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FLORA AGARICINA
DANICA

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WOMAN'S

FOR A GENTLE

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COLLYBIA

Cap generally convex, with incurved edge. Gills never decurrent, in most cases rotundate behind. Stem rather slender, more or less cartilaginous. Flesh thin or membranaceous, never coriaceous.

COLLYBIA is fairly well separated from the adjoining genera in outward appearance. Most *Mycenas* have a somewhat parabolic cap with a straight edge, while the cap in Collybia is convex-flat, with incurved edge. *Tricholoma*, its neighbour on the opposite side, generally has a more fleshy-fibrous, stoutish stem. But in both genera intermediate species are to be met with. Thus *Tricoloma persicolor* is almost Collybioid and only retains its place in *Tricholoma* on account of its close affinity to *T. carneum*. Also the species of which *Agaricus aggregatus* is the most prominent representative (and which were for the most part included by FRIES in his group *Difformes* of *Clitocybe*) are very close to the *Collybia*-type. But the greatest difficulty is to regulate the frontier-line between *Collybia* and *Marasmius*. Some authors regard them as subgenera only, but I prefer to maintain them as distinct genera, in dubious cases referring to *Collybia* all species with thin and crowded gills. *Armillaria mucida* (Schr.) Fr. I remove to *Collybia* (as already proposed by QUÉLET). It might also be justifiable to include in *Collybia* a little group of Agarics centering around *Agaricus cucumis* Pers. which are now distributed among *Collybia*, *Nolanea* and *Naucoria*, according to the colour of their spore-print (which varies from white or whitish in *Collybia mimica* to pinkish tan in *Naucoria cucumis*), but which should certainly be kept together either in a new genus (*Macrocystis* Heim) or as a subgenus (under *Naucoria*?).

Microscopic structure. The majority of the Collybias show but little variation with regard to their microscopic characters. Thus most species have rather small, somewhat pip-shaped, smooth spores. But certain groups are exceptional in this regard. In *C. mucida* the spores are globose and gigantic, and also *C. radicata* and its allies have unusually large spores. Verrucose spores are also met with, although rarely. — In the great majority of cases genuine cystidia are lacking, the edge of the gills being either homomorph or set with inconspicuous, short, hairlike cells. — Large, inflated cystidia are found on the gills of *C. radicata* and its nearest allies and also in *C. platyphylla*. And *C. velutipes*, *C. tenacella* and others also have cystidia on the gill-edge. The texture of the epiderm varies considerably. In

most species it is made up of minute fibrils; but in *C. radicata* and *C. longipes* it is formed of inflated, obovate or almost cylindrical, erect cells.

Taxonomy. The annulate *C. mucida* stands in a rather unique position as the only representative of *Mucidula* (PATOULLARD) which I include in *Collybia* as a subgenus. Next to this species come *C. radicata* and *C. longipes*. In fact BOURSIER includes both of them in *Mucidula*. But this is, to my mind, hardly defensible, at least for *C. longipes*. And to include *C. radicata* only, and remove its very close relative to *Marasmius* (as done by KONRAD & MAUBLANC) seems to me to make matters even worse. I prefer to arrange all the ringless *Collybias* in two large groups: the Friesian section *Tephrophanae* (the dusky, hygrophane species with grayish gills) and *Laticolores*, in which I include all the rest (species with white or yellowish gills and white or bright-coloured cap).

Tephrophanae is a fairly homogeneous group, but *Laticolores* comprises a number of rather different types. The most prominent of these is the group *Macrospora* (*C. radicata* and its relatives). But also *C. velutipes* is a very outstanding type, which does not fit into the ordinary *Collybias*. For such reasons I find it impracticable to maintain the old Friesian divisions: *Striapedes*, *Lævipedes* and *Vestipedes*, as originally defined. However I shall preserve them, but in a more restricted sense, as nothing would be gained by disbanding them altogether. The minor points in my taxonomic arrangements will be seen in the key.

KEY

TO THE SPECIES FIGURED

I. MUCIDULA

Surface of cap gelatinous. Stem with a distinct ring. Spores very large, globose.

Xylophilous. Cap white or whitish 1. *C. mucida*

II. EU-COLLYBIA

No trace of veil or ring.

A. LATICOLORES. Gills white, yellowish or rufescent.

a. *Macrospora*. Spores large (index > 40), broadly ovate.

a. Stem with a long "taproot".

1. Cap and stem not velutinous, horn-brown to whitish.

* Rather large. Cap horn-brownish 2. *C. radicata*

** Smaller. Cap whitish 2 b. *C. radicata* var. *gracilis*

2. Cap and stem velutinous, soot-brown 3. *C. longipes*

b. Stem truncate, with white, creeping, rootlike strands 4. *C. platyphylla*

β . *Mesosporæ*. Spores smaller, of various shape.a. *Striæpedes*. Stem rather stout, sulcate or fibrous-striate.1. Gills distant, rather thick. Stem somewhat fusiform ... 5. *C. fusipes*

2. Gills rather crowded.

* Spores subglobose.

† Whole plant (when fresh) white (or pale yellowish)... 6. *C. maculata*†† Cap rufous ... 7. *C. distorta*** Spores ellipsoid-lanceolate... 8. *C. butyracea*b. *Tenuiores*. Stem rather slender, not striate.1. *VISCIPELLES*. Densely fasciculate with a viscous, yellow cap... 9. *C. velutipes*2. *SICCÆ*. Cap not viscid.* *Lævipedes*. Stem glabrous (except at the base).

† Spores smooth.

° Spores somewhat pip-shaped, generally rather small ($5-8\ \mu$ long).^ Cap medium ($2\frac{1}{2}-5$ cm), pale tan to date-brown.• Stem pale ochre or tan ... 10. *C. dryophila*

** Stem rufo-fulvous, shining.

° Cap fulvous-brown or somewhat rufous ... 11. *C. succinea*°° Cap pallid tan. Subfasciculate ... 12. *C. erythropus*

** Cap smaller (1-2 cm).

• Stem not rooting.

° Whole plant yellow... 13. *C. macilenta*°° Gills white. Cap white with a subochraceous disc... (*C. ocellata*)** Stem with a long root. Cap whitish or brown ... 14. *C. tenacella*°° Spores subcylindrical, longer ($8-9\ \mu$). Stem slender, white... 15. *C. pseudo-radicata*†† Spores granulate. Cap subfulvous... 16. *C. nitellina* forma *minor*** *Vestipedes*. Stem velvety, tomentose or hairy.† Clustered... 17. *C. confluens*

†† Not clustered.

° Never springing from a sclerotium (growing on buried cones) 18. *C. conigena*
(Stem almost glabrous, minutely pruinose: vide no. 14).

°° Generally springing from a sclerotium (growing on decayed mushrooms or on humus).

^ Stem without branchlets. Sclerotium brown or ochry.

• Sclerotium ovate or pip-shaped, brown... 19. *C. tuberosa*** Sclerotium roundish, ochraceous ... 20. *C. cirrhata*** Stem with numerous branchlets. Sclerotium black ... 21. *C. racemosa*B. *TEPHROPHANÆ*. Gills gray or dingy-pale. Cap hygrophanous, gray to dirty brownish. α . Stem with a long "taproot"... 22. *C. rancida* β . Stem without "taproot".

a. Spores smooth.

1. Spores ovate or ellipsoid.
 - * Spores medium ($4\ \mu$ or more broad).
 - † Cap not striate. Growing on the ground.
 - ° Stem rather stout (4—6 mm); base strigose-tomentose ... 23. *C. inolens*
 - °° Stem less stout, not strigose at base ... 24. *C. murina* forma
 - †† Cap pellucido-striate. Growing in Sphagnum ... 25. *C. leucomyosotis*
 - ** Spores small ($2\frac{1}{2}$ — $3\frac{1}{2}\ \mu$ broad).
 - † Cap striate, umbonate ... 26. *C. misera* forma
 - †† Cap not striate.
 - ° Medium. Cap 2—3 cm broad. Odour very faint (mealy) ... 27. *C. ozes* forma
 - °° Very small. Cap $1\frac{1}{2}$ cm. Foetid ... 28. *C. mephitica*
(Stem with numerous branchlets: vide no. 21).
2. Spores almost globose.
 - * Cap brownish-black. Stem dark ... 29. *C. ambusta*
 - ** Cap watery dirt-brownish, striate. Stem pallid ... 30. *C. cessans*
- b. Spores verrucose or spinulose.
 1. Cap striate, dirt-brownish ... 31. *C. erosa*
 2. Cap even, dark fuscous ... 32. *C. tylicolor*

SPECIFIC DESCRIPTIONS AND NOTES

I. MUCIDULA

1. *C. mucida* (Schrad.) Fr. (*Mucidula mucida* (Schrad.) Pat.). (Plate 41. fig. E.)

Medium to rather large. Cap 4—7 cm, convex, white, occasionally with a flush of fuscous, especially on the disc; cuticle gelatinous, almost diaphanous. Gills broad. Stem thin, comparatively short, white, somewhat fuscous towards the subbulbous base, with a narrow, horizontal ring. Gregarious or somewhat fasciculate.

Spores globular, gigantic, 13 — 18×12 — $16\ \mu$, with a very thick epispore.

Common, on wounded trunks and dead branches of *Fagus*, lying on the ground or still on the tree, even high up (15 meter above ground).

It sometimes appears to be a true parasite, but never attacks young and vigorous trees.

II. EU-COLLYBIA

A. *Laticolores*

a. *Macrosporæ*

2. *C. radicata* (Relh.) Fr. (Plate 41. fig. D.)

Tall and often large, but varying very much in size. Cap 3—9 cm, varying from rather dark livid brown to almost white, radiately wrinkled, somewhat gelatinous. Gills broad,

distant, white (occasionally with a fuscous edge). Stem straight, very tall, attenuated upward, with a longer or shorter tapering "taproot".

Spores very large, ovate, about $15 \times 10 \mu$. Basidia 4-spored. Cystidia inflated, cylindric-sack-shaped, about 20μ broad. The epiderm of the cap is formed of inflated, obovate or almost balloon-shaped cells (diameter about $14-23 \mu$) with pale brownish contents.

Common everywhere in woods of *Fagus* (very rarely of *Carpinus* and *Tilia*), solitary.

Although apparently growing on the ground it is probably always a true xylophilous species, springing from tree-roots in different depths.

2a. *C. radicata* forma *arrhiza*. (Plate 41. fig. B.)

Stem rootless, base bulbous. — Generally small and pale. Otherwise like the main form. Occasionally met with, growing on superficially running roots.

2b. *C. radicata* var. *gracilis* Lange. (Plate 42. fig. A.)

Small. Cap about 2 cm broad, hyaline-whitish. Gills slightly decurrent, narrower than usual. Stem 8 cm high, white, somewhat downy.

Spores as in the typical *C. radicata*. Cystidia cylindric subulate, $2-3 \mu$ broad, base inflated, cylindric-ovate, $11-14 \mu$ broad.

Rare, in woods of *Fagus*.

If the awl-shaped cystidia are a constant feature, this form must be a distinct variety, although macroscopically very much like small forms of *C. radicata*.

3. *C. longipes* (Bull.) Fr. (Plate 41. fig. A.)

Tall and rather large. Cap about $5\frac{1}{2}$ cm, subgibbous, radiately wrinkled, edge involute; surface fuliginous, velutinous-atomate with a faint, whitish bloom. Flesh white. Gills distant, yellowish white, rather thick, somewhat adnate and connected by veins. Stem strongly attenuated upward, about 9 cm high (with a rather long "taproot"), fuliginous, white-pruinose towards the base, coarsely sulcate. After-taste slightly bitter.

Spores roundish ovate, $8-9 \times 6-6\frac{3}{4} \mu$. Cystidia (very sparse) obtuse, almost cylindric or slightly inflated in the middle, $50 \times 10 \mu$ (apex about 5μ). Between the marginal cystidia are long thin hairs. The epiderm is made up of cylindric-obovate, palisade-like cells ($35 \times 12-16 \mu$).

Very rare. The figured specimen is from a wood of *Fagus*, Næsbyholm in Sjælland (M. P. CHRISTIANSEN, 1934).

Quite distinct, but very close to *C. radicata*. In America (Vermont, U. S. A.) I have seen a form with even broader cystidia (20μ), almost like those of *C. radicata*.

4. *C. platyphylla* (Pers.) Fr. (Plate 42. fig. D.)

Large. Cap 6—10 cm, pallid horn-brownish, everywhere streaked with very minute,

radiating, innate, subfuscous fibrils. Gills very broad, distant. Stem straight, cylindric, fibroso-striate, about 8 cm high, springing from white, coarse, creeping strands.

Spores ovate to subglobose, with a somewhat lateral pedicel, mostly $6\frac{3}{4}$ — $8\frac{1}{4} \times 6$ — 7μ ; epispore thick. Cystidia sackshaped-clubshaped, about 14μ broad. The cells of the fibrils of the cap are ovate-clubshaped, 12 — 15μ broad.

Common, on and around stumps of frondose trees (particularly *Corylus*), from early summer.

β . Mesosporæ

a. *Striæpedes*

5. *C. fusipes* (Bull.) Fr. (Plate 43. fig. D.)

Medium, subfasciculate. Cap 3—7 cm, convex or somewhat umbonate; when young and fresh of a dull rufous colour, but soon fading to pallid tan with a flush of flesh-colour. Gills distant, broad, venose, with a tinge of the same colour. Stem subfusiform, cartilaginous, tough, sulcate, pale above, dark rufous-bistre below and attenuated into a longer or shorter "root" (which springs from a black rhizomorph).

Spores almost pip-shaped, mostly 5 — 6×3 — $4\frac{1}{4} \mu$. Cystidia on edge crowded, hair-shaped, somewhat wavy, about 2μ broad.

Not uncommon, growing at the base of or around stumps and living trees (*Fagus*, *Quercus*).

6. *C. maculata* (Alb. & Schw.) Fr. (Plate 42. fig. C and C¹.)

Medium to rather large. Cap 4—7 cm, convex-flat, edge strongly incurved, milk-white when young. Gills rather narrow, crowded. Stem tall, somewhat ventricose, fibroso-lineate, of the same colour. The whole plant turns brownish flesh-colour with age and when bruised. Flesh bitter.

Spores almost globular, 4 — $5\frac{1}{2} \times 3$ — $4\frac{1}{2} \mu$.

Not rare, in woods of *Picea* and in adjoining open spaces among grass and heather.

Fig. C represents the main type, fig. C¹ a more slender and lax form. A yellowish, slender variety (*C. scorzonerea* (Batsch) Fr.) is also occasionally met with.

7. *C. distorta* Fr. (Plate 42. fig. B.)

Medium to rather large, subfasciculate. Cap 4—7 cm, often somewhat umbonate, rufo-fulvous. Gills with somewhat serrate edge. Stem deeply sulcate, often distorted.

Spores globular, small, $3\frac{1}{2}$ — $4 \times 3\frac{1}{4}$ — $3\frac{1}{2} \mu$.

Rather rare, mostly found about stumps of *Picea*.

Very intimately related to the preceding species, the slender, dark rufescent forms of which run it very close. — *C. proluxa* as described by RICKEN (loc. cit.) seems to be a form of *C. distorta*.

8. *C. butyracea* (Bull.) Fr. (Plate 41. fig. C.)

Medium. Cap 3—7 cm, subumbonate, slightly greasy, varying in colour from dark rufous-bistre to pale horn-brownish, but always becoming very much paler when dry, sometimes almost alutaceous-white. Gills' edge somewhat crenulate. Stem more or less conical, striate, cortex cartilaginous, of the same colours as the cap, occasionally more or less densely clad with adpressed, short hairs.

Spores narrowly pip-shaped, $6\frac{1}{2}$ — 7×3 — $3\frac{3}{4}$ μ .

Very common, both in frondose and coniferous woods, sometimes forming large "fairy-rings".

Pale and thin-stemmed forms (especially from frondose woods) are often called *C. asema* Fr., but hardly deserve specific rank. In coniferous woods a very dark, stoutish form with a dense coating of adpressed, white hairs on the stem (*Ag. trichopus* Pers.) is occasionally met with.

b. *Tenuiores***1. VISCIPELLES****9. *C. velutipes* (Curt.) Fr. (Plate 43. fig. B and B¹.)**

Medium to rather small, densely fasciculate. Cap 2—5 cm, viscous, yellow ochre, somewhat orange or subfulvous towards the centre. Gills white, soon becoming flushed with light ochre and at last subfulvous. Stem pale yellowish at the apex, shading off through all nuances of fulvous to almost black at the base, densely velutinous.

Spores cylindric ellipsoid, mostly $7\frac{1}{2}$ — $10 \times 3\frac{1}{2}$ — 4 μ . Gill-cystidia inflated, cylindric or somewhat bottle-shaped, obtuse or rather acute, almost subulate, 8 — 12 — 15 μ broad; epidermal cystidia dispersed, somewhat amber-coloured. The velvety coating on the stem is made up of long, wavy, about 4 μ broad hairs of a more or less pronounced yellow-brown colour.

Common, especially on living, slightly decayed stumps of *Ulmus*, *Fraxinus* and *Populus*. Also (parasitic) on living trees, several meters above ground. Very rare (and always dwarfish, subsolitary) on coniferous wood.

2. SICCÆ*** *Lævipedes*****10. *C. dryophila* (Bull.) Fr. (Plate 43. fig. E.)**

Medium to rather small. Cap 2—5 cm, soon flat, varying from alutaceous through light tan or ochre to date-brown. Gills crowded, white or pale sulphur (often fulvescent with age). Stem rather slender, whitish, flushed with the colour of the cap, especially towards the more or less swollen base.

Spores ellipsoid to pip-shaped, $5 \times 3\frac{1}{4} \mu$. Edge of gills set with hair-shaped, somewhat wavy (occasionally branched), thin or somewhat inflated cells.

Very common in frondose woods, from spring till late in the autumn.

REA (loc. cit.) places this species in *Marasmius*; but it appears to me to be a genuine *Collybia*. It varies very much in colour. Forms with distinctly sulphur-yellow gills are not rare. The white gills often become somewhat rufescent with age.

11. *C. succinea* Fr. (Plate 43. fig. C.)

Medium to rather small. Cap $2-4\frac{1}{2}$ cm, convex-flat, at first dark fulvous or somewhat rufous, then paler (dingy fulvous-alutaceous); the edge in very young specimens slightly white-pruinose. Gills somewhat distant, rather thick, broad and truncate behind, pallid at first, then with a tinge of the colour of the cap; edge not visibly denticulate. Stem rather short ($2\frac{1}{2}-5$ cm), tough, bay-brown, glabrous and shining, with a felty, fulvo-cinnamon coating at the base.

Spores ovate, base somewhat acuminate, $6-7 \times 3\frac{3}{4} \mu$. Hairs on edge of gills short, thin, wavy, occasionally somewhat clavate or subcapitate (up to 7μ broad).

Rather rare. Growing gregariously at base of (or at some distance from) stumps of *Fagus*.

A somewhat disputed species. FRIES has it from woods of *Fagus*, like me, but he also records it from coniferous woods in other parts (Eastern Sweden). ROB. FRIES ascribes larger spores ($9-10 \times 7-8 \mu$) to it, a rather dubious record.

12. *C. erythropus* (Pers.) Lange. (*Marasmius erythropus* (Pers.) Fr. (sensu Bres.)). (Plate 45. fig. H.)

Medium. Cap $2.6-3.1$ cm, plano-convex, very pale tan with a flush of whitish, broad behind and somewhat truncate. Gills somewhat distant, broad behind and subtruncate, slightly adnexed, whitish. Stem rather slender, bright fulvous (almost with a tinge of orange), shining, apex paler, $6-7 \text{ cm} \times 2\frac{1}{2} \text{ mm}$, fistulose, glabrous. Somewhat fasciculate.

Spores elongated-pipshaped, $8\frac{1}{2}-9 \times 4 \mu$, base acuminate. Cystidia of various shapes, more or less inflated-clavate, obtuse or with a shorter or longer filiform appendix, $7-10 \mu$ broad.

Only met with once, in frondose wood, growing on a bit of wood, buried in the ground.

BRESADOLA has a good figure and description of this rare and very much disputed species. It is not unlike his *Collybia acervata* Fr., but is not attached to conifers and lacks the very crowded gills. (Vide Iconographia, pl. 211 and 496). But I prefer to place them together in *Collybia*. *Marasmius erythropus* (Pers.) (sensu Schroet.) is *M. coharens*; and *Collybia erythropus* (Pers.) Quél. according to KONRAD & MAUBLANC is *Collybia acervata*.

13. *C. macilenta* Fr. (Plate 44. fig. A.)

Small. Cap $1-1\frac{1}{2}$ cm, slightly umbonate, yellow ochre with a tinge of fulvous in the centre. Gills very narrow, crowded, yellowish. Stem pallid, with a tinge of yellow, rather short (3 cm).

Spores ovate-ellipsoid, $4\frac{1}{2}$ — $5\frac{1}{2} \times 2\frac{1}{2}$ — 3μ . Cystidia hair-shaped, somewhat nodulose. Only met with once, in a wood of *Picea*, on somewhat boggy ground.

C. ocellata Fr.

Small. Cap 1— $1\frac{1}{2}$ cm, convex flat, subumbonate, white, with a more or less bright fulvo-ochraceous, central eye-spot. Gills moderately crowded, white, adnate. Stem short (2 — 3 cm $\times$ 1 — 2 mm), slightly flushed with fulvous, smooth.

Spores oval, $7\frac{1}{2}$ — $8\frac{1}{2} \times 4\frac{1}{2}$ — 5μ . Cystidia somewhat clavate, 5 — 7μ broad above.

Found by POUL LARSEN in Southern Jylland (1921), amongst grass in a heath-bog.

Confounded by some authors with *C. cirrhata*, but easily distinguished from large specimens of this species by means of the large spores.

14. *C. tenacella* (Pers.) Fr. (Plate 44. fig. F.)

Rather small to small. Cap 1—3 cm, convex-flat, varying in colour from almost white to date-brown. Gills white, moderately crowded. Stem paler or darker date-brown or somewhat ochry, apparently glabrous (very minutely pruinose), elongated into a shorter or longer, fibrillose „root”, which springs from a buried cone (generally of *Picea*).

Spores ovate-oval, 5 — 7×3 — 4μ . Cystidia on edge and face of gills cylindric-fusoid, about 10μ broad, acuminate or somewhat capitate, with or without a granulate hood. The pruina of the stem is due to scattered, erect, hyaline, short hairs (about 20μ long).

Common, even in early spring, in woods of *Picea*.

C. conigena (sensu Rick.) is synonymous. *C. esculenta* (Wulf.) Fr. is hardly specifically distinct.

C. tenacella forma *minor*.

Differing from the type by its reduced dimensions. The cap is 0,5—0,7 cm broad, pellucido-striate; the stem 0,6 mm thick, almost filiform.

This tiny little form is met with on cones of *Picea alba* (*canadensis*).

15. *C. pseudo-radicata* Møller & Lange. (Plate 43. fig. A.)

Rather small. Cap $1\frac{1}{2}$ —3 cm, convex, horn-brownish, silky; flesh thin. Gills not crowded, deeply emarginate, adnexed, white, moderately broad, thin. Stem straight and slender (6 cm $\times$ 3 mm), without a “root” (base with white fibrils), smooth, apex (sub lente) minutely flocculose-pruinose, white, slightly horn-brownish towards to base, fistulose, somewhat cartilaginous. Smell and taste almost none.

Spores cylindric-phaseoliform, 8 — 9×3 — $3\frac{1}{4} \mu$. Cystidia coarse, obtusely subulate, inflated below, 60 — 65×5 — 6 (base 15) μ , rather crowded. Surface of cap formed of sub-parallel, thin hyphae (10 — 18μ broad).

Rare. Growing on sticks and chips on the ground in woods of *Fagus*.

A more detailed description of this species is given in *Friesia*, vol. I., pg. 94 by F. H. MØLLER.

It has a certain superficial likeness to small specimens of *C. radicata*.

The Agaric figured by COOKE (Illustrations, pl. 205) as *Collybia collina* (Scop.) Fr. may represent *C. pseudo-radicata*. And REA (who refers to this illustration) mentions that *C. collina* may be met with on stumps of *Fagus*. The genuine *C. collina*, however, is described as a somewhat fasciculate species which grows in circles on grassy slopes (almost like *Marasmius oreades*), but which has hardly been observed in Denmark.

16. *C. nitellina* Fr. forma *minor*. (Plate 44. fig. B.)

Small. Cap about 1 cm, flat, somewhat umbonate, hygrophanous, dark fulvous. Gills whitish, with a tinge of ochraceous, rather narrow. Stem $3\frac{1}{2}$ cm $\times$ 2 $\frac{1}{2}$ mm, glabrous, shining, light fulvous, paler towards the base, where it is slightly white-tomentose. Smell slightly rancid.

Spores obliquely ovate, with a somewhat lateral pedicel, $7\frac{1}{2} \times 4\frac{1}{4} \mu$, granulate-rough. Cystidia absent.

Only met with once, in a mixed wood, growing on the ground.

This little fungus is figured very well by FRIES (Icones sel., pl. 65²). The larger form (ibid. pl. 65¹) I have never seen. The *C. nitellina* of COOKE (Illustrations, pl. 146) can hardly be a true *C. nitellina*. And BRESADOLA'S is a smooth-spored species.

**** *Vestipedes***

17. *C. confluens* (Pers.) Fr. (Plate 44. fig. G.)

Medium to rather small, fasciculate. Cap 3—5 cm, convex-flat, pallid and dingy flesh-colour, becoming almost white or alutaceous. Gills narrow and very crowded, with a flush of the same colour. Stem straight and tall, of the same colour as the cap, but becoming darker with age, everywhere with a more or less dense coating of whitish tomentum (which makes the stems adhere to each other).

Spores ellipsoid-pipshaped, $6\frac{1}{2}$ — $7\frac{1}{2} \times 3\frac{1}{2}$ — $3\frac{3}{4} \mu$ (rarely 7 — $9\frac{1}{2} \times 3\frac{3}{4} \mu$). Hairs on edge of gills somewhat nodulose. Hairs on stem straight or somewhat wavy, about 4 μ thick, in young specimens 100—150 μ long, with age often longer, more or less agglutinated or tufted.

Common, often in circles, both in plantations of *Picea* and in deciduous woods.

Marasmius hariolorum (DC.) Quél. (sensu Rea) is synonymous; and *M. argyropus* (Pers.) Fr. (*achyropus* ex Schroet.) is hardly specifically distinct.

18. *C. conigena* (Pers.) Fr. (Plate 44. fig. C.)

Small. Cap 1—1 $\frac{1}{2}$ cm, convex, pallid alutaceous-datebrown. Gills white, very narrow and crowded. Stem of the same colour, everywhere minutely velvety-villose, slender, often elongated into a shorter or longer hairy "root", which springs from a buried cone.

Spores very small, ellipsoid-ovate, 3 — $3\frac{1}{2} \times 1\frac{3}{4}$ — 2μ . Edge with obtusely fusiform, about 7 μ broad cystidia.

Not uncommon, on fallen cones, in plantations of *Pinus*; rarely met with on cones of *Picea*.

BRESADOLA (Iconographia, pl. 214²) figures and describes it under the new name *C. Friesii*. Others use the name *C. myosurus* Fr. for it.

19. *C. tuberosa* (Bull.) Fr. (Plate 44. fig. D and D¹.)

Very small. Cap 0.3—1.3 cm, whitish, almost flat. Gills rather narrow, white. Stem often rather short, pallid, springing from an oblong, rufous-baybrown sclerotium (either directly or by means of a hairy "root").

Spores ovate, 3—4—5 × 2—3 μ .

Common, chiefly nestling in decaying mushrooms (*Lactarius deliciosus*, *Russula nigricans* etc.).

20. *C. cirrhata* (Schum.) Fr. (Plate 44. fig. E.)

Very small, even minute. Cap 0.2—1.2 cm, flat, whitish. Gills narrow. Stem slender, almost filiform, often wavy, with a long, pilose "root", generally attached to an ochraceous, roundish sclerotium.

Spores ovate-ellipsoid, 4—6 × 2—3 μ . Cystidia absent.

Common, on decaying mushrooms or on humus.

The form and colour of the sclerotium serve to distinguish this species from slender, rooting forms of *C. tuberosa*. Some authors call the sclerotiferous forms *C. Cookei* Bres.

21. *C. racemosa* (Pers.) Fr. (Plate 45. fig. E.)

Very small. Cap 0.2—0.8 cm, ashy gray. Gills narrow, crowded. Stem subfuscous, slender, rooting, racemose, from base up, with numerous, short (2—13 mm long), spreading branchlets (with or without a rudimentary cap). Even the main cap is sometimes rudimentary. The "root" (always?) springs from a black, roundish sclerotium.

Spores ovate-ellipsoid, 4½ × 2½ μ .

Rare. On humus, moist ground. (Met with under *Populus* and *Picea*, amongst moss).

FRIES describes the gills as white. In my specimens they were gray. But I do not remove it to *Tephrophanae* on account of its close affinity to *C. cirrhata*.

*B. Tephrophanae***22. *C. rancida*** Fr. (Plate 45. fig. I.)

Medium. Cap 3½—5 cm, somewhat umbonate, expanding, rather dark gray (at first with a whitish bloom). Gills crowded, ashy gray. Stem stiff and straight, rather tall, of the same colour, with a long "taproot". Strong smell of rancid meal.

Spores ellipsoid, 7—8 × 4½ μ .

Not uncommon, but always solitary, chiefly in frondose woods, till late in the season.

23. *C. inolens* Fr. (Plate 45. fig. J.)

Medium. Cap 2—5 cm, expanded, with a small, obtuse or somewhat acute umbo, dull brownish gray. Gills dirty whitish, rather broad, moderately crowded. Stem rather short,

often compressed, of the same colour, minutely white-plumulose above, and clad with white, strigose tomentum at the base. Very slight mealy smell.

Spores ovate-ellipsoid, $7-8 \times 4-5 \mu$.

Rather common, gregarious in woods of *Picea*.

My plants answer very well to the umbonate form depicted by FRIES (*Icones sel.*, pl. 69³), while fig. 69⁴ is somewhat aberrant. A white form has been met with by F. H. MØLLER.

24. *C. murina* (Batsch) Fr. forma. (Plate 45. fig. F.)

Rather small. Cap 2—3 cm, campanulate, then expanded, dark fuscous. Gills pale dirty grayish. Stem not compressed, often wavy, paler than the cap (darker inside), white-plumulose above, base naked. Smell very faint.

Spores ovate-ellipsoid, $6\frac{1}{2}-8 \times 4-5 \mu$.

Not uncommon, somewhat gregarious, chiefly in frondose and mixed woods.

My plant differs from the Friesian description in not becoming umbilicate.

25. *C. leucomyosotis* Cooke & Smith (*C. clusilis* Fr. (sensu Schroet., nec Fr.)). (Plate 45. fig. C.)

Rather small. Cap $1\frac{1}{4}-2$ cm, campanulate, at last depressed, watery fuscous (edge pallid), transparently striate to the middle. Gills rather broad, dirty whitish. Stem thin, rather long, paler than the cap (pallid below), glabrous, attached to *Sphagnum*.

Spores ovate, $6-7 \times 4\frac{1}{2} \mu$. Cystidia absent.

Not uncommon, in *Sphagnum*-swamps, generally solitary.

This little species, which may be mistaken for an *Omphalia* or a *Mycena*, was described by SCHROETER as *C. clusilis* Fr. which, however, seems to be an entirely different plant, a native of woods and meadowland.

26. *C. misera* Fr. forma. (Plate 45. fig. A.)

Small. Cap $1\frac{1}{4}-2$ cm, convex, with a minute papilla, dirt-gray, whitish towards the edge and transparently striate almost to the umbo. Gills dirty whitish. Stem slender, of the same colour as the cap (darker below and inside), glabrous.

Spores rather narrow ellipsoid, $7\frac{1}{2}-3\frac{1}{2} \mu$. Cystidia absent.

Rare. Met with in shady woods (*Corylus* and *Fagus*), growing on the ground, rather solitary.

C. misera is not too well known and very differently conceived. My plant agrees fairly well with the description and figure of FRIES (*Icones sel.*, pl. 70¹); but FRIES has it from coniferous woods. KARSTEN ascribes prickly spores to it, and BRESADOLA considerably larger ones (*Iconographia*, pl. 207³).

27. *C. ozes* Fr. forma. (Plate 45. fig. D.)

Rather small. Cap $1\frac{1}{2}-2\frac{1}{2}$ cm, convex flat, brownish-fuscous, drying pallid clay. Gills dirty gray, crowded, rotundato-adnate. Stem rather stout, fuscous below, whitish

above, everywhere minutely silky-fibrillose, base white-tomentose. Odour rather slight, somewhat rancid.

Spores ovate, $4-5 \times 3 \mu$.

Rather rare, growing amongst dead needles in woods of *Picea*.

It is not unlike *Clitocybe ditopoda*. FRIES describes it with a somewhat longer and more slender stem.

28. *C. mephitica* Fr. (Plate 45. fig. B.)

Very small. Cap 0,8—1,2 cm, convex, dirty white, somewhat silky. Gills crowded, dirt-gray. Stem rather short, but slender, wavy, ashy gray, pruinose-mealy, especially above. Foetid.

Spores minute, oval, $3\frac{1}{2}-4 \times 2\frac{1}{2} \mu$. Cystidia absent.

Rather rare, but gregarious, growing in the needle-bed on naked ground in woods of *Picea*.

REA'S *C. mephitica*, with rather large, ellipsoid spores, cannot be identical.

29. *C. ambusta* Fr. (Plate 45. fig. G.)

Small. Cap 0,8—2 cm, convex (occasionally with a rudimentary papilla), then almost plane or slightly depressed, soot-brown or almost sepia; edge minutely striate, somewhat paler. Gills moderately crowded and rather small, whitish or grayish, adnate (or subdecurrent). Stem rather short (3 cm) and thin, of the same colour as the cap, paler above, apex slightly mealy. Smell faint, of meal. Taste slightly rancid.

Spores almost globose, $4\frac{1}{2}-5 \times 4\frac{1}{2} \mu$, smooth; contents granular. Cystidia absent.

Rather rare, because confined to burnt ground (charcoal) in coniferous woods, but generally gregarious.

To judge from the current descriptions *C. atrata* Fr. is almost identical. FRIES has an excellent figure of *C. ambusta* in *Icones selectæ*. His figure of *C. atrata* depicts a somewhat stouter species.

30. *C. cessans* Karst. (Plate 46. fig. A.)

Small. Cap 0,8—2 cm, convex, becoming slightly depressed, hygrophanous, pale dirt-grayish and striate almost to the centre when wet, pallid when dry. Gills rather broad, adnate, dirty whitish. Stem short, of the same colour as the cap. No smell.

Spores almost globular, $5\frac{1}{2}-6 \times 4\frac{1}{2}-5 \mu$. Cystidia on edge cylindric hair-shaped, occasionally slightly swelled in the middle, $60-65 \times 10-12 \mu$.

Rather rare. Met with in woods of *Abies*, growing gregarious on the naked needle-bed.

Except for the non-decurrent gills and the dwarfish stature this species is very close to *Omphalia striæpilea* Fr. (sensu Karsten).

31. *C. erosa* Fr. (Plate 46. fig. B.)

Small. Cap $1\frac{1}{2}$ cm, campanulate or somewhat umbonate, brownish dirt-gray, coarsely striate almost to umbo. Gills very broad, almost free, dirty whitish. Stem slender, pale dirty gray, glabrous.

Spores subrotund-oval, minutely spinulose, $7 \times 5\frac{1}{2} \mu$. Cystidia absent.

Rare and solitary, in woods of *Picea* (boarders of drives etc.).

32. *C. tylicolor* Fr. (Plate 46. fig. C.)

Small. Cap 0,8—1,4 cm, expanded umbonate, even, rather dark fuscous. Gills emarginate, broad, dirty whitish. Stem short, dirty grayish, glabrous.

Spores subrotund-oval, spinulose (almost like spores of *Russula*), $7 \times 5—5\frac{1}{2} \mu$. Cystidia absent.

Rare. Met with inside and outside of woods of *Fagus*, on ground covered with short moss.

I formerly referred my finds to *C. tesquorum* Fr., although they differed from the descriptions of this species by a rather strongly umbonate cap and dwarfish stature. But BRESADOLA and others apply the name *C. tesquorum* to a smooth-spored *Agaric*.

MARASMIUS

Tough, not putrescent Agarics. Cap convex to flat, membranaceous. Gills generally rather distant, horizontal. Stem cartilaginous or almost horny.

MARASMIUS was early elevated to generic rank; and FRIES placed it in the vicinity of *Lentinus* and *Panus*. But it is so close to *Collybia* (and *Mycena*) that I prefer to place it next to these genera, even if I do not go so far as KARSTEN (*Kritisk Öfversigt*), who made *Collybia* a subgenus of *Marasmius* (*sensu ext.*).

The *Marasmii* are generally well known. They can be preserved in herbarii in a fairly good condition, and their specific characteristics are more of form than of colour and therefore more easy to describe with sufficient exactness. Consequently any differences between the mycological authors can comparatively easily be settled. Still the number of so-called species is evidently far too large. Thus BATAILLE (*Flore monographique des Marasmes d'Europe*) enumerates 96 species. But of these he has only seen 24, about the same number (and about the same species) as are known from Denmark, and which FRIES himself knew from personal observation.

Still *Marasmius* evidently is a very large genus. Several hundreds are on record from the tropics. Like *Lentinus* and other subcoriaceous fungi the genus appears to have its centre of distribution outside of Europe, in warmer climates.

Microscopical characteristics. The size and shape of the spore, which in so many genera are of paramount value for the identification of the species, vary but little within *Marasmius*. In general the spores are somewhat pip-shaped, occasionally more narrow, ellipsoid or lanceolate-clavate. Their size varies from 11×7 to $6 \times 3\frac{1}{2} \mu$, but in the

great majority of cases it lies within 9×5 and $7 \times 3\frac{1}{2} \mu$. Two-spored species seem to be extremely rare. *Marasmius fuscopurpureus* is said (by KONRAD & MAUBLANC) to be mostly two-spored. Most species seem to be devoid of cystidia. However in some of the smaller Marasmii the gill-edge is set with cystidia of a certain type (common in *Mycena*): obovate, with minute, wart-like excrescences on the upper part of the cystidium. Similar cells are also met with in the epiderm of the cap in a number of species. And in *Marasmius cohærens* the excrescences are longer and dark-coloured, giving the cells a brush-like appearance. These brush-cells form a transition to the other type of cystidia met with: the setulose or bristle-like, brown, thick-walled hairs. These are found in great numbers on the edge of the gills of *M. cohærens* and on the stem of *M. lupuletorum*. And both the stem and the surface of the cap in *M. stipitarius* is more or less densely clad with very long and thin hairs of the same type.

Recent authors (R. KÜHNER et al.) have shown that microchemical tests can be made use of for the identification of the species. Both the spore-membrane and the hyphæ from the interior of the cap are somewhat amyloid in certain species and consequently become bluish under the influence of reagents containing iodine. However these criteria do not come within the pale of my personal observations and are therefore not made use of in my taxonomical arrangements.

Taxonomy. Probably a really satisfactory arrangement of the genus cannot be attained as long as our knowledge of the innumerable tropical species is so superficial and incomplete. Meanwhile I think that the main lines of the Friesian classification deserve to be maintained. Still some alterations seem to be called for. *Marasmius stipitarius* — which under divers names has been placed in *Marasmius* and *Collybia* — most modern authors, following PATOUILLARD, call *Crinipellis stipitarius* on account of its characteristic coating of coarse, brown hairs. PATOUILLARD'S other innovation: to segregate the species with brush-like epidermis-cells in a new genus, *Androsaceus*, is more disputable: Such intimately related species as *M. cohærens* and *M. lupuletorum* should not be separated. Like QUÉLET I think it better to transfer *M. alliaceus* and its allies from the Friesian main section II (*Mycena*) to section I (*Collybia*), and consequently I also adopt the Quéletian names *Radicosi* and *Insititii* for sect. I and II respectively. FRIES divides his section I (*Collybia*) into three subsections: *Scortei*, *Tergini* and *Calopodes*. But these groups are not very well defined. I prefer (with RICKEN) to rearrange all the species within section I in two groups which I call *Fibrosi* and *Cartilaginei* after the texture of the stem.

The most difficult species to dispose of are *M. foetidus* and *M. ramealis* (and its allies). FRIES places them in *Calopodes* — with which they have very little in common. QUÉLET on the other hand transfers them to *Insititii*. KÜHNER has created a new section, *Gloeonemi*, for *M. foetidus*. Probably these species cannot be properly treated until we know more about the innumerable southern Marasmii; provisionally I prefer to keep them together in my group *Rameales* (vide "Studies" IV, 1921).

KEY

TO THE SPECIES FIGURED

I. EU-MARASMIUS

Cap not fibrillose-squamulose from dark brown fibrils.

- A. RADICOSI. Stem somewhat rooting or attached to the substrate by means of a visible mycelium. Large or medium-sized species (cap 1½ cm or more), generally growing on the ground.
- α. *Fibrosi*. Stem tough, but not really cartilaginous or horny. Epiderm of cap generally fibrillose. Rather large species.
- a. Taste pungent 1. *M. urens*
- b. Taste mild.
1. Base of stem strigose-tomentose.
- * Cap wrinkled, but not pellucido-striate. Base of stem curved, attached to dead foliage 2. *M. fusco-purpureus*
(Vide also no. 9, *M. prasiosmus*).
- ** Cap pellucido-striate. Stem straightly rooting amongst dead needles (of Pinus) 3. *M. putillus*
2. Base of stem not strigoso-tomentose.
- * Gills distant, thick 4. *M. oreades*
- ** Gills crowded, thin: Vide *Collybia confluens* and other *Collybias*.
- β. *Cartilaginei*. Stem cartilaginous or almost horny, fistulose, generally becoming bay-brown or blackish from base upward. Epiderm of cap cellular. Medium-sized species.
- a. Inodori. Not smelling of garlic.
1. Stem neither string-like nor blackish brown.
- * Cap, gills and apex of stem at first milk-white 5. *M. globularis*
- ** Gills of a pale wood-colour (or yellow).
- † Gills pallid wood-colour.
- ° Gills' edge set with brown setæ. Stem polished 6. *M. cohærens*
- ∞ Gills' edge devoid of such setæ. Stem minutely velvety-pruinose 7. *M. lupuletorum*
- †† Gills yellow, somewhat decurrent: (*M. (Xeromphalina) cauticinalis*).
2. Stem very tall, string-like, blackish brown (*M. chordalis*)
- b. Alliodori. Smelling of garlic.
1. Stem almost insititious, polished, fulvous-bay 8. *M. scorodonius*
2. Not so.
- * Stem rootless; base bay-brown, velvety, attached to dead foliage 9. *M. prasiosmus*

** Stem rooting, blackish (or dirt-gray), velvety-pruinose all over.

† Stem blackish. Rather large form 10. *M. alliaceus*

†† Stem dirt-gray. Very small 10 a. *M. alliaceus* var. *subtilis*

B. INSITITIL. Stem insititious. Rather small or minute species, growing on foliage, twigs etc.

α. *Rameales*. Rather small or dwarfish species. Stem tough, but not horny or bristle-like, velvety or minutely flocculose.

a. Cap 2—3 cm. Stem blackish, velvety. Stinking 11. *M. foetidus*

b. Cap 1—1½ cm. Stem pallid. Inodorous.

1. Cap pallid, slightly flesh-coloured. Stem short 12. *M. ramealis*

2. Cap pure white. Stem slender... .. 13. *M. candidus*

(Vide also nos. 20—21).

β. *Setacei*. Small species with bristle-like stem.

a. *Rotulæ*. Gills forming a short tube around the stem like the nave of a wheel.

1. Cap milk-white, 0,6—1,5 cm... .. 14. *M. rotula*

2. Cap tile-red or pale wood-colour, smaller.

* Cap wood-coloured, pallid.

† Growing on dead foliage. Gills 8—12. Spores < 10 μ long 15. *M. Bulliardii*

†† Growing on dead grass. Gills 6—7. Spores > 10 μ long... .. 16. *M. limosus*

** Cap tile-red 17. *M. graminum*.

b. *Perforantes*. Gills not forming a nave around the apex of the stem.

(Cap set with erect, coarse bristles)... .. (*M. Hudsonii*)

1. Stem glabrous, black, horsehair-like. 18. *M. androsaceus*

(Stem fulvous-bay, 1—1½ mm thick: vide no. 8).

2. Stem velvety, downy or pilose.

* Gills rather broad.

† Foetid. Cap about 1 cm, pallid. Stem black, velvety 19. *M. perforans*

†† Inodorous. Cap 3—4 mm, milk-white. Stem capillary, umber, slightly hairy 20. *M. recubans*

** Gills fold-like or reduced to wrinkles on lower surface of cap.

Milk-white... .. 21. *M. epiphyllus*

II. CRINIPELLIS

Cap fibrillose-squamulose from long, dark brown, adpressed fibrils.

Stem insititious, almost bristle-like, brown-setulose. Growing on dead grass

(or sticks)... .. 22. *M. (C.) stipitarius*

SPECIFIC DESCRIPTIONS AND NOTES

I. EU-MARASMIUS

A. Radicosi α . *Fibrosi*1. *M. urens* (Bull.) Fr. (Plate 46. fig. G and G¹.)

Large. Cap 3—5 cm, convex-flat, varying in colour from yellowish brown to very pale wood-colour, somewhat lacunose or wrinkled. Gills broad and distant, concolorous. Stem more or less downy-fibrillose, base with a thick covering of felty or strigose villosity.

Spores pipshaped-lanceolate, $9 \times 3\frac{3}{4} \mu$. Cystidia crowded, short, cylindric.

Very common, in frondose as well as coniferous woods.

I regard *M. peronatus* (Bolt.) Fr. as synonymous. Some authors reserve the name *M. peronatus* for a large-spored form, *M. urens* for a small-spored one. I have never seen either the very small or the very large spores in any specimens. The figures Pl. 46 G¹ depict a very pale and rather slender form.

2. *M. fusco-purpureus* (Pers.) Fr. (Plate 46. fig. E and E¹.)

Rather large. Cap $2\frac{1}{2}$ — $4\frac{1}{2}$ cm, convex flat, at last slightly depressed in the middle, when fresh dark brown, with a flush of purple-rufous, becoming pale when dry. Gills almost concolorous, rather distant. Stem dark purplish-brown, but covered half way up by a peronate strigose felt of a pallid ochry colour, extending to the somewhat curved, root-like base which is attached to dead foliage.

Spores pipshaped-lanceolate, $6\frac{1}{2}$ — 8×3 — $3\frac{1}{2} \mu$. Basidia with very long (8μ) sterigmata.

Not uncommon in woods of *Fagus*.

When young the whole plant is much lighter in colour (pale tan or gilvous-ochraceous, the edge minutely striolate (Plate 46, fig. E). This to my mind is *M. terginus* Fr.

3. *M. putillus* Fr. (Plate 46. fig. H.)

Medium. Cap 2—3 cm, convex or with a minute papilla, rufo-fulvous, edge striolate, paler. Gills rather crowded, with a tinge of the same colour. Stem straight, rufescent, but clad from the blunt, root-like base upward with a white, strigose tomentum.

Spores pipshaped-lanceolate, $9 \times 3\frac{3}{4} \mu$.

Rare. Met with in woods of *Pinus montana* and *P. silvestris*, growing in the deep bed of fallen needles.

4. *M. oreades* (Bolt.) Fr. (Plate 46. fig. F.)

Large. Cap $2\frac{1}{2}$ —5 cm, somewhat gibbous, tough. In wet weather the colour is somewhat rufescent tan, in dry weather alutaceous or pallid tan. Gills pallid, distant. Stem straight, tough, pallid with a flush of the same colour, covered with interwoven villosity; base not strigose. Smell faint, aromatic.

Spores broadly pip-shaped, $9\frac{1}{2}$ — $10\frac{1}{2} \times 5\frac{1}{2}$ — $6\ \mu$. Cuticle of cap formed of small roundish cells with interwoven minute fibrils.

Very common, on lawns, commons etc, parasitic on grass-roots, growing in small or large "fairy-rings". It is even met with in places which are occasionally submerged by the sea.

Marasmius argyropus (Pers.) Fr. (em. Oudem.) (spelt *achyropus* by SCHROETER) I regard as a synonym of *Collybia confluens*.

β. Cartilaginei

a. Inodori

5. *M. globularis* Fr. (*M. Wynnei* B. & Br.). (Plate 46. fig. D.)

Rather large to medium. Cap 2—4 cm, at first almost semiglobate, then expanded, when young milk-white, becoming somewhat fuscous with a flush of lilaceous. Gills white to whitish. Stem white, gradually turning bay-brown from base upward, pruinose. Somewhat fasciculate.

Spores broadly pip-shaped, 6 — $7 \times 4\ \mu$.

Rather common in woods of *Fagus*, but also met with under *Picea*.

6. *M. cohærens* (Pers.) Quél. (*M. ceratopus* (Pers.) Quél.). (Plate 47. fig. F.)

Medium. Cap $1\frac{1}{2}$ —3 cm, campanulate-convex, then expanded, subumbonate, pale cinnamon, more or less fulvous in the middle, velutinous-pruinose. Gills wood-coloured, distant, more or less distinctly edged with brown. Stem slender, horny, glabrous and shining, pallid above, becoming dark bay-brown from base upward; base velutino-strigose.

Spores obovate-pipshaped, 9 — $9\frac{1}{2} \times 5\ \mu$. Cystidia on edge (and sometimes on face) of gills setulose, acute, thick-walled, brown, about $50 \times 8\ \mu$. Epiderm of cap formed of basidioform, erect, hyaline cells, crowned with minute, brown bristles. Among these cells are isolated cystidia like those on the gills.

Not common, in frondose woods.

Mycena balanina Berk. as figured by COOKE, evidently is identic; SCHROETER gives an excellent description of it sub nom. *M. erythropus* (Pers.).

7. *M. lupuletorum* (Weinm.) Fr. (sensu Bres., nec Fr.). (Plate 47. fig. G.),

Rather small. Cap 1—2 cm, convex and slightly umbonate, wood-coloured or with a flush of brownish in the middle. Gills broad and very distant, pale wood-colour. Stem slender, pale above, dark bay-brown from base up, minutely pruinose; base velutino-strigose.

Spores pip-shaped, $9 \times 4\frac{1}{2}\ \mu$. Cystidia on edge of gills obovate, $20 \times 11\ \mu$. Setulæ on stem brown, pointed, about $60 \times 6\ \mu$. Cuticle cellular.

Not uncommon, solitary or subfasciculate, in woods of *Fagus* etc. on dead foliage and twigs.

KONRAD & MAUBLANC have a good figure of this species. BRESADOLA'S with a short, incurved stem is rather abnormal. JOSSE RAND adopts the name *M. torquescens* Quél. for it. *M. erythropus* (Pers.) sensu COOKE is probably identical.

***M. chordalis* Fr.**

Small, but very tall. Cap 1—2½ cm, somewhat brownish, with striate-sulcate edge, membranaceous. Gills whitish, at last spotted with rufous. Stem very tall, 10 cm or more, very slender, almost string-like, tense, blackish brown, covered with a gray, velutinous pruinosity, rooting.

Spores obliquely lemon-shaped, base acuminate, 8½—9 × 6 μ. Cystidia 70—100 × 10—12 μ, cylindric-ventricose, subcapitate.

Met with in coniferous wood (Vallø, 1934) by M. P. CHRISTIANSEN.

b. *Alliodori*

8. *M. scorodonius* Fr. (*M. alliatus* (Schaeff.) Quél.). (Plate 47. fig. A.)

Rather small or small. Cap 1—2 cm, convex expanded, at first tinged with rufous, but soon becoming whitish, rugulose, thin. Gills whitish, moderately distant. Stem almost insititious, glabrous and shining, about 1½ mm broad, bright rufous; base naked. Smell alliaceous.

Spores pip-shaped, 7—8 × 3½—4 μ.

Not uncommon, in grass-tufts, on *Calluna* and twigs of *Picea* etc., especially in sandy localities.

9. *M. praiosmus* Fr. (Plate 47. fig. D.)

Medium. Cap 1½—2½ cm, convex, wood-coloured or watery pale tan, somewhat rugulose, thin. Gills rather crowded, whitish, thin. Stem rather tall, straight, pallid above and pruinose-pubescent, covered downward with a dense, bay-brown, plushy villosity which gives it a somewhat club-shaped appearance. The base is truncate and attached to dead foliage (chiefly oak-leaves). Smell alliaceous.

Spores pip-shaped, 9 × 5 (or 8 × 4½—5) μ.

Rather rare, in woods of *Quercus* (and *Fagus*).

10. *M. alliaceus* (Jacq.) Fr. (Plate 47. fig. E.)

Generally medium, but varying very much in size. Cap 2—3½ cm, convex, whitish, somewhat rugoso-sulcate at the edge. Gills white. Stem tall and tense, rooting, blackish bistre, velutino-pruinose. Smell alliaceous, strong.

Spores ovate, 10—11½ × 6½—7 μ. Cystidia on edge crowded, inflated-cylindric or subfusiform, about 11 μ broad. The coating of the stem is made up of hyaline, cylindric, obtuse, 6—9 μ broad hairs.

Common, but always solitary, springing from more or less deeply buried sticks of *Fagus*.

10 a. *M. alliaceus* var. *subtilis* Lange. (Plate 47. fig. B.)

Very small. Cap 0,3—0,45 cm, convex, pellucido-striate, fuscous-pallid. Gills broad, ventricose, distant. Stem almost setaceous (3—4 cm × 0,4 mm), rooting, pruinose, pale fuscous, apex whitish. Smell identical.

Spores ovate, $10 \times 6\frac{1}{2} \mu$. Cystidia obtuse, cylindric or slightly ventricose, 6—8 μ broad. Rare. Met with several times in woods of Fagus.

Although this tiny little *Marasmius* at first sight does not at all remind one of *M. alliaceus*, I do not think it deserves specific rank.

B. *Insititii***α. *Rameales*****11. *M. foetidus* (Sow.) Fr.** (Plate 48. fig. G.)

Rather small, dwarfish. Cap $1\frac{1}{2}$ — $2\frac{1}{2}$ cm, convex to plane, slightly depressed, dingy rufescent, coarsely plicato-striate. Gills distant, pallid with a flush of rufescent. Stem short (1— $2\frac{1}{2}$ cm), velvety-pruinose, slightly attenuated downward, pallid above, blackish bistre below. Foetid.

Spores lanceolate-ellipsoid, $8\frac{1}{2}$ — $10 \times 3\frac{1}{4}$ —4 μ .

Rare. Growing on fallen sticks and dead stumps of *Corylus*.

12. *M. ramealis* (Bull.) Fr. (Plate 48. fig. C.)

Small, dwarfish. Cap $\frac{1}{2}$ — $1\frac{1}{2}$ cm, convex-flat, edge at first incurved, pale flesh-colour to alutaceous whitish, rugulose. Gills whitish. Stem thin, short, often ascendent, 1— $1\frac{1}{2}$ cm × 0,6 mm, pallid or alutaceous flesh-colour, slightly squamulose-mealy.

Spores lanceolate-ellipsoid, 8 — $9 \times 2\frac{1}{2}$ (or $8\frac{1}{2} \times 3\frac{1}{4}$) μ . Cystidia sack-shaped, small, with short, hair-like excrescences.

Very common, often in large numbers, on dead sticks, twigs and herbaceous stems.

13. *M. candidus* (Bolt.) Fr. (Plate 47. fig. C.)

Small. Cap $\frac{1}{2}$ — $1\frac{1}{2}$ cm, almost flat, milk-white, sulcate-rugulose. Gills rather broad behind. Stem slender, $2\frac{1}{2}$ —3 cm × 0,6 mm, white, pale date-brownish towards the base, slightly pruinose.

Spores ellipsoid lanceolate, $9 \times 3\frac{1}{4} \mu$. Cuticular hyphæ interwoven, 6—8 μ broad, apical cells subclavate.

On twigs and dead grass in damp places, on moist ground, but rather rare.

M. candidus is generally regarded as a distinct species, although it is rather doubtful, if it is anything but an etiolated form of *M. ramealis*. It is very much like *M. epiphyllus*, but easily distinguished by its rather broad gills. *M. insititius* Fr. var. *albipes* Fr., as described by REA, seems to be synonymous.

β . Setacei

a. Rotulæ

14. *M. rotula* (Scop.) Fr. (*Androsaceus rotula* (Scop.) Pat.). (Plate 48. fig. H.)

Small. Cap $\frac{1}{2}$ — $1\frac{1}{2}$ cm, campanulate-convex, disc slightly flattened or impressed, deeply sulcate almost to centre, milk-white. Gills broad, very distant, forming a free nave around the apex of the stem. Stem horsehair-like, black, insititious or springing from a hair-like, black, creeping, rhizomorphoid mycelium.

Spores pip-shaped, $8-9 \times 3\frac{1}{2}-4\frac{1}{2} \mu$. Cystidia and cuticular cells subglobose ($11-20 \mu$), apex somewhat granulate-warty.

Very common, generally in small flocks on the ground or on sticks and twigs, in copses and woods.

15. *M. Bulliardii* Quél. (Plate 48. fig. F.)

Very small. Cap about 0.4 cm, subglobose-convex, deeply sulcate, pale wood-colour. Gills 8—12, with free nave. Stem slender (about 3 cm $\times$ 0.3 mm), bistre, with some few short branchlets (with abortive caps) in the lower half.

Spores pip-shaped, $8\frac{1}{2}-10 \times 4\frac{1}{4}-4\frac{1}{2} \mu$. Cystidia as in no. 14.

Rather rare, on dead foliage (of *Fraxinus* etc.).

The small branchlets on the stem are only developed in damp places. When they are absent, we have *M. rotula* var. *phyllophila* Schroet. which is rather common, especially on dead foliage of *Fagus*, in small flocks.

16. *M. limosus* Boud. & Quél. (Plate 48. fig. B.)

Very small and delicate. Cap 0.2—0.3 cm, subglobose, pallid, with 6—7 grooves (and gills). Stem thin as a hair (2 cm $\times$ 0.2 mm), blackish bistre.

Spores pipshaped-lanceolate, $12 \times 5\frac{1}{2} \mu$. Cystidia obovate, about 12 μ broad, apex warty.

Rare. Met with once on *Deschampsia cæspitosa* in a wood, on boggy ground, in great numbers.

17. *M. graminum* (Lib.) Berk. (Plate 48. fig. D.)

Very small and delicate. Cap 0.15—0.3 cm, convex, almost tile-red, with 5—7 white gills. Stem 1— $1\frac{1}{2}$ cm $\times$ $\frac{1}{4}$ mm, fuscous-bistre.

Spores pipshaped-lanceolate, $9-12 \times 4-5 \mu$.

Rare. Met with on dead grass-straw in a meadow.

COOKE'S figure of *M. graminum* (Illustrations, pl. 1129) depicts an entirely different species (with globose spores), while his figure of *Mycena juncicola* (pl. 193³) probably belongs here. I have met a form of *M. graminum* (on *Agrostis alba*) which differs from the type by somewhat larger and paler cap (only tile-reddish at the disc) and by slightly smaller spores (about $10 \times 4\frac{1}{2} \mu$). This probably is *M. Curreyi* B. & Br. (COOKE'S Illustrations, pl. 1130); but it is rather too close to *M. graminum* to deserve specific rank.

b. *Perforantes****M. Hudsonii*** (Pers.) Fr.

Very small. Cap 0,2—0,4 cm, semiglobate, white to somewhat reddish, set with erect, purplish setulæ. Gills white, narrow (6—7 in all). Stem rather short, 0,4—1,5 cm × 0,4 mm, towards the base setulose like the cap and somewhat rufescent.

Spores pip-shaped ovate, 8—9 × 5 μ . Cystidia 1) inflated-clavate with numerous short excrescences; 2) lanceolate, smooth.

Rare. Met with by POUL LARSEN on dead leaves of *Ilex* in Jylland, 1926 (and later years).

18. *M. androsaceus* (L.) Fr. (Plate 48. fig. A.)

Small. Cap 0,7—1 cm, pallid, convex or slightly depressed, wrinkled-striate. Gills concolorous, rather crowded. Stem slender, horsehair-like, black.

Spores pip-shaped, 7 × 3 $\frac{1}{3}$ μ .

Common on *Calluna*, but also met with on fallen needles of *Pinus* etc. and on dead branches of living trees of *Picea* in dense plantations.

19. *M. perforans* (Hoffm.) Fr. (Plate 49. fig. G.)

Small. Cap 1—1 $\frac{1}{2}$ cm, convex or slightly depressed, white, rugulose. Gills adnate. Stem stiff upright, 3—4 cm × $\frac{1}{2}$ —1 mm, black, densely velutinous.

Spores pip-shaped, 5—7 × 3 $\frac{1}{3}$ μ .

Exceedingly common, often in great numbers, in plantations of *Picea*, always springing from a single dead needle.

20. *M. recubans* Quél. (Plate 48. fig. E.)

Very small. Cap 0,2—0,3 cm, coarsely sulcate, milk-white. Gills very distant, broad, arcuato-adnate. Stem very thin, almost hair-like, somewhat wavy (about 2 cm × 0,2 mm), bay-brown below, whitish above, very thinly clad with long, woolly, minute hairs in the lower half.

Spores broadly fusiform-ellipsoid, 10—13 × 4 $\frac{1}{2}$ —5 μ . Cystidia on edge of gills obtuse, slightly inflated in the middle, about 40 × 7—10, deeply seated.

Not uncommon (but easily overlooked), solitary on the petiole of dead foliage, chiefly of *Quercus* (but also of *Salix*).

This tiny Agaric may be mistaken for a *Mycena*, but is easily recognized by the brown stem. My plant deviates from the description of QUÉLET by larger spores and hairy, not tomentose stem. It is very close to *M. saccharinus* (Batsch) Fr., but is altogether smaller, without papilla and with broader, distinct gills. Probably the two forms are not specifically distinct.

21. *M. epiphyllus* Fr. (*M. squamula* (Batsch) Schroet.). (Plate 49. fig. F.)

Small. Cap 0,4—1 cm, convex-flat, wrinkled, milk-white. Gills very distant, fold-like,

sometimes branched and wavy. Stem very thin (about 0,5 mm), white above, becoming date-brown from base upward, minutely velvety.

Spores lanceolate to lanceolate-pipshaped, $10-12 \times 3\frac{1}{2}-4 \mu$ (or $10 \times 4\frac{1}{2} \mu$). Cystidia somewhat subulate, free portion about 30μ long.

Very common in damp places, on dead foliage (particularly of *Fraxinus* and *Populus*).

M. recubans and *M. epiphyllus* show some affinity to *M. ramealis* and *M. candidus*, and it is not unlikely that further microscopical investigation will show their right position to be in *Rameales*.

II. CRINIPELLIS

22. *M. stipitarius* (Fr.) Lange (*Crinipellis stipitarius* (Fr.) Pat.). (Plate 49. fig. E.)

Small. Cap 0,5—1,2 cm, rather flat, with a minute, acute, brown papilla, somewhat concentrically scaly by small, adpressed, bistre-brown squamules and fibrils on a whitish ground. Gills rather broad, white. Stem about $3 \text{ cm} \times 0,5-7 \text{ mm}$, bistre, sulcate, shaggy-tomentose.

Spores ovate or oval, varying considerably in size ($6\frac{1}{2} \times 4 \mu-8 \times 6 \mu-9 \times 5,5 \mu$). Cystidia crowded, cylindric-hairshaped, obtuse, about 4μ broad. Coating of stem and cap made up of long, brown, thick-walled fibrils.

Common, especially in tufts of *Dactylis*, but also on dead stumps of *Syringa* and twigs of *Picea* etc.

FRIES placed this little characteristic Agaric in *Collybia*, but it has no natural connection there. *Marasmius epichloë* Fr. appears to be identical; and so, to my mind, is *M. caulicinalis* (Bull.) Quél., although REA describes it as a distinct species.

MYCENA

Rather small to very minute species. Cap somewhat parabolic, edge not incurved. Gills never truly decurrent. Stem cartilaginous, generally slender.

Although *MYCENA* is one of the largest genera within Agaricaceæ it is a rather homogeneous one. Very few Agarics of other genera can be mistaken for a *Mycena*; nor is a *Mycena* likely to be erroneously referred to any other genus. Some few of the more fleshy species (e. g. *M. pelianthina*) have a superficial likeness to *Collybia*, and some small species with subdecurrent gills (*M. vulgaris* etc.) are somewhat Omphalioid. Finally *Agaricus cohærens* was placed in *Mycena* by FRIES himself (and described by BERKELEY as *Mycena balanina*) while it is now generally accepted as a genuine *Marasmius*.

Microscopic characteristics. While the delimitation of the genus thus does not present any real difficulties, the exact definition of the innumerable species is less easy and

was exceedingly difficult for the older mycologists. But the introduction of the microscope into mycology entirely altered the situation. Few genera show such diversified microscopical characteristics as *Mycena*. It is true that the spores do not vary so much in size as in certain other, more heterogeneous genera (e. g. *Lepiota*); but their shape varies from narrow lanceolate to roundish, — some few species even have subglobose, granulate spores. An anatomical trait also worth mentioning is the comparatively common occurrence of basidia with only two sterigmata. To be sure this character is not always a constant one. As already pointed out by me ("Studies" I, 1914) the number of sterigmata in some species varies from 2—(3)—4; (vide also the elaborate researches by ALEX. H. SMITH (Mycologia vol. XXVI, 1934)). But in most 2-spored species the character seems to be quite constant and therefore of practical value for the identification. However the most important anatomical characteristic is the shape of the cystidia at the edge of the gills (occasionally also on their faces). Cystidia seem to be present in all (or almost all) species. And their shape is so characteristic and constant that they are of the highest value for the taxonomy of the genus and the determination of the species. Two types of cystidia can be distinguished: 1) the subfusoid, entirely smooth one, the free portion of which is hair-shaped, awl-shaped or somewhat conical (rarely irregularly branched or forked) and 2) the obovate or balloon-shaped cystidia, the obtuse, free portion of which is granulate or set with a number of short rod-shaped or finger-like protuberances. (As this latter type of cystidia is very little projecting, they are easily overlooked. The easiest way to detect them is to examine the edge of a gill — dry, without cover-glass — by a low-power lens (about 300×)).

Taxonomy. If the anatomical characteristics here mentioned be used as a foundation for the systematic arrangement of the species, the taxonomic construction of the genus will become more exact, and the least valuable of the macroscopic characteristics formerly used as leading characters for the main divisions can be dispensed with or at least pushed back to a secondary position.

To which of the microscopical characters precedence should be given is a matter of opinion. But I am inclined to think that the smoothness or roughness of the spore is the most marked distinction. In the Key the genus is therefore first divided in two subgenera: the smooth-spored main group *Eu-Mycena* and the small group of rough-spored species: *Mycenella*.

Next in importance to this spore-character comes the type of cystidia. According to this criterium *Eu-Mycena* can be divided into two main sections: *Ciliatæ*, with prominent, subfusoid marginal cystidia, and *Granulatæ*, in which the cystidia are obtuse, obovate, with numerous warts or rod-like protuberances. — In a few species the edge of the mature gill is devoid of cystidia, being formed of an elastic, almost amorphous filament. But it is highly probable that this edging is partly made up of gelatinised cystidia, probably of the *Granulatæ*-type — cystidia of this kind being met with on the apex of the stem in certain cases

(e. g. *Mycena pelliculosa* var.). I therefore place these species in a subsection within *Granulatæ*.

The two types of cystidia are generally very distinct. Only in a few cases intermediate forms are met with: fusoid or clavate cystidia with a number of branches or hair-like appendices. But such atypical forms rarely cause any real taxonomic difficulties. Some few of the original Friesian main sections will be met with as subsections in my Key (e. g. *Lactipedes*). But in most cases the old sections (e. g. *Calodontes* and *Basipedes*) have been split up, because they were made to include species of entirely different anatomical structure. The minor points of the taxonomic arrangement will be seen in the Key.

KEY

TO THE SPECIES FIGURED

I. EU-MYCENA

Spores smooth, of various shape.

- A. *Ciliatæ*. Edge of gills set with cystidia of type I: protruding, sub-fusoid, their free portion hair-shaped, cylindrical or conical.
- α. *Marginatæ*. Contents of cystidia coloured and the gill-edge consequently showing a more or less distinct coloured line.
- a. *Exsuccæ*. Stem devoid of coloured juice.
1. Spores 6—7 μ long. Cap rather fleshy. Edge of gills blackish purple... 1. *M. pelianthina*
 2. Spores 8—12 μ long.
 - * Edge of gills dark purple or purplish-brown.
 - † Cap membranaceous. Edge of gills distinctly dark purple ... 2. *M. rubro-marginata*
 - †† Cap somewhat fleshy. Edge of gills faintly purplish-brown ... 3. *M. plicosa* var. *marginata*
 - ** Edge of gills date-brown or yellow.
 - † Edge of gills date-brown ... 4. *M. avenacea*
 - †† Edge of gills lemon-yellow ... 5. *M. citrino-marginata*
- b. *Lactipedes*. Stem with a coloured (red) juice.
1. Cap membranaceous. Stem smooth ... 6. *M. sanguinolenta*
 2. Cap somewhat fleshy. Stem with a powdery bloom ... 7 a. *M. hæmatopoda* var. *marginata*
- β. *Concolores*. Contents of cystidia colourless, hyaline.
- a. *Lactipedes*. Stem with coloured or milky juice.
1. Juice red ... 7. *M. hæmatopoda*
 2. Juice milky, white.

- * Solitary. Cap white, gray or fuscous... 8. *M. galopoda*
(Vide also *M. fellea*, no. 10).
- ** Fasciculate. Cap and stem fuliginous ... 8 a. *M. galopoda* var. *leucogala*
- b. Exsuccæ. No coloured or milky juice.
- 1. Stem dry, devoid of slimy coating.
- * Stem without basal disc.
- † Stem everywhere densely clad with erect setulæ... 9. *M. iris*
- †† Not so.
- ° Spores broad (breadth half the length or more).
- ^ Taste bitter (like quinine) ... 10. *M. fellea*
- ^^ Not so.
- Basidia 4-spored.
- ° Spores large (8—12 μ long).
- x Cystidia rather large (7—18 μ broad).
-) Cystidia somewhat fusiform.
- Smell nitrous, strong.
- ” Stoutish. Cap somewhat fleshy... 11. *M. alcalina*
- ”” Delicate. Cap membranaceous ... 11 a. *M. alcalina* var. *chlorinella*
- ”” Smell none or faint.
- ” Whole plant pure white... 12. *M. lævigata*
- ”” Not so.
- ° Cap not pellucido-striate (but somewhat grooved), gray ... 13. *M. leptcephala*
- ° Cap pellucido-striate.
- » Cap pallid when young.
- § Cap becoming flesh-coloured; (growing in coniferous woods)... 14. *M. zephira*
- §§ Cap not becoming flesh-coloured; (growing on frondose stumps)... 15. *M. pseudo-galericulata*
- »» Cap dark gray; (growing amongst grass) 16. *M. ammoniaca*
-) Cystidia cylindric. (Cap fuscous) ... 17. *M. excisa*
- xx Cystidia (free portion) hair-shaped, thin (2—5 μ broad).
-) Stem with parallel, raised lines.
- Raised lines distinct, silvery... 18. *M. polygramma*
- ” Raised lines indistinct.
- ” Whole plant milky-white... 18 a. *M. polygramma* forma *candida*
- ”” Dwarfish, fuscous; (growing on the trunk of living trees) ... 18 b. *M. polygramma* forma *pumila*
-) Stem without raised lines, very slender ... 19. *M. vitilis*
- Spores small (6—8 μ long).
- x Cap fleshy (2—5 cm), bright coloured. Smell of radish.

-) Cap 2—4 cm, of various colours... .. 20. *M. pura*
)) Cap about 5 cm, rosy. Stem tall... .. 20 a. *M. pura* forma *rosea*
 xx Cap submembranaceous, ivory-white. Smell faint,
 not of radish... .. 21. *M. flavo-alba*
 ** Basidia 2-spored.
 □ Cap red.
 x Cap about 1 cm. Stem white 22. *M. adonis*
 xx Cap about 3 mm. Stem pale pink... .. 23. *M. rubella*
 ▢ Cap white or whitish.
 x Gills nearly free.
) Medium. Cap about 1 cm..... 24. *M. gypsea*
)) Very delicate. Cap about 0,4 cm. Stem fili-
 form... .. 25. *M. ephiphloea*
 xx Gills adnate. Stem filiform, insititious 26. *M. hiemalis*
 ∞ Spores narrow (breadth less than half the length).
 ^ Cap red. Stem yellowish. (Basidia 4-spored) 27. *M. acicula*
 ^^ Cap white.
 □ Basidia 4-spored. (Growing on dead foliage)..... 28. *M. echinipes*
 ▢ Basidia 2-spored. (Growing on needles).
 x Cap conic-campanulate 29. *M. lactea*
 xx Cap expanded... .. 29 a. *M. lactea* var. *pithya*
 *** Stem springing from small basal disc.
 † Cap white... .. 30. *M. stylobates*
 †† Cap grayish 31. *M. clavularis*
 2. Stem with a slimy coating. (Small, whitish plant)..... 32. *M. rorida*
- B. GRANULATÆ. Edge of gills set with cystidia of type II: obovate, warty
or with numerous short excrescences (or edge formed of a gelatinised,
viscid filament).
- a. *Typeicæ*. Marginal cystidia not gelatinised.
- a. Marginatæ. Contents of cystidia coloured, and the gill-edge
consequently more or less coloured.
1. Edge of gills yellow or orange.
 * Edge of gills bright orange-yellow 33. *M. elegans*
 ** Edge of gills very pale lemon-yellow 34. *M. luteo-alba* var. *sul-*
phureo-marginata
2. Edge of gills red.
 * Stem stiff upright. Cap about 1 cm 35. *M. rosella*
 ** Stem filiform, slack. Cap very small 36. *M. pterigena*
- b. Concolores. Cystidia hyaline. Gills without coloured edge.
1. Stem with saffron-coloured juice 37. *M. crocata*
2. Stem without coloured juice.
 * Cap not "sugar-sprinkled" (devoid of a coating of loose,
 glistening particles).
 † Spores not spherical.

- ° Densely cæspitose species.
 - ^ Spores small (about $5\ \mu$ long) ... 38. *M. tintinnabulum*
 - ** Spores large ($8-10\ \mu$ long) ... 39. *M. inclinata*
 - °° Solitary or subfasciculate species.
 - ^ Spores rather broad.
 - Basidia 4-spored.
 - Gills plano-adnate ... 40. *M. pinetorum*
 - Gills ascendent, slightly adnate or almost free.
 - x Cap at last expanded. Gills rather distant, connected by veins ... 41. *M. fagetorum*
 - xx Cap campanulate or parabolic. Gills rather crowded.
 -) Cap with a tinge of flesh-colour... 42. *M. metata*
 -) Not so.
 - Cap whitish, more or less tinged with olivaceous ... 43. *M. lineata*
 - ** Cap dark fuscous ... 44. *M. sepia*
(Vide also *M. filopes* forma *tetraspora*).
 - ** Basidia 2-spored.
 - Cap somewhat fleshy, 2—4 cm broad... 45. *M. galericulata*
 - Cap membranaceous, smaller.
 - x Gills narrow, attenuato-adnate.
 -) Cap $1\frac{1}{2}-2$ cm ... 46. *M. parabolica*
 -) Cap smaller ... 47. *M. filopes*
(Vide also *M. fellea* and 2-spored forms of *M. metata*).
 - xx Gills broad, rather broadly adnate ... 48. *M. debilis*
 - ** Spores narrow (breadth less than half the length). Minute species.
 - Stem without basal disc... 49. *M. capillaris*
 - ** Stem springing from a minute disc ... 50. *M. mucor*
 - †† Spores spherical. (Very small species).
 - ° Cap somewhat conical, striate... 51. *M. supina*
 - °° Cap truncate-campanulate, grooved ... 52. *M. corticola*
 - ** Cap "sugar-sprinkled".
 - † Stem springing from a minute basal disc.
 - ° Basidia 2-spored ... 53. *M. tenerrima*
 - °° Basidia 4-spored ... 53 a. *M. tenerrima* var. *carpopbila*
 - †† No basal disc. Basidia 4-spored... 54. *M. osmundicola*
- β. *Gummosæ*. Edge of mature gills formed of an elastic, gelatinised filament. Cap with a viscid pellicle.
- a. Cap 1—2 cm.

1. Gills rather narrow. Stem generally somewhat flushed with lemon-yellow..... 55. *M. epipterygia*
2. Gills rather broad, distant. Stem pale grayish with a flush of olive ... 56. *M. pelliculosa* forma
- b. Cap about 1 cm. Gills broad, subdecurrent. No trace of yellow on the stem ... 57. *M. vulgaris*

II. MYCENELLA

Spores spherical, set with coarse warts. Cystidia of the *Ciliatæ*-type.

- A. Cap 1—2 cm, without pellucid striæ ... 58. *M. lasiosperma*
- B. Cap less than 1 cm, pellucido-striate ... 59. *M. margaritispora*

SPECIFIC DESCRIPTIONS AND NOTES

I. EU-MYCENA

A. *Ciliatæ*

α. *Marginatæ*

a. *Exsuccæ*

1. *M. pelianthina* Fr. (Plate 49. fig. C.)

Large. Cap $3\frac{1}{2}$ —5 cm, convex, hygrophanous, edge pellucido-striate, livid violaceous flesh-colour (pale dingy whitish with a flush of lilaceous when dry). Gills broad, of the same colour, with a minutely denticulate, vinaceous-fuscos edge. Stem rather short (5—6 cm × 2—5 mm), somewhat paler, more or less streaked with fuscous fibrils.

Spores cylindric-ellipsoid, $5-7 \times 3 \mu$. Cystidia cylindric-fusiform, $50-90 \times 10-12 \mu$, containing a red juice. Basidia 4-spored.

Common, but generally solitary, in woods of *Fagus*.

In Vermont and New York (U. S. A.) a very similar, but distinct species, which I have called *M. pseudo-pelianthina*, is not uncommonly met with. It is easily distinguished by considerably larger spores ($8-10 \times 4\frac{1}{2}-5 \mu$) and by being pervaded, inside and outside, especially in the stem, by a pale amber-yellow tint. It has not yet been reported from the European side of the Atlantic.

2. *M. rubro-marginata* Fr. (Plate 49. fig. D.)

Medium. Cap 1—2 cm, convex or somewhat parabolic, pellucido-striate $\frac{3}{4}$ in, rather thin and diaphanous, pallid, with a tinge of dingy flesh-colour, very hygrophanous. Gills subdistant, with a minute edging of a brownish-crimson colour. Stem 5—8 cm × 1—2 mm, whitish, with a flush of the colour of the cap.

Spores oblong-ovate or broadly oval, $10\frac{1}{2}$ — $12 \times 6 \mu$. Cystidia rather small, pointed, slenderly fusiform, about 32 — 40μ long.

Rather rare. Met with amongst moss, on fallen twigs etc. in damp places, in small troops.

The whitish form figured by FRIES (Icones sel., tab. 78) is unknown to me.

3. *M. plicosa* Fr. var. *marginata* Lange. (Plate 49. fig. A.)

Rather large and stout. Cap $1\frac{1}{2}$ — 3 cm, parabolic-campanulate, then convex-flat, very coarsely striate, dark fuscous when young, expallent (whitish ashy-gray) and somewhat sulcate when dry. Gills grayish white, distant, with a pale pinkish-brown edging, soon becoming white-pruinose and thick. Stem rather short. Smell very faint, slightly "nitrous".

Spores ovate-oblong, 9 — $10 \times 4\frac{3}{4}$ — 5μ . Basidia 4-spored. Cystidia with very pale brownish contents, obtusely fusiform (occasionally sparingly branched), 60 — 80×10 — 15μ .

Rare. Met with in a wood of *Abies*, growing gregariously on the ground amongst dead needles.

The typical *M. plicosa*, without a coloured gill-edge, I have never met.

4. *M. avenacea* Fr. (sensu Schroet., vix Fr.). (Plate 49. fig. B.)

Medium. Cap 1 — 2 cm, parabolic or somewhat campanulate, coarsely striate half way in, colour somewhat dirt-brown. Gills rather distant, pale gray with an (often indistinct) edging of date-brown. Stem 5 — 7 cm $\times$ $1\frac{1}{2}$ — 2 mm, of the same colour, paler and slightly yellowish above.

Spores ovate-ellipsoid, 9 — 12×5 — $5\frac{1}{2} \mu$. Basidia 4-spored. Cystidia (free portion) about 15μ long, hair-shaped, occasionally somewhat branched, base slightly inflated.

Not uncommon, growing in small troops on road-banks and on lawns, always in grass.

M. olivaceo-marginata Masee might be considered identical but for the smaller spores (6×4 — 5μ). The dark edging often is very faint and may be overlooked. The plant described by SEV. PETERSEN (Danske Agaricaceer, p. 127) sub nom. *M. prolifera* Fr. probably is such a form. FRIES' description of *M. avenacea* differs considerably from the present plant.

5. *M. citrino-marginata* Gill. (Plate 50. fig. F and F¹.)

Medium to rather small. Cap $0,5$ — $1,4$ cm, campanulate-convex, very pale lemon-yellow, disc and rather coarse striæ with a tinge of dirt-brownish. Gills whitish, edge generally very pale lemon-yellow. Stem whitish to pale sulphur above, dirt-brownish below, 5 — 6 cm $\times$ $0,8$ — $1,5$ mm.

Spores ovate-ellipsoid or pip-shaped, 8 — $10 \times 4\frac{1}{2}$ — 5μ . Cystidia fusoid-bottleshaped, with a generally long and slender neck, 30 — 50×9 — 15μ . Basidia 4-spored.

Not uncommon, in coniferous as well as frondose woods and copses.

When typical this is a very distinct species. But small and slender whitish forms, almost devoid of the yellow edging, occur.

b. *Lactipedes*6. *M. sanguinolenta* (Alb. & Schw.) Fr. (Plate 50. fig. A.)

Rather small. Cap 0,5—1,3 cm, parabolic, then convex or flat, striate $\frac{2}{3}$ in. Colour dingy crimson or pale pinkish vinaceous. Gills with a flush of the same colour, edge brownish-crimson. Stem slender, concolorous, with a vinaceous juice.

Spores almost pip-shaped, $8-11 \times 4-6 \mu$. Cystidia (free portion) subulate, base up to 10μ broad. Basidia 4-spored.

Common, especially in coniferous woods, on the ground among sticks and dead foliage.

The red edging is sometimes very faint; but *M. cruenta* Fr., with no edging at all, I have never met. Vide also no. 7 a.

3. Concolores

a. *Lactipedes*7. *M. hæmatopoda* (Pers.) Fr. (Plate 50. fig. G.)

Medium to rather large, subfasciculate. Cap 1,2—2,5, convex to somewhat conical, almost even, of a paler or darker dull vinaceous colour with a whitish bloom; edge denticulate. Gills whitish. Stem 5—7 cm $\times$ 1½—2½ mm, dull vinaceous below, pale above with a dark vinaceous juice.

Spores ovate oval, $7-10 \times 5\frac{1}{2}-6 \mu$. Cystidia fusiformly inflated below the middle, drawn out to a sharp point, $10-17 \mu$ broad. Basidia 4-spored.

Rather rare, on fallen branches and stumps, chiefly of *Fagus*.

7a. *M. hæmatopoda* var. *marginata* Lange. (Plate 50. fig. D.)

Only the distinctly vinaceous gill-edge distinguishes this variety from deep red-brown forms of the typical *M. hæmatopoda*.

Rare. Met with on stumps of *Fagus* and in head of pollarded willow (*Salix fragilis*).

8. *M. galopoda* (Pers.) Fr. (Plate 51. fig. G and G' (white form)).

Medium. Cap 1—1½ cm, campanulate, coarsely striate, varying in colour from fuscous to pure white. Gills white, subdistant. Stem concolorous, with a milk-white latex.

Spores oblong-ovate, $10-13 \times 5-6\frac{1}{2} \mu$. Cystidia awl-shaped, subfusiform, $45-65 \times 10-14 \mu$, occasionally branched. Basidia 4-spored.

Common, in all kinds of woods, on the ground.

The pure white form, which is rather rare, might easily be misjudged, if it were not for the latex.

8a. *M. galopoda* var. *leucogala* (Cooke) Lange (*M. leucogala* Cooke). (Plate 50. fig. E.)

Rather large, fasciculate. Cap more distinctly umbonate than the main form, more coarsely grooved, fuliginous. Stem concolorous. Microscopical characters as in the type.

Rather rare, on and around stumps of *Picea*.

b. *Exsuccæ*9. **M. iris** Berk. (*M. amicta* Fr. (sensu Josserand)). (Plate 50. fig. C.)

Small to rather small. Cap 0.5—1.2 cm, parabolic to somewhat convex, indistinctly striolate $\frac{1}{3}$ in, greenish blue all over when in bud, but soon discolouring, from disc out, to a dull gray or olive. Gills pallid, rather crowded. Stem whitish or gray, base at first often flushed with bright greenish blue, minutely setulose-velvety all over.

Spores oval or ovate, $6-7 \times 3\frac{3}{4}-4 \mu$. Cystidia on gill-edge and stem crowded, obtusely setiform, $35-40 \times 4-5 \mu$. Basidia 4-spored.

Rather rare, but often in small troops, on or around stumps of *Picea*.

When the bluish colours disappear this species is most easily recognized by the minute, erect setulæ that give a velvety appearance to the stem. *M. amicta* Fr. in all probability is synonymous. *M. marginella* (Pers.) Fr. and *coerulescens* Schroet. are very intimately related forms, in which the gill-edge becomes flushed with blue.

10. **M. fellea** Lange. (Plate 50. fig. B.)

Small. Cap 0.6—1 cm, conically campanulate, dull gray with a faint bloom, indistinctly striate. Gills rather narrow, moderately distant. Stem 3—4 cm $\times$ 1 mm, concolorous, somewhat ascendent and slightly rooting, when young with a somewhat whitish juice. Taste like quinine.

Spores subrotund-oval, $9-11 \times 7-8 \mu$. Cystidia variable, sometimes fusiform, pointed, sometimes rather obtuse, with a number of setiform branches. Basidia 2-(rarely 3)-spored.

Rather rare. Met with exclusively on the lower portion of mossy trunks (chiefly of *Fagus*, more rarely of *Quercus*).

This species has a superficial likeness to *M. polygramma* var. *pumila*, but it is smaller and thinner. By the form of its cystidia it runs into *Granulata*. — *M. cholea* Al. H. Smith (Mycologia, vol. XXVI⁴), is hardly specifically distinct.

11. **M. alcalina** Fr. (Plate 51. fig. H.)

Medium to rather large. Cap generally $1\frac{1}{2}-2\frac{1}{2}$ cm, conical to somewhat convex, subumbonate, varying in colour (from dirty gray to almost black), striate about half way in. Gills whitish. Stem paler than the cap, somewhat rooting. More or less fasciculate. Smell very strong, of nitric acid.

Spores obovate-oblong, $10\frac{1}{2}-11 \times 5-5\frac{1}{2} \mu$. Cystidia somewhat fusiform, awl-shaped, pointed, $7-9 \mu$ broad. Basidia 4-spored.

Common, especially on and around stumps of *Picea*, more rarely in frondose woods.

This species is a very variable one. The specimens here figured represent a densely fasciculate, brownish-fusoid form from frondose wood. A more blackish, subfasciculate form is exclusively met with on and around stumps of coniferous trees. The most extreme form is:

11a. **M. alcalina** var. *chlorinella* Lange. (Plate 51. fig. D.)

Small. Cap about 1 cm, membranaceous, pellucido-striate, gray. Stem slender (about 1 mm thick), pallid. Not fasciculate.

Spores $7\frac{1}{2}$ — $10\frac{1}{2} \times 4\frac{1}{4}$ — $4\frac{1}{2} \mu$ (slightly smaller than in the main form). Cystidia somewhat broader (10 — 15μ), pointed or obtuse.

Rather rare. Growing on the ground, in mossy places.

If it were not for the characteristic smell this form would be difficult to identify.

12. *M. lævigata* (Lasch) Fr. (?) (Plate 51. fig. C.)

Medium. Cap $1\frac{1}{4}$ — $1\frac{1}{2}$ cm, convex-campanulate, obtuse, pure white, minutely striate when fresh. Gills rather distant, ascendent, somewhat adnate with a decurrent denticle (not emarginate). Stem straight, $4\frac{1}{2}$ cm long, $1\frac{1}{2}$ (base $2\frac{1}{2}$) mm thick, not rooting. Smell almost none.

Spores ovate, $7\frac{1}{2}$ — $9 \times 4\frac{1}{2} \mu$. Cystidia broadly fusiform, somewhat obtuse, 10 — 14μ broad. Basidia 4-spored.

Met with in a coniferous wood, growing in small clusters on a stump of *Picea*.

I formerly called this plant *M. alcalina* var. *nivea*, and it may be nothing but a colour- and odour-less form of no. 11. But it is very close to *M. lævigata*, as figured by BRESADOLA. (He describes it as devoid of cystidia which is highly improbable). *M. lævigata* (Pers.) Schroet. does not belong here; nor *M. lævigata* in the sense of QUÉLET (with globose spores). — The stem of my specimens was not lubric as described by FRIES.

13. *M. leptcephala* (Pers.) Fr. (Plate 51. fig. F.)

Rather large or large. Cap $2\frac{1}{2}$ — $3\frac{1}{2}$ cm, conic-campanulate, not pellucido-striate, but coarsely grooved $\frac{2}{3}$ in, of a dull, pale tin-gray colour. Gills moderately distant. Stem straight, rather tall, with a short, blunt, pilose "root". Smell much fainter than in *M. alcalina*.

Spores cylindric-oval, $10\frac{1}{2}$ — $12 \times 5\frac{1}{2} \mu$. Cystidia acutely awl-shaped, somewhat fusiform, 60 — 70×10 — 14μ . Basidia 4-spored.

Rather rare, but met with both in coniferous and deciduous woods, generally solitary.

14. *M. zephira* Fr. (Plate 52. fig. A.)

Medium to rather large. Cap 2 — 3 cm, at first conic-convex, then expanding, coarsely sulcato-striate $\frac{2}{3}$ in, at first whitish-pallid, but soon becoming flushed with flesh-colour or rubescent, like the gills and the stem, which latter originally is minutely flocculose-fibrillose.

Spores cylindric oval, $10\frac{1}{2}$ — 12×5 — $5\frac{1}{2} \mu$. Cystidia inflated, obtuse or fusiform, 12 — 24μ broad. Basidia 4-spored.

Rather rare, but generally numerous, growing dispersedly in the needle-bed of coniferous woods.

15. *M. pseudo-galericulata* Lange. (Plate 51. fig. E.)

Rather large, but short-stemmed. Cap $2\frac{1}{2}$ — 3 cm, plano-convex, pellucido-striate, whitish (striae and disc livid-gray). Gills rather distant, rather narrow, arcuato-adnate with a decurrent tooth, not connected by veins and not becoming flesh-coloured. Stem rather short

(3½ cm), with a short "root", hollow, rather brittle, even and somewhat shining. Smell almost absent.

Spores oblong-ovate, $10\frac{1}{2}$ — $12 \times 5\frac{1}{2}$ — $6\frac{1}{4}$ μ . Cystidia large, very protruding, fusiform, 75 — 95×12 — 18 μ .

Very rare. Growing on stumps of *Alnus* and *Corylus* (not fasciculate).

It has a superficial likeness to young specimens of *M. galericulata*, but belongs to the present section.

16. *M. ammoniaca* Fr. (Plate 51. fig. A.)

Medium. Cap $1\frac{1}{2}$ — $2\frac{1}{2}$ cm, campanulate, at last expanded and even with a somewhat upturned edge, when fresh dark gray, coarsely striate (umbo and striæ darker), very hygrophanous, when dry tin-gray and sulcate-rugose. Gills grayish, rather distant (more distant, thicker and venose when old). Stem rather short and firm (4—6 cm $\times$ 2 mm), gray. Smell rather faint, not "nitrous".

Spores ovate, $9\frac{1}{2}$ — 10×5 — $5\frac{3}{4}$ μ . Cystidia about 12 μ broad, ventricose below the middle, upper portion somewhat bottleneck-like.

Very common, exclusively in grass, mostly in open spaces (lawns, road-banks etc.), gregarious.

SCHROETER describes this species very well sub nom. *Agaricus (Mycena) lævigatus* Pers., identifying this species with *M. metata* Fr., which is an entirely different species. Also COOKE'S *M. consimilis* (Illustrations, pl. 1186) seems to be practically identical. — Although the smell of this fungus is rather faint and not nitrous I think it is the true *M. ammoniaca* of FRIES, which by him is expressly stated to grow in green fields etc., not attached to trees like *M. alcalina*.

17. *M. excisa* (Lasch) Fr. forma *solitaria*. (Plate 51. fig. B.)

Medium. Cap about 2 cm, convex, somewhat wrinkled-sulcate, dark fuscous or almost fuliginous. Gills narrow, attenuato-adnate with a decurrent denticle, white. Stem rather short, paler than the cap, everywhere sparsely clad with minute, dark, adpressed, floccose squamules (sub lente!), apex somewhat powdery.

Spores broadly ovate-oval, 9 — $10 \times 5\frac{1}{2}$ — 7 μ . Cystidia scattered, large, obtuse, almost cylindric (free portion 50 — 60 μ long). The hyphæ of the trama are very broad (12—16 μ). Basidia 4-spored (rarely 2-spored).

Rather rare. Met with exclusively on the foot of old beeches (*Fagus*), late in the autumn.

COOKE'S *M. excisa* (Illustrations, pl. 148) does not belong here. But FRIES' figures and description of the smaller and subsolitary form (Icones sel., tab. 81¹) is fairly good, although no notice is taken of the minute squamules on the stem.

18. *M. polygramma* (Bull.) Fr. (Plate 52. fig. F.)

Large. Cap $2\frac{1}{2}$ — $3\frac{1}{2}$ cm, campanulate, at last convex with a more or less prominent umbo, sulcate, tin- or iron-gray with a whitish bloom. Gills rather narrow. Stem tall and stiff upright, gray, with numerous raised, silver-white lines and a long "taproot".

Spores broadly ovate, $9-11 \times 6-7 \mu$. Cystidia are present in the form of short, occasionally somewhat branched, wavy hairs (about 3μ broad), the immersed portion of which is somewhat inflated. Basidia 4-spored.

Very common, solitary or some few specimens together, on the ground or at the base of stumps in frondose woods.

18a. *M. polygramma* forma *candida*. (Plate 52. fig. C.)

Medium. Cap $1\frac{1}{2}-2$ cm, milk-white. The raised lines on the stem less distinct. Otherwise like the main form.

Rare.

18b. *M. polygramma* forma *pumila*. (Plate 52. fig. E.)

Rather small and dwarfish. Cap $1-1\frac{1}{4}$ cm. Stem ascendent, short, striæ almost obsolete and "root" very short. For the rest like the main form.

Not uncommon, growing on mossy trunks, especially of oaks (*Quercus*).

A reduced form, of a very different habit, but not really distinct.

19. *M. vitilis* Fr. (Plate 52. fig. D.)

Rather small to small, slender. Cap $0.6-1.5$ cm, convex with a small, rather prominent, callous umbo, striate, dirt-gray to pallid. Gills moderately distant. Stem tall, rooting (springing from buried twigs), minutely striate (sub lente).

Spores oval-ovate, $9-12 \times 5\frac{3}{4}-7 \mu$. Cystidia very much like those of *M. polygramma*, hair-shaped, about $10 \times 2 \mu$, basal part slightly thickened. Basidia 4-spored.

Very common, always solitary, in frondose woods.

Confounded by some authors (e. g. RICKEN) with *M. filipes* (which belongs to *Granulata*).

20. *M. pura* (Pers.) Fr. (Plate 52. fig. G.)

Rather large to large. Cap $2\frac{1}{2}-4$ cm, convex-campanulate or expanded, of various colours, mostly flesh-coloured with a flush either of pinkish or violaceous, rarely light blue or white. Gills broadly emarginate. Stem attenuated upward, rather fleshy, of the same colours. Odour of radishes.

Spores oval, $6-8 \times 3\frac{1}{2}-4\frac{1}{4} \mu$. Cystidia large, inflated, about 25μ broad, their upper portion occasionally narrowed into a short, broad neck. Basidia 4-spored.

Very common, in coniferous as well as frondose woods.

20a. *M. pura* forma *rosea* (*Agaricus roseus* Schum. in Fl. D.). (Plate 53. fig. H.)

Larger and taller (stem about $9 \text{ cm} \times 5 \text{ mm}$). Cap light pink. Stem paler, whitish above. Typical specimens of this beautiful form are rather rare.

It is very well depicted by COOKE (Illustrations, pl. 167) as *M. pura*.

21. *M. flavo-alba* Fr. (Plate 53. fig. G.)

Rather small and dwarfish. Cap 0,8—2 cm, somewhat conical, but soon expanded, ivory white, striate when fresh. Gills moderately distant. Stem subpellucid, white, about 4 cm × 1—1,2 mm.

Spores almost pip-shaped, $6-8 \times 3\frac{1}{2}-4 \mu$. Cystidia awl-shaped or inflated conical, $25-35 \times 9-16 \mu$. Basidia 4-spored.

Common, especially in open spaces, in or just outside of woods, gregarious, generally attached to dead stubble and roots of grass.

When the striation of the cap is unusually distinct you have *M. lineata* (Bull.) (sensu Schroet., nec al.). Some authors use the name *M. pumila* (Bull.) for it. With age the gills often become thickish and Hygrophoroid.

22. *M. adonis* (Bull.) Fr. (Plate 53. fig. A.)

Small. Cap about 1 cm, campanulate-convex, striate, of a pure and deep pink colour. Gills with a decurrent denticle. Stem rather short, white, subpellucid.

Spores almost pip-shaped, $9 \times 5 \mu$ (or $9\frac{1}{2}-5\frac{1}{2} \mu$). Cystidia awl-shaped conical, long, pointed, up to 60μ long. Basidia 2-spored.

Rare. Met with in moss, in frondose woods, generally solitary.

The other colour-varieties described in literature are unknown to me.

23. *M. rubella* Qué. (?). (Plate 53. fig. B.)

Very small. Cap about 0,3 cm, campanulate-convex, light pink. Gills very narrow. Stem concolorous, with radiating, mycelioid hairs at the base.

Spores oblong-ovate, $9-10 \times 5-5\frac{1}{2} \mu$. Cystidia awl-shaped. Basidia 2-spored.

Rare. Met with in frondose woods, growing on twigs, amongst dead foliage, at the foot of a living elm-tree (*Ulmus*) etc.

This tiny little fungus of the *adonis*-group may be identical with *Collybia clavus* (L.) Fr., as suggested by ROB. FRIES (loc. cit.). COOKE'S figure (Illustrations, pl. 147) is not unlike my plant. — A very closely allied form, which is met with on the needle-bed in dense plantations of *Picea*, probably equals *M. coccinea* (Sow.) Qué. (sensu Rea). (Vide "Studies" I).

24. *M. gypsea* Fr. forma. (Plate 52. fig. B.)

Small. Cap 0,6—1,2 cm, somewhat conical, yellowish-white, striate $\frac{2}{3}$ in. Stem rather short, slightly rooting, 2—3 cm × 1—1,2 mm.

Spores subrotund-ovate, $7-8 \times 5-5\frac{1}{2} \mu$. Cystidia (free portion) obtusely awl-shaped, 7—9 μ broad (entire length about 55 μ). Basidia 2-spored.

Rare. Growing on the cracked and cankerous bark of old beeches (*Fagus*), in small flocks.

Differs from the Friesian description by being rather short-stemmed and not densely clustered.

25. *M. epiphloea* Fr. (Plate 53. fig. E.)

Very small and delicate. Cap about 0,4 cm, conic-campanulate, striate $\frac{3}{4}$ in, white, cen-

tral part and striæ hyaline-grayish. Gills very narrow, ascendent, almost free. Stem filiform (about 0,5 mm), somewhat rooting in moss and crevices in the bark.

Spores broadly ovate, $8-10 \times 5-6 \mu$. Cystidia about 30μ long, obtuse hairshaped-cylindric, slightly inflated downward. Basidia 2-spored.

Rather rare, solitary. On mossy trunks (Populus).

This little species is probably not specifically distinct from *M. hiemalis*. SCHROETER'S *M. epiphloea* is probably a form of *M. lineata*.

26. *M. hiemalis* (Osb.) Fr. (Plate 54. fig. A.)

Very small and delicate. Cap about 0,5 cm, campanulate, expanding, white, with hyaline-grayish striæ. Gills moderately broad. Stem filiform, insititious, about 0,4 mm thick, base fibrillose.

Spores broadly ovate, $7\frac{1}{2}-9 \times 5\frac{1}{2}-6 \mu$. Cystidia obtuse, cylindric hair-shaped, $7-10 \mu$ thick. Basidia 2-spored.

Rather common, late in the season, on the mossy trunk of frondose trees (Ulmus, Quercus etc.).

27. *M. acicula* (Schaeff.) Fr. (Plate 53. fig. D.)

Very small. Cap 0,2—0,5 cm, campanulate, minium-red or deep orange. Gills white or pale yellow. Stem slender, almost filiform, yellow, rooting.

Spores fusiform, base often somewhat obliquely pointed, $9-11 \times 3-3\frac{1}{2} \mu$. Cystidia small, free portion conical. Basidia 4-spored.

Not uncommon, but generally solitary, among twigs, dead foliage etc.

28. *M. echinipes* (Lasch) Fr. (Plate 53. fig. I.)

Small or very small. Cap 0,5—1,5 cm, soon flattened, with a slight umbo, pure white. Gills narrow. Stem $2\frac{1}{2}-4 \text{ cm} \times 0,7-1,1 \text{ mm}$, springing from a disc of radiating, mycelioid hairs.

Spores lanceolate-ellipsoid, $6-8\frac{1}{2} \times 2\frac{1}{2}-3\frac{1}{2} \mu$. Cystidia short, hair-shaped, $3\frac{1}{2}-4 \mu$ thick. Basidia 4-spored.

Rare; growing solitary on fallen leaves of Fagus.

29. *M. lactea* (Pers.) Fr. (Plate 53. fig. F.)

Very small or small. Cap 0,7—1,5 cm, membranaceous, somewhat conical, pure white. Gills very narrow, crowded. Stem thin, base slightly pilose.

Spores ellipsoid-lanceolate, base drawn out to a point, $9-10 \times 3-4 \mu$. Basidia 2-spored.

Rather common, amongst moss and dead needles, in dense plantations of Picea.

29a. *M. lactea* var. *pithya* Alb. & Schw. (Plate 53. fig. C.)

Very small. Cap 0,5—1,2 cm, convex, soon almost flat. Stem somewhat flexuose, about 0,5 mm thick.

Spores narrow fusiform, base acuminate, $10 \times 2\frac{1}{2} \mu$. Basidia 2-spored.

Not uncommon, in moist, deep needle-beds in coniferous woods.

This variety differs but very slightly from the main form. The plant described under this name by AL. H. SMITH (Mycologia, vol. XXVII) probably is *M. epiphloea*.

30. *M. stylobates* (Pers.) Fr. (Plate 54. fig. C.)

Very small. Cap 0,4—0,8 cm, convex, striate, white. Stem filiform, downy below, with a round, radiato-striate, minutely plushy basal disc which is $1\frac{1}{2}$ —2 mm across.

Spores oblong-ellipsoid, $7-10 \times 3\frac{1}{2} \mu$ (or $8\frac{1}{2}-10 \times 4-4\frac{1}{2} \mu$). Cystidia short, hair-shaped. Basidia 4-spored.

Not uncommon, but solitary, on small twigs etc. on the ground in damp, shady places.

KARSTEN erroneously gives the spore-dimensions as $3 \times 1\frac{1}{2} \mu$.

31. *M. clavularis* Fr. (Plate 54. fig. B.)

Small to very small. Cap about 0,9 cm, campanulate-convex, whitish, disc and rather coarse striæ hyaline-grayish. Stem about 0,7 mm thick, with a circular, somewhat conic basal disc.

Spores oblong ovate-ellipsoid, $8-9\frac{1}{2} \times 4-4\frac{1}{2} \mu$. Cystidia (free portion) 40—55 μ long, hair-shaped, wavy, occasionally slightly branched. Basidia 4-spored.

Growing solitary on a twig, in a copse, on foot-path.

M. stylobates var. *grisella* Sturm is probably identic.

32. *M. rorida* Fr. (Plate 54. fig. D.)

Very small. Cap 0,3—0,5 cm, semiglobate to convex, striate, whitish-pale. Gills very broad, arcuato-adnate. Stem $2\frac{1}{2}$ —3 cm $\times$ 0,4 mm, with a thick, glutinous, hyaline coating.

Spores lanceolate-ellipsoid, $11 \times 3\frac{1}{2} \mu$. Cystidia obtuse, more or less ventricose or nearly cylindric, about $25 \times 5-9 \mu$. Basidia 4-spored.

Rare. Met with in damp places, growing on twigs (*Vaccinium*) or needles, among *Sphagna* etc.

B. Granulatæ

α. Typicæ

a. Marginatæ

33. *M. elegans* (Pers.) Fr. (Plate 54. fig. G.)

Small or rather small. Cap 0,8—1,5 cm, convex, striate half way in, dirt-brownish or pale date-brown. Gills dirty grayish, edge deep orange yellow. Stem paler than the cap, 4—5 cm $\times$ 1—1,5 mm.

Spores oblong oval, $8-9 \times 4\frac{1}{2} \mu$. Cystidia obovate or almost pyriform, 9—11 μ broad, with numerous warts or prickles. Contents dark yellow.

Not uncommon, in dense plantations of *Picea*, gregarious.

Occasionally rather big and fleshy specimens occur which form a transition to *M. aurantio-marginata* Fr. But typical specimens of this species I have never met. *M. elegans* as described by AL. H. SMITH (Mycologia, vol. XXVII) is an entirely different plant. BRESADOLA'S (Iconographia, pl. 222²) is *M. citrino-marginata*.

34. *M. luteo-alba* (Bolt.) Fr. var. *sulphureo-marginata* Lange. (Plate 54. fig. E.)

Small. Cap about 1 cm, conic-campanulate, whitish or very pale yellow, striate $\frac{3}{4}$ in, with pallid striæ. Gills white, with a very pale sulphur edge. Stem 5—6 cm $\times$ 1 mm, somewhat pilose towards the base.

Spores obovate-ellipsoid, $8-9 \times 4\frac{1}{2}-5 \mu$. Cystidia 15—30 μ broad, obovate-vesiculose, outer half set with numerous wart-like protuberances; contents very pale sulphur. Basidia 4-spored.

Rare. Met with in frondose woods and copses, growing solitary amongst dead foliage, ferns etc.

This nice little species may easily be confounded with pale forms of *M. citrino-marginata*, from which the cystidia clearly distinguish it.

35. *M. rosella* Fr. (Plate 54. fig. F. & F¹.)

Rather small or small, 0.8—1.2 cm. Cap convex, sometimes with a minute papilla, pale pink, disc and striæ of a somewhat deeper colour. Gills whitish-pink with a deep rosy edge, broadly adnate. Stem paler than the cap.

Spores oblong-ellipsoid or ovate-ellipsoid, $8-10 \times 4\frac{1}{2}-5 \mu$. Cystidia obovate or bludgeon-shaped, 7—15 μ broad, obtuse or drawn out to a short "bottle-neck". Contents pinkish. Basidia 4-spored.

Rather rare, but gregarious, growing in the deep needle-bed in woods of *Picea*.

36. *M. pterigena* Fr. (Plate 54. fig. H.)

Very small and delicate. Cap 0.2—0.5 cm, hemispheric campanulate, pale pink, striate. Gills very broad behind, rather distant, with a pink edging. Stem filiform, pinkish (deep pink towards the base which is slightly swollen).

Spores ellipsoid, $9-10 \times 4\frac{1}{2}-5 \mu$. Cystidia ovate or subglobular, with numerous minute, erect setulæ; contents pinkish. Basidia 4-spored.

Rather rare. Exclusively to be met with on dead fern-fronds (*Athyrium filix femina* and *Dryopteris filix mas*), springing from the stalk and mid-rib.

b. *Concolores*

37. *M. crocata* (Schr.) Fr. (Plate 55. fig. D.)

Rather large. Cap $1\frac{1}{2}-2\frac{1}{2}$ cm, campanulate or somewhat conical, gray or dirt-brown (rarely whitish), edge striate. Gills whitish. Stem straight, tall, rooting (springing from a

buried twig), paler than the cap, but at first coloured by the saffron-red sap inside, which pervades all parts of the plant.

Spores broadly oval, $6\frac{1}{2}$ — 8×5 — $5\frac{1}{2}$ μ . Cystidia club-shaped or somewhat pyriform, set with wart-like setulæ; apex occasionally with a hair-like appendix. Basidia 4-spored.

Rather common in woods of Fagus.

38. *M. tintinnabulum* Fr. (sensu Schroet.). (Plate 55. fig. C.)

Rather small, densely cæspitose. Cap 0.8—1.3 cm, campanulate convex, dark fuscous to pale dirt-brown, edge slightly striate. Gills broad, arcuate and subdecurrent. Stem short, somewhat rooting; often more than 30 fruit-bodies in a cluster.

Spores ovate, 4 — $5 \times 2\frac{1}{2}$ — 3 μ . Cystidia obovate to subglobose, set with wart-like setulæ, 9 — 12 μ broad. Basidia 4-spored.

Not uncommon, growing in great clusters on stumps of Alnus and Fagus, late in the season.

The solitary form, figured by FRIES in Icones sel. (tab. 80, fig. 4) seems to be a totally different species, and so is BRESADOLA'S (Iconographia, pl. 247¹).

39. *M. inclinata* Fr. (Plate 55. fig. E and E¹.)

Rather large, densely fasciculate. Cap $1\frac{1}{2}$ — $2\frac{1}{2}$ cm, somewhat campanulate, umbo often somewhat flattened, fuscous to dingy date-brown, striate, edge somewhat denticulate when young. Gills whitish, moderately distant. Stem white above, soon becoming bright bay-brown from base upward, somewhat rooting, with a pilose-velutinous root.

Spores subglobose-oval, $8\frac{1}{2}$ — $9\frac{1}{2} \times 6$ — $6\frac{1}{2}$ μ . Cystidia broadly club-shaped, their apex (which does not protrude very much) rounded or obtuse, set with comparatively few, wavy, 4 — 8 μ long hairs (a transition to the type of cystidia met with in *M. polygramma*).

Rather common, but exclusively to be met with on stumps of Quercus.

M. galericulata var. *calopus* Fr. (Icones sel., tab. 80) evidently is synonymous, and so is *M. alcalina* as represented by the upper figure on pl. 255 in COOKE'S Illustrations.

40. *M. pinetorum* Lange. (Plate 55. fig. B.)

Rather small to medium. Cap 1 — $1\frac{1}{2}$ cm, convex, umbonate, pale or darker fuscous to pale dirt-grayish, coarsely striate. Gills very broad, rather distant, broadly adnate with a small decurrent denticle, at last almost horizontal, white or whitish, slightly connected by veins. Stem rather tough, 5 — 6 cm $\times$ 1 — $1\frac{1}{2}$ mm, straight, elongated into the substrate in a truncate, piloso-tomentose tap-root, and downward densely clad with erect, fibrillose hairs.

Spores obovate-ellipsoid, $7\frac{1}{2}$ — 9×4 — $4\frac{1}{2}$ μ . Cystidia (on edge and faces of gills) large, somewhat variable, in most cases obovate or pyriform, more or less set with warts.

Rare. Only met with once in a dense plantation of Pinus montana, growing gregariously in the deep needle-bed.

41. *M. fagetorum* Fr. (Plate 56. fig. E.)

Medium to rather large. Cap $1\frac{1}{2}$ —3 cm, expanded-conical, subumbonate, submembranaceous, coarsely striate $\frac{3}{4}$ in, pallid, with darker, livid grayish umbo and striæ (somewhat rufescent when old). Gills narrow, rather distant, with a decurrent tooth. Stem concolorous, 4—6 cm $\times$ 2 mm, with a horizontally bent, short "root".

Spores oblong-ellipsoid, $9\frac{1}{2}$ — 11×4 — $4\frac{1}{2}$ μ . Cystidia club- or pear-shaped, sparse, small, easily overlooked, their not much protruding free portion set with short setæ. Basidia 4-spored.

Rather rare. Exclusively to be met with in woods of *Fagus*, where it grows on the ground, often in great numbers, individually attached to a dead leaf by the creeping basal part of the stem.

42. *M. metata* Fr. (Plate 56. fig. F.)

Medium. Cap 1—1.8 cm, parabolic or somewhat conical, very pale flesh-colour, umbo and striæ of a darker and more dingy hue. Gills whitish. Stem slender, concolorous (whitish above).

Spores ovate-ellipsoid, $7\frac{1}{2}$ — 9×4 — $4\frac{1}{2}$ μ (or 9 — 10×4 — 5 μ). Cystidia obovate or pyriform, 12—19 μ across, set with setulose warts. Basidia mostly 4-spored; 2-spored forms occur, but seem to be rather rare. (The larger spores probably belong here).

Very common, often in great numbers, on the needle-bed in coniferous woods (*Picea*).

I apply the Friesian name *M. metata* to this species as the only one in his long list which fits my plant fairly well. It seems impossible that this very common species should be overlooked by him.

43. *M. lineata* (Bull.) Fr. (Plate 55. fig. A and A¹.)

Medium to rather small. Cap 0.8—1.8 cm, campanulate, distinctly striate $\frac{2}{3}$ in, of a paler or deeper olive-greenish colour (whitish towards the edge), rarely almost entirely white. Stem somewhat dirt-gray below, whitish above, 3—7 cm $\times$ 1—1.3 mm, opaque.

Spores broadly ovate, 7 — 8×5 — $6\frac{1}{2}$ μ (in forma *pumila* $9 \times 5\frac{1}{2}$ μ). Cystidia crowded, subspherical to pyriform, warty-setulose, about 13 μ broad. Basidia 4-spored.

Rather common. A dwarfy, whitish form (forma *pumila*, fig. A¹) grows on the bark of living trees and shrubs (garden-roses etc.); a rather dark olivaceous form is met with on needles and twigs in plantations of *Picea*.

M. lineata is a very disputed species (vide „Studies” I). The *M. lineata* described by SEV. PETERSEN (loc. cit.) does not belong here. The yellowish forms described by FRIES and others probably belong to *M. citrino-marginata*.

44. *M. sepia* Lange n. sp. (Plate 54. fig. I.)

Rather small. Cap 0.8—1.2 cm, conic-campanulate or parabolic, dark fuscous (edge whitish pale, disc and striæ almost sepia), minutely striate $\frac{3}{4}$ in. Gills narrow, adnate with a small tooth, rather crowded, pale grayish, edge white. Stem about 6 cm $\times$ 1 mm, concolorous (apex white); base with white, crispate hairs.

Spores ellipsoid, $8\frac{1}{2}$ — $9 \times 4\frac{1}{2}$ μ . Cystidia pyriform, minutely setulose-warty, about 16 μ broad. Basidia 4-spored.

Rather rare, but gregarious, amongst needles in plantations of *Pinus* and *Picea*.

Very nearly related to *M. metata*, but in colour almost like *M. ammoniaca* (which differs in distant, thicker gills etc.). I formerly ("Studies" V) called it *M. atro-alboides* Peck, but recent American authors describe this species with cystidia of the *Ciliatæ*-type.

45. *M. galericulata* (Scop.) Fr. (sensu restr.). (Plate 56. fig. C.)

Large or very large. Cap $2\frac{1}{2}$ —5 cm, campanulate, then expanded, while in bud sub-fuscos or livid gray, soon becoming pallid tan or alutaceous, rather tough. Gills rather broad and broadly emarginate, turning flesh-colour with age. Stem cartilaginous, rather stiff, without striation, somewhat rooting. Single or subfasciculate.

Spores broadly ovate-oval, 11 — $13 \times 6\frac{1}{2}$ — 7 μ . Cystidia club-shaped, apex set with short or somewhat elongated hairs. Basidia 2-spored.

Common, especially on stumps of *Betula* and *Alnus*.

The densely cæspitose forms described in literature probably belong to *M. inclinata*. The *M. galericulata* of KAUFMANN and other American authors does not belong here. *M. rugosa* Fr. is hardly a distinct species.

46. *M. parabolica* Fr. (Plate 56. fig. D.)

Rather large. Cap 1 — $2\frac{1}{4}$ cm, parabolic to conico-campanulate, indistinctly striate, dirty-gray (or slightly lilaceous) with a hoary bloom, a rather dark fuscous umbo and a whitish edge. Gills rather narrow. Stem slender, concolorous, pallid above, rooting, subfasciculate.

Spores ovate, 8 — 10×5 — 6 μ . Cystidia obovate-subglobose (set with minute, wart-like setulæ), forming a rather broad, sterile edging to the gill. Basidia 2-spored.

Rather rare, chiefly at the base of decaying poles (coniferous wood), but also to be met with at the foot of frondose trees.

47. *M. filipes* (Bull.) Fr. (Plate 57. fig. F.)

Rather small to small. Cap 0,5—0,8 cm, conic-campanulate, pallid dirt-gray, edge whitish, indistinctly striate. Gills narrow, crowded. Stem very slender, thin, paler than the cap, somewhat rooting.

Spores obovate, $8\frac{1}{2}$ — $9\frac{1}{2} \times 5$ μ . Cystidia obovate-globular, set with minute, wart-like setæ, forming a sterile, marginal zone at the gill-edge. Basidia 2-spored.

Rather common, solitary, in frondose woods, generally springing from buried twigs.

This species is not very well distinguished from *M. parabolica*, to which it bears the same relation as *M. vitilis* to *M. polygramma*.

47a. *M. filipes* forma *tetraspora*. (Plate 57. fig. G.)

A somewhat smaller form with 4-spored basidia and slightly longer spores (9 — $10 \times 4\frac{1}{2}$ — 5 μ) which seems to be rather rare.

48. *M. debilis* Fr. (Plate 57. fig. H.)

Very small. Cap 0,2—0,5 cm, semiglobate, whitish, striæ and disc pale dingy flesh-colour. Gills broadest behind, broadly adnate, rather distant. Stem rather short, flexuose, almost filiform, whitish.

Spores obovate-lanceolate, $11-12\frac{1}{2} \times 5 \mu$. Basidia 2-spored. Cystidia almost globular, warty-setulose.

Rather rare, solitary and easily overlooked, on small twigs, midribs of dead oak-leaves etc.

49. *M. capillaris* (Schum.) Fr. (Plate 56. fig. B.)

Minute. Cap 0,1—0,25 cm, campanulate, then convex, milk-white. Gills narrow, almost free. Stem filiform, very flexible ($2-4 \text{ cm} \times \frac{1}{4} \text{ mm}$), whitish, apex at first hyaline-grayish.

Spores obovate-lanceolate, $7\frac{1}{2}-9 \times 3-3\frac{3}{4} \mu$ (or somewhat longer, $9-11 \times 3-3\frac{3}{4} \mu$). Cystidia crowded, obovate-globular, set with wart-like setulæ. Basidia 4-spored.

Common, growing on dead leaves of *Fagus*, often gregarious, till late in the autumn.

50. *M. mucor* (Batsch) Fr. (Plate 56. fig. A.)

Very minute. Cap 0,1—0,2 cm, soon almost flat, striate, white. Gills distant, horizontal. Stem filiform, rather short (1—2 cm), base $\frac{1}{4}$, apex $\frac{1}{6}$ mm; base somewhat pilose with a tiny, about $\frac{1}{3}$ mm broad disc.

Spores oblong-ellipsoid, $10 \times 3\frac{1}{2}-4 \mu$. Cystidia sparse, their protruding part rounded and set with delicate setæ.

Rather rare, in troops on leaves of *Fagus* and *Quercus*.

It may be confounded with *Omphalia polyadelpha* (which has two-spored basidia and no basal disc). *M. setosa* (Sow.) Fr. probably is identic.

51. *M. supina* Fr. (Plate 57. fig. D.)

Very small. Cap 0,4—0,7 cm, somewhat conical, expanding, striate half way in, rather dark fuscous, edge paler. Gills ascendent, rather narrowly adnate. Stem $2-3 \text{ cm} \times 0,6-0,8 \text{ mm}$, paler than the cap, with a hairy, whitish "root".

Spores almost spherical, $7\frac{1}{2}-9 \times 7-8 \mu$. Cystidia elongated pyriform, minutely setulose, forming an about 50μ broad marginal zone at the gill-edge. Basidia 4-spored.

Very rare. On mossy trunks (*Salices*).

52. *M. corticola* (Schum.) Fr. (Plate 57. fig. E, E¹ and E².)

Very small. Cap 0,3—0,5 cm, subglobose or slightly flattened above, coarsely striate, glaucous to bluish gray or dingy flesh-colour. Gills distant, very broad, almost horizontal. Stem ascendent or curved, short ($1\frac{1}{2}-2 \text{ cm} \times 0,3-0,5 \text{ mm}$), base insititious.

Spores almost spherical, $7-10 \times 7\frac{1}{2}-8 \mu$ (or $9\frac{1}{2}-11 \times 9-10 \mu$). Cystidia club-shaped, set with short warts and occasionally some few hair-shaped appendices. Basidia 4-spored.

Common, late in the season, on the trunk of various deciduous trees (*Ulmus*, *Tilia*, *Fagus* etc.), generally gregarious.

The pinkish and the glaucous form are rather distinct. The latter, when nestling in deep moss, occasionally grows to double the ordinary size and gets a somewhat rooting stem, thus approaching *M. supina*, (vide plate 57, fig. E³).

53. *M. tenerrima* (Berk.) Fr. (Plate 57. fig. C.)

Very small and delicate. Cap 0,3 cm, campanulate-convex, striate, white, minutely granulate. Gills rather broad, free. Stem filiform, short, curved, with long, crispate hairs, especially towards the base which springs from a tiny ($\frac{1}{2}$ mm broad) disc.

Spores broadly ovate, $8-9\frac{1}{2} \times 6-6\frac{1}{2} \mu$. Cystidia variable, apex either obtuse (with or without a hair-like appendix) or tapering off into a hair-like prolongation; membrane warty. Basidia 2-spored. Cells on surface of cap spherical to oval, densely warted.

Rare. Met with on the bark of living trees (*Ulmus*, *Populus*).

53 a. *M. tenerrima* var. *carpophila* Lange. (Plate 57. fig. B.)

Very delicate; the cap more parabolic, the stem straighter than in the main form. The basidia are 4-spored, the spores somewhat smaller, $8-8\frac{1}{2} \times 4-4\frac{1}{2} \mu$.

Very rare. Met with on dead pericarps of *Fagus*, early in the season (July).

The smallness of the spores of this variety may be accounted for by its 4-spored basidia.

54. *M. osmundicola* Lange. (Plate 57. fig. A.)

Very small. Cap 0,3—0,7 cm, conical, at last somewhat expanded, grooved with distinct striæ almost to apex, grayish while in bud, then white, densely clad with snow-white meal. Gills narrow, reaching the stem, which is about 3 cm long, apex $\frac{1}{3}$ mm, base about 1 mm, everywhere minutely pilose.

Spores ovate-ellipsoid, $7\frac{1}{2}-9 \times 4-4\frac{1}{2} \mu$. Cystidia oblong or oval, set with minute, setulose warts. Basidia 4-spored. Cells on surface of cap globular, $35-40 \mu$ diam., minutely warty.

Evidently an introduced species, growing in great numbers on "Osmunda-fibre" in orchid-pots in hothouses. (The fibre is said to come from South-America).

M. chlorina P. Henn. seems to be closely related. The plant forms a transition to the *Hiatula*-type.

β. Gummosæ

55. *M. epipterygia* (Scop.) Fr. (Plate 58. fig. A.)

Medium. Cap 1—2 cm, parabolic or somewhat convex, striate half way in, livid-brownish or livid-white; pellicle hyaline, viscid, detachable. Gills rather narrow. Stem rather tall, pale lemon-yellow or almost hyaline-white, glutinous.

Spores ovate, base somewhat obliquely tapering into a point, $8-9 \times 4-4\frac{1}{2} \mu$.

Common, amongst moss and dead sticks etc. in coniferous woods (also to be met with on heaths, very rarely in beech-woods).

56. *M. pelliculosa* Fr. forma. (Plate 58. fig. C.)

Medium. Cap 1,2—1,8 cm, campanulate-convex, then almost plane, even and of a pale sulphur colour when in bud, pallid with a flush of greenish in the centre and livid-gray towards the edge, with coarse, dark striæ about half way in when expanded, at last becoming entirely gray; pellicle viscid, detachable. Gills rather broad, thick, connected by veins, pallid. Stem slender ($6-7 \text{ cm} \times 1\frac{1}{2}-2 \text{ mm}$), subpellucid, livid with a flush of olivaceous, viscous, apex minutely pruinose. Smell faint, somewhat cucumber-like.

Spores ovate-ellipsoid, $8-9 \times 4-4\frac{1}{4} \mu$. Basidia 4-spored. Apex of stem set with obovate, about 9μ broad, verrucose cystidia.

Very rare. Met with amongst rank mosses, in an open plantation of *Pinus* and *Sarothamnus*, amongst *Calluna*.

57. *M. vulgaris* (Pers.) Fr. (Plate 58. fig. B.)

Small. Cap 0,6—1,2 cm, semiglobate-convex, gray (or whitish), edge striate; pellicle detachable. Gills very broad, almost horizontal, broadly adnate to subdecurrent. Stem about $4 \text{ cm} \times 1 \text{ mm}$, whitish.

Spores ovate-ellipsoid, $7-9 \times 4-4\frac{1}{2}$ (or $9-10 \times 4$) μ . Basidia 4-spored.

Common, often in great numbers, on the needle-bed in dense plantations of *Picea*.

If it were not for the viscid pellicle it would be placed in *Omphalia*.

II. MYCENELLA

58. *M. lasiosperma* Bres. (Plate 58. fig. F.)

Medium. Cap 1—2½ cm, campanulate expanded, even, dull gray, hoary, edge paler. Gills narrow, somewhat distant, creamy white. Stem 3—5 cm $\times$ 1—2 mm, slightly rooting, concolorous, whitish above (fuscous inside), everywhere powdery-velvety. Subfasciculate.

Spores spherical, coarsely warty, 6—7 μ diam. (excl. the warts). Cystidia deeply set, their free portion conical, 12—15 μ broad.

Rare. Growing on rotten stumps (of *Picea* and other trees).

My plant differs from the description of *BRESADOLA* in not being pellucido-striate; his plant is intermediate between nos. 58 and 59, but closest to no. 58.

59. *M. margaritispota* Lange. (Plate 58. fig. D.)

Small or very small. Cap 0,4 (rarely up to 0,8) cm, campanulate or expanded-conical, striate, of a pale and dingy ochraceous colour, margin light yellowish. Gills free, rather

narrow, almost distant, whitish with a faint yellowish tint. Stem 2 (rarely 4) cm long, almost filiform, more or less fuscous, with a delicate, velvety coating (i. e. set with minute, cystidiiform hairs).

Spores spherical, 5—6 μ diam. (excl. the warts), with a number of coarse warts. Cystidia (free portion), about 35 μ long, awl-shaped; apex occasionally bifurcate.

Rare. Met with on mossy stumps of *Salix* and (rarely) of *Fagus*.

M. lutea Bres. is very like, but lacks the warty spores. My plant has the velvety stem in common with *M. iris*.

OMPHALIA

Rather small to very minute Agarics. Cap convex or umbilicate. Gills somewhat decurrent. Stem more or less cartilaginous, generally thin.

OMPHALIA is intermediate between *Mycena*, *Collybia* and *Clitocybe*. These affinities are very evident; and already FRIES divided the genus accordingly in two main groups which he called *Collybiarii* and *Mycenarii*. The first, however, might just as well be named after *Clitocybe*; in fact some of the species can hardly be distinguished from the smaller Clitocybes, even if the somewhat cartilaginous stem is a fairly good characteristic for the Omphalias. The second group is distinguished from *Mycena* by the more or less decurrent gills and by the apex of the stem gradually widening into the tissue of the cap. Some few species are not unlike certain *Camarophylli*; but the gills in the genuine Omphalias are not "waxy".

Microscopic investigations have rendered the proper distinction and identification of the numerous species considerably easier. Several otherwise very similar species can be distinguished at a glance by means of their smooth or rough, ellipsoid or globose spores. Cystidia are present in some (all?) of the *Mycenarii*, while most of the *Collybiarii* seem to have a fertile, homogeneous gill-edge. Two-spored basidia are an apparently constant feature of some species.

Unfortunately the first, unavoidable result of the introduction of microscopic characters for the identification has been to make the existing confusion more evident. Thus under the name of *O. striæpilea* we have a whole series of distinct types: two smooth-spored and two rough-spored species. But which one is the "true" *O. striæpilea*?

Taxonomy. What renders the study of the taxonomy of the Omphalias particularly difficult is that the majority of the species are rather rare and sporadic; many species may be sought for in vain during a lifetime, and it is therefore exceedingly difficult to acquire a thorough knowledge of the genus. This also is my chief reason for not attempting a complete rearrangement of the species or diverging materially from the main lines of the taxonomy of FRIES. In fact this taxonomy has not been very much improved by later authors.

FRIES — as mentioned above — divides the genus in two main groups: *Collybiarii* and *Mycenarii*. The boundary-line between the two is, however, rather indistinct, especially when we come to the very small species. (Thus FRIES himself placed *O. stellata* in *Collybiarii*, *O. gracillima* in *Mycenarii*, although these two can hardly be distinguished from each other). The best and most reliable characters for the *Mycenarii* are: the straight, often tall and slender stem, the more or less campanulate cap which at first is either subumbonate or only slightly umbilicate (while it is Clitocyboid in *Collybiarii*), and the characteristic cystidia met with in the majority of species. The first of the main groups, *Collybiarii*, FRIES divides in three series: *Hydrogrammi*, *Pyxidati* and *Umbelliferi*. But the boundary-line between the first two is so vague, that I prefer to have only two series: *Angustifoliae* (which almost equals *Hydrogrammi* + *Pyxidati*) and *Latifoliae*. The minor points of the taxonomy will require no special explanation.

KEY

TO THE SPECIES FIGURED

- A. COLLYBIARIIL. Cap generally flat or somewhat infundibuliform with at first slightly incurved edge.
- α. *Angustifoliae*. Large to medium-sized species. Gills rather crowded, often narrow.
- a. *Coloratae*. Cap not white.
1. SUBFUSCÆ. Cap dirt-gray, brownish, livid or fuliginous.
- * Cap cup-shaped or deeply umbilicate.
- † Cap pale livid to hyaline-grayish... 1. *O. hydrogramma*
- †† Cap dingy brownish.
- ° Cap without striation ... 2. *O. umbilicata* forma *subspadicea*
- °° Cap radiato-striate ... 3. *O. sphagnicola*
- ** Cap convex, more or less umbilicate.
- † Cap almost black ... 4. *O. maura*
- †† Cap dingy or livid brownish.
- ° Spores smooth.
- ^ Stem straight, tall. Gills white. Spores ovate ... 5. *O. leucophylla*
- ** Stem less straight. Gills pallid. Spores almost spheric 6. *O. striæpilea*
- °° Spores rough, globose.
- ^ Stem straight. Spores minutely warty ... 7. *O. bisphærigera*
- ** Stem less straight. Spores with long spinules ... 8. *O. asterospora*
2. LÆTICOLORÆ. Cap subochraceous to flesh-coloured or gilvous.
- * Strong farinaceous smell. Cap subochraceous ... 9. *O. graveolens*

- ** Smell none or slight. Cap gilvous ... 10. *O. pyxidata*
 b. Albatæ. Cap white.
 1. Gills cream-white ... 11. *O. scyphoides*
 2. Gills somewhat ochre ... 12. *O. chrysolenca*
 β. Latifoliæ. Rather small species with somewhat distant, rather broad gills.
 a. Tetrastoræ. Basidia 4-spored.
 1. Fuscous or whitish species.
 * Fuscous species.
 † Gills medium, rather dark gray ... 13. *O. rustica*
 †† Gills very broad, pallid to somewhat brownish ... 14. *O. umbellifera*
 (Vide also *Camarophyllus atropunctus*).
 ** Whitish species ... 14 a. *O. umbellifera* forma *albida*
 2. More or less bright-coloured species.
 * Green or pale yellow.
 † Dark green ... 15. *O. viridis*
 †† Pale lemon- or sulphur-yellow. ... 16. *O. abiegna*
 ** Somewhat flesh-coloured or pinkish.
 † Dirty flesh-colour ... 17. *O. demissa* forma
 †† Pale pink ... 18. *O. rosella*
 b. Bisporæ. Basidia 2-spored.
 1. Gills very broad, whitish ... 19. *O. grisella*
 2. Gills narrow, fuscous ... 20. *O. griseo-pallida*
 B. MYCENARI. Cap generally somewhat campanulate when young.
 α. Coloratæ. Cap not white.
 a. Fasciculate species.
 1. Densely fasciculate. Cap fulvous-ochre ... 21. *O. campanella*
 2. In small bunches. Cap subfuscous ... 22. *O. Belliæ*
 b. Solitary species.
 1. Cap pallid or fuscous.
 * Dark fuscous.
 † Basidia 4-spored ... 23. *O. picta* var. *concolor*
 †† Basidia 2-spored ... 24. *O. pseudo-picta*
 (Vide also no. 19, *O. grisella*).
 ** Pallid or grayish.
 † Strong farinaceous smell ... 25. *O. cinerella*
 †† No smell.
 ° Cap 0,5—1 cm. Stem short ... 26. *O. speirea* forma
 ∞ Cap 0,2—0,4 cm. Stem filiform ... 26 a. *O. speirea* var. *tenuistipes*
 2. Cap more or less bright coloured. (Basidia 4-spored).
 * Cap of a clear or pale orange colour ... 27. *O. fibula*
 ** Cap generally pallid. Apex of stem more or less indigo... 28. *O. Swartzii*

β. *Albatæ*. Whole plant white.

a. *Gracillimæ*. Gills normal, alternating.

1. Stem short, often incurved or ascendent.

* Solitary ... 29. *O. gracillima*

** Gregarious ... 30. *O. stellata*

2. Stem filiform, straight (whitish varieties of nos. 26, 27 and 28).

b. *Integrellæ*. Gills reduced to low ridges or veins or at least hardly reaching the edge.

1. Cap glabrous.

* Stem central ... 31. *O. integrella*

** Stem subexcentric ... 31 a. *O. integrella* var. *caricicola*

2. Cap pubescent-fimbriate.

* Basidia 4-spored... 32. *O. cuspidata* var. *stenospora*

** Basidia 2-spored.

† On sticks, twigs and herbaceous plants ... 33. *O. crispula*

†† On dead leaves of *Fagus* and *Quercus* ... 34. *O. polyadelpha*

SPECIFIC DESCRIPTIONS AND NOTES

A. Collybiarii

α. *Angustifoliæ*

a. *Coloratæ*

1. SUBFUSCÆ

1. *O. hydrogramma* (Bull.) Fr. (Plate 58. fig. G.)

Large. Cap 3—5 cm, at first umbilicate-convex, then almost infundibuliform, livid dirt-gray (margin densely striolate) when wet, whitish when dry. Gills crowded, pallid. Stem cartilaginous, often compressed, hollow; base white-tomentose.

Spores oval-ellipsoid, $5\frac{1}{2}$ — $6\frac{1}{2} \times 3\frac{1}{4}$ — $3\frac{1}{2}$ μ . Cystidia absent.

Not uncommon, growing in dead foliage, chiefly of *Fagus* (more rarely in mixed *Picea*-*Fagus* woods).

This species may be mistaken for a *Clitocybe* (*C. expallens*, *C. dicolor* etc.), but the stem is more distinctly cartilaginous, often somewhat twisted. FRIES describes the gills as “confertissimæ”, but I have never found them so.

2. *O. umbilicata* (Schaeff.) Fr. forma *subspadicea*. (Plate 58. fig. H.)

Large. Cap $2\frac{1}{2}$ —5 cm, at first umbilicate convex, then deeply infundibuliform, watery dirt-brown to almost date-brown (pallid dingy ochre when dry). Gills deeply decurrent, narrow, crowded, pale dirt-brownish. Stem rather short, very cartilaginous, somewhat paler than the cap, apex slightly white-silky.

Spores ellipsoid, base slightly acuminate, $7-8 \times 3\frac{3}{4} \mu$. Cystidia absent.

Rather rare, in woods of *Fagus* (on rotten stumps or on leaf-mould).

My plant differs from the Friesian description of *O. umbilicata* by darker colours, dirty brownish (not whitish) gills. RICKEN'S figure (*Blätterpilze*, pl. 104) is very close to my form, but even larger and more fuscous, while BRESADOLA depicts an almost white species which hardly can belong here (*Iconographia*, pl. 257¹).

3. *O. sphagnicola* Berk. (Plate 60. fig. I.)

Medium. Cap $1\frac{1}{2}-2\frac{1}{2}$ cm, soon becoming very deeply infundibuliform, watery livid-fuscous, centre slightly squamulose, coarsely pellucido-striate. Gills dirty pallid, very strongly decurrent. Stem not cartilaginous, paler than the cap.

Spores varying from elongated-ellipsoid, about $9 \times 3\frac{1}{2} \mu$, to pip-shaped, $7 \times 4 \mu$. Basidia 4-spored.

On *Sphagnum*, chiefly in early summer, probably not uncommon.

I formerly referred my finds to *O. philonotis*, because they were not tough (as FRIES has it). But *O. philonotis* is generally described and figured as a soot-black species. (Vide COOKE, *Illustrations*, pl. 289).

4. *O. maura* Fr. (Plate 59. fig. J.)

Medium. Cap $1\frac{1}{2}-3$ cm, convex-flat, umbilicate, dark fuliginous (edge almost even), somewhat paler and shining when dry. Gills almost horizontal, slightly decurrent, whitish. Stem short, soot-brown inside and outside, cartilaginous.

Spores broadly ovate, slightly flattened, $4\frac{1}{2}-6 \times 3\frac{1}{2}-4 \mu$. Cystidia crowded on the gill-edge, subfusiform, $6-12 \mu$ broad.

Rather rare, in open spaces in woods of *Picea*, growing gregariously amongst chips etc.

This species is somewhat Collybioid (the colour recalls *Collybia ambusta*). While FRIES' figures (*Icones sel.*, pl. 73²) are excellent, RICKEN'S are much too pale and COOKE'S have strongly decurrent gills.

5. *O. leucophylla* Fr. (*O. striæpilea* Fr. (sensu Bres., nec al.)). (Plate 59. fig. F.)

Medium. Cap $1\frac{1}{2}-2\frac{1}{2}$ cm, convex, deeply umbilicate, livid dirt-brown, striate (paler and even when dry). Gills decurrent, rather crowded, white. Stem straight and generally slender, very cartilaginous, paler than the cap.

Spores oval, $6-7 \times 4-4\frac{1}{2} \mu$. Basidia 4-spored. Cystidia sparse, almost cylindric, about 10μ broad.

Not common. Met with on sandy soil in plantations of *Picea* and *Pinus*.

BRESADOLA'S figure of *O. striæpilea* (*Iconographia*, pl. 270²) is an excellent portrait of my plant; but it differs considerably from *O. striæpilea* in the Friesian sense.

6. *O. striæpilea* Fr. (sensu Karst.). (Plate 59. fig. D.)

Medium or rather small. Cap $1\frac{1}{4}-2\frac{1}{4}$ cm, convex-flat or slightly umbonate, then somewhat depressed, pellucido-striate, pallid dirt-brownish (whitish when dry). Gills pallid, decurrent. Stem generally somewhat wavy, not very cartilaginous.

Spores oval-spheric, $5\frac{1}{2}$ — $6\frac{1}{2} \times 4\frac{3}{4}$ — $5\frac{1}{2} \mu$, smooth.

Not uncommon, growing gregariously on the ground in plantations of *Picea*, amongst needles, moss and grass.

7. *O. bisphærigera* Lange (*O. striæpilea* Fr. (sensu Ricken, nec al.)). (Plate 59. fig. H.)

Medium to rather large. Cap about $2\frac{1}{2}$ cm, strongly convex, slightly umbilicate, fuscous, somewhat paler towards the pellucido-striate edge (pale dirty brown when dry). Gills rather distant, very pale grayish, broadly adnate with a slightly decurrent tooth, arcuato-horizontal, rather broad. Stem straight, rather tall, very cartilaginous, pallid.

Spores spherical, 8—9 μ diam., very minutely warty-punctate. Cystidia cylindric-vesiculose or fusiform-ventricose, 10—20 μ broad. Basidia 2-spored.

Not uncommon, on the ground among sticks etc. in woods (*Fagus*, *Picea*).

I have met a form of this species with shorter stem, darker and thicker, somewhat Laccarioid gills, which was more like the specimen figured by RICKEN (*Blätterpilze*, pl. 105³).

8. *O. asterospora* Lange (*O. striæpilea* Fr. (sensu QuéL.)). (Plate 59. fig. G.)

Medium to small. Cap 1—2 cm, convex-flat or slightly depressed, fuscous to dirt-brownish, pellucido-striate (even and whitish when dry). Gills slightly decurrent, plano-arcuate, paler than the cap. Stem 3 cm $\times$ 2 mm, fusco-pallid, not very cartilaginous. Smell faint, of cucumber.

Spores spherical, $5\frac{1}{2} \mu$ in diameter, with $1\frac{1}{4} \mu$ long, cylindric spinules. Basidia 4-spored. Cystidia absent.

Rather rarely seen, but probably overlooked. Found both in plantations of *Picea* and under old beeches (*Fagus*), on mossy ground.

In outward appearance very much like small specimens of no. 6 (*O. striæpilea*). Which of the species nos. 5—8 is the real *O. striæpilea* of FRIES it is hardly possible to ascertain. But as his figure in *Icones sel.* accords very well with KARSTEN'S smooth-spored species, I have retained the Friesian name in the Karstenian sense.

2. LÆTICOLORS

9. *O. graveolens* Sev. Petersen. (Plate 59. fig. I.)

Rather large. Cap 2—4 cm, deeply umbilicate, at last somewhat infundibuliform (large specimens often with irregularly wavy edge), dirty ochre, edge even and somewhat paler. Gills slightly dingy cream, somewhat distant, deeply decurrent, arcuate, rather narrow. Stem concolorous with the cap (slightly darker, dirty brownish below); base white-felty. Strong "farinaceous" smell.

Spores ovate ellipsoid or obovate, 7 — $8 \times 3\frac{3}{4}$ — $4\frac{1}{4} \mu$. Cystidia absent. Basidia 4-spored.

Met with in a dense plantation (*Chamæcyparis* and old *Pinus silvestris*-trees), gregarious.

First described by SEV. PETERSEN (Danske Agaricaceer, 1907). It differs from *Clitocybe squamulosa* in being less robust, with a more cartilaginous stem and ochry, not hazel-brownish cap. *O. Kalchbrenneri* Bres. is altogether more pale.

10. *O. pyxidata* (Bull.) Fr. (nec Rick.). (Plate 58. fig. E and E¹.)

Medium to rather small. Cap 1—2 cm, deeply umbilicate, at last somewhat infundibuliform, coarsely pellucido-striate, flesh-coloured rufous or almost gilvous. Gills subdistant (occasionally furcate, but not connected by veins), rather narrow, arcuato-decurrent, gilvous-pallid or isabella. Stem wavy, somewhat cartilaginous, paler than the cap. Spore-powder white.

Spores ovate pip-shaped, $7\frac{1}{2}$ — $8\frac{1}{2} \times 4\frac{1}{2}$ — 5μ . Cystidia absent. Basidia 4-spored.

Not uncommon, in sandy grassland, road-edges etc.

O. pyxidata, in the sense of RICKEN, is a species with globose, echinulate spores. *O. muralis* (Sow.) as described by FRIES and REA comes very close to the dull-coloured form here depicted (Plate 58. fig E). QUÉLET also regards *O. muralis* as a mere form of *O. pyxidata*.

b. *Albatæ*

11. *O. scyphoides* Fr. (?) (Plate 59. fig. A.)

Medium. Cap 1—2½ cm, rather fleshy, at first plano-convex, slightly depressed, then subinfundibuliform, not hygrophanous and without striation, somewhat innato-fibrillose, pure white. Gills decurrent, crowded, very narrow, cream. Stem short, base somewhat yellowish, tough and rather firm, not hollow.

Spores ovate-ellipsoid, obliquely pedicellate, $5\frac{1}{2}$ — $6 \times 3\frac{1}{4} \mu$. Cystidia absent. Basidia 4-spored.

Met with in wood of *Abies*, on the ground amongst needles.

My plant answers fairly well to the description of FRIES, but may be nothing but an albino of *Clitocybe parilis*.

12. *O. chrysoleuca* Fr. (?) (Plate 59. fig. B.)

Medium. Cap 2½ cm, plano-convex, slightly depressed and indistinctly umbonate, white, glabrous and even, somewhat shining. Gills very narrow and crowded, thin, strongly decurrent and furcate below, light ochre. Stem solid, whitish, base slightly thickened and tomentose. Taste somewhat bitter. Spore-powder whitish with a slight tinge of dingy flesh-colour.

Spores obliquely ovate-ellipsoid or almost pip-shaped, $6\frac{1}{2}$ — $7\frac{1}{2} \times 3\frac{1}{2}$ — 4μ . Cystidia absent. Basidia 4-spored.

Met with in a *Betula*-bog, growing in moss.

It may be only a pygmean, pale-spored form of *Paxillus (Lepista) orcelloides* COOKE & MASSEE = *Rhodopaxillus fallax* (Quél.) Maire (as described by KONRAD & MAUBLANC, loc. cit. p. 277). *O. chrysoleuca* (Pers.) is a synonym for *O. abiegna* B. & Br.

β . Latifoliae

a. Tetrasporae

13. *O. rustica* Fr. (Plate 59. fig. E.)

Small. Cap 0,7—1,4 cm, convex, umbilicate, at last subinfundibuliform, soot-brown, coarsely striate (when dry fuscous, rugulose, dull). Gills very decurrent, rather distant, arcuate, dirty gray, darker when old. Stem thin, rather slender, concolorous with the cap.

Spores broadly ovate to subspheric-ovate, $6\frac{1}{2}$ — $7\frac{1}{2} \times 4\frac{3}{4}$ — $5\frac{1}{2} \mu$. Cystidia absent.

Met with on a sandy hill among lichens, *Calluna* and *Sarothamnus*.

It differs from *O. grisella* by the 4-spored basidia, darker colours etc., from *O. griseo-pallida* by longer stem, more distinctly umbonate cap, more roundish spores and 4-spored basidia.

14. *O. umbellifera* (L.) Fr. (Plate 60. fig. J.)

Medium to small. Cap 1—2 cm, umbilicato-convex, at last almost infundibuliform, pale dirt-brown olive with very coarse, subfuscous striæ (dry almost whitish). Gills very distant, very broad, decurrent, edge almost straight, pallid. Stem short, somewhat fuscous.

Spores ovate, $8 \times 5 \mu$.

Rather common on peaty ground.

14a. *O. umbellifera* forma *albida*. (Plate 60. fig. B.)

Whole plant whitish, striæ hyaline or dingy white. For the rest like no. 14.

Not uncommon, in heath-bogs etc., but intermediate forms are more frequent than the type.

Like Quélet I identify *O. pseudo-androsacea* (Bull.) Fr. with the white form of *O. umbellifera*.

15. *O. viridis* (Fl. D.) Lange. (*O. umbellifera* var. *viridis* Fr.). (Plate 60. fig. G.)

Very small. Cap 0,5—0,7 cm, convex, depressed in the centre, coarsely striate, fundamental colour pale green, striæ of a dark, dull green colour. Gills broad, decurrent, distant, white with a flush of greenish. Stem about 2 cm $\times$ 1 mm, dull dark green.

Spores ovate, somewhat pip-shaped, $7\frac{1}{2}$ — $9\frac{1}{2} \times 4\frac{1}{2}$ —5. Basidia 4-spored.

Only met with once, on sandy hill amongst lichens in young plantation of *Picea*.

O. smaragdina Berk. evidently is a synonym and so is *O. chlorocyanea* Pat. I am inclined to regard it as a distinct species.

16. *O. abiegna* B. & Br. (*O. umbellifera* var. *citrina* Quél.). (Plate 60. fig. H.)

Medium to rather small. Cap 1—2½ cm, strongly convex, at last slightly umbilicate, pale lemon-yellowish, pellucido-striate (whitish and even when dry). Gills distant, arcuate, decurrent, concolorous. Stem whitish.

Spores ovate, $8 \times 5 \mu$. Cystidia absent. Basidia 4-spored. The trama of the gills is made up of 9—15 μ broad hyphæ.

Rather common, on and around dead stumps of *Picea*.

The characteristic habitat, the yellowish colour and the absence of any intermediate forms induce me to regard this little agaric as a distinct species. It is the bearer of quite a number of names: *Hygrophorus Wynnii* B. & Br., *Omphalia bibula* Quél., *Omphalia umbellifera* var. *chrysoleuca* (Pers.) Fr. This latter probably is the most ancient name, but leads to confusion with *O. chrysoleuca* Fr.

17. *O. demissa* Fr. forma. (Plate 60. fig. F.)

Small. Cap 0,8—1,6 cm, submembranaceous, convex, slightly umbilicate or depressed, of a dull, subfuscous flesh-colour, hardly pellucido-striate (when dry paler, almost argillaceous and somewhat pruinose-furfuraceous). Gills distinct, rather thick, arcuato-decurrent, concolorous or more lilac flesh-coloured. Stem 2—2½ cm × 1—1½ mm, concolorous with the cap, dull, glabrous.

Spores pip-shaped, 7—8 × 4½—5 μ. Cystidia absent. Basidia mostly 4-spored (exceptionally 2- or 3-spored on the same gill).

Met with on gravelly soil, old grass-field (*Holcus mollis* etc.) behind a copse, growing gregariously.

My plant differs from the typical *O. demissa* in the Friesian sense by not having a "polished and bright" stem.

18. *O. rosella* Lange. (Plate 60. fig. C.)

Small. Cap 0,7—1,5 cm, membranaceous, at first umbilicate, then infundibuliform, of a pale and somewhat dingy pink colour (without striation), centre slightly dirt-brownish. The edge is somewhat irregularly crenato-fimbriate and slightly rugoso-plicate. Gills deeply decurrent, rather narrow, somewhat furcate, rather distant, pale pinkish. Stem short (1—2 cm × 1½ mm), at first pinkish, then whitish, glabrous.

Spores cylindric-ellipsoid, obliquely pedicellate, 7½—9 × 4—4½ μ. Cystidia scattered, short hair-shaped, about 4 μ thick, (imbedded base about 6 μ). Basidia 4-spored.

Found on a lawn (light soil), in park, growing gregariously on the ground (1921—23).

b. *Bisporæ*

19. *O. grisella* (Weinm.) Karst. (Plate 60. fig. E.)

Very small. Cap 0,5—0,9 cm, strongly convex, fundamental colour dirty pallid, the distant and coarse striæ and the disc fuscous. Gills distant, very broad, whitish. Stem slender (2—3 cm × 1 mm), subfuscous, minutely pruinose.

Spores ellipsoid-oblong, 8 × 3½ μ. Basidia with two (rarely 1 or 3) sterigmata.

Rather common amongst lichens and grass in sandy soil on heaths and in open plantations.

O. velutina Quél. probably is synonymous (although BRESADOLA depicts it somewhat larger and paler).

20. *O. griseo-pallida* (Desm.) Fr. (Plate 60. fig. D.)

Small and dwarfish. Cap 1—1½ cm, membranaceous, at first convex-flat, then depressed, often somewhat excentric, striate, subfuscous (pallid when dry). Gills rather distant, attenuated at either end, fuscous. Stem short, concolorous, somewhat wavy or incurved.

Spores varying from ovate to subellipsoid, 9—12 × 5—6 (mostly 10—11½ × 5½) μ . Basidia 2-spored.

Met with on a hill amongst *Calluna* and *Holcus lanatus* and other xerophilous grasses.

Vide also *O. rustica*.

B. *Mycenarii* α . *Coloratæ***21. *O. campanella*** (Batsch) Fr. (Plate 60. fig. A.)

Small, densely fasciculate. Cap 0.6—1.3 cm, campanulate-convex, comparatively fleshy, ochraceous, coarsely striate (umbo and striæ subfulvous). Gills arcuato-decurrent, rather distant, ochraceous like the ascendent stem, which is fusco-fulvous towards the slightly bulbous and ochry-velutinous base.

Spores ovate-ellipsoid or pip-shaped, 6½—7½ × 3½ μ . Cystidia scattered, short, cylindric-filiform.

Growing densely cæspitose on a rotten stump of a pole (pine-wood?), observed twice, 1905 and 1909, both finds in April. But in Sweden I have met it in August.

Marasmius caudicinalis (With.) Fr. (*M. fulvo-bulbillosus* R. Fr.) is hardly distinguishable from *O. campanella*, except by its solitary growth. I have never met it in Denmark, but it seems to be widely distributed (found by me in pine-woods in Central Canada). Recent authors have placed the two species together in a new genus, *Xeromphalina* Kühner & Maire.

22. *O. Belliæ* Johnst. (Plate 61. fig. F.)

Fasciculate, rather small. Cap 1—2 cm, convex, somewhat umbilicate (when old subinfundibuliform), edge deflexed, coarsely striate or almost sulcate, whitish-pale to subfuscous, striæ darker. Gills distant, thick, very decurrent, rather broad, whitish. Stem 2—5 cm, whitish, becoming paler or darker fuscous from base upward, generally a number (2—15) joined in a fascicle, their bases connected by a felty outgrowth.

Spores oval-oblong, 11—15 (mostly 12—14) × 6—6¾ μ . Cystidia absent. Basidia 4-spored.

In great numbers on dead reeds of *Phragmites*, close to the surface of the water, boggy tarn near Bogense (Fyn), January 1935 (P. J. PETERSEN).

Although the original picture (copied by COOKE (Illustrations, pl. 251 B)) depicts abnormal, old specimens with upturned, revolute edge, it undoubtedly represents this rare species, which has been re-discovered almost simultaneously in Germany and Denmark in the winter 1934—35, about a century after its discovery in England.

23. *O. picta* Fr. var. *concolor* Lange. (Plate 61. fig. I.)

Small. Cap 1—1½ cm, campanulate convex, coarsely and rather densely striate; fundamental colour pallid, centre and striæ fuliginous. Gills rather distant, venose, extraordinary broad (as broad as long), edge almost plane with a decurrent denticle, gray (edge paler). Stem straight, hollow, paler than the cap; base (sub lente) minutely pruinose-pubescent.

Spores ovate-ellipsoid, $7-8 \times 3\frac{1}{2}-4 \mu$. Edge of gills densely set with obovate-clavate cystidia, whose outer portion has numerous wart-like setulæ.

Met with at the edge of a bog, outskirts of wood of *Picea*, amongst moss and needles.

My plant differs from the typical *O. picta* (which I have never seen) by entirely lacking the fulvous, membranaceous mycelium, which surrounds the base of the stem. If the typical *O. picta* has minutely echinulate spores (as given by SACCARDI), my plant must be a distinct species.

24. *O. pseudo-picta* Lange. (Plate 61. fig. J.)

Small. Cap 0.9—1.5 cm, campanulate, at last convex with a minute, evanescent papilla, dirtygrayish, somewhat shining, centre and coarse, rather dense striæ dark fuscous (paler and even when dry). Gills distant, extraordinarily broad, edge horizontal, arcuate and decurrent, gray, edge paler. Stem 6 cm $\times$ 1½ mm, straight and rather stiff, paler than the cap, somewhat rooting.

Spores obovate, base slightly acuminate, $9-10 \times 6 \mu$. Cystidia inflated-clavate, $35-45 \times 9-16 \mu$, in young specimens almost without branchlets, in older ones crowned with irregular, short branchlets.

Only met with once, in old grass-field, behind a *Cratægus*-hedge.

25. *O. cinerella* (Karst.) Lange n. comb. (*Mycena cinerella* Karst.). (Plate 61. fig. H.)

Small. Cap about 0.6—1 cm, campanulate-convex, striate, ashy gray. Gills whitish, rather distant, arcuate and more or less decurrent. Stem straight and slender, about 1 mm thick, paler than the cap. Smell strong, farinaceous.

Spores ovate-ellipsoid or somewhat pip-shaped, $7-8 \times 4\frac{1}{2}-5 \mu$. Cystidia small and easily overlooked, their free portion (which only protrudes very little) obtuse, about 10 μ broad, with minute, wart-like setulæ.

Not uncommon, in small flocks on the ground amongst needles in woods of *Picea*.

O. grisea Fr. (sensu Rick.) is a synonym, but FRIES' own figure differs widely from it. — I have removed it to *Omphalia*, because it has no natural affinities within *Mycena*.

26. *O. speirea* forma. (Plate 61. fig. C.)

Small. Cap 1.2 cm, convex-flat, slightly depressed, whitish, with coarse, hyaline-grayish striæ. Gills white, rather narrow and distant, decurrent with a tooth. Stem about 2 cm $\times$ 1 mm.

Spores ovate-pipshaped, $8-10 \times 5-5\frac{1}{2} \mu$. Cystidia short, hair-shaped, obtuse. Basidia 2-spored.

Rather rare, on trunks and fallen twigs (*Salix* etc.). A darker, subfuscous form is also met with.

O. speirea was sometimes referred to *Mycena* by FRIES himself, but appears to me to be more *Omphalioid*. FRIES' figure (*Icones sel.*, pl. 78²) depicts two forms: a papillate form which according to the descriptions must be the typical one, and another which is more like mine. *O. albedo-pallens* Karst. (to which species I formerly referred my plant) differs in having spheric-ellipsoid, small spores.

26 a. *O. speirea* var. *tenuistipes* Lange. (Plate 61. fig. E.)

Very small. Cap 0,3—0,5 cm, convex, whitish, with hyaline-grayish striæ. Gills broad, arcuate. Stem filiform, 2—3½ cm × 0,3—0,6 mm. For the rest like the main type.

On dead bark and twigs, more rarely on decaying foliage in deciduous copses. Not uncommon, but easily overlooked.

O. grisea as depicted by BRESADOLA (*Iconographia*, pl. 271²) appears to be an intermediate form between nos. 26 and 26 a, but has nothing to do with *O. grisea* Fr. Another intermediate form is *O. campophylla* Berk. in the sense of BRESADOLA.

27. *O. fibula* (Bull.) Fr. (Plate 61. fig. G.)

Very small. Cap 0,5—1 cm, convex or somewhat campanulate, slightly depressed, clear or very pale orange, pellucido-striate. Gills arcuate, very deeply decurrent, white. Stem filiform, more or less tinged with orange.

Spores very small, somewhat pip-shaped, $5 \times 2\frac{1}{2} \mu$. Cystidia very scarce, their protruding portions obtusely awl-shaped, subcapitate, 6—7 μ broad. Basidia 4-spored.

Common in humid, shady places amongst moss etc. Somewhat etiolated forms in deep moss are often almost white.

28. *O. Swartzii* Fr. (*O. setipes* var. *acrocyanea* Fr.). (Plate 61. fig. D.)

Very small. Differing from *O. fibula* by a slightly more umbilicate cap which is subfuscous in the centre, pallid towards the edge, and by the apex of the stem being dark indigo or violaceous when young.

Spores narrow pip-shaped, $5\frac{1}{2}$ — $2\frac{1}{2} \mu$. Cystidia (free portion) narrow conical, subcapitate, 7—13 μ broad.

In shady places amongst damp mosses etc., not uncommon.

When the indigo colour at the top of the stem is very rich, it is a beautiful little agaric; but pale forms can hardly be distinguished from expallent specimens of no. 27.

β . *Albatæ*

a. *Gracillima*

29. *O. gracillima* (Weinm.) Fr. (Plate 61. fig. A.)

Very small. Cap 0,8 cm, campanulate-convex with a minute papilla, snow-white, hyalino-striate. Gills arcuate, rather broad. Stem incurved, short.

Spores ellipsoid-pipshaped, $7 \times 3\frac{1}{4} \mu$. Cystidia (free part) obtuse, awl-shaped, about 25μ long. Basidia 4-spored.

Rare. Met with on dead stalks of herbaceous plants, solitary.

30. *O. stellata* Fr. (Plate 61. fig. B.)

Very small. Cap 0,4—0,8 cm, convex with a minute papilla, snow-white. Stem short.

Spores ellipsoid-pipshaped, $6\frac{1}{2}$ — $7 \times 3\frac{1}{4} \mu$. Basidia and Cystidia as in no. 29.

Rather common, growing gregariously on fallen twigs and branches of *Picea*, generally in small fascicles.

This species is almost too close to *O. gracillima*, chiefly distinguished from it by habitat and subfasciculate growth. BRESADOLA tries to distinguish the two species by the form of their spores ($7-9 \times 2-3 \mu$ and $4-6 \times 4\frac{1}{2}-5 \mu$ respectively). As will be seen my spore-dimensions for both forms are exactly intermediate. — *O. buccinalis* (Sow.) is hardly distinct from *O. stellata*.

b. *Integrellæ*

31. *O. integrella* (Pers.) Fr. (Plate 62. fig. C.)

Very small. Whole plant milk-white. Cap 0,3—0,6 cm, campanulate convex, striate. Gills reduced to raised veins or very low, wavy, somewhat branched ridges. Stem 1— $1\frac{1}{2}$ cm, incurved, base slightly swollen, minutely pilose.

Spores pip-shaped, $7\frac{1}{2}$ — $8 \times 4\frac{1}{2} \mu$. Cystidia absent.

Rare. Met with on mossy, decaying stump of *Populus*, in a wood.

31 a. *O. integrella* var. *caricicola* Lange n. comb. (*O. caricicola* Lasch?). (Plate 62. fig. E.)

Very small, entirely milk-white. Cap 0,3—0,7 cm. Gills as in the main form. Stem often somewhat incurved, very short, white.

Spores $7\frac{1}{2} \times 4 \mu$ (?). Cystidia (free portion) subulate, somewhat obtuse.

Only met with once, but rather numerous, on dead *Carex stricta* in a bog.

It has the gills of *O. integrella*, the cystidia of *O. gracillima*. *Marasmius (Androsaceus) caricis* Karst. may be identic.

32. *O. cuspidata* Quél. var. *stenospora* Lange. (Plate 62. fig. B.)

Very minute, entirely white. Cap 0,1—0,3 cm, with a minute, occasionally excentric papilla; edge and surface pubescent. Gills (about 10) arcuato-decurrent, narrowed towards the edge. Stem insititious, very thin ($\frac{1}{2}$ —1 cm $\times$ 0,25 mm), incurved, minutely pubescent.

Spores clavate-ellipsoid, $8-10 \times 2-2\frac{1}{4} \mu$. Cystidia absent. Basidia 4-spored. Hairs on edge of cap about 40μ long.

Probably rare. Met with on almost dead *Fragaria*-plants and on mossy trunks of *Salix*, gregarious.

QUÉLET describes the spores of the typical *O. cuspidata* as pruniform, 8μ long. *O. gibba* Pat. seems to be almost identical, but for the larger spores.

33. *O. crispula* Quél. (Plate 62. fig. D.)

Very minute, entirely milk-white. Cap 0,2—0,3 cm, at first hemispherical, then convex, edge and surface minutely pilose. Gills (5—9 in number) decurrent, about $\frac{1}{4}$ mm broad near the stem, but disappearing half way towards the edge. Stem incurved, filiform ($\frac{1}{2}$ cm $\times$ 0,25 mm), everywhere pilose.

Spores ellipsoid-pipshaped, $9\frac{1}{2}$ — $10 \times 4\frac{1}{2}$ (or 10 — $11\frac{1}{2} \times 5$) μ . Cystidia absent. Basidia 2-spored. Hairs on stem erect, thin (2 μ), rather long (150 μ below, about 65 μ above).

On dead stems of herbaceous plants (*Fragaria*, *Pæonia*). Probably rare.

The broader spores and 2-spored basidia besides the semiglobate, not mucronate cap distinguish this species from *O. cuspidata*.

34. *O. polyadelpha* (Lasch) Fr. (Plate 62. fig. A.)

Very minute and tender, hyaline-white. Cap about 0,2 cm, convex, striate, pruinoso-flocculose. Gills narrow, arcuato-decurrent, distant. Stem insititious, about 1 cm $\times$ 0,2 mm.

Spores ovate-lanceolate or cylindric-ellipsoid, 10 — $11 \times 4\frac{1}{2}$ —5 μ . Cystidia globose, setulose-warty, very sparse (or entirely absent). The surface of the cap is clad with rather large, sausage-shaped, warty cells.

Gregarious on dead foliage (*Quercus*, rarely *Fagus*). Probably not uncommon, in certain years.

From *Mycena mucor*, which evidently is a near relative, it is distinguished by the two-spored basidia and want of a basal disc.

PLEUROTUS

Cap more or less one-sided. Stem excentric, lateral, rudimentary or entirely absent. Flesh generally though, but not coriaceous. Mostly xylophilous species.

PLEUROTUS is a very heterogeneous genus, numerous species of which show affinity to *Tricholoma*, *Collybia*, *Clitocybe*, *Armillaria* or *Panus*. In many cases a *Pleurotus* might almost be regarded as a representative of another genus having acquired xylophilous habits and in consequence thereof having evolved certain characters: excentricity, toughness etc.

Still it will not do to dissolve the genus altogether and distribute its members among the adjacent genera, where many of the species cannot possibly find a natural position.

The closest affinity is with the genus *Panus*. Good arguments could be advanced for uniting the two genera in one, treating *Panus* as a subgenus, as done by PILÁT in his recent work (*Atlas d. champ. de l'Europe*, Vol. II). But as long as our knowledge of the innumerable exotic species of *Panus* is so superficial I think such a scheme too revolutionary. I shall only go half way: severing *Panus* from *Lentinus* and placing it next to *Pleurotus*.

Microscopic characteristics. The spores vary very widely within *Pleurotus*. While in most other genera the ovate or pip-shaped spore predominates, such spores play a comparatively unimportant part in *Pleurotus*. The most remarkable type is the allantoid (almost cylindric, somewhat curved) spore. This type is represented by very large spores (f. inst. those of *P. corticatus* and *P. ostreatus*) as well as by very small, almost bacilloid ones (*P. mitis*, *P. serotinus*). But globose spores are also met with rather frequently, besides the subellipsoid ones. *P. petaloides* is the only species here described which has distinctly warty-punctate spores. — Characteristic cystidia are rather rare. *P. petaloides* and *P. mastrucatus* are remarkable for their coarse, thick-walled, subulate-fusiform cystidia; *P. serotinus* has somewhat inflated cystidia on the faces as well as on the edge of the gills; and in *P. ostreatus* the edge is set with somewhat clavate, deeply immersed cystidia with a minute, hair-like appendix. I have never come across any 2-spored basidia. But according to PILÁT they occur occasionally in some of the normally 4-spored species. The texture of the cap — in a group of species — is remarkable for its gelatinous nature, the tissue being made up of thin, gelatinizing hyphæ almost like those met with in *Exidia* and other xylophilous fungi of divers groups.

The taxonomy of FRIES has been modified or revolutionised by more recent authors. But like RICKEN and REA I am inclined to leave it practically intact. To transfer *P. corticatus* and *P. ostreatus* to *Armillaria* and *Clitocybe* respectively, as done by SCHROETER, is to separate very intimately related species. It is also rather doubtful if it is a real improvement to segregate the resupinate or sessile species in a distinct genus (*Phyllotus* Karst.). The line of demarcation is not very distinct. One of the most difficult species to place is *P. nidulans*. The spore-print is not pure white, and some authors therefore place it in *Crepidotus*; but its spores are Pleurotoid. *P. mitis* was, by KARSTEN, made the foundation-stone for a new genus, *Scytinotus*. It also has some traits in common with *Panus stipticus*. And MAIRE has recently set apart in a separate genus the group *Acanthocystis* (Fayod) — all the species with the characteristic thick-walled, coarse cystidia. Finally it has also been proposed to extend the genus by transferring to *Pleurotus* *Tricholoma rutilans* and its allies (particularly *Clitocybe decorus* Fr.); but they seem to me to find no natural position within this genus, although their xylophilous habit approaches them to it.

The key for the determination of the several species will require no special explanations.

KEY

TO THE SPECIES FIGURED

A. CARNOSI. Cap more or less fleshy, often large, rarely less than 2 cm broad.

α. *Excentrici*. Stem excentric to almost lateral.

a. *Clitocyboidei*. Gills decurrent.

1. Spores cylindric or allantoid.

* Veil present (soon disappearing).

† Scales on cap pallid or grayish... 1. *P. corticatus*

†† Scales on cap dark gray... 1 a. *P. corticatus* var. *tephrotrichus*

** Veil absent.

† Gills whitish ... 2. *P. ostreatus*

†† Gills dingy lilaceous-pale ... 2 a. *P. ostreatus* forma

2. Spores ovate.

* Cap thick-fleshed. Gills without cystidia ... 3. *P. pulvinatus*

** Cap thin-fleshed. Cystidia coarse, subulate fusoid (vide no. 9).

b. *Tricholomoidei*. Gills not decurrent.

1. Very large (10—20 cm). Gills broad. Smell slight... 4. *P. ulmarius*

2. Medium. Gills narrow. Smell strong, farinaceous ... 5. *P. lignatilis*

β. *Laterales*. Stem exactly lateral, short, rudimentary or wanting.

a. *Virgulispori*. Spores small and narrow.

1. Stem lateral. Gills white or yellowish.

* Cap medium, olive or purplish. Gills yellowish.

† Cap firm-fleshed, olivaceous or greenish... 6. *P. serotinus*

†† Cap flaccid, with a tinge of livid purplish ... 6 a. *P. serotinus* var. *flaccida*

** Cap small, whitish to pale flesh-colour ... 7. *P. mitis*

(Spores large, cylindric-oblong: vide no. 2).

2. Sessile. Gills bright orange... 8. *P. nidulans*

b. *Ovispori*. Spores ovate or ellipsoid.

1. Upper layer of flesh gelatinous. Cap squarrose ... (*P. mastrucatus*)

2. Not so.

* Cystidia numerous, coarse, subulate-fusoid. Cap medium.

† Solitary... 9. *P. petaloides*

†† Densely fasciculate or branched ... (*P. petaloides* forma)

** No cystidia. Cap small.

† Cap cinereous.

° Growing on wood (sticks, stumps)... 10. *P. acerosus*

°° Growing on the ground... 10 a. *P. acerosus* forma

†† Cap pure white... 11. *P. limpidus*

B. EFFUGIENTES. Very small species. Cap rarely over 1 cm.

α. Pedicellati. Stem distinct, excentric, often incurved.

a. Cap white... .. 12. *P. mutilus*

b. Cap coloured.

1. Cap fuscous, almost even 13. *P. fuscifrons*

(Vide also no. 10, *P. acerosus*).

2. Cap flesh-coloured, radiato-striate 14. *P. roseolus*

β. Resupinati. Stem rudimentary or entirely absent.

a. Cap fusco-cinereous. Flesh somewhat gelatinous.

1. Spores allantoid 15. *P. unguicularis*

2. Spores spheric.

* Cap almost naked 16. *P. applicatus*

** Cap with a black, velutinous coating on the disc... .. 17. *P. rhacodium*

b. Cap whitish or pallid. Flesh not gelatinous.

1. Spores ovate.

* Cap even, white... .. 18. *P. chioneus*

** Cap striate, pallid 19. *P. subplicatus*

(Vide also no. 11, *P. limpidus*).

2. Spores lanceolate... .. 20. *P. pubescens*

SPECIFIC DESCRIPTIONS AND NOTES

A. *Carnosi*

α. Excentrici

a. Clitocyboidei

1. *P. corticatus* Fr. (Plate 62. fig. H.)

Large, fleshy. Cap 6—10 cm, whitish, more or less fibrillose-squamulose with innate, pallid to dirty grayish scales. Gills white, deeply decurrent and anastomosing. Stem generally short and stout, excentric, whitish with a white, membraneous, very fugacious veil, the remnants of which are seen at the edge of the cap and just below the gills.

Spores cylindric-oblong, straight or slightly curved, $11-13 \times 3\frac{1}{2}-3\frac{3}{4} \mu$. Cystidia obovate-clavate, $6-7 \mu$ broad, with a $6-10 \mu$ long, hair-like appendix. Basidia 4-spored.

Not uncommon, chiefly on *Populus*, but also on *Ulmus*, *Fagus*, *Pyrus* etc.

1a. *P. corticatus* var. *tephrotrichus* Fr. (Plate 62. fig. G.)

Differing from the main form by being densely imbricato-squamulose with dark fuscous scales.

Met with on an old *Æsculus*, about 3 m up.

I have never seen any form of *P. corticatus* growing on coniferous trees, to which var. *tephrotrichus* is said to be particularly attached. According to PILÁT *P. dryinus* (Pers.) Fr., *P. pantoleucus* Fr. and *P. pometi* Fr. are not specifically distinct from *P. corticatus*.

2. *P. ostreatus* (Jacq.) Fr. (Plate 63. fig. C.)

Large and rather fleshy. Cap 6—14 cm broad, glabrous, varying in colour from livid to fuscous with a flush of purplish or pigeon-blue. Gills decurrent and anastomosing, pallid, then almost white. Stem of varying length, very excentric or almost lateral, whitish, with a more or less strigose base. Often fasciculate.

Spores cylindric-oblong, $10-11 \times 3\frac{1}{2}-3\frac{3}{4} \mu$. Cystidia short, scattered, their free, about 5μ broad part slightly protruding, obtuse, with a hair-like appendix, which often terminates in a minute head. Basidia 4-spored.

Common on a great number of trees (*Salix*, *Populus*, *Fagus*, even *Picea*); the figured specimens are a pinophilous form. It is a late species, in mild winters to be met with even in January.

2a. *P. ostreatus* forma. (Plate 63. fig. A.)

Differing from the main form by the dingy lilaceous tinge on the gills and by the somewhat pigeon-blue colour of the cap.

Not uncommon. The figured specimens are from a hollow stump of *Fagus*.

When the blue and lilac colours are more pronounced than in the figured specimens we have *P. columbinus* Quél. But neither this form nor *P. salignus* (Pers.) Fr. seem to me to deserve specific rank. The latter is a subsolitary, almost lateral, very short-stemmed form.

3. *P. pulvinatus* (Pers.) Fr. (?) (Plate 65. fig. F.)

Large and firm-fleshy, with an almost lateral stem. Cap 10×8 cm, convex, alutaceous flesh-coloured or subochraceous pallid; centre whitish-pale, very minutely flocculose (sub lente). Gills rather crowded, decurrent, whitish, connected by veins. Stem whitish, stout (2 cm), rather short, with a truncate, subbulbous "root". Flesh white, with a faint sweetish smell. Spore-powder white.

Spores broadly ovate, $5\frac{1}{2}-6 \times 4-4\frac{1}{2} \mu$. Edge of gills with minute, hair-shaped cystidia.

Met with on black, humous, low ground, under *Fagus* and *Sambucus*, in the outskirts of a wood, solitary. Not visibly connected with any roots or buried sticks.

This peculiar Agaric has several traits in common with *P. (Clitocybe) nauseodulcis* Karst., but is only faint-smelling. Its spores, cap-colour and odour reminds one of *Clitocybe geotropa*. PILÁT erroneously refers my plant to *Panus conchatus*, with which it has nothing to do.

b. *Tricholomoidei*

4. *P. ulmarius* (Bull.) Fr. (Plate 64. fig. C. (Gigantic specimen.))

Large or very large. Cap up to 30 cm (generally 10—14 cm), almost flat, alutaceous to dirty ochraceous-isabelline. Gills crowded, broad, rounded towards the stem, transversely striate. Stem excentric or almost central, short, fleshy, curved, subfuscous.

Spores almost spheric, $4\frac{1}{2}$ — $5\frac{1}{2} \times 4\frac{1}{2}$ (or $5\frac{1}{2} \times 4\frac{3}{4}$) μ . Basidia 4-spored.
Rather rare, growing on the trunk of old elms (*Ulmus*).

5. **P. lignatilis** Fr. (Plate 62. fig. F.)

Medium. Cap about 5 cm broad, thin, flat, slightly depressed, with incurved edge, creamy white, surface slightly fibrilloso-floccose. Gills white, narrow, crowded, affixed (decurrent with a minute line). Stem (in the figured, somewhat etiolated specimen) very long, subex-centric, white, somewhat villose-pubescent. Smell strong, of rancid meal.

Spores oval, $4\frac{1}{2} \times 2\frac{1}{2}$ μ . Basidia 4-spored.

Rare. The only specimen I have seen, grew inside a hollow trunk of *Fagus*.

β . Laterales

a. *Virgulispori*

6. **P. serotinus** (Schrad.) Fr. (Plate 64. fig. A.)

Medium. Cap up to 6 cm broad, fleshy, olive-green, edge yellowish, pellicle somewhat viscid, at first minutely plushy tomentose. Gills very narrow and crowded, pale yellow, decurrent on the very short, definitely lateral stem, which is punctato-squamulose with olive-brownish squamules.

Spores very small (5×1 μ), cylindric, slightly curved. Cystidia (on edge and faces of gills) vesiculose-clavate or inflated fusiform, 25 — 30×10 — 15 μ ; contents pale yellowish.

Not uncommon on frondose trees (especially *Alnus*). Oct.-Dec.

6a. **P. serotinus** var. *flaccidus* Lange. (Plate 64. fig. B.)

Cap more thin-fleshed, edge crenulate, surface livid purplish or alutaceous-purplish. Gills at first whitish, then pale yellowish flesh-colour, broader than in the main form.

Contents of cystidia subfuscous.

Rarer than the type. Met with on *Alnus* and *Salix cinerea*.

7. **P. mitis** (Pers.) Fr. (Plate 65. fig. G.)

Small. Cap 1—2 cm, whitish with a tinge of alutaceous or pale flesh-colour; pellicle detachable, subgelatinous. Gills white, very narrow and crowded. Stem obconic, short, squamulose, definitely lateral.

Spores very small (4 — 6×1 — $1\frac{1}{3}$ μ), cylindric, slightly curved.

Common, often very numerous, on fallen branches and sticks of coniferous trees. Late.

8. **P. nidulans** (Pers.) Fr. (*Panus nidulans* (Pers.) Pilát). (Plate 65. fig. D.)

Medium. Cap 2—5 cm, resupinate or lateral, sessile, edge strongly involute. Surface yellowish (when soaked of a deeper orange yellow), clad with a velutinous tomentum. Gills

narrow, somewhat crowded, of a rich and deep orange colour. Spore-powder (when fresh) of a pale dingy flesh-colour.

Spores small, cylindric-irregular, slightly compressed, $5-5\frac{1}{2} \times 2-2\frac{1}{2} \times 1\frac{1}{2}-1\frac{3}{4} \mu$, hyaline. Basidia 4-spored. Edge of gills set with scattered, short, thin, hyphoid hairs.

Rare. On trunks and stumps of *Fagus*, very late in the season (Dec.). The specimens figured were from Låland (leg. F. H. MØLLER).

The somewhat flesh-coloured spore-powder has made some authors transfer this species to *Crepidotus* (*Crepidotus jonquilla* (Lév.) Qué.). Its toughness has induced others to place it in *Panus*. When drying, especially after having been moistened, the spore-print becomes almost hyaline.

b. *Ovispori*

P. mastrucatus Fr.

Cap 2—3 cm (or more), tongue-shaped or semicircular, sessile, mouse-gray or glaucous, tomentose, squarrose with scattered, coarse, horn-brown, prickly scales. Gills pallid grayish, somewhat creamy ochre behind. Upper layer of flesh gelatinous, subfuscous; lower portion whitish.

Spores ellipsoid-ovate, $8-9 \times 5-5\frac{1}{2} \mu$. Cystidia (on edge and faces) $55-70 \times 11-13 \mu$, fusiform, thick-walled, their free portion densely clad with a coating of crystalloid granules.

Rare. Met with by FERDINANDSEN & WINGE on fallen branch (of *Fagus*). Sjælland. 1924. PILÁT (loc. cit.) refers this species to *P. atrocoeruleus* Fr.

9. *P. petaloides* (Bull.) Fr. (sensu Rick.). (Plate 65. fig. E.)

Medium. Cap about 6 cm, thin-fleshed, convex with a strongly involute edge and a deeply infundibuliform depression in the middle, split open on one side right to the stem which is somewhat excentric; colour ochre-hazel-brown or somewhat horn-brown with a faint whitish bloom (from the cystidia). Gills deeply decurrent, crowded, narrow, yellowish white, thin, not anastomosing, detachable. Stem short (about 1 cm), thick, solid, somewhat tough, whitish. Flesh rather tough. Smell mealy. Spore-powder pure white.

Spores broadly ovate, $6 \times 4 \mu$, minutely warty-punctate. Cystidia on edge and face of gills large ($65 \times 12 \mu$), thick-walled, fusoid, subulate, apex often somewhat granulate. Cystidia on surface of cap narrower, almost setulose.

Rare. Met with on an old, decaying stump (of *Fagus*), outskirts of wood.

My plant answers almost completely to the var. *geogenius* (DC.) PILÁT and to *P. semiinfundibuliformis* Karst. FRIES' own description of *P. petaloides* is rather divergent.

P. petaloides forma.

Densely fasciculate, partly conrescent fruit-bodies with deeply decurrent, anastomosing gills. For the rest like the type.

Met with on a heap of sawdust by F. H. MØLLER (Låland 1934).

This probably is *Pleurotus geogenius* (DC.) Fr. in the sense of REA (Transact. Brit. Myc. Society, XII). *P. petaloides* is the only representative known to me of the group *Acanthocystis* (Fayod), characterised by the coarsely subulate cystidia.

10. *P. acerosus* Fr. (Plate 63. fig. D.)

Small. Cap 1—3 cm broad, sub-reniform, horizontal, gray, surface minutely sericeo-fibrillose, edge whitish-tomentose, without striation, but in large specimens somewhat plicato-crenate. Gills narrow, subdistant, dirt-gray. Stem lateral, very short, white, tomentoso-strigose. Flesh submembranaceous (not gelatinous).

Spores ovate, pip-shaped, $6-8$ (or $6\frac{1}{2}-9\frac{1}{2}$) $\times$ $3\frac{3}{4}-4\frac{1}{2}$ μ . Cystidia absent.

Rare. Met with on rotten stumps, attached to the decaying wood or the humus inside.

10a. *P. acerosus* forma (a transition to *P. tremulus*). (Plate 63. fig. B.)

Differing from the main form by the upright, distinct stem, the somewhat infundibuliform cap and the broader gills.

Spores pip-shaped, $6\frac{1}{2}-7\frac{1}{2} \times 3\frac{1}{2}$ μ .

On naked ground, wood of *Fagus*. Only met once.

P. acerosus is rather differently conceived by the mycological authors. REA says the spores are "globose, $4-6 \mu$ ", while RICKEN has "fast lancettlich, $6-7 \times 3-4 \mu$ ". No. 10a probably equals RICKEN'S *P. tremulus*. But FRIES' description of *P. tremulus* (Schaeff.) Fr. is somewhat divergent, and PILÁT reserved the name *P. tremulus* for the round-spored forms. — A smaller, more membranaceous form of *P. acerosus* is occasionally met with on fallen sticks of conifers.

11. *P. limpidus* Fr. (sensu Quél.) (*P. Langei* Pilát). (Plate 65. fig. A.)

Small. Cap $1\frac{1}{2}-4$ cm, linguiform or reniform, plane, almost membranaceous, white, somewhat velutinous. Gills rather crowded, concurrent into a lateral, rudimentary stem, which is velutinous and pure white, while the gills soon become tinged with alutaceous. Spore-powder white.

Spores subspheric-ovate, $4\frac{1}{2}-6 \times 3\frac{3}{4}-4$ μ , with a short pedicel.

Rare. Met with on a very rotten stump (*Fagus*?)

P. limpidus is a very misused name. PILÁT discards it altogether. He has found that most exsiccata under this name are either *Crepidotus mollis* or *Pleurotus ostreatus*, and he takes *P. limpidus*, in the sense of FRIES, as a reduced form of this latter species. But I think Fries' own description forbids such a construction. FRIES describes it as entirely white and says it cannot be confounded with any other species but bears a certain likeness to *P. mitis*. — *P. candidissimus* Pilát is very close, but only half as large.

B. *Effugientes*

α. *Pedicellati*

11. *P. mutilus* Fr. (Plate 79. fig. C.)

Small. Cap 1— $1\frac{1}{2}$ cm broad, generally more or less excentric, white, almost membranaceous. Gills narrow, decurrent, white, at last pale flesh-colour. Stem very short, thin; base somewhat tomentose. Spore-powder with a slight flush of flesh-colour.

Spores ellipsoid or somewhat pip-shaped, varying in different finds from $5\frac{3}{4} \times 3\frac{3}{8} \mu$ to $7 \times 3\frac{3}{4} \mu$. Cystidia absent.

Rare. On grassy road-borders etc.

I formerly referred this tiny species to *Clitopilus cretatus* B. & Br. on account of the slight flesh-coloured tinge of the gills and the spore-print. But as the only real difference between *Clitopilus cretatus* and *Pleurotus mutilus* appears to be this faint pinkish colour, I am inclined to think the difference too slight for upholding two distinct species. (FRIES himself only knew *Clitopilus cretatus* from BERKELEY'S description). It also has some traits in common with the (much larger) *Rhodopaxillus fallax*.

13. *P. fuscifrons* B. & C. (Plate 65. fig. B.)

Minute. Cap 0,4—0,8 cm, subrotund, plane, gray, minutely tomentose. Gills fuscous (darker than the cap), rather distant, adnate to subdecurrent, 1 mm broad. Stem excentric or even almost lateral, curved, thin and short. Flesh membranaceous, not gelatinous.

Spores almost spheric, $4-4\frac{1}{2} \times 3\frac{1}{2}-4 \mu$. Basidia 4-spored.

Rare. Only met once, growing gregariously on the mossy trunk and branches of an old apple-tree.

First described from Cuba. The original description covers my plant exactly, except that the Cuban specimens were a little larger. The distinct stem and the non-gelatinous cap distinguish it from *P. applicatus*, with which it has the colour and the spherical spores in common.

14. *P. roseolus* Quél. (Plate 65. fig. C.)

Very minute. Cap 0,4—0,8 cm broad, 0,4—0,6 cm long, subrotund reniform, incised to the somewhat excentric stem, transparently radiato-striate, pale dingy flesh-colour, disc a little more ochre-brownish. Gills rotundato-adnate, rather crowded, concolorous. Stem almost semicircular, somewhat darker than the cap, and hidden under it, $1\frac{1}{2}$ mm long. Spore-powder creamy white.

Spores oval, $5\frac{1}{2}-6 \times 3\frac{1}{2} \mu$. Cystidia sparse, hair-shaped.

Only met once, in plantations of young *Picea* on dead halm and blades of grass (*Agrostis alba*).

3. Resupinati

15. *P. applicatus* (Batsch) Fr. (Plate 66. fig. B.)

Minute. Cap 0,4—1 cm, resupinate or almost free, dark gray. Gills meeting in a subexcentric point, rather distant, pale gray, edge whitish. Flesh somewhat gelatinous.

Spores almost globate, smooth, $4\frac{1}{2}-5\frac{1}{2} \mu$ diam.

Not common. Growing on rotten, decorticated branches on the ground in deciduous woods.

16. *P. rhacodium* B. & C. (Plate 66. fig. A.)

Minute. Cap 0,5—0,8 cm broad, fastened horizontally to the vertical substratum, almost hoof-shaped or convex, disc covered with a dense, black, strigoso-velutinous tomentum. Gills

dark fuscous (edge paler), somewhat crowded, rather narrow, concurrent in a lateral or very excentric point behind. Flesh gelatinous, fuscous.

Spores spherical, $4\frac{3}{4}$ — $5\frac{1}{2}$ μ diam. Basidia 4-spored.

Rare. On stumps of *Fraxinus* and *Fagus*.

Originally found in N. America by CURTIS. Very close to no. 15, but rather distinct.

17. *P. unguicularis* Fr. (Plate 66. fig. C.)

Very small. Cap 0,5—1,5 cm, at first obliquely campanulate, fastened to the substrate by the upper, narrow part, later expanded, somewhat hoof-shaped, dark fuscous sepia, slightly shining; its base (especially at first) white-pruinose by a minute, adpressed pubescence. Gills concurrent to an excentric point, distant, rather broad, white, then turning grayish. No genuine stem, but the top of the cap is occasionally drawn out. Flesh gelatinous, dark.

Spores cylindric oval, slightly curved, obliquely pedicellate, $8 \times 4\frac{1}{4}$ μ , generally with two minute drops. Basidia about 7 μ broad. The gelatinous flesh is made up of a loose web of thin, 2 μ broad hyphæ. According to F. H. MØLLER the edge of the gills has small, hyaline thin-walled cystidia which are irregularly fusiform or somewhat bottle-shaped, $25-35 \times 7-8$ μ .

Only met once, growing gregariously on the bark of a fallen trunk of *Ulmus* (Sjælland 1932, F. H. MØLLER).

The figure in FRIES' *Icones sel.* is mediocre. *P. silvanus* Sacc. seems to be very close to *P. unguicularis*. The form of my specimens was intermediate between the two.

18. *P. chioneus* Pers. (Fr.). (Plate 66. fig. D.)

Minute. Cap 0,4—1,0 cm broad, hoof-shaped flat, attached to the substratum by the back, white, tomentose-downy. Gills concurrent near the hind edge to a rudimentary stem which forms a minute tubercle behind.

Spores broadly ovate, $7-8 \times 5$ μ . Cystidia hair-shaped.

Not uncommon. Met with on fallen trunks of *Populus* as well as on old deal-boards and on decaying fruit-bodies of *Dædalea gibbosa*.

P. chioneus as described by REA (with pip-shaped, minutely verrucose spores ($5-8 \times 3$ μ)) can hardly belong here.

19. *P. subplicatus* Karst. (Plate 66. fig. E.)

Very minute. Cap 0,4—0,6 cm, dingy whitish (edge striate), hoof-shaped, sessile, more or less resupinate. Gills rather distant, rather broad, whitish.

Spores ovate, $8-10 \times 5\frac{1}{2}$ μ , slightly granulate. Basidia 4-spored. Edge of gills set with long, wavy, thin and slender (2 μ broad) hairs.

Probably not very rare, but easily overlooked, growing in fissures in the bark of divers trees. (The figured specimens grew on *Alnus*).

I formerly referred this tiny little Agaric to *P. striatulus* Fr. But this species is a very dubious one. PILÁT takes it to be a synonym of *P. applicatus*, and this view is born out by KARSTEN'S

description (spores spherical). I therefore have adopted the name *P. subplicatus* for my plant. It is very close to *P. chioneus*, might be regarded as a variety only, distinguished by the striate, not pure white cap.

20. *P. pubescens* (Sow.) Schroet. (Plate 66. fig. F.)

Minute. Cap 0,4—0,9 cm, resupinate, reniform, milk-white, minutely tomentose-pubescent. Gills rather crowded, concurrent in an excentric point, at first milk-white, but soon becoming pale yellowish and at last pallid subochraceous. Stem wanting. Spore-powder creamy white.

Spores obliquely ellipsoid-fusiform or lanceolate pip-shaped, $7-8\frac{1}{2} \times 2\frac{3}{4} \mu$ (or $8-9\frac{1}{2} \times 3-3\frac{1}{4} \mu$). Basidia 4-spored.

Rather common on dead blades of grass, on thatched roofs, dead twigs, even on living foliage (of Geum), often gregarious.

A number of authors call this little *Pleurotus* *P. septicus* Fr., and the *P. septicus* of ROB. FRIES evidently belongs here. But neither REA'S nor KARSTEN'S *P. septicus* has anything to do with it; and BRESADOLA'S probably equals *P. chioneus*. Besides *P. septicus* is generally described as a stipate species, what my plant never is. I therefore prefer the name *P. pubescens* (in the Schroeterian sense). It is often mistaken for a *Claudopus* of the *variabilis*-group on account of its somewhat coloured gills, but is easily recognized by the narrow spores.

PANUS

Cap more or less one-sided. Edge of gills not serrulate. Stem lateral, excentric or entirely absent. Spore-print white. Flesh rather dry, more or less coriaceous, tough. — All species strictly xylophilous.

PANUS is a very large genus. But the great majority of the species are extra-European, subtropical ones. In Denmark it is but poorly represented. And the few Danish species have very little in common, except the toughness of the tissue. Their affinity to *Pleurotus* is very evident, and I therefore place them in the vicinity of this genus, not of *Lentinus*, as done by FRIES.

KEY

TO THE SPECIES FIGURED

- A. Stem more or less excentric or almost central.
 - α . Subsultary. Stem almost central... .. 1. *P. torulosus*
 - β . Fasciculate. Stem very excentric... .. 2. *P. conchatus*
- B. Stem definitely lateral, very short.
 - α . Whole plant pale tan 3. *P. stipticus*
 - β . Whole plant milk-white 3 a. *P. stipticus* var. *albus*

SPECIFIC DESCRIPTIONS AND NOTES

1. *P. torulosus* (Pers.) Fr. (Plate 67. fig. C.)

Cap 5—7 cm, almost regular, soon becoming infundibuliform; colour wood-brown to pale tan (somewhat lilac flesh-colour when young). Gills narrow, rather crowded, decurrent, concolorous. Stem short, cylindric, plushy tomentose with a somewhat lilac (soon discolouring) coating.

Spores ellipsoid, $5\frac{1}{2}$ — $7 \times 3 \mu$. Cystidia irregular, up to 10μ broad, clavate to somewhat bottle-shaped.

Rather rare, on stumps of *Fagus*.

Occasionally a form is met with, in which the young cap is of a clearer lilac flesh-colour and the edge minutely velutinous (hairs erect, hyaline, about 30μ long). This is a transition to *P. rudis* Fr. — The spores in my specimens of this form were slightly smaller ($5 \times 2\frac{1}{2} \mu$).

2. *P. conchatus* Fr. (Plate 67. fig. D.)

Of very different size, forming fascicles of more or less deformed and concrescent fruit-bodies. Individual caps very irregular, wavy-infundibuliform, becoming somewhat squamulose, darker or paler wood-brown. Gills very narrow, often anastomosing. Stems very short, obconical, dilated in the cap. For the rest like no. 1.

Spores ovate ellipsoid, 5 — 6×3 — $3\frac{1}{4} \mu$. Cystidia narrow, clavate or of various shape, 6 — 8μ broad, straight or somewhat meandering.

Rather rare, on stumps of *Fagus* (and *Fraxinus*).

Various authors unite no. 1 and 2, and they are certainly very close; but their habit is very different.

3. *P. stipticus* (Bull.) Fr. (Plate 67. fig. A.)

Cap 1—4 cm broad, convex flat, reniform, pale tan or pallid wood-colour, minutely furfuraceous. Gills very narrow and very crowded, of the same colour or pale cinnamon. Stem whitish, very short ($\frac{1}{2}$ cm), dilated into the edge of the cap. Taste bitter, astringent.

Spores very small, ovate, $3\frac{1}{2}$ — $4\frac{1}{2} \times 2$ — $2\frac{1}{2} \mu$.

Very common, till late in the season, on living stumps of *Betula*, *Quercus* etc.

3a. *P. stipticus* var. *albus* Bres. (Plate 67. fig. E.)

The whole plant devoid of any pigment and consequently entirely milk-white.

Rare. Met with on a stump of *Quercus* (with the main form).

May be mistaken for a *Pleurotus*.

B. RHODOSPORÆ

VOLVARIA

Tissue of cap distinct from that of the stem. Gills free. Young fruit-body inclosed in a universal veil, which, when ruptured, forms a basic volva. Spore-print pinkish or flesh-coloured.

VOLVARIA is one of the most distinct genera in Agaricaceæ. Its nearest ally is the white-spored *Amanitopsis* with which it agrees almost entirely, and in the immediate vicinity of which it is therefore placed by all taxonomists who regard the spore-colour as a character of only secondary importance. *Pluteus*, which is its nearest relative amongst the pink-spored Agarics, is destitute of any trace of a volva.

It is rather remarkable that a genus of such homogeneity shows such diversity with regard to habitat. While *V. speciosa* is subcoprophile, *V. Loveiana* is a mycophile parasite and *V. bombycina* a xylophilous plant (it grows on living trees, but probably as a saprophyte, not as a real parasite). Most other species are ordinary terrestrial fungi, growing in grass, on stubble-fields or on dead foliage.

The microscopical characteristics are rather uniform. The spores are smooth, generally ovate (not globose as in *Amanitopsis*). But they vary considerably in size (from index about 140 to index 25). Cystidia are present in all the species; they are generally large, inflated club-shaped or ventricose. Hooked cystidia like those of *Pluteus cervinus* are never met with, but in some species the body of the cystidium has a hair-like appendix or a bottleneck-like protraction. The basidia seem to be universally 4-spored.

Taxonomy. Volvaria is a rather small genus, the species of which are fairly well distinguished. But the rareness of most of the species is a serious obstacle to the proper and thoroughgoing study of their relation. Only *V. speciosa* is fairly common, most other species may be sought in vain for decades. *V. volvacea* seems to be almost extinct, having disappeared from our hothouses with the tanner's bark in which it grew, but which is now replaced by hotwater-pipes.

Already FRIES divided the genus in two sections: the silky-fibrillose and the viscid. And although the boundary-line is not always clearly visible, I think this arrangement is a natural one.

KEY

TO THE SPECIES FIGURED

- A. VISCIDÆ. Cap distinctly viscid, glabrous.
- α. Large species (cap 7—10 cm broad).
 - a. Cap livid-white, edge quite even... 1. *V. speciosa*
 - b. Cap grayish or subfuscous, edge somewhat striate... 1 a. *V. speciosa* forma
 - β. Rather small species.
 - a. Cap about 3½ cm. Spores large ... 2. *V. media*
 - b. Cap about 1½ cm. Spores small: vide *V. pusilla*.
- B. SERICELLÆ. Cap silky-fibrillose.
- α. Large, xylophilous species ... 3. *V. bombycina*
 - β. Medium to small species.
 - a. Parasitic (on Clitocybe) ... 4. *V. Loveiana*
 - b. Terrestrial.
 - 1. Medium to small species.
 - * Lobes of volva more or less bistre or fuscous.
 - † Cap dingy livid; edge whitish ... 5. *V. Taylora*
 - †† Cap almost pure white, smaller... 6. *V. plumulosa*
 - ** Lobes of volva white. Cap gray ... 7. *V. murinella*
 - 2. Very small. Cap almost membranaceous, 1½—2 cm broad.
 - * Volva about 4-lobed... 8. *V. pusilla*
 - ** Volva 2-lobed... 8 a. *V. pusilla* var. *biloba*

SPECIFIC DESCRIPTIONS AND NOTES

A. Viscidæ

1. *V. speciosa* Fr. (Plate 69. fig. D.)

Large. Cap 7—10 cm broad, obtuse, viscid, pale livid or almost ivory-white; edge even. Gills at first almost pure white. Stem tall.

Spores ovate, 13—18 × 8—10 μ. Cystidia 55—85 × 20—25 μ, inflated, obtuse, ventricose, with or without a short, hair-shaped (2 μ broad) appendix.

Not uncommon, from early summer, in rich soil, around old hot-beds, recently manured land etc.

1 a. *V. speciosa* forma (a transition to *V. gloiocephala* (DC.) Fr.) (Plate 69. fig. D'.)

Cap livid-gray (darker at the disc); edge slightly striate. Volva dingy white. For the rest like the main species and met with in similar places, but less common.

The typical, soot-brown *V. gloiocephala* DC. I have never met. The form here figured is almost too close to *V. speciosa* to be regarded as a distinct species. COOKE's figure of *Volvaria gloiocephala* (Illustrations, pl. 298) is exactly like mine.

2. **V. media** (Schum.) Fr. (Plate 69. fig. B.)

Rather small. Cap about $3\frac{1}{2}$ cm, at last somewhat depressed, ivory whitish, very viscid. Stem rather short (about 4 cm). Volva white.

Spores oval, $11-16 \times 7-8 \mu$. Cystidia inflated ventricose, about $14-24 \mu$ broad, obtuse.

Met with in an open plantation of *Picea*, in grass, border of drive, a single specimen.

Very close to *V. speciosa*, but small and dwarfish. — *V. media* is a very disputed species. The original figure in *Flora Danica* (tab. 1676²) fairly well represents my plant. And probably QUÉLET's *V. media* is identical. But the *V. media* figured by COOKE (Illustrations, pl. 299³) appears to be an entirely different species (with slender stem and prominent umbo); and the *V. media* of REA, a species with small spores ($5-6 \times 4 \mu$), is again something else. ROB. FRIES ascribes spores of medium size ($7-8 \times 4 \mu$) to it.

B. *Sericellæ*

3. **V. bombycina** (Schaeff.) Fr. (Plate 68. fig. E.)

Large. Unexpanded cap about 5 cm high, ovate-campanulate, white, densely silky-fibrillose all over. Volva very large and deep, whitish.

Spores ovate, $7\frac{1}{2}-8\frac{1}{2} \times 5\frac{1}{2} \mu$.

I have only seen a single specimen (young), which grew in the hollow trunk of a living horse-chestnut (*Æsculus*); but it has also been met with on various other frondose trees. G. EBBESEN has collected it on a sawdust-heap.

To judge from descriptions this species can attain very large dimensions.

4. **V. Loveiana** Berk. (Plate 68. fig. B.)

Medium or rather small. Cap 3—7 cm broad, convex, whitish, densely clad with silky fibrils. Stem attenuated upward from the broad, pure white volva, somewhat striate.

Spores ovate-oval, $6 \times 3\frac{3}{4}-4 \mu$. Cystidia inflated fusiform or somewhat bottle-shaped, rather acute (about 60μ long and $10-16 \mu$ broad).

Met with on a decaying *Clitocybe* (*nebularis*?), about 10 fruit-bodies growing together, in a *Betula*-wood.

This is the only species that grows densely gregarious, almost fasciculate. The volva opens with a little round aperture at the top to make way for the cap.

5. **V. Taylori** Berk. (Plate 68. fig. F.)

Rather small. Cap 3—5 cm broad, at first somewhat campanulate, then convex-expanded and slightly umbonate, dingy whitish (somewhat darker, livid argillaceous at the disc), clad with innate, silky fibrils. Stem short, attenuated upward from the 3—5-lobed, on the outside grayish date-brown volva.

Spores broadly ovate, $6\frac{1}{2}$ — $7 \times 5 \mu$. Cystidia inflated, ventricose-cylindric, rather variable in shape, about 60 — 70×20 — 25μ .

Only met once, in a stubble-field (wheat), on clayey soil (a number of specimens).

COOKE (Illustrations, pl. 296) has a very good figure of this species. Some authors (KILLERMANN et al.) take it to be a mere form of *V. volvacea*. But to judge from FRIES' diagnosis and COOKE's illustrations *V. volvacea* is an entirely different plant with soot-brown fibrils all over the cap.

6. *V. plumulosa* (Lasch) Lange. (Plate 68. fig. A.)

Small. Cap $1\frac{1}{2}$ — $3\frac{1}{2}$ cm, almost hemispherical, white, centre slightly dirt-grayish, shining silky fibrillose (at first minutely plumulose). Gills very broad, ventricose, white at first. Stem short (2—3 cm). Volva 4(-3)-lobed, brownish gray on the outside.

Spores broadly oval, 6 — $7 \times 4 \mu$. Basidia 4-spored. Cystidia of various shape, in most cases obtuse, inflated, fusiform-ventricose, about 18μ broad.

Met with on a grassy slope, a number of specimens. (It reappeared three years later on the same spot).

This pretty little species is close to *V. Taylori*, but its colour and stature is more like *V. pusilla*. It is not unlikely that the *V. plumulosa* found by HERPELL in similar localities is identical. (Vide RICKEN, Die Blätterpilze, p. 275).

7. *V. murinella* Quél. (Plate 67. fig. B.)

Small. Cap 4 cm (in a later find only $2\frac{1}{2}$ cm), convex, pale ashy gray, silky fibrillose-felty. Stem rather short, at last somewhat hollow above, whitish, slightly striate, almost glabrous (or somewhat plumulose-pruinose). Volva deeply 2-3-lobed.

Spores obovate-ellipsoid, somewhat pip-shaped, $6\frac{1}{2}$ — $7\frac{1}{2} \times 3\frac{3}{4}$ — 4μ . Cystidia inflated fusiform, obtuse or almost acute, 14 — 17μ broad.

Rare. Met with twice, growing solitary in black garden-soil.

8. *V. pusilla* (Pers.) Quél. (*V. parvula* (Weinm.) Fr.). (Plate 68. fig. C.)

Very small. Cap (when fully expanded) $1\frac{1}{2}$ —2 cm broad, at first obtusely conic-campanulate, then expanded and slightly umbonate, white, silky fibrillose, at last somewhat striate-sulcate at the edge. Gills rather narrow, lanceolate. Stem short, not hollow, white, smooth, sub-diaphanous. Volva rather large, split half way down into about 4 dingy white lobes.

Spores broadly oval or ovate, 6 — $6\frac{1}{4} \mu$. Cystidia obtuse, ventricose or inflated-clavate, 14 — 18μ broad.

Met with on naked, moist ground (drive in park), a number of specimens growing dispersedly.

I place this species in *Sericellæ*, where it seems to me to have its nearest relatives. And although FRIES ranges it among the viscid species, he describes it as "mox sicco". My specimens were almost dry.

8a. *V. pusilla* var. *biloba* Massee. (Plate 68. fig. D.)

Very small. Cap, when expanded, about 2 cm, white, with a small, slightly livid umbo, its surface silky, slightly fibrillose rimose, edge minutely plumulose. Gills narrow, almost lanceolate. Stem (sub lente) minutely plumulose. Volva lax, whitish, small, two-lobed.

Spores ovate-oval, $5\frac{1}{2}$ — $6\frac{1}{2} \times 3\frac{1}{2}$ — $4\ \mu$. Cystidia with a somewhat acute, bottleneck-like protraction.

Rare and solitary. On humus, under frondose trees, moist ground.

This tiny little plant might be referred to *V. hypopithys* Fr.; but this species is said to grow on heaps of dead needles in coniferous woods. Whether it deserves specific rank or not cannot be decided on the evidence of a few finds of solitary specimens.

PLUTEUS

Tissue of cap distinct from that of the stem. Gills free, thin and crowded. No trace of a volva. Spore-print pinkish flesh-colour. Spores broadly ovate to subglobose. Cystidia large, inflated.

PLUTEUS is one of the best defined genera of the whole mushroom-family. While most other fairly large genera are rather heterogeneous, being made up of different series or groups with rather few traits in common, a *Pluteus* is always a *Pluteus* and cannot be mistaken for anything else. From *Volvaria* the genus is clearly distinguished by the total want of a volva. And *Pluteolus*, the genus next in kind in the opposite direction, not only differs from *Pluteus* by having ochraceous, ellipsoid spores, but also by the totally different texture of the gills (lack of inflated cystidia etc.).

Pluteus is a truly xylophilous genus. But while the larger species grow on rotten stumps and trunks (or on sawdust-heaps), the smaller species — such as *P. semibulbosus*, *P. hispidulus* etc. — may also be found growing on the ground (but only where the soil is made up of leaf-mould, peat or other decaying vegetable matter). A practical difficulty to the study of the *Plutei* arises from the circumstance that these fungi in most cases grow singly, so that specimens in different stages of development cannot be compared. Besides the great majority of the species are extremely rare (the only exceptions are *P. cervinus* and *P. nanus*). But nevertheless they are so well characterised that their synonymy is comparatively simple and clear.

Microscopic characteristics. The spores are so uniform in this genus that they are of little value for the identification of the species. Some species have almost globose spores (proportion of long and short diameter, about 5:4), while in others (*P. cervinus* and its relatives) they are oval (diam. 3:2); the difference, however, is but slight. But on the other hand the cystidia are very characteristic. All the species seem to be provided with large, inflated, marginal cystidia; but besides these plain and obtuse cystidia certain species are adorned with another type of cystidia: large, somewhat bottle-shaped ones, crowned

with 2—5 hook- or thorn-like excrescences, which are dispersed on the face of the gill. In other species the marginal cystidia have a shorter or longer hair-shaped appendix. Numerous investigations have convinced me that the shape of the cystidia is a constant character and consequently of great systematic value. Another structural characteristic is even more marked: the different make-up of the epidermal tissue of the cap. Already FRIES divided the genus according to the texture of the cuticle. But being confined to macroscopic investigations FRIES was unable to draw the boundary-lines between the different groups with sufficient exactness. The microscopic examination clearly shows that the whole genus naturally falls into two series: 1) the species in which the cuticle is of a fibrillose texture and 2) those in which it is more or less granulose, being made up of subglobular, detached or more or less cohering cells.

For the taxonomy of the genus these microscopical characteristics are of supreme importance. It seems natural to divide the genus (after the texture of the cap) into two main groups: *Trichodermei* and *Micacei*. In *Trichodermei* the cap varies from almost smooth (or slightly velvety) to rather rough, pilose or squamulose. In the other group (*Micacei*) the cap is sometimes covered with glittering „meal”, while in other species it is smooth and naked, because the globose cells do not fall apart but form a thin, homogeneous, subparenchymatic cuticle. The fibrillose or cellular texture of the cuticle can be ascertained by means of a good pocket-lens, as the reflections from the globose cells make the cuticle of the later type somewhat glittering. Only some few transitional forms are met with, in which the terminal cells of the fibrils are inflated, club-shaped or almost ovate. Such species appear to the naked eye as having a somewhat velvety bloom on the surface of the cap. Next in importance for the taxonomy comes the type of cystidia. The hooked cystidia are strictly confined to the *cervinus*-stirpe within *Trichodermei*. In the *Micacei*-group the species are almost uniform in microscopic structure, and colour here becomes the most important criterium for the different types.

KEY

TO THE SPECIES FIGURED

- A. TRICHODERMEI. Cuticle smooth or pilose-squamulose, made up of filaments.
 - α. *Coronati*. Facial cystidia crowned with 2—5 hooks. Spores broadly oval.
 - a. Cap soot-brown or gray.
 - 1. Cap paler or darker soot-brown, large (6—10 cm) 1. *P. cervinus*
 - 2. Cap glaucous gray, smaller (4—5 cm) 2. *P. salicinus*
 - b. Cap whitish.
 - 1. Cap very large and fleshy (8—15 cm broad) 3. *P. petasatus*

2. Cap smaller (4—7 cm).
 * Cap 5—7 cm, almost glabrous..... 4. *P. pellitus*
 ** Cap about 4 cm; centre with fuscous, fibrillose squamules 4 a. *P. pellitus* forma
3. *Depauperati*. No hooked cystidia. Spores subglobose.
- a. Cap whitish, set with small, dark squamules.
1. Cap 2—4 cm, slightly squamulose.
 * Cap becoming minutely squamulose all over; squamules dirty brownish 5. *P. gracilis*
 ** Cap pilose-squamulose at the disc. Squamules subfuscous.
 † Squamules very minute and dispersed 6. *P. Robertii*
 †† Squamules denser and darker... 6 a. *P. Robertii* forma
2. Cap 1 cm, everywhere densely clad with fuscous, pilose squamules... 7. *P. hispidulus*
- b. Cap coloured, velvety or pruinose.
1. Cap dark umber, velvety. Cystidia without a hair-like appendix.
 * Edge of gills not dark 8. *P. plantus*
 ** Edge of gills fuscous... (P. umbrosus)
2. Cap yellow or gray, somewhat pruinose.
 * Cap gray with a powdery bloom. Small species 9. *P. cinereus*
 ** Cap yellow, pruinose. Medium-sized species... (P. leoninus)
- B. MICACEI. Cuticle smooth or somewhat mealy, formed of subglobose cells. Spores almost spherical.
- α. Cap white, its surface micaceous mealy 10. *P. semibulbosus*
- β. Cap not white.
- a. Cap not bright scarlet or orange.
1. Cap cinereous or glaucous.
 * Cap small (2—3 cm), pale gray; margin translucent, striate 11. *P. Godeyi*
 ** Cap medium (3—5 cm), gray with subfuscous umbo... 12. *P. cinereo-fuscus*
2. Cap soot-brown to cinnamon.
 * Cap with a network of raised, wrinkled ribs 13. *P. phlebophorus*
 ** Cap not distinctly reticulate.
 † Cap soot-brown or bistre.
 ° Stem white 14. *P. nanus*
 °° Stem (and young gills) lemon-yellow 14 a. *P. nanus* var. *lutescens*
 †† Cap cinnamon... 15. *P. chrysophæus*
- b. Cap bright scarlet-orange 16. *P. coccineus*

SPECIFIC DESCRIPTIONS AND NOTES

A. Trichodermei

α. Coronati

1. *P. cervinus* (Schaeff.) Fr. (Plate 69. fig. A.)

Large or rather large. Cap generally 5—8 cm, convex or somewhat bullate, more or less dark soot-brown (edge slightly paler), becoming paler with age, smooth or somewhat innato-fibrillose. Gills originally pure white (as in most other species). Stem rather tall, white, more or less clad with paler or darker fuscous fibrils from base upward (in small specimens often almost glabrous).

Spores broadly oval, mostly $7-7\frac{1}{2} \times 5-5\frac{1}{2} \mu$. Cystidia on edge of gills inflated, obtuse or somewhat pointed, $20-25 \mu$ broad, on the faces bottleshaped-fusoid, about $15-16 \mu$ broad, with 3—4 hooks.

Common, both in summer and late in the autumn, growing (mostly solitary) on stumps, particularly of *Fagus*. But it is also met with on coniferous stumps.

Besides the figured typical *P. cervinus* other distinct forms of this very variable species are met with. A variety with sootbrown-edged gills I have seen growing on a stump of *Abies alba*. This is *P. umbrosus* (Pers.) Bres. (*Fungi Tridentini*, tab. 116), but not *P. umbrosus* in the sense of RICKEN, which is a relative of *P. plantus*. On a big heap of sawdust I have found a very robust form, very much like COOKE'S figure of *P. eximius* Saund. & Sm., except for the lack of the miniate-coloured edge. Finally I have met with a large variety in which the stem was set all over with black, woolly squamules, after the manner of *Boletus scaber*, but coarser. This form may deserve a varietal name (var. *scaber*).

2. *P. salicinus* (Pers.) Fr. (Plate 69. fig. C.)

Medium. Cap 4—5 cm, glaucous gray with a small, darker fuscous umbo, which is slightly squamulose. Stem slender, almost white. For the rest like no. 1.

Spores broadly oval, $8 \times 5\frac{1}{2} \mu$. Cystidia on edge inflated clavate, $16-18 \mu$ broad, on face of gills fusoid bottle-shaped, with hooks. Filaments on umbo 12μ broad, formed of elongated cylindrical cells.

Rather rare. Met with on willow (*Salix caprea*), but also on beech (*Fagus*).

P. salicinus in the sense of RICKEN does not belong here, but to **Depauperati*.

3. *P. petasatus* Fr. (Plate 70. fig. C and C'.)

Very large and fleshy. Cap 8—15 cm broad, convex, whitish, more or less grayish in the middle and slightly squamulose. (When scorched by the sun the entire surface becomes sub-fuscous and disrupted into somewhat coarser scales). The very broad gills remain white for a long time, but slowly turn very pale flesh-colour. Stem solid, rather robust, white, somewhat sulcate towards the base.

Spores broadly oval, $7\frac{1}{2}-9 \times 4\frac{1}{2}-5 \mu$ (or $7\frac{1}{4} \times 5 \mu$). Cystidia on face of gills fusoid

bottle-shaped, 11—14 μ broad, with some few small hooks, on the edge obtuse, inflated. Filaments on umbo about 8—10 μ broad.

Met with exclusively on deep heaps of old sawdust, often gregarious or even subfasciculate.

Plate 70, fig. C¹ depicts the sun-scorched, scaly form, which, to judge from KALCHBRENNER'S figure, equals *P. patricius* Schulz. — FRIES' diagnosis of *P. petasatus* differs somewhat from mine, particularly in giving it a somewhat striate cap.

4. *P. pellitus* (Pers.) Fr. (Plate 70. fig. A.)

Medium. Cap 5—7 cm, convex or slightly gibbous, white to pale ivory. Gills rather bright flesh-colour. Stem white, glabrous.

Spores broadly ovate, 6—7 $\times$ 4—5 μ . Cystidia on face of gills subfusoid, hooked, on the edge inflated, obtuse, somewhat club-shaped.

Rather rare, always found on stumps of *Fagus*.

Not clearly distinguished from pallid forms of *P. cervinus*.

4a. *P. pellitus* forma. (Plate 72. fig. H.)

A slender and rather small form (cap about 4 cm), the white cuticle everywhere sparingly clad with very minute, dark fibrils which on the disc become denser and form small, fibrillose, erect squamules.

Spores subrotund oval, 7½ $\times$ 5½ μ . Cystidia as in the main form.

This form grew on the ground under old beech-trees (*Fagus*).

It has some traits in common with *P. Robertii*; in fact *P. Robertii* in the sense of RICKEN appears to be identical.

β . Depauperati

5. *P. gracilis* (Bres.) Lange. (*P. pellitus* var. *gracilis* Bres.). (Plate 71. fig. E.)

Rather small. Cap 2—3 cm, campanulate-convex, at first whitish, then everywhere minutely and densely squamulose. Squamules dirty brownish, especially towards the edge. Gills whitish, then pale flesh-colour. Stem 3—4 cm $\times$ 3—4 mm, striate and plumulose-pruinose, becoming brownish like the cap.

Spores oval-globate, 6½—7 $\times$ 5½—6 μ . Cystidia clavate or (rarely) subfusiform, about 18 μ broad. The cuticle is made up of coarse fibrils, the terminal cells of which are cylindrical or somewhat inflated (90 $\times$ 18 μ).

Only met with once, growing (some few specimens) in the head of pollarded poplar (*Populus*).

6. *P. Robertii* Fr. (Plate 71. fig. A.)

Rather small. Cap about 2 cm, strongly convex, whitish, thinly clad with minute, grayish fibrils (denser and somewhat darker fuscous towards the middle). Stem short, incurved, whitish, slightly bulbous at the base.

Spores ovate-globose, $6\frac{1}{2}$ — $5\frac{1}{2}$ — $6\ \mu$.

Met with once, growing solitary on a stump (of *Fagus*).

6 a. *P. Robertii* forma (Plate 71. fig. B.)

Very small. Cap somewhat campanulate, about 1.2 cm broad, more densely fibrillose and somewhat darker fuscous than in the main form. Stem pure white, slightly plumulose.

Spores oval-globose, 7 — 8×6 — $7\ \mu$. Cystidia inflated, 14 — $16\ \mu$ broad.

Only met with once, growing on a twig (in frondose wood).

It forms a transition to *P. hispidulus*.

7. *P. hispidulus* Fr. (Plate 70. fig. B.)

Very small. Cap about 1 cm, campanulate-convex, densely pilose-squamulose (fibrillose towards the edge); squamules and fibrils blackish gray on a whitish ground. Gills broad. Stem slender (about $3\text{ cm} \times 1\text{ mm}$), white.

Spores almost globular, $5\frac{1}{2}$ — 7×5 — $5\frac{3}{4}\ \mu$. Cystidia inflated club-shaped, 13 — $16\ \mu$ broad.

Only met with once, on the ground in a copse, on leaf-mould.

8. *P. plautus* (Weinm.) Fr. (Plate 71. fig. H.)

Medium to rather small. Cap about 3 cm, subumbonate, somewhat radiately veined, soot-brown, everywhere velvety pruinose. Stem striate, whitish, but clad from base upward with a subvelutinous coating of fuscous, downy squamules.

Spores oval-subglobose, 7 — $8\frac{1}{2} \times 6$ — $7\ \mu$. Cystidia fusoid ventricose, without hooks, 16 — $24\ \mu$ broad. The filaments on the surface of the cap are obtuse, inflated-cylindric, 14 — $24\ \mu$ broad, with pale fuscous-brownish contents.

Rare, chiefly on conifers.

P. umbrosus (Pers.) Fr. (sensu Ricken).

Medium. Cap about 4 cm broad, soot-brown, somewhat velutinous, veined-rugulose. Stem subfuscous (darkest below), subvelutinous. Gills' edge distinctly fuliginous.

Spores ovate-globose, $5\frac{1}{2}$ — 6×4 — $5\ \mu$. Cystidia on edge of gills fusoid-vesiculose, 15 — $25\ \mu$ broad, contents yellowish brown.

Rare. Met with on stumps of *Populus* and other frondose trees.

This species, which is very close to *P. plautus*, must not be confounded with *P. umbrosus* in the sense of BRESADOLA (Iconographia, pl. 535), which is a relative of *P. cervinus*.

9. *P. cinereus* Quél. (Plate 71. fig. D.)

Small. Cap $1\frac{1}{2}$ — $1\frac{3}{4}$ cm, somewhat campanulate or expanded-subumbonate, wrinkled-lacunose from the disc out, of a dull, rather dark gray colour. Stem straight, ashy gray, everywhere covered with white, furfuraceous down.

Spores subglobose-oval, $7 \times 5\frac{1}{4}\ \mu$. Cystidia inflated, with or without a hair-like appendix

of varying length. Cuticular cells inflated and obtusely fusiform (varying from almost cylindrical to somewhat lemon-shaped), $15-18\ \mu$ broad.

Rather rare and solitary. Met with on stumps (*Fagus*) as well as on the ground (rubbish-heaps, peaty soil in copse etc.).

P. cyanopus Quél in the sense of BRESADOLA seems to be almost identical.

P. leoninus (Schaeff.) Fr.

Medium. Cap 4—6 cm, convex, slightly umbonate, of a deep yellow colour, somewhat pruinose, edge minutely striate. Gills occasionally edged with yellow. Stem thin and fibrous, pale yellowish, base white-hairy.

Spores subglobose, $6\frac{1}{4}-7\frac{1}{2} \times 5-6\ \mu$. Marginal cystidia more or less inflated ($7-22\ \mu$ broad), generally with a hair-shaped or bottleneck-like appendix, more rarely obtuse. Cuticle of cap made up of coarse, septate hyphae, the terminal cells of which are more or less inflated, lanceolate.

Rare. Met with in Møen and Låland (F. H. MØLLER and G. EBBESEN) on *Fagus* and *Betula*.

Easily distinguished from the other yellow and orange-coloured *Plutei* by the character of its cuticular tissue.

B. *Micacei*

10. *P. semibulbosus* (Lasch) Fr. (Plate 71. fig. C.)

Small. Cap $1\frac{1}{2}-1\frac{3}{4}$ cm, somewhat campanulate, white, everywhere radiately wrinkled and covered with white, micaceous "meal". Stem white, plumulose.

Spores ovate-subglobose, $6-7 \times 5-5\frac{1}{2}\ \mu$. Cystidia obtuse, elongated cylindrical, very prominent, total length $75 \times 115\ \mu$, $13-14\ \mu$ broad. Cells on surface of cap subglobose, $25-35\ \mu$ diam.

Only seen once, in copse (*Fagus*, *Populus*), growing on the ground.

11. *P. Godeyi* Gill. (Plate 71. fig. F.)

Rather small to small. Cap $1\frac{3}{4}-3\frac{1}{2}$ cm, convex and subumbonate, pale gray, with translucidly striate edge. Stem white, minutely striate-fibrillose.

Spores subglobose-ovate, $7\frac{1}{2} \times 6\ \mu$. Cystidia subovate or inflated club-shaped to inflated fusiform, $12-25\ \mu$ broad. Cuticular cells subglobose.

Rather rare. Met with in several places, always growing on the ground in frondose woods of divers trees.

The somewhat translucent, striate edge distinguishes this species from the other species of the group. The figured specimens are rather small.

12. *P. cinereo-fuscus* Lange. (Plate 71. fig. G.)

Medium. Cap 3—5 cm, at first somewhat campanulate, then expanded and umbonate,

glaucous gray (umbo darker), slightly striate-rugulose at the edge, sub lente micaceous powdery. Stem rather tall (6—8 cm), about 0.6 cm broad, hollow, white, naked, slightly silky-striate.

Spores subglobose-oval, averaging $8-8\frac{1}{2} \times 6-6\frac{1}{4} \mu$. Cystidia on face and edge of gills rather obtuse, inflated fusiform or ellipsoid, $12-13 \mu$ broad. Cuticular cells globular, sub-fuscous, $35-50 \mu$ diam.

Rather rare (but often several fruit-bodies together) in deep leaf-mould in frondose woods.

P. nanus var. *major* COOKE (Illustrations, pl. 305 c) is undoubtedly identical. But it seems to me to deserve specific rank and is at any rate far from *P. nanus*, while it has more in common with large specimens of the preceding species.

13. *P. phlebophorus* (Dittm.) Fr. (Plate 72. fig. E.)

Rather small. Cap about 2 cm broad, expanded subumbonate, umber (paler brown towards the edge), surface everywhere (but particularly in the middle) densely reticulate-venose by furcate, wrinkled, elevated ribs which towards the edge become almost effaced. Stem glabrous, hollow, whitish.

Spores almost globose, $5-5\frac{1}{2} \times 4\frac{1}{2}-5 \mu$. Cystidia inflated, cylindric to broadly bottle-necked, about 18μ broad (on the face of the gills), more variable on the edge. Cuticular cells globate, $20-45 \mu$ diam., with pale brownish contents.

Rare. Some few specimens seen growing together on wet, peaty ground in a wood of *Betula* etc.

14. *P. nanus* (Pers.) Fr. (Plate 72. fig. G.)

Rather small to small. Cap $1\frac{1}{2}-3$ cm, expanded and slightly umbonate, soot-brown of a paler or darker shade, almost glabrous. Stem white, glabrous.

Spores almost spherical, $7-7\frac{1}{2} \times 6-6\frac{1}{2} \mu$. Cystidia cylindric-vesiculose, $11-25 \mu$ broad. Cuticular cells globular.

Rather common, but generally solitary, as well on rotten stumps as on the ground. Terrestrial specimens are often very small.

14a. *P. nanus* var. *lutescens* Fr. (Plate 72. fig. F.)

Rather small. Cap 2—3 cm, subumbonate, almost bistre or dark bay. Gills, when young, pale sulphur. Stem with a flush of lemon-yellow from below up.

Spores almost spherical, $6\frac{1}{2}-7 \times 5\frac{1}{2}-6 \mu$. Cystidia cylindric vesiculose, $11-25 \mu$ broad. Cuticular cells globular, $30-45 \mu$ diam.

Not uncommon on old stumps and pollarded trunks of poplars (*Populus*).

15. *P. chrysophæus* (Schaeff.) Fr. (Plate 72. fig. D.)

Rather small. Cap about $2\frac{1}{2}$ cm, convex-flat, somewhat yellowish cinnamon brown, edge minutely striate, slightly wrinkled at the disc. Stem whitish, slightly flushed with pale ochre below.

Spores almost globose, $6\frac{1}{2} \times 5\frac{1}{2} \mu$. Cystidia obtusely bottle-shaped fusiform, inflated. Cuticular cells subrotund, mutually cohering, about 30μ broad, with yellowish contents.

Rare and solitary. On stumps, chiefly of *Fagus* (but also of *Populus*).

16. *P. coccineus* (Cooke) Masee. (*P. calocephus* Atk.). (Plate 72. fig. C.)

Medium to rather small. Cap $2\frac{1}{2}$ — $3\frac{1}{2}$ cm, convex, bright orange-scarlet (edge orange, minutely striate). Stem white above, flushed with pale orange-yellow from base up.

Spores oval-globose, $5\frac{1}{2} \times 4$ — $4\frac{1}{2} \mu$. Cystidia on edge of gills inflated vesiculose, either almost globose or somewhat club-shaped, 15 — 25μ broad. Cuticular cells spherical, 25 — 40μ diam.; contents orange yellow.

Rare. On stump of Elm (*Ulmus*) at Krabbesholm in Jylland (1917 and later years).

This beautiful species (very well figured by COOKE (Illustrations, pl. 421)) is rare, but widely distributed. It is described from U. S. A. sub nom. *P. calocephus* Atk. and I have seen it in the Adirondacks (N. York). COOKE called it *P. leoninus* var. *coccineus*. But there is no reason for reducing this striking plant to varietal rank. Besides, the true *P. leoninus* belongs to **Trichodermei*. The delicate little *P. admirabilis* Peck (with orange-yellow cap and slightly hollow, thin stem) is very close to *P. coccineus* (and grew in the same wood in the Adirondacks), but has not yet been met on this side of the Atlantic.

RHODOPHYLLUS

Tissue of cap not distinct from that of the stem. Veil absent. Spore-powder flesh-coloured or dingy pink. Spores polyhedrous; their outline ellipsoid to almost spherical.

The genus *RHODOPHYLLUS* was created by QUÉLET to comprise the Friesian pink-spored subgenera: *Entoloma*, *Nolanea* etc. with conrescent tissue in cap and stem. And he was undoubtedly right in so doing. While the corresponding white-spored Friesian subgenera: *Tricholoma*, *Mycena* etc. are wide apart, not only in habit, but more especially with regard to their anatomical traits, the pink-spored ones, even when differing markedly in form and stature, have all the same type of spores, basidia etc. as a clear evidence of their intimate relationship.

Although the subgenera of *Rhodophyllus* differ considerably in habit all the species have a good many traits in common, so that a *Rhodophyllus* is generally easy to identify, even before its gills begin to turn pinkish. The cap of the larger species is mostly thin-fleshed, their stem more fibrous than pulpy (as in many *Tricholomas*). The gills are very rarely thin and crowded, nearly always somewhat hyaline, white to grayish, and the cuticle of the cap is inconspicuous, rarely adorned with distinct scales or a hairy coating.

Microscopic characters. The spore in the true *Rhodophylli* is alway more or less acutely polyhedrous or wavy-nodulose and comparatively large (index rarely below 50). But three fairly distinct types of spore can be distinguished: the heterodiametric, the subrotund and the substellate one. The spore of the first group (to which the *Leptonidei* of

Entoloma, all the *Leptonias* and the majority of the *Noleaneas* and *Eccilias* belong) is characterised by an ovate or ellipsoid circumference. The second (comprising *Nolanidei* and *Genuini* of *Entoloma* besides some few species of *Nolanea* and *Eccilia*) has spores with an almost circular outline. And finally the substellate spore (varying from almost quadrangular to cruciate-stellate) is met with in some few *Noleaneas* of the *N. staurospora*-group. Cystidia are comparatively rare and when present they are generally very plain and inconspicuous, hair-shaped or subcylindric. The basidia in this genus are of a very distinct type: large, very prominent, inflated, broadest a little below the apex which is crowned with rather coarse, corniform sterigmata. Four-spored basidia are the rule, but *R. (Nolanea) cetratus* seems to be constantly 2-spored, and in a few other species the number varies from 2 to 4, even on the same gill.

Taxonomy. With the exception of *Clitopilus* the Friesian subgenera can be left almost intact. But *Clitopilus* will not hold together. Some of its species do not at all represent the ordinary *Rhodophyllus*-type, but have smooth or quite small spores. Such species (*C. prunulus*, *C. mundulus*, *C. popinalis*) may probably find their proper place within the boundaries of the genus *Paxillus*. And all the other Danish species are so small and membranaceous that they without difficulty can be removed to *Eccilia*. Thus the subgenus *Clitopilus* might be disbanded altogether, if it were not for such species as the North-American *C. abortivus* B. & C., which has spores of the *Leptonidei*-type, but is far too large and fleshy to be regarded as an *Eccilia*.

The rather numerous species are almost too intimately related to deserve specific rank. This is especially true of the species of the *Nolanidei*-tribe of *Entoloma*. From *E. clypeatum* through *E. rhodopolium*, *nidosum* etc. to *E. speculum* all the species form a chain of almost imperceptible links. But also in *Leptonia* and *Nolanea* some of the "species" might just as well be regarded as forms or varieties, their only notable differences being shades of colour or shape of gills.

KEY

TO THE SPECIES FIGURED

I. ENTOLOMA

Somewhat fleshy, rather large species with emarginate gills.

- A. OVISPORI (*Leptonidei* Fr.). Spores heterodiametric. Cap not hygrophanous, more or less flocculose or fibrillose, dry.
- α. Stem bluish fuscous, everywhere with darker, minute, flocculose scales 1. *R. dichrous*
 - β. Stem fibrillose.
 - a. Cap campanulate, umbonate.
 - 1. Gills whitish when young. Stem subfuscous with dingy purplish-rubrescent fibrils... 2. *R. porphyrophæus*

2. Gills of a dirty gray colour. No trace of red on the stem ... 3. *R. jubatus*
- b. Cap convex or slightly depressed. Stem lilac-gray.
1. Cap not depressed in the middle ... 4. *R. griseo-cyaneus*
2. Cap depressed ... 4 a. *R. griseo-cyaneus* forma
- B. SUBSPHÆROSPORI. Spores isodiametric. Cap smooth.
- α. *Genuini* Fr. Cap not hygrophanous, subviscid.
- a. Cap dark blue or fuliginous.
1. Cap campanulate, dark indigo-blue with a silky lustre ... 5. *R. nitidus*
2. Cap obtuse, fuliginous, rather small (3 cm) ... 6. *R. Batschianus*
- b. Cap whitish or alutaceous, no trace of blue.
1. Not umbonate. Cap very large (up to 20 cm). Gills yellowish when young ... 7. *R. lividus*
2. More or less umbonate. Cap smaller. Gills not yellowish.
- * Cap convex, umbonate, medium (5—8 cm) ... 8. *R. prunuloides*
- ** Cap conic-campanulate, rather small (3—4 cm) ... 9. *R. repandus*
- β. *Nolanidei* Fr. Cap hygrophanous.
- a. Large species (cap 5—10 cm).
1. Cap umbonate, rather fleshy, dirty gray, shaded with darker gray ... 10. *R. clypeatus*
2. Cap obsoletely umbonate, hyaline-grayish, fading to alutaceous-whitish ... 11. *R. rhodopolius*
- b. Smaller species.
1. Cap conic expanding, pale tan. Stem tall ... 12. *R. turbidus* forma
2. Not so.
- * Cap whitish ... 13. *R. speculum*
- ** Cap gray, brown or fuliginous.
- † Cap striate when fresh (not silky), gray or dirty brown.
- ° Gills whitish, moderately broad.
- ^ Small and dwarfish. Cap about 2 cm, radiato-striate ... 14. *R. radiatus*
- ** Medium (cap 3—6 cm).
- Umbonate ... 15. *R. majalis*
- Not umbonate ... (*R. nidorosus*)
- °° Gills gray, very broad. Stem tall ... 16. *R. Cordæ*
- †† Cap not striate, fuliginous or roe-brown.
- ° Cap fuliginous. Stem stout. Smell faint ... 17. *R. costatus*
- °° Cap umber to roe-brown. Stem less stout. Smell farinaceous ... 18. *R. sericeus*

II. LEPTONIA

Rather small species with a cartilaginous stem and an obtuse, fibrillose squamulose cap with incurved edge.

- A. Edge of gills black or dark blue.
 - α. Edge of gills blue. Growing on stumps... 19. *R. euchrous*
 - β. Edge black. Growing on the ground ... 20. *R. serrulatus*
- B. Edge of gills concolorous.
 - α. Stem not yellow or white.
 - a. Gills at first pure white. Stem dark blue.
 - 1. Cap sepia-brown, squamulose ... 21. *R. placidus*
 - 2. Cap blackish blue, velvety-flocculose on disc ... 22. *R. lampropus*
 - b. Young gills bluish or dirty grayish.
 - 1. Gills at first bluish. Stem blackish blue ... 23. *R. cyanulus*
 - 2. Gills dirty grayish. Stem glaucous or brownish... 24. *R. asprellus*
 - β. Stem yellow or white.
 - a. Stem yellow, turning greenish coerulean when touched ... 25. *R. euchlorus*
 - b. Stem white. Cap whitish, alutaceous or slightly flushed with ochre ... 26. *R. sericellus*

III. NOLANEA

Rather small species with a cartilaginous stem and a glabrous, somewhat striate, more or less papillate, straight-edged cap.

- A. Spores 4-(5-)angular, stellate or almost cruciate.
 - α. Cap large (2—4 cm) ... 27. *R. staurosporus*
 - β. Cap small (1—1½ cm)... 28. *R. xylophilus*
- B. Spores not quadrangular-stellate.
 - α. Spores heterodiametric (subovate).
 - a. Basidia 2-spored. Whole plant with a tinge of ochraceous ... 29. *R. cetratus*
 - b. Basidia 4-spored.
 - 1. Plant not yellowish or pallid.
 - * Rather large and tall (stem 8—11 cm) ... 30. *R. hirtipes*
 - ** Smaller (stem less than 7 cm).
 - † Gills pure white when young ... 31. *R. infula*
 - †† Gills fuscous or pale umber.
 - ° Cap glabrous, 1½—2 cm.
 - ^ Cap papillate. Stem rigid, polished. Gills not thick 32. *R. papillatus*
 - ** Stem short, not shining. Gills thick ... 33. *R. clandestinus*
 - °° Cap minutely fibrillose (less than 1 cm) ... 34. *R. fumosellus*
 - 2. Plant yellowish or pallid.
 - * Cap yellowish. Smell of ananas.

- † Stem yellowish, rather short ... 35. *R. icterinus*
- †† Stem whitish, slender ... 35 a. *R. icterinus* forma
- ** Cap pallid, very small... 36. *R. minutus*
- β. Spores isodiametric (subglobose-angular).
 - a. Cap and stem not bluish.
 - 1. Cap fuscous, radiato-striate. Gills somewhat fuscous brown... 37. *R. junceus*
 - 2. Cap pallid. Gills whitish (vide no. 36).
 - a. Cap and stem with a glaucous tinge... 38. *R. coelestinus*

IV. ECCILIA

Rather small species with a depressed or umbilicate cap and somewhat decurrent gills.

- A. Spores heterodiametric (subovate).
 - α. Whole plant white or alutaceous.
 - a. Stem slender. Cap convex, subdepressed. Gills subdecurrent... 39. *R. carneo-albus*
 - b. Stem rather short. Cap convex-umbilicate. Gills decurrent... 40. *R. cancrinus*
 - β. Cap brownish or subfuscous.
 - a. Stem short, not cartilaginous.
 - 1. Cap 2—3 cm, dirty gray or brownish ... 41. *R. undatus*
 - 2. Cap 1—1½ cm, pallid gray with a silky lustre ... 41 a. *R. undatus* var. *pusillus*
 - b. Stem rather tall (twice diameter of cap or more).
 - 1. Cap squamulose-tomentose. Stem fibrillose... 42. *R. Mougeotii* forma
 - 2. Cap smooth. Stem polished, glabrous.
 - * Cap about 2 cm. Gills slightly decurrent.
 - † Stem glaucous ... 43. *R. griseo-rubellus*
 - †† Stem pallid... 43 a. *R. griseo-rubellus* forma
 - ** Cap 1 cm or less. Gills narrow, strongly decurrent... 44. *R. nigrellus*
 - B. Spores isodiametric (subspheric).
 - α. Gills dirty brownish. Cap umber or soot-brown... 45. *R. rusticoides*
 - β. Gills whitish. Cap pallid with dirty grayish, coarse striæ ... 46. *R. rhodocylix*
 (Spores very small (about 5 µ diam), almost spheric: vide *Paxillus* (*Clitopilus*) *popinalis*).

V. CLAUDOPUS

Small species with an excentric or lateral stem.

- Cap reniform, dirty gray; paler and silky when dry. Stem very short... 47. *R. byssisedus*

SPECIFIC DESCRIPTIONS AND NOTES

I. ENTOLOMA

A. *Ovispori*

(Leptonidei)

1. **R. dichrous** (Pers.) Quél. (Plate 72. fig. A.)

Cap 4—5 cm, with a broad but low umbo, dark fuscous, minutely squamulose and darker at the disc, somewhat fibrillose-subsquamulose towards the edge. Gills at first pallid. Stem subbulbous, everywhere sparsely set with minute, down-like, blackish squamules on a dark violaceous-gray, silky fibrillose ground. Flesh in cap grayish, in stem pale steel-bluish. Smell slight, sweetish.

Spores obtusely angular, outline oval, $9-10\frac{1}{2} \times 6\frac{1}{2}-7\ \mu$. Sterile marginal cells cylindric-hairshaped, about $6-7\ \mu$ broad. The down on the stem is made up of cylindric, up to $9\ \mu$ thick cells with glaucous contents.

Rare and solitary. Met with in grass in frondose woods (chiefly *Quercus*).

Besides the figured form I have seen specimens of a more slender type. The species figured by FRIES in *Icones sel.* (pl. 97¹) sub nom. *Leptonia placida* is very much like my plant.

2. **R. porphyrophæus** (Fr.) Lange. (*Entoloma subrubens* Karst.). (Plate 73. fig. D.)

Cap 3—7—(9) cm, convex, with a rather prominent, somewhat acute umbo. The surface is fibrillose-plumulose-tomentose, grayish brown with a flush of flesh-colour. Gills originally white. Stem rather tall, attenuated upwards, fibrillose-striate and slightly plumulose, almost concolorous, but with a more marked tinge of purplish pink; base white.

Spores somewhat nodulose, outline oval or ovate, about $10-12 \times 6\ \mu$. Cystidia on edge of gills inflated, somewhat bottle-necked and occasionally with a round head, up to $22\ \mu$ broad.

Rare. Seems to be confined to meadow-land in the outskirts of frondose woods.

The difference between the descriptions of *Entoloma porphyrophæum* Fries and *E. subrubens* Karst. seems to me to be too slight to keep the two species apart. But KARSTEN'S form is more distinguished and very well represented by my figures. FRIES placed *E. porphyrophæum* in **Genuini*, but it is closely related to *E. jubatum*, and the spores also indicate its proper place to be in **Leptonidei*. The figures in COOKE'S *Illustrations* (pl. 317), said to represent *E. jubatum*, evidently depict *R. porphyrophæus*.

3. **R. jubatus** (Fr.) Quél. (Plate 72. fig. B.)

Cap 2—3 $\frac{1}{2}$ cm, conic-convex, with a small, rather acute umbo, brownish gray or mouse-colour, tomentose-fibrillose. Gills brownish-gray. Stem attenuated upward, concolorous but paler, whitish towards the base.

Spores nodulose-angular, outline oval, base obliquely pedicellate, $9-10\frac{1}{2} \times 5\frac{1}{2}-6\ \mu$.

Rather rare, in mossy meadow-land.

Smaller and more dull gray than no. 2. Best characterised by the dark, subfuscous gills. The figures in BRESADOLA'S *Iconographia* are misleading (too pale).

4. **R. griseo-cyaneus** (Fr.) Quél. (Plate 73. fig. C.)

Cap 2—3½ cm, strongly convex, then expanded, obsoletely umbonate, of a lilaceous-gray colour, at first almost even, then minutely plumulose-squamulose, at last subrimose. Gills originally white. Stem rather slender and thin, minutely fibrillose, whitish pale above, flushed with dingy lilac from base upward, with fibrous, not cartilaginous flesh.

Spores ovate, outline irregularly nodulose, 9½—11 × 6½—7½ μ . The gill-edge has no sterile, hair-shaped cells.

Rather rare, in small flocks, on grassy meadow-slopes and hill-sides.

4a. **R. griseo-cyaneus** forma. (Plate 73. fig. E.)

Cap convex, slightly depressed at the disc, a little more tomentose squamulose. Gills almost plano-adnate. For the rest like the main form.

Spores irregularly wavy-nodulose, 9½—11 × 7—8 μ .

Met with in a swamp amongst Hypna, Carices etc., gregarious.

This variety of *R. griseo-cyaneus* forms a transition to *R. (Eccilia) Mougeotii*, and is figured and described by BRESADOLA (Iconographia, pl. 549) sub nom. *Entoloma ardosiacum* (Bull.) Quél. (nec Fries) which some authors regard as a synonym to *Eccilia Mougeotii*.

B. *Subsphaerospori*

a. *Genuini*

5. **R. nitidus** Quél. (*Entoloma ardosiacum* Fr. (nec Bull.)). (Plate 74. fig. A.)

Cap 2½—5½ cm, somewhat conical, then expanded, with an obtuse or somewhat acute umbo, dark indigo-violaceous, with a silky lustre, when old fading to a somewhat fuscous lilaceous. Gills originally whitish. Stem comparatively slender, slightly fusiform, fibroso-striate, concolorous; rooting base whitish.

Spores almost globose, indistinctly 5-(6-)angular, about 7 μ diam.

Only met with once, growing gregariously on the ground under Betulas amongst ferns etc.

FRIES' figure of this elegant species (Icones sel., pl. 94⁴) is excellent. But as Bulliard's *Agaricus ardosiacus* is a different plant altogether, the name *R. nitidus* Quél. is generally preferred. BRESADOLA'S figure of *R. nitidus* is somewhat dubious.

6. **R. Batschianus** (Fr.) Lange. (Plate 76. fig. E.)

Cap 1½—3 cm broad, plano-convex, then slightly depressed, fuliginous, edge somewhat paler and minutely striate, subviscid. Gills rather crowded, adnate (slightly rotundate), dirty white. Stem slender (5—8 cm × 2—4 mm), pale, with a tinge of amber, minutely silky-fibrillose. Spore-print very pale flesh-colour.

Spores almost globose, indistinctly angular, 6½—7½ × 5¾—6½ μ . Cystidia absent.

Rather rare. Growing in moss in woods of *Picea*.

The thin stem and small cap, which becomes depressed (with slightly descendent gills) when old, gives it a somewhat *Eccilioid* appearance.

7. *R. lividus* (Bull.) Quél. (Plate 74. fig. C.)

Cap 7—12 cm, comparatively fleshy, convex-expanded or somewhat gibbous, ivory-yellow or alutaceous, subviscid. Gills yellowish when young. Stem firm, white. Smell faint (of meal or cucumber).

Spores subspheric, obtusely 5-(6-)angular, $7\frac{1}{2}$ —10 μ diam.

Rather rare. Growing on moist ground (clayey soil), in open spaces in frondose woods (chiefly *Quercus*).

Like SCHROETER (loc. cit.) I see no real difference between *R. lividus* (Bull.) and *R. sinuatus* (Fr.).

8. *R. prunuloides* (Fr.) Quél. (Plate 73. fig. B.)

Cap about 7 cm, expanding and distinctly umbonate, subviscid, alutaceous white. Gills originally white, without any flush of yellow. Stem firm, white, about 1.2 cm thick. Faint farinaceous smell.

Spores subglobose, obtusely angular, 8 — $10 \times 7\frac{1}{2}$ μ .

Rare. Growing on grassy slopes, road-banks, under hedges etc.

9. *R. repandus* (Bull.) Quél. (Plate 73. fig. A.)

Cap $2\frac{1}{2}$ —5 cm, conic-convex, at last expanding with a rather acute umbo, edge sometimes lobed, surface shining (slightly viscid at first), whitish, streaked with livid-gray spots from umbo out. Gills originally white, almost free, rather narrow. Stem 4—8 mm thick, firm, white. Faint smell of meal or cucumber.

Spores subglobular, obtusely 5-(6-)angular, diam. about $7\frac{1}{2}$ μ .

Rare. Sloping grassland between wood and bog, gregarious.

This species is very close to *R. prunuloides* and should probably not be kept apart from it.

β . *Nolanidei*

10. *R. clypeatus* (L.) Quél. (Plate 75. fig. C.)

Cap 5—10 cm, expanding, more or less prominently umbonate, dirty gray, often streaked and variegated with darker, more saturated spots. Gills at first grayish white. Stem rather stout, dingy white, streaked or somewhat grooved, subfibrillose.

Spores ovate-subglobose, obtusely 5-(6-)angular, 8 — $10 \times 7\frac{1}{2}$ —8 μ .

Rather common, chiefly in May and June, under hedges etc., subfasciculate.

11. *R. rhodopolius* (Fr.) Quél. (Plate 75. fig. A.)

Cap 5—9—(11) cm, convex-expanded, slightly umbonate, hyaline grayish, fading to

whitish alutaceous. Gills white. Stem rather tall, not stout, white, somewhat fibrous-striate. Gregarious but not subfasciculate. Smell faint.

Spores irregularly 5-angular, outline subrotund, $8-10\frac{1}{2} \times 7-8 \mu$.

Very common, in frondose woods (chiefly *Fagus*).

The large figure, pl. 75, fig. A, depicts the ultra-typical, whitish form; but more grayish, smaller specimens (transitions to *R. nidorosus*) are even more common than the type.

12. *R. turbidus* (Fr.) Quél. forma. (Plate 76. fig. H.)

Cap about 6 cm, conical expanded (umbo rather acute), pale tan, edge somewhat striate. Gills white, rather narrow. Stem tall and rather slender, attenuated upward, $9-10 \text{ cm} \times 0.4-0.8$ (above) and $0.6-1.0 \text{ cm}$ (below), striate, concolorous but somewhat paler. Smell none.

Spores obtusely (6-)angular, subrotund-obovate, $9-10 \times 6\frac{1}{2}-7 \mu$.

Met with in a wood of *Quercus* (the figured specimen) and also on moist ground under *Betula* etc. in several places.

The typical *R. turbidus* of FRIES (*Icones sel.*, pl. 93³) I have never seen. It is said to be a pino-philous species, rather large and stout. My plant has much in common with *R. rhodopolius*, while the form depicted by KONRAD & MAUBLANC (*loc. cit.*, pl. 196) is more like *R. majalis*.

13. *R. speculum* (Fr.) Quél. (Plate 75. fig. B.)

Cap 2—4 cm, convex, hyaline-whitish (white when dry), edge minutely striate. Gills white when young. Stem rather slender, somewhat striate, white. Gregarious or subfasciculate. Smell very faint, nitric or almost none.

Spores oval-subrotund, 5—6-angular, $9 \times 6\frac{1}{2}-7 \mu$.

Rather common in dense copses (*Corylus*, *Quercus*) on humid ground, generally gregarious.

Somewhat larger and more grayish-alutaceous specimens are also met, which form a transition to *R. nidorosus*.

14. *R. radiatus* Lange nov. sp. (Plate 76. fig. I.)

Cap $1\frac{1}{2}-2\frac{1}{2} \text{ cm}$, slightly fleshy, convex-expanding with a small, rather acute umbo, pale dingy date-brownish, coarsely radiato-striate half way in. Gills horizontal, rotundate behind, pallid. Stem short (about 3 cm), pallid, slightly hollow.

Spores subglobular-ovate, obtusely 5-angular, $8-9\frac{1}{2} \times 7-7\frac{1}{2} \mu$.

Not uncommon, growing gregariously in outskirts of copses, on naked ground or among grass and weeds.

I described this species in "Studies" IV (1921) sub nom. *R. elaphinus* (Fr.) (?) var. *radiatus*. But it is so different from *Entoloma elaphinum* (as depicted by FRIES in *Icones sel.*) and in itself so constant, wherever it grows, that I now prefer to raise it to specific rank. It is the smallest and most dwarfish species of the *Rhodopolius*-stirpe.

15. *R. majalis* (Fr.) Lange. (Plate 74. fig. B.)

Cap 3—6 cm, distinctly umbonate, convex-expanded, edge striate, dingy date-brown to

subfuscous (dingy gray and rather pale when dry). Gills pallid, like the stem, which is distinctly striate, slightly hollow. Smell faint.

Spores subrotund, 5-(6-)angular, $8-10 \times 7-8 \mu$.

Met with in May, growing gregariously in a copse (*Corylus*, *Quercus*, *Prunus padus*).

***R. nidorosus* (Fr.) Quél.**

Plants answering to the description of *R. nidorosus* are rather commonly met with in frondose woods, especially on moist or boggy ground under *Salices* etc. They differ from no. 15 chiefly by want of umbo and generally by a more pronounced, somewhat nitric smell. But the species is very variable, sometimes more like *R. speculum*, sometimes approaching *R. majalis* or even *R. radiatus*.

16. *R. Cordæ* (Karst.) Lange. (*Entoloma Cordæ* Karst.). (Plate 76. fig. D.)

Cap 3—4 cm, convex, soon slightly depressed around the obtuse umbo, sepia, somewhat paler towards the coarsely striate edge (pale dirt-grayish brown when dry), shining (but not viscid), very brittle and thin-fleshed. Gills broad, broadest and somewhat truncate behind, brownish gray, at last with a flush of flesh-colour. Stem rather tall (up to $7 \text{ cm} \times 6 \text{ mm}$), becoming hollow, silky and somewhat fibrillose, grayish pale, base slightly incrassated and whitish. Smell and taste almost absent. Spore-print very pale flesh-colour.

Spores small, almost globose, indistinctly 5-angular, $6-7 \times 5\frac{3}{4}-6 \mu$.

Rather rare. Growing in deep moss in woods of *Picea*, solitary.

A rather distinct species, very well characterised by the radiato-striate, dark gray cap and the dark gills. It has nothing to do with *R. costatus*, of which KARSTEN in his later works made it a subspecies.

17. *R. costatus* (Fr.) Lange. (Plate 76. fig. F.)

Cap $3-4\frac{1}{2}$ cm, convex, pitch brown, shining, expallent, somewhat fleshy. Gills dirty gray, transversely venose. Stem short and rather stout, coarsely striate, dirt-brownish, $2-3 \text{ cm} \times 0.6-1.0 \text{ cm}$. Smell faint.

Spores 5-(6-)angular, outline subrotund, $7-8 \times 6\frac{1}{2}-7 \mu$.

Not uncommon, in rich permanent pastures etc., late in the season.

Less fleshy specimens (which are occasionally met) form a transition to *R. sericeus*.

18. *R. sericeus* (Bull.) Quél. (Plate 76. fig. G and G¹.)

Cap $2\frac{1}{2}-4$ cm, convex or slightly umbonate, varying from bistre to roe-brown, with a silky lustre. Gills whitish or pallid at first. Stem generally rather short and thin ($0.3-0.5 \text{ cm}$). Strong farinaceous or cucumber-like smell.

Spores subspheric-oval, irregularly nodulose-angular, $8-10 \times 6-7 \mu$.

Rather common and often gregarious on lawns, old pastures, grassy road-borders etc.

Slender forms have a habitual likeness to *R. (Nolanea) staurosporus*, but are easily recognised by the subrotund spores and the "mealy" smell.

II. LEPTONIA

19. R. euchrous (Pers.) Quél. (Plate 76. fig. A and A¹.)

Cap 2—3 cm, convex (or slightly conical at first), silky-fibrillose, lilac or bluish with a flush of fuscous from centre out. Gills dingy blue or lilac at first, with a dark blue edging. Stem concolorous, paler below, often curved, minutely fibrillose.

Spores nodulose or obtusely angular; outline obovate or oval, $9-11 \times 5-7\frac{1}{2} \mu$.

Not uncommon, on stumps, particularly of *Alnus*, but also of *Corylus*.

20. R. serrulatus (Pers.) Quél. (Plate 77. fig. G and G¹.)

Cap $1\frac{1}{2}-2\frac{1}{2}$ cm, convex, somewhat umbilicate, dark fuscous (when sun-scorched often almost black and glossy). Gills broad to very broad, adnate or slightly emarginate, with a decurrent denticle, gray or glaucous, with a denticulate, black edge. Stem rather short, thin, dark gray with black granules or striæ at the apex.

Spores ovate oval, with 5—8 rather sharp angles, $8-11 \times 6-7 \mu$. Cystidia on edge of gills fasciculate, clavate, $11-12 \mu$ broad, pale gray.

Not common, amongst grass and heather on hill-slopes etc.

Rather variable. When the cap is distinctly umbilicate and the gills provided with a decurrent denticle, it almost equals *Eccilia atrides* (Lasch.) Fr. which FRIES himself regards as hardly specifically distinct. COOKE (Illustrations, pl. 333) depicts a totally different Agaric under the name *Leptonia serrulata*. It probably represents a form of *Entoloma griseo-cyaneum*. — Fig. G in pl. 77 depicts a sun-scorched form.

21. R. placidus (Fr.) Quél. var. *gracilis* Lange nov. var. (Plate 76. fig. B.)

Cap 2—2 $\frac{1}{2}$ cm, convex-plane, densely-flocculose, flocci fuliginous, set on a paler, mouse-gray ground. Gills originally white. Stem slender (about 2 mm thick), indigo-blue, white-tomentose at the base, slightly punctate or striate with black above.

Spores ovate, obliquely apiculate, nodulose wavy or obtusely angular, $9-10 \times 6-6\frac{1}{2} \mu$.

Not uncommon, on and around old stumps of *Fagus*.

The form here depicted is the most common one in Denmark. But I have also met another, larger and more robust variety with a 3—4 cm broad, somewhat paler, mouse-gray brownish, fibrillose-squamose cap and a short, sulcato-striate, blackish blue stem. FRIES' figure of *Leptonia placida* in *Icones sel.* (pl. 97¹) is even more robust, with a flocculose stem and more like *Entoloma dichroum*. The figure in BRESADOLA'S *Iconographia* (pl. 568) is very dubious.

22. R. lampropus (Fr.) Quél. (Plate 76. fig. C.)

Cap 2—2 $\frac{1}{2}$ cm, convex, blackish blue, minutely plushy. Gills rather broad, originally white. Stem rather slender, dark indigo-blue, cartilaginous, about 3 mm thick.

Spores irregularly oval, nodulose, $9\frac{1}{2}-11\frac{1}{2} \times 6\frac{1}{2}-7 \mu$. Basidia 4-spored.

On a hill-slope, outside a plantation of *Picea*, amongst moss, grass and heather.

Besides the form here figured I have seen more short-stemmed specimens and even some with a rather profoundly umbilicate cap. BRESADOLA'S figure (*Iconographia*, pl. 570¹) is misleading.

23. *R. cyanulus* (Lasch) Lange. (*Leptonia cyanula* (Lasch) Fr.). (Plate 77. fig. F.)

Cap $1\frac{1}{2}$ —3 cm, convex, expanded, blackish blue, fading to fuliginous, slightly plushy in the middle, striate when old. Gills rather narrow, originally glaucous-blue (edge paler). Stem of a deep and bright indigo-blue, very slender (about 2 mm thick), white-felty below.

Spores irregularly angular, outline roundish ovate, $10 \times 7 \mu$. Basidia mostly 3-spored (exceptionally 2—4-spored on the same gill).

Rather rare, in dense copses (*Betula*, *Prunus padus* etc.).

This species is very much like the slender form of *R. lampopus*, chiefly differing in the narrower, glaucous bluish gills. I formerly referred it to *R. chalybæus*. But this species is said to grow in open spaces and seems to be a somewhat stouter type.

24. *R. asprellus* (Fr.) Quél. (Plate 77. fig. D and D¹.)

Cap $1\frac{1}{2}$ —2 cm, campanulate-convex, expanding (disc slightly depressed) bistre, rather coarsely striate. Gills rather broad and truncate behind, grayish pale. Stem steel-blue or bluish glaucous (in other finds subfuscous), straight, 4—6 cm long.

Spores somewhat angular, oval, $11\frac{1}{2} \times 7\frac{1}{2} \mu$. Basidia 4-spored.

Not uncommon in boggy meadows, amongst moss and grass.

The stem varies in colour from a rather pure steel-blue to dingy brownish. Fig. D¹ is a rather extreme form, which has some traits in common with *Leptonia sarcita* Fr. in the sense of KONRAD & MAUBLANC.

25. *R. euchlorus* (Lasch) Quél. (*Leptonia incana* Fr. sensu Konr. & M.). (Plate 77. fig. C.)

Cap $1\frac{1}{2}$ —3 cm, campanulate-convex, disc slightly depressed, colour lemon-yellowish, more or less flushed with olivaceous tones. Gills originally white. Stem sulphur-yellow, becoming light sky-blue or greenish blue when touched or cut.

Spores irregularly ovate, somewhat angular, $10\frac{1}{2}$ — 13×7 — 8μ . Basidia with 2 or 3 long sterigmata.

Rare. Growing in grass on road-borders etc.

26. *R. sericellus* (Fr.) Quél. (*Entoloma sericellum* Fr.). (Plate 77. fig. E.)

Cap $1\frac{1}{2}$ — $2\frac{1}{2}$ cm, convex, flattened or somewhat depressed when old, alutaceous or ivory white (becoming flushed with tan when sun-scorched), minutely innato-squamulose or almost glabrous. Gills originally white. Stem generally rather short ($3 \text{ cm} \times 2$ — 3 mm), whitish.

Spores obovate, rather acutely angular, 9 — 11×7 — $7\frac{1}{2} \mu$.

Rather common in old grassland, especially in sandy soil, gregarious.

I think this species has its most natural place in *Leptonia*, although it has no intimate relations there.

III. NOLANEA

27. *R. staurosporus* (Bres.) Lange. (*Nolanea staurospora* Bres.). (Plate 77. fig. A.)

Cap 3 — $3\frac{1}{2}$ cm, parabolic-convex, date-brown, striate half way in (paler and without

striation when dry). Gills whitish-pale when young. Stem rather slender, distinctly striate, paler than the cap. Smell almost none.

Spores 4—6-angular with prominent angles or almost cruciate-stellate, $9-10 \times 7-9 \mu$. Basidia 4-spored.

Not uncommon, chiefly met with in open spaces among moss and grass in woods of *Picea*, more rarely in frondose woods. In open pastures a more dwarfish and paler form occurs.

I formerly (Studies IV.) used the name *R. pascuus* (Pers.) for this species. But as the Persoonian name has been applied to quite a number of different species (*Nolanea hirtipes*, *N. staurospora*, *N. cetrata* etc.) and probably originally was a collective, I now discard it, like KONRAD & MAUBLANC, adopting the Bresadolan name instead, which characterises the plant so well. BRESADOLA'S figure (*Iconographia*, pl. 584) represents specimens of an unusually fuscous colour. — Some French and English mycologists apply the name *Nolanea proletaria* to it. But this according to FRIES is a species with an umber-brown and villose cap.

On a sea-coast common (Illumø, 1926) I once met with a *Rhodophyllus* which was intermediate between *Nolanea staurospora* and *Entoloma sericeum*. It had the substellate spores of *N. staurospora*, but the cap was convex, dark brownish-fuscous (shining and silky when dry), the gills pale date-brownish, the stem shining, almost without striation, and it had a faint farinaceous smell, thus in many ways approaching *Entoloma sericeum*.

This form will require further study; but probably it should be referred to *Nolanea proletaria* in the sense of RICKEN (*Blätterpilze*, pl. 74⁴).

28. *R. xylophilus* Lange. (Plate 77. fig. B.)

Cap about 1 cm, convex, pellucido-striate, pallid (somewhat dirty brownish in the middle, the striæ isabelline clay-colour with a tinge of flesh-colour). Gills free, originally white. Stem $4 \text{ cm} \times 1 \text{ mm}$, whitish, almost diaphanous.

Spores irregularly angular-stellate, $10 \times 8\frac{1}{2} \mu$.

Met with in several places, growing on rotten stumps of *Fagus* and *Corylus*.

This little species has the habit of *R. minutus*, but differs in the free gills, the substellate spores and the habitat.

29. *R. cetratus* (Fr.) Quél. (sensu Schroet., nec Fries). (Plate 78. fig. F.)

Cap 2—3 cm, parabolic convex, somewhat tan or gilvous ochre, striate half way in. Gills pallid with a slight flush of ochre when young. Stem slender, striate, pallid ochry; flesh concolorous.

Spores obovate, wavy-nodulose, $10\frac{1}{2}-11 \times 7-7\frac{1}{2} \mu$. Basidia 2-spored, about 11μ broad.

Rather common in mossy coniferous woods.

Easily recognized by the ochry tinge of all its parts. The nodulose spores and 2-spored basidia distinguish it clearly from *R. pascuus* as here defined. Several authors apply the name *N. pascua* to this species, and it is not unlikely that the slender, pinophilous form of *N. pascua* mentioned by FRIES (*Monographia*, p. 292) belongs here. The *N. staurosporus* of FRIES seems to be a totally different plant. SCHROETER (loc. cit.) was the first author who strictly confined this name to the present species; but it is now generally accepted.

30. *R. hirtipes* (Schum.) Lange. (Plate 78. fig. G.)

Cap 2—4 $\frac{1}{2}$ cm, conic convex with a minute evanescent papilla, minutely striate at the edge, dingy brownish (when dry pale and silky). The edge of the gills is at first slightly inflexed. Gills ventricose, almost free, whitish at first. Stem tall (8—12 cm), straight, silky, striate, paler than the cap, slightly thickened towards the base which about 2 cm up is clad with a pure white, cobwebby tomentum. Slight oily-rancid odour.

Spores ovate or oval, rather obtusely angular, 10—14 $\times$ 7—8 $\frac{1}{2}$ μ . Basidia 4-spored. Edge of gills set with hair-shaped sterile cells.

Not uncommon in woods of *Quercus*, *Corylus* etc.

This is *Nolanea mammosa* in the sense of RICKEN and BRESADOLA and *N. pascua* according to QUÉLET. The specimens depicted by KONRAD & MAUBLANC are uncommonly large.

31. *R. infula* (Fr.) Lange. (Plate 79. fig. G.)

Cap 1 $\frac{1}{2}$ —2 cm, convex with a small, prominent papilla, almost maroon, slightly striate. Gills rather narrow, originally white. Stem rather tense, not pruinose above, cartilaginous.

Spores oval, rather prominently nodulose-wavy, 8—9 $\times$ 6 μ .

Not uncommon, chiefly in boggy meadow-land.

There is an intermediate form between nos. 30 and 31, intermediate as well in stature as in spore-size and gill-colour. This is the *Nolanea mammosa* described by KONRAD & MAUBLANC (Icones sel. fung., pl. 180¹). It is met with on naked soil (in shrubberies, herbaceous borders etc.) in small flocks.

32. *R. papillatus* (Bres.) Lange. (*Nolanea papillata* Bres., *Nolanea mammosa* forma *tenuior* Fries). (Plate 78. fig. D.)

Cap 1 $\frac{1}{4}$ —2 cm, strongly convex with a prominent papilla, maroon, umbo almost bistre, minutely striate. Gills originally dirty brown. Stem paler than the cap, slender, straight and shining, somewhat white-pruinose above.

Spores subovate, obtusely angular-wavy, 9 $\frac{1}{2}$ —10 $\frac{1}{2}$ $\times$ 7—7 $\frac{1}{2}$ μ . Basidia 4-spored.

Not uncommon on grassy roadborders, on hill-slopes, in open plantations etc.

It has the stature of *R. infula*, but the gills are grayish brown from the beginning and it is next in kind to *R. clandestinus*.

33. *R. clandestinus* (Fr.) Quél. (Plate 78. fig. C.)

Cap about 1 $\frac{1}{2}$ cm, conic-convex, soon somewhat depressed, with a minute, low papilla, almost soot-brown, expallent. Gills fuscous-brown, rather thick and distant, broadly adnate. Stem rather short (3 cm) and firm, paler than the cap, not shining.

Spores oblong, irregularly wavy-angular, 11—12 $\frac{1}{2}$ $\times$ 7—7 $\frac{1}{2}$ μ . Basidia 4-spored.

Met with on a grassy slope outside a copse (a small flock).

The broadly adnate, rather distant and thick gills and the shorter stem distinguish this species from no. 32.

33. *R. fumosellus* (Wint.) Lange (*Nolanea fumosella* Wint.). (Plate 78. fig. E.)

Cap about 1 cm, conic convex, coarsely pellucido-striate, soot-brown, sparsely clad with minute, pallid, flocculose fibrils. Gills distant, broad, soot-brown (at last with a rubescent tinge from the spores), broadly adnate, slightly emarginate, with a decurrent denticle. Edge concolorous. Stem 4 cm × 1 mm, slender, of the same colour, with pallid, minute flocci above and flocculose fibrils below.

Spores oblong ellipsoid, wavy angular, very large, $14-18 \times 7\frac{1}{2}-9 \mu$. Basidia 4-spored. Rare. Met with on boggy ground under *Alnus* etc.

My description differs a little from that of WINTER, particularly in the distant gills.

35. *R. icterinus* (Fr.) Quél. (Plate 78. fig. A.)

Cap $1\frac{1}{2}-2$ cm, somewhat conic-convex, pale sulphur, indistinctly papillate, edge somewhat striate when saturated. Gills originally white, then very pale pinkish. Stem generally rather short, pallid, flushed with amber. Smell of ananas.

Spores irregularly ovate in outline, rather acutely angular-wavy, $8-12 \times 7 \mu$. Marginal cystidia rather short, somewhat nodulose hair-shaped (in other finds absent).

Not uncommon, in boggy places under *Alnus*, *Fraxinus* etc.

35a. *R. icterinus* forma *gracillimus*. (Plate 78. fig. B.)

Differing from the type by smaller cap (0.8 cm) and very slender, almost white stem. Met with in a ditch under a hedge.

Hardly anything but an etiolated form. If it were not for the spores it might be mistaken for a *Mycena luteo-alba*.

36. *R. minutus* (Karst.) Lange (*Nolanea minuta* Karst.). (Plate 79. fig. H.)

Cap $1-1\frac{1}{2}$ cm, plano-convex, slightly umbilicate, minutely striate almost to centre, pallid (striæ dingy drab or pale brownish). Gills whitish, somewhat adnate. Stem slender ($3-5 \text{ cm} \times 1\frac{1}{2} \text{ mm}$), dingy brownish, apex pallid, base slightly fibrillose.

Spores broadly ovate or subspheric, 5-(6-)angular-wavy, $9-10 \times 7-7\frac{1}{2} \mu$.

Rather rare. It grows on boggy ground under *Alnus* etc., in small flocks.

37. *R. juncus* (Fr.) Quél. (Plate 79. fig. F.)

Cap $1\frac{1}{2}-2\frac{1}{2}$ cm, convex, slightly umbonate, fuscous-brown, coarsely striate almost to centre, edge paler. Gills broad, fuscous grayish. Stem rather slender and tense, dark fuscous, about $7 \text{ cm} \times 2 \text{ mm}$.

Spores subrotund, indistinctly and obtusely 5-(6-)angular, $8\frac{1}{2}-10\frac{1}{2} \times 7\frac{1}{2} \mu$. Basidia 4-spored.

Not uncommon, but generally solitary, in moist woods.

A very distinct species. The form *cuspidata* figured by FRIES in *Icones sel.*, I have never seen. The umbo in the typical form is, on the contrary, very inconspicuous.

38. *R. coelestinus* (Fr.) Lange. (Plate 79. fig. E.)

Cap $\frac{3}{4}$ — $1\frac{1}{3}$ cm, conic convex with a minute papilla, dark gray steel-blue, edge coarsely striate (steel-gray and silky when dry). Gills whitish at first. Stem about 4 cm $\times$ 1 $\frac{1}{2}$ mm, somewhat wavy, glaucous to steel-blue.

Spores spheric-ovate, obtusely 5-(6-) angular, 8—9 $\times$ 7 μ . Basidia 4-spored.

Met with in a pasture on sloping ground between a bog and a wood, some few specimens.

The subspheric spores and the somewhat papillate cap distinguish this species from the bluish *Leptonias*.

IV. ECCILIA

39. *R. carneo-albus* (With.) Quél. (*Clitopilus carneo-albus* (With.) Fr.). (Plate 79. fig. B.)

Cap 1—3 cm, convex, disc slightly umbilicate, alutaceous white, indistinctly striate and faintly flocculose-silky when young. Gills pure white, becoming pale pink, broadly adnate and somewhat arcuate-decurrent. Stem slender (4—6 $\times$ 1 $\frac{1}{2}$ —2 mm), white.

Spores subovate, irregularly and obtusely angular (8) 10 (12) $\times$ 6—7 μ .

Not uncommon, always in shady, moist places in frondose woods.

It is very close to *R. sericellus* and might be characterised as a silvan, somewhat etiolated form of that species, if it were not for the somewhat decurrent gills. A dwarfish form (cap only about 3 mm) is also met with and may be mistaken for an *Omphalia*.

40. *R. cancrinus* (Fr.) Quél. (*Clitopilus cancrinus* Fr.). (Plate 79. fig. D.)

Cap 2—3 cm, convex flat, broadly depressed in the middle, alutaceous white, minutely squamulose, subinfundibuliform when old. Gills rather narrow, arcuato-decurrent, descendent, white, becoming pale pink. Stem rather short (3 $\frac{1}{2}$ cm), white.

Spores ovate or oval, irregularly wavy in outline, 10—12 $\times$ 7—7 $\frac{1}{2}$ μ . Basidia 4-spored.

Rare. Met with in pastures on boggy or sandy ground.

The subinfundibuliform cap and the distinctly decurrent, arcuate gills distinguish this species both from *R. carneoalbus* and *R. sericellus*.

41. *R. undatus* (Fr.) Quél. (*Clitopilus undatus* Fr.). (Plate 79. fig. A and A¹.)

Cap 2—3 cm broad, convex, umbilicate or subinfundibuliform, without striation, but sometimes indistinctly belted, fuliginous, dingy bistre or somewhat paler grayish brown, opaque (silky and paler when dry). Gills somewhat decurrent, dusky brownish at first. Stem rather short (about 2 cm), often irregularly wavy, paler than the cap.

Spores oval, irregularly wavy, 8 $\frac{1}{2}$ —9 $\frac{1}{2}$ $\times$ 5 $\frac{3}{4}$ —6 μ .

Not uncommon, in open pastures and in more sheltered places (on boggy ground in copses etc.).

Fig A¹ represents a more membranaceous and infundibuliform type, almost answering to FRIES' description of his subspecies *viarum*. — RICKEN refers *Clitopilus undatus* to *Paxillus* and ascribes smooth, ellipsoid spores and rusty brown spore-print to it.

41 a. *R. undatus* var. *pusillus* Lange. (Plate 80. fig. G.)

Cap $1\frac{1}{2}$ — $1\frac{3}{4}$ cm, convex-flat, umbilicate depressed, almost ashy gray, at first slightly hoary-pruinose. Gills rather strongly decurrent, arcuate, moderately crowded, dingy pallid, at last with a pale incarnate tinge. Stem $1\frac{1}{2}$ —2 cm $\times$ 1— $1\frac{1}{4}$ mm, paler than the cap, slightly pruinose at first.

Spores oval, obliquely pedicellate, outline wavy-nodulose, $9 \times 5\frac{1}{2}$ —6 μ .

Met with on naked ground under a hedge, outskirts of wood, gregarious.

Although this tiny little plant at first sight does not recall *R. undatus* I refrain from making it a new species, as the Friesian subspecies *viarum* connects it with the larger and darker typical form.

42. *R. Mougeotii* (Fr.) Lange forma. (Plate 80. fig. H.)

Cap $2\frac{1}{4}$ — $2\frac{3}{4}$, convex, rather profoundly depressed in the middle or subinfundibuliform, dark gray-violet, everywhere hairy-tomentose-squamulose. Gills arcuato-adnate, somewhat descendent and subdecurrent, whitish when young. Stem 2—5 cm $\times$ 3 mm, steel-gray lilac, somewhat fibrillose and with indistinct, blackish flocci.

Spores ovate, obtusely angular, about 10×7 μ . Edge of gills set with hair-shaped, cylindric, obtuse, 6—8 μ broad cells.

Met with in a boggy meadow (July), growing gregariously amongst Carices etc.

This species is very closely related to *Entoloma griseo-cyaneum*, more especially the form described sub no. 4 a (*Entoloma ardosiacum* (Bull.) Quél. as conceived by BRESADOLA). My plant differs from *Ec-cilia Mougeotii*, in the sense of KONRAD & MAUBLANC, by the less strongly decurrent gills.

43. *R. griseo-rubellus* (Lasch) Quél. (Plate 80. fig. E.)

Cap about 2 cm, convex, deeply umbilicate, fuscous brown, edge pellucido-striate. Gills slightly decurrent, almost horizontal, pallid when young. Stem rather tall, about 5 cm $\times$ 2 mm, glaucous, glabrous.

Spores broadly ovate, wavy angular with about 6 angles. Basidia 4-spored.

Rare. Open spaces in plantations and on grassy slopes, gregarious.

43 a. *R. griseo-rubellus* forma. (Plate 80. fig. F.)

Slightly paler and more slender, stem pallid. Spores somewhat larger (10 — 12×7 —8 μ).

Met with on boggy ground and probably only a palustrine form.

44. *R. nigrellus* (Pers.?) Quél. (Plate 80. fig. B.)

Cap about 1 cm, convex infundibuliform, fuscous steel-gray, somewhat blackening, edge slightly striate. Gills whitish when young, narrow, descendent and deeply decurrent. Stem about 3 cm $\times$ 2 mm, glaucous gray with a flush of violaceous-fuscous.

Spores obovate or irregularly oval, wavy angular, $9-12 \times 6\frac{1}{2}-7\frac{1}{2} \mu$.

I have only seen a single specimen of this species (herbaceous border in park).

QUÉLET'S description (SACCARDO Syll. Fung., V, no. 3027) is very brief, but answers very well to mine. The species requires further study.

45. *R. rusticoides* (Gill.) Lange. (Plate 80. fig. D and D'.)

Cap about 2 cm, strongly convex or convex, more or less umbilicate, bistre or almost soot-brown, edge striate. Gills very broad, horizontal or descendent, more or less decurrent, rather distant, fuscous. Stem short (about $2 \text{ cm} \times 2 \text{ mm}$), paler than the cap.

Spores subspheric, obtusely 5-angular, $8 \times 6\frac{1}{2} \mu$. Basidia 4-spored. Cystidia absent.

Rather rare, growing in sandy soil on hill-sides amongst *Sarothamnus* and Lichens.

This very characteristic species — which FRIES did not know — is very closely related to his *Eccilia parkensis*, especially as represented in his figure (Icones sel., pl. 100⁵), in which the gills are fuscous and rather broad (while in the diagnosis they are said to be whitish and linear). *Eccilia tristis* Bres. does not differ materially from *R. rusticoides*.

46. *R. rhodocylix* (Lasch) Lange. (Plate 80. fig. A.)

Cap $\frac{1}{2}-1$ cm, convex, slightly depressed at the disc, coarsely striate, pallid with somewhat fuscous disc and striæ. Gills very broad, arcuato-decurrent, very distant, pallid. Stem about $2 \text{ cm} \times 0.7 \text{ mm}$, pallid.

Spores subspheric, 5-angular, $8-10 \mu$ diam. Basidia 4-spored. Cystidia absent.

Rare. In boggy places. I have met with it on stumps of *Betula* and amongst needles under *Alnus* and *Picea*.

Very well characterised by the broad, very distant gills and its extraordinarily small dimensions.

V. CLAUDOPUS

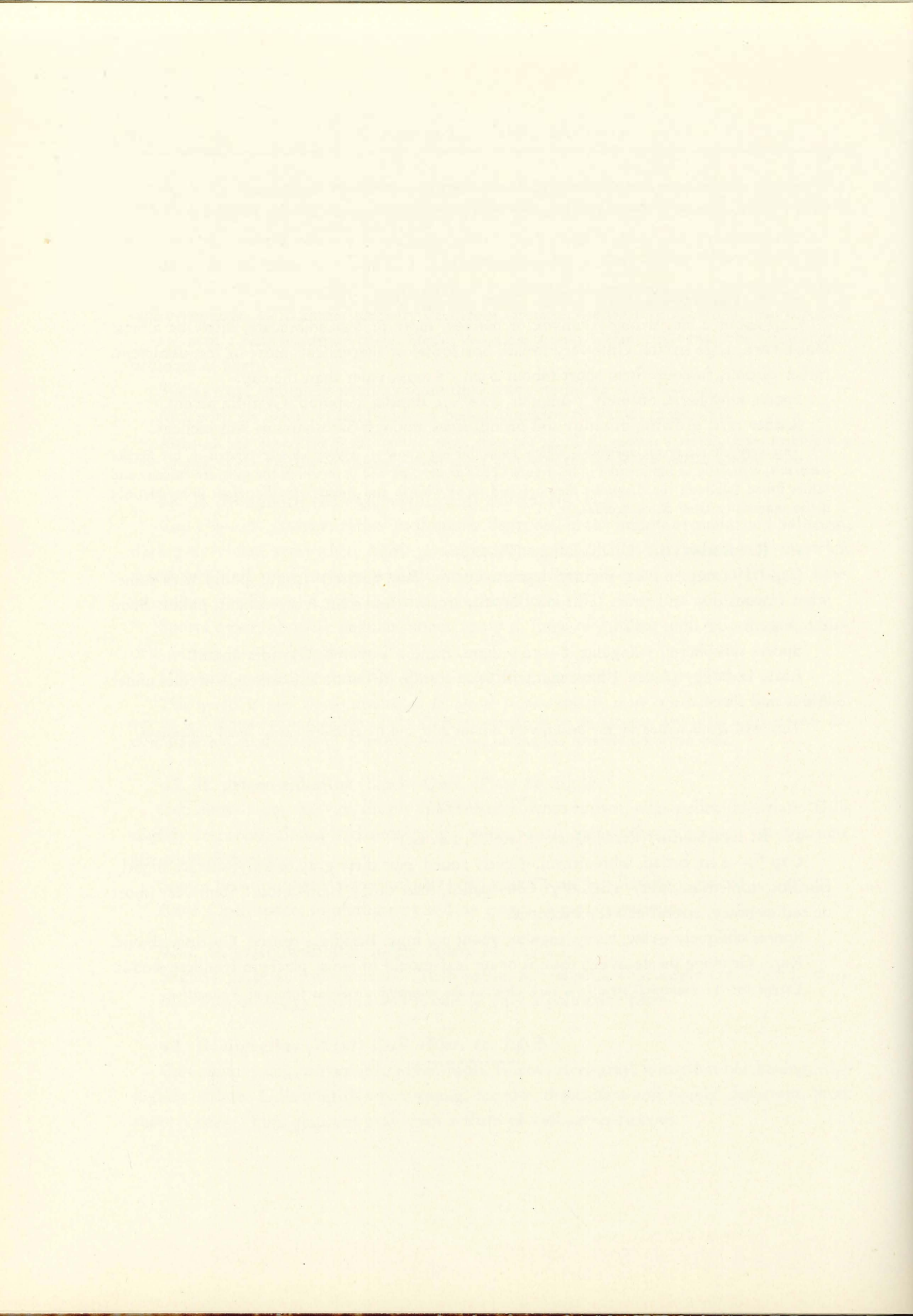
47. *R. byssisedus* (Pers.) Quél. (Plate 80. fig. C.)

Cap $\frac{3}{4}-2$ cm broad, subreniform, slightly zoned, pale dirty gray or ashy, surface slightly fibrillose-tomentose, silky when dry. Gills pallid, then dingy flesh-colour. Stem very short or rudimentary, lateral or very excentric.

Spores obliquely ovate, wavy angular, about 9μ long. Basidia 4-spored. Cystidia absent.

Rare. Growing on decaying stumps or on leaf-mould in moist places in frondose woods.

Except for the sublateral stem it is very close to the submembranaceous forms of *R. undatus*.



FORENINGEN
TIL
SVAMPEKUNDSKABENS FREMME
THORVALDSENSVEJ 40, ØPG. 8
1871 KØBENHAVN V.

JAKOB E. LANGE

FLORA AGARICINA DANICA

Vol II.

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41—80

THEORY OF THE EARTH

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cirrhatta... ..	44 E	lupuletorum	47 G	» var. pithya	53 C
confluens	44 G	oreades... ..	46 F	lævigata	51 C
conigena	44 C	perforans	49 G	lasiosperma	58 F
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dryophila	43 E	putillus... ..	46 H	lineata... ..	55 A
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erythropus... ..	45 H	recubans	48 E	marginata	54 E
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leucomyosotis	45 C	stipitarius	49 E	mucor	56 A
longipes	41 A	urens	46 G	osmundicola	57 A
macilenta	44 A			parabolica	56 D
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» forma arrhiza	41 B	debilis... ..	57 H	rosella... ..	54 F
rancida... ..	45 I	echinipes	53 I	rubella... ..	53 B
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cinerella	61 H	ostreatus	63 C	fumosellus... ..	78 E
crispula	62 D	» forma	63 A	griseo-cyaneus	73 C
cuspidata var. stenospora ...	62 B	petaloides	65 E	» forma	73 E
demissa... ..	60 F	pubescens	66 F	griseo-rubellus... ..	80 E
fibula	61 G	pulvinatus	65 F	» forma	80 F
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graveolens... ..	59 I	roseolus	65 C	icterinus	78 A
grisella... ..	60 E	serotinus	64 A	» forma gracillimus ...	78 B
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maura	59 J			majalis... ..	74 B
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» var. tenuistipes	61 E	hispidulus	70 B	radiatus... ..	76 I
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B. COLLYBIA RADICATA forma ARRHIZA

C. COLLYBIA BUTYRACEA

D. COLLYBIA RADICATA

E. COLLYBIA (MUCIDULA) MUCIDA



A. *COLLYBIA RADICATA* var. *GRACILIS*

B. *COLLYBIA DISTORTA*

C. *COLLYBIA MACULATA*

C'. *COLLYBIA MACULATA* forma

D. *COLLYBIA PLATYPHYLLA*



A. COLLYBIA PSEUDO-RADICATA

B & B¹. COLLYBIA VELUTIPES

C. COLLYBIA SUCCINEA

D. COLLYBIA FUSIPES

E. COLLYBIA DRYOPHILA



A. COLLYBIA MACILENTA

B. COLLYBIA NITELLINA forma MINOR

C. COLLYBIA CONIGENA

D. COLLYBIA TUBEROSA

D¹. COLLYBIA TUBEROSA forma

E. COLLYBIA CIRRHATA

F. COLLYBIA TENACELLA

G. COLLYBIA CONFLUENS



A. COLLYBIA MISERA forma
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G. COLLYBIA AMBUSTA
J. COLLYBIA INOLENS

D. COLLYBIA OZES forma
H. COLLYBIA ERYTHROPUS



A. COLLYBIA CESSANS

B. COLLYBIA EROSA

C. COLLYBIA TYLICOLOR

D. MARASMIUS GLOBULARIS

E. MARASMIUS FUSCOPURPUREUS

E¹. MARASMIUS FUSCOPURPUREUS forma

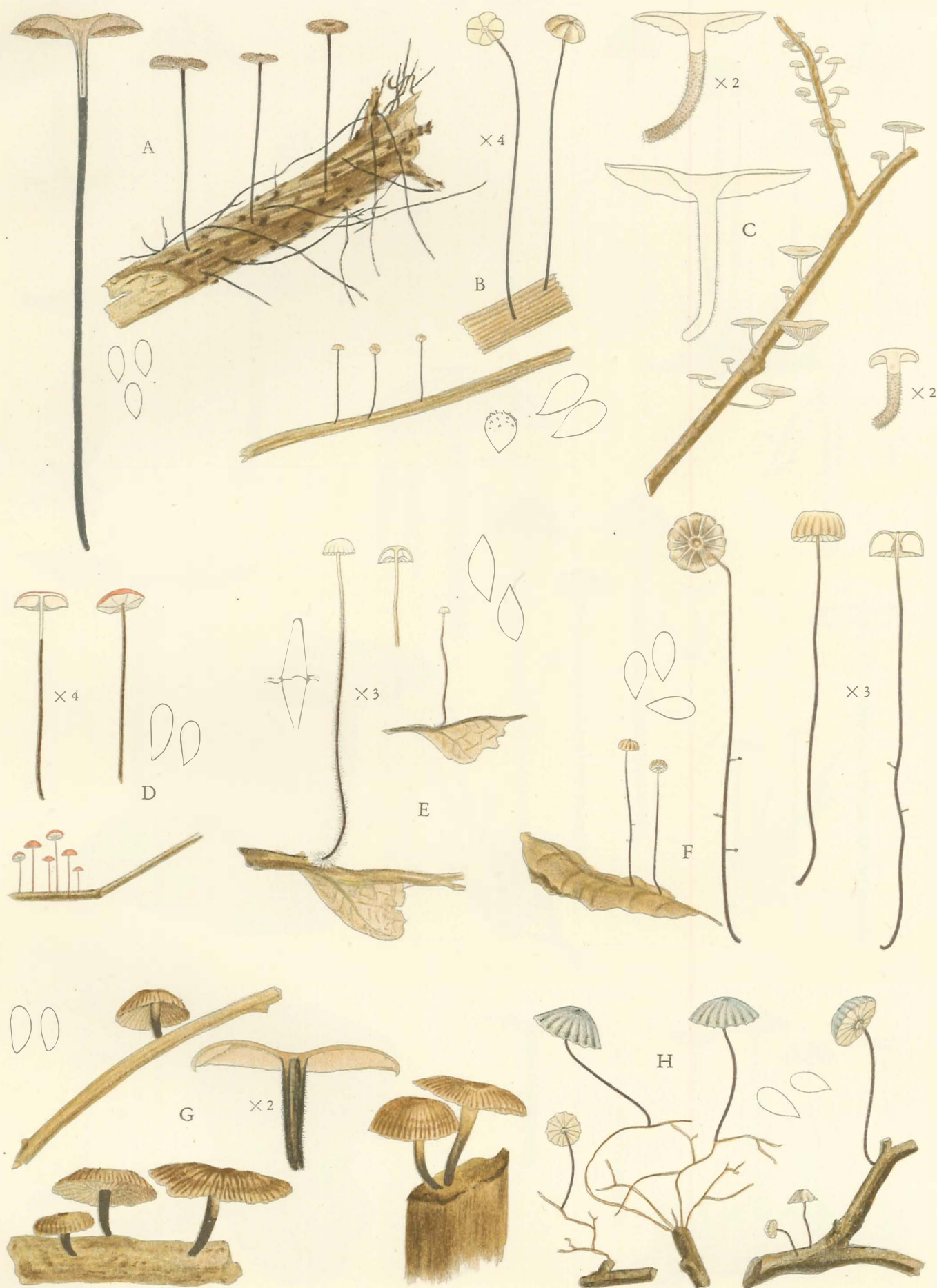
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G. *MARASMIUS FOETIDUS*

D. *MARASMIUS GRAMINUM*
H. *MARASMIUS ROTULA*



A. MYCENA PLICOSA var. MARGINATA

B. MYCENA AVENACEA

C. MYCENA PELIANTHINA

D. MYCENA RUBROMARGINATA

E. MARASMIUS (CRINIPELLIS) STIPITARIUS

F. MARASMIUS EPIPHYLLUS

G. MARASMIUS PERFORANS



A. MYCENA SAUGUINOLENTA

B. MYCENA FELLEA

C. MYCENA IRIS

D. MYCENA HÆMATOPODA var. MARGINATA

E. MYCENA GALOPODA var. LEUCOGALA

F. MYCENA CITRINO-MARGINATA

G. MYCENA HÆMATOPODA



A. MYCENA AMMONIACA
D. MYCENA ALCALINA var. CHLORINELLA
G. MYCENA GALOPODA

B. MYCENA EXCISA forma SOLITARIA
E. MYCENA PSEUDO-GALERICULATA
G¹. MYCENA GALOPODA forma ALBA

C. MYCENA LAEVIGATA
F. MYCENA LEPTOCEPHALA
H. MYCENA ALCALINA



A. MYCENA ZEPHIRA

B. MYCENA GYPSEA

C. MYCENA POLYGRAMMA forma CANDIDA

D. MYCENA VITILIS

E. MYCENA POLYGRAMMA forma PUMILA

F. MYCENA POLYGRAMMA

G. MYCENA PURA



A. MYCENA ADONIS
E. MYCENA EPIPHLOEA

B. MYCENA RUBELLA
F. MYCENA LACTEA

C. MYCENA LACTEA var. PITHYA
G. MYCENA FLAVO-ALBA

D. MYCENA ACICULA
H. MYCENA PURA forma ROSEA

I. MYCENA ECHINIPES



A. MYCENA HIEMALIS

B. MYCENA CLAVULARIS

C. MYCENA STYLOBATES

D. MYCENA RORIDA

E. MYCENA LUTEOALBA var. SULPHUREO-MARGINATA

F & F¹. MYCENA ROSELLA

G. MYCENA ELEGANS

H. MYCENA PTERIGENA

I. MYCENA SEPIA



A. MYCENA LINEATA

A¹. MYCENA LINEATA forma PUMILA

B. MYCENA PINETORUM

C. MYCENA TINTINNABULUM

D. MYCENA CROCATATA

E & E¹. MYCENA INCLINATA



A. MYCENA MUCOR
D. MYCENA PARABOLICA

B. MYCENA CAPILLARIS
E. MYCENA FAGETORUM

C. MYCENA GALERICULATA
F. MYCENA METATA



A. MYCENA OSMUNDICOLA
D. MYCENA SUPINA
F. MYCENA FILOPES

B. MYCENA TENERRIMA var. CARPOPHILA
E & E¹. MYCENA CORTICOLA
G. MYCENA FILOPES forma TETRASPORA

C. MYCENA TENERRIMA
E². MYCENA CORTICOLA forma
H. MYCENA DEBILIS



A. MYCENA EPIPTERYGIA

B. MYCENA VULGARIS

C. MYCENA PELLICULOSA

D & D¹. MYCENA MARGARITISPORA

E & E¹. OMPHALIA PYXIDATA

F. MYCENA LASIOSPERMA

G. OMPHALIA HYDROGRAMMA

H. OMPHALIA UMBILICATA forma SUBSPADICEA



A. *OMPHALIA SCYPHOIDES* (?)

B. *OMPHALIA CHRYSOLEUCA* (?)

C. *OMPHALIA SCYPHIFORMIS*

D. *OMPHALIA STRIÆPILEA*

E. *OMPHALIA RUSTICA*

F. *OMPHALIA LEUCOPHYLLA*

G. *OMPHALIA ASTEROSPORA*

H. *OMPHALIA BISPHÆRIGERA*

I. *OMPHALIA GRAVEOLENS*

J. *OMPHALIA MAURA*



A. *OMPHALIA CAMPANELLA* B. *OMPHALIA UMBELLIFERA* forma *ALBIDA* C. *OMPHALIA ROSELLA*
D. *OMPHALIA GRISEO-PALLIDA* E. *OMPHALIA GRISELLA* F. *OMPHALIA DEMISSA* G. *OMPHALIA VIRIDIS*
H. *OMPHALIA ABIEGNA* I. *OMPHALIA SPHAGNICOLA* J. *OMPHALIA UMBELLIFERA*



A. *OMPHALIA GRACILLIMA*

B. *OMPHALIA STELLATA*

C. *OMPHALIA SPEIREA* forma

D. *OMPHALIA SWARTZII*

E. *OMPHALIA SPEIREA* var. *TENUISTIPES*

F. *OMPHALIA BELLII*

G. *OMPHALIA FIBULA*

H. *OMPHALIA CINERELLA*

I. *OMPHALIA PICTA* var. *CONCOLOR*

J. *OMPHALIA PSEUDO-PICTA*



A. *OMPHALIA POLYADELPHA*

B. *OMPHALIA CUSPIDATA*

C. *OMPHALIA INTEGRELLA*

D. *OMPHALIA CRISPULA*

E. *OMPHALIA INTEGRELLA* var. *CARICICOLA*

F. *PLEUROTUS LIGNATILIS*

G. *PLEUROTUS CORTICATUS* var. *TEPHROTRICHUS*

H. *PLEUROTUS CORTICATUS*



A. *PLEUROTUS OSTREATUS* forma

B. *PLEUROTUS ACEROSUS* forma

C. *PLEUROTUS OSTREATUS*

D. *PLEUROTUS ACEROSUS*



A. PLEUROTUS SEROTINUS

B. PLEUROTUS SEROTINUS var. FLACCIDUS

C. PLEUROTUS ULMARIUS



A. *PLEUROTUS LIMPIDUS*

B. *PLEUROTUS FUSCIFRONS*

C. *PLEUROTUS ROSEOLUS*

D. *PLEUROTUS NIDULANS*

E. *PLEUROTUS PETALOIDES*

F. *PLEUROTUS PULVINATUS*

G. *PLEUROTUS MITIS*



A. *PLEUROTUS RHACODIUM*
D. *PLEUROTUS CHIONEUS*

B. *PLEUROTUS APPLICATUS*
E. *PLEUROTUS SUBPLICATUS*

C. *PLEUROTUS UNGUICULARIS*
F. *PLEUROTUS PUBESCENS*



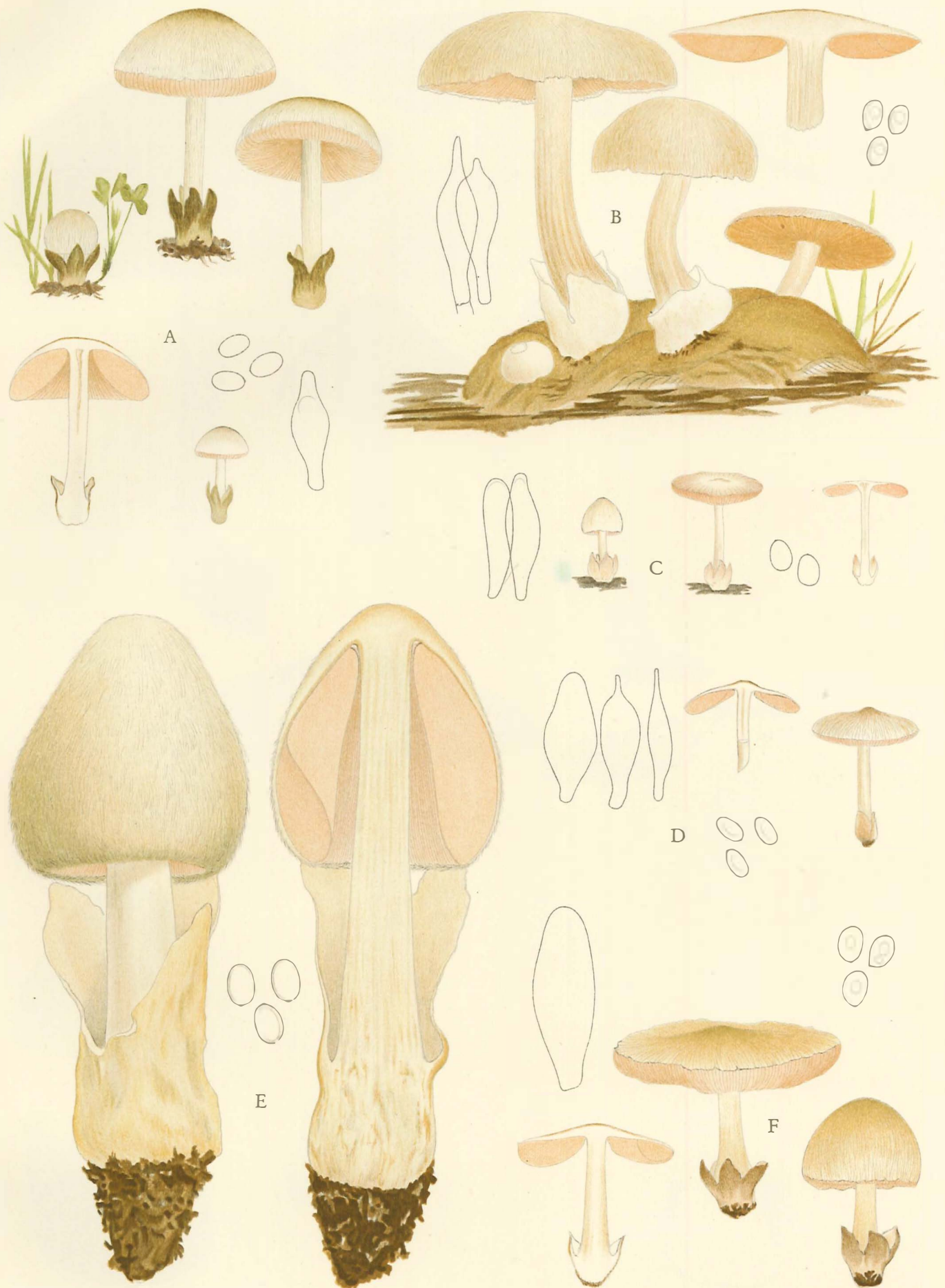
A. PANUS STIPTICUS

B. VOLVARIA MURINELLA

C. PANUS TORULOSUS

D. PANUS CONCHATUS

E. PANUS STIPTICUS var. ALBUS



A. VOLVARIA PLUMULOSA

B. VOLVARIA LOVEIANA

C. VOLVARIA PUSILLA

D. VOLVARIA PUSILLA var. BILOBA

E. VOLVARIA BOMBYCINA

F. VOLVARIA TAYLORI



A. PLUTEUS CERVINUS

B. VOLVARIA MEDIA

C. PLUTEUS SALICINUS

D. VOLVARIA SPECIOSA.

D¹. VOLVARIA SPECIOSA forma



A. PLUTEUS PELLITUS

B. PLUTEUS HISPIDULUS

C. PLUTEUS PETASATUS

C¹. PLUTEUS PETASATUS forma



A. PLUTEUS ROBERTII
E. PLUTEUS GRACILIS

B. PLUTEUS ROBERTII forma
F. PLUTEUS GODEYI

C. PLUTEUS SEMIBULBOSUS
G. PLUTEUS CINEREO-FUSCUS

D. PLUTEUS CINEREUS
H. PLUTEUS PLAUTUS



A. RHODOPHYLLUS DICHROUS B. RHODOPHYLLUS JUBATUS C. PLUTEUS COCCINEUS
D. PLUTEUS CHRYSOPHAeus E. PLUTEUS PHLEBOPHORUS F. PLUTEUS NANUS var. LUTESCENS
G. PLUTEUS NANUS H. PLUTEUS PELLITUS forma



A. RHODOPHYLLUS REPANDUS

B. RHODOPHYLLUS PRUNULOIDES

C. RHODOPHYLLUS GRISEO-CYANEUS

D. RHODOPHYLLUS PORPHYROPHÆUS

E. RHODOPHYLLUS GRISEO-CYANEUS forma



A. RHODOPHYLLUS NITIDUS

B. RHODOPHYLLUS MAJALIS

C. RHODOPHYLLUS LIVIDUS



A. RHODOPHYLLUS RHODOPOLIUS

B. RHODOPHYLLUS SPECULUM

C. RHODOPHYLLUS CLYPEATUS



A & A¹. RHODOPHYLLUS EUCHROUS B. RHODOPHYLLUS PLACIDUS var GRACILIS C. RHODOPHYLLUS LAMPROPUS
D. RHODOPHYLLUS CORDÆ E. RHODOPHYLLUS BATSCHIANUS F. RHODOPHYLLUS COSTATUS G & G¹. RHODOPHYLLUS SERICEUS
H. RHODOPHYLLUS TURBIDUS forma I. RHODOPHYLLUS RADIATUS



A. RHODOPHYLLUS STAUROSPORUS
D & D¹. RHODOPHYLLUS ASPRELLUS

B. RHODOPHYLLUS XYLOPHILUS
E. RHODOPHYLLUS SERICELLUS
G. & G¹. RHODOPHYLLUS SERRULATUS

C. RHODOPHYLLUS EUCHLORUS
F. RHODOPHYLLUS CYANULUS



A. RHODOPHYLLUS ICTERINUS

B. RHODOPHYLLUS ICTERINUS forma GRACILLIMA

C. RHODOPHYLLUS CLANDESTINUS

D. RHODOPHYLLUS PAPILLATUS

E. RHODOPHYLLUS FUMOSELLUS

F. RHODOPHYLLUS CETRATUS

G. RHODOPHYLLUS HIRTIPES



A. RHODOPHYLLUS UNDATUS

B. RHODOPHYLLUS CARNEO-ALBUS

C. PLEUROTUS MUTILUS

D. RHODOPHYLLUS CANCRINUS

E. RHODOPHYLLUS COELESTINUS

F. RHODOPHYLLUS JUNCUS

G. RHODOPHYLLUS INFULA

H. RHODOPHYLLUS MINUTUS



A. RHODOPHYLLUS RHODOCYLIX B. RHODOPHYLLUS NIGRELLUS C. RHODOPHYLLUS BYSSISEDUS
 D & D¹. RHODOPHYLLUS RUSTICOIDES E. RHODOPHYLLUS GRISEO-RUBELLUS. F. RHODOPHYLLUS GRISEO-RUBELLUS forma
 G. RHODOPHYLLUS UNDATUS var. PUSILLUS H. RHODOPHYLLUS MOUGEOTII