NOTES ON BRITISH AGARICS: III*

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Part I of these notes is designed to bring the 'New Check List of British Agarics' (Trans. Brit. Mycol. Soc. 43 suppl.: 1–225, 1960), hereafter referred to as 'the List', more up to date as regards genera, in view of recent work on the agarics, and also to make certain necessary new combinations, so that these more modern names can be used by those who desire to do so. For convenience, the changes are dealt with alphabetically by genera in the List. The opportunity is taken of giving a key to the species of the extended genus *Psilocybe*. Changes of specific names on account of newly discovered synonyms and new records since 1960 are not included except in so far as they concern proposed new combinations or different interpretations of genera.

Part II consists of notes concerning collections of new or critical agarics made over a long period in England and more recently in Scotland, material of which is now deposited in the Herbarium of the Royal Botanic Garden, Edinburgh. Material of the new species has also been sent whenever possible to the Herbarium of the Royal Botanic Gardens, Kew. The species described are arranged in alphabetical order within genera as in the List. 'The List, Part III' referred to in the text is in Trans. Brit. Mycol. Soc. 43: 150–439 (1960).

PART I. NOTES ON GENERA.

Asterophora. Following Donk (Taxon 11, 3: 79, 1962), this is rejected as a *nomen anamorphosis* to be associated with the chlamydospores and not with the perfect agaric, for which the name *Nyctalis* Fr. must be used.

Boletus. This is restricted to species not included in *Suillus* and *Leccinum*, which are separated out, together with *B. cramesinus* which becomes *Aureoboletus cramesinus*. Thus *B. aeruginascens*, *bovinus*, *elegans*, *flavidus*, *granulatus*, *luteus*, *tridentinus* and *variegatus* are transferred to *Suillus*, and *B. carpini*, *crocipodius*, *duriusculus*, *percandidus*, *scaber* and *testaceoscaber* are transferred to *Leccinum*.

Collybia subgenus *Tephrophana*. Because the type species of *Tephrophana* Earle (1909) belongs to *Marasmius*, this name cannot be used at generic level for this subgenus. We therefore adopt *Tephrocybe* Donk (Nova Hedwigia, Heft 5, Beihefte 284, 1962) as is also done by Moser in Band IIb/2 Kleine Kryptogamenflora (1967). Most new combinations are already made, but the following are proposed:

* Notes on British Agarics: I, Trans. Brit. Mycol. Soc. 40: 263-267 (1957); II, Notes R. B. G. Edinb. 26: 43-65 (1964).

** Rannoch School, Rannoch, Perthshire.

Tephrocybe confusa (P. D. Orton) P. D. Orton, **comb. nov.**
Basionym:— *Collybia confusa* P. D. Orton in Trans. Brit. Mycol. Soc. 43: 189 (1960).

Tephrocybe putidella (P. D. Orton) P. D. Orton, **comb. nov.**
Basionym:— *Collybia putidella* P. D. Orton, l.c. 174, for which the epithet *putidus* cannot be used, since *Agaricus* (*Collybia*) *putidus* Fr. (1838) is a later homonym of *A.* (*Lepiota*) *putidus* Weinm. (1836).

Following M. Lange & Siversen (Bot. Tidskr. 62: 198, 1966), we adopt *Agaricus anthracophilus* Lasch as the first available name for *C.* (*Tephrophana*) *carbonaria* in the List.

Tephrocybe anthracophila (Lasch) P. D. Orton, **comb. nov.**
Basionym:— *Agaricus anthracophilus* Lasch in Linnaea 4: 532 (1829). This name antedates at species level the also carbonicolous *Agaricus ambustus* (Fr.) Fr. (1838), first validly published as *Agaricus umbratilis* β *A. ambustus* Fr., Syst. Mycol. I: 157 (1821), for which the habitat given is 'ad terram locis deustis'.

These authors also reaffirm that *Collybia gibberosa* J. Schaeff. is an agaric of coniferous woods growing in moss or amongst needles and not a carbonicolous fungus at all, as I can confirm by a collection from Camghouran, Perthshire, 7 x 1967, growing in needles on ground which was certainly not likely to be burnt ground. The epithet *gibberosa* should therefore be used for this agaric, quoted in the List as *C.* (*T.*) *ambusta*.

Tephrocybe gibberosa (J. Schaeff.) P. D. Orton, **comb. nov.**
Basionym:— *Collybia gibberosa* J. Schaeff. in Ann. Mycol. 40: 150 (1942). This is *C.* (*T.*) *ambusta* sensu Ricken non Fries, not as stated in the List, since Fries indicates a carbonicolous habitat for *A. ambustus* in his validating description, so that similarity of cap shape becomes a character of less importance.

Deconica. This genus is abandoned and the species transferred to *Psilocybe* (see below).

Drosella. This name is replaced by *Chamaemyces* Earle (1909—See Donk in Nova Hedwigia, Heft 5, Beihefte 42, 1962).

Eccilia. *E. polita* (Pers. ex Fr.) Kummer has been fixed as the type species of this genus (see Donk, l.c., 92), and is therefore removed from *Leptonia*, together with *L. pernitrosa* P. D. Orton, for which the following new combination is proposed:—

Eccilia pernitrosa (P. D. Orton) P. D. Orton, **comb. nov.**
Basionym:— *Leptonia pernitrosa* P. D. Orton in Trans. Brit. Mycol. Soc. 43: 297 (1960). These two small to medium species were excluded from *Eccilia* in the List because of their relatively large size, in an effort to restrict *Eccilia* to small or very small species. It seems better to abandon this idea for the moment, but segregation of genera within the Rhodophyllaceae is still not satisfactorily solved.

Flocculina. This must be replaced by *Flammulaster* Earle, (1909), which I unfortunately overlooked when preparing the List. All necessary new combinations have already been made by R. Watling (Notes R.B.G. Edinb. 28: 65–68, 1966).

Galerina. Since writing about this genus previously (the List, part III, 167) I have come across another species of section *Kuehneromyces* at Rannoch in Perthshire. As I have also notes on a third British species, I feel better able to assess the merits of *Kuehneromyces* as a genus. The situation is complicated by the collection of good material of a taxon belonging to the *Galerina marginata/unicolor* aggregate on pine sawdust at Rannoch in which the spore print is exactly that of *G. mutabilis*, and also similar to that of *Pholiota spumosa*, namely chocolate-rusty. The spore-print of the Rannoch species of section *Kuehneromyces* is however snuff brown, practically as in *Agrocybe praecox*. Obviously there is a strong overlap in spore-print colour so that this character is definitely useless for separating *Galerina* and *Kuehneromyces*. Since habit, habitat, colour of fruit body, velar, and cystidial characters are all also useless for separating them, the difference in spore type remains the only available character. Thus section *Kuehneromyces* have, so far, small rather thick-walled smooth spores not more than 8μ long with distinct germ-pore, and spore prints tending to be dull coloured, *Galerina* has spores at least slightly larger, varying from smooth to rough, with a few showing also a germ-pore, and spore-print tending to be brighter coloured. I feel, therefore, more strongly than ever that there is no case for separating *Kuehneromyces* at generic level, and prefer to keep it as a section of *Galerina*. The two new British species of this section are therefore described as species of *Galerina*.

There remains much further field work to be done on the *G. marginata/unicolor* agg. before these puzzling taxa can be separated, for Bas (Persoonia 1: 303–314, 1960) deals only with a few species not growing on wood or sawdust. Careful notes on spore and cystidial characters and exact habitat and perhaps also colour of spore-print seem likely to be the only way to acquire a clearer understanding of this difficult and complex group.

Gomphidius. A new genus *Chroogomphus* O. K. Miller, (Mycologia 56: 529, 1964), has been created for species of *Gomphidius* with gills coloured from the start and coloured flesh. European authors have begun to adopt this and we propose to do the same. *G. rutilus* therefore becomes *Chroogomphus rutilus* (Schaeff. ex Fr.) O. K. Miller (1964).

Gyrodon. This genus is abandoned because the identity of its type species is doubtful and we therefore adopt *Uloporus* Quél. (1886) and the single British species becomes *Uloporus lividus* (Bull. ex Fr.) Quél. (1886).

Hygrophorus. This genus is discussed at length in a joint paper with R. Watling, published in these Notes (Notes R.B.G. 29: 129–138, 1969).

Inocybe. Some authors have chosen a rough-spored species (either *Agaricus lanuginosus* or *A. trechisporus*) to be the type species of this genus, which means the use of different subgeneric names from those in the List. I do not regard this matter as settled and prefer to make no change for the moment (see Donk in Nova Hedwigia, Heft 5, Beihefte 147–149, 1962).

Leptonia. *L. polita* and *L. pernitrosa* are transferred to *Eccilia* (see above).

Marasmius. Some authors following Singer have included *M. menieri* in the genus *Gloiocephala* Massee, 1892. Bas (Persoonia 2: 77–89, 1961) has discussed this at some length but concludes by saying, 'I am afraid, however, that it will not be possible to maintain this group as a separate genus'. I agree with this, and *M. menieri* is therefore retained in *Marasmius*.

Naucoria. In the List part III, 170 and 308, I emended this genus to include two groups of species as well as *Naucoria* section *Naucoria* (erroneously called section *Alnicola* in the List part III: 311), which includes the type species, *N. escharoides*. One of these groups (*centunculus*, *laevigata*, *rubi*, *sumptuosa*), I now think is better separated out in *Simocybe* Karsten, 1897 as typified by Singer & Smith (1946). The following new combination is proposed:

Simocybe laevigata (Favre) P. D. Orton, **comb. nov.**
Basionym:— *Naucoria centunculus* var. *laevigata* Favre, Hauts Marais: 138 (1948).

The other group (*stagnina*, *stagninoides*, *zetlandica*) is left in *Naucoria* for the time being, but its position is still controversial.

Panaeolina. This genus is now regarded as a synonym of *Panaeolus*, the spore colour distinction being too slender to warrant its separation, especially as a second species with rough spores but blackish spore-print has been discovered recently.

Pleurotellus and **Pleurotus.** In the List, *Pleurotellus* was taken as adapted by Konrad & Maublanc in 1937 for a residue of the smaller species of *Pleurotus* and not in the sense of Singer (1951), who used it for *Crepidotus herbarum*, since he regarded this as *Pleurotellus hypnophilus* sensu Fayod (*hypnophilus* is quoted by Fayod for *Pleurotellus* and is to be regarded as the type species of this genus). The only information Fayod gives for *P. hypnophilus* is, 'spores lacrymées allongées', and there is no mention of a coloured spore-print at all, *Pleurotellus* being included in the Leucosporae. Elongate spores are figured by Pilat (1935) for his *Pleurotus hypnophilus*, which could quite well have been described by Fayod as 'lacrymées allongées'. Although I have no personal knowledge of it, I prefer therefore to accept Pilat's interpretation of *P. hypnophilus* rather than Singer's.

There does seem to be a strong case, however, for removing *Pleurotus lignatilis* and *P. porrigens* to the genus *Pleurocybella* Sing., 1951, and to this genus may be added *Pleurotus tessulatus* as done by Moser (1955) which avoids using yet another genus (*Hypsizygus* Sing., 1947) for the latter species. With *Pleurotus ulmarius* removed to *Lyophyllum* (for carminophilous basidia have now been confirmed for this), *Pleurotus* is thus restricted to *P. dryinus* and *P. ostreatus* and its allies, which form a natural group. *Pleurotellus* can be restricted to the following white species:—*P. candidissimus*, *dictyorhizus*, *filicinus* and *hypnophilus* (none of which unfortunately I have collected personally) and by removing *P. acerosus* and *P. tremulus* to *Leptoglossum* which has already has been done by other authors.

This leaves *Pleurotellus patelloides* unaccounted for. In his revision of the Agaricales, Singer (1950) synonymised this species with *Agaricus craterellus* Dur. & Lév., 1846–49, which he had placed in his genus *Chaetocalathus*, characterised, according to him, by having pseudoamyloid hairs on the cap, pseudoamyloid spores and by absence of stem. I unfortunately overlooked the existence of *A. craterellus* in my researches for the List, but I have no doubt this synonym is correct, for the maritime habitat given for *A. craterellus* is very similar to that of *P. patelloides* and other characters are in agreement. Examination of copious spore-prints from fresh material (kindly supplied by T. J. Wallace Esq.) has shown that the spores are, however, not truly pseudoamyloid (or dextrinoid as I prefer to call it) for although the spore-print may become tinged red brown in Melzer's solution, at least after a time, the individual spores when examined under the microscope remain colourless or appear no more than slightly yellowish. The acceptance of *Chaetocalathus* is therefore with the reservation that the spores are no more than partially dextrinoid, though there is no doubt about the dextrinoid hairs on the cap.

Plicatura. *P. crispa* is transferred to *Plicaturopsis* D. A. Reid, and is placed in the Aphyllophorales (see D. A. Reid, Persoonia 3: 150–153, 1964).

Pluteolus. This becomes *Bolbitius* subgenus *Pluteolus*.

Pseudohiatula. This is no longer available for the temperate species growing on pine cones included in it in the List, for its type species is a tropical agaric of different characters growing on tree ferns. Singer has therefore created *Strobilurus* Sing., (Persoonia 2: 409, 1962), for these species, which we therefore adopt.

Psilocybe. Following Singer's treatment in his revision of the Agaricales (1962), more or less, this genus is extended to include *Deconica* and also some species included in *Stropharia* in the List which do not possess chrysocystidia, since it seems better to restrict *Stropharia* to species which do possess chrysocystidia. This is a clearer cut distinction than their separation purely on macroscopic characters as was done in the List—viscid cap and well developed veil for *Stropharia*, dry cap, or if viscid then with less well developed veil, or characteristic cap shape for *Psilocybe*. This means that all members of the Strophariaceae without chrysocystidia are placed in *Psilocybe*, whether the cap is dry or viscid or veil present or absent, though these characters can be used to separate the species with chrysocystidia into *Hypholoma* and *Stropharia*.

In the List, *Deconica* was maintained as a separate genus because it included species with broadly adnate or subdecurrent often ± triangular gills and ± lentiform spores as opposed to *Psilocybe* whose species (*P. cyanescens* and *semilanceata*) had free or more narrowly adnate, ± ventricose gills and ellipsoid non-lentiform spores as well as a tendency for the fruit-body to turn blue-greenish in parts. The subsequent discovery of *Stropharia fimetaria* P. D. Orton (Notes R.B.G. Edinb. 26: 59, 1964) which also tends to turn blue-greenish, but is a *Stropharia* in the sense of the List by its viscid cap and copious veil, cuts across this, as also does the collection of *Psilocybe subcoprophila* (Britz.) Sacc. which is macroscopically a *Deconica* but has

large ellipsoid clearly non-lentiform spores. These and other finds make me think that Singer is correct to synonymise *Deconica* and *Psilocybe*, and also that he correctly restricts *Stropharia* to species with chrysocystidia and strongly viscid cap with well developed veil. Since *S. squamosa* has no chrysocystidia, I would, however, transfer this to *Psilocybe* too, rather than make it an anomalous member of *Hypholoma* as Singer does. The following must therefore be included in *Psilocybe:—S. luteonitens*, *merdaria*, *percevalii* and *squamosa*, as well as the more recently described *S. fimetaria* and all species of *Deconica*. The necessary combinations for the most part are already made, but the following are proposed:

Psilocybe graminicola (P. D. Orton) P. D. Orton, **comb. nov.**
Basionym:— *Deconica graminicola* P. D. Orton, Notes R.B.G. Edinb. 26: 49 (1964).

Psilocybe percevalii (Berk. & Br.) P. D. Orton, **comb. nov.**
Basionym:— *Agaricus* (*Stropharia*) *percevalii*, Berk. & Br. in Ann. Mag. Nat. Hist. 206 (1879).

Psilocybe squamosa (Pers. ex Fr.) P. D. Orton, **comb. nov.**
Basionym:— *Agaricus* (*Psalliota*) *squamosus* Pers. ex Fr., Syst. Myc. I: 284, 1821.

In the List part III, 223, I gave a key to the genus *Deconica*. However, in view of recent field work this key is now in need of revision especially as regards '*D. coprophila*' and also to include five new or recently described species, two of which, *P. graminicola* (No. 1) and *P. pratensis* (No. 2), were included in the above mentioned key as "taxonomic species Nos. 1 and 2" without names. Opportunity is therefore taken to give a key to all the British and West European species of *Psilocybe* in the extended sense.

As thus constituted *Psilocybe* contains three elements:—
(1) section *Psilocybe*, for species showing a tendency to turn blue-greenish (includes *P. semilanceata*, taken as type species, *P. cyanescens* and *P. fimetaria*), (2) section *Squamosa* for *P. squamosa* and *P. percevalii*, and (3) section *Deconica* for species formerly in *Deconica* plus *merdaria* and *luteonitens* and three new species described in part II of this paper:— *P. caricicola*, *P. apelliculosa* and *P. pratensis*.

Key to species of Psilocybe

(Species not yet recorded for Britain are placed in brackets)

1 Cap very small (2–7 mm); stem very short, often eccentric (1–3 mm long); growing on *Carex* stems in marsh (fen country); spores $5\frac{1}{2}$–$7\frac{1}{2}/3$–4μ ellipsoid-amygdaliform with small germ-pore . . . *P. caricicola*
1 Not so 2

2 Cap small (c. 5–15 mm) elongate conical, often irregularly puckered at margin, with viscid pellicle: stem cream or pale often turning blue-greenish in lower part, rather stiff; spores ellipsoid, $11\frac{1}{2}$–$14\frac{1}{2}/7$–9μ; gills narrowly adnate; growing in grass . . . . *P. semilanceata*
2 Not so 3

3 Stem becoming blue-greenish in lower part; spores ellipsoid, or slightly amygdaliform, 9μ or more long 4

3 Not so 5

4 Growing on dung: cap date or liver colour often becoming olivaceous or ochraceous-yellowish with conspicuous white scales with veil at first; spores ellipsoid, 11–14/6½–7½μ . . . . . *P. fimetaria*

4 Growing on herbaceous debris; cap reddish buff or ochraceous, sometimes tinged blue-greenish in parts; veil cortinate often forming ring-zone on stem; spores ellipsoid or amygdaliform 9–12/5–6μ . *P. cyanescens*

5 Relatively large species (cap c. 30–60 mm; stem 3–10 mm in diam.) with ellipsoid spores either 11–14/6–7μ or 13–16/6½–8μ and conspicuous ring or veil (formerly included in *Stropharia*) 6

5 If spores so large, smaller species or with other characters . 7

6 Spores 11–14/6–7μ; ring pendulous, thin, often no more than a fibrillose-floccose whitish zone, soon discoloured by spores; cap barely viscid with conspicuous V-shaped whitish or pale yellowish scales when fresh *P. squamosa*

6 Spores 13–16/6½–8μ; ring conspicuous, spreading, sometimes torn and adhering to cap margin, whitish or pale yellowish; cap ± viscid, with fugacious white veil-scales near margin when fresh . . *P. percevalii*

7 Growing on dung 8

7 Not growing on dung 13

8 Spores lentiform, 6–7(8)/3½–4½/4½–4¾μ; (cap ± semiglobate with conconspicuous dentate appendiculate veil at first) . . *P. bullacea*

8 Spores ellipsoid or lentiform, mostly 10μ or more long . . 9

9 Spores lentiform, ± hexagonal in some views, 12–15/7–7½/8–9½μ; (cap usually small; stem with ± conspicuous veil traces when young, not pruinose except at apex) . . . . . *P. coprophila*

9 Spores ellipsoid or slightly angular, non-lentiform . . . 10

10 Spores 14–20/8–10μ, ellipsoid; (cap very small, 10 mm or less); stem with ± fugacious veil traces) . . . . . *P. subcoprophila*

10 Spores shorter or narrower, or cap larger 11

11 Spores 13–16(17)/8–9½μ, ellipsoid; marginal cystidia 7–11½μ in diam.; veil slight or none; cap paler, ochraceous or olivaceous (see Huijsman in Persoonia 2: 93, 1961) . . . . . (*P. merdicola*)

11 Spores 10–14/6–8μ, ellipsoid or slightly angular; marginal cystidia 4–8μ in diam.; veil well-developed; cap paler, or darker date or liver colour 12

12 Spores 10–13/6–8μ, ellipsoid or slightly angular; cap relatively pale, yellowish or buff to olivaceous honey; stem-flesh ochraceous to honey colour in stem base; smell and taste none or slight fungussy; veil appendiculate at cap margin, stem floccose or pruinose . . *P. merdaria*

12 Spores 11–14/6½–7½μ, ellipsoid (not angular); cap darker, date or liver colour when moist, later olivaceous or drying yellowish or ochraceous; stem-flesh date to vandyke in stem base; smell and taste mealy; veil as white fibrillose often fugacious scales on cap, and ring-zone and patches on stem . . . . . *P. fimetaria*

13 Spores mostly 10μ or more in length 14
13 Spores mostly 9μ or less in length 16

14 Spores ellipsoid lentiform, (8½)9½–12(13)/(5)5½–7/6–7¾μ; cap small (5–20 mm) soon expanded ± plane, dark date or chocolate drying tawny ochraceous or ochraceous yellowish; gills ± broadly adnate; (growing in grass or on sand dunes) . . . . . *P. pratensis*

14 Spores ellipsoid or ellipsoid-amygdaliform, non-lentiform; cap convex or conico-convex rarely expanding completely, often paler; gills usually narrowly adnate 15

15 Spores ellipsoid, 10–12/6–8μ; growing in grass; cap and stem pale yellowish but cap centre or stem may be darker brownish (see Persoonia 2: 91, 1961) . . . . . (*P. callosa* (Fr. ex Fr.) Quél.)

15 Spores ellipsoid amygdaliform, 11–13½/6–8μ; growing on soil or in moss in wet places; cap and stem pale to dark cigar-brown (see Bull. Soc. Mycol. Fr. 55: 196, 1939) . . . . . (*P. turficola* Favre)

16 Cap without separable pellicle, not or scarcely viscid . . . 17
16 Cap with separable viscid pellicle 21

17 Cap entirely, or at least in outer part, greyish tomentose, sooty-brown, drying pale, convex with small umbo; (stem about 15–20/1–2 mm, concolorous, everywhere fibrillose-flocculose; gills becoming concolorous, rather distant, decurrent; spores broadly ovoid, 6–7/4½–5μ; marginal cystidia lageniform, sometimes subcapitate (14)24–32/5–6μ, apex 3–4μ in diam.; in grass (see Fungi Faeroes: 187, 1945) (*P. libertatis* (Fr.) Møller)

17 Cap smooth or matt when dry (cuticle occasionally cracked, sometimes with narrow white or yellowish veil-zone when young) . . 18

18 Gills buff, honey buff or dark rusty, not umber or purplish or only slightly so when quite old 19
18 Gills soon umber or purplish brown 20

19 Growing on soil in grass; stem-base bulbillose usually with pale (whitish, greyish or pale buff) mycelial tomentum and veil remnants; gills less crowded, L 14–20 l 3 (–7), honey-buff or tobacco colour; spores ellipsoid or slightly amygdaliform, 6–8(9)/3¾–4½/4½–5μ . . *P. apelliculosa*

19 Growing on conifer needles or other herbaceous debris; stem not bulbillose but with white veil remnants; gills relatively crowded, L 22–30 l 3, tawny chocolate; spores submitriform, 5–7(8)/3½–5/4¼–5½μ (see Persoonia 2: 94 1961) . . . . . (*P. xeroderma Huijsman**)

20 Cap striate when moist, deep date or rufous sepia, semiglobate, more rarely with slight umbo; stem concolorous or slightly paler at apex only; spores 6–8/4–5μ . . . . . *P. montana*

20 Cap striate at edge only or not at all when moist, dull bay then ochraceous buff, convex expanded often with small umbo; stem paler than cap, reddish brown or tinged tawny below; spores 6–7/4–5μ *P. physaloides*

21 Gills dull rusty or clay sepia, not tinged violaceous or purplish except sometimes when quite old; spore-print cigar-brown with slight purplish tinge 22

21 Gills soon umber or purplish brown; spore-print violaceous-umber 24

* = *physaloides* s. Bres. sec Huijsman = *Geophila hyperella* s. K. R. vix Fr.

22 Spores 7½–10/4½–5½μ, ellipsoid lentiform, slightly angular in some views; cap smooth, without veil scales, strongly striate when moist; veil slight; (on grass stems or other herbaceous debris) . . . *P. inquilina*

22 Spores 5½–8½/3½–4/4½–5μ, ellipsoid or ± rhomboid, ± lentiform; cap with small adpressed white scales from veil at first, these usually persisting at margin, when moist not striate or striate at margin only 23

23 Spores ellipsoid lentiform, ± rhomboid in some views, 6–8½/3½–4½/4–5μ; on deciduous or coniferous chips or sawdust . . *P. rhombispora*

23 Spores ellipsoid slightly lentiform, less distinctly angled in any view, 6–7½/3½–4/4¼–4¾μ; on grass stems, twigs or other herbaceous debris *P. crobulus*

24 Spores larger 7–9½/4½–5/5–6μ, ellipsoid lentiform sometimes slightly angular in some views; cap striate at margin when moist; (stem with white silky fibrillose veil at first; cap with only a few fugacious veil remnants; in moss and lichens or in grass on sand dunes *P. muscorum*
(Note:—if spores broader 9–10½/5–6/6½–7½μ, see *P. pratensis*, p. 82)

24 Spores smaller, 6–8½/3¾–4½/4–5½μ, ellipsoid ± lentiform; cap striate at margin or not when moist 25

25 Growing on dung or in rotten straw; cap with conspicuous appendiculate or dentate veil at first, striate when moist., ± semiglobate; stem-apex with conspicuous fibrillose veil-zone at first . . . *P. bullacea*

25 Growing in moss or grass; cap with minutely fibrillose veil traces at margin only when young, when moist not striate or striate at margin only, convex then ± expanded sometimes slightly umbonate; stem at first with white or whitish ring-zone and scattered patches below this from veil . . . . . *P. graminicola*

Tricholoma *T. carneum*, *cerinum*, *constrictum*, *gambosum*, *ionides*, *obscurissimum*, *persicolor* and the recently reinstated *T. onychinum* are transferred to *Calocybe* Kühner ex Donk, 1962, the necessary combinations having already been made.

Part II. Notes on species

Cantharellus ferruginascens P. D. Orton, **sp. nov.** Figs. 1, a′, a″; 5, d-f.

I have for some time been aware of the comparative rarity or even the complete absence of *Cantharellus cibarius* in areas of basic soils. However, I have occasionally found a differently coloured *Cantharellus* in such situations which I formerly dismissed as a 'pale form of *C. cibarius*'. I do not now think this is at all satisfactory, however, for this agaric shows some seemingly constant differences from *C. cibarius*. Until it can be proved that spores of *C. cibarius* in some mysterious way produce such differently constituted fruit-bodies if they land on basic soil (an event which I do not consider very likely), it seems better to have a name available for this so-called 'pale form'. None of the descriptions of the numerous forms and varieties of *C. cibarius* in the literature seems to fit, and since I do not believe in forms and varieties anyway, I am therefore describing this as a new species of which the following is a diagnosis and description.

Pileus 18–58 mm, e convexo expanso-depressus vel leviter umbilicatus, interdum leviter umbonatus vel irregularis et ad marginem undulato-lobatus, ochraceo-luteus vel ochraceo-luteolo-fuscus ad discum obscuriore coloratus vel olivaceo-luteolofuscus, ad marginem pallidiore luteus vel cremeus, siccitate ± totus pallide eburneus vel cremeo-luteus, sericeo-opacus, interdum circa discum adpresso sericeo-floccoso vel circa marginem minute squamulosus, ad marginem juventute albidus interdum tenuissimus et senectute recurvatus. *Lamellae* profunde decurrentes, crassae et rugosae, angustissimae, circa marginem pilei furcatae, interdum etiam venosae vel juxta stipitem conjunctae, 20–40 ad stipitem pervenientes, interdum ad marginem pilei evanidae, cremeae vel pallide luteae, interdum partim obscuriore luteae vel flavae, saepe vulneratis lente ochrascentes dein ferruginascentes. *Stipes* 20–40/4–11(15) mm, aequalis vel ad basim attenuatus, interdum compressus, albidocremeus vel eburneus vel colore pilei tinctus, saepe vulnerato vel senectute ochrascens vel ferruginascens, sericeo-glaber sed interdum leviter sericeo-floccoso squamulosus vel in mediam partem longitudinaliter costatus, solidus, juventute aliquantum firmus lentusque. *Caro* albido-cremea vel pallide cremeo-luteola, interdum in cortice stipitis luteotincta, saepe in externam partem vulnerata ochrascens vel ferruginascens. *Odor* nullus vel debilis. *Sapor* mitis, interdum lente leviter amarescens. *Sporae* late ellipsoideae, 7½–10/5–6μ, (fig. 1, a) in cumulo pallide cremeae vel cremeoluteolae. *Basidia* 5–6-sporigera. *Acies lamellarum* fertilis. *Hyphae* cuticulae pilei filamentosae, ramosae, fibulatae, cellulae 3–8(10)μ latae, hyalinae vel luteolo-pigmentatae.

Gregarius. Inter Bromos ramosos et arbores mixtas, Norbury Park, Mickleham, Surrey, 20 x 1961, *P. D. Orton* (typus in Herb. Edinb. et Kew.); ad viam inter Mercuriales perennes, Anemones nemorosas, Circaeas et arbores frondosas mixtas, Allerford Wood, Bossington, Somerset, 8 et 10 ix 1963, *P. D. Orton*. A coloribus pallidioribus mutabilioribus, lamellis pallidis et habitatione a *C. cibario* facile distinguitur.

Cap 18–58 mm, convex then expanded-depressed or slightly umbilicate, sometimes slightly umbonate or irregular with wavy-lobed or upturned margin, *ochraceous yellow or yellowish-buff with darker olive-buff or ochre-buff centre and paler yellowish or creamy-whitish margin, drying ± entirely pale ivory or creamy-yellowish*, silky matt, sometimes adpressed silky-floccose scaly around centre or more minutely so towards margin, extreme margin whitish when young sometimes becoming very thin or recurved with age. *Gills* deeply decurrent, thick and fold-like, very narrow, forked in outer part, sometimes also interveined or anastomosing near stem, about 20–40 reaching stem, sometimes becoming ± evanescent at edge of cap in expanded specimens, *pale yellowish or creamy*, sometimes tinged lemon or chrome in places, often bruising slowly yellow ochraceous (after 10 to 15 minutes) then rusty ochre (after about 20–30 minutes). *Stem* 20–40/4–11(15) mm, equal or attenuated at base, sometimes compressed, *creamy-whitish or ivory or with tinge of cap colour, often bruising yellow then rusty-ochraceous like the gills* when handled or with age, silky smooth but sometimes slightly silky-floccose scaly or longitudinally ribbed in middle part, solid, rather firm and tough at first. *Flesh* whitish cream or pale creamy-yellowish sometimes tinged chrome in stem-cortex in places, often becoming yellow or rusty-ochraceous under cap and stem cuticle when bruised. *Smell* none or

faint. *Taste* mild, sometimes becoming slowly slightly bitterish. *Spores* broadly ellipsoid, 7½–10/5–6μ (fig. 1, a), pale cream or creamy-yellowish in the mass. *Basidia* 5–6-spored, 8–10μ in diam. *Gill-edge* fertile. *Cap cuticle* of filamentous, interwoven, branched clamped, hyphae, cells 3–8(10)μ in diameter, hyaline or with yellowish (? membranar) pigment.

Gregarious. Under *Bromus racemosus* and mixed trees, Norbury Park, Mickleham, Surrey, 20 ix 1961, *P. D. Orton*, (type in Herb. Edinb. and Kew); by path under *Mercurialis perennis*, *Anemone nemorosa*, *Circaea* and mixed deciduous trees, Allerford Wood, Bossington, Somerset, 8 and 10 ix 1963, *P. D. Orton*. Readily distinguished from *C. cibarius* by paler and more changeable colours, especially the pale gills, and habitat. The spores seem on the average slightly broader than those of *C. cibarius* but hardly diagnostically so.

Collybia inodora (Pat.) P. D. Orton, **comb. nov.** Figs. 2, a; 5, g-h.
Basionym: *Marasmius inodorus* Pat., Tab. Anal., 2nd series, 13: No. 523 (1886).

A fine collection of an unfamiliar agaric was made on the British Mycological Society's foray in Somerset in 1960; I have since identified it as *Marasmius inodorus* Pat. I think, however, it is better to include this in *Collybia* along with *C. confluens* and allied species which seem nearest to it. I have seen this agaric before in North Wales but failed to identify it and have since found another solitary specimen in Somerset. The following is a description of my collections:—

Cap 8–50 mm, convex soon expanded-plane, sometimes slightly umbilicate or with wavy-lobed or upturned margin when old, *sepia-date when young* then sepia-buff or pale ochraceous-buff, sometimes darker or tinged rusty-ochraceous in the centre when older, hygrophanous, *drying paler* but still with darker centre, margin strongly striate or sulcate when moist, sometimes with small reddish-brown or date scales at or around the centre, otherwise matt with silky sheen, at first entirely finely adpressed silky tomentose. *Gills* adnate, sometimes with tooth, usually rather narrow, white soon whitish or pale greyish, fairly crowded, L 20–34 l 3–7, often crisped and veined or forked, edge rather conspicuously but minutely flocculose-denticulate sub lente. *Stem* usually short but sometimes slightly eccentric, 8–28/2–4 mm, equal or slightly attenuated downwards, often compressed or channelled, pale date, pinkish-ochraceous-buff or dirty pinkish-ochraceous *then usually with darker reddish-date or vandyke base and finally entirely reddish-date or vandyke*, at first entirely minutely whitish mealy flocculose, later often ± smooth but with white, pale buff or dirty brownish strogose tomentose base (sometimes extending up to 10 mm above base), *tough*, stuffed then hollow. *Flesh* very thin in cap, date or reddish-date in stem and centre of cap, drying whitish in centre. *Smell* none. *Spores* ellipsoid or slightly oblong, 6–9/3–4μ, non-amyloid. *Basidia* 4-spored, 25–30/6–7μ. *Marginal cystidia* cylindric-flexuose, clavate, utriform, broadly lageniform or irregularly shaped but always rather broad at the apex, which is occasionally branched, 30–62/8–18μ apex 6–12(14)μ (fig. 2, a). *Facial cystidia* ± clavate or cylindric clavate, c. 33–45/8–14μ. *Hyphae of cap surface* filamentous, branched, clamped, hyaline or slightly encrusted-pigmented, cells ± cylindric, 5–15μ in diam.

Singly or in groups on fallen twigs and branches. On ash and birch, Crowcombe, Somerset, 15 ix 1960; on ? oak, Horner Water, Somerset, 2 ix 1967. Also on deciduous twig, Bettws-y-Coed, Caernarvonshire, 27 viii 1951. Readily distinguished by inodorous flesh, darkish flocculose tough often slightly eccentric stem, dingy cap and habitat on wood.

Patouillard describes the cap as '10–20 *mm*, *brun roux*, *couvert d'un tomentum soyeux appliqué*, marge legèrement striolée', and the stem as '*rigide*, grêle, creux, non renflé à la base, *noir roussâtre plus pâle au sommet*, *entièrement couvert d'une pruinosité blanche*, formée de poils courts incolores et onduleux'. (Italics mine, to emphasise features which are particularly in agreement with my notes.)

The gill edge in all specimens I have seen was flocculose denticulate, often conspicuously so, so that I looked for it at first in the genus *Lentinus*, but without success. It is, however, too soft (apart from the stem) for that genus, I think, and the non-amyloid spores preclude it being in *Lentinellus*. Patouillard compared his collection to *Marasmius foetidus*, which it does certainly resemble superficially in habit and habitat, but I would not include it in *Micromphale* with *M. foetidus* since it has neither gelatinous flesh in the cap nor the characteristic unpleasant smell of that group. It seems to me after examination that it resembles *C. confluens*, *C. acervata*, *C. putilla* or *C. hariolorum* (sensu Kühner & Romagnesi) much more, hence the new combination proposed.

Josserand (Bull. Soc. Mycol. Fr. 71: 87, 1955) has described an agaric under this name which differs slightly in smooth matt cap, a consistently thin stem (1–2 mm in diam.) and slightly longer spores as well as an entire gill edge and gills sometimes with a slight pinkish tinge. This may well be the same but further field work is required on this problem.

Coprinus acuminatus (Romagn.) P. D. Orton, **stat. nov.** Figs. 1, c′ c″; 3, a-c. Basionym:—*C. atramentarius* var. *acuminatus* Romagn. in Rev. Mycol. Paris, 16: 120 (1951).

I have been familiar with this taxon for some time and feel that on account of its differently shaped and narrower spores (see fig. 1, c-d) and consistently smaller fruit-bodies, it should be separated from *C. atramentarius* and raised to specific rank. Although the cap is frequently narrowly umbonate (hence the epithet), it is also not uncommonly rounded convex, so that cap shape is useless as a diagnostic feature. However, one glance at a spore print under the microscope is quite sufficient to confirm its identity in cases of doubt. The habitat is often similar to that of *C. atramentarius*, i.e. attached to fallen or buried wood or on sawdusty soil, but it has also been found apparently on soil, when however, it was probably attached to buried wood. Here is a description of British collections.

Cap 10–30(35) mm high by 12–23(30) mm wide before expanding; 22–60(80) mm when expanded, variously shaped, from rounded-convex to elongate elliptical with mammiform umbo, then expanded with revolute and split margin, greyish often with darker sepia or clay-ochraceous centre, edge often ± silvery grey, usually minutely yellowish-brown or dark sepia scaly at centre, smooth and silky atonate and often radially wrinkled or striate in outer half. *Gills* free, whitish then pinkish, finally blackish-umber, crowded,

edge white flocculose at first. *Stem* 22–60(90)/2–5(9) mm, ± equal or attenuated upwards, often slightly swollen at base, more rarely slightly fusiform and attenuated at base, white then sometimes discoloured pale clay-ochraceous at base, silky striate, base usually with volva-like zone of scales as on cap-centre topped by a ring-like mark, hollow, sometimes with white mycelial strands at base. *Flesh* thin except at centre of cap, ± ochraceous-clay but white in stem cortex. *Spores* ellipsoid slightly amygdaliform with ± conspicuous flat germ-pore, (7½)8–10/4–5¼μ (fig. 1, c), dark umber in mass. *Basidia* 4-spored. *Marginal cystidia* shortly cylindric or vesiculose, 10–18μ in diam. *Facial cystidia* elongate cylindric, sometimes slightly curved, (64)84–180/12–30μ.

Singly or caespitose, often gregarious, on buried wood or old sawdusty ground, sometimes apparently on soil. Mountain Wood, Netley Heath, Surrey, 26 vii 1953 and 21 ix 1961; Covenhope, Herefordshire, 29 xi and 5 xii 1959. Readily distinguished from *C. atramentarius* by narrower spores (width 4–5μ instead of 5–6μ for same length—see fig. 1, c-d) and usually smaller size of fruit-bodies.

Coprinus cothurnatus Godey apud Gillet, Hym. Fr. 605 (1874). Figs. 1, e; 3, d-f.

Having an opportunity to examine a large manured straw heap in Norfolk early one morning a rich harvest of fruit-bodies of several species of *Coprinus* was observed. Amongst these were some which I think can be identified as *C. cothurnatus* Godey, especially as redescribed by Morten Lange (Mycologia 40: 739, 1948). Strangely enough, *C. hexagonosporus* with more markedly hexagonal spores was also present (see below). Both these species seem easily distinguished by spore size and shape and veil characteristics and both are additions to the British List. It was noteworthy on this occasion that whilst fruit-bodies of both these species (and one or two others) were numerous and in all stages of development between 6 and 7 a.m., by 9.30 a.m. only a few rather tattered ones were left and by 11 a.m. nothing at all! The following is a description of this collection of *C. cothurnatus*.

Cap 7–20 mm high by 5–12 mm broad before expanding; 14–40 mm when expanded, conico-convex, conical or elongate cylindrical at first, becoming expanded with split and revolute margin, white or pale ivory then greyish white with radially grooved and split margin, *at first entirely white or greyish granular-floccose scaly, sometimes with darker sepia scales at apex. Gills* free to adnate, whitish then blackish or tinged umber, ± crowded. *Stem* 50–100/2–4½(6) mm, slightly fusiform at first, then equal or slightly thickened at base, white then whitish and discoloured dirty brownish in lower part, *entirely white floccose-scaly* becoming smoother with age, apex minutely white floccose-pruinose when fresh, *lower part often with pinkish or clay-brownish granular veil as on cap* (*often discolouring when bruised*), extreme base sometimes with brownish or reddish tomentum as well, hollow. *Flesh* very thin concolorous. No smell noted. *Spores ellipsoid lentiform, slightly hexagonal in some views*, with flat germ pore, 11½–14½/6–8/7½–9μ (fig. 1, e), dark reddish-brown sub micr. (daylight in NH_4OH), black in mass. *Basidia* 4-spored. *Marginal cystidia* vesiculose or spheropedunculate, a few with papillate apex, 10–44μ in diam. *Facial cystidia* broadly lageniform to clavate,

30–44/8–14μ apex 7–10μ, rather fugacious. *Veil* on cap of globose or broadly ellipsoid fairly thick-walled smooth cells 20–144μ in diam, sometimes with brownish pigment-masses in amongst.

On manured straw-heap Smee Loke, and in field, Wheatfen, Surlingham, Norfolk, 26 and 27 vii 1960. Distinguished from other species with veil consisting of smooth ± globose cells by large slightly angular spores. The base of the stem is not always coloured.

Coprinus hexagonosporus Joss. in Rev. Mycol. 13: 82 (1948). Figs. 1, f; 2, b; 3, g.

As explained under *C. cothurnatus* a good collection of this species was made in Norfolk in 1960. The following is a description of the British material.

Cap 9–33 mm, conical or conico-convex then expanded-conical, finally often plane or depressed, dull date or date-brown umber with paler grey margin, *becoming purplish or reddish-umber in centre when old*, but margin persistently grey, apparently smooth but minutely pruinose sub lente, soon furrowed radially and sometimes splitting or becoming slightly revolute, margin soon crenate, very fragile and thin and papery when old. *Gills* free, lanceolate, grey then blackish, fairly crowded, L 24–32 l (0)–1. *Stem* 38–74/1–2 mm, ± equal, white or hyaline-white, sometimes discolouring pale dirty brownish in lower part, minutely pruinose like cap sub lente (lageniform cells as on cap), becoming hollow and very fragile, base white tomentose. *Flesh* very thin. No smell noted. *Spores lentiform, ellipsoid in one view,* ± *hexagonal in the other,* 10½–13½/6–7/7–8μ (fig. 1, f), *germ-pore* ± *eccentric, sometimes showing peg-like projections towards the apiculus* (not figured), dark chocolate or umber in the mass. *Basidia* 4-spored. Cystidial characters not noted. *Cap* with ± lageniform setules, 40–84/12–16μ with apex 7–12μ and usually slightly swollen (fig. 2, b), as well as spherocysts 20–42μ in diam.

On manured straw heap, Wheatfen, Surlingham, Norfolk, 27 vii 1960. Readily distinguished by spores and cap with setules and sphaerocysts, and tendency to turn purplish in the centre.

Coprinus leiocephalus P. D. Orton, **sp. nov.** Figs. 1, g′ g″; 3, h.
Syn.:— *C. plicatilis* var. *microsporus* Kühner in Bull. Soc. Mycol. Fr. 50: 57 (1934).

I have long felt that it is unsatisfactory to regard this taxon as a variety of *C. plicatilis*, for the spores are not only smaller but also less markedly angular. Although I cannot distinguish it from *C. plicatilis* macroscopically with certainty, I think there may be a habitat difference, for I find *C. plicatilis* characteristic of open grassland or grassy woodland paths, whereas var. *microsporus* I have so far most often found on soil or very rotten wood in damp and shady places. The only macroscopic difference that I have been able to find is that in var. *microsporus* the cap centre is not always depressed in mature caps, which does seem always to be the case in *plicatilis*, which is the only one of this group in which this feature is constant. It would seem then that, for the moment, habitat and spore characters are the only reliable characters usable for separating the species (see key below). As "*microsporus*"

does not seem satisfactory as a specific name, I am redescribing it as a new species using a different name. The collection from Freshfield had the caps in some cases slightly umbonate and was growing singly or subcaespitose on very damp rotten wood. Yet it has the same spores, cap colours and other characters and cannot really be separated.

The species of this group (characterised by having a smooth cap without veil or setules) may be separated as follows:—

1 Growing on dung; spores lentiform, 7–8/5–6/6–7μ . . . *C. miser*
1 Not growing on dung; spores longer 2

2 Spores 8–11/5½–6½/7–8½μ, lentiform, ellipsoid or broadly ovoid slightly angled on the sides in some views (fig. 1, g); commonly in damp places; (cap centre depressed or not, sometimes slightly umbonate; occasionally subcaespitose) . . . . . *C. leiocephalus*
2 Most spores 11μ or more long, angular or not; habitats various; never subcaespitose 3

3 Spores narrowly lentiform, ellipsoid or ovoid, not angular, 11½–12½/6¼–6¾/7–8μ; cap centre not or rarely depressed . *C. hemerbius*
3 Spores strongly lentiform, ellipsoid, ovoid or subglobose, angular on the sides in some views; cap centre depressed or not . . . 4

4 Spores ellipsoid or ovoid, ± distinctly 5- or 6-angled in some views, (10)11–13/6½–7½/8½–10½μ (fig. 1, h); in open grassland or grassy places in woods; cap centre usually depressed when expanded . *C. plicatilis*
4 Spores ellipsoid or subglobose-triangular, 10½–12½/5–7/10–11μ; growing on soil; cap not or hardly expending, semiglobate, centre not depressed (see Watling, Notes R.B.G. Edinb. 28: 42, 1966) . *C. galericuliformis*

It is possible that *C. velaris* Fr., (Epicrisis, 253, 1838), at least as interpreted by Patouillard (Tab. Anal. 436) may be either *C. leiocephalus* or *C. galericuliformis* (by cap shape more likely the latter), but it is probably better to have a firm name based on type material, rather than make tentative use of an old unsubstantiated name, originally based almost solely on cap shape. The following is a description of *C. leiocephalus*:—

Pileus juventute 5–15 mm altus, 4–13 mm latus, dein 13–32 mm, ovoideus vel ellipsoideus dein conico-convexus, postremo expanso-convexus interdum ad discum depressus, castaneus, fulvo-brunneus vel ochraceo-mellinus ad discum obscuriore vel fulvo tinctus, siccitate pallide ochraceus vel sordide cremeus ad discum ochraceo-luteolobrunneus, rufo-brunneus vel fuscus, senectute circa marginem griseascens et radialiter sulcato-striatus, ad discum persistente laevis. *Lamellae* liberae, remotae, anguste lanceolatae, ex albido griseae vel colore pilei tinctae, postremo nigrescentes, vix confertae, L c. 32–40 l 0–1, ad aciem primo albo-flocculosae. *Stipes* (30)62–74(90)/1–2 mm, aequalis vel sursum leviter attenuatus, ex albo vel albido deorsum ochraceo-lutescens vel rufo-brunnescens, glaber, opacus, cavus, fragilis, ad basim albo tomentosus vel strigoso-tomentosus. *Caro* tenuissima, ad discum colore pilei concolorata. *Odor* nullus. *Sporae* lentiformes, ellipsoideae vel ovoideae leviter angulatae, poro germinativo excentrico aliquantum amplo, 8½–11/5½–6½/7–8½μ (fig. 1, g), sub micr. obscure rufo-brunneo, in cumulo fere nigrae. *Cystidia* aciei lamellarum vesiculoso-clavata 30–42/16–32μ, vel lageniformia ad apicem obtusa, 50–84(92)/12–32μ ad apicem 10–18(24)μ

lata. *Cystidia* faciei lamellarum vesiculoso-clavata, pyriformia vel utriformelageniformia ad apicem obtuse lata c. 50–90/16–42μ. *Cellulae cuticulae* pilei globosae vel ellipsoideae, setulae nullae.

Ad terram, solitarius vel catervatim, vulgo in locis humidis; Shobdon, Herefordshire, 24 x 1959; Wheatfen, Surlingham, Norfolk, 18 ix 1965, *P. D. Orton.* (typus in Herb. Kew.); ad solum vel ad lignam putridissimam, solitarius vel subcaespitosus, Freshfield, Lancs., 16 ix 1959. A sporis et probabiliter habitatione distinguitur.

Cap 5–15 mm high, 4–13 mm broad, when expanded 13–32 mm, ovate or ellipsoid in bud then conico-convex, finally expanded-convex, sometimes with depressed centre, varying from deep chestnut or burnt sienna to ochraceous-honey with darker honey or tawny-tinged centre, drying pale ochraceous or dirty cream usually with darker ochraceous-buff, or reddish-brown sepia central spot, outer part becoming grey and radially grooved-striate as the cap expands, the centre remaining smooth. *Gills* free, remote, narrow laceolate, whitish then greyish or tinged colour of cap, finally ± black, not to fairly crowded, L c. 32–40 l 0–1, edge white flocculose at first. *Stem* (30)62–74(90)/1–2 mm, equal or slightly attenuated upwards, white or whitish then buff or creamy ochraceous to reddish-brown in lower part, smooth, matt, hollow, fragile, base white tomentose or strigose-tomentose. *Flesh* very thin, concolorous in centre of cap. *Smell* none. *Spores* lentiform, ellipsoid or ovoid, slightly angular, with fairly large eccentric germ-pore, 8½–11/5½–6½/7–8½μ (fig. 1. g), dark reddish-brown sub micr., blackish in mass. *Marginal cystidia* vesiculose-clavate 30–42/16–32μ, or lageniform with broad apex, 50–84(92)/12–32μ apex 10–18(24)μ in diam. *Facial cystidia* vesiculose-clavate, pyriform or lageniform-utriform with broad apex, c. 50–90/16–42μ. *Cap cuticle* of globose or ellipsoid cells, without setules.

On soil, usually in damp places, solitary or in small troops; Shobdon, Herefordshire, 24 x 1959; The Avenue, Wheatfen, Surlingham, Norfolk, 18 ix 1964 (type in herb. Kew); on soil or very rotten wood, Alder Carr, Freshfield, Lancs., 16 ix 1959.

Cortinarius (*Phlegmacium*) **fulvidolilaceus** P. D. Orton, **sp. nov.** Figs. 1, i; 3, i-j.

Pileus 35–70 mm, e convexo expanso-convexus, margine interdum diu incurvato dein saepe undulato-lobato, ad discum fulvo-umbrinus, circa discum fulvo-ochraceus, ad marginem ochraceus vel pallide ochraceus, viscidus, siccitate forte sericeo-nitidus, juventute ad marginem albo-sericeo-zonatus dein glabrescens. *Lamellae* anguste adnatae leviter emarginatae, saepe aliquantum angustae, pallide argillaceae dein pallide argillaceo-fuscae postremo obscuriore argillaceo-fuscae vix ferrugineo-tinctae, confertae, L 84–112 l 1–3, interdum venosae vel crispatae, ad aciem integrae. *Stipes* 32–70/8–15 mm, aequalis vel levissime clavatus vel bulbo leviter teretimarginato, albidus, ad basim mox luteolo-tinctus vel ochraceo-luteolo-fuscus, ad mediam partem vel infra a vestigiis cortinae albae et veli decoratus quae mox ex sporis ferruginascens, ad basim saepe velo lilaceo plerumque imperfecte interdum haud spectabile 2–3-cinctus, ad basim extremam albo-tomentosus, et interdum irregulariter rugosus, supra solidus, infra saepe cavus, juventute durus. *Caro pilei* alba vel albida, sub cuticula fulvido-vel

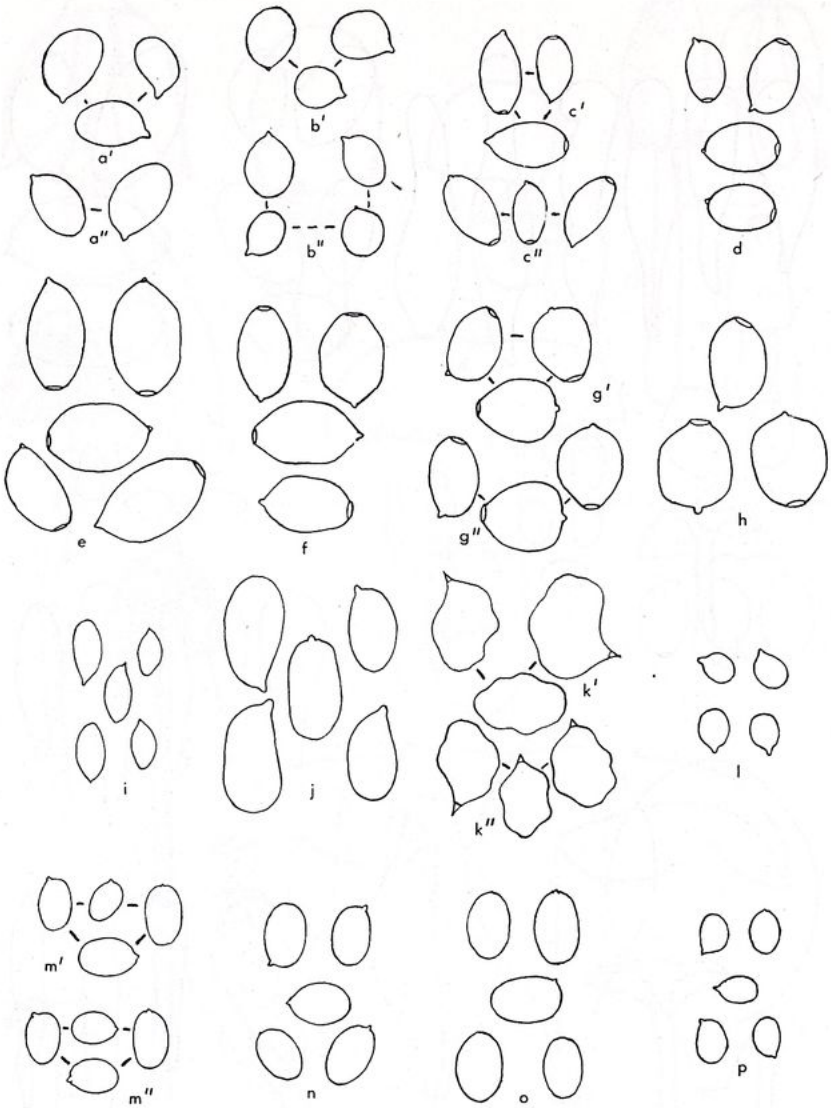

FIG. 1. a′, a″, *Cantharellus ferruginascens:* a′, Mickleham, 20 ix 1961; a″, Bossington, 11 ix 1963. b′, b″, *Tephrocybe fuscipes*, Rannoch: b′, 21 x 1961; b″, 28 x 1965. c′, c″, *Coprinus acuminatus:* c′, Covenhope, 29 xi 1959; c″, Netley Heath, 26 vii 1953. d, *Coprinus atramentarius*, Reading, 31 v 1957. e, *Coprinus cothurnatus*, Surlingham, 27 vii 1960. f, *Coprinus hexagonosporus*, Surlingham, 27 vii 1960. g′, g″, *Coprinus leiocephalus:* g′, Shobdon, 24 x 1959; g″, Surlingham, 18 ix 1964. h, *Coprinus plicatilis*, Surlingham, 13 x 1957. i, *Cortinarius fulvidolilaceus*, Rannoch, 5 x 1965. j, *Hygrocybe aurantiolutescens*, Rock, 18 ix 1965. k′, k″: k′, *Nolanea limosella*, Dryplaid, 2 ix 1954; k″, *Eccilia bisporigera*, Shobdon, 31 x 1959. l, *Limacella ochraceolutea*, Bishop's Lydeard, 30 x 1958. m′, m″, *Paxillus rubicundulus*, Rannoch: m′, 2 x 1965; m″, 22 x 1966. n, *Paxillus involutus*, Rannoch, 28 ix 1965. o, *Pholiota heteroclita*, Tomich, 6 ix 1965. p, *Tricholoma resplendens*, Rannoch, 8 x 1965. (All x 1000).

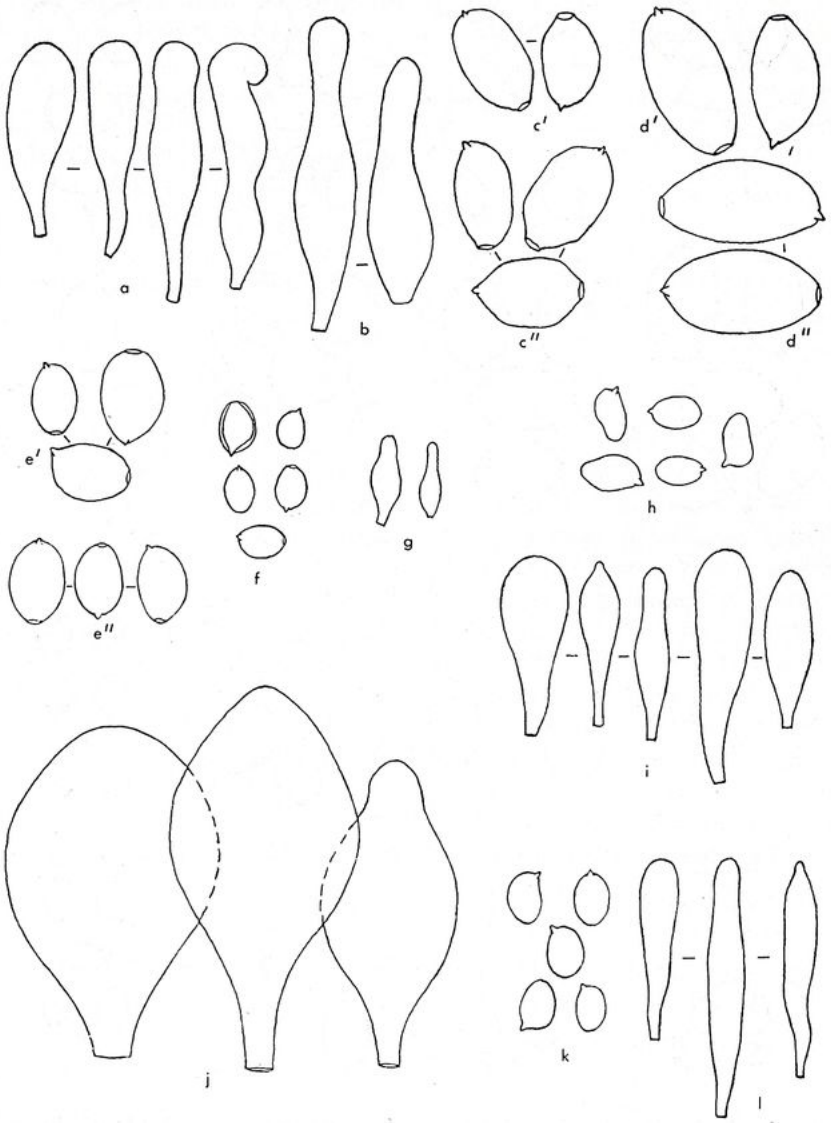

FIG. 2. a, *Collybia inodora*, Crowcombe, 15 ix 1960, marginal cystidia (x 500). b, *Coprinus hexagonosporus*, Surlingham, 27 vii 1960, setules on cap (x 500). c', c'', *Psilocybe coprophila*, spores (x 1000): c', Oxshott, 21 x 1951; c'', Malham, 13 ix 1961. d', d'', *Psilocybe subcoprophila*, Tomich, spores (x 1000): d', 24 viii 1964; d'', 26 viii 1964. e', e'', *Psilocybe pratensis*, spores (x 1000): e', Epsom, 21 xi 1951; e'', Aberlady, 16 xi 1960. f, *Galerina leucolepidota*, Rousdon, 18 vii 1959, spores (x 1000). g, *ibid.*, marginal cystidia (x 500). h, *Limacella medullata*, Lucton, 25 xi 1959, spores (x 1000). i, *ibid.*, marginal cystidia (x 500). j, *Pluteus dryophiloides*, Mickleham, 22 ix 1961, facial cystidia (x 500). k, *Tricholoma aestuans*, Guisachan, 29 viii 1957, spores (x 1000). l, *ibid.*, marginal cystidia (x 500).

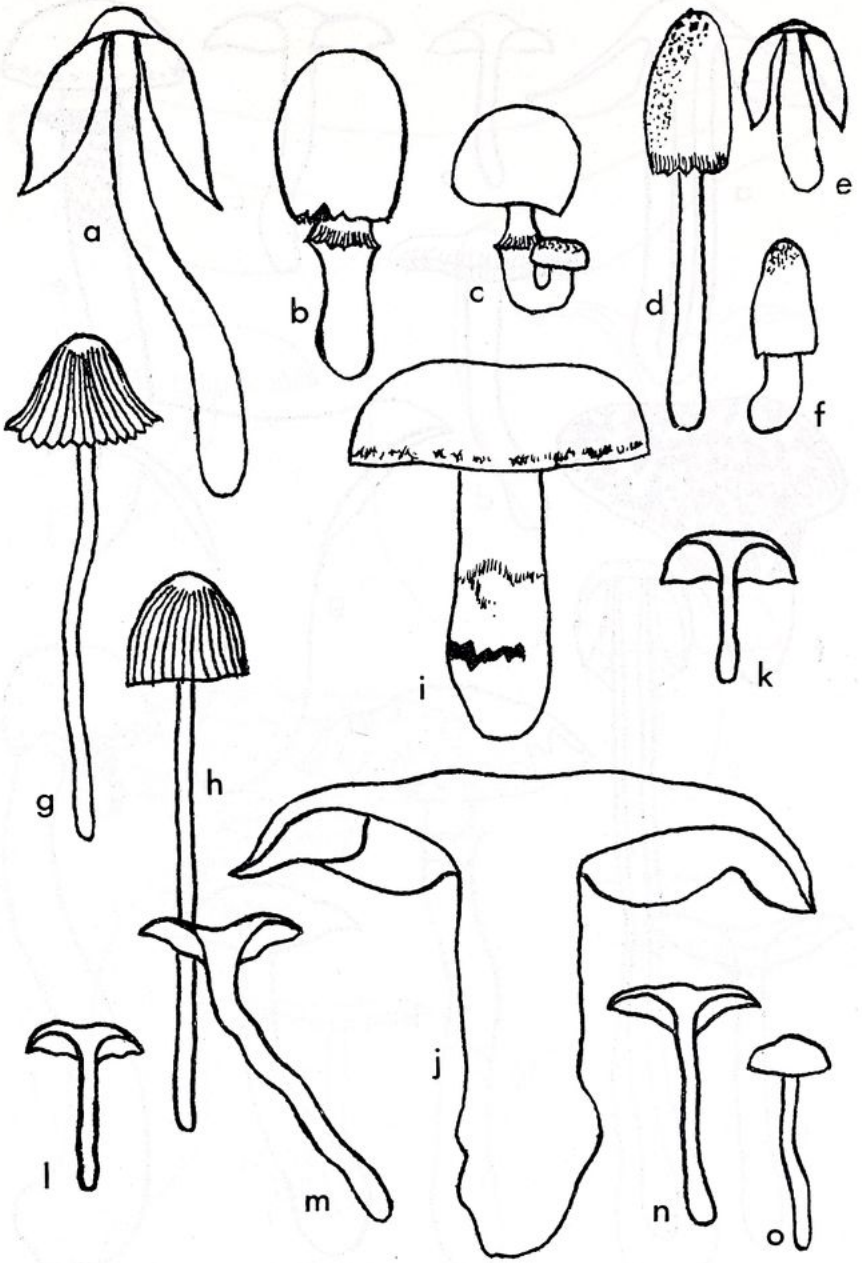

FIG. 3. a, *Coprinus acuminatus*, Covenhope, 29 xi 1959. b, c, *ibid.*, 5 xii 1959 (Figs. b and c show differently shaped caps all from the same mycelium). d, *Coprinus cothurnatus*, Surlingham, 26 vii 1960. e, f, *ibid.*, 27 vii 1960. g, *C. hexagonosporus*, Surlingham, 27 vii 1960. h, *Coprinus leiocephalus*, Surlingham, 18 xi 1964. i, *Cortinarius fulvidolilaceus*, Camghouran, 3 x 1965, showing white scales on cap, cortinal zone and position of lilac veil near base of stem (solid black). j, *ibid.*, 5 x 1965. k, *Psilocybe pratensis*, Epsom, 4 xi 1952. l, m, *Eccilia bisporigera*, Shobdon, 24 x 1959. n, o, *ibid.*, Kingthorpe, 14 ix 1959. (All x 1).

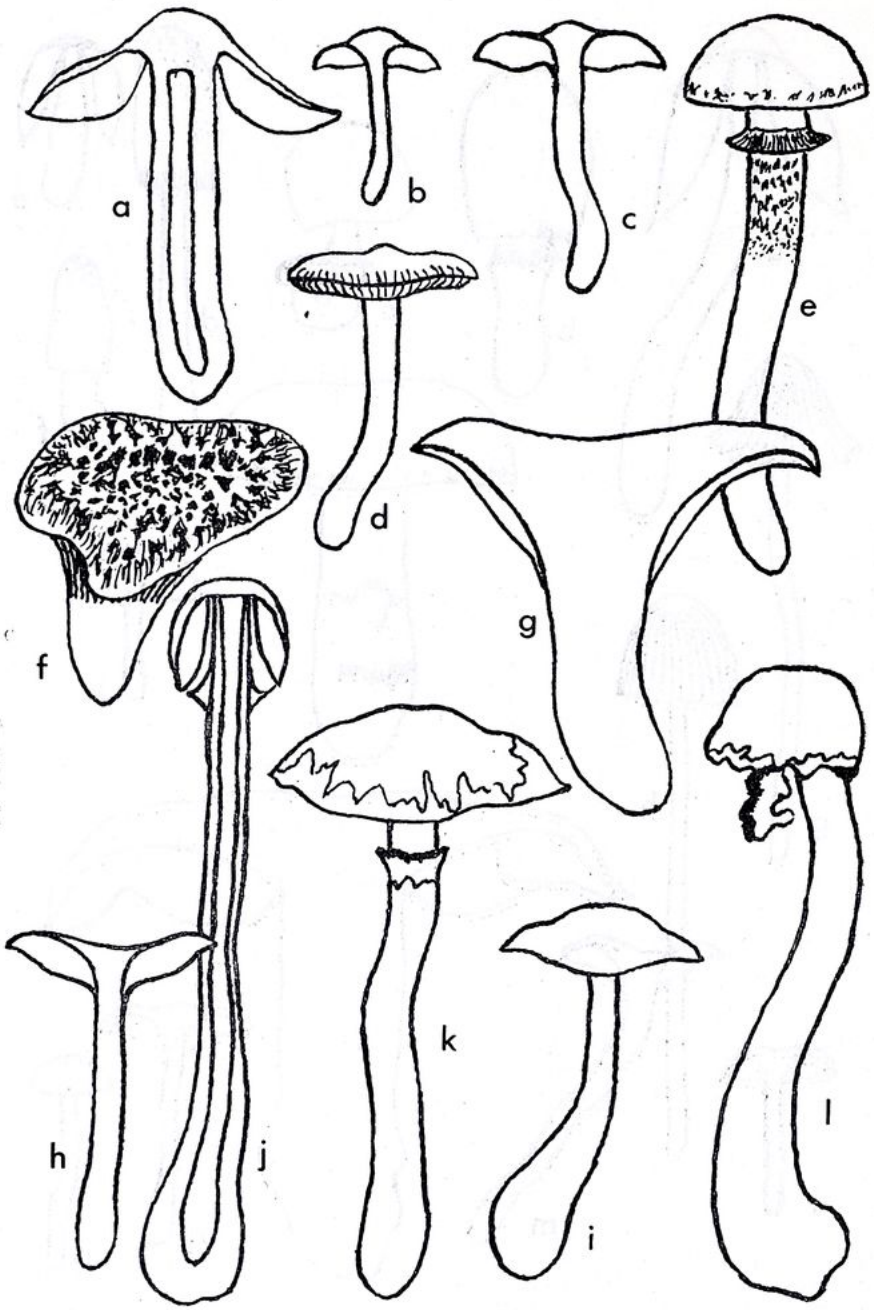

FIG. 4. a, *Hygrocybe aurantiolutescens*, Rock, 18 ix 1965. b, c, d, *Nolanea limosella*, Dryplaid, 2 ix 1954. e, *Galerina leucolepidota*, Rousdon, 18 vii 1959, showing small white or whitish scales on cap and on stem below large spreading ring. f, *Paxillus rubicundulus*, Rannoch, 26 ix 1965, eccentric specimen showing scales on cap. g, *ibid.*, 28 ix 1965. h, i, *Tephrocybe fuscipes*, Rannoch, 21 x 1961. j, *Limacella medullata*, Lucton, 27 xi 1959, section of young fruit-body showing hollow stem and ring. k, *ibid.*, 25 xi 1959, expanded specimen showing excoriated cap and ring still entire and coloured on the upper margin. l, *ibid.*, 26 xi 1959, showing ring broken and adhering partly to margin of cap (All x 1).

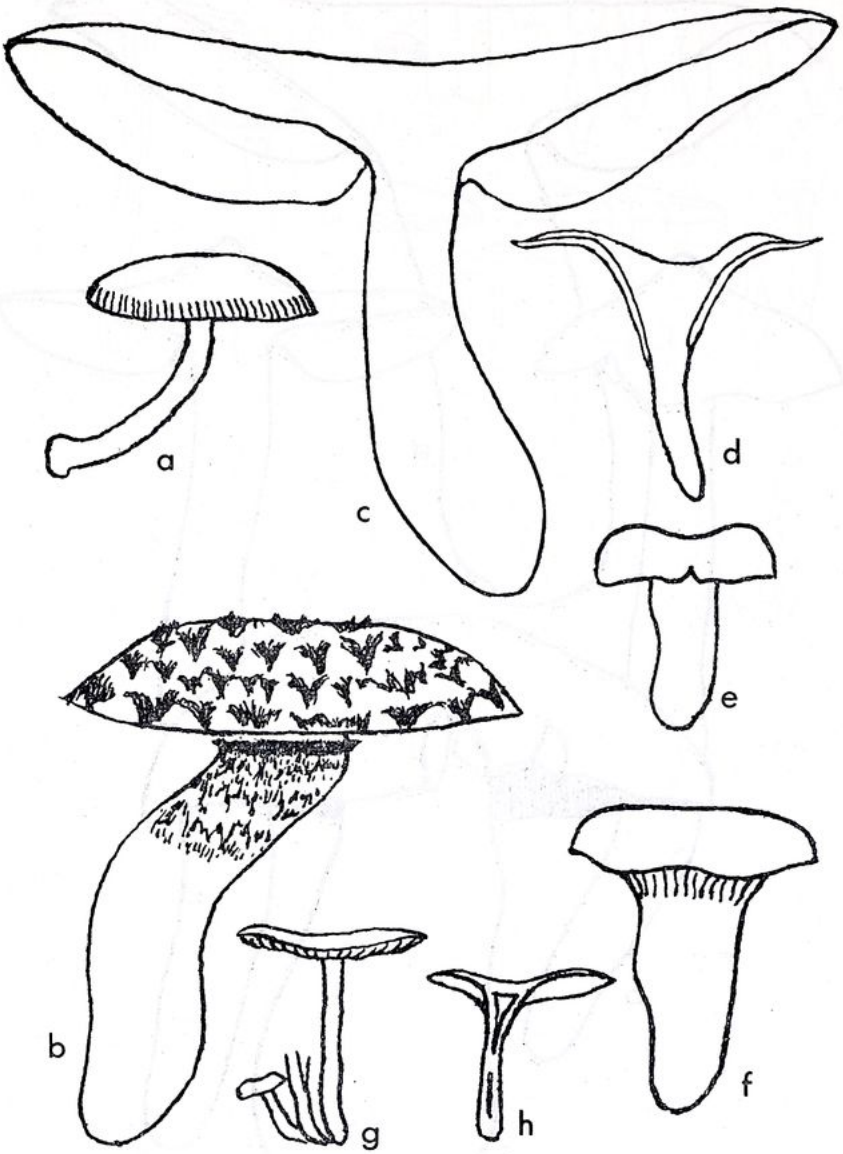

FIG. 5. a, *Pluteus dryophiloides*, Mickleham, 22 ix 1961, mature specimen with wrinkled-striate cap. b, *Pholiota heteroclita*, River Affric, 6 ix 1965, young specimen with thick pale yellowish scales on cap. c, *ibid.*, mature specimen. d, e, *Cantharellus ferruginascens*, Mickleham, 20 ix 1961. f, *ibid.*, Bossington, 11 ix 1963. g, h, *Collybia inodora*, Crowcombe, 15 ix 1960. (All x 1).

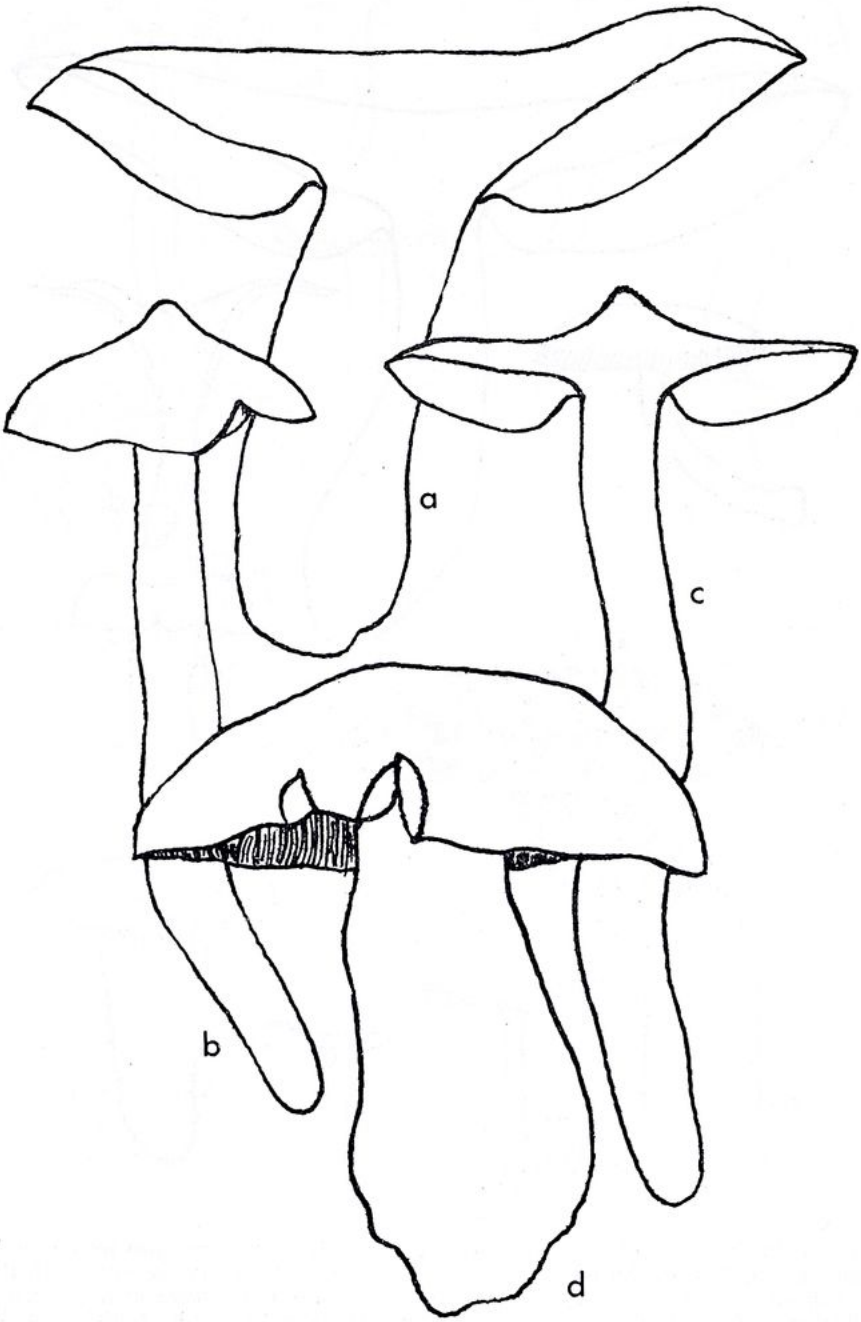

FIG. 6. a, *Tricholoma stans*, Rannoch, 7 x 1964. b, c, *Tricholoma aestuans*, Guisachan, 29 viii 1957. d, *Tricholoma resplendens*, Dall, 22 x 1962. (All x 1).

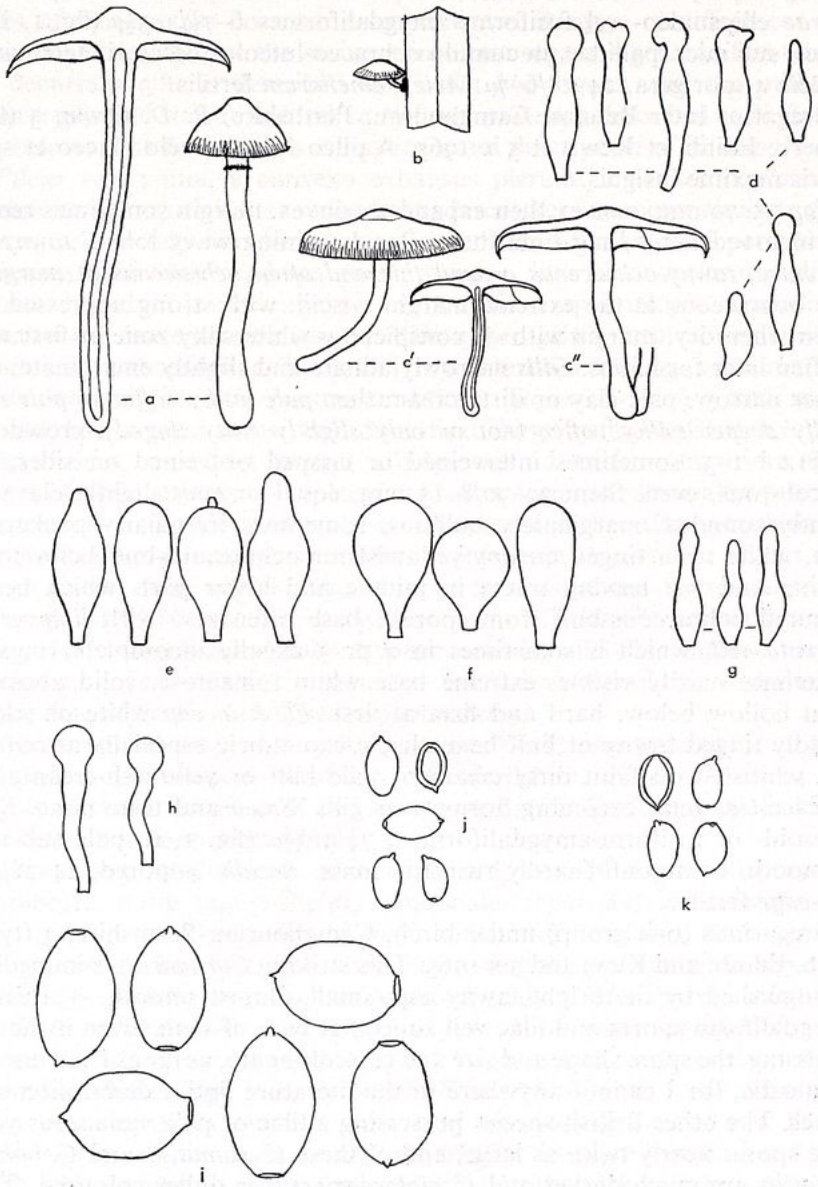

FIG. 7. a, *Galerina myriadophylla*, Rannoch, 29 v 1967 (x 1). b, *Psilocybe caricicola*, Surlingham, 5 viii 1967, (x 1). c', c'', *Psathyrella piluliformis:* c', Netley Heath, 27 viii 1967; c'', Rannoch, 28 x 1967 (x 1). d, *Galerina myriadophylla*, Rannoch, 29 v 1967, marginal cystidia (x 1000). e, *Psathyrella piluliformis*, various dates, facial cystidia (x 500). f, *ibid.*, Horner Water, 8 xi 1959, marginal cystidia (x 500). g, *Psilocybe caricicola*, Surlingham, 5 viii 1967, marginal cystidia (x 500). h, *Panaeolus speciosus*, Camghouran, 27 ix 1967, marginal cystidia (x 500). i, *ibid.*, spores (x 1000). j, *Psilocybe caricicola*, Surlingham, 5 viii 1967, spores (x 1000). k, *Galerina myriadophylla*, Rannoch, 29 v 1967, spores (x 1000).

luteolo-fusco tincta, caro stipitis albida partim argillaceo-cremeo vel luteolo tincta, saepe juxta lamellas mox colore cornu tincta. *Odor et sapor* nulli. *Sporae* ellipsoideo- vel fusiforme-amygdaliformes 6–7½/3–3½μ (fig. 1, i), ± laeves, sub micr. pallidae, in cumulo ochraceo-luteolo-fuscae vix ferrugineae. *Basidia* 4-sporigera, 24–28/6–7μ. *Acies lamellarum* fertilis.

Gregarius inter Betulas, Camghouran, Perthshire, *P. D. Orton*, 3 (typus in herb. Edinb. et Kew.) et 5 x 1965. A pileo fulvido, velo lilaceo et sporis parvis maxime insignis.

Cap 35–70 mm, convex then expanded-convex, margin sometimes remaining incurved for a long time then often becoming wavy lobed, *tawny-date at centre, tawny-ochraceous around this and often ochraceous at margin* or pale ochraceous at the extreme margin, viscid, with strong adpressed silky sheen when dry, margin with ± conspicuous white silky zone at first which is often later fugacious. *Gills* narrowly adnate and slightly emarginate, often rather narrow, pale clay or dirty cream then *pale milky coffee or pale sepia, finally deeper milky coffee* (*not or only slightly rusty tinged*), crowded, L 84–112 l 1–3, sometimes interveined or crisped or veined on sides, edge concolorous, even. Stem 32–70/8–15 mm, equal or very slightly clavate or slightly rounded, marginately bulbous, sometimes irregularly puckered at base, white soon tinged creamy-yellowish or ochraceous-buff below, white cortina and veil leaving traces in middle and lower part (which become coloured ochraceous-buff from spores), base often also with *lilac or pale magenta veil*, which is sometimes in 2 or 3 usually incomplete rings and sometimes hardly visible, extreme base white tomentose, solid above but often hollow below, hard and firm at first. *Flesh in cap* white or whitish, broadly tinged tawny or buff beneath the cap cuticle especially at centre of cap, whitish with faint dirty cream or pale buff or yellowish-creamy tinge in places in stem, becoming horny over gills. *Smell* and taste none. *Spores* ellipsoid- or fusiform-amygdaliform, 6–7½/3–3½μ (fig. 1, i), pale sub micr., ±smooth, ochre-buff (hardly rusty) in mass. *Basidia* 4-spored, 24–28/6–7μ. *Gill-edge* fertile.

Gregarious (one group) under birch, Camghouran, Perthshire, 3 (type in Herb. Edinb. and Kew) and 5 x 1965. This striking *Cortinarius* is immediately distinguished by the bright tawny cap, small, almost smooth, ± fusiform-amygdaliform spores and lilac veil zone(s) at base of stem. Even if the latter is missing, the spore shape and size and cap colour are, as far as I can discover, diagnostic, for I cannot anywhere in the literature find a description which agrees. The other British species possessing a lilac or pale violaceous veil all have spores nearly twice as large, and of these *C. cumatilis* and *C. balteato-cumatilis* are much darker and *C. violaceocinctus* is duller coloured. This is "species nobilissima" as Fries would say.

Eccilia bisporigera P. D. Orton, **sp. nov.** Figs. 1, k″; 3, l–o.

For some time now I have had notes on some collections of Rhodophyllaceous agarics with 2-spored basidia not in the List. All occurred in damp places and I at first thought they were all the same. However after studying spore drawings done by camera lucida and reconsidering macroscopic characters I have come to the conclusion that two taxa are concerned and I am therefore describing both as new species, since I can find no descriptions

which fit them convincingly. I thought and hoped at one time that I might have rediscovered *Agaricus limosus* Fr., (1838), but the description given by Fries of that species does not seem to agree. Because of differences in gill attachment they go for the moment into two separate genera. The one with ± decurrent gills is described as *Eccilia bisporigera*, and the other with adnate gills and stature not unlike *Nolanea radiata* is described as *N. limosella* see below). The following is a diagnosis and description of *E. bisporigera*.

Pileus 10–23 mm, e convexo expansus plerumque leviter depressus vel umbilicatus, rariore leviter umbonatus, fuscus vel brunneus, siccitate griseo-fuscus vel sordide luteolo-brunneus, interdum ad marginem persistentiore obscurus, jove pluvio ad marginem striatus, jove sicco sericeo-nitidus, ad discum interdum leviter rugulosus vel ruguloso-squamulosus. *Lamellae* late adnatae vel dente decurrentes e pallide griseo griseo-incarnatae dein fusco-incarnatae, subconfertae, L 18–27 l 1–3, interdum venosae vel furcatae, ad aciem integrae juventute crassae et obtusae. *Stipes* 20–35/1½–3 mm, aequalis vel ad basim attenuatus, interdum flexuosus, hyalino-griseus vel pallide griseo-fuscus, interdum partim albidus vel ad basim obscuriore fuscus, minute sericeo-striatus vel ± laevis sed ad apicem juventute albo-pruinosus, farctus, primo firmus. *Caro* pilei et ad apicem stipitis alba vel albida, caro stipitis hyalino grisea, juxta lamellas et interdum in corticem stipitis colore cornu tincta. *Odor* saltem secto et sapor forte farinacei. *Sporae* ellipsoideo-oblongae angulatae, 10–12/6½–7½(8)μ, (Fig. 1, k″). *Basidia* 2-sporigera 36–46/8–10μ. *Acies lamellarum* fertilis. *Hyphae cuticulae* pilei filamentosae, ramosae, fibulatae, 4–10μ crassae, brunneolo- vel griseo-vacuolatae interdum hac atque illac nigro-brunneo lineato-pigmentatae.

Ad terram vel prope Alnos, Kingthorpe, Yorkshire, 14 ix 1959; ad terram palustrem, Downwood, Shobdon, Herefordshire, *P. D. Orton* 24 et 31 (typus in Herb. Edinb. et Kew.) x 1959. A habitu Ecciliae, basidiis bisporigeris et habitatione distinguitur.

Cap 10–23 mm, convex then expanded, usually slightly depressed or umbilicate, more rarely slightly umbonate, *sepia horn or vandyke drying pale greyish or dirty yellowish-buff*, sometimes retaining dark colour at margin, *striate* in outer part when moist, with silky sheen when dry, centre sometimes slightly rugulose or rugulose-scaly. *Gills broadly adnate with tooth to subdecurrent, pale grey or pale horn then greyish-pink, finally brownish-pink*, fairly crowded, L 18–27 l 1–3, sometimes veined on sides or forked in places, edge even, rather thick and blunt when fresh. *Stem* 20–35/1½–3 mm, equal or slightly attenuated downwards, sometimes flexuose, *hyaline-grey or pale horn*, sometimes whitish in places or darker at base, apex white pruinose when fresh, minutely silky striate below this or ± smooth, stuffed, firm at first. *Flesh* white or whitish in centre of cap and stem apex, hyaline-grey in stem, horny over the gills and sometimes in cortex of upper part of stem. *Smell strongly mealy* (but sometimes faint until cut). *Taste* strong mealy. *Spores* oblong-angular 10–12/6½–7½(8) μ. (Fig. 1, k″). *Basidia 2-spored*, 36–46/8–10μ. *Gill-edge* fertile. *Hyphae of cap* cuticle 4–10μ in diam., branched, clamped, with pale brownish or greyish vacuolar contents, in darker specimens with dark brown granular pigment, which may be in stripes. Shorter broader hyaline cells, 8–28(38)μ, can be seen below these.

On wet ground by stream under alder, Kingthorpe, Yorkshire, 14 ix 1959;

amongst willow debris under grass tussock or in *Carex* in dried up swamp, Downwood, Shobdon, Herefordshire, 24 and 31 (type in Herb. Edinb. and Kew) x 1959. Readily distinguished by eccilioid habit, 2-spored basidia, spore shape and habitat. The rather similarly coloured 2-spored *Nolanea limosella* has rather larger more strongly nodulose-angular spores (see fig. 1, k″) and is more robust with gills not decurrent and usually less broadly adnate. *E. paludicola* also has dark pigment in the cap but is 4-spored, rather darker coloured and has relatively broader spores. *E. polita* is 4-spored with angular-ellipsoid spores and rather browner cap and stem and does nöt smell or taste mealy.

Galerina leucolepidota P. D. Orton, **sp. nov.** Figs. 2, f, g; 4, e.

Some years ago I collected an unfamiliar agaric which turned out to be obviously akin to *G. mutabilis* when examined under the microscope. It differed obviously macroscopically, however, in having a white veil, which left white scales on the cap and stem, unlike the characteristic brown scales of *mutabilis*. My description and paintings were shown to A. H. Smith, who said (per Watling) that this was unlike any N American species of *Kuehneromyces* known to him. Having failed to find any description that fits it, I am therefore describing it as a new species, of which the following is a diagnosis and description.

Pileus (15)20–40 mm, e convexo expanso-convexus, vulgo obtuse umbonatus, mellinus vel ochraceo-mellinus saepe ad marginem obscuriore rufo-brunneo-mellinus, siccitate a disco marginem versus ochraceo-lutescens saepe ad discum fulvo-tinctus, ad marginem persistentiore obscuriore coloratus, jove pluvio leviter viscidus et interdum ad marginem leviter striatus, siccitate opacus vel leviter rugulosus, ad marginem primo a velo appendiculato albo squamulis albis lutescentibus minutis aliquantum fugacibus obtectus. *Lamellae* late adnatae interdum leviter emarginatae vel dente parvo decurrentes, pallide argillaceo-mellinae dein obscuriore argillaceo-mellinae vel -luteolo-brunneae, subconfertae, L 38–44 l 3(–7), ad aciem primo manifeste albido-floccosae. *Stipes* 44–80/4–7 mm, ± aequalis vel deorsum vel ad basim atteniatus, albidus infra rufo-ferrugineo-tinctus dein sursum obscuriore rufo-brunnescens, ad apicem persistentiore pallidiore coloratus et leviter luteolo-pruinosus et interdum a lamellis striatus, deorsum fibrilloso-striatus, e velo albo dein albido vel cremeo annulatus et fibrilloso-squamulosus; annulus apicalis, 9–14 mm latus dein adpressus, supra striatus et mox a sporis discoloratus, infra fibrillosus vel floccoso-squamulosus, ad aciem minute laceratus vel radialiter fissuratus. *Caro* pilei albida vel pallide cremea, stipitis pallide interdum in corticem obscuriore rufo-brunnea, sub cuticulam ochraceo-fulvo tincta. *Odor* et *sapor* debiles vel grati. *Sporae* ellipsoideae vel fere ovoideae, laeves, poro germinativo parvo, 5–6½/3½–4½μ (fig. 2, f), in cumulo pallide ferrugineo-fuscae. *Basidia* 4-sporigera, 16–20/5–6μ. *Cystidia aciei lamellarum* obtusa breviter lageniformia, 14–24/5–7μ ad apicem 3–4μ (fig. 2, g). *Cystidia faciei lamellarum* nulla. *Hyphae* cuticulae pilei 1½–6μ latae, filamentosae, ramosae, fibulatae.

Fere caespitosus ad lignum Fraxini, Whitlands Landslip, Rousdon, Devon, *P. D. Orton*, 18 et 20 vii 1959 (typus in Herb. Edinb. et Kew.). A velo albo annuloque magno et sporis facillime distinguitur.

Cap (15)20–40 mm, convex then expanded-convex usually obtusely umbonate, *honey or ochraceous-honey with darker date-honey margin when moist, soon drying ochraceous-yellowish from the centre out*, often with slight tawny tinge at centre, frequently seen bicoloured with darker often rather persistently darker marginal zone, when moist slightly greasy-viscid and striate or not at margin, when dry matt or slightly rugulose, *margin with appendiculate fragments of white veil at first and also scattered white then creamy-yellowish minute rather fugacious scales from veil in outer one-third.* Gills broadly adnate, sometimes slightly emarginate or with small tooth, pale clay-honey then *pale clay-buff or deeper clay-honey*, fairly crowded, L 38–44 l 3(–7), edge conspicuously whitish flocculose at first. *Stem* 44–80/4–7 mm, ± equal or attenuated downwards or at base, whitish with slight reddish-brown tinge below, *soon discolouring deep reddish-brown or date from the base up*, apex remaining paler and slightly yellowish pruinose and sometimes striate from gills, lower part fibrillose-striate, *white then whitish or creamy-yellowish veil forming large ring near apex and small fibrillose-floccose often concentric scales below this;* ring membranaceous, 9–14 mm in diam., later collapsing, white, striate above and soon discoloured by spores, fibrillose or minutely floccose-scaly below, with the edge minutely lacerate and often splitting radially. *Flesh* whitish or pale cream in cap, pale reddish-brown in stem (sometimes darker in cortex), tinged tawny-ochraceous under the cap cuticle. *Smell* and taste faint to fairly strong, pleasant fungussy. *Spores* ellipsoid or ± ovoid, smooth, with small germ-pore, 5–6½/3½–4½μ (fig. 2, f), pale chocolate-rusty in mass. *Marginal cystidia* shortly lageniform with obtuse apex, 14–24/5–7μ apex 3–4μ (fig. 2, g). *Facial cystidia* absent. *Hyphae* on cap, filamentous, branched, clamped, 1½–6μ in diam.

On ash stump, ± caespitose, Whitlands Landslip, Rousdon, Devon, 18 and 20, (type in Herb. Edinb. and Kew) vii 1959. Readily distinguished by white veil, large ring and spore details.

Galerina myriadophylla P. D. Orton, **sp. nov.** Fig. 7, a, d, k.

Icon. et descr.: Favre, Catalogue descriptif des champignons supérieurs de la zone subalpine du Parc National Suisse, 544, fig. 92 (1960) as *Kuehneromyces vernalis* (Peck) Singer & Smith.

Each spring recently I have noticed an agaric growing in dense tufts on the pine sawdust at the site of the sawmill at Dall in Perthshire, but it has usually been so dried up that I could not deal with it. In 1967, however, in the wet weather experienced in May I was able to examine it thoroughly and in large quantities. Furthermore it appeared on pine sawdust elsewhere in the neighbourhood, which gave me a broader knowledge of it. I found that it was clearly a species belonging to *Galerina* section *Kuehneromyces*, differing from *G. mutabilis* in the lack of brown scales on stem, duller colours and spore print, more crowded gills and marginal cystidia often with protuberances. I think this is *K. vernalis* (Peck) Singer & Smith sensu Favre and probably also Lundell (Fungi Exsicc. Suec. 2026 as *Pholiota vernalis* Peck) but not the N American *K. vernalis*. Watling, who has collected *K. vernalis* in N America, confirms (pers. comm.) that the latter is a different species, which differs in brighter colours and has vesiculose marginal cystidia as

well as clavate ones with or without protuberances. I am therefore describing this as a new species, of which the following is a diagnosis and description.

Pileus 8–60 mm, e conico vel convexo expanso-convexus vel fere planus, interdum obtuse umbonatus, saepe senectute ad marginem undulato-lobatus, unicolorato mellino-luteolo-brunneus vel ochraceo-mellinus, siccitate cremeus, ochraceo-luteolus vel luteolo-brunneus saepe ad discum obscuriore coloratus, dum siccat circa marginem zona obscuriore videtur, jove pluvio leviter viscidulus et exstriatus vel solum ad marginem striatus, jove sicco opacus minute sericeo-atomatus. *Lamellae* adnatae vel adnato-decurrentes, angustissimae, pallide ochraceo-luteolo-brunneae vel -mellinae dein obscuriore mellino-luteolo-brunneae, postremo ± fusco-ferrugineae, confertissimae, L 28–56 l 3–7(–11), ad aciem sub lente primo minute denticulatae. *Stipes* 24–85/1–5 mm, (a compressione < 8 mm), aequalis vel ad basim incrassatus, saepe flexuosus vel distortus compressusque, primo mellino-luteolo-brunneus dein sursum ferrugineo-fuscus vel brunneus, ad apicem persistentiore pallidus, e velo pallido cortinato apicale fere fugace annuloso-zonatus, et maculis dispersis obtectus, rariore infra fibrilloso-striatus vel interdum laevis, ad apicem a lamellis striatus et albido vel pallide luteolo-brunneo pruinosus, cavus, primo admodum tenax dein fragilis, ad basim albido-tomentosus vel strigosus, interdum mycelio radicato albido vel sordide rufulo. *Caro* ad discum pilei crassa, siccitate ochraceascens vel luteolo-brunnescens, stipitis obscuriore brunnea, saepe juxta lamellas vel sub cuticula pilei cornea. *Odor* nullus vel saltem secto forte acidulus. *Sapor* debilis vel leviter rancidus. *Sporae* ellipsoideae, laeves, poro germinativo parvo, 5½–7/3½–4½μ, in cumulo fusco-ferrugineae. *Basidia* 4-sporigera, 18–22/6–7μ. *Cystidia aciei lamellarum* obtuse-lageniformia ad apicem 2–4μ lata vel capitato-lageniformia capitulo vulgo irregulare vel a partibus appendicibus brevibus ornato 5–9μ lato (fig. 7, d). *Cystidia faciei lamellarum* nulla. *Hyphae cuticula pilei* filamentosae, ramosae, fibulatae, vulgo incrustato-pigmentatae, interdum leviter gelatinosae, 3–12μ latae. *Hyphae veli* vulgo incrustato-pigmentatae, 3–8μ latae.

Dense caespitosus vel gregarius a scobe coniferarum (*Pinus sylvestris*), Dall, Perthshire, 29 v bis 16 vi 1967, *P. D. Orton* (30 v 1967 typus in Herb. Edinb. et Kew.). Species vere vernalis a habitu, coloribus sordidis et lamellis angustissimis confertissimis facile distinguitus. *K. vernalis* a cystidiis vesiculosis vel dendriformibus, coloribus clarioribus et annulo distinctiore differt.

Cap 8–50 mm, conical, conico-convex or convex then expanded-conical to ± plane, sometimes obtusely umbonate, often wavy-lobed at margin when old, *uniform honey-buff or ochraceous-honey, drying creamy, ochraceous-yellowish or -buff* often with darker central spot, *with darker marginal zone when half-dry*, greasy-shiny and not striate or striate at margin only when moist, matt and minutely silky-atomate when dry. *Gills* adnate-decurrent or adnate with tooth, *very narrow*, pale ochraceous-buff or -honey then *deeper honey-buff* (almost colour of moist cap), finally ± tobacco or cigar-brown, *very crowded*, L 28–56 l 3–7–(11), edge ± conspicuously minutely denticulate under a lens when fresh. Stem 24–85/1–5 mm (< 8 mm when compressed), equal or thickened at base, often flexuose or contorted and compressed, at first honey-buff like cap but *soon vandyke or reddish-date from base up*, apex often remaining paler for some time and striate from

gills and whitish or pale buff pruinose, pale fibrillose *veil cortinate, apical, usually forming ± fugacious ring-zone with a few scattered patches below*, more rarely forming thin membranaceous ring, lower part fibrillose-striate or sometimes smooth or with undulated surface, hollow, fairly stiff at first but soon fragile, base whitish tomentose or ± strigose, sometimes with a few whitish or pallid reddish mycelial strands. *Flesh* thick at disc, drying ochraceous-cream or -buff or yellowish in centre of cap, darker in stem, often horny over gills or under cuticle of cap centre. *Smell* none to strong fungussy-acid, especially when cut. *Taste* fungussy or slightly rancid. *Spores* ellipsoid, smooth, with small germ-pore, 5½–7/3½–4½μ, in mass deep snuff or cigar brown. *Basidia* 4-spored, 18–22/6–7μ. *Marginal cystidia* lageniform-capitate to lageniform with obtuse apex, capitulum often irregular or with short projection(s) at sides, often flat-topped, 20–45/6–10μ, apex 2–4μ or when capitate 5–9μ (fig. 7, d). *Facial cystidia* absent. *Hyphae of cap surface* 3–12μ in diam., filamentous, branched, clamped, often encrusted pigmented, sometimes slightly gelatinised. *Hyphae of veil* 3–8μ in diam., often encrusted pigmented.

Densely caespitose or gregarious on pine sawdust. Dall, Perthshire, 29 v to 16 vi 1967 (30 v 1967—type in Herb. Edinb. and Kew). A seemingly truly vernal species recognised by habit, dull colours and very crowded gills. Differs from *G. mutabilis* in lack of scales on stem, habitat, duller colours, very narrow crowded gills, and marginal cystidia, and from *K. vernalis* in absence of vesiculose or dendriform marginal cystidia, duller colours and less substantial ring. Often found in extended line or rings of tufts containing many hundreds or even thousands of individuals.

Hygrocybe aurantiolutescens P. D. Orton, **sp. nov.** Figs. 1, j; 4, a.

Whilst investigating sand-dunes in Cornwall after a rainy spell in September 1965, I came across several groups of a red, orange and yellow *Hygrocybe* which did not fit any of the species on the British list, chiefly on account of the spores, which were too big for *H. aurantiosplendens* which seemed nearest macroscopically. I at first thought this might be a 4-spored form of *H. langei* Kühn, but it did not look like *langei* when collected, and indeed differs in several respects—see below. Its colours are more or less those of *H. aurantiosplendens*, but this has spores only 7–9μ long.

As there seems to be no description that fits that I can find in European or N American literature, I am describing this as a new species. In the key to *Hygrophorus* in the List, part III: 254, this would key out with *H. langei* in couplet 42, which may be amended thus:—

42 Spores ellipsoid-oblong or cylindric-ovoid, sometimes slightly constricted, 10¼–14(15)/5¼–7½(8)μ; basidia 2- or 4-spored 42a

42 Spores subglobose, broadly ovoid or pruniform, 6–10(11)μ broad; basidia (1)–2–4-spored or 4-spored 43

42a Basidia 2-spored; spores ellipsoid-oblong, 11–14(15)/5½–7½(8)μ; gills lemon or sulphur-yellow, rarely tinged slightly chrome; cap usually markedly and persistently conical, very viscid and striate at edge when moist, orange-red with yellower margin at first, then entirely pale chrome or lemon; stem orange or orange-red above, grey-lemon or whitish below . . . . . *H. langei*

42a Basidia 4-spored; spores ellipsoid-oblong or cylindric-ovoid, sometimes slightly strangulate, 10½–13½(14½)/5½–6½μ (fig. 1, j); gills pale then deeper chrome-yellow, sometimes becoming flushed orange; cap obtusely conical then expanded-conical or ± plane, fairly viscid and shiny when moist but not seen striate, scarlet or orange-scarlet then chrome-yellow in places or entirely so, finally discolouring pale lemon- or sulphur-yellow; stem chrome-yellow, sometimes with orange flush, then lemon-yellow, base whitish . . . . . *H. aurantiolutescens*

The other red British species of *Hygrocybe* typical of maritime habitats, *H. conicoides*, is more persistently red and has gills becoming deep red, and is a blackening species. Singer, The Agaricales, 2nd. edition: 197 (1962), synonymises this with *H. foliirubens* Murrill. I do not agree with this, for *foliirubens* is clearly stated not to be a blackening species, whereas *H. conicoides* is (and is equally clearly stated to be) a blackening species; also the spores of *H. foliirubens* are too small (8–10/3½–4½μ as opposed to 9½–13/4–5μ for *H. conicoides*), and the colours are not the same either (cap 'purplish-ruber', and gills 'ochroleucous becoming miniatous'). The habitat, too, 'on a lawn, under oak', is different, though perhaps not so important a difference. Taking all these things into consideration I do not see any grounds for synonymising these species at all, merely because they both have narrow spores and reddish gills.

The following is a diagnosis and description of *H. aurantiolutescens*.

Pileus 30–50 mm, ex obtuse conico vel conico-convexo expanso-convexus vel fere planus, interdum obtuse umbonatus, e coccineo vel aurantio-coccineo aurantio-flavus interdum hac atque illac flavus, siccitate vel senectute lutescens vel citrinus, jove pluvio nitente viscidulus, siccitate praecipue circa marginem minute radialiter albido-sericeus, saepe ad marginem radialiter fissuratus, *Lamellae* liberae vel anguste adnatae, ± ventricosae, pallide dein obscuriore flavae ad marginem pallidiore flavae, senectute interdum leviter sordide aurantiaco-tinctae, subconfertae, L 48–60 l (0)–1–3, ad aciem fere integrae. *Stipes* 48–60/6–10 mm, (a compressione < 12 mm), aequalis vel ad basim leviter attenuatus, flavus vel aurantiotinctus, senectute vulgo citrinus, ad basim albidus, fibrilloso-striatus, aliquantum firmus, vix viscidus, cavus. *Caro pilei* concolorata, siccitate pallide luteola saepe juxta lamellae flavo-cornea, caro stipitis pallide flavus vel citrinus, ad basim stipitis alba. A nullam partem nigrescens. *Odor* nullus. *Sporae* ellipsoideo-oblongae vel cylindraceo-ovoideae, interdum leviter strangulatae, 10½–13½(14½)/5½–6½μ (fig. 1, j). *Basidia* 4-sporigera, 38–52/9–10μ. *Acies lamellarum* fertilis.

In locis arenosis graminosis maritimis, Rock, Cornwall, 18 ix 1965, *P. D. Orton* (typus in Herb. Edinb. et Kew.). A coloribus et sporis facile distinguitur. *H. langei* proxime accedit sed a basidiis 2-sporigeris, coloribus et habitatione differt.

Cap 30–50 mm, obtusely conical or conico-convex then expanded-conical or ± plane, sometimes obtusely umbonate, *scarlet or orange-scarlet fading to orange-chrome, sometimes chrome-yellow in places* (especially at the centre), margin often sulphur or deep lemon-yellow when cap is expanded, when old or dry entirely yellow, fairly viscid and shiny when wet, when dry

minutely radially whitish silky especially at margin and around the centre, often splitting radially at edge. *Gills* free or narrowly adnate, ± ventricose, *pale then deeper chrome-yellow with paler margin*, sometimes with slight dirty orange flush when old, fairly crowded, L 48–60 l (0)–1–3, edge even or slightly uneven. *Stem* 48–60/6–10 mm (< 12 mm when compressed), equal or slightly attenuated at base, *chrome-yellow or tinged orange, often more lemon-yellow when older, base whitish*, fibrillose striate, rather firm and tough, hardly viscid, hollow. *Flesh* concolorous, drying pale yellowish in cap, often chrome-horny over the gills, pale chrome or lemon in stem, white in stem base. Not blackening in any part. *Smell* none. *Spores* ellipsoid-oblong or cylindric-ovoid, sometimes slightly constricted, 10½–13½(14½)/5½–6½μ (fig. 1, j). *Basidia* 4-spored, 38–52/9–10μ. *Gill-edge* fertile.

In grassy semi-fixed sand-dunes, Rock, Cornwall, 18 ix 1965 (type in Herb. Edinb. and Kew). Readily distinguished from all other similarly coloured British species (with free or narrowly adnate gills) by spore size. *H. aurantiosplendens* has much shorter smaller spores, 7–9(10)/4–4½μ. For differences from *H. langei* see key above.

I suspect the whole fruit-body may discolour lemon-yellow in bad weather or when old, for on the same date I found two such coloured expanded specimens, which had identical spores, but were growing apart from the others. Further observations are needed to be sure of this.

Limacella medullata (Fr.) P. D. Orton, **comb. nov.** Figs. 2, h, i; 4, j–l.
Basionym: *Agaricus* (*Lepiota*) *medullatus* Fr., Epicrisis: 19 (1838).
Synonym: *Lepiota medullata* (Fr.) Quél., Champ. Jur. Vosges: 36 (1872).
Icon.: Barla, Champ. Alpes Maritimes 16, 18–22 (1888). Cooke, Ill. Brit. Fungi 1: 44, 44 (1881–3).

In 1959, a small group of puzzling agarics turned up in the garden of the house where I was living at that time. On first examination this seemed likely to be *Lepiota medullata*, which according to modern concepts one would expect to need transference to *Limacella*. Subsequent thorough study of the collection and of the literature makes me conclude that I had indeed collected *Agaricus medullatus* Fr. and that since it has a sub-viscid cap and a bilateral trama in the gills it can be transferred to *Limacella*. Since this does not seem to have been already done, the above new combination is proposed.

I can find no modern description of this taxon, in fact it is omitted altogether in recent agaric floras. It appears to be unknown in N America. My specimens matched in colour almost exactly those depicted by Barla in the quoted plate, and, although he shows no ring, which he says becomes 'caduc', this is sometimes so, for one of my specimens had the ring completely detached from the stem and adhering to the edge of the cap. This agrees with Fries's description—"*Annulus incompletus*, laceratus, vulgo in margine pilei hinc quasi dentato-*fimbriato appendiculatus*, vix in stipite prominens" (italics as in Fries). The Cooke plate is less convincing in colour but more so in shape and ring details. The following is a description of my collection.

Cap 35–36 mm, (20 mm when young), convex-truncate then expanded slightly obtusely umbonate, sometimes becoming slightly depressed around

the centre, *white or whitish-cream with centre tinged grey-clay or pale dirty ochraceous, fairly viscid when moist*, smooth and shiny when dry, cuticle often torn into patches or cracked radially at margin giving an excoriate appearance, *margin white floccose-woven, sometimes with appendiculate fragments of ring*, extreme margin sometimes slightly reflexed when old. *Gills* free, *remote, separated from stem by slight collar*, white then whitish, crowded, c. L. 70–80 l 1–(3), edge conspicuously flocculose-denticulate when fresh. *Stem* 65–80/5–6 mm, (5–15 mm at base), varying from ± equal or slightly thickened at apex or attenuated at base to strongly rounded-marginate bulbous, pure white at first then discolouring to whitish or pale dirty ochraceous in places, smooth or smoothly silky-tomentose below, with small sometimes fugacious scattered silky floccose scales below ring, fragile, hollow or stuffed with separable pith, base white tomentose; *ring large, apical, sheathing, upper part rather thick*, pale, becoming dirty ochraceous floccose, lower part white, silky, *sometimes breaking and adhering in part or wholly to cap edge. Flesh* white. *Smell* faint to fairly strong, rather like that of *Lepiota cristata. Spores ellipsoid-amygdaliform*, smooth, *dextrinoid*, 7–8/4–4½μ (fig. 2, h). *Basidia* 4-spored, 24–30/8–9μ. *Marginal cystidia* ± cylindric to clavate, sometimes with pointed apex, 32–60/(8)10–17μ (fig. 2, i). *Hyphae on cap* moderately strongly gelatinised, (½)–1–4(6)μ in diam. *Hyphae of ring* of ± cylindric cells, 2–10μ in diam. *Gill-trama* bilateral, cells (6)10–20μ in diam. No clamps seen.

Gregarious under cypress by hedge, Lucton, Herefordshire, 25 to 28 xi 1959.

L. illinita is rather similarly coloured, but is much more viscid (both cap *and* stem) and has subglobose spores. At first sight it may resemble *Lepiota sublittoralis*, but the latter is dry-capped and has small but distinct scales on at least part of the cap.

Limacella ochraceolutea P. D. Orton, **sp. nov.** Fig. 1, l.

In my experience it is only relatively rarely that one comes across examples of the genus *Limacella* in Britain, and then mostly in the south of England, but twice now in the south-west of England I have collected a yellowish agaric which is clearly related to *L. illinita*. Judging by the wording of some descriptions of this taxon, it may well have been included in this taxon in the past. However in Fries's original diagnosis of *Agaricus illinitus* (Syst. Myc. 1: 23) the cap is said to be in a var. A "*major immaculatus, candoris*", but in a var. B "*minor, tenuior, umbo distinctus discolor*". In a later description (Epicrisis: 19, 1838) the cap is "*candidus sed in* var. *Upsaliae lecta pileo argillaceo*". In recent times, Kühner (Bull. Soc. Mycol. Fr. 52: 198, 1936) states that the cap is 'blanc à centre à peine isabelle ou brunâtre argileux' and the stem 'blanc isabelle . . . . à chair brun rosé clair'. These white or grey colours are in accordance with my only gathering of *L. illinita* (made not in Britain but on the continent). It seems more useful to distinguish for the present the very differently coloured agaric described below as a new species, despite similarity of microscopical characters, since I can find no species already described which agrees. No N American species fits although some are similarly coloured. Meanwhile careful notes on habitat

and other characters of *L. illinita* and my species might yield further information about their relationships. Should some kind of culture experiment in the future prove them to be the same, then this new species can be sunk as a synonym, but I do not think this very likely. The following is a diagnosis and description of my species.

Pileus c. 40–50 mm, e convexo expansus, interdum late obtuse umbonatus, luteole vel pallide ochraceus ad discum obscuriore ochraceo- vel ferrugineo-mellinus, vulgo circa marginem clariore luteus, glutinosissimus, circa marginem a reliquis veli viscidi ochracei obtectus interdum hac atque illac guttatus et siccitate minute obscure punctatus. *Lamellae* liberae, ± ventricosae, albidae vel cremeo-luteolo tinctae, confertae (L 68, l 0–1), ad aciem integrae vel quasi erosae. *Stipes* c. 40/8–9 mm, aequalis interdum ad basim vel ad apicem leviter incrassatus, albidus vel praecipue deorsum pallide sordide ochraceus, glutinoso-viscidus, siccitate a velo praecipue deorsum pallide sordide ochraceo guttatus et minute sericeo-striatus, solidus, exannulatus. *Caro pilei* alba vel albida, ad discum crassa et colore pilei tincta, caro stipitis albida vel praecipue ad basim pallide sordide ochracea. *Odor* fortis, farinaceus. *Sporae* subglobosae vel late ellipsoideae apiculo magno obliquo, sub immers. minute aculeolatae, nec amyloideae nec dextrinoideae, 4½–6/3½–4μ (fig. 1, l). *Basidia* 4-sporigera, 28–32/7–8μ, sterigmatibus 4–6μ longis. *Trama* lamellarum bilateralis. *Hyphae* cuticulae pilei cylindrico-flexuosae, hyalinae, ramosae, fibulatae, 1–4μ latae.

In sylvis deciduis, Park End, Bishop's Lydeard, Somerset, 30 x 1958, *P. D. Orton* (typus in herb. Edinb. et Kew.); Whitlands Landslip, Rousdon, Devon, 13 ix 1962. A coloribus luteolis et pileo stipiteque viscido facile distinguitur.

Cap c. 40–50 mm, convex then expanded, sometimes broadly obtusely umbonate, *yellowish or pale ochraceous with darker ochraceous- or rusty-honey centre, often brighter yellow in outer part, very glutinous, margin with traces of ochraceous veil*, sometimes with scattered darker ochraceous guttate glabrous spots in places (especially about halfway in), sometimes minutely darker stippled in outer part when dry. *Gills* free, ± ventricose, *whitish or with creamy-yellowish tinge*, crowded, (L 68 l 0–1), edge even or becoming cracked-eroded. *Stem* c. 40/8–9 mm, equal or slightly thickened at base or apex, *whitish or pale ochraceous* (especially towards base), *glutinous-viscid*, drying pale dirty ochraceous spotted especially near base and apex from veil, minutely silky striate beneath gluten, solid, ring absent. *Flesh* white or whitish in cap, thick at centre of cap and with trace of cap colour, in stem whitish to pale dirty ochraceous (especially at base). *Smell strong, mealy. Spores subglobose or broadly ellipsoid with large oblique apiculus*, very minutely prickly sub immers., neither amyloid nor dextrinoid, 4½–6/3½–4μ (fig. 1, l). *Basidia* 4-spored, 28–32/7–8μ, sterigmata 4–6μ long. *Gill-edge* fertile, no cystidia seen. *Gill-trama* bilateral. *Hyphae* on cap cylindric-flexuose, branched, clamped, hyaline, 1–4μ in diam.

Under ash, hazel and oak and *Mercurialis perennis*, Park End, Bishop's Lydeard, Somerset, 30 ix 1958 (type in herb. Edinb. and Kew); under ash and other deciduous trees, Whitlands Landslip, Rousdon, Devon, 13 ix 1962. The yellowish or ochraceous colours distinguish this from all other British species of *Limacella* except *L. guttata*, which is not bright yellow and is usually larger and has a distinct large membranaceous ring. The above

description is not as complete as I would like owing to scanty material available. The Devon collection was so slug-eaten that it could not be preserved.

Nolanea limosella P. D. Orton, **sp. nov.** Figs. 1, k′; 4, b–d.

Pileus 12–24 mm, e conico-convexo expansus aliquantum acute umbonatus, dein saepe circa umbonem depressus, obscure fuscus siccitate pallescens, laevis, jove pluvio ad marginem striatus, jove sicco leviter sericeo-nitidus et interdum ad discum sub lente leviter rugulosus. *Lamellae* adnatae vulgo leviter emarginatae, albidae dein pallide fusco-incarnatae, vix confertae, L 18–22 l 1–(3), ad aciem integrae, crassiusculae. *Stipes* 15–30/2–3 mm, aequalis vel ± clavatus, pallide griseo-fuscus ad apicem fere albidus et albo-pruinosus, infra albido, sericeo-striatus, farctus, ad basim albo-tomentosus. *Caro* concolorata intus alba. *Odor* saltem secto farinaceus. *Sporae* nodulosae oblongo-angulatae, (10)11–13/7–9μ (fig. 1, k′). *Basidia* bisporigera. *Acies* lamellarum fertilis.

Ad marginem lacunae, Dryplaid, Kincardineshire, 2 ix 1954, *P. D. Orton* (typus in herb. Edinb. et Kew.). A basidiis bisporigeris forma sporarum et coloribus insignis.

Cap 12–24 mm, conico-convex then expanded rather acutely umbonate, later often depressed around umbo, *dark sepia-horn*, paler when dry, smooth, *when moist striate at margin*, when dry silky shiny and sometimes rugulose at centre sub lente. *Gills* adnate often slightly emarginate, *whitish then pale brownish-pink*, not crowded, L 18–22 l 1–(3), rather narrow at first then ventricose near stem, edge even, fairly thick. *Stem* 15–30/2–3 mm, equal or ± clavate, *pale grey-horn*, *apex almost white* and white pruinose, remainder whitish silky-striate, stuffed, base white tomentose. *Flesh* concolourous, white in centre of cap and stem. *Smell fairly strong*, *mealy*, especially when cut. *Spores* nodulose oblong-angular, (10)11–13/7–9μ (fig. 1, k′). *Basidia* 2-spored. *Cystidia* absent.

On mud at edge of pond, Dryplaid, Kincardineshire, 2 ix 1954, (type in herb. Edinb. and Kew). Distinguished from other British bispored members of the Rhodophyllaceae by colours or stature and spore size and shape. Of the other greyish bispored species, *N. cuspidifer* differs in absence of mealy smell and spores subglobose or broadly ellipsoid in outline, whilst *Eccilia bisporigera* has more distinctly decurrent gills and rather smaller spores (see p 99). *N. cetrata* and *N. testacea* are differently coloured (yellowish-buff or red-brown).

Panaeolus speciosus P. D. Orton, **sp. nov.** Fig. 7, h, i.

A large and unfamiliar species of *Panaeolus* has appeared on old horse dung at Rannoch, Perthshire, which seems so striking that it should surely not be confused with any other species. It is a species without veil that resembles *P. subbalteatus* in stature but is differently coloured and has larger spores. The other European species of *Panaeolus* so far described with large spores are all veiled species, so that it is immediately distinguishable in this way. This is one of three or four unfamiliar *Panaeoli* I have

recently collected, but is sufficiently striking to be described as new straightaway, for I have not been able to find a description which agrees with it. The other apparently undescribed species await further investigation. The following is a diagnosis and description of this species.

Pileus 22–75 mm, e convexo vel ± conico expanso-convexus vel -conicus, juventute sordide rubro-brunneus vel mellino-luteolo-brunneus dein griseus zona submarginata obscuriore olivaceo-brunnea (rariore bizonata) et ad discum rubro-brunneo vel fulvo-luteolo-brunneo tinctus, siccitate fere totus griseus, sordide cremeus vel pallide olivaceo-luteolo-brunneus, opacus, interdum leviter rugulosus, ad marginem primo incurvatus dein lamellas excedans. *Lamellae* adnatae ± ventricosae, argillaceo-luteolo-brunneae dein argillaceo-olivaceae postremo obscure olivaceae vel fuligineae, griseo et fuligineo variegatae, subconfertae, L 20–26 l (3)–7, ad aciem conspicue albo-floccosae jove pluvio guttas aqueas plorantes. *Stipes* 70–175/2–5 mm, elongatus, aequalis vulgo ad basim incrassatus, albidus vel pallide incarnato-ochraceus interdum deorsum luteolo-fusco vel rufo-brunneo tinctus, juventute totus albo-pruinosus, jove pluvio guttas aqueas obtectus, cavus, ad basim albo vel albido-tomentosus. *Caro* pilei concolorata vel ochraceo-luteolo-fusca, juxta lamellas olivaceo-cornea, ad apicem stipitis ochraceo-luteolo-fusca vulgo deorsum brunnea. *Odor* debilis. *Sporae* lentiformes, angulato-limoniformes, 14–20/8–10/10–12μ, in cumulo fere nigrae. *Basidia* 4-sporigera, c. 30/15–16μ (fig. 7, i). *Cystidia aciei lamellarum* copiosa, cylindraceoclavata vel capitata vulgo flexuosa rariore acapitata, 30–50/3–6μ ad apicem 7–11μ lata. *Cystidia stipitis* cylindraceo-flexuosa vel -capitata vulgo fasciculata, c. 30–60/5–8μ.

Ad fimum equinum vetustum, Camghouran, Perthshire, 27 ix 1967, *P. D. Orton* (typus in herb. Edinb. et Kew.). A sporis magnis stipite evelato pruinoso et coloribus facillime distinguitur.

Cap 22–75 mm, convex or ± conical then expanded-convex or -conical, *dull date or honey-buff in bud, soon fading to greyish with darker olive-sepia submarginal zone* (occasionally with two such zones) and centre often tinged date, pinkish-ochraceous or tawny-buff, *when dry entirely greyish or pale ochraceous-buff* or dirty cream at centre, matt, sometimes slightly rugulose, margin incurved at first then exceeding gills. *Gills* adnate, ± ventricose, clay-buff or pale milky coffee then clay-olive, finally deep olive to blackish, mottled, fairly crowded, L 20–26 l (3)–7, edge conspicuously white flocculose, holding drops of water when wet. *Stem* 70–175/2–5 mm, elongate, equal but often thickened at base, whitish or pale pinkish-ochraceous, sometimes tinged buff or date-brown at base, *entirely white or whitish pruinose when fresh*, holding drops of water when wet especially near apex, hollow, base white or whitish tomentose. *Flesh* in cap concolorous or ochraceous-buff with olive-horny layer over gills, stem flesh sharply marked off, ochraceous-buff at apex, often ± vandyke in lower part. Smell faint, fungussy. *Spores* lentiform, angular-limoniform, 14–20/8–10/10–12μ, almost black in mass (fig. 7, i). *Basidia* 4-spored, c. 30/15–16μ. *Marginal cystidia* cylindric-clavate or capitate, only rarely not swollen at apex, often flexuose, 30–50/3–6μ, apex 7–11μ, in thick layer. *Cells on stem* cylindric-flexuose or capitate often flexuose, c. 30–60/5–8μ.

On old horse dung, Camghouran, Perthshire, 27 ix 1967 (type in herb. Edinb. and Kew) and subsequently. The lack of veil, large spores, size and

colours are very distinctive. The submarginal zone is sometimes very broad, even up to one-third of the cap radius, and may remain as scattered radial darker streaks as the cap dries out, but in all specimens so far seen the dark zone did not quite reach the margin.

Paxillus rubicundulus P. D. Orton, **sp. nov.** Figs. 1, m′, m″; 4, f, g.

I have for some time been aware that an unfamiliar *Paxillus* was growing on the loch side of the road by the Black Wood of Rannoch in Perthshire in damp litter consisting mainly of alder leaves, but also with pine needles and birch leaves or grass in places. This differs from *P. involutus* in deeper yellow gills and flesh, and cap more distinctly scaly and generally turning redder with age, and microscopical investigation has shown that it has smaller spores also. This agaric has I think been described by Kotlaba (Česk. Myk. 14: 176–184, 1962) as *P. filamentosus* Scop. ex Fr.

Fries first described *P. filamentosus* in Epicrisis: 317, 1838, but changed the name to *P. leptopus* Fr. in Monographia II, 311, 1863, because of an *Agaricus filamentosus* Schaeff. The essential features of *P. filamentosus* are cap 'vetustus tantum in squamas villosas fuscas vel lutescentes solutus', flesh 'lutea', gills 'decurrentes quidem sed *non anastomantes* . . . lutescentes dein obscuriores, sed tactu *non maculatae*', and stem 'solidus, brevis (vix uncialis) obliquus' (italics mine). The habitat was given as 'ad terram inter ramenta et frustula lignea'. Whilst the cap (except that there is no mention of reddening), flesh, stem, and possibly habitat characters agree fairly well with my agaric, the gill characters emphatically do not, for in my agaric the gills are frequently branched near base and sometimes elsewhere and are sometimes poroid around the stem and they always bruise reddish-rusty quite quickly as in *P. involutus*. Also there is no mention of reddening of the cap in any of Fries's descriptions. I therefore think it advisable to describe this as a new species of which a diagnosis and description is given below.

It would seem that *P. filamentosus* as described by Bresadola (Ic. Myc. 678) and Moser in Gams, Kleine Kryptogamenflora IIb 2: 50, 1967, is correctly named, for in each case the gills are said to be simple and not changing in colour. Kotlaba, however, in his description says that the gills are 'forked . . . after pressing they slowly turn from reddish-brown to rusty-brown', and that 'Fries's original description differs somewhat from our fungus . . .'. I think these gill differences are too fundamental to ignore myself, and therefore regard Kotlaba's description as belonging to my new species, even although he does not mention the reddening of the cap, for other characters agree very well.

Kotlaba's agaric was found under alders in very moist places. The roadside in Scotland where I made my finds is lined with alders on the loch side of it, although the road itself is a few feet above the base of the trees. There are also alders on the opposite side of the road in places. Strangely enough I have so far not seen any specimens anywhere else in the neighbourhood or even on the opposite side of the road, nor at the foot of the alders, but only along the roadside verge on the loch side, which certainly retains moisture very effectively. Further observations in other places are necessary before one can comment on any possible association with *Alnus*.

Pileus 33–100 mm, e convexo mox expansus plerumque leviter depressus, dein ad marginem saepe undulato-lobatus, ex olivaceo-fusco ad marginem luteo mox ochraceo-luteus maculis olivaceo-fuscis vel rubro-fuscis adpressis obtectus, jove pluvio viscidus vulnerato rubro-ferruginascens, juventute minute adpresse tomentosus dein mox adpresse sericeo-fibrilloso squamulosus, ad marginem extremam diu incurvatus lamellas tenuiter excedans persistentiore olivaceo-tomentosus. *Lamellae* arcuato-decurrentes, aliquantum angustae, carne pilei facile secedentes, pallide cremeae vel cremeo-luteae mox obscuriore aureo-luteae interdum olivaceo-tinctae, vulneratis rubro-ferruginascentes postremo fere nigrescentes, confertae, L 60–70 l 1–3, plerumque furcatae praecipue prope basim, interdum ad apicem stipitis porosae etiam venosae, juventute crassae et saepe crispae, senectute tenues rectaeque ad aciem integrae. *Stipes* 17–45/5–15 mm, interdum excentricus, plerumque obconicus, interdum ad basim attenuatus, albidus vel pallide cremeus mox pallide flavus vel olivaceo-luteolus, saepe ad apicem obscuriore flavus, vulnerato vel secto rubro-ferruginascens, pruinoso-opacus, vulgo infra rubro-ferrugineo vel purpureo pruinoso-punctatus vel notatus, solidus, juventute firmus, interdum ad basim radicellis filiformibus pallide luteolo-fuscis. *Caro* pallide lutea vel flava vel olivaceo-lutea, plerumque ad basim stipitis fusco-, rubro- vel purpureo-ferruginascens. *Odor* gratus, boletoideus. *Sporae* phaseoliforme-ellipsoideae, $5\frac{1}{2}$–$7\frac{1}{2}/3\frac{1}{2}$–$4\mu$ (fig. 1, m′, m″). *Basidia* 4-sporigera, 6–7μ lata. *Acies* lamellarum fertilis, sed cystidia dispersa prominentia fusiformia vel leviter lageniformia, 56–80/8–12μ, ad apicem vulgo aliquantum acuta sed interdum obtusa 1–3μ lata adsunt. *Cystidia* faciei lamellarum similia, 70–90/8–10μ. *Hyphae* cuticulae pilei filamentosae flexuosae, cellulae 3–10μ latae saepe rubro-brunneo granulato pigmentatae.

Ad viam inter folias mixtas rariore inter gramina, Loch Rannoch, Perthshire, 26 ix 1965, 2 x 1965, 22 x 1966 (typus in herb. Edinb. et Kew.), 18 vii 1967. A *P. involuto* a lamellis et carne luteoribus, sporis parvis et pileo aliquantum distincte rubro-ferrugineo squamuloso differt.

Cap 33–100 mm, convex soon expanded usually ± depressed, margin often becoming wavy-lobed, *olive-sepia with yellower margin, soon ochraceous-yellowish with olive- or reddish-brown adpressed scales*, buff or ochraceous-sepia when dry, viscid when moist, shiny when dry, *bruising carmine-reddish-rusty in places especially when wet, minutely and ± adpressedly tomentose-velvety at first, soon adpressedly silky-fibrillose scaly*, extreme margin incurved for a long time, slightly exceeding the gills, *more persistently olive-tomentose. Gills* arcuate-decurrent, rather narrow, separating from flesh of cap easily, pale cream or creamy-yellowish soon *deeper yellow* often with olive tinge, *bruising reddish-rusty like cap* and finally blackish, crowded, L 60–70 l 1–3, *usually branched near base and often also elsewhere*, sometimes poroid at stem apex, sometimes also interveined, thick and often crisped when young, thin and straight when mature, edge even, concolorous. *Stem* 17–45/5–15 mm eccentric or central, usually obconic, sometimes attenuated at base, whitish or pale cream, *soon pale sulphur or olive-yellowish often deeper yellow at apex, bruising reddish-rusty when handled or cut*, pruinose matt, often reddish-rusty or purplish pruinose-punctate or streaked in lower part, solid, firm at first, *sometimes with pale buff mycelial threads at base. Flesh* pale lemon or sulphur or olive-yellowish usually becoming dull rusty or date or reddish- or purplish-rusty in stem base. *Smell* pleasant, boletoid. *Spores* phaseoliform-

ellipsoid, 5½–7½/3½–4μ (fig. 1, m′, m″). *Basidia* 4-spored, 6–7μ in diam. *Gill-edge* fertile but with fairly numerous projecting fusiform or slightly lageniform cystidia 56–80/8–12μ, apex often rather acute but sometimes obtuse, 1–3μ in diam. *Facial cystidia* fairly numerous, similar, 70–90/8–10μ. *Hyphae* on cap surface filamentous flexuose, 3–10μ in diam., often with reddish-brown granular pigment (in water).

By roadside in damp verge, mostly of alder leaves but also with pine needles, birch leaves and other litter, more rarely in grass, Loch Rannoch, 26 ix, 2 x 1965, 22 x 1966 (type in herb. Edinb. and Kew), 18 vii 1967, also seen July 1964 and previously. Differs from *P. involutus* in yellower gills and flesh, smaller spores (see fig. 1, n for spores of *P. involutus*), and more distinctly often reddish-brown adpressed scaly cap. Once one has seen and identified this species one can easily distinguish it in the field, and it will no doubt be found elsewhere not uncommonly in favourable situations. Dried material usually shows traces of the reddish colour and scaliness on the cap.

Pholiota comosa (Fr.) Quél., Champ Jur. Vosges: 125 (1872).
Syn.: *Agaricus* (*Pholiota*) *comosus* Fr., Epicrisis: 165 (1838).
Icon.: Cooke 388(600) (colours rather dull).

For some years now a sawmill has been established in the middle of the once extensive beech woods forming the Mountain Wood area near East Horsley, Surrey. Recently this has been abandoned and some sawn beech blocks were left on the site. On visiting these in October 1967 I found them a veritable fungus garden, the chief item being a rather large and handsome *Pholiota* which was pushing its way from in between the blocks, in some cases lifting them slightly in the process! Perusal of the literature soon showed that this was *P. comosa* and that this is very definitely distinct from both *P. destruens* and *P. heteroclita* and can be reinstated on the British list. Fruit-bodies of both these two species have a strong characteristic smell whereas *P. comosa* is odourless or has only a weak fungussy smell. The colour of *P. comosa* is also different, although variable, for older fruit-bodies varied from tawny-ochraceous to date or chocolate colour. Yellow tints as in *P. heteroclita* were absent and all accounts of *P. destruens* indicate a persistent pale colour and different host tree. Fries does not mention smell in Epicrisis but in Monographia says that *P. comosa* is '*inodorus*' and gives the host tree as beech. *P. heteroclita* is said to have '*odore forti pungente, fere Armoraciae*' and to grow on birch. No comment is given anywhere on smell for *P. destruens* by Fries for he had not seen it himself, but all recent descriptions emphasise a strong peculiar smell, and give poplar as the host tree. J. E. Lange gives the smell of the latter as 'strong, somewhat aromatic', and that of *P. heteroclita* as 'reminding of that of *Inocybe pyriodora* and *Armoracia*', but does not mention *P. comosa*.

I think, therefore, that Fries quite correctly separated the three species, and suggest that this is further evidence that we should not lightly lump Fries's species, for he obviously had a most observant eye and a shrewd mind. All three species have thick hard flesh, ellipsoid or slightly phaseoliform spores (6½–9/4½–6μ), which are snuff-brown in the mass and rather nondescript marginal cystidia and are without chrysocystidia. They may be distinguished thus:—

1 Smell none or faint; growing on beech; cap becoming tinged tawny-honey or date or chocolate-brown; veil scales white then whitish or pale buff; not distinctly yellow in any part (see Cooke, Pl. 388/600) *P. comosa*

1 Smell strong, characteristic (at least when cut); host tree otherwise 2

2 Cap and gills yellowish at first; cap margin often retaining yellow tinge; veil scales on cap soon yellowish; growing on alder or birch (? also *Salix* sp.); medium to large; taste none or slightly fungussy (see J. E. Lange Pl. 108 C) . . . . . : *P. heteroclita*

2 Cap buff or wood brown at first; gills clay coloured at first (never yellowish); veil scales on cap white or whitish; growing on poplar; often large or very large; taste becoming bitter (see Bres., Ic. Myc. 696 and J. E. Lange Pl. 107 C) : . . . . . *P. destruens*

The following is a description of my collection of *P. comosa.*

Cap 75–115 mm, convex or conico-convex becoming expanded-convex or conical, sometimes wavy-lobed at margin, *pale creamy-buff or wood-colour then ochraceous-buff becoming tinged tawny, often finally date-honey or chocolate-brown in places* (especially at and around centre), sometimes with burnt sienna tinge, often darker streaky around centre when fresh, later ± unicolorous, *at first covered with thick whitish veil then ± concentrically whitish adpressed silky-fibrillose scaly*, sometimes with thick often recurved scales at or around centre or at margin, slightly viscid (tacky) when moist, margin exceeding gills, thick at first, later becoming torn or lacerate, extreme margin often persistently whitish. *Gills* adnate-emarginate with tooth, ventricose near stem, *pale clay then pale snuff or clay-snuff, finally cigar colour*, crowded, L 50–80, l 3–11, edge paler, at first minutely whitish flocculose-denticulate, later ± concolorous but often darkened by spores. *Stem* 35–165/15–20 mm (28 mm at base), incurved, equal with attenuated base or clavate-bulbous, *pale to dark sepia or vandyke, darkening with age, upper part entirely covered with thick white or whitish often recurved scales*, below this adpressed whitish silky-fibrillose with darker streaks here and there, hard and firm, solid. *Flesh pale cream or whitish in cap*, sepia-buff or darker sepia in stem, ± *entirely vandyke or deep date in stem-base. Smell* none or slightly fungussy. *Taste* none or slightly adstringent bitter after a few seconds. *Spores* broadly ellipsoid or slightly phaseoliform, (6½)7–9/4½–6μ, snuff-brown in mass. *Basidia* 4-spored 23–28/6–8μ, often constricted in the middle part when mature. *Marginal cystidia* cylindric or cylindric-clavate or more rarely slightly utriform, 20–50/6–10μ. *Facial cystidia* and chrysocystidia absent. *Hyphae on cap* filamentous, cells 2–8μ in diam., ± cylindric, often with large clamps.

On old sawn beech blocks, Moutain Wood, East Horsley, Surrey, 28 x 1967. Gregarious but not caespitose. Cooke's illustration is fair but only shows dull-coloured specimens; the lacerate cap margin is, however, well shown.

Pholiota heteroclita (Fr. ex Fr.) Quél., Champ. Jur. Vosges: 249 (1872). Figs. 1, 0; 5, b, c.

Syn.: *Agaricus* (*Pholiota*) *heteroclitus* Fr. ex Fr., Epicrisis: 165 (1838).

Icon. et descr.: Lange, J. E., Fl. Ag. Dan.: Pl. 108. C. Karsten, Myc. Fenn. III: 115 (1876). Stevenson, British Fungi, Hymenomycetes: 229 (1886).

In 1965 I had spent some time wandering about the normally prolific woods in the vicinity of the River Affric near Tomich, Inverness-shire, without success and so was moved to investigate parts not normally visited, and more out of curiosity than anything else I ventured into the river bed where the river divides into several streams running between islands. Here I was astonished and gratified to find a group of fruit-bodies of a large, handsome and unfamiliar *Pholiota* growing on a prostrate alder. The outstanding feature of these was the presence of white scales on the stem and large pale yellowish V-shaped scales on the caps of younger specimens. First thoughts were that this must be either *P. destruens* or *P. heteroclita*, and after due consideration of these and the '*squarrosa*' group I think it safe to assign the name *P. heteroclita* to it and reinstate the name on the British list.

It differs from the '*squarrosa*' group not only in having whitish scales but also a more snuff-brown spore-print, firmer, harder flesh and in absence of chrysocystidia. Doubts have been expressed about the separation of *P. destruens*, *heteroclita* and *comosa* in the past. Stevenson (l. c. 208–209) gives good descriptions of *comosa* and *heteroclita* but did not know *destruens*. Cooke used the epithet *heteroclitus* for *destruens* as far as can be gathered from his plate (389/356) and Bresadola combined all three as *P. destruens* (Ic. Myc. 696). J. E. Lange separated *P. destruens* and *heteroclita*, but did not know *P. comosa*. I have no personal notes on *P. destruens* unfortunately, having only seen it once many years ago, but I believe *destruens* to differ from *heteroclita* in: 1) a paler always dull coloured cap (clay-buff) with more persistent scales; 2) less yellow gills (needs confirmation); 3) stem-base less deeply coloured; 4) stature larger and more robust; 5) taste becoming bitter; and 6) a different host-tree (poplar). *P. comosa* I have since gathered and found immediately distinguishable because it is inodorous and differently coloured (see above under *P. comosa*). The following is a description of Scottish material of *P. heteroclitus*.

Cap 100–140 mm, convex soon expanded or depressed, margin sometimes slightly wavy-lobed, very thick-fleshed, *straw-yellow then tinged ochraceous or date-brown especially at the centre*, slightly viscid when moist but soon becoming dry, *with thick adpressed or recurved pale yellowish later ochraceous or honey-coloured coarse often V-shaped fibrillose scales*, these later often smaller and restricted to central part of cap, *margin* incurved and slightly tomentose at first, *later often conspicuously velvety-tomentose. Gills* adnate with tooth, often emarginate, sometimes fairly broad but hardly ventricose (about 12 mm broad for cap 125 mm), *pale yellow like cap then pale yellow-olive or olive-buff to olive-snuff, finally snuff-brown*, crowded, L 50–70 l 3–11, edge concolorous even, later often pale yellowish and finally uneven. *Stem* 55–80/10–16 mm (13–21 mm at base), usually thickened at base but sometimes pointed at extreme base, *apex pale lemon- or straw-yellow*, *ring apical* (about 5–10 mm from base of gills) *rather thick and floccose-fibrillose*, *below this with conspicuous white, whitish or creamy-ochraceous often rather pointed and concentric fibrillose scales connected by longitudinal often raised fibrillose striae*, base soon staining deep rusty-date or vandyke, *very firm and hard. Flesh pale straw to deeper chrome-yellow at first*, soon discolouring ochraceous or rusty, when old often vandyke or deep date in places, especially the stem-cortex, stem-base and centre of cap, firm and hard. *Smell fairly strong*

pungent-spicy, more fruity than that of *P. squarrosa*. *Taste* none or slight fungussy. *Spores* phaseoliform-ellipsoid, 7–9½/4¼–5¾μ, (fig. 1, o), snuff-brown in mass. *Basidia* 4-spored 24–28/7–9μ, sometimes with yellow pigment inside. *Marginal cystidia* cylindric or cylindric-clavate or irregular, sometimes septate, 16–36/5–6(10)μ. *Facial cystidia* and chrysocystidia absent.

Singly or in small groups on fallen alder, River Affric, Tomich, Inverness-shire, 6 ix 1965.

Young specimens look very elegant with large thick yellowish scales on the cap and white scales on stem. Lange's plate represents it when rather older, when it looks rather different. The yellowish tints are diagnostic, it seems. Lange's specimens were growing on alder like mine, but it also occurs on birch. Stevenson's description is very good.

Pluteus dryophiloides P. D. Orton, **sp. nov.** Figs. 2, j; 5, a.

Pileus 22–40 mm, e convexo vel conico-convexo expansus ± planus, ochraceo-luteolo-fuscus, ad marginem albus vel albidus mox ad discum fulvo-ochraceus, siccitate cito cremeo-ochraceus interdum ad marginem tenuem et plicato-striatum incarnato-tinctus, opacus partim sericeo-atomatus, siccitate minutiore tomentoso-maculatus. *Lamellae* liberae, saepe remotae, ex albo incarnatae, confertae, ad aciem juventute minute albido-denticulatae. *Stipes* 20–40/2–3 mm, aequalis, ad basim abrupte bulbosus 4–5 mm latus, ex albido pallide vel obscuriore ochraceo-luteolo-fuscus, juventute omnino albo-floccoso pruinosus dein sericeo-striatus, ad basim albo-tomentoso strigosus. *Caro* pilei concolorata siccitate albido-cremea, stipitis pallida. *Odor* nullus vel vineus. *Sporae* subglobosae vel late ellipsoideae, 6–8/5–6μ. *Basidia* 4-sporigera. *Cystidia aciei* lamellarum fusiformia, fusiforme lageniformia vel leviter clavata, 28–63(70)/8–30μ. *Cystidia faciei* lamellarum vesiculoso-fusiformia, late pyriformia vel late lageniformia, 60–94/24–52μ, interdum ad apicem pustula breve 8–14μ lata (fig. 2, j). *Cellulae* cuticulae pilei clavatae vel fusiforme-lageniformes erectae, 60–150/8–32μ, hyalinae vel pallide brunneo-pigmentatae.

Ad lignum fagi, Mickleham Downs, Surrey, 22 ix 1961, *P. D. Orton* (typus in herb. Edinb. et Kew.). A coloribus *Collybiae dryophilae* similibus, cystidiis faciei lamellarum latis et characteribus cuticulae pilei facile distinguitur.

Cap 22–40 mm, convex or conico-convex then expanded ± plane, *ochraceous-buff with white or whitish margin, soon tawny-ochraceous in the central part*, rapidly drying out creamy-ochraceous, margin sometimes becoming tinged pinkish, thin and wrinkled-striate, surface matt and silky-atomate in places, more minutely cracked-velvety when dry. *Gills* free, often remote, white then pinkish, crowded, edge concolorous or minutely whitish-denticulate when fresh. *Stem* 20–40/2–3 mm, equal *with swollen basal disc* 4–5 mm in diam., whitish, then pale to deep buff, *entirely white floccose-pruinose when fresh*, later silky-striate, white tomentose-strigose at base. *Flesh* in cap concolorous drying creamy-whitish, pale in stem. *Smell* none or slightly winey. *Spores* subglobose or broadly ellipsoid, 6–8/5–6μ. *Basidia* 4-spored. *Marginal cystidia* fusiform, fusiform-lageniform or slightly clavate 28–63(70)/8–30μ. *Facial cystidia vesiculose-fusiform, broadly pyriform or broadly lageniform* sometimes with short apical pimple, 8–14μ in diam.,

60–94/24–52μ (fig. 2, j). *Hyphae* on cap with end-cells clavate or fusiform-lageniform, forming a palisade, 60–152/8–32μ, hyaline or with pale brownish vacuolar pigment (in daylight in water).

On beech log, Mickleham Downs, Surrey, 22 ix 1961 (type in herb. Edinb. and Kew). The colours of this agaric are so distinct that I have no hesitation in describing it as new species, using the epithet *dryophiloides* because these colours resemble those of *Collybia dryophila*, which it resembles superficially. Amongst British species it is perhaps closest to *P. boudieri* from which it differs in brighter colours and broader facial cystidia and shorter end-cells to the hyphae on the cap.

In my key to *Pluteus* (Trans. Brit. Mycol. Soc. 43: 347, 1960), it would key out to couplet 26, where it is easily separated by brighter colours and broader facial cystidia. Since the cuticle might appear 'cellular' in certain views it should also be keyed out in couplet 39, where it can be similarly separated.

Psathyrella piluliformis (Bull. ex Mérat) P. D. Orton, **comb. nov.** Fig. 7, c′, c″, e, f.

Basionym: *Agaricus piluliformis* Bull. ex Mérat, Nouvelle Flore 84 (1821).

Icon. et descr.: no modern example known.

In the List part III, p. 373, I discussed the use of the epithets *hydrophila* and *piluliformis* in the genus *Psathyrella*, and suggested that these might be two distinct species differing in size, habit and possibly cap colours and facial cystidia. I have since gathered and studied ample material of both species and am now convinced that this suggestion was correct. The two species differ thus:—

P. hydrophila	*P. piluliformis*
Cap and stem relatively robust; cap 20–70 mm, stem 3–10 mm in diam	Cap and stem smaller; cap 10–43 mm, stem 1–3 mm in diam.
Truly caespitose, often 5–20 stems joined together, more rarely fewer or growing singly.	Densely gregarious, singly or not more than three or four stems joined together at base.
Sterile gill-edge not unusually thick; cystidia clavate to broadly lageniform or utriform.	Sterile gill-edge unusually thick (40–120μ) formed of a mass of mostly spheropedunculate or pyriform or vesiculose cells, but a few cylindric-clavate ones also present.
Facial cystidia obtuse, fusiform-clavate or lageniform with broad obtuse neck 6–12μ in diam., body on the whole broader, 12–18μ in diam.	Facial cystidia often more pointed, clavate often with short point, or lageniform with short usually slender neck 3–6(8)μ in diam., body on the whole narrower, 10–16(18)μ in diam. (fig. 7, e).
Cap colour on the whole brighter, more tawny, especially when drying out.	Cap colour duller, not tawny-tinged or only slightly so when drying out.

The thick gill-edge of *P. piluliformis* is very striking and seems constant, for specimens from Surrey, Somerset and Perthshire all showed it, but it is easily missed. I have re-examined the larger *P. hydrophila* from this point of view, and, as the more varied shape of the marginal cystidia suggests, the sterile edge is of normal thickness. In my discussion of this problem (ibid. 374) I stated that the more robust '*hydrophila*' was more common than the smaller one. This seems an error, for recent experience has shown that *P. piluliformis* is the more common if it is carefully looked for, since it tends to be hidden away inside hollow trunks or logs or to be growing under a thick undergrowth of nettles etc. such as often surrounds a fallen log after a time. Here is a description of British material of *P. piluliformis*.

Cap 10–43 mm, convex or conico-convex then expanded, sometimes obtusely umbonate, *deep date or deep honey with brighter ochraceous-buff tinge at margin when young, then sepia-date or liver colour, drying pale ochraceous-buff or dirty cream from centre out* and often deeper ochraceous or yellowish or more rarely tawny-tinged in centre especially when half-dry, entirely pale when completely dry, *finely striate up to two-thirds in when moist*, opaque and atomate and sometimes radially rugulose-wrinkled especially around the centre when dry, extreme margin exceeding gills slightly, very thin, ± recurved and torn when old, at first with appendiculate but soon fugacious veil remnants. *Gills* adnate, sometimes with tooth, linear or narrowly ventricose, *pale clay-buff or pale ochre-buff then pale sepia-buff or pale clay-umber to milky-coffee colour*, finally umber or chocolate, crowded, L 24–46 l 3–7, edge paler minutely flocculose-denticulate when fresh. *Stem* 12–52/1–3(5) mm, equal or slightly thickened at base, *whitish or pale dirty cream then tinged ochraceous-buff or colour of cap from base up* but always relatively pale (especially at apex), apex whitish or pale buff pruinose, remainder minutely but often interruptedly silky-striate, *whitish, creamy or pale buff veil cortinate from edge of cap at first and covering middle and lower part of stem but soon fugacious*, hollow, base white or whitish tomentose or tomentose-strigose. *Flesh* concolorous in cap, fairly thick at centre, drying cream or ochraceous-cream, date-brown-horny over gills and in stem-apex, cream or creamy-buff in stem. *Smell* and *taste* none or faint, pleasant, slightly fungussy. *Spores* ellipsoid or slightly phaseoliform, 4½–6/2½–3¾μ, with small germ-pore, chocolate or umber with slight violaceous tinge in the mass. *Basidia* 4-spored, c. 20–22/5–6μ. *Gill-edge* sterile *with thick layer of mostly spheropedunculate, pyriform or ellipsoid-vesiculose cells* 10–20μ *in diam.*, with a few cylindric or cylindric-clavate ones 20–36/10–21μ *forming a layer* 40–120μ *thick* (only near the edge of the cap and near the stem is the sterile edge of normal thickness (20–40μ). *Facial cystidia fusiform or fusiform-clavate sometimes with short blunt point to shortly lageniform*, 28–58/(8)10–16(18)μ with apex 3–6(8)μ in diam. (fig. 7, e). *Cells of cap* cuticle often rather large, 20–52μ in diam. *Hyphae of veil* filamentous, cells 4–14μ in diam. with bundles of narrower hyphae 1–4μ in diam.

Densely gregarious (like *Coprinus disseminatus*), singly or in groups of two, three or four, on deciduous wood. Common and widespread. On oak, Horner Water, Somerset, 8 xi 1959; on beech, Netley Heath, Gomshall, Surrey, 27 viii 1967 and Selworthy, Somerset, 30 viii 1967; on birch, Dall, Perthshire, 12 xi 1967, and many other records.

J. E. Lange gives a fair representation of *P. hydrophila* (Fl. Ag. Dan. Pl

146A) but unfortunately does not give details of facial cystidia. Cooke 589 (605B) is also a relatively large agaric and might be the same as Lange's, for it shows the tawny tinge to the cap quite distinctly. Without microscopical details this is pure guesswork, however.

Psilocybe apelliculosa P. D. Orton, **sp. nov.**

Some years ago I made a good collection of an agaric growing on soil in grass at Malham, Yorkshire, which did not appear to agree with any of the species of *Psilocybe* section *Deconica* described from Europe. Very characteristic were the non-pelliculose relatively dry cap, bulbillose stem and hardly violaceous gills as in *P. inquilina* and *P. crobulus*. I withheld publication of this, however, hoping to make another collection. In September 1967 to my surprise I found it growing in some quantity in one place on the grassy bank below my window at Rannoch School! I am therefore now describing it as new and the following is a diagnosis and description.

Pileus 6–20 mm, e convexo ± planus, vulgo obtuse umbonatus (praecipue juventute), primo fulvo-mellinus vel rufo-fulvus dein ochraceo-mellinus ad marginem vulgo luteolus, siccitate cremeus vel pallide ochraceo-luteolo-fuscus interdum ad discum obscuriore coloratus, dum siccans ad marginem obscuriore coloratus est, jove pluvio striatus et leviter viscidus sed apelliculosus, jove sicco opacus vel leviter nitens et sericeo-atomatus, ad marginem primo a velo fibrilloso adpresse squamulosus vel appendiculatus. *Lamellae* dente adnatae vel adnato-decurrentes, ventricosae vel triangulares, albidae mox pallide luteolo-fuscae vel mellino-luteolo-fuscae, senectute tabacinae vel violaceo-tinctae, subconfertae, L 14–20 l 3 (–7), ad aciem juventute albido-denticulatae dein leviter pallidiores. *Stipes* 15–30/0·5–1·5 mm, aequalis vel ad apicem leviter incrassatus, plerumque bulbillosus, vulgo flexuosus, ochraceo-mellinus vel fulvo-mellinus mox sursum fuscescens vel umbrinascens, ad apicem pallidior et interdum rufo-tinctus, primo a velo conspicuo ± copioso adpresso pallide-luteolo-fusco vel luteolo fibrilloso-zonatus dein sericeo-striatus, ad apicem albido-floccoso pruinosus et vulgo a lamellis striatus, cavus, ad basim minute albido, griseo vel pallide luteolo-fusco tomentosus. *Caro* concolorata, siccitate intus albida vel pallide luteola. *Odor* nullus vel debilis. *Sporae* ellipsoideae leviter amygdaliformes, lentiformes, 6–8(9)/$3\frac{3}{4}$–$4\frac{1}{2}$/$4\frac{1}{2}$–5μ, in cumulo violaceo-fuscae. *Basidia* 4-sporigera, 26–30/7–8μ. *Cystidia* aciei lamellarum ± lageniformia, 22–40/8–12μ ad apicem 2–4μ lata. *Hyphae* cuticulae pilei filamentosae, cellulae 6–14μ latae

Ad terram graminosam; Malham, Yorks., 7 ix 1961, *P. D. Orton* (typus in Herb. Edinb. et Kew.); Dall, Perthshire, 15 ix 1967. A *P. montana* et *P. physaloide* a base stipitis vulgo bulbillosa griseo-tomentosa, pileo haud viscido et lamellis vix violaceo-tinctis differt.

Cap 6–20 mm, convex then ± plane, often obtusely umbonate especially when young, *rather deep tawny-honey or burnt sienna at first then ochraceous-honey often with yellower margin*, drying creamy or pale ochraceous-buff from centre out but sometimes remaining darker at centre with dark marginal zone when half-dry, slightly viscid and striate $\frac{1}{4}$–$\frac{2}{3}$ in when wet but *without separable pellicle*, matt or slightly shiny and silky-atomate when dry, margin with adpressed fibrillose or appendiculate remnants of veil at first. *Gills*

adnate with tooth or adnate-decurrent, ventricose or triangular, whitish then soon *pale- or honey-buff, tobacco colour or tinged violaceous when old,* fairly crowded, L 14–20 l 3–(7), edge whitish denticulate at first then concolorous or slightly paler. *Stem* 15–30/0.5–1.5 mm, equal or slightly thickened at apex, usually bulbillose, often flexuose, *ochraceous-honey or tawny-honey like cap, soon becoming vandyke or bay from the base up* but apex remaining paler or sometimes slightly redder, at first *with conspicuous copious adpressed pale buff or yellowish fibrillose ring-zone or remnants of veil* which usually disappear with age leaving the stem ± silky-striate, apex whitish floccose-pruinose when fresh and often striate from gills, hollow, base finely whitish, greyish or pale buff tomentose. *Flesh* concolorous, drying whitish or pale yellowish in centre of cap and stem. *Smell* none, or faint pleasant *Spores* ellipsoid slightly amygdaliform, lentiform, 6–8 (9)/$3\frac{3}{4}$–$4\frac{1}{2}$/$4\frac{1}{2}$–5μ, violaceous-brown in mass. *Basidia* 4-spored, 26–30/7–8μ. *Marginal cystidia* ± lageniform, 22–40/8–12μ apex 2–4μ in diam. *Hyphae* of cap cuticle filamentous, cells 6–14μ in diam.

On soil in grass. Malham, Yorks., 7 ix 1961 (type in herb. Edinb. and Kew); Dall, Perthshire, 15 ix 1967. The often greyish tomentose bulbillose stem-base, together with dryish cap without separable pellicle and gills violaceous only when quite old distinguish this species from its allies—see key to *Psilocybe* in part I of this paper.

Psilocybe caricicola P. D. Orton, **sp. nov.** Fig. 7, b, g, j.

Whilst searching in reeds and *Carex riparia* for *Marasmius menieri* in Norfolk I came across a small agaric with a very similar habit which I at first thought to be brown-spored and possibly a species of *Crepidotus*, on account of its short often slightly eccentric stem. However, somewhat to my surprise it produced a clearly violaceous spore-print and microscopic examination showed that the spores and cystidia were similar to those of the genus *Psilocybe.*

Its features make this a characteristic species but it is easily overlooked because of its peculiar habitat. According to Singer's system because of its short stem this might appear to belong in the genus *Melanotus* Pat. characterised by stem 'little developed, short, (shorter than the diameter of the pileus), curved and often not free from the rear side of the cap, eccentric'. The species given by Singer as belonging to this genus are all tropical or semi-tropical and no species are so far known from temperate zones. Since the stem is not more than slightly eccentric and never lateral I prefer to regard this as a dwarf member of *Psilocybe* and am describing this as a new species of that genus, since I can find no description that fits it. I thought perhaps Velenovsky might have described it for it occurred in the kind of situation in which he liked to search, but it does not seem to have been found by him. Material is somewhat scanty despite three searches of some length resulting in much sweat, many mosquito bites and lacerations of the hands from *Carex* leaves! The following is a diagnosis and description.

Pileus 2–7 mm, e convexo expanso-convexus, ochraceus leviter fulvo-tinctus dein ferrugineo-ochraceus interdum rubro-brunneus et ad marginem pallidiore coloratus, jove pluvio leviter viscidus et ad marginem striatus cum pellicula separabile, siccitate leviter pallidiore et clariore coloratus,

primo omnino sordide albido-fibrillosus dein glabrescens, ad marginem primo minute fimbriatus. *Lamellae* late adnatae, rariore leviter emarginatae vel dente adnatae, pallide argillaceae dein brunneo vel violaceo-brunneo tinctae, subdistantes, L 12–20 l 1–3, ad aciem ± integrae, aliquantum crassae. *Stipes* curtissimus, 1–3/0·25–0·5 mm, vulgo leviter excentricus, incurvatus, incarnato-ochraceus vel violaceo-brunneo tinctus, interdum rubriore coloratus quam pileus, supra sericeo-fibrilloso striatus, ad basim conspicue radialiter albido strigoso-tomentosus. *Sporae* ellipsoideo-amygdaliformes vel leviter fusiformes poro germinativo parvo, 5½–7½/3–4μ, in cumulo violaceo-fuscae. *Basidia* 4-sporigera, 14–18/5–6μ. *Cystidia* aciei lamellarum parva, anguste lageniformia, 21–32/5–7μ ad apicem 2–4(5)μ lata, interdum leviter irregulariter ventricosae. *Hyphae* cuticulae pilei filamentosae, ramosae, fibulatae, hyalinae vel ochraceo-luteolo-fusco incrustato pigmentatae, vulgo aliquantum crasso-tunicatae, cellulae ± cylindraceae 6–10μ latae.

Ad caules erectos mortuos *Caricis ripariae*, Alder Carr Marsh, Wheatfen, Surlingham, Norfolk, 5 viii 1967, *P. D. Orton* (typus in herb. Edinb.). A habitatione et parvitate maxime insignis.

Cap 2–7 mm, convex then expanded-convex, *ochraceous with slight tawny tinge then darkening to rusty-ochraceous*, sometimes tinged umber and paler at margin, when moist *slightly viscid and striate at margin with separable pellicle*, drying slightly paler and brighter coloured, *at first entirely covered with dirty-whitish fibrils which later become dispersed or disappear*, margin delicately fringed when fresh. *Gills* broadly adnate, more rarely slightly emarginate or with tooth, *pale clay then tinged umber or violaceous-umber*, not crowded, L 12–20 l 1–3, edge even or slightly uneven, rather thick. *Stem* very short, 1–3/0:25–0.5 mm, *often slightly eccentric, incurved*, pinkish-ochraceous or tinged violaceous-umber, sometimes redder than cap, striate with silky fibrils as on cap in upper part, base conspicuously radially strigose-tomentose. No smell or taste noted. *Spores ellipsoid-amygdaliform or slightly fusiform* with small germ-pore, 5½–7½/3–4μ, violaceous-umber in the mass. *Basidia* 4-spored, 14–18/5–6μ. *Marginal cystidia* small, narrow lageniform, 21–32/5–7μ apex 2–4(5)μ, sometimes slightly irregularly swollen. *Hyphae* on cap filamentous, branched, clamped, hyaline or ochraceous-buff encrusted pigmented, often with rather thick walls, cells ± cylindric, 6–10μ in diam., with broader ones up to 20μ in diam. below these.

On standing dead stems of *Carex riparius*, Alder Carr Marsh, Wheatfen, Surlingham, Norfolk, 5 viii 1967 (type in herb. Edinb.). Easily distinguished by habitat and size.

Psilocybe pratensis P. D. Orton, **sp. nov.** Figs. 2, e′, e″; 3, k.

In the List part III: 223 in my key to *Deconica* I included a 'taxonomic sp. 2', but did not publish it as a new species because of lack of dried material. This taxon has since been collected, albeit sparingly, in Scotland on sand-dunes, and so I can now publish it. The following is a diagnosis and description.

Pileus 5–20 mm, e convexo expansus, vulgo obtuse umbonatus, obscure brunneus vel ferrugineo-fuscus leviter purpureo-tinctus, siccitate fulvo-ochraceus vel ochraceo-luteolus vel -luteolo-fuscus, jove pluvio ± viscidus et ad marginem striatus cum pellicula separabile. *Lamellae* adnatae dente

decurrentes interdum emarginatae, pallide ferrugineo-brunneae vel argillaceo luteolo-fuscae interdum leviter olivaceo-tinctae, dein purpureo-brunneae, subconfertae, L 14–20 l 3–(7), ad aciem juventute pallide flocculosae. *Stipes* 8–20/1–2½ mm, aequalis vel ad apicem leviter incrassatus, argillaceo luteolo-fuscus vel albidus dein vulgo praecipue supra incarnato vel rubro-brunneo tinctus et juventute a velo albo pruinoso-fibrillosus dein fibrilloso-striatus, cavus, ad basim albo-tomentosus. *Caro* concolorata siccitate in pileo pallide ochracea vulgo in stipite ± ferruginea. *Odor* haud notabilis. *Sporae* ellipsoideae lentiformes poro germinativo, (8½)9½–12/(5)5½–7/6–7¾μ (fig. 2, e′, e″). *Basidia* 4-sporigera. *Cystidia* aciei lamellarum ± lageniformia interdum supra flexuosa, c. 25–30/6–10μ, ad apicem 2–4μ lata.

Inter graminos solo calcareo, Epsom College, Epsom, Surrey, 21 xxi 1951 et 4 xi 1952. Inter graminos juxta mare: Aberlady, East Lothian, 16 xi 1960 (legit *R. Watling*); Dirleton, East Lothian, 7 xii 1960 (legit *R. Watling*; typus in Herb. Edinb.). A sporis majoribus et habitatione distinguitur.

Cap 5–20 mm, convex then expanded often obtusely umbonate, *dark date-brown or rusty-chocolate with slight purplish tinge, drying tawny-ochraceous, ochraceous-yellowish or -buff*, ± viscid when moist and striate at edge or up to halfway in, *with separable pellicle. Gills* adnate with tooth, sometimes adnate-decurrent or emarginate, pale bay or clay-buff, sometimes slightly olivaceous, then bay or umber tinged purplish to distinctly purplish-umber, subcrowded, L 14–20 l 3–(7), edge pale flocculose when fresh. *Stem* 8–20/1–2½ mm, equal or slightly swollen at apex, clay-buff or whitish, often becoming pinkish or reddish-brown especially above, *white pruinose-fibrillose from veil especially in upper part when fresh*, then fibrillose-striate, hollow, base white tomentose. No smell or taste noted. *Spores* ellipsoid lentiform with germ-pore, (8½)9½–12/(5)5½–7/6–7¾μ (fig. 2, e′, e″). *Basidia* 4-spored. *Marginal cystidia* ± lageniform with shorter or longer often flexuose neck, c. 25–30/6–10μ, apex 2–4μ in diam.

In grass (on basic soil), Epsom College, Epsom, Surrey, 21 xi 1951 and 4 xi 1952. In turf on stable dunes, Aberlady, East Lothian, 16 xi 1960 (legit *R. Watling*); Dirleton, East Lothian, 7 xii 1960 (legit *R. Watling;* type in Herb. Edinb.). Readily distinguished from other non-coprophilous species of section *Deconica* by relatively large spores. In view of the above habitats it would seem likely that this is a calcicole species. This description is still somewhat imperfect on account of the scanty material available.

Psilocybe subcoprophila (Britz.) Sacc., Sylloge Fungorum 11:72(1895). Fig. 2, d′,d″.

Syn.: *Agaricus subcoprophilus* Britz., Hym. Südbayern 8:9 (1891).

Whilst investigating '*Deconica coprophila*' I discovered that some of my collections had longer ellipsoid non-lentiform spores which were quite different from the shorter more broadly ellipsoid-angular lentiform spores of the agaric I take to be *Psilocybe coprophila*. I then found that this had already been described by Britzelmayr as *Agaricus subcoprophilus*, and that this is indeed included in Kühner & Romagnesi's recent 'Flore' as a variety of *P. coprophila*. Since the spore shape is so very different and constant I prefer to regard *P. subcoprophila* as a good species and have included it as such in the key to *Psilocybe* in part I of this paper. It seems to be always

small in size and is perhaps paler than the angular-spored species, especially the stem, but I would like to compare the two in the field before indicating any definite macroscopical differences. For the present, examination of the spores seems to be essential, but one glance is enough, for they are very different (see fig. 2, c′, c″, 2 d′, d″). The following is a description of my material.

Cap 3–15 mm, convex or convex-umbonate, expanded-convex when old, *ochraceous-honey or rusty-honey to date-brown*, often with paler yellower margin, drying ochraceous-yellowish, *viscid with separable pellicle*, striate at margin or up to two-thirds in when moist, sometimes slightly rugulose at centre, matt or slightly shiny when dry, margin at first with whitish flocculose-fibrillose ± fugacious remnants of veil. *Gills* adnate often with tooth and almost triangular, *clay-sepia then tinged umber or violaceous-umber*, sometimes with clay-olive tinge, finally purplish-umber, rather distant (in very small specimens) to subcrowded (in larger specimens), L 10–14(20) l 0–3, edge white flocculose at first then ± concolorous. *Stem* 7–55/0·5–2 mm, equal or slightly thickened at base, *pale straw or dirty cream then tinged ochraceous or rusty in lower part*, apex whitish pruinose, *remainder at first entirely whitish, pale cream or pale buff flocculose-fibrillose from veil* then silky-striate, hollow, base white tomentose or not. *Flesh* concolorous, fairly thick and drying paler at centre of cap. *Smell* and taste none or slight, fungussy. Spores 14–20/(7)8–10μ, ellipsoid, non-lentiform with conspicuous germ-pore (fig. 2, d′, d″). *Basidia* 4-spored, 40–46/12–14μ. *Marginal cystidia* lageniform with fairly long often slightly flexuose neck, 30–44/6–10μ, apex fairly acute, occasionally slightly capitate, 2–3(4)μ in diam.

On horse and sheep dung. Rannoch, Perthshire, 29 viii 1954; Tomich, Inverness-shire, 24 and 26 viii 1964; also Holyrood Park, Edinburgh, 11 iv 1963 (legit R. A. Barrett).

This is *Stropharia coprophila* (Bull. ex Fr.) J. E. Lange sensu Møller non Fr., Fungi Faeroes 193 (1945).

Tephrocybe fuscipes P. D. Orton, **sp. nov.** Figs. 1, b′, b″; 4, h, i.

For a few years now I have regularly found an unfamiliar dull-coloured agaric in pine needles by the road by the Black Wood, Loch Rannoch. It has subglobose or broadly ellipsoid spores and I suspected that it belonged to the genus *Tephrocybe* (= *Collybia* subgenus *Tephrophana*). Tests have shown that the basidia are indeed carminophilous, so that it can be assigned to this genus. I cannot find any description which fits except *Collybia misera* as described by Ricken, Die Blätterpilze: 403 (1915), which except that Ricken says that the cap is 'nie niedergedrückt' agrees very well. He emphasises the stiff stem and dark colours. *Omphalia striaepilea* sensu J. Lange has similar spores but appears to be more slender, paler coloured even when wet, with gills that are not grey and with a different habitat, 'amongst needles, moss and grass' under *Picea*, and with stem 'not very cartilaginous'. *C. misera* sensu Singer and sensu J. Lange are both elongate spored species; the former was accepted in the List as being *Agaricus miser* of Fries and included as *C.* (*T.*) *misera*. The caps of my collections varied from distinctly umbonate to slightly umbilicate or depressed, as is not uncommon in this

group, so I think cap shape differences can be ignored. I am therefore describing this as a new species of *Tephrocybe* of which the following is a diagnosis and description.

Pileus 10–38(48) mm, e convexo expansus ± planus dein interdum leviter umbilicatus vel depressus, haud raro primo obtuse umbonatus, rariore ad marginem undulato-lobatus, obscure fuscus vel brunneus, ad marginem pallidiore fuscus vel griseus, juventute ad apicem albo-floccoso squamulosus albidus vel sordide cremeus, interdum partim griseotinctus vel ad discum obscuriore griseus, jove pluvio ad discum striatus, jove sicco sericeo-opacus vel leviter atomatus, senectute ochraceo-mellescens. *Lamellae* dente adnato-decurrentes vel subdecurrentes, pallide griseo-cremeae vel colore cornus tinctae dein senectute interdum ochraceo-tinctae, haud confertae vel subconfertae, L 16–24 l (1)–3–(7), interdum aliquantum crassae vel venosae, rariore partim furcatae, ad aciem integrae interdum senectute praecipue juxta marginem pilei obscuriores. *Stipes* 28–52/1½–4(4½) mm, aequalis vel ± clavatus, obscure fuscus vel brunneus vulgo ad apicem vel siccitate pallidiore fuscus vel griseus, juventute ad apicem albo-floccoso squamulosus dein laevis nitidusque vel leviter sericeostriatus, ad basim albo-tomentosus vel strigosus, anguste cavus, juventute rigidus dein cartilagineus facile frangens. *Caro* concolorata, siccitate intus alba. *Odor* saltem secto et sapor forte farinacei. *Sporae* subglobosae vel late ellipsoideae, 6–7½(8)/(4)4½–6μ (fig. 1, b′, b″), non-amyloideae, in cumulo albae. *Basidia* 4-sporigera, 28–36/7–9μ, cum granulis carminophilis. *Cystidia* absunt. *Hyphae* pilei filamentosae, ramosae, fibulatae, cellulae saepe flexuosae, 3–10μ latae, interdum incrustato-pigmentatae.

Inter acus et strobilos Pini ad viam, Loch Rannoch, Perthshire, *P. D. Orton*, 21 et 22 x 1961, 28 ix 1965, 2 x 1965 (typus in herb. Edin. et Kew.). A coloribus obscuris, forma sporarum, et habitatione distinguitur. *T. anthracophila* a sporis distinctiore globosis, stipite molliore et habitatione semper ad terram incensam differt. *Omphalia striaepilea* sensu J. Lange a coloribus pallidioribus, stipite molliore et lamellis non griseis distinguitur.

Cap 10–38(48) mm, convex then expanded ± plane, sometimes obtusely umbonate at first or becoming slightly umbilicate or depressed, more rarely wavy-lobed at the margin, *dark sepia-horn or vandyke* with paler margin then ochraceous-horn often with darker central spot, *rather strongly hygrophanous*, drying whitish or dirty cream often in patches from centre out, sometimes greyish in places and darker grey-horn at centre, striate to disc when moist, entirely silky-matt or slightly atomate when dry, tending to turn ochraceous-honey when old. *Gills* adnate with tooth to subdecurrent, *pale greyish cream or pale grey-horn*, sometimes tinged creamy-ochraceous when old, not to fairly crowded, L 16–24 l (1)–3–(7), sometimes rather thick or veined on the sides or interveined or forked in one or two places, edge even, concolorous, but sometimes darker brownish with age especially near the margin of the cap. *Stem* 28–52/1½–4 (4½ when compressed) mm, equal or ± clavate, in larger specimens often thickened at base, *dark sepia to vandyke like moist cap*, often becoming paler at apex, *also drying paler like cap*, apex white floccose-scaly when fresh, remainder smooth and shiny or slightly silky striate, base white tomentose or strigose, *stiff and firm at first* then cartilaginous but snapping easily, narrowly hollow. *Flesh* concolorous when moist, drying white in centre of cap and stem. *Smell* (especially when

cut) and *taste* strong, mealy. *Spores subglobose or shortly ellipsoid*, 6–7½(8)/ 4½–6μ (fig. 1, b′, b″), non-amyloid, white in the mass. *Basidia* 4-spored, 28–36/7–9μ, with carminophilous granules. *Gill-edge* fertile. *Cystidia* absent. *Hyphae* on cap filamentous, branched, clamped, cells often flexuose, 3–10μ, in diam., sometimes with encrusting pigment.

Attached to pine needles and cones by road by the Black Wood, Loch Rannoch, Perthshire, 21 and 22 x 1961, 28 ix 1965, 2 x 1965 (type in herb. Edin. and Kew). Distinguished by very dark moist colour, spore shape, stiff stem and habitat. *T. anthracophila* has spores more distinctly globose, is softer stemmed and always found on burnt soil.

Tricholoma aestuans (Fr.) Gillet, Hym. France: 102 (1874). Figs. 2, k, l; 6, b, c.
Syn.: *Agaricus aestuans* Fr., Syst Mycol. I: 47 (1821).
Icon.: Bull. Soc. Mycol. Fr. 82: Atlas Pl. 105 (1966).

Some years ago I came across a group of specimens of an unfamiliar *Tricholoma* which seemed to combine features of *T. flavovirens* and *T. virgatum*. Research in the literature failed to reveal an identity for it and I was beginning to think it would have to be described as new, but did not do so, because I wished to find it again before doing so. However when I saw the plate quoted above I recognised my unknown, and so am adding this name to the British list. I had overlooked the description of *A. aestuans* of Fries because it was in a different section from *A. flavovirens* (*Tricholoma Genuini* and not *T. Limacina*). I have on more than one occasion collected rather pale-gilled specimens of *T. flavovirens* which I have at first thought to be this, but these have not had the bitter-tasting cap cuticle and the gill-edge has shown no projecting cells, such as are found in *T. aestuans*, which are the best distinguishing features between the two species. Here is a description of the Scottish material.

Cap 42–98 mm, convex soon expanded, obtusely or rather acutely umbonate, *viscid when fresh and moist* then dry and shiny, *pale greenish-yellow soon tinged reddish-brown or tawny-date from the centre out, margin remaining greenish-yellow at least in places*, smooth except sometimes cracked-scaly at centre or with minute adpressed fibrillose scales around centre, *remainder radially brown fibrillose-streaky* (like *T. virgatum*), margin often quite smooth, but sometimes becoming torn or radially cracked, cuticle sometimes cracking and showing white flesh through, *fragile*. *Gills* adnate emarginate often with tooth, *pale greenish-yellow* (± the colour of the cap-margin), crowded, edge concolorous or sometimes slightly brownish when old, even or uneven. *Stem* 80–110/8–14 mm (< 18 mm at base), equal, slightly ventricose, or clavate and usually attenuated at apex, often slightly flexuose, pale greenish-yellow, usually paler than the gills, sometimes discolouring pale dirty reddish-brown near base, whitish at base at first, silky-fibrillose striate, fibrous-stuffed, cuticle fairly rigid but fragile. *Flesh* white or whitish, slightly coloured under cap cuticle, often slightly horny over the gills or in stem cortex. *Taste* of flesh none, of cap cuticle slowly bitterish or slightly acrid (leaves tongue smarting). No smell noted. *Spores* ellipsoid, (5½)6–7(8)/ 3¾–4½(5)μ (fig. 2, k). *Gill-edge* fertile *but with fairly numerous cylindric, cylindric-clavate, or fusiform-cylindric cells* 30–60/6–10μ, *projecting* 20–40μ *beyond the basidia*, apex occasionally ± pointed (fig. 2, l).

Subcaespitose or singly in troop under pine and birch, Plodda Falls, Guisachan, Inverness-shire, 29 viii 1957. Not so viscid as and with gills normally paler than in *T. flavovirens*.

Tricholoma resplendens (Fr.) Karst. in Hattsv. 1: 32 (1879). Figs. 1, p; 6, d. Syn.: *Agaricus resplendens* Fr., Monogr.: 55 (1857).

In recent years I have regularly come across a large white viscid *Tricholoma* around Rannoch in grass under or near birch (and elsewhere in the Highlands of Scotland in previous years), which I now feel sure is *T. resplendens*. Although I originally named this *resplendens*, in recent years I had been content to name it *T. columbetta* after seeing that in the South of England. Fries, however, makes the distinction between these two quite plain, for *resplendens* is given as 'gregarius, totus candidus, odore grato, sapore miti', with the cap 'recens prorsus laevis et viscosus, siccus pulchre argenteo splendens, saepe cum maculis hyalinis, discus lutescens et superficies adpresse sericea apparet, licet glabro sit'. The stem is 'laevis, glaber l. apice modo leviter flocculosus, siccus'. All this agrees perfectly well with my finds (see description below). *T. columbetta* on the other hand has the cap 'sicco, primo glabro, dein subsquamoso fibrillosove' and 'margine juventute inflexo tomentoso', and is 'saepe rubello-maculata'. The validity of the last mentioned character taxonomically seems to me a little doubtful, however, for at Rannoch I have gathered both *T. flavovirens* and *T. resplendens* with deep violet spots—no doubt a pathological condition like the pink spots on *Hygrophorus niveus*. Although I have seen *T. resplendens* with both hyaline and violet spots, I have never seen it with pink or reddish spots, but I doubt if this is of taxonomic importance. Nevertheless the cap characters are sufficiently distinct between the two for there to be no confusion—*T. resplendens:* viscid, smooth, and *T. columbetta:* dry, smooth then subsquamulose or fibrillose, margin tomentose at first. Habitats given by Fries are less convincing; for *T. resplendens* he gives 'in nemoribus, praecipue sub *Corylis*' and for *T. columbetta* 'inter Ericas et gramina locis sabulosis passim' and later 'in betuletis ericetosis inter muscos'. In England I have found *T. columbetta* in deciduous woods of various sorts, but must make more field observations before discussing this matter further.

In the List, J. E. Lange's plate 17 B was quoted for *T. resplendens*, but this now seems to me rather doubtful and best excluded, for the spores are given as subglobose and it does not look the same. I know of no certain illustration of my present interpretation of *resplendens* although Cooke 64(55) gives a fair idea of it, but the yellowish colour of the cap centre is exaggerated. The following is a description of Scottish *T. resplendens*.

Cap 58–115 mm, convex then expanded ± plane, sometimes slightly umbonate, often with wavy-lobed or upturned margin, which may be ridged near the edge, *pure white at first then ivory or ochraceous-cream or yellowish in places* especially at and around the centre, *viscid when moist, shiny white when dry* especially in the outer part, more rarely with hyaline spots, smooth then silky-shiny sub lente, often cracking radially and splitting at edge or nearer the centre. *Gills* narrowly adnate or almost free, emarginate, sometimes with tooth, *white hardly discolouring* (whitish) even when old, crowded, L c. 60–100 l 1–3, ventricose or not, sometimes crisped or veined

on sides, edge even or uneven. *Stem* 72–125/11–34 mm, often slightly ventricose-fusiform or flexuose and irregular, usually attenuated at apex and ± pointed at base, *shining white then discoloured ivory or dirty cream especially in lower part*, sometimes pale blue-greenish in places, especially at or near base but this colour appears sometimes to fade after gathering, silky-fibrous, apex slightly white-floccose when fresh, firm and hard at first, narrowly stuffed. *Flesh* white, often hyaline-ivory in cap or becoming yellowish-cream in lower part of stem. *Smell none or faint*, pleasant to sweetish, rarely faintly mealy (the stem-base appears to smell more strongly sweetish when discoloured). *Taste mild*, rarely very faintly mealy. *Spores* ellipsoid, 1-guttulate, 6–8/4–5μ (fig. 1, p). *Gill-edge* fertile. *Basidia* 4-spored, 24–30/6–8 μ. *Hyphae* on cap filamentous, branched, cells cylindric 2–5 (8)μ in diam.

Under birch and pine, Dall, Perthshire, 13 x, 22 x, 12 xi 1962 and subsequently; in grass under birch, Camghouran, Perthshire, 9 x 1965. Superficially coloured like *T. album* and *T. columbetta*, although less deeply coloured than *T. album* and differs from both in being distinctly viscid. It would seem that *T. columbetta* also differs by not turning yellowish.

Tricholoma stans (Fr.) Sacc., Sylloge Fungorum 5: 94 (1887). Fig. 6, a.
Syn.: *Agaricus pessundatus** *A. stans* Fr., Ic. Sel. I: 25 (1867). *A. stans* (Fr.) Karst., Myc. Fenn. 3: 36 (1876).

During 1964, I had opportunity to make a fair number of collections of *Tricholoma* from the Black Wood at Rannoch which were exannulate and had the cap viscid and the gills becoming spotted red-brown with age. These could quite easily be separated into three taxa. One was on the whole relatively small in size and differed from the other two, both of which tasted mealy, in having a distinctly bitter taste and the stem entirely reddish-brown except for the apex. This was easily identified as *T. albobrunneum* sensu Ricken, Kühner & Romagnesi as in the List (= *T. striatum* (Quél.) Sacc.). The second was of large size and nearly always had ± concentric dark brown spots somewhere on the cap near the margin. This was also easily identified as *T. pessundatum*.

This left a third taxon with fruit-bodies often of large size but without dark brown spots, and with the stem conspicuously white-scaly when fresh but bruising red-brown with age or when handled, and with smooth, viscid, cow-red or bay cap, which was often dark red-brown innately-fibrillose at or around the centre and sometimes costate or tuberculate-striate at the margin. This had a strong mealy smell and taste, and spores much like the others, and should I think be called *T. stans*, for Fries says that the cap of this is 'nec granulato nec guttato-maculato'—and therefore different from *T. pessundatum*—and that the stem is '*squamuloso*'. He describes two forms which he says seem hardly distinct, differing mainly in habit. One, forma *campestris*, is more robust with an obese stem, the other, forma *montana* is less robust with an elongate equal stem. Overall dimensions of my collections show a great range in size (cap 50–165 mm, stem 45–175/10–28 mm) and in stem shape, so I do not think these forms have any taxonomic value. The description Bresadola gives for *stans* (Ic. Myc. 66) seems quite good, but the plate shows colours which are too yellow a brown. The species *stans* was rejected as doubtfully distinct from *pessundatum* in the List, but

I think it can now be reinstated, in view of cap and stem differences. The following is a collective description of my material.

Cap 50–165 mm, convex then expanded, sometimes obtusely umbonate or slightly depressed, margin often upturned and wavy-lobed in large specimens, *entirely cow-red, reddish-date or bay at first, soon paler reddish-buff or ochraceous-cream at the margin*, viscid when moist, at first slightly fibrillose-tomentose or fibrillose-virgate in places but later smoother although usually *slightly tomentose or innately fibrillose at or around the centre, margin sometimes radially costate or tuberculate-wrinkled*, cuticle peeling halfway. *Gills* adnate emarginate, white then whitish or pale horn or pale dirty cream, soon spotted rusty-reddish on the edge or sides or entirely so, crowded, L 70–100 l 1–3, sometimes forked near stem, edge even at first, often becoming split vertically. *Stem* 45–175/10–28 mm, sometimes slightly eccentric, equal or thickened or attenuated at base, white then whitish with ± rusty-tawny base, *upper part conspicuously white floccose-scaly when fresh*, these scales often discolouring rusty-reddish, lower part often with rather smaller or minute floccose-fibrillose ochraceous- or rusty-tawny scales, when old or after handling the stem may be entirely rusty-tawny except for apex, very firm, solid with white pith becoming hollow, extreme base sometimes whitish strigose-tomentose. *Flesh* white or horny, especially in stem, drying white in centre of cap and stem, horny over gills, bruising rusty-tawny in places or when maggotty. *Smell* and *taste mealy* (occasionally the cuticle may be very slightly bitterish). *Spores* ellipsoid with large guttule, 4–5½/2¼–3½μ. *Basidia* 4-spored, 6–7μ in diam. *Gill-edge* fertile when fresh, cystidia none. *Hyphae* on cap filamentous, branched, cells ± cylindric but often flexuose or swollen in places, 2–6μ in diam., hyaline or encrusted-pigmented. No obvious clamps seen.

Under *Calluna* and *Vaccinium* near *Pinus sylvestris*, usually by the side of tracks, usually in groups, singly or subcaespitose, Black Wood, Rannoch, Perthshire, 30 ix, 7 x and 9 x 1964, and subsequently. *T. albobrunneum* differs in smaller size (cap 26–70 mm, stem 30–66/(5)7–15 mm), immediate bitter taste, and stem except for apex reddish-brown from the start. *T. pessundatum*, which also tastes mealy, has the cap smooth but usually with a ring of dark brown guttate spots in the outer part, and stem less conspicuously scaly even when fresh.