscure. Until a more fundamental basis for segregation can be found,

* Contribution from the Laboratories of Cryptogamic Botany and the Farlow Herbarium, Harvard University, No. 207.

¹ Text references are to be found in the synonymy list.

the genus *Helotium* must be recognized in its present broad sense as embracing all the members of the Helotiales that are of waxy texture, are light-colored, have a simple prosenchymatous disc tissue, and lack any sufficiently striking character to place them elsewhere. It will thus to a large extent at least be comparable to *Corticium* and *Polyporus* as these genera have been recognized in America, and perhaps, though not certainly so, will to the same extent be unnatural. If the *Hyaloscyphaceae* (Nannfeldt), which are characterized principally by having the apothecia clothed with hairs, be considered derived from the morphologically simpler forms now in *Helotium*, then the single much-named species under consideration in the present paper may be considered intermediate in a phyletic series from *Helotium* to *Lachnum*; and it is possible that the genus *Lachnum* or at least the family in which it is placed, the *Hyaloscyphaceae*, may be derived in several natural series from various sections of our present *Helotium*.

On the following pages is presented a synonymy of the species with a complete literature record as far as is known to the writer, also a brief taxonomic description with certain summarizing data on occurrence and distribution; the thirteen original epithets are then taken up in chronological order and the evidence for their inclusion in the synonymy is presented along with certain other pertinent information. The writer in preparing the paper has not been unmindful of the possibility that future workers may not agree with him on the question of synonymy; an attempt is made therefore to organize the information in such a way that should it become necessary to remove any name from the list, its accompanying data concerning substrata, distribution, etc., may quite easily be removed with it.

After the elimination of numerous species that obviously belong in other genera there still remain in *Helotium* at least five hundred species that will have to be allowed to stand as valid until they can be reworked and reduced to synonymy or shown to belong elsewhere. The taxonomic criteria that are available for the delimitation and identification of these species are few and are of a type that may not be relied upon too closely; they are chiefly size, shape, and color of the apothecium, and size and shape of the ascospores. When a monograph of the group is finally prepared, such lists of synonymy as the one presented in this paper in all probability will not be uncommon.

LACHNUM PYGMAEUM (Fries) Bresadola, Ann. Myc. 1:121. 1903

Peziza pygmaea Fr. Syst. Myc. 2:79. 1822; Fr. Summa Veg. Scand. 351. 1849; Berk. & Br., Ann. Mag. Nat. Hist. 3: 15: 445, pl. 15, fig. 18a-b. 1865; Berk. Trans. Linn. Soc. 25: 432, pl. 55, fig. 7-13. 1866; Cooke, Handb. Brit. Fungi 679. 1871; Quél. Champ. Jura et Vosges 2: pl. 5, fig. 5. 1873; Bucknell, Proc. Bristol Nat. Soc., n.s. 4(1): 58. 1883.

Helotium luteolum Currey. Trans. Linn. Soc. 24: 153, pl. 25, fig. 11-12. 18. 1864; Berk. & Br. Ann. Mag. Nat. Hist. 3: 15: 446. 1865; Cooke, Handb. Brit. Fungi 710. 1871; Massee, Brit. Fung. Fl. 4: 240. 1895; Massee & Cr. Fung. Fl. Yorkshire 281. 1905; Buckley, Brit. Myc. Soc. Trans. 6: 346. 1920; Ramsb. Brit. Myc. Soc. Trans. 17: 156. 1932.

Helotium rhizophilum Fckl. Fungi Rhen. Exsicc. 1598. 1865; Cooke, Handb. Brit. Fungi 714. 1871; Gill. Champ. Fr. Discom. 156. 1879; Quél. Bull. Soc. Bot. Fr. 26: 234. 1879; Pat. Tab. Anal. Fung. 35, fig. 590a-e. 1886; Quél. Enchr. Fung. 308. 1886; Sacc. Syll. Fung. 8: 251. 1889; Boud. Icon. Myc. 449, fig. a-k. 1905-10; Boud. Hist. Classif. Discom. Eu. 113. 1907; Nannf. Morph. Classif. non-Lich. Inop. Discom. 262. 1932; Povah, Papers Michigan Acad. 20(1934):128. 1935.

Ciboria rhizophila (Fckl.) Fckl. Symb. Myc. 312. 1869; Rehm, in Rabh. Krypt.-Fl. 1(3):761. 1893; Migula, in Thomé's Krypt.-Fl. 10(2): 1064. 1913; Nannf. Brit. Myc. Soc. Trans. 23: 240. 1939.

Helotium pygmaeum (Fr.) Karst. Symb. Myc. Fenn. I, 214. 1871; Karst. Myc. Fenn. pars prima Discom. 153. 1871; Boud. Hist. Classif. Discom. Eu. 113. 1907; Le Gal, Revue de Mycologie 3: 144. 1938.

Helotium tuba (Bolt. ex Fr.) Fr. b. *ochracea* Berk. & Br. nom. nud. Ann. Mag. Nat. Hist. 4: 15: 38. 1875.

Lachnea pygmaea (Fr.) Gill. Champ. Fr. Discom. 71. 1897. [Non *L. pygmaea* Sacc. & Syd. In Sacc. Syll. Fung. 14: 755. 1899.]

Peziza (*Dasyp.*?) *nuda* Phill. & Plowr. Grevillea 8: 101. 1880; Scott. Nat. 6: 124. 1881.

Helotium (*Pelastea*) *affinissimum* Peck, Ann. Rep. N. Y. State Mus. 33 (1880): 32. 1883.

Erinella pygmaea Quél. Enchr. Fung. 303. 1886.

Hymenoscypha tuba (Bolt. ex Fr.) Phill. var. *ochracea* (Berk. & Br.) Phill. Brit. Discom. 126. 1887.

Hymenoscypha Hedwigii Phill. Brit. Discom. 130. 1887.

Hymenoscypha rhizophila (Fckl.) Phill. Brit. Discom. 144. 1887.

Lachnella pygmaea (Fr.) Phill. Brit. Discom. 242. 1887.

Lachnella nuda (Phill. & Plowr.) Phill. Brit. Discom. 247. 1887.

Lachnella luteola (Currey) Phill. Brit. Discom. 247. 1887.

Ciboria carniolica Rehm apud Voss, Zool. Bot. Ges. Wien 37:226, pl. 5, fig. 1a-b. 1887; Rehm. Hedwigia 27:164. 1888; Voss, Myc. Carn. part 3, 211. 1891; Boud. Hist. Classif. Discom. Eu. 106. 1907.

Helotium rhizogenum Ellis & Ev. Journ. Myc. 4: 100. 1888; Sacc. Syll. Fung. 8: 250. 1889; Ellis, Cat. New Jersey Pl. 550. 1890; Pound, Clements et al., Bot. Survey Nebraska 4: 42. 1896.

Helotium Phillipsii Sacc. Syll. Fung. 8: 220. 1889.

Phialea Hedwigii (Phill.) Sacc. Syll. Fung. 8: 260. 1889.

Phialea affinissima (Peck) Sacc. Syll. Fung. 8: 272. 1889.

Dasyscypha pygmaea (Fr.) Sacc. Syll. Fung. 8: 436. 1889; Massee, Brit. Fung. Fl. 4: 353. 1895; Seaver, Proc. Iowa Acad. 12: 116. 1905; Seaver, Bull. Lab. Nat. Hist. St. Univ. Iowa 6: 97, pl. 24, fig. 3a-d. 1910; Bieby, Fungi of Manitoba & Saskatch. 39. 1938.

Dasyscypha pygmaea (Fr.) Sacc. forma *prolifera* (Berk. & Br.) Sacc. Syll. Fung. 8: 436. 1889; Trans. Linn. Soc. 25: 432, pl. 55, fig. 7-13. 1866. As *Peziza pygmaea*.

Dasyscypha luteola (Currey) Sacc. Syll. Fung. 8: 440. 1889; Boud. Hist. Classif. Discom. Eu. 119. 1907; Nannf. Brit. Myc. Soc. Trans. 23: 241. 1939.

Hymenoscypha flexipes (Cooke & Phill.) Sacc. Syll. Fung. 10: 9. 1892.

Ciboria pygmaea (Fr.) Rehm. In Rabh. Krypt.-Fl. 1(3): 760. 1893; Feltg. Vorst. Pilz-Fl. Luxemb. 1(3): 44. 1903; Maenus, Die Pilze von Tirol 387. 1905; Migula, in Thomé's Krypt. Fl. 10(2): 1067. 1913; Dodge, Trans. Wisconsin Acad. Sci. 17(2): 1033. 1914.

Helotium Hedwigii (Phill.) Massee. Brit. Fung. Fl. 4: 243. 1895; Boud. Hist. Classif. Discom. Eu. 113. 1907; Nannf. Brit. Myc. Soc. Trans. 23:243. 1939.

Ciboria ochracea Masee, Brit. Fung. Fl. 4: 276. 1895; Nannf. Brit. Myc. Soc. Trans. 23: 240. 1939.

Helotium nudum (Phill. & Plowr.) Masee, Brit. Fung. Fl. 4: 498. 1895.

Phialea arenicola Ellis & Ev. Amer. Nat. 31: 426. 1897; Lindsay and Syd. Hedwigia 37(7): 36. 1898; Sacc. & Syd. Syll. Fung. 14: 768. 1899.

Calycina rhizogena (Ellis & Ev.) Kuntze, Rev. Gen. Pl. 3(2): 449. 1898.

Hymenoscyphus affinis (Peck) Kuntze, Rev. Gen. Pl. 3(2): 485. 1898.

Lachnum Hedwigii (Phill.) Bres. Ann. Myc. 1: 121. 1903.

Ciboria carbonaria Feltg. Vorst. Pilz.-Fl. Luxemb. 1(3): 44. 1903; von Höhn. Sitz.-ber. Akad. Wien. 115. Abt. 1, 1286 (98). 1906; Vel. Monogr. Discom. Bohem. 1: 219; 2: pl. 22, fig. 12. 1934.

Lachnum pygmaeum (Fr.) Bres. Ann. Myc. 1: 121. 1903; Nannf. Morph. Syst. non-Lich. Inop. Discom. 262. 1932; Nannf. Brit. Myc. Soc. Trans. 23: 240, 241, 243, 244. 1939.

Helotium carbonarium (Feltg.) Boud. Hist. Classif. Discom. Eu. 113. 1907.

Helotium pygmaeum (Fr.) Karst. var. *proliferum* (Berk. & Br.) Boud. Hist. Classif. Discom. Eu. 113. 1907.

Helotium flexipes (Cooke & Phill.) Boud. Hist. Classif. Discom. Eu. 114. 1907; Nannf. Brit. Myc. Soc. Trans. 23: 243. 1939.

Hyphoscypha nuda (Phill. & Plowr.) Boud. Hist. Classif. Discom. Eu. 122. 1907; Nannf. Brit. Myc. Soc. Trans. 23: 244. 1939.

Helotium subrubescens Rehm, Ann. Myc. 7: 524. 1909.

Helolachnum aurantiacum Torrend, Broteria 9: 53, fig. 1-3. 1910; Sacc. & Trott. Syll. Fung. 22(1): 680. 1913; Nannf. Morph. Classif. non-Lich. Inop. Discom. 260. 1932. Under *Lachnum*.

Ciboria subrubescens (Rehm) Dodge, Trans. Wisconsin Acad. Sci. 17(2): 1033. 1914.

Helotium gramineum Vel. České Houby 850. 1922.

Lachnum rhizophilum (Fckl.) Vel. Monogr. Discom. Bohem. 1: 258; 2: pl. 10, fig. 21. 1934.

Apothecia gregarious or caespitose, typically occurring in a few caespitose clusters of 5-10 surrounded by a few growing singly, stipitate, 2-7 (-20) mm. high, 2-4 (-8) mm. across the disc; disc at first infundibuliform, then spreading and plane; stipe slender, flexuous, usually somewhat thickened just below the disc, pale yellow to flesh-color or dull orange, more or less whitish puberulent, often appearing smooth in the dried condition; receptacle concolorous with stipe and similarly marked; margin rather obtuse, when dried becoming somewhat elevated above the hymenium, finely and obscurely puberulent; hairs of receptacle 20-50 μ long, clavate, rough, hyaline, 4-6 μ diam., 1-2 septate; hymenium pale yellow to deep yellow often varying toward orange or apricot, retaining the color on drying or becoming more ochraceous; paraphyses more or less lance-pointed, protruding above the asci, septate, 3-4.5 μ diam.; asci small, cylindric, 60-75 x 4.5-6 μ ; spores biseriolate, 1-celled, narrow, broadest just above the middle, slightly tapering toward a point at the lower end, round or only slightly pointed above, straight, 7-11 x 1.9-2.4 μ .

Apothecia arising at ground level on partly buried plant debris of all sorts, especially on roots and rhizomes of grasses and other herbaceous plants and on limbs of both frondose and coniferous trees.

Throughout northern United States, southern Canada, and western Europe including the British Isles.

The species as here recognized, despite its excessive synonymy, is not an extremely variable one. It exhibits some variation in color and in length of stipe apparently due to environmental conditions, but all microscopic characters are constant. It is a matter of common observation that among the stipitate inoperculates the degree of color in the apothecium and also the length of the stipe will vary considerably with light and moisture conditions.

PEZIZA PYGMAEA Fr. 1822

Described under this name by Fries in 1822 and transferred by later writers successively to *Helotium*, *Lachnea*, *Erimella*, *Lachnella*, *Dasyscypha*, *Ciboria*, and *Lachnum*. The original description was based on a single collection made by Fries and which he records as on the decayed trunk of fir in an open swampy place in the mountains in June, presumably in Sweden. Noteworthy among other early literature records is that of Berkeley (Trans. Linn. Soc. 25: 432. 1866) in which two collections are described and illustrated. One of these, said to be bright apricot when mature, and whitish and tomentose on the base of the stems was noteworthy because of the stipe splitting several times with each subdivision terminated by a disc. It "occurred in swampy places on rotten gorse, frequently coming through the ground, on mosses." In the second collection the surface of one of the cups was described as proliferating to form secondary discs.

During the past seventy-five years perhaps a dozen collections have been recorded in the literature under this specific name, most of them from Europe. A woody substratum has been indicated in all or nearly all cases—either partially exposed roots, or partially buried wood or twigs; in one case fallen pine needles; other hosts named specifically are *Alnus*, *Quercus*, furze, gorse. In North America it has been reported from Wisconsin by Dodge, Iowa by Seaver, and by Bisby from Manitoba. Only Seaver's material has been examined by the writer.

Apparently the Friesian type has been lost. Nannfeldt (Brit. Myc. Soc. Trans. 23: 240. 1939) commenting on *Ciboria ochracea* wrote: "This name is a synonym of *Lachnum pygmaeum* (Fr.) Bres. Whether it is the true *Peziza pygmaea* Fr. cannot be decided with certainty, as no specimens from Fries seem to exist." However, since there appears never to have existed any disagreement as to the identity of the species, the writer feels justified in accepting Fries' name as the earliest that has been applied to the species.

Only five collections have been located by the writer under *Peziza pygmaea* or any of its later combinations. Two of these are in the Patouillard Herbarium labeled questionably and are considered by the writer as incorrectly determined; the other three are as follows: Wimbledon, Surrey, May, 1867. C. E. Broome. Rabh. Fungi Europ. 1120 (FH)*—On exposed roots of *Andropogon*. New-

* Abbreviations used to designate the herbaria in which the material studied is deposited are indicated in the first paper of this series. Mycologia 34: 1942.

field, N. J. July 4, 1886. Ellis. (CUP.—8484)—On buried twigs and roots. Iowa City, Iowa. 1904. F. J. Seaver (CUP-D 483).

The following specimens have been identified by the writer as *Lachnum pygmaeum*: On rotten wood. Belleville, Ontario. Sept. 10, 1878. Macoun, Can. Fungi 425 as *Peziza longipes* C. & P. (OTB)—On rotten logs. Holderness, New Hampshire. June 30, 1922. D. H. Linder (FH)—On hardwood. Lyon's Falls, New York. Oct. 18, 1936. H. J. Miller, W. L. White et al. (FH)—On rotten oak. Iowa City, Iowa. June 6, 1937. G. W. Martin 5196 (FH)—On bases of dead woody or semi-herbaceous plants. Lake Clear, New York. August 22, 1938. H. H. Whetzel (FH).

HELOTIUM LUTEOLUM Curr. 1864

The original description was based on material taken at Kent, England, May 31, 1862, "on a gorse stick, the end of which was sunk in the mud of a pool of water." According to the description and the rather good colored habit sketch provided, the apothecia were caespitose, slender-stipitate, and pale yellow, with the margin "covered with very minute parallel white hairs." The author called special attention to the caespitose habit, branching of the stipe, the "peculiar" paraphyses, and occurrence in a moist situation. Cooke, in his "Handbook" of 1871 reproduced Currey's treatment without comment. Phillips transferred it to *Lachnella* noting that he had examined the type and that "the presence of hairs and acerose paraphyses" convinced him that it did not belong in *Helotium*. Saccardo included it in *Dasyscypha*. Masee in 1895 furnished a more detailed description based on his examination of the type and an additional collection "on branches buried among moss" at Worcester, England, by Carlton Rea in September, 1894. He commented further: "The species is obviously a good *Helotium*, as originally proposed by Currey, in spite of the one deviation presented by the peculiar paraphyses. The minute marginal down is not to be compared with the pilose exterior of species of *Dasyscypha*." Another collection referred to the species was reported in 1905 from Yorkshire by Masee and Crossland. Nannfeldt (1939) examined the type and noted: "This species is—according to the type specimen at Kew and the published illustration—identical with the fungus generally known as *Lachnum pygmaeum* (Fr.) Bres.

The Masee Herbarium in the New York Botanical Garden contains Masee's drawings of Currey's types, the Worcester collection of Rea mentioned above, and drawings and notes of what appears to be insofar as the writer has discovered, a fourth collection referred to the species; it was taken at Worcester in 1896. Examination of the Rea specimen reveals no character that is not typical of *L. pygmaeum*. The apothecia are not at all yellow in the dried condition but are dull orange and more or less griseous; the hymenium is brown. Under a hand lens they appear practically smooth, but under the microscope the short rough clavate hyphal tips are numerous.

Durand at one time studied the species and referred to it several North American collections. He placed it in *Lachnum* but never published the combination.

Following is a summarization of specimens examined under *luteolum*. They are all correctly determined and are referable to *Lachnum pygmaeum*: On decaying wet wood among moss. Wyre Forest, Worcester. Sept., 1894. C. Rea (NY)—On burnt gorse

stems partially buried in moss, etc. Manchester, England. June 8, 1904. A. D. Cotton. (CUP-D 190)—On dead stick. Lick Run, West Virginia. June 16, 1907. C. P. Hartley (CUP-D 6515)—On dead sticks. Lafayette, Indiana. June, 1909. Mrs. A. W. Cole (CUP-D 6812)—On earth-covered roots. Mountain Lake, Virginia. July, 1909. Murrill 458 (CUP-D 9004)—On dead roots mixed with sphagnum in orchid basket. Cornell University Greenhouse, Ithaca, New York. 9 April 1910. Burt Brown. (CUP-D 6998).

HELOTIUM RHIZOPHILUM Fckl. 1865

Described under this name by Fuckel in 1865 and successively transferred to *Ciboria*, *Hymenoscypha*, and *Lachnum*. The original description was based on German material, the apothecia occurring on the decaying rhizomes of *Koeleria glauca*; and in Europe the name seems to have been used only or largely for the form occurring on grasses. The European distribution includes England (rhizomes of grasses, May); France (*Festuca ovina*, autumn); Germany (*Koeleria glauca*, autumn); Poland (as syn. of *Lachnum pygmaeum*, on roots of herbaceous plants, October); Czechoslovakia (*Koeleria* sp., *Festuca* sp., and *Agropyron* sp.). In North America it has been reported but once "on rotten wood in swamp," Michigan [Povah (1935) as *Helotium*]. The apothecia are described in the fresh condition as gregarious to caespitose with the exterior pale and furfaceous and the hymenium 'vitelline yellow' or clear deep yellow." The various descriptions and illustrations in the literature together with the specimens examined indicate no differences at all between this and the preceding *Helotium luteolum*. Boudier (pl. 489) furnishes a beautiful illustration. Bresadola (Ann. Myc. 1:121. 1903) appears to have been the first to refer this name to synonymy with *Lachnum pygmaeum*; and Nannfeldt and Rehm apparently accept this disposition. The doubt expressed by the various writers as to whether *Helotium luteolum* should be referred to *Helotium* or to the Lachneae is equally evident in the writings of those who have dealt with *Helotium rhizophilum*.

Material examined: Fckl. Fungi Rhenani 1598 (FH)—Herb. Barb.-Boiss. 1218 (FH).

HELOTIUM TUBA (Bolt. ex Fr.) b. OCHRACEA Berk. & Br. nom. nud. (1875)

This name was recorded without description for a form collected "on a heap of decaying vegetables" at Menmuir, England, March, 1874, by M. Anderson. Masee in 1895 raised the varietal name to specific rank under *Ciboria* and furnished a complete description based on his examination of the type. The apothecia according to the description were scattered, slender-stipitate, ochraceous in all parts, with both stipe and receptacle glabrous. This description presumably was based on dried material. The paraphyses were said to be slightly thickened at the apex but there was no mention of their being elongated above the asci and pointed. Though there is little in the description to indicate identity of the form with *Lachnum pygmaeum*, Nannfeldt (Brit. Myc. Soc. Trans. 23:240. 1939) has recently examined the type and has referred the species to

synonymy there without comment on its characters. Known only from the type, no later collections having been referred there.

PEZIZA (DASYSCYPHA) NUDA Phill. & Plowr. 1881

The original description was based on material taken in Scotland and said to be "on the ground amongst moss in a fir woods." It appears that no later collections have been referred here and that the type has been lost. The apothecia were described as scattered, pale orange-red, smooth, 5 mm. high and 2.5 mm. across the disc, with the stipe long and flexuous. It was noted as an "anomalous species, having the long pointed paraphyses not hitherto observed in any section besides Dasyschyphae, yet destitute of hairs of any kind that would justify placing it in that section." Later compilers included the form in various genera, depending upon their interpretation of the original description and their own generic concepts. Phillips transferred it to *Lachnella*, Masee to *Helotium*, and Boudier to *Hyphoscypa*. Saccardo for no apparent reason changed the name to *Helotium Phillipsii*. Nannfeldt in his paper on British types says: "No specimen seems to exist of this species, but a water-colour drawing in Phillips' Herbarium (Brit. Mus.) as well as the description indicate clearly *Lachnum pygmaeum* (Fr.) Bres."

HELOTIUM AFFINISSIMUM Peck 1883

Original description based on specimen taken at Albany, New York, in the month of June and said to be growing on "decaying sticks buried in the ground." The apothecia were described as subcaespitose, yellow, with external surface and margin slightly pruinose, and the stipe yellowish and 2-4 lines long. Peck noted more or less correctly that the species resembles *Helotium lutescens* from which it differs in its mode of growth, in becoming more discolored in drying, and in having smaller spores. Examination of the type reveals no characters not typical of those previously discussed for *Helotium luteolum* and *H. rhizophilum*. In the dried condition the hairs on the external parts of the apothecium are closely appressed and scarcely noticeable even under a good lens.

Material examined: Albany, New York. June (1880?). Peck. *Type*. (CUP-D 5952)—On twigs buried in soil. Cascadilla, Ithaca, New York. June 18, 1900. Durand. (CUP-D 894)—On rotted shaded log. Cantwell's Cliff, Hocking Co., Ohio. June 2, 1918. Bruce Fink. Fink. *Ascom*. Ohio 869 (CUP-D 10964).

HYMENOSCYPHA HEDWIGII Phill. 1887

Based on an English specimen taken in May at Hanwood, near Shrewsbury, and said to be on the twigs of hazel. The gross characters of the apothecia were described as follows: "Cup stipitate, concave or plane, yellow tinged with orange, margin entire, paler beneath; stem rather long, lower half tomentose, white and enlarged; . . ." Masee transferred the form to *Helotium* but only copied Phillip's description, saying that the species was entirely unknown to him. In 1903 Bresadola reported the species from Poland "ad ligna mucida" in June. He transferred the species to *Lachnum* and furnished a brief descrip-

tion based on his material. According to Nannfeldt (Brit. Myc. Soc. Trans. 23:243. 1939) there are in Phillips' herbarium two collections of the species, both on hazel from Hanwood in 1876, one taken in May and the other in June. The original description appears to have been based on the May collection and this is represented only by a water-color drawing. The June collection is represented by a specimen which, quoting from Nannfeldt ". . . matches the drawing and description so well that I do not hesitate to regard them as the same species, which furthermore proves to be identical with *Lachnum pygmaeum* (Fr.) Bres. Only one herbarium specimen has been located under the specific name *Hedwigii* and it is correctly referable to *L. pygmaeum*."

Material examined: On rotten logs and sticks. Ann Arbor, Michigan. May 26, 1894. Miss D. Bailey (CUP-D 624, 8361).

CIBORIA CARNIOLICA Rehm apud Voss 1887

The original description was based on material collected in Jugoslavia, evidently by Voss, who sent it to Rehm. The latter apparently wrote the description which was later published by Voss. The form was said to be "herdenweise auf von der Erde entblösten Wurzeln (*Quercus*?) im Walde bei Tivoli nächst Laibach, Ende June 1884." Rehm's description indicates identity with *Lachnum pygmaeum*, as does also the habit sketch furnished by Voss. However, Voss' drawings of paraphyses, asci, and spores are not at all those of *L. pygmaeum*, nor do they agree with Rehm's description. Voss (Myc. Carn. p. 211) again treated the species in 1891 and this time reported it "auf Coniferenwurzeln und an den Rhizomen von *Brachypodium sylvaticum* sowie *Carex* sp., welche durch Regen von Erde entblösst wurden, herdenweise." He noted that the species scarcely was different from *Lachnum pygmaeum*. It apparently was this collection or combination of collections which was distributed in Rehm's *Ascomycetes 903* and cited by Voss. The habitat is indicated on the packet as rhizomes of large grasses and other roots. Examination of this specimen shows it to be entirely in agreement in all respects with the writer's conception of *Lachnum pygmaeum*; it perhaps is slightly more yellowish in the dried condition than some specimens and the excipular hairs are slightly less obvious under a hand lens but microscopically are typical. When Rehm (*Hedwigia* 27:164. 1888) published the list of numbers for his *Ascomycetes* fascicle 19 he noted that according to Bresadola (*in litt.*) the species was identical with *Lachnum pygmaeum*, and he later (Rabh. *Krypt.-Fl.* 13:760. 1893) definitely referred it to synonymy with that species. No additional literature records or herbarium specimens under the name have come to the attention of the writer.

Material examined: Rehm *Ascom.* 903.

HELOTIUM RHIZOGENUM Ellis & Ev. 1888

Described from a specimen taken "on exposed dead roots of *Andropogon*" at Newfield, New Jersey, Aug. 1885. The apothecia were described as pale at first, becoming light yellow, 2-4 mm. high, 1-2 mm. diam., the stipes pale and granulose pubescent, and the disc pale yellow. The type has not been seen but several specimens from the Ellis collection at New York have been avail-

able. They agree in all respects except that the apothecia vary somewhat in color and in the conspicuousness of the pubescence as seen under a lens. In one of the collections the apothecia even in their present dried condition retain perfectly the form and color indicated by Boudier (Icon. Myc. pl. 449) for *Helotium rhizophilum* Fckl. Pound and Clements (Bot. Surv. Nebr. 4:42. 1896) report the species from Nebraska on decorticated branches of *Prunus*. This appears to be the only literature record since the original description.

Material examined: On old roots of *Andropogon* in dooryard. Newfield, New Jersey. July, 1888. (NY; CUP-D8490)—On sticks. Agassiz, British Columbia. May 9, 1889. Macoun 87 (NY; CUP-D 8489)—On twigs of *Prunus americana*. Nebraska. July 4, 1896. Pound & Clements (CUP-D 10874)—On grass roots. Newfield, New Jersey. May 29, 1898 (NY).

HYMENOSCPHA FLEXIPES Cooke & Phill. apud Phill. 1891

Described from an English specimen said to be on decorticated wood. The apothecia were recorded as scattered or caespitose, with pale alutaceous and granular exterior, darker hymenium and long slender stipe. Saccardo placed it in *Phialea* and Boudier in *Helotium*. Nannfeldt in his study of British types wrote: "This is another synonym of *Lachnum pygmaeum* (Fr.) Bres. . . . though the description is very deficient. The substratum is coniferous wood." Presumably he examined the type. No other records under the name are known.

PHIALEA ARENICOLA Ellis & Ev. 1897

Described from a collection taken in Delaware, June, 1896, and said to be "on sandy ground. . . ." Described as stipitate, with disc dull orange, 2-3 mm. broad, the outside lighter, uneven, subpruinose, and the stipe stout, 2-4 mm. long, substrate, gradually enlarged above, and the same color as the disc. No additional specimens have been identified with the species in so far as can be determined, and it appears to have been mentioned in the literature only twice since the original description. Examination of the type indicates agreement in all respects with Boudier's figures of *Helotium rhizophilum*. The apothecia are attached to plant debris buried in sandy soil.

Material examined: "On sandy ground." Blackbird Landing Bridge, Delaware. June 8, 1896. Commons 2487 (FH; NY).

CIBORIA CARBONARIA Feltg. 1903

The original description was based on a specimen from Luxemburg with the habitat and locality indicated as follows: "Auf einem Agglomerat von Erde, faulenden Grashalmen und Graswurzeln, auf alter Brandstelle; Grünewald-Dommeldingen. IX. Ol." All the essential characters of *Lachnum pygmaeum* were indicated in the description: The hymenium was described as egg-yellow; the disc 2 mm. diameter; the stipe 5 mm. long; and the external parts of the apothecium pale yellow with whitish pubescence. In 1906 von Höhnel after having examined Feltgen's type reported that it agreed so well with Fuckel's description of *Ciboria rhizophila* (Fckl.) Fckl. that it would have to

be considered synonymous. A single apothecium from Feltgen's type is in the von Höhnel Herbarium. It is slender, of an ochraceous orange color and appears smooth under a lens. Velenovský in his "Monographia Discomycetum Bohemiae" included *Ciboria carbonaria* based on a collection from near Mnichovice. His description however does not indicate identity of his material with that of Feltgen and the record should be discounted; perhaps as much can be said for Velenovský's work in its entirety.

Material examined: Type (FH-H).

HELOTIUM SUBRUBESCENS Rehm 1909

Described by Rehm from material sent him from Wisconsin by B. O. Dodge; later transferred by Dodge to *Ciboria*. The apothecia were said to be gregarious or thickly aggregated on the thickened bark of decaying roots. They were described as 1-4 mm. across the disc with stipes 1-2 cm. long, the exterior parts glabrous, pale rubescent, dilute alutaceous when dry and whitish pruinose. The apothecia of the dried specimens upon examination are found to be of a somewhat orange-ochraceous color on all parts and externally are sparsely and finely granular with white hairs.

Material examined: Rehm, Ascom. 1852. Type. (FH).

HELOLACHNUM AURANTIACUM Torr. 1910

Based on material taken in Portugal in the month of March and said to be on the roots of *Ulex europaeus* in a moist sandy place. The apothecia were described as gregarious, 4-7 mm. high, 4-10 mm. across the disc, externally puberulent, and of a beautiful orange color. Torrend's description was recorded in volume 22 of Saccardo's *Sylloge*. Nannfeldt (Morph. & Syst. 260. 1932) refers the monotypic *Helolachnum* to synonymy under *Lachnum* but does not make a new combination in *Lachnum* for the specific name. No other literature references have been seen. The specimen cited below is too fragmentary for study of the macroscopic characters but microscopic examination leaves no doubt as to the identity of Torrend's species; it may or may not be type material.

Material examined: "Ad radices Ulicis europaei." Alfeite (Portugal). IV-1910. C. Torrend. Torr. Fungi Sel. Exsicc. 171. (FH).

HELOTIUM GRAMINEUM Vel. 1922

Described from Czechoslovakia and with the original description recorded on *Nardus*, *Koeleria*, and *Festuca*. Velenovský later relegated his species to synonymy with *Lachnum rhizophilum* (Fckl.) Vel. and it is on this basis that the present writer is including it.

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