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STUDIES IN
THE AGARICS OF DENMARK

BY

JAKOB E. LANGE

PART VIII

OMPHALIA. PLEUROTUS. CLITOCYBE

WITH TWO PLATES

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Studies in the Agarics of Denmark.

Part VIII.

Omphalia. Pleurotus. Clitocybe.

By

Jakob E. Lange.

With two plates.

THE GENUS OMPHALIA.

It is with no little hesitation that I send out this (8th) part of my *Studies in the Agarics of Denmark*. I fear that it will be deemed if not a failure at least a disappointment by readers of former parts. I should rather prefer to postpone the publication some years to gain time for further investigations of the critical species within these difficult genera. But the plan for my work does not allow such postponements. All genera must be dealt with. My illustrations cannot become really useful as long as a descriptive text is wanting.[1])

Even if the text — as I am now able to write it — will be found deficient (or even faulty) I trust it will bring forward so many facts about the species, so many exact details, that it may serve to elucidate some of the intricate problems which confront all students in this interesting but difficult field.

Omphalia is intermediate between *Mycena*, *Collybia* and *Clitocybe*. These affinities are very evident, and already Fries

[1]) "*Danmarks Agaricaceer*" now comprises 1015 watercolour plates, all painted by the author (1893—1929) (Library of the Bot. Museum of the University of Copenhagen). For further particulars vide part I of these Studies.

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 cartilaginous stem is a fairly good characteristic for the *Omphalias*. The second group, *Mycenarii*, characterized by the somewhat campanulate cap, 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. However even this group is not without intermediate forms. *Omphalia grisea* of Ricken is a synonym of *Mycena cinerella*, and *Mycena vulgaris* and *M. rorida* might be mistaken for *Omphalias* even by experienced observers. The little group of tiny species which FRIES calls *Integrelli* shows a certain affinity to the smallest and most filmy *Marasmii*, but these latter can generally be distinguished by their stem which is more cartilaginous and — even in the snow-white species — more or less fuscescent from base upward. Some few *Omphalias* are not unlike *Camarophylli*, but the gills in the true *Omphalias* are not "waxy".

The introduction of the microscope has rendered considerable help for the proper distinction of the numerous species which otherwise are very difficult to characterize with sufficient exactness. The size and shape of the spores, the presence or absence of cystidia, the number of the sterigmata are the most important characters for this purpose. All these appear to be very constant and reliable. Whenever two or more authors disagree as to the spore-dimensions etc. of a certain species (which is very often the case) the overwhelming probability will be that their descriptions cover different species.

In fact so great are the difficulties which confront the student of these tiny fungi that mistakes and misunderstandings can hardly be avoided as long as macroscopic characters only are taken into consideration. The descriptions are often vague approximations. And many of the existing pictures only make confusion worse confounded, because neither colour, striation etc. of the cap nor the nature of the gills are given with sufficient exactness.

Naturally the first result of the use of microscopic characters for the identification will be to make the existing confusion more evident. Thus under the name *O. striæpilea* we have a whole series of distinct species: two smoothspored and two roughspored ones. Likewise *O. pyxidata* covers at least two distinct species: the

O. p. of Ricken with spinulose, spheric spores and the *O. p.* of most other authors with ovate, smooth spores.

What also augments the difficulties of the taxonomy of the *Omphalias* is that while the number of species is rather large the great majority of them are sporadic or rare. In fact not a few are so rare that I have only met with them once (if ever) during 35 years of field-mycology. Under such conditions it is almost impossible to ascertain whether a new find represents a distinct species or merely is an "atmospheric variety" of another one.

On account of their rareness the *Omphalias* — in spite of their large number of species — play a very insignificant part on the mycological stage, while *Mycenas* and *Clitocybes* abound everywhere.

The taxonomy of FRIES, the main point of which is that he divides the genus in two tribes: *Collybiarii* and *Mycenarii*, has not been materially improved by later authors. The boundary-line between the tribes is however rather indistinct, especially when we come to the very small species. Thus Fries himself places *O. stellata* in *Collybiarii*, *O. gracillima* in *Mycenarii*, although these two can hardly be distinguished from each other. The incurved margin, which is said to characterize *Collybiarii*, is often not very pronounced, especially in the smaller species. But nevertheless they are fairly well distinguished from *Mycenarii*, which latter have a certain mycenoid habit: a straight, often rather tall and slender stem, a more or less campanulate cap, which is either subumbonate at first or only slightly umbilicate, while the *Collybiarii* by their whole stature recall *Collybia* or *Clitocybe:* cap flat or infundibuliform, stem shorter etc. A number of the *Collybiarii* are so close to *Clitocybe* in all respects except size that if they were twice as large most authors would probably transfer them to *Clitocybe.*

It is not unlikely that a more exact taxonomy could be established on the main microscopical characters, more especially on the presence or absence of Cystidia. The cystidiate species (almost exclusively met with in *Mycenarii*) might be retransferred to *Mycena*, while the cystideless species would go, the majority to *Clitocybe*, a few to *Collybia.* However such a radical reorganisation will require much more thoroughgoing investigations and should not be attempted without. I therefore keep to the main lines of the Friesian taxonomy. But while FRIES divided the

first group (*Collybiarii*) in three subdivisions, I reduce to two, because the boundary-line between *Hydrogrammi* and *Pyxidati* appears to me altogether too vague.

The total number of *Omphalias* mentioned by FRIES in *Hymenomycetes Europæi* is 51. Later authors (REA for England, RICKEN for Central Europe) have 54. The number of species (or distinct varieties) found and figured by me in *D. A.* is 34. But if to this number be added a number of species met with by other mycologists (SEV. PETERSEN in "*Danske Acaricaceer*" mentions *O. chrysophylla*, *O. scyphiformis*, *O. Postii*, *O. epichysium*, *O. tricolor* and probably others, not found by me) the total for Denmark runs up to a very considerable figure. And when it is taken into consideration that many species are extremely rare, it is not unlikely that further investigations in coming years will bring up the number of Danish *Omphalias* to the European figure.

The details of my taxonomical arrangement of the species will be seen in the Key and will require no particular comments.

KEY

TO THE SPECIES OF THE GENUS OMPHALIA FIGURED IN »DANMARKS AGARICACEER«.

A. **Collybiarii** (Fr.)

Cap generally flat or infundibuliform, with somewhat incurved edge.

α Angustifoliæ (approxim. = *Hydrogrammi*+ *Pyxidati* Fr.). Large to medium-sized species; gills rather crowded, often narrow

1. *Coloratæ*. Cap not white.
   a. subfuscæ. Cap dirtgray, brownish, livid-fuscous or fuliginous.
      * Cap cupshaped or deeply umbilicate.
        † Cap pale livid-cinereous ..... 1. *O. hydrogramma.*
        †† Cap dingy brownish.
          o Cap without striæ ..... 2. *O. umbilicata.*
          oo 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.*
   b. læticolores. Cap subochraceous, somewhat flesh-coloured or gilvous.
      * Strong farinaceous smell, cap subochraceous 9. *O. graveolens.*
      ** Smell none or slight, cap gilvous ..... 10. *O. pyxidata.*
2. *Albatæ*. Cap white.
   a. Gills cream-white ..... 11. *O. scyphoides.*
   b. Gills somewhat ochrey..... 12. *O. chrysoleuca.*

β Latifoliæ. Gills rather broad, somewhat distant. Rather small species.

1. *Tetrasporæ*. Basidia 4-spored.
   a. Fuscous or whitish species.
      * Fuscous.
        † Gills medium, rather dark gray ..... 13. *O. rustica.*
        †† Gills very broad, pallid to somewhat brownish 14. *O. umbellifera.*
      ** Whitish..... 14 a. *O. u.* var. *pseudo-androsacea.*

b. More or less bright-coloured species.
* Green or pale yellow.
† Dark green ..... 15. *O. viridis.*
†† Pale lemon-yellow ..... 16. *O. abiegna.*
** Somewhat flesh-coloured or pinkish.
† Dirty flesh-colour ..... 17. *O. demissa.*
†† Pale pink. ..... 18. *O. rosella.*

2. *Bisporæ.*
* Gills very broad, whitish ..... 19. *O. grisella.*
** Gills narrower, fuscous ..... 20. *O. griseopallida.*

B. **Mycenarii** (Fr.).

Cap somewhat campanulate, edge not incurved.
Stem generally slender.

α Coloratæ. Cap not white.
1. Fasciculate; Cap fulvo-ochraceous ..... 21. *O. Campanella.*
2. Subsolitary.
a. Pallid or fuscous species.
* Dark fuscous.
† 4-spored basidia ..... 22. *O. picta* var.
†† 2-spored basidia ..... 23. *O. pseudo-picta.*
(vide also no. 19 *O. grisella*).
** Pallid grayish (2-spored).
† Cap 0.5—1 cm., stem short ..... 24. *O. speirea* var.
†† Cap 0.2—0.4 cm., stem filiform ..... 25. *O. tenuistipes.*
b. More or less bright-coloured (4-spored).
* Cap pale or clear orange ..... 26. *O. fibula.*
** Apex of stem more or less indigo-blue, Cap generally pallid ..... 27. *O. Swartzii.*

β Albatæ. Whole plant white.
1. *Gracillimæ.* Gills normal, alternating.
a. Stem short, often incurved or ascending.
* Solitary..... 28 a. *O. gracillima.*
** Gregarious ..... 28 b. *O. stellata.*
b. Stem filiform, straight, long: (whitish varieties of 26 and 27).
2. *Integrellæ.* Gills reduced to low ridges or veins or at least hardly reaching the edge.
a. Basidia 4-spored (or unknown).
* Cap glabrous.
† Stem central ..... 29 a. *O. integrella.*
†† Stem subexcentric ..... 29 b. *O. caricicola.*
** Cap pubescent-fimbriate ..... 30. *O. cuspidata.*
b. Basidia 2-spored.
* On sticks and herbaceous plants ..... 31. *O. crispula.*
** On dead leaves of Fagus and Quercus.... 32. *O. polyadelpha.*

SYSTEMATIC AND FLORISTIC NOTES.

A. COLLYBIARII.

α. ANGUSTIFOLIÆ.

1. Coloratæ.

1. **O. hydrogramma** (Bull.).

Diagnosis[1]): Large. Cap 3—5 cm., at first umbilicate-convex, then almost infundibuliform, livid-dirtgray, margin densely striate (whitish and even when dry). Gills crowded, pallid-whitish. Stem cartilaginous, hollow, rather long, often compressed, paler than the cap, base somewhat rooting, white-tomentose.

Spores $5^1/_2$—$6^1/_2$ μ × $3^1/_4$—$3^1/_2$ μ, oval-ellipsoid. — Basidia 4-spored, cystidia 0 (1917).

Figured specimens (*Danmarks Agaricaceer* pl. 276): "Høbbet", gregarious in foliage of Fagus and Picea, outskirts of plantation Nov 1901. — Also at Langesø, on dead foliage of Fagus, Aug. 1917 etc.

This species may be mistaken for a *Clitocybe* (*expallens*, *dicolor* etc.). The best mark of distinction is the hollow, often compressed and twisted, cartilaginous stem. The gills are not "confertissimæ", as given by Fries.

2. **O. umbilicata** (Schaef.) var. *subspadicea.*

Diagn.: Large. Cap $2^1/_2$—5 cm., at first unbilicate-convex then deeply infundibuliform, margin even, watery dirt-brown or almost datebrown (pallid dingy ochre when dry). Gills deeply decurrent, narrow and crowded, pale dirt-brownish. Stem rather short, incurved, somewhat paler than the cap, apex slightly white-silky, very cartilaginous, somewhat dilated above.

Spores 7—8 × $3^3/_4$—4 μ, ellipsoid, base slightly acuminate. Bas. 4-spored, cystidia 0.

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[1]) Only the diagnoses of the rare or critical species are given in a more detailed manner. The descriptions always refer to my own finds only; when I have only met with a species once or twice my diagnoses may consequently be incomplete or even differ materially from what is considered typical or normal for the species in question.

Fig. specim. (D. A. pl. 277): Rudme, "Frueskov", on the foot of a rotten stump (of Fagus), Oct. 1915. — Also at Våsemose etc. 1915—16, in woods of Fagus, on leafmouldy ground.

My plant is darker, more datebrown than described by Fries. Also the gills are darker (not "albidæ", as Fries has it). Bresadola's figure (in *Iconographia mycol.*) depicts an almost white species, which hardly can be identical. Ricken's figure comes nearer to mine but is too fuscous and too large. *O. ventosa* in Bresadola's work is not unlike my species, but differs by having a striate edge.

3. **O. sphagnicola** Berk.

Diagn.: Medium. Cap $1^1/_2$—$2^1/_2$ cm., soon very deeply infundibuliform, watery livid-fuscous, centre slightly squamulose, coarsely pellucido-striate. Gills dirty-pale, narrow, very strongly decurrent. Stem soft, somewhat wavy, paler than cap.

Spores varying mostly from $9 \times 3^1/_2$ to $7 \times 4\ \mu$ (on the same specimen), elongated ellipsoid, almost cylindrical or pipshaped. Basidia 4-spored.

Fig. specim. (D. A. 285): Gerup skov near Korinth, on Sphagnum in a bog, June 1898 (and 1917).

My plants were not tough (as Fries has it). For this reason I formerly referred it to *O. philonotis*. But this species is described as much darker ("nigricante-fuligineus" Fries). Also Cooke depicts an almost sootblack species under this name (*Illustrations* pl. 289.

4. **O. maura** Fr.

Diagn.: Medium. Cap $1^1/_2$—3 cm., convex-flat and umbilicate, dark fuliginous (edge almost even), somewhat paler and shining when dry. Gills almost horizontal, slightly decurrent, whitish. Stem short (3 cm. $\times$ 2 mm.) sootbrown inside and outside, cartilaginous, pale grayish at the base.

Spores broadly ovate, slightly flattened, $4^1/_2$—$6 \times 3^1/_2$—$4\ \mu$. Cystidia crowded on edge of gills, subfusiform, 6—12 μ broad.

Fig. specim. (D. A. 278): Ålsbo bakker, open space in wood of Picea, on the ground among chips etc., gregarious, Oct. 1899.

This pretty little agaric has a somewhat Collybioid habit. While Fries' figure (*Icones selectæ*) is excellent, Ricken's figure is much too pale, and Cooke's (*Illustrations*) has too decurrent gills. — The presence of marginal cystidia in this species probably shows some affinity to *Mycenarii*.

5. **O. leucophylla** Fr. (*O. striæpilea* ex Bresadola.)

Diagn.: Medium. Cap $1^1/_2$—$2^1/_2$ cm., convex, deeply umbilicate, edge striate livid-dirtbrown (paler end even when dry). Stem straight, slender, very cartilaginous, paler than the cap (4 cm. $\times$ 2—3 mm.). Gills decurrent, rather crowded, white (slightly pallid at the base).

Spores 6—7 × 4—4$^1/_2$ μ, oval. Basid. 4-sp. Cystidia sparse, almost cylindrical, about 10 μ broad.

Fig. specim. (D. A. 281): Ørslev Bjerge near Gammeldam, border of road through wood of Picea, gregarious, Oct. 1917. — Also at Krabbesholm, Sept. 1918 (under young Pinus on sandy soil) and at N. Søby, gregarious among sticks and fallen branches in plantation of Picea, Oct. 1928. — The two later finds deviated from the figured specimens by having less crowded and but slightly decurrent gills and a somewhat shorter stem.

Bredasola's figure (in *Iconographia*) of *O. striæpilea* is a very good portrait of my plant. But it differs considerably from O. s. in the Friesian sense (*Icones selectæ*, tab. 73[3]).

. **O. striæpilea** Fr. (sensu Karst.).

Diagn.: Medium or rather small. Cap 1$^1/_4$—2$^1/_4$ cm., convex-flat or slightly umbonate then somewhat depressed, pellucido-striate, pallid dirtbrownish (whitish and even when dry). Gills pallid, decurrent. Stem generally somewhat wavy, not very cartilaginous, pallid-fuscous, 3—4 cm. × 2—3 mm.

Spores oval-spheric, 5$^1/_2$—6$^1/_2$ × 4$^3/_4$—5$^1/_2$ μ, smooth.

Fig. specim. (D. A. 283): Hesbjærg, on the ground among moss and grass, drive in wood of Picea and Fagus, Nov. 1898. — Also at Rask and at Hesselager, in woods of Picea, 1900—1905.

7. **O. bisphærigera** nom. nov. (*O. striæpilea* ex Ricken).

Diag.: Medium to rather large. Cap about 2$^1/_2$ cm., strongly convex, slightly umbilicate, fuscous, somewhat paler towards the edge, pellucido-striate (pale dirtbrown and even when dry). Gills rather distant, very pale grayish, broadly adnate with a slightly decurrent tooth, arcuato-plane, rather broad. Stem straight, rather tall, cartilaginous, 5 cm. × 3$^1/_2$ mm., pallid.

Spores spherical, 8—9 μ diam., very minutely warty-punctate. Basidia 2-spored. — Cystidia cylindric-vesiculose or fusiform-ventricose, 10—20 μ broad (1913).

Fig. specim. (D. A. 282): Tommerup, wood to the north of the station among sticks etc. in plantation of Picea. Also at Dyrehaven near Nyborg on moist ground in wood of Fagus, Oct. 1917 and at Laurbjerg, wood of Fagus, Oct. 1913.

This species has much in common with *O. deflexa* Karst. which however has smaller spores. Ricken figures the spores (of *O. striæpilea*), as having long, straight spinules, almost like those found in No. 8; but this probably is an exaggeration (not unusual in this work).

At Langesø, Sept. 1923 in wood of Picea, Fagus etc. I have met with a form which differed from the one here figured by having a shorter stem, darker and thicker gills (somewhat Laccarioid) which approached the specimen figured by Ricken. The tall-stemmed form here figured might be referred to *Mycenarii*.

8. **O. asterospora** nom. nov. (*O. striæpilea* ex Quél.).

Diagn.: Medium to small. Cap 1—2 cm., convex-flat or slightly depressed, pellucido-striate, pale dirt-brownish (dry: whitish, even). Gills slightly decurrent, plano-arcuate, paler than the cap, somewhat distant. Stem 3 cm. × 2 mm., fusco-pallid, not very cartilaginous, somewhat wavy. It has a very faint smell (of cucumber).

Spores spherical, $5^1/_2\,\mu$ diameter, with $1^1/_4\,\mu$ long cylindric spinules. Bas. 4-spored. Cystidia 0.

Fig. specim. (D. A. 284): Tommerup (wood to the north of the station) on mossy ground under old trees (Fagus), Oct. 1905. — Also at Hesbjerg, in moss, young plantation of Picea, Oct. 1912, and at Gelsted, young plantation of Picea, Oct. 1906—7—14.

Macroscopically so like *striæpilea* (No. 6) that they can hardly be distinguished; it is however a little smaller, the gills slightly darker. *O. pyxidata* (ex Ricken nec al.) seems to be intimately related and has the same type of spore, but differs by the almost even, silky cap, darker gills etc.

No. 5—8 are very difficult to distinguish from each other except by microscopical investigation. Which of them is the real *O. striæpilea* of Fries it is hardly possible to ascertain, but his figure in *Icones selectæ* accords very well with Karsten's smooth-spored species of this name, which I have described under No. 6.

9. **O. graveolens** Sev. Petersen.

Diag.: Rather large. Cap 2—4 cm., deeply umbilicate, at last somewhat infundibuliform (large specimens with irregularly wavy edge), very thin-fleshy, dirty ochre, edge even and somewhat paler. Gills slightly dingy cream (b 8)[1]), somewhat distant, deeply decurrent, arcuate, rather narrow. Stem of the same colour as the cap, a little darker dirt-brownish towards the base, at last hollow, base white-felty. Strong farinaceous smell (*Tricholoma stans* etc.).

Spores ovate-ellipsoid or obovate, 7—8 × $3^3/_4$—$4^1/_4\,\mu$. Basidia 4-spored. Cystidia 0.

Fig. specim. (D. A. suppl.): Langesø Nordskov, gregarious in dense plantation (Chamæcyparis with old Pinus and some few Betula), Oct. 1928. (Also Nov. same year and Oct. 1929).

First described by Sev. Petersen in his "*Danske Agaricaceer*" (1907). More slender and light-coloured than O. umbilicata (No. 2). Darker than *O. Kalchbrenneri* Bres. — Less robust and with a more cartilaginous stem than the more hazel-brownish *Clitocybe squamulosa*.

10. **O. pyxidata** (Bull.).

Diagn.: Medium to rather small. Cap 1—2 cm., deeply umbilicate, at last somewhat infundibuliform, coarsely pellucido-striate,

[1]) Referring to figures and numbers on my colour-chart in Studies VI.

fleshcoloured-rufous or almost gilvous. Gills subdistant (occasionally furcate, but not connected by veins), rather narrow, arcuato-decurrent, at last descending, gilvous-pallid or isabella. Stem 3 cm. × 1½ mm., wavy, somewhat cartilaginous, paler than the cap, not hollow, base slightly white-tomentose. Sporepowder white.

Spores ovate-pipshaped, 7½—8½ × 4½—5 μ. Bas. 4-spored, cyst. 0.

Fig. specim. (D. A. 280) 1): Hunderup, edge of road on sandy soil, Oct. 1903. 2): Kerteminde, sandy grassland near the coast, Sept. 1905 and in other places 1906—26.

O. pyxidata 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 represented by my figure 1; Quélet also regards *O. m.* as a mere form of *O. pyxidata*. The *O. muralis* of Ricken is more like a form of *O. rustica*.

2. Albatæ.

11. **O. scyphoides** Fr. (?).

Diagn.: Medium. Cap 1—2½ cm., rather fleshy, at first plano-convex, slightly depressed, then subinfundibuliform, often irregular, not hygrophanous and without any striation but (s. l.) minutely innato-fibrillose or subsquamulose, pure white. Gills decurrent, crowded, very narrow, cream. Stem short, white, base somewhat yellowish, rather firm and tough, not hollow, a little thicker above, base fibrillose.

Spores ovate-ellipsoid, obliquely pedicellate, 5½—6 × 3¼ μ. Bas. 4-spored. Cystidia 0.

Fig. specim. (D. A. 279): Langesø (Sydskoven), on the ground amongst needles in wood of Abies (in the vicinity of *Clitocybe parilis*). — Answers fairly well to the description of Fries; but may be nothing but an albino of *Clitocybe parilis*.

12. **O. chrysoleuca** Fr. (?).

Diagn.: Medium. Cap 2½ cm., plano-convex, slightly depressed and indistinctly umbonate, white, glabrous, somewhat shining without striation, flesh thin except at the umbo. Gills very narrow (1½ mm.) and crowded, thin, strongly decurrent, furcate below, light ochre. Stem 3—4 cm. × 2½ mm., solid, whitish, base slightly thickened and tomentose, apex strongly widened into the tissue of the cap. Taste somewhat bitter. Sporedust white with a slight tinge of dingy fleshcolour.

Spores obliquely ovate-ellipsoid or almost pipshaped, 6½—7½ × 3½—4 μ.

Fig. specim. (D. A. Supplem.): "Snapind" near Odense, solitary in a Betula-bog (Betula, Fraxinus etc.) in moss by a stump,

Oct. 1922. — Answers very well to the description of *O. chrysoleuca;* but may be only a dwarfish form of *Lepista orcelloides.*

β. LATIFOLIÆ.

1. Tetrasporæ.

13. **O. rustica** Fr.

Diagn.: Small. Cap 0.7—1.4 cm., convex, umbilicate, at last umbilicato-infundibuliform, sootbrown, coarsely striate (when dry: fuscous, rugulose, dull). Gills very decurrent, rather distant, arcuate, (about 1 mm. broad), dirt-gray, darker when old. Stem solid, thin, rather slender (2 cm. × 1 mm.), colour of cap. Smell none.

Spores broadly ovate or subspheric-ovate, $6^1/_2$—$7^1/_2 \times 4^3/_4$—$5^1/_2\ \mu$. Basida 4-sp. Cyst. 0.

Fig. specim. (D. A. Suppl.): Gelsted Lunger, gregarious on Sarothamnus-hill among Lichens, heather etc., sandy soil, Oct. 1929.

It differs from *O. grisella* by 4-spored basidia, darker colours etc., from *O. griseopallida* by longer stem, more distinctly umbilicate cap, shorter, more roundish spores and 4-spored basidia.

14 a. **O. umbellifera** (L.) *f. typica.*

Diagn.: Medium to small. Cap 1—2 cm., umbilicato-convex, at last almost infundibuliform, pale dirtbrown-olive with very coarse subfuscous striæ (dry: almost whitish). Gills very distant and very broad, edge almost straight, decurrent, pallid. Stem short, often incurved, somewhat fuscous, base paler.

Spores ovate, 8 × 5 μ.

Fig. specim. (D. A. 287): Trolleborg, gregarious on peat, (sidewalls of ditches in a bog), Oct. 1899. Rather common in similar localities.

14 b. **O. umbellifera** *f. albida* (*O. pseudo-androsacea* (Bull.)).

Diagn.: Whole plant whitish, striæ hyaline or dingy white. For the rest like No. 13 a.

Fig. specim. (D. A. 288): Rold, on peaty ground in a heath-bog, Oct. 1899. Not uncommon in similar places. — Various intermediate forms occur.

15. **O. viridis** Fl. Dan. (tab. 1672[1]) (as a var. of *O. umbellifera*).

Diagn.: Very small. Cap 0.5—0.7 cm., convex, depressed in the middle, coarsely striate, fundamental colour pale green, but the centre and the striæ of a dark dull green colour. Gills broad, decurrent, distant, edge almost straight, white with a flush of greenish. Stem about 2 cm. × 1 mm., dull dark green.

Spores ovate, somewhat pipshaped, $7^1/_2$—$9^1/_2 \times 4^1/_2$—$5\ \mu$. Basid. 4-sp.

Fig. specim. (D. A. 290): Gelsted Lunger (on sandy hill among lichens in young plantation of Picea and Pinus, Oct. 1907. — *O. smaragdina* Berk. evidently is a synonym and so is *O. chlorocyanea* Pat. I am inclined to regard it as a distinct species, not as a variety of *O. umbellifera*. But I have never met it again.

16. **O. abiegna** B. et Br. (*O. umbellifera v. citrina*).

Diagn.: Medium to rather small. Cap 1—$2^1/_2$ cm., convex, at last slightly umbilicate, pellucido-striate, pale lemon-yellow (whitish and even when dry). Gills distant, arcuate, decurrent, of the same colour. Stem short, white, with or without a slight tinge of yellowish.

Spores ovate, $8 \times 5\ \mu$. Basidia 4-spored. Cystidia 0. The trama of the gills is made up of 9—$15\ \mu$ broad hyphæ.

Fig. specim. (D. A. 289): Hesbjerg, on old stump of Picea. Not uncommon, always on stumps of Picea, often gregarious.

The strongly convex cap and the arcuate gills besides the characteristic colour distinguish this species from *O. umbellifera*. No intermediate forms are ever met with. For these reasons I cannot regard it as a mere variety of *O. u.* — This pretty little agaric has been overwhelmed with names. The list of synonyms comprises among others: *Hygrophorus Wynnei* B. et Br. *Omphalia bibula* Quél., *O. umbellifera* var. *chrysoleuca* Pers. This latter probably is the most ancient name, but leads to confusion with *O. chrysoleuca* Fr.

17. **O. demissa** Fr. var.

Diagn.: Small. Cap 0.8—1.6 cm., submembranaceous, convex, slightly depressed or umbilicate, fleshcoloured-fuscous, dull, hardly pellucido-striate (when dry paler, almost argillaceous and somewhat pruinate-furfuraceous. The edge on the bigger specimens is often irregular-sinuate and the surface slightly rugose. Gills distinct, rather thick, arcuato-decurrent, of the same colour or a little more lilac-fleshcolour. Stem 2—$2^1/_2$ cm. $\times$ 1—$1^1/_2$ mm., wavy, hardly hollow, of the same colour, glabrous, dull, not particularly tough.

Spores pipshaped (somewhat oblique) 7—$8 \times 4^1/_2$—$5\ \mu$. Cyst. 0. Basidia mostly 4-spored (exceptionally 3- or 2-spored on the same gill).

Fig. specim. (D. A. suppl.): Kalør, in old grassfield (light gravelly soil) amongst Gnaphalium silvestre, Holcus mollis etc. behind a copse, rather numerous, Nov. 1919.

Differing from *O. hepatica* (Fries) by the coloured gills and by not being "tenax, rigidus" nor truly infundibuliform. But the *O. hepatica* of Ricken appears to me to be synonymous. My plant differs from the typical *O. demissa* in the Friesian sense by not having the stem "politus, nitidus".

18. **O. rosella** J. E. Lange, nova. sp.

Diagn.: Small. Cap 0.7—1.5 cm., membranaceous, at first umbilicate with incurved edge, 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. When dry the colour is paler and duller. Gills deeply decurrent rather narrow, somewhat furcate, rather distant, pale pink. Stem short (1—2 cm. × 1½ mm.), at first pinkish, then whitish, glabrous, somewhat wavy, not particularly tough and not hollow.

Spores cylindrical-ellipsoid, obliquely pedicellate, 7½—9 × 4—4½ μ. Basidia 4-spored. Cystidia scattered, short hairshaped, about 4 μ thick (the base, which is imbedded in the tissue of the gill, about 6 μ).

Fig. specim. (D. A. 292): "Slukefter" near Odense, in a park, gregarious on old lawn, (light soil), Oct. 1921 (and 23).

Pileus diametro 0.7—1.5 cm., membranaceus, umbilicatus (margine incurvato) dein infundibuliformis, lævigatus, roseolus (pars centralis sordide subfulva), margine (in adultis) crenato-fimbriato vel rugoso-plicato, pallescens; lamellis longe decurrentibus, angustis subfurcatis, subdistantibus, pallide roseolis. Stipes brevis (1—2 cm. × 1½ mm.), roseolus (in adultis albus), glabratus. Sporæ et cystidia ut supra. —

2. Bisporæ.

19. **O. grisella** (Weinm.) Karst.

Diagn.: Very small. Cap 0.5—0.9 cm., fundamental colour pallid sordid, the distant and coarse striæ and centre fuscous, strongly convex, slightly umbilicate. Gills distant, very broad, whitish. Stem slender (2—3 cm. × 1 mm.), subfuscous, minutely pruinose.

Spores ellipsoid-oblong, obliquely pedicellate, 8 × 3½ μ. Basidia with 2 (1—3) sterigmata.

Fig. specim. (D. A. 291): Årup, sandy hill among grass, lichens and young Picea, Sept. 1902. Rather common in similar localities.

O. velutina Quél. probably is synonymous. To judge from the figure of Bresadola (*Iconographia*) it is somewhat larger and paler. Probably *O. g.* is often mistaken for a form of *O. umbellifera*, f. inst. the variety mentioned by Fries in *Hymen. Eur.* as being "grisea, pileo stipiteque velutinis, in terra deusta".

20. **O. griseopallida** (Desm.).

Diagn.: 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 (1—2 cm. × 1 mm.), of the same colour; somewhat wavy or incurved.

Spores varying from 9—12$^1/_2$ × 5—6 μ (mostly 10—11$^1/_2$ × 5$^1/_2$), ovate or ovate-ellipsoid. Basidia 2-spored.

Fig. specim. (D. A. 286): Nyfæste near Årup, grassy path on a hill with Calluna, Holeus lanatus and other xerophilous grasses, Oct. 1900. — Vide also no: 13.

B. **MYCENARII** (Fr.).

α. COLORATÆ.

21. **O. campanella** (Batsch).

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

Spores ovate-ellipsoid or pipshaped, 6$^1/_2$—7$^1/_2$ × 3$^1/_2$ μ. Basid. 4-spored. Cystidia scattered, short, cylindric-filiform.

Fig. specim. (D. A. 293): Hunderup, growing densely clustered on the rotten stump of a pole (pinewood?), April 1905 (and 1909).

22. **O. picta** Fr. var. *concolor*.

Diagn.: Small. Cap 1—1$^1/_2$ cm., campanulato-convex, coarsely and rather densely striate, fundamental colour pallid, centre and striæ fuliginous. Gills extraordinarily broad (as broad as long), plane with a decurrent tooth, gray (edge paler), rather distant, venose. Stem 4—6 cm. long, straight, hollow, paler than the cap, glabrous, base (sub lente) minutely pruinose-pubescent.

Spores ovate-ellipsoid, 7—8 × 3$^1/_2$—4 μ. Basid. 4-spored. Edge of gills densely set with obovate-clavate cystidia whose outer portion has numerous wartlike setulæ (like those found in a number of Mycenas).

Fig. specim. (D. A. 294): Rold, outskirt of wood of Picea, edge of bog, gregarious among moss and needles, Oct. 1898.

The main form (which is characterized by the fulvous membranaceous mycelium surrounding the base of the stem) I have never met. — If the spores of *O. picta* are "minutely echinulate" (as SACCARDO has it) my find must be regarded as a distinct species.

23. **O. pseudo-picta** J. E. Lange, nova spec.

Diagn.: Small. Cap 0.9—1.5, campanulate, at last convex with a minute, evanescent papilla, dirt-grayish, centre and the coarse, rather dense striæ dark fuscous, somewhat shining (when dry paler and even). Gills extraordinarily broad, edge horizontal, arcuate and decurrent, gray (edge paler), distant. Stem 6 cm. × 1$^1/_2$ mm., straight and rather stiff, glabrous, paler then the cap, slightly hollow, somewhat rooting with a little white-fibrillose rootlet.

Spores obovate, base slightly acuminate, 9—10 × 6 μ. Basidia

2-spored. Cystidia crowded, inflated-clavate (35—45 × 9—16 μ, in young specimens without or almost without branchlets, in older ones crowned with irregularly protruding short branchlets.

Fig. specim. (D. A. 295): Dalum Landbrugsskole, gregarious in an old grassfield behind a hedge of Cratægus, Nov. 1914.

Evidently very close to No. 21, being intermediate between this one and *O. umbratilis* var. *minor* as described by Fries. I have never met it again. I add a brief latin diagnosis.

Pileus 0.9—1.5 cm., campanulatus subpapillato-convexus, striatus, fusco-pallens (pars centralis et striæ fuscæ), nitidus, lamellis distantibus, latissimis, horizontalis, arcuato-decurrentibus, griseis (acie pallidiore). Stipes 6 cm. × $1^1/_2$ mm., rectus, glaber, subfistulosus, pallidior. Basidia sterigmatis 2. Cystidia et sporæ ut supra.

24. **O. speirea** Fr. var.

Diagn.: Small. Cap 1.2 cm., convex-flat, slightly depressed, whitish with coarse hyaline-gray striæ. Gills rather narrow and distant, white, decurrent with a tooth. Stem whitish, almost glabrous, about 2 cm. × 1 mm.

Spores ovate-pipshaped, 8—10 × 5—$5^1/_2$ μ. Cystidia short, hairshaped, obtuse. Basidia 2-spored, about 6 μ broad.

Fig. specim. (D. A. 299): Hjallese 1) on a fallen twig of Alnus, Nov. 1898. 2) On the trunk of a Salix capræa, Dec. 1897. — A darker, subfuscous form is also met with.

The figure in *Icones selectæ* of O. speirea depicts two types, one with a dark papilla, one more campanulate-convex. Mine are never papillate. *O. grisea* Fr. shows some affinity, but has a lastingly campanulate cap and grows on the ground in pinewoods. (*O. grisea* sensu Ricken is a synonym for *Mycena cinerella* Karst., easily recognised by its strong farinaceous smell). *O. albido-pallens* Karst. (to which species I formerly referred my plant) differs by having spheric-ellipsoid spores, 4—5 × 3 μ. *O. speirea* is called *Mycena speirea* in *Hymenomycetes Europæi* but appears to be a true *Omphalia* (and is called *Omphalia s.* by Fries himself in *Icones selectæ*).

25. **O.** (*speirea* var.?) **tenuistipes** J. E. Lange.

Diagn.: Very small. Cap 0.3—0.5 cm., convex, whitish with hyaline-grayish striæ. Gills broad, arcuate, rather distant, whitish. Stem filiform, 2—$3^1/_2$ cm. × 0.3—0.6 mm., white.

Spores obovate-pipshaped, 8—11 × 5 μ. Basidia 2-spored. Cystidia short hairshaped, about 5 μ broad (or slightly fusiform, scattered).

Fig. specim. (D. A. 298): Hjallese, on fallen sticks and in decaying foliage in moist copse, Oct. 1897 and 98. — Also on dead bark of Corylus etc.

The numerous intermediate forms which connect No. 24 and

25 and the exact correspondence of their microscopical characters make me believe that they are not specifically distinct, although habitually very different. *M. grisea* as depicted by BRESADOLA (*Iconographia*) may be such an intermediate form. The name *O. setipes*, which is now generally applied to pale forms of *O. Swartzii*, would be very appropriate for this tiny agaric, but would lead to confusion.

26. **O. fibula** (Bull.).

Diagn.: Very small. Cap 0.5—1 cm., convex-campanulate, slightly depressed, clear or very pale orange, pellucido-striate. Gills arcuate, very deeply decurrent, white. Stem filiform, more or less tinged with orange, 3—5 cm. × 0.6—0.8 mm.

Spores very small, 5 × $2^1/_2$ μ. Cystidia very scarse, the protruding portion obtusely awlshaped, subcapitate, 6—7 μ broad. — Basidia 4-spored (1916).

Fig. specim. (D. A. 296): 1) A form from deep moss on boggy ground, Bramstrup mose, July 1897. 2) Hjallese, in short moss under Fagus, Oct. 1897. Common.

In wet and shady places the whole plant often becomes very pale, almost white.

27. **O. Swartzii** Fr. (*O. setipes* var. *acrocyanea* Fr.).

Diagn.: Very small. Differing from no. 26 by the cap being a little more umbilicate (subfuscous in the centre, pallid towards the edge) and by the apex of the stem being dark indigo to violet.

Spores $5^1/_2$ × $2^1/_2$ μ, narrow pipshaped. Basidia 4-spored. Cystidia (free portion) narrow conical, subcapitate, about 7—13 μ broad.

Fig. specim. (D. A. 297): Hjallese, amongst low mosses in wood, May 1898. Not uncommon. — Expallent forms of nos. 26 and 27 are very much alike, and *O. Swartzii* may be regarded as a variety of *O. fibula*.

β. ALBATÆ.

28 a. **O. gracillima** Weinm.

Diagn.: Very small. Cap 0.8 cm., campanulate-convex with a minute papilla, snow-white, hyalino-striate. Gills arcuate, rather broad. Stem incurved, short, 2 cm. × 0.5 mm.

Spores ellipsoid-pipshaped, 7 × $3^1/_4$ μ. Basidia 4-spored. Cystidia (free portion) obtuse awlshaped, 25 μ long.

Fig. specim. (D. A. 300): Hjallese, solitary on dead petiole of herbaceous plant in copse, Sept. 1898.

28 b. **O.** (*grac.* var.) **stellata** Fr.

Diagn.: Macroscopically hardly to be distinguished from no. 28 a except by its somewhat gregarious habit and by the habitat (on the bark of twigs and fallen branches of Picea).

Spores $6^1/_2$—$7^1/_2 \times 3^1/_4\ \mu$. Basidia and Cystidia like no. 28 a.

Fig. specim. (D. A. 301): Trolleborg, on sticks of Picea, gregariously, Nov. 1899. Not uncommon.

This little agaric is referred by Fries to *Collybiarii*, while *O. gracillima* was placed by him in *Mycenarii*. I see no real difference. Cooke's fig. (loc. cit.) of O. stellata is fairly good. *O. buccinalis* Sow. is hardly specifically distinct. — Bresadola (*Iconographia*) distinguishes the two species (*gracillima* and *stellata*) by the form of their spores (which for *O. g.* he describes as "narrow, 7—9 × 2—3 μ" while for *O. st.* he has "subglobose, 4—6 × $4^1/_2$—5 μ"). As will be seen, my spore-dimensions — for both forms — are exactly intermediate.

28 a. **O. integrella** (Pers.).

Diagn.: Very small; whole plant milk-white. Cap 3—6 mm., campanulate-convex, striate. Gills reduced to raised veins or very low, wavy, somewhat branched ridges. Stem 1—$1^1/_2$ cm. × 0.7 mm., incurved, base slightly swollen, minutely pilose.

Spores pipshaped, $7^1/_2$—8 × $4^1/_2\ \mu$. Basid. 4-sp. Cystidia 0.

Fig. specim. (D. A. 304): Hjallese, on mossy, decaying stump of Populus in wood, Sept. 1908.

28 b. **O. (integrella** var.?) *caricicola* (*O. caricicola* Lasch?).

Diagn: Very small; entirely milk-white. Cap 3—7 mm. Gills as in no. 28 a. Stem often somewhat excentric, very short (6 mm.).

Spores $7^1/_2 \times 4\ \mu$(?) Cystidia (free portion) subulate, somewhat obtuse.

Fig. specim. (D. A. 305): Skovsbo near Flødstrup, gregarious on dead Carex stricta in a bog, Oct. 1899.

Marasmius (*Androsaceus*) *Caricis* Karst. may be synonymous.

29. **O. cuspidata** Quél. var. *stenospora* n. v.

Diagn.: Very minute, entirely white. Cap 1—3 mm., convex with a minute, occasionally excentric papilla, edge and surface pubescent. Gills about 10, arcuato-decurrent, narrowed towards the edge (but nearly reaching it). Stem filiform, insititious, incurved, $^1/_2$—1 cm. × 0.25 mm., minutely pubescent.

Spores clavate-ellipsoid, 8—10 × 2—$2^1/_4\ \mu$. Basidia 4-spored. Cystidia 0. Hairs on edge of cap about 40 μ long.

Fig. specim. (D. A. 302): Hjallese, gregarious on almost dead Fragaria, Oct. 1906 (and Sept. 1907). — Also on mossy stem of Salix, gregarious, July 1897.

The narrow spores this species has in common with *O. gracilis* Quél., which, however, is described as somewhat larger (5 mm.) and glabrous, with a rooting stem. — The only difference between the *O. cuspidata* of Quélet and my plant is the very narrow spores, while Quélet describes the spores as pruniform, 8 μ long.

30. **O. crispula** Quél.

Diagn.: Very minute, entirely milk-white. Cap 2—3 mm., at first hemispherical, then convex, edge and surface minutely pilose. Gills (5—9 in number) decurrent, near the stem about $^1/_4$ mm. broad, but disappearing half way towards the edge. Stem insititious, incurved, filiform ($^1/_2$ cm. × 0.25 mm.), everywhere pilose.

Spores ellipsoid-pipshaped, $9^1/_2$—10 × $4^1/_2\,\mu$ (10—$11^1/_2$ × 5 1906). Basidia 2-spored. Cystidia 0. Hairs on stem thin (2 μ), erect, sligthly wavy, long (150 μ below, about 65 μ above).

Fig. specim. (D. A. 303): Hjallese, on dead Fragaria, Aug. 1905. (Also Dalum Landbrugsskole, Nov. 1906 (on Fragaria), and Hjallese, Nov. 1906 (on Pæonia)).

This species is very closely related to no. 29, chiefly distinguished by want of papilla and by the 2-spored basidia with broader spores.

31. **O. polyadelpha** (Lasch).

Diagn.: Very minute, hyaline-white. Cap about 2 mm., convex striate, pruinoso-flocculose. Gills narrow, arcuato-decurrent, distant. Stem insititious, filiform, about 1 cm. × 0.2 mm.

Spores ovate-lanceolate or cylindric-ellipsoid, 10—11 × $4^1/_2$—5 μ (or 11 × $4^1/_2$ or $9^1/_2$—$10^1/_2$ × $4^1/_2$—$4^3/_4\,\mu$). Basidia 2-spored. On the figured specimens no cystidia were observed; but on those from 1902 the edge of the gills were (very sparingly) set with globose, minutely setulose-warty cells. — The surface of the cap is clad with rather large, sausage-shaped, warty cells.

Fig. specim. (D. A. 306): Hjallese, gregarious on dead foliage of Quercus (rarely also of Fagus), Nov. 1897 (and 1898—1902).

The somewhat decurrent gills and the 2-spored basidia distinguish this tiny little species from *Mycena capillaris*, which also generally is somewhat larger. From *Mycena Mucor*, which also is a very near relative, it is distinguished by the 2-spored basidia and want of basal disc.

THE GENUS PLEUROTUS.

Pleurotus is a somewhat artificial genus. The only general character which distinguish the rather numerous species from the adjacent genera is the excentric (or lateral) insertion of the stem. Now excentricity is a quality which seems to be developed by growing in a lateral position and which therefore is to be met with chiefly in xylophilous fungi. (It is even not infrequent to meet with specimens of normally excentric species which on account of their growing on the horizontal surface of a stump have become regular or subcentral (*Panus* sp. div. etc.), and vice versa: regular species (e. g. *Clitocybe cyathiformis*) which by growing laterally on trunks have become excentric, because the side of the cap which faces the trunk is incompletely developed. A good many species of *Pleurotus* in fact are nothing but excentric xylophilous representatives of other genera, such as *Clitocybe*, *Tricholoma* etc.

Other species, however, especially of the lateral or resupinate groups, are so entirely transformed from the ordinary *Agaricus*-type, that they cannot be referred to any other existing genera. And as the genus *Pleurotus* must therefore needs be upheld I deem it most practical — instead of transferring the Tricholomoid and Clitocyboid species to these genera — to maintain the genus in its Friesian sense. — KARSTEN has segregated the sessile species as a new genus *Phyllotus*. But the minute petiolate species link this group so intimately to the rest of the *Pleuroti* that its separation is hardly satisfactory.

The tissue of most of the fleshy species is rather tough. In some cases it is even not quite easy to say whether a given specimen should be referred to *Pleurotus* or *Panus*. Evidently toughness — like excentricity — is a character produced by a xylophilous habit. Whether the evolution of a layer of gelatinous tissue in the cap (a character found in a number of *Pleuroti*) is also a character

developed in fungi by growing on wood is not clear to me. But the number of gelatinous xylophilous fungi within diverse groups is certainly very large (*Exidia*, *Bulgaria*, *Dacryomyces* etc.). The gelatinous tissue may serve as a water-reserve, may be able hygroscopically to absorb water or in other ways protect the plant against withering.

The microscopic characters are of considerable use for the exact delimitation of the species. The spores vary considerably in size and shape (from about 12 μ in length to a diametre of less than 4 μ, from linear-oblong to almost spheric). Nearly all the species have perfectly smooth spores; the only exception to this rule known to me is *P. petaloides* whose spores are minutely warty-punctate, and which also in other respects is an outsider in the genus. — Cystidia are rather rare and — when found — generally of a very commonplace shape. The most remarkable ones are those found in *P. petaloides:* very thickwalled, fusoid, pointed cells. In *P. ostreatus* and its allies we have obtuse, clavate marginal cystidia with a short hairlike appendix. Twospored basidia I have never met with in the genus.

The number of *Pleuroti* figured by me is about 20, a comparatively small number (Fries in *Hymenomycetes Eur.* has 68). But this is only what might be expected in a country where nearly all woods are cultivated ones, where stumps are carefully lifted, fallen branches removed and no sick or dead trees allowed to stand. However besides the species here mentioned some others have been recorded by other authors. Thus Severin Petersen ("*Danske Agaricaceer*") mentions *P. spodoleucus*, *P. pometi*, *P. dictyorhizus*(?) *P. pulmonarius*, *P. porrigens* and others, and careful field-work in out-of-the-way localities may bring others to light.

Taxonomy. Fries in *Hymenomycetes Europæi* divides the *Pleuroti* in three main groups which he calls *Excentrici*, *Dimidiati* and *Resupinati*, chiefly characterized by the respectively excentric, lateral or obliterate stem. The excentric species (by far the more numerous) are then arranged in 4 subdivisions: the velate, the tricholomoid, the clitocyboid and the lateral-clitocyboid. — As mentioned above Karsten segregated the resupinate and sessile species (sub nom. *Phyllotus*) in a distinct genus (which nearly equals what Quélet called *Calathinus*). The deviations from Fries in other authors are less essential. Schroeter transfers *P. corticatus* and the other velate species to *Armillaria*, *P. ulmarius*

to *Tricholoma* and *P. ostreatus* etc. to *Clitocybe*. I do not follow him in this. The genus *Armillaria* is hardly worth upholding, as the species now generally included in it do not make up a taxonomic entity, but in most cases find a more natural position within other genera (*Cortinarius*, *Tricholoma* etc.). *P. ostreatus* and its allies should not be transferred to *Clitocybe* and thus separated from *P. corticatus* to which they are evidently very intimately related (particularly by the shape and size of their spores). *P. nidulans* the English author REA (loc. cit.) transfers to *Crepidotus*. This, however, most likely is a mistake. The *C. nidulans* of Rea is described as having bright ochraceous, broadly elliptical spores, 5—6 × 4 μ, and probably is a form of *Paxillus panuoides*. According to RICKEN and KARSTEN (and my own observations) the true *P. nidulans* has very small, narrow spores, not over 2 μ broad, almost like those of *Panus stypticus*. Its right position may be in *Panus*.

The number of *Pleuroti* found by me is too small to form a reliable foundation for any important taxonomic reconstruction. But by making use (to a rather large extent) of the microscopic characters I have tried to make my Key to the genus more exact than it can possibly be when only such characteristics as can be seen with the naked eye are taken into consideration.

KEY

TO THE SPECIES OF THE GENUS PLEUROTUS FIGURED IN »DANMARKS AGARICACEER«.

A. **Carnosi.**

Cap more or less fleshy, often large, rarely < 2 cm. broad.

α. Excentrici. Stem more or less excentric.
1. *Clitocyboidei.* Gills decurrent.
   a. Cylindrospori. Spores cylindric-oblong.
      * Velati. Veil present (soon disappearing) ..... 1. *P. corticatus.*
      ** Nudi. Veil 0..... 2 a. *P. ostreatus.*
      2 b. *P. o.* var.
   b. Ovispori. Spores ovate.
      * Cap thick-fleshy. Gills without cystidia ..... 3. *P. pulvinatus.*
      ** Cap rather thin-fleshy. Cystidia fusoid, large: vide no. 9.
2. *Tricholomoidei.* Gills not decurrent.
   a. Very large (10—20 cm.). Gills broad. Smell slight. 4. *P. ulmarius.*
   b. Medium; Gills narrow. Smell strong, mealy.. 5. *P. lignatilis.*

β. Laterali. Stem exactly lateral (or 0).
1. *Virgulispori.* Spores very small and narrow.
   a. Stem lateral. Gills white or yellowish
      * Cap medium, olive-greenish. Gills yellowish .. 6. *P. serotinus.*
      ** Cap small, whitish to pallid fleshcolour..... 7. *P. mitis.*
      (Spores large, cylindric-oblong: vide no. 2).
   b. Stem 0. Gills bright orange ..... 8. *P. nidulans.*
2. *Ovispori.* Spores ovate or ellipsoid.
   (Spores large, cylindric: vide P. ostreatus, no. 2).
   a. Cystidia numerous, fusoid, rather large. Cap medium
   9. *P. petaloides.*
   b. No cystidia. Cap small.
      * Cap cinereous ..... 10. *P. acerosus.*
      ** Cap white ..... 11. *P. limpidus.*

B. **Effugientes.**

Cap very small (rarely above 1 cm.).

α. Pedicellati. Stem distinct (short, often incurved), excentric.
1. Cap white ..... 12. *P. mutilus.*

2. Cap coloured.
   a. Cap fuscous, almost even ..... 13. *P. fuscifrons.*
      (vide also no. 10, P. acerosus).
   b. Cap fleshcoloured, radiato-striate ..... 14. *P. roseola.*

β. Resupinati. Stem wanting or rudimentary.

1. Cap fusco-cinereous. Spores globose.
   a. Cap naked ..... 15. *P. applicatus.*
   b. Cap in the middle covered by black velutinous coating.
      16. *P. Rhacodium.*
2. Cap whitish or pale. Spores not globose.
   a. Spores ovate.
      * Cap striate, pallid ..... 17. *P. striatulus.*
      ** Cap even, white ..... 18. *P. chioneus.*
      (vide also no. 11: P. limpidus).
   b. Spores lanceolate ..... 19. *P. pubescens.*

SYSTEMATIC AND FLORISTIC NOTES.

A. CARNOSI.

α. EXCENTRICI.

1. Clitocybari.

1. **P. corticatus** Fr.

Diagnosis: Large and fleshy. Cap 6—10 cm. whitish, more or less fibrilloso-squamulose with adpressed, innate, pallid to dirtgray scales. Gills white, deeply decurrent and anastomosing. Stem generally short and stout (2—5 cm. × 2 cm.), whitish, with a white, membranaceous and very fugacious veil, the remnants of which are seen on the edge of the cap and just below the gills.

Spores cylindric-oblong, straight or slightly curved, 11—13 × $3^1/_2$—$3^3/_4$ μ. Cystidia obovate-clavate, 6—7 μ broad, with a 6—10 μ long, thin, hairlike appendix. — Basidia 4-spored (1902).

Fig. specimen (D. A. 156): Hvidkilde, on a fallen Populus monilifera, Sept. 1900.

Not uncommon, chiefly on Populus, but also to be met with on Ulmus, Fagus, Pyrus Malus.

2 a. **P. ostreatus** (Jacq.).

Diagn.: Large and rather fleshy. Cap 6—12 cm. broad, glabrous, varying in colour from livid to dark livid-fuscous or purplish black, expallent. Gills crowded, decurrent and anastomosing, pallid, then whitish. Stem of varying length, very excentric or even definitely lateral, whitish, base more or less strigose. Often fasciculate.

Spores cylindric-oblong 10—11 × $3^1/_2$—$3^3/_4$ μ. Cystidia short, scattered, their free portion only slightly protruding (12—14 μ × 5 μ), obtuse, with a hairlike appendix, which often terminates in a minute head. Basidia 4-spored.

Fig. specim. (D. A. 159): Hunderup, on stump of Picea, fasciculate, Dec. 1900. — Rather common, especially on Salices and Populus, but also on Fagus. The figured specimens are the only ones I have met on coniferous wood.

2 b. **P. ostreatus** var. (a transition to *P. euosmus* Berk.).

Smaller; gills at first hyaline-gray, the surface gray with a flush of lilac (later becoming pallid with a tinge of isabella). Smell

faint, Psalliota-like. Stem lateral, almost obsolete. Spores etc. identic.

Fig. specim. (D. A. 160): Hjallese, on the inside of a hollow stump of Fagus, Dec. 1911.

P. salignus (Pers.) comes very close to no. 2 b, but hardly deserves specific rank. I regard it as a subsolitary, almost lateral-sessile form, chiefly growing on the trunk of living Salices and Populus, late in the year.

3. **P. pulvinatus** (Pers.).

Diagn.: Large and firm-fleshy. Cap ovate (10 × 8 cm.), with an almost lateral stem, alutaceous-fleshcoloured or pallid-subochraceous (centre whitish-pale), almost glabrous (sub l. minutely flocculose). Gills rather crowded, connected by veins, decurrent, whitish with a tinge of the colour of the cap. Stem stout (2 cm.) short, whitish, slightly mealy-pubescent, with a short, blunt subbulbous "root". Flesh white, with a faint sweetish smell. Sporedust white.

Spores broadly ovate, $5^1/_2 \times 6 \times 4—4^1/_2\ \mu$. Basidia 4-sp. Edge of gills with minute, hairshaped cystidia.

Fig. specim.: Fruens Bøge, solitary on black humous ground in wood, under Fagus and Sambucus, not visibly connected with any roots or sticks in the ground.

This interesting plant has colour and several other characters in common with *Tricholoma irinum*. It is not unlike COOKE's illustration (plate 256) of *P. craspedius*, but the gills are truly decurrent, the edge of the cap not lobed-crenate. It also has several traits in common with *P.* (*Clitocybe*) *nauceodulcis* Karst. (KARSTEN: *Krit. Öfvers*, pg. 72), but is only faint-smelling. — I have never met with it again.

2. Tricholomoidei.

4. **P. ulmarius** (Bull.).

Diagn.: Very large. Cap up to 30 cm. (generally 10—14 cm. across), excentric or almost central, alutaceous to dirty ochraceous-isabella. Gills crowded, adfixed, rounded towards the stem, transversely striate. Stem short, fleshy ($1^1/_2$—3 cm. thick) curved, subfuscous.

Spores almost spheric, $4^1/_2—5^1/_2 \times 4—4^1/_2\ \mu$. ($5^1/_2 \times 4^3/_4$, Basidia 4-spored 1910).

Fig. specim. (D. A. 157): Odense (very large specimen) growing in a knothole on old Ulmus, Oct. 1901. — Also at Brændekilde (on Ulmus) 1910 etc. Rather rare.

5. **P. lignatilis** Fr.

Diagn.: Medium. Cap thinfleshy, $5^1/_2$ cm. broad, flat, slightly depressed, edge incurved, creamy white, surface slightly fibrilloso-

floccose. Gills white, crowded, adfixed and decurrent with a minute line. Stem very long, ascending, white, subexcentric, somewhat villoso-pubescent. Smell strong "of rancid meal".

Spores oval, $4^1/_2$—$2^1/_2$ μ. Basidia 4-spored.

Fig. specim. (D. A. 158): Jægersborg Hegn near Strandmøllen, growing inside a hollow trunk of a living Fagus, solitary, Oct. 1911. — The very long and slender stem in the specimen here figured evidently was due to etiolation.

β. LATERALI.

1. Virgulispori.

6 a. **P. serotinus** (Schrad.).

Diagn.: Medium. Cap fleshy, up to 5—6 cm. broad, 4—5 cm. long, olive-green, edge yellowish, pellicle somewhat viscid, at first minutely plushy-tomentose. Gills very narrow and crowded, pale yellow, decurrent on the very short, obconic, definitely lateral stem, which is olive-brownish punctate-squamulose.

Spores very small, cylindric, slightly curved, 5×1 μ. Cystidia (on edge and face of gills) vesiculose-clavate or inflated fusiform, 25—35 $\times$ 10–15 μ, contents pale yellowish.

Fig. specim. (D. A. 162): Ravnholt, on stump of Æsculus, Oct. 1897. Not uncommon, especially on Alnus.

6 b. **P. serotinus** var. *flaccida* n. v.

Diagn.: Cap more thin-fleshy, edge crenulate, surface livid-purplish or alutaceous purplish. Gills at first whitish, then pale yellowish fleshcolour (like those of Entoloma lividum), slightly brownish at the edge and broader than in the main form. — Contents of cystidia subfuscous.

Fig. specim. (D. A. pl. 163): Fruens Bøge, on trunk of Alnus, gregarious, Dec. 1900. Also at Langesö, on Salix cinerea, Nov. 1929.

7. **P. mitis** (Pers.).

Diagn.: Small. Cap 1—2 cm. broad, whitish with a tinge of alutaceous or pale fleshcolour; pellicle detachable, subgelatinous. Gills white, very narrow and crowded, decurrent on the definitely lateral, obconic, short, whitish, squamulose stem.

Spores very small, cylindric, slightly curved, 4—6 $\times$ 1—$1^1/_3$ μ.

Fig. specim. (D. A. pl. 164): Hjallese, on the bark of dead branches of Larix, gregarious, Nov. 1895. — Common, often very numerous, on fallen coniferous branches and sticks.

8. **P. nidulans** (Pers.).

Diagn.: 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 distinct, narrow, of a rich and deep orange colour.

Spores very small, bacilliform (cylindric, somewhat curved) 5—5½ × 1.8—2 μ slightly compressed (1.2—1.4 μ), hyaline. Basidia 4-spored. Edge of gills set with scattered, short, thin hyphoid hairs.

Fig. specim. (D. A. suppl.): Pederstrup (Låland), on trunk of old decaying Fagus, Dec. 1929. (Leg. F. H. Møller).

As mentioned above the right position of this species may be in the Genus *Panus*. The flesh, although rather soft, is certainly more tough than in the typical Pleuroti. According to F. H. Møller (in lit.) the sporepowder is not white but somewhat fleshcoloured (d 7), like that of *Claudopus* (*Crepidotus*) *variabilis*. But the *Crepidotus nidulans* described by Rea cannot be synonymous, as its spores are said to be "bright ochraceous, broadly elliptical, 5—6 × 4 μ" (almost answering to the spores of *Paxillus panuoides*).

2. Ovispori.

9. **P. petaloides** (Bull.) ex Rick.

Diagn.: Medium. Cap about 6 cm. broad, thinfleshy, convex, with a strongly involute edge and a deeply infundibuliform depression in the middle, split open in one side to the stem, which is somewhat excentric. The colour is ochre-nutbrown or somewhat hornbrown (central part subfulvous) with a faint whitish bloom (from the cystidia). Gills deeply decurrent, crowded, narrow (not serrate), yellowish white, (base a little more brownish) thin, not anastomosing, detachable like in Lepista. Stem short, about 1 cm. thick, solid, somewhat tough, whitish, slightly pruinose. Flesh of cap rather tough, white, (in stem somewhat ochrebrownish). Smell mealy. Sporepowder pure white.

Spores broadly ovate, 6 × 4 μ, minutely warty-punctate. Cystidia on edge and face of gills large (65 × 12 μ), thickwalled, fusoid, apex often subverrucose or granulate. The Cystidia on the surface of the cap are somewhat narrower, more setulose.

Fig. specim. (D. A. suppl.): Kajberg near Nyborg, old decaying stump (of Fagus), Sept. 1926.

P. semiinfundibuliformis Karst. (*Krit. Öfvers.* p. 75) evidently is identical. My plant corresponds exactly with Ricken's description; but *P. petaloides* of Fries differs materially ("Stem exactly lateral, cap spathulate, fuscous"). If no intermediate forms connect the two extremes, the present one should be called *P. semiinfundibuliformis*. —

10 a. **P. acerosus** Fr.

Diagn.: Small. Cap 1—3 cm. broad, sub-reniform, horizontal, gray, surface minutely sericeo-fibrillose, edge whitish-tomentose, without striæ, but in larger specimens somewhat plicato-crenate.

Gills narrow (1 mm. broad), subdistant, dirty gray. Stem lateral, very short (0.3—0.5 cm.), white, tomentoso-strigose, Flesh submembranaceous (not gelatinous).

Spores ovate, 6—8 × 4 μ (1897) or ovate-oblong (1898). — Sp. $6^1/_2$—$9^1/_2 \times 3^3/_4$—$4^1/_2$ μ; basidia 4-spored; cystidia 0 (1904).

Fig. specim. (D. A. 165): Hjallese, on rotten stump, attached to the decayed wood or on the mould inside the stump, Oct. 1897 (and 98).

10 b. **P. acerosus** var. (a transition to *P. tremulus*).

Differing from no: 10 a by the distinct, upright (but short) stem and the somewhat infundibuliform or depressed-ovate, somewhat hygrophanous cap. Gills somewhat broader.

Spores pip-shaped, $6^1/_2$—$7^1/_2 \times 3^1/_2$ μ.

Fig. specim. (D. A. 166): Sorø, on naked ground, open space in wood of Fagus, gregarious, Oct. 1901.

P. acerosus is rather differently conceived by the mycological authors. Rea says the spores are "globose, 4—6 μ", while Ricken has "fast lancettlich, 6—7 × 3—4 μ". No. 10 b probably is = P. tremulus in the sense of Rea; but Fries describes P. t. as glabrous, while both forms here described are minutely tomentose-fibrillose. — A smaller, more membranaceous form of P. a. is occasionally met on fallen sticks and twigs of coniferous trees.

11. **P. limpidus** Fr.

Diagn.: Small. Cap $1^1/_2$—4 cm., linguiform or reniform, plane, almost membranaceous, white, somewhat velutinous. Gills rather crowded, concurrent into a lateral, rudimentary stem, which is pure white and velutinous, while the gills rapidly become tinged with alutaceous. Sporepowder white.

Spores subspheric-ovate, $4^1/_2$—6 × $3^3/_4$—4 μ, with a short pedicel. Basidia 4-spored.

Fig. specim. (D. A. 168): Langesø, small troop on a dead, very decayed stump (Fagus?), Sept. 1922.

Karsten says (loc. cit.) that the spores are spheric, 8—9 μ diam., while Quélet has almost round, 6 μ diam. (more like mine) and Saccardo has subcylindrical, 7—8 × 3—4 μ. Evidently these observations must apply to different species.

B. **Effugientes.**

α. PEDICELLATI.

12. **P. mutilus** Fr.

Diagn.: Cap generally more or less excentric, white, almost membranaceous, 1—$1^1/_2$ cm. broad. Gills narrow, decurrent, white, at last pale fleshcoloured. Stem very short, thin, base somewhat tomentose. Sporepowder white with a slight flush of flesh-colour.

Spores ellipsoid or obovate-ellipsoid, varying from $5^3/_4 \times 3^3/_8\ \mu$— $7 \times 3^3/_4\ \mu$, in my different finds. — Basidia 4-spored; Cystidia 0 (1914).

Fig. specim. (D. A. 535): Rold, grassy border of road, Sept. 1900. Rather rare.

I formerly referred this tiny species to *Clitopilus cretatus* (B. et Br.) on account of the slight fleshcoloured tinge of the gills (in fully developed specimens) and of the sporepowder. And the description by Rea of *C. c.* (*British Basidiomycetae*) as well as the figure of Cooke cover my plant almost completely. But as the only real difference between *C. cretatus* and *Pleurotus mutilus* appears to be the pinkish colour of the gills (which in my specimens is exceedingly pale) I am inclined to think that the difference is too slight for upholding a specific distinction. Fries himself only knew *C. cretatus* from the description of Berkeley. Ricken on the other hand, while describing "*Eccilia cretata*", does not mention *P. mutilus*. According to Rea, who describes both species, the spores are identical in form an size. — According to Fries *P. mutilus* almost might be regarded as an excentric form of *Omphalia scyphoides*. (But with my *O. scyphoides*(?) it has nothing to do). Bresadola's "*P. fimbriatus* var. *mutilus*" is something entirely different.

13. **P. fuscifrons** B. et C.

Diagn.: Cap minute, subrotund, 0.4—0.8 cm., plane, slightly depressed, gray, minutely tomentose. Gills fuscous (darker than the cap), rather distant, adnate-subdecurrent, 1 mm. broad. Stem excentric or even almost lateral, curved, thin and short (3 mm. long, 0.5 mm. thick). The flesh of the cap is totally membranaceous, not gelatinous.

Spores almost spheric, $4—4^1/_2 \times 3^1/_2—4\ \mu$. Basidia. 4-spored.

Fig. specim. (D. A. 169): Dalum, gregarious on the mossy trunk and branches of old appletree in garden, Nov. 1906. — This little Pleurotus was originally found in Cuba and has never before been met with in Europe. But the description corresponds so well with my specimens — except that the Cuban plant is a little bigger — that I do not hesitate to use the name.

14. **P. roseolus** Quél.

Diagn.: 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 fleshcolour, centre a little more ochre-brownish, slightly arachnoid-filamentose when seen under a lens. Gills rotundato-adnate, rather crowded, of the same colour as the cap. Stem almost semi-circular, somewhat darker than the cap and hidden under it, $1^1/_2$ mm. long, 0.3 mm. broad. Sporepowder creamy white.

Spores oval, $5^1/_2$—$6 \times 3^1/_2\ \mu$ (slightly smaller than in Quélet's own specimens).

Fig. specimen.: Årup, plantation of young Piceas, on dead halm and blades of Agrostis alba, gregarious (either horizontally extended from the substratum or on the underside of it, but not truly resupinate), Oct. 1904.

β. RESUPINATI.

15. **P. applicatus** (Batsch).

Diagn.: Cap minute, 0.4—1 cm., resupinate or almost free, dark gray. Gills meeting in a subexcentric point, pale gray with a whitish edge, rather distant. Stem 0. Flesh of cap somewhat gelatinous.

Spores almost spherical, smooth, $4^1/_2$—$5^1/_2\ \mu$ diam.

Fig. specim.: Hjallese, gregarious on rotten, barkless stick (in wood of Quercus). Sept. 1898. Not common.

16. **P. Rhacodium** B. et C.

Diagn.: Cap minute, 0.5—0.8 cm. broad, stemless, fastened horizontally to the substratum, almost hoofshaped-convex, gray, somewhat striato-plicate towards the edge, central part covered with a dense, black, strigoso-velutinous tomentum. Gills dark fuscous (edge pale), rather crowded, almost horizontal, rather narrow (1 mm.), concurrent in a lateral or very excentric point behind. Flesh thin, gelatinous under the tomentum, fuscous.

Spores spherical, $4^3/_4$—$5^1/_2\ \mu$ diam. Basidia 4-spored.

Fig. specim. (D. A. 171): Hjallese, on stump of Fraxinus, springing from a cross-section of the wood, gregarious, Nov. 1898. — Also on stump of Fagus (Hunderup, Oct. 1903).

Originally found in N. America by Curtis. Very close to no. 15.

17. **P. striatulus** Fr.

Diagn.: Cap very minute, 0.4—0.6 cm., dingy whitish, edge striate, sessile, more or less resupinate or hoofshaped. Gills rather distant, whitish, rather broad. Stem 0.

Spores ovate, 8—$10 \times 5^1/_2\ \mu$, slightly granular. Basidia 4-spored. Edge of gills set with long, wavy, thin and slender ($2\ \mu$ broad) hairs.

Fig. specim. (D. A. 174): Hjallese, on the bare wood in fissure of trunk of Alnus, Dec. 1898. Easily overlooked, but perhaps not uncommon. — Karsten (*Krit. Öfvers.*) says the spores are spherical. His *P. supplicatus* (with ovate or broadly ellipsoid spores) may be *P. striatulus*.

P. (*striatulus* var.) *perpusillus* Fr. which differs from no. 17 by having a pure white, slightly mealy cap (0.7 cm. broad) and slightly smaller spores (7—$9 \times 4^1/_2$—$5\ \mu$) (but with the same hairy edge of the gills) was met with by me on trunk of Picea, Oct. 1896. — Not figured.

P. p. in the sense of Bresadola (*Icon. Mycol.*) which has a distinct, almost central stem, does not belong here. — My plant forms a transition to *P. chioneus*.

18. **P. chioneus** (Pers.).

Diagn.: Minute. Cap 4—10 mm. broad, white, tomentose-downy, even, hoofshaped-flat, attached to the substrate by the back of the edge. Gills concurrent near the edge to the rudimentary stem which only forms a slight tubercle on the inside of the back-edge of the cap.

Spores broadly ovate, 7—8 × 5 μ. Basidia 4-spored. Cystidia hairshaped.

Fig. specim. (D. A. 173): On decaying fallen trunk of Populus monilifera, Hjallese, Oct. 1901. (Also Pårup, Nov. 1919, similar position). — Almost identical specimens were met with on rotten Dædalia gibbosa, Laurbjerg, Oct. 1913 and on old deal-boards, Hjallese, Nov. 1902.

P. chioneus as described by Rea (*loc. cit*) with pipshaped, minutely verrucose spores, only 5—8 × 3 μ, can hardly be identical.

19. **P. pubescens** (Sow.) Schroeter.

Diagn.: Minute. Cap 4—9 mm., resupinate, reniform, milkwhite, minutely tomentoso-pubescent. Gills rather crowded, concurrent in an excentric point, at first milkwhite but soon becoming pale yellowish and at last pallid subochraceous. Stem 0. Sporepowder creamwhite.

Spores obliquely ellipsoid-fusiform or lanceolate-pipshaped, 7—$8^1/_2$ × $2^3/_4$ μ. Basidia 4-spored. (1915: 8—$9^1/_2$ × 3—$3^1/_4$ μ).

Fig. specim. (D. A. 172): A: Hjallese, gregarious on dead Aira cæspitosa, Nov. 1902. B: Hunderup, on a dead twig of Salix capræa, Oct. 1903. Also met with on living foliage of Geum rivale and on a thatched roof. — Rather common, often gregarious.

Very well described by Schroeter. (*Die Pilze Schlesiens*). Often mistaken for a *Claudopus* of the *variabilis*-group on account of the somewhat coloured gills, but easily recognised by the narrow, almost comma-like spores. — *Pleurotus commixtus* Bresadola (*Iconographia*) evidently is synonymous. His *P. septicus*, with somewhat broader spores, probably belongs to *P. chioneus*. But *P. septicus* of Rob. Fries (*Anteckningar om svenska Hymenom.*) is identical, and E. Fries also regarded them as synonymous, although he did not give any microscopical data.

Besides the species here described and those recorded by other Danish mycologists it is not unlikely that further investigation

will bring other species to light. Thus *P. circinatus* is known as well from England as from Sweden and should be looked for in our Betula-copses. It is easily distinguished from *P. lignatilis* by want of "mealy" smell and by the globose spores. Also the dark bluish *P. atrocæruleus*, which is fairly common in central Europe, should be sought for as well as the fagophilous *P. mastrucatus*, so well characterized by its squarrose-scaly cap.

THE GENUS CLITOCYBE.

Clitocybe is one of the largest genera within Agaricaceæ. A recent monograph of the European species comprises 124 species, and already FRIES in *Hymenomycetes Eur.* (1874) mentioned 111. My list of names is considerably shorter. This is not altogether due to the poorness of the Danish flora. I have come to believe that the number of names in some sections exceeds the number of species; while in other cases progress lies in the direction of the disintegration of collective species, *Clitocybe* would benefit by a reduction, because a considerable number of so-called species can hardly be regarded as anything but mere forms, not even as distinct varieties.

The proof of this mainly lies in the conformity of their microscopic characters. While in other genera, e. g. *Omphalia*, species which before the introduction of the microscope would hardly have been distinguished from each other (or at least only regarded as varieties) are at once clearly distinguished by their spores, cystidia etc. as soon as the microscope is made use of, this is very rarely the case within the genus *Clitocybe*. Nay, even if the macroscopic characters of two or more forms are fairly distinct, the microscopic ones often will be found to be absolutely identical, thus weakening the case for their claim to specific rank.

This holds true in a marked degree of the form-groups around *C. cerussata* and *C. inversa* respectively. Most mycologists have spent hours, if not days, of close investigation in vain attempts to distinguish these forms. But the widely different or even contradictory results make it evident to me that there is no real and solid foundation for the establishment of series of distinct species within these form-groups.

Take f. inst. the *cerussata*-group (*cerussata*, *phyllophila*, *pityophila*, *catina* and probably a good many more). The first impression from a perusal of a modern author's descriptions of these species will be that the differences in the spore-dimensions of the several species strengthen the case for upholding the great majority of them. Although the differences are rather small they are not too small to be ascertained, and the whole series may be arranged accordingly. But if you turn to another modern author, you will find the whole matter turned upside down. — If, for more easy comparison, we indicate the relative size of the spores by the multipla of their length and breadth (in μ) and term a spore small if the multiplum be 15 or less, medium if it be 20 or less, and large if it be above 20, we can tabulate the records of the authors as follows:

for *cerussata:* small (Karsten, Schroeter, Sev. Petersen).
medium (Nüesch, Rea).
large (Ricken, Bresadola).

for *catina:* small (Ricken, Rea).
large (Nüesch etc.).

Now, if the microscopic characters — which generally are the more constant and can be more accurately measured and described than the macroscopic ones — vary so much, what can be built up upon such slight and vague characters as the more or less pronounced depression of the cap or the smell of the flesh? — Moreover the fact is clearly brought out by comparing the figures and descriptions of the authors in question that the conception of the species is very vacillating. Nor is it so that the authors whose spore-measures correspond also give congruent macroscopic descriptions — far from it. Thus *C. pityophila* according to Nüesch is rather large (cap 5—9 cm. or more), while Bresadola describes it as a little plant (cap only 2—5 cm.). But their sporedimensions are almost identical. The conclusion to be drawn from such a review must be that either the species are hopelessly confounded or else the microscopic and macroscopic characters are so varying that no real specific differences exist.

With regard to the group around *C. inversa* the spore-characters as given by the various authors on the contrary correspond very well. (In nearly all cases the spores are described as subspheric, minutely prickly). Here accordingly the case for uniting the numerous "species" is still stronger. In fact what is given out as fundamental characters are differences so vague and slight (colour-shades, depression of cap etc.) that hardly anything can be built upon them, the more so as even individual specimens often will alter their colour and form very markedly under the influence of time and atmospheric conditions.

Also such cases as *C. geotropa—maxima* and *gigantea—candida* show the tendency in certain authors to multiply names beyond natural limits. The only marked difference between the two last-named species appears to be whether the edge is even or somewhat

grooved. But in the same "fairy ring" may be seen specimens of either type.

I therefore feel inclined to reduce the number of species. And this reduction is not made up for by any increase of species established on microscopic characters. In fact (barring the *Laccaria*-group and the species around *C. inversa*) the microscopic characters of the *Clitocybes* are generally very monotonous. Cystidia are generally wanting as well as spores of extraordinary types. Even 2-spored basidia — met with in most other neighbouring genera — have never been observed in *Clitocybe*.

The delimitation of the genus. — Although *Clitocybe* is a very natural genus, its delimitation is not entirely satisfactory. The segregation of *Laccaria* evidently is very well founded. I consider this the most decided improvement by post-Friesian taxonomists, (even if the American species, *Laccaria* (*Clitocybe*) *ochropurpurea* Berk., is macroscopically a more genuine *Clitocybe* than the European ones (*laccata* and *tortilis*) and connects the two subgenera). — The cæspitose and subcartilaginous species, which already Fries segregated into a special group (*Difformes*), make up a rather peculiar tribe, sharing the characters of *Collybia*, *Tricholoma* and *Clitocybe*, without exactly falling within any one of these genera. In order not to deviate from the Friesian taxonomy, except where absolutely necessary, I retain them in *Clitocybe*, although other authors, probably for equally good reasons, transfer them to *Tricholoma*. For the same reason I also resist the temptation to transfer the Clitocyboid *Cantharelli* (*C. umbonatus* and *C. aurantiacus*) to *Clitocybe*, as done by various authors. —

When *Laccaria* is cut away from the Friesian group *Versiformis*, this series dwindels into mere nothingness, and its few remaining species can easily find a place within *Genuinæ*. The genuine Clitocybes then will fall into only two main groups: *Carnosæ* and *Hygrophanæ*, with *Difformes* as an auxiliary third tribe, a classification which I consider rather satisfactory.

The original subdivision of the Friesian main groups leaves more to be desired. The hygrophanous species he arranged in two tribes: *Cyathiformes* and *Orbiformes*, chiefly according to the more or less pronounced depression of the cap. And the non-hygrophanous species were, after the same principle, divided in *Disciformes* and *Infundibuliformes*, and further subdivided according to colour. Here I am inclined to deviate from the Friesian path

by introducing the spore-character as a guide to a better taxonomy. To have to look for *C. maxima* and *C. geotropa* (which probably are only two forms of one species) in two different groups is rather awkward, and the same holds true for *C. catina* and *cerussata*. But unfortunately the microscopic differences within the main groups are hardly so characteristic that the taxonomy can be mainly built up on them. It will be seen in my Key how far I have deemed it advisable to go in this direction.

About the boundary-line between *Clitocybe* and *Omphalia* I have spoken under *Omphalia*. Also some of the *Tricholomas* with narrow, curved, apparently decurrent gills are rather difficult to distinguish. In fact such a Tricholoma as *T. grammopodium* is truly Clitocyboid and is only retained in Tricholoma on account of its close affinity to *T. melaleucum* etc. On the other hand *Agaricus calathus*, which on account of its somewhat decurrent gills is generally referred to *Clitocybe*, I transfer to *Tricholoma*, because it is so very intimately related to *T. sordidum*.

A problem of wider interest is whether the genus (or subgenus) *Lepista* should be upheld (and grouped with *Paxillus*) or merged in *Clitocybe*. While Fries did not admit any of the Tricholomas (*personatum*, *nudum* etc.) into *Lepista*, he referred some of the larger Clitocyboid species to this genus, which he characterized by dirtgrayish spores and easily separable gills. Quélet went further, creating a new group *Rhodopaxillus* for the above mentioned Tricholomoid species. — I for my part prefer to place the whitespored "*Lepistas*" in *Clitocybe*. And although Fries included such species as *giganteus*, *sordarius* and *Alexandri* in the dirtgray-spored subgenus *Lepista*, they certainly are whitespored and hardly in any way truly related to *Paxillus*. — *Lepista* (limited) will then only retain the truly coloured-spored species, but can be made to include such species as *Clitopilus mundulus*, *prunulus* and other smoothspored Clitopili (while the rest of this genus, the angular-spored species, are better transferred to *Eccilia*, as done by me (*Studies IV*)).

The number of Clitocybes here figured is 49, a relatively small figure. The reason for this I have mentioned above. But besides the numerous so-called species (which are varieties or mere "atmospheric" forms of such species as *C. inversa*, *C. cyathiformis*, *C. aggregata* etc. and which swell the list of names in the

monographs) there exist some charaeteristic and distinct species which probably also should be included in the Danish flora. In fact some of these are on record in SEV. PETERSEN's *Danske Agaricaceer*, e. g. *C. nimbata*, *C. luscina*, *C. socialis*.

The Key is constructed in accordance with the principles stated above. Its minor details will require no special explanation.

KEY

TO THE SPECIES OF THE GENUS CLITOCYBE FIGURED IN »DANMARKS AGARICACEER«.

I. CLITOCYBE VERA

(Gills not Hygrophoroid. Spores smooth or minutely spinuloso-punctate).

A. **Genuinæ.** Not fasciculate.

α. Carnosæ. Not hygrophanous, generally rather fleshy species.

a. *Giganteæ.* Cap averaging more than 8 cm. diam.

1. Gills white to alutaceous.

* Spores subspherical ..... 1. *C. geotropa.*

** Spores ovate.

† Cap white to alutaceous ..... 2. *C. gigantea.*
(Vide also C. nebularis var. alba).

†† Cap cloudy-gray ..... 3. *C. nebularis.*

2. Gills (and cap) becoming dirt-brownish (h 4).... 4. *C. Alexandri.*
(Vide also Tricholoma grammopodium).

b. *Mesomorphæ.* Cap averaging less than 7 cm.

1. Microsporæ. Length × breadth of spore (in μ) < 35.

* Coloratæ. Cap not white.
(Gills repeatedly dichotomous: Vide Cantharellus).

† Spores ovate or fusiform, smooth.

o Flesh turning black when cut. Gills gray 5. *C. gangrænosa.*

oo Flesh not turning black.

§ Spores fusiform ..... 6. *C. inornata.*

§§ Spores not fusiform.

⟩ Smell of anise.

□ More or less greenish..... 7. *C. odora.*

□□ Dingy whitish ..... 7 b. *C. Trogii.*

⟩⟩ Smell faint, not of anise.

□ Gills subdistant, somewhat branched or veined ..... 8. *C. subalutacea.*

□□ Not so.

⊙ Medium (Cap averaging more than 3 cm.).

\+ Stem conical. Cap convex.

" Gills white to cream-yellowish 9. *C. clavipes.*

"" Gills pallid with a tinge of alutaceous fleshcolour ..... 10. *C. subinvoluta.*

++ Cap somewhat infundibuliform.
" Cap whitish-alutaceous or somewhat pink ..... 11. *C. infundibuliformis.*
"" Cap hazel or dirty hornbrownish.
) Cap brownish, slightly squamulose. Stem rather tall ..... 12. *C. squamulosa.*
)) Cap clay- or horncoloured. Stem short, coarsely fibrillose-striate ... 13. *C. trullæformis.*

⊙⊙ Small species; Cap < 3 cm.
+ Spores ovate.
" Gills dirt-grayish ..... 14. *C. hirneola.*
"" Gills white ..... 15. *C. parilis.* (Vide also C. rivulosa, no. 20).
++ Spores almost clavate ... 16. *C. fuscosquamula.*

†† Spores almost globate, minutely spinuloso-punctate 17. *C. inversa.*

** Albatæ. Cap white.
† Rather large species; cap averaging 5—9 cm.
o Spores medium (over 6 μ long).
§ Spores fusiform. Cap dingy whitish: Vide C. inornata, no. 6.
§§ Spores ovate.
) Large, very fleshy: Vide C. nebularis forma alba, no. 3b.
)) Smaller, smell of anise: Vide C. Trogii, no. 7 b.
oo Spores smaller (< 6 μ long) 18. *C. cerussata* (sensu lat.).
†† Smaller species.
o Flesh bitterish ..... 19. *C. gallinacea.*
oo Flesh not bitter.
§ Growing in grass.
) Cap whitish fleshcolour ..... 20. *C. rivulosa.*
)) Cap white or slightly alutaceous .... 21. *C. dealbata*
§§ Growing among needles and foliage. Pure white 22. *C. candicans.*

2. Macrosporæ. Length × breadth of spore > 35 μ.
* Cap brownish red. Gills white. Smell farinaceous 23. *C. sinopica.*
** Cap subochraceous or dirt-brownish.
† Cap medium, somewhat ochre or honey-colour.. 24. *C. ectypa.*
†† Cap small, clay-brownish; gills thick. Bitter 25. *C. pachyphylla.*

β. Hygrophanæ. Cap submembranaceous, hygrophanous.
a. (Cap minutely innato-fibrillose, rather fleshy: Vide C. ectypa).
b. Cap glabrous or slightly pruinate.
1. *Macrosporæ.* Spore rather large (length × breadth > 40.
* Cap fuscous to livid gray, somewhat cupshaped 26. *C. cyathiformis.*

2. *Microsporæ*. Spores small (l. × b. < 30).
x Subfuscæ. Cap brownish- or grayish-fuscous (darker or paler).
* Spores minute (less than 5 μ long).
† Dark gray. Strong smell "of meal" ..... 27. *C. ditopoda.*
†† Clay-coloured to livid; smell faint ..... 28. *C. brumalis.*
** Spores ovate or ellipsoid, over 5 μ long.
† Cap dirt-gray or livid-pale.
o Stem silvery-white above, subfuscous below, tough, elastic, rather tall ..... 29. *C. dicolor.*
oo Stem almost of one colour, paler than cap.
§ Cap umbilicate-cyathiform.
› Pallid-fuscous or cloudy-datebrown. Very slight "mealy" odour ..... 30. *C. vibecina.*
›› Dark fuscous. No smell(?) .. 31. *C. v. pseudo-obbata.*
§§ Cap convexo-plane or slightly depressed (no smell?) ..... 32. *C. metachroa.*
† Cap dark datebrown, convex ..... 33. *C. mortuosa.*
xx Læticolores. Cap whitish or alutaceous with a tinge of flesh-colour or ochre-brownish.
* Spores ovate-ellipsoid.
† Cap hornbrownish to alutaceous ochre.
o Strong smell of anise. Solitary. Stem not tough 34. *C. fragrans.*
oo Smell very faint. Subfasciculate. Stem tough 35. *C. obsoleta.*
† Cap hyaline-white ..... 36. *C. angustissima.*
(Cap pale lilac: Vide Ag. calathus (Tricholoma).
** Spores subspheric. Cap tinged with pale fleshcolour 37. *C. diatreta.*

B. **Difformes** (Fr.).
Fasciculate. Stem somewhat cartilaginous.

α. Whole plant white or whitish. Spores ellipsoid ..... 39. *C. connata* (and allied forms).
β. Cap hornbrownish to dark fuscous.
1. Spores ovate ..... 40 b. *C. aggregata ovispora.*
2. Spores spheric.
* Cap brown or livid. .
† Densely fasciculate ..... 40 a. *C. aggregata.*
†† Subsolitary ..... 41. *C. coffeata.*
** Cap sepia or pitchbrown; densely fasciculate 42. *C. conglobata.*

II. LACCARIA.

Gills Hygrophoroid, mealy. Spores large, spheric, warty-spinulose.
(Spores ovate, smooth: Vide C. pachyphylla, no. 25).

a. Cap medium to rather small. Basidia 4-spored..... 43. *C. laccata* (and allied forms).
b. Cap very small (1 cm.). Basidia 2-spored ..... 44. *C. tortilis.*

SYSTEMATIC AND FLORISTIC NOTES.

I. CLITOCYBE VERA.

A. GENUINÆ.

α. CARNOSÆ.

a. *Giganteæ.*

1. **Clitocybe geotropa** (Bull.) (Fr.?).

Diagnosis: Very large and tall. Cap (when fully expanded) generally 10—15 cm., alutaceous-white when young, when old somewhat darker alutaceous with a tinge of fleshcolour, plano-infundibuliform with a small, indistinct umbo; edge remaining strongly incurved for a long time. Gills of the same colour, decurrent, distinct. Stem tall (exceeding the diameter of the young cap) solid, firm, attenuated upward, slightly paler than the cap. Faint agreeable odour (= that of C. infundibuliformis).

Spores subglobose, pedicel included $6^3/_4 \times 5^1/_4\ \mu$, smooth or at least not distinctly granulate (1928). Also $6—7 \times 5^1/_2—6^1/_2\ \mu$; $6 \times 5^1/_2\ \mu$ etc.

Fig. specim. (D. A. 133): Hjallese, mixed frondose wood, Oct. 1895. — Rather common, often late in the season, growing in rows or arcs, open spaces in frondose woods.

A. geotropus as described by Fries in his monograph (*Monographia Hym. Suec. I*), does not belong here. It is a rather small plant (cap 4—8 cm.), the stem is "albus, lutescens" and it grows "in pinetis densis Smolandiae . . . sed rarior", and is placed close to *C. inversa.* His description in *Hymenomycetes Europæi* is more ambiguous, as he compares it with *C. maxima.* — This latter I (with Quélet and Ricken) take to be only a form of *C. geotropa*, or rather established on overgrown specimens of *C. g.* Fries, description in his monograph squares very well with *C. geotropa.*

2. **C. gigantea** (Sow.) Fr.

Diagn.: Often gigantic. Cap (when fully expanded) generally 15—20 cm., broadly infundibuliform, without umbo, at first almost cream-white but soon becoming more or less dingy alutaceous and slightly squamulose in the middle. The edge is more

or less distinctly grooved, becoming even and irregularly wavy when growing old. The gills are somewhat furcate, crowded, decurrent, narrow, cream, becoming watery-alutaceous. The stem is comparatively short and very stout (often over 3 cm.), of the same colour, slightly squamulose. Smell faint. Sporepowder white.

Spores broadly ovate, $6^1/_2 \times 4\ \mu$. — Cystidia 0. Basid. 4-spored.

Fig. specim. (D. A. 132 A and B): Dalum Landbrugsskole, growing in fairy-ring under appletrees on lawn, Sept. 1905—07. — Not uncommon, always in grass (probably parasitically), in gardens, outskirts of woods etc.

Rea and other authors refer this species to *Lepista* (*Paxillus*). As stated above I see no weighty reasons for this. At any rate it should not be widely separated from *Clitocybe candida* Bres. which is if not exactly identical at least very close to *C. gigantea*. The only differences worth mentioning are that in *C. c.* the edge is even (more or less grooved in *C. g.*), that the spores are somewhat longer ($6—8 \times 3—4\ \mu$) and that the subfarinaceous smell is said to be strong. — Ricken describes both species, but evidently has only seen one. — I do not see any reason for giving *C. candida* specific rank.

3. **C. nebularis** (Batsch).

Diagn.: Large to very large. Cap (when fully expanded) mostly 7—12 cm., convex or plano-convex, very fleshy, cloudy-gray. Gills crowded, somewhat paler like the stem which is stout, of medium length, somewhat attenuated upward.

Spores oval-ellipsoid, $6—7^1/_2 \times 3^1/_2\ \mu$ or $5^1/_2—7 \times 3^1/_2\ \mu$.

Fig. specim. (D. A. 117): Fruens Bøge, wood of Picea, Oct. 1897—Nov. 1898.

Very common, chiefly in coniferous woods, often in vast "fairy-rings" (I have measured a ring 9 m in diameter, with over 200 fully developed fruit-bodies). —

3 b. **C. n.** var. *alba*.

Exactly like the main form except for the almost milkwhite cap.

Spores $6^1/_2 \times 3^3/_4\ \mu$.

Fig. specim. (D. A. 118): Fruens Bøge, a single specimen among several typical ones. Oct. 06. (Also in large numbers at Våsemose 1915. — The surest characteristic to avoid confusing this plant with the true white species is the larger spores. — *C. cerussata* sensu Rick. evidently belongs here.

4. **C. Alexandri** Gil. (Paxillus extenuatus (Scop.) Fr.).

Diagn.: Large. Cap (when fully expanded) 7—11 cm., at first convex with strongly incurved edge, then rather flat. The whole

plant of a dull dirtgray or claybrownish colour, paler at first, but soon entirely pervading gills, flesh etc. Flesh dry, tough, persistent. The swollen base of the stoutish stem is surrounded by a clump of needles etc. The gills are decurrent and rather crowded. Sporepowder white.

Spores broadly oval, $4^3/_4$—6×3—$4^1/_4\ \mu$.

Fig. specim. (D. A. 114): Hjallese, gregarious in wood of Picea, Oct. 1898. Not uncommon, always gregarious, on the naked needle-bed in woods of Picea. Often persistent in winter.

I have adopted Gillet's name *C.* (*Lep.*) *Alexandri*, because the other name used for this species, *Paxillus* (*Lepista*) *extenuatus* (Scop.) Fr. may lead to confusion. Fries' figure (*Icones selectæ*) is a fairly good one, but his descriptions are rather misleading (especially that in *Hymenomycetes Europæi* which gives the diameter of the cap as $2^1/_2$—8 cm., that of the stem about 0.9 cm., and the original colour of the gills as white). The plant depicted by Cooke (loc. cit. pl. 280) as *C. elixus* (Sow.) evidently also is C. Alexandri.

b. *Mesomorphæ.*

1. Microsporæ.

* COLORATÆ.

5. C. gangrænosa Fr.

Diagn.: Medium to rather large. Cap (expanded) 4—9 cm., at first strongly convex with involute edge, then almost flat, pallid ochraceous dirtgray (edge whitish-gray, tomentose), somewhat lacunoso-rugulose and streaked-shaggy (like the inside of sheepskin). Gills rather crowded, at first adnate then somewhat decurrent, pale dirtgray. Stem somewhat obliquely rooting, cylindric or slightly attenuated upwards, fibrilloso-striate, of the same colour, 0.8—1.5 cm. broad. Flesh when cut and gills when bruised rapidly turning inky black (like the whole plant with age). Smell almost none. Sporepowder white.

Spores narrowly oval, $6^1/_2$—$7^1/_2 \times 3\ \mu$.

Fig. specim. (D. A. 120): Hæsbjerg, under young Piceas in wood of Fagus, two finds, Oct. 1901. — Also Knagelsbjerg, at base of Alnus, Sept. 1907. —

This rare species is very little known. Fries only knew it from figure and descriptions. It is said to be foetid, but my plants, when fresh, were almost inodorous.

Nüesch ("Die Trichterlinge") regards C. gangrænosa as a synonym for C. fumato-fætens Secr. But he describes this species as "etwas glänzend, Rand braunfaserig . . . Lamellen weiss ins gelbliche spielend. Stiel weiss" — totally different from my plant.

6. C. inornata (Sow.).

Diagn.: Medium. Cap 4—6 cm., plano-convex, slightly umbonate and depressed about the umbo, edge involute, minutely tomentose,

somewhat grooved. The surface at first covered by a whitish, tomentose bloom, then dingy alutaceous, at last dirtgray. Gills rather crowded, adnato-decurrent, whitish, then dirty brownish-gray. Stem ascending, at first (chiefly above) white-tomentose, of the same colour as the cap, $^1/_2$—1 cm. broad. The hymenophore is somewhat horn-brownish; the gills not detachable. Sporepowder white.

Spores ellipsoid-fusiform, $7^1/_2$—$9^1/_2 \times 3^1/_4$—$3^3/_4$ μ.

Fig. specim. (D. A. 115): Høbbet, near Fåborg, growing scattered among dead foliage in wood of Fagus, Oct. 1900 — (and 1916). Rather rare in woods of Fagus.

This species is very well characterized by the subfusiform, large spores. *Paxillus sordarius* Fr. evidently is identical (Fries had not seen the Sowerbyan species).

7. **C. odora** (Bull.).

Diagn.: Medium to rather large. Cap 4—8 cm., often irregular, wavy and flaccid. Whole plant of an æruginous or pale green colour, often fading and decolorating with age to dingy whitish or pale clay. Odour strong of anise.

Spores ellipsoid, $7 \times 3^1/_2$ μ (1912).

Fig. specim. (D. A. 124): Hjallese, wood of Fagus, Oct. 1895. Common, as well in frondose as in coniferous woods. —

7 b. **C. odora** v. *alba*. (*C. Trogii* Fr. s. Cooke).

Diagn.: Medium. Cap about 5 cm., slightly depressed and somewhat umbonate, alutaceous-white. Gills and stem of the same colour. Smell like the main form.

Spores ellipsoid, 7—$7^1/_2 \times 3^1/_2$—4 μ.

Fig. specim. (D. A. 125): Tommerup, growing under Abies together with C. odora proper. — My plant squares with Cooke's figures of *C. Trogii*. But I see no reason for raising it to specific rank. It evidently is a mere albino.

8. **C. subalutacea** Batsch(?).

Diagn.: Medium to rather small. Cap 3—4 cm., convex, at last slightly depressed, somewhat fleshy, of a dull, pallid-dingy alutaceous colour (more brownish when old), minutely tomentoso-fibrillose, later somewhat squamulose. Gills decurrent, distant, rather thick (but not waxy) somewhat anastomosing at the base, occasionally bifurcate, of the same colour. Stem somewhat paler, not hollow, generally slightly incrassated below with a contracted rootlike base, rather short, indistinctly squamulose above and subtomentose. Flesh whitish, of a faint, agreeable smell (= Mar. Oreades). Sporepowder white.

Spores broadly ovate or oval, about 6×4 μ.

Fig. specim. (D. A. 116): a) (mature specimens): Hjallese, open

space in copse, Oct. 1898. b) (younger): Lundsgård, gregarious in wood of Fagus among sticks and foliage (Larix etc.), Oct. 1899. Not common.

This rather ordinary-looking but characteristic species is not easy to place. My plant differs somewhat from the descriptions given of *C. s.* Fries says the cap is glabrous, the stem naked, while the surface of my plant is dull, soft, skin-like or felty to the touch. *C. insilis*, as given by Nüesch, has some traits in common with my plant, but is described as somewhat "ziegelrot", which mine never is. Cooke's figure of *C. i.* (loc. cit.) is very like mine in stature, but minutely red-squamulose.

9. **C. clavipes** (Pers.).

Diagn.: Medium. Cap mostly 4—6 cm., plano-convex, at first slightly umbonate, colour somewhat variable, generally subfuscous-olivaceous, edge pallid. Gills decurrent, almost cream. Stem tall, conically attenuated upwards, somewhat paler than the cap, fibroso-striate.

Spores subspheric-ovate, $4^1/_2$—$5 \times 3^3/_4\ \mu$.

Fig. specim. (D. A. 119): Trolleborg, wood of Picea, Sept. 1897. Rather common in coniferous woods. Very distinct in spite of its varying colours.

10. **C. subinvoluta** W. G. S.(?).

Diagn.: Rather large. Cap 5 cm., broadly umbonate, slightly depressed, edge involute, of a pale dingy-brownish fleshcolour, slightly tomentoso-pruinate. Gills of almost the same colour, but paler, subochraceous, decurrent, easily detachable, slightly anastomosing. Stem attenuated upward, (1 cm.) subbulbous (2 cm.) (somewhat spongy), whitish below, but for the rest of the same colour as the cap and gills. Flesh of the same colour in the upper part of the stem, but more whitish-pale in the cap and the basic part. — Sporepowder pure white.

Spores ovate or somewhat pipshaped, $5^1/_2$—$6 \times 3^1/_2$—$4\ \mu$. Basidia 4-sp., Cystidia 0.

Fig. specim. (D. A. 127): Silkeborg, on black-mouldy ground, road in wood of Fagus and Betula, Oct. 1914.

I have never met this characteristic species since 1914. It is smaller than given by Rea, the stem not "zoned with spots", but for the rest fairly like his description. — With *C. geotropa* it has nothing to do, nor with the *C. geotropa* var. *subinvoluta* figured by Cooke (l. c. pl. 177). It has the stature of *C. clavipes*, but different colours. *C. gilva* in Bresadola's *Iconographia* is not unlike my plant, but more robust.

11. **C. infundibuliformis** (Schaeff.).

Diagn.: Rather small to rather large (3—8 cm.), thin-fleshy, soon broadly infundibuliform, edge often wavy, slightly silky-squamulose

or almost glabrous; colour variable, often light pinkish (centre more brownish), but also whitish or alutaceous. Gills crowded, white, decurrent. Stem whitish, flushed with the colour of the cap, slightly attenuated upward. Faint agreeable odour.

Spores pipshaped, 6—7 × $3^1/_2$—4 μ.

Fig. specim. (D. A. 129): Årup, wood of Fagus, Sept. 1901. Common in frondose and mixed woods. — Fries distinguishes between an umbonate, more fleshy main form and a membranaceous variety. I have but rarely seen truly umbonate specimens.

12. **C. squamulosa** (Pers.).

Diagn.: Medium to rather small ($2^1/_2$—$4^1/_2$ cm.), soon becoming deeply infundibuliform. The colour of the cap is hazel-brownish, central part somewhat darker and minutely squamulose. Gills decurrent, pallid. Stem rather tall, slightly attenuated upwards, paler than the cap and somewhat fibroso-striate. Faint odour like no. 11.

Spores pipshaped, 7—8 × 4 μ.

Fig. specim. (D. A. 130): Bederslev dale, plantation of Picea, July 1898. Rather rare, always in coniferous plantations on the ground among moss in open spaces. —

13. **C. trullæformis** Fr.

Diagn.: Medium. Cap 3—6 cm., at first depressed, then somewhat infundibuliform, at first minutely flocculoso-subtomentose, soon glabrous, often indistinctly zoned, at first whitish dirtgray to clay, later more brownish clay, when old often irregularly wavy or ruffled, thin-fleshy, not hygrophanous. Gills narrow, truly decurrent, rather crowded (but because of their narrowness looking rather distant), often branched, when old often irregularly anastomosing and crispate, not pure white. Stem short and comparatively stout, but elastic-tough, coarsely fibroso-striate, pallid-dirtgray with a tinge of fleshbrown, its base attached to a lump of earth. Flesh white, under the gills with a hyaline-grayish line which continues in the stem. Odour somewhat sourish-musty (like some species of Polyporus). Sporepowder white.

Spores broadly pipshaped, 6—$6^1/_2$ × 4—$4^1/_4$ μ. Cystidia 0.

Fig. specim. (D. A. suppl.): Husmandsskolen, Odense, gregarious on naked soil under Corylus. July—Aug. 1927 (and Aug. 1929). More dingy colours, more coarsely fibrous and tough stem than the preceding two species. —

14. **C. hirneola** Fr.

Diagn.: Very small. Cap 0.8—1.8 cm., convex, depressed in the middle, earthy gray, not striate and not hygrophanous, but silky-shining when dry. Gills decurrent, dingy whitish, rather crowded. Stem slender and somewhat meandering, equal or somewhat

attenuated downwards, apex white-powdered. Flesh whitish. Sporepowder white (1929).

Spores ovate, $7 \times 4\ \mu$.

Gerup, near Trolleborg, on open sloping ground in plantations of Picea, among grass and heather, Aug. 1902, gregarious. Rather rare. It has the stature of an Omphalia. The whitish flesh in cap and stem and its non-hygrophanous — though somewhat expallent — cap distinguish it from *Hygrophanæ*.

15. **C. parilis** Fr.

Diagn.: Small. Cap 2—3 cm., plano-convex, flattened above, gray, minutely fusco-squamulose in the middle, edge paler, even. Gills very decurrent, subdistant, white. Stem about 2 cm. high, of the colour of the cap (paler below), not hollow. Flesh white (except immediately under the cuticle and the gills). Faint "mealy" odour.

Spores ovate, $5^1/_2 \times 3\ \mu$. Basidia 4-spored. Cystidia 0.

Fig. specim. (D. A. 121): Ærholm, amongst moss and needles in wood of Picea, grassy walk, gregarious, Sept. 1908 (and other similar localities. (Also in wood of Fagus, Sept. 1910).

My plant diverges from the current descriptions by having white, not pale grayish gills.

16. **C. fuscosquamula** J. E. L. n. sp.

Diagn.: Small. Cap 1—$2^1/_2$ cm. convex-flat, with or without a minute umbo, whitish-pale, densely and very minutely fusco-squamulose, especially in the middle; edge even. Gills very decurrent and very narrow (about 1 mm.), cream-white, rather distant. Stem 1—3 mm. thick, dingy whitish, not hollow, somewhat meandering. Flesh white.

Spores lanceolate-clavate, $6^1/_2$—9×2—$3\ \mu$ (very scanty).

Fig. specim. (D. A. 122): Hæsbjerg, plantation of Abies, gregarious, Oct. 1901. —

Very close to *C. parilis*. The main difference is the long and narrow spores. But as these were very scanty and I have never met with it again I have only provisionally endowed it with a specific name. But it is remarkable that several authors describe *C. parilis* as having either ovate or elongated spores (Vide Nüesch, Saccardo etc.). Evidently my plant has been met with in other countries without having been distinguished as a separate species. (Bresadola (*Iconographia* pl. 164) depicts two rather different forms and remarks that they are so different that they almost look like different species). Whether it should be regarded as a distinct species or as a var. *stenospora* of *C. parilis* can hardly be decided from the material at hand. — I add a brief account of the distinctive characters in Latin:

C. fuscosquamula n. sp. vel *C. parilis* var. *stenospora*.

A typica *C. parili* differt stipite et pileo pallidioribus, lamellis angustissimis (1 mm.) et præcipue sporis elongatis, fere lanceolato-clavatis, 6—9×2—$3\ \mu$. —

17. **C. inversa** (Scop.).

Diagn.: Medium to rather large. Cap generally 5—7 cm., at first convex and slightly depressed in the middle, then broadly plano-infundibuliform, smooth and even, at last often somewhat undulating-difform. Colour varying in intensity, but generally becoming darker and more rufous or fulvous with age, especially when it has been repeatedly soaked in wet weather. Expallent when dry, but not really hygrophanous. The young plant is generally gilvo-alutaceous (e 6) or even paler (b 7) with almost milkwhite, slightly alutaceous gills (paler than b 8). The mature, water-soaked specimens are almost fulvous or even rufofulvous (e 4—k 7) with alutaceo-fulvous gills (k 6). — The gills are strongly decurrent, crowded; the stem often ascending, somewhat paler than the cap, thin or fairly stout, almost smooth.

Spores subglobose, $4^1/_4$—$4^1/_2 \times 3^3/_4$—4 or $4 \times 3^1/_4$ μ, minutely spinuloso-punctate.

Fig. specim. (D. A. 131 and suppl.) 131: Fruens Bøge, wood of Picea, Oct. 1895. Suppl.: Langesø, wood of Fagus and Picea, Oct. 1826. Very common, often in large rows or circles, especially in coniferous woods, till late in the season.

According to FRIES (*Monographia* and *Hym. Eur.*) *C. flaccida* is distinguished from the present species by narrower gills ("vix lineam (2.6 mm.) latæ") which become yellowish ("lutescens", "flavescens"), never rufescent. Specimens with really yellowish gills I have never seen, and the gills in my forms generally are a little broader (3—4 mm.). A more compact, rather distinct form of the same tribe is described sub nom. *C. gilva.* I have never met the main form of this problematic species which FRIES in his *Monographia* describes as robust and stout-stemmed. But the somewhat shining and thin-stemmed form, which he calls var. *splendens* (but which he in "*Icones selectæ*" describes and figures as a distinct species) is not unlike my figure B (*Supplement*) of *C. inversa.* —

Entirely foreign to this group of sphærosporic Clitocybes are *C. flaccida* and *C. splendens* of Bresadola (*Iconographia*) with ellipsoid spores. The former is more like a dark-coloured *C. infundibuliformis.* Also his *C. gilva* (ibid.) is very dubious ("margine tomentoso, stipite fibrilloso, apice furfuraceo"); and so is *C. gilva* of Rea (with "villose, swollen" edge). To judge from description and figure (*Iconographia* tab. 165) these forms approach my *C. subinvoluta* (no. 10).

α. ALBATÆ.

18. **C. cerussata** Fr.

As mentioned above there exists a group of white Clitocybes which might be called *Cerussatæ* because the surface of the cap is formed by a very minute white bloom-like epiderm which when

the plant is soaked by rain, especially when old, partly wears away or becomes pellucid in places, so that the fundamental colour (pallid alutaceous with or without a tinge of fleshcolour) becomes visible. All of these grow in deep beds of dead foliage or needles, often gregarious, and they have broadly or narrowly ovate spores. What I consider the main form may be characterized as follows: Diagn.: Rather large (cap 5—8 cm. broad) rather fleshy at the disc, at first somewhat convex, or even slightly umbonate, then depressed or plano-infundibuliform, white (as described above). The gills are whitish, moderately crowded, adnate to somewhat decurrent. Stem rooting and ascending, base strigoso-tomentose. Spores broadly ovate, $4^1/_4$—$4^1/_2 \times 3$—$3^1/_4\ \mu$. Grows in deciduous woods, in deep foliage-beds. (Not figured).

18 a. **C. cerussata** var. (*C. catina* Fr.?).

Differing from the above description by a more depressed, at last plano-infundibuliform cap, which when old is pallid with a tinge of dingy flesh-colour; gills truly decurrent.

Spores as above.

Fig. specim. (D. A. 135): Årup, on mossy ground under Betula amongst grass and dead foliage, Oct. 1908.

18 b. **C. cerussata** var. (*C. pithyophila* Fr.?).

Differing from no. 18 by a more straight and somewhat taller stem, a little more crowded gills and by the habitat. Rather common (in certain years) in large rows and circles in dense plantations of Picea, late in the autumn. Not figured.

18 c. **C.** (**cerussata** var.?) *phyllophila* Fr.

Diagn.: Cap 5—11 cm., convex-plane, slightly depressed, thin-fleshy, silky-white, especially towards the edge. Gills somewhat decurrent, moderately distant, creamy to alutaceous-white. Stem solid, rather stout (1—2 cm.), obliquely rooting; root more or less pointed, felty-pilose. — Inodorous, not bitter. —

Spores subspheric-oval, 4—$4^1/_2 \times 3$—$3^1/_2\ \mu$.

Fig. specim. (D. A. 134). Rathlousdal, gregarious (but never fasciculate), wood of Fagus amongst dead foliage, Oct. 1913.

The diagnoses of the *cerussatæ* in the different standard-works are so confusing (or even contradictory) that the name-giving is exceedingly difficult and will depend too much on individual judgement. What I call *C. catina* is very close to the main type of *C. cerussata*. Both Fries' and Cooke's figures of *C. catina* represent my plant very well. The only thing that makes me doubtful is that Fries says it corresponds to *C. infundibuliformis*, with which mine has nothing to do.

My *C. phyllophila* is a more distinct variety: more pure silky-white, gills cream and spores more roundish. — Of the figures on

Cooke's pl. 121 of *C. cerussata* the upper figures have the stature of my *C. phyllophila*, while the lower ones represent my *cerussata* fairly well. — But Ricken's *C. cerussata* is *C. nebularis alba.*

19. **C. gallinacea** (Scop.).

Diagn.: Very small. Cap $1^1/_2$ cm., convex to plano-convex, dirty white, edge even. Gills white, adnate, horizontal, crowded. Stem thin (2 mm.), a little darker than the cap, slightly wavy, not hollow, apex slightly flocculose. It has a faint, but disagreable rank and bitter taste.

Spores oval $5^1/_2$—$6^1/_2 \times 3^1/_2$—$4\ \mu$.

Fig. specim. (D. A. 139): Dalum, in old orchard amongst grass and litter, under trees.

NÜESCH describes as *C. gallinacea* a larger plant with "intensiv erdartig, widerlich" smell and "endschieden scharf" taste, which hardly can be identical.

20. **C. rivulosa** (Pers.).

Diagn.: Rather small. Cap 2—4 cm., edge white-pruinose, somewhat involute, often wavy. Surface pale whitish flesh-colour or subalutaceous, expallent, but not hygrophanous. Gills of the same colour, adnate or subdecurrent, crowded. Stem rather short, solid, slightly white-pruinose above.

Spores ovato-ellipsoid, 5—$5^1/_2 \times 3\ \mu$. Cyst. 0.

Fig. specim. (D. A. 126): Varde, in moss and grass on sandy roadbank, Sept. 1909. — Not uncommon in similar localities. More rarely met with in more shady places (Tommerup, grassy drive in wood 1912).

21. **C. dealbata** (Sow.).

Diagn.: Rather small. Cap 2—4 cm., convexo-plane, white or slightly alutaceous. Gills white with a faint tinge of yellowish, crowded, adnate. Stem thin, whitish, minutely mealy-velutinous above. It has a faint Oreades-smell.

Spores broadly ovate, $4^1/_2 \times 3$—$3^1/_4\ \mu$.

Fig. specim. (D. A. 137): Lumby, on grassy common near the coast, gregarious, Sept. 1920. Not uncommon on roadbanks railway-slopes etc. When water-soaked it may be mistaken for a *C. fragrans* or other hygrophanous species, but it is not really hygrophanous and of a firmer texture.

22. **C. candicans** (Pers.).

Diagn.: Small. Cap submembranaceous, $1^1/_2$—$2^1/_2$ cm., pure white, convex-flat or slightly depressed. Gills white, crowded or very crowded, narrow, thin, slightly decurrent. Stem thin, at last somewhat hollow.

Spores ovate-ellipsoid, 5—$5^1/_2 \times 3\ \mu$.

Fig. specim. (D. A. 138): Årup, gregarious on dead needles in wood of Picea, Oct. 1904. Not uncommon (but never fasciculate as depicted by Fries). The phyllophilous form is occasionally met with in moist places (*Icon. sel.* 51 b) amongst leaves (under Alnus etc.). It is very much like the pinophilous form, but generally has a more ascending stem and a cottony, oblique root (vide Fries' *Icones* tab. 51 a).

2. Macrosporæ.

23. **C. sinopica** Fr.

Diagn.: Medium. Cap 2—5 cm. plano-convex or slightly depressed with incurved edge, pinkish brown or almost crimson brown, minutely innato-squamulose. Gills cream, somewhat crowded, strongly decurrent. Stem often ascending, attenuated downward, somewhat fibrillose, paler than the cap. Flesh white (except immediately under the cuticle); odour "mealy".

Spores broadly oval, 7—$9^1/_2 \times 5$—$5^1/_2$ μ (or $7^1/_2$—$9^1/_2 \times 5$ μ).

Fig. specim. (D. A. 128): Vormark, solitary under trees (Picea) on rivulet-bank, Oct. 1900. — Also Hesselager, under Populus, about a hedge, June 1906.

(The gills in my specimens were not "confertissimæ", as Fries has it).

24. **C. ectypa** Fr.

Diagn.: Medium, tall. Cap 3—5 cm., convex-flat, gilvous-ochre or honey-coloured, margin minutely striate, central part slightly fusco-fibrillose. Expallent or almost hygrophanous. Gills rather distant, decurrent, at first almost white, then pallid gilvous ochre, occasionally bifurcate, not very thick. Stem tall (8—10 cm. × 0.7—1.4 cm.), somewhat clubshaped, when young slightly pruinose, of the same colour as the cap. All parts darken when touched.

Spores ovate, ocellate, 8—$9^1/_2 \times 5^1/_2$ μ. Basidia 4-spored. Fibrils on surface of cap septate, pale datebrown, about 7 μ broad.

Fig. specim. (D. A. 152): Bramstrup, in a wet bog among Carices and Hepaticæ, July 1915. — (Bresadola's *C. ectypa* hardly belongs here).

25. **C. pachyphylla** Fr.

Diagn.: Rather small. Cap 2—4 cm., convex or convex-campanulate, often flattened or slightly depressed in the middle, pale fuscous clay-brown, dull, minutely innato-squamulose. Gills decurrent with a tooth, dirty whitish clay, distant, thick. Stem attenuated downwards, hollow above, colour of cap, about 3 cm. long. Taste slight, bitterish, disagreable.

Spores broadly ovate, 7—8 × 5 μ.

Fig. specim. (D. A. 183): Trolleborg, open space among grass and needles in wood of Picea, July 1898. Uncommon.

Whether this plant should be called *C. pachyphylla* or *C. absinthiata* Lasch is not quite clear to me. Probably they are only two forms of the same species. But it has no absinth-smell, so *C. p.* is the more appropriate name. Ricken's description is very good (except for the "angewachsen, trennend" gills. I have not noticed any "mealy" odour. *Collybia incomis* Karst. evidently is synonymous. — It forms a transition to Laccaria.

β. HYGROPHANÆ.

1. Macrosporæ.

26. **C. cyathiformis** (Bull.).

Diagn.: Medium. Cap 3—7 cm, at first depressed with strongly involute edge, then broadly infundibuliform, fuscous (when young almost sepia with a tinge of violet or slate-gray; when old more livid, when dry dirty brownish clay), hardly striate. Gills paler than the cap, not crowded, subdecurrent (at last often brownish). Stem somewhat paler than the cap, attenuated upward, often tall, apex with a white, silky coating, that connects the basis of the gills and forms a filamentose reticulation on the stem.

Spores ovate-oval, 8—11 × 5—6 μ. Basidia 8 μ broad. Cyst. 0.

Fig. specim. (D. A. 141): Ravnholt, outskirts of wood among grass, needles and dead foliage, Oct. 1897. Common in similar localities, late in the year.

A somewhat excentric, short-stemmed form, which may be mistaken for a *Pleurotus*, is occasionally met with on mossy trunks of Populus etc. — *C. cacabus* Fr. (at least as described and figured by Ricken) I take to be nothing but a gigantic *C. cyathiformis*. On the other hand *C. obbata* Fr. in the sense of Ricken and Nüesch is hardly anything but a small and slender form of the same: The microscopic differences are trifling. According to Fries (*Icon. sel.*) *C. expallens* in the sense of Bulliard and Persoon also belongs here, while *C. expallens* Fr. is rather different.

2. Microsporæ.

* *Subfuscæ.*

27. **C. ditopoda** Fr.

Diagn.: Rather small. Cap 2—4½ cm., at first depressed, then plano-infundibuliform (edge involute and white-pruinose) fuscous-gray, not pellucido-striate. Gills rather crowded, pallid-fuscous like the stem which occasionally is compressed and at last somewhat hollow, generally short. Strong smell of "meal".

Spores almost spherical, 3—3½ × 2½—2¾ μ.

Fig. specim. (D. A. 144): Årup, wood of Picea, gregarious amongst needles, Oct. 1914. Common, late in the season.

28. **C. brumalis** Fr.

Diagn.: Cap $3^1/_2$—5 cm., somewhat fleshy, convex, then depressed and at last somewhat irregularly convexo-infundibuliform, livid brownish or sordid-clay (albido-argillaceous when dry); edge even (or at last slightly striate). Gills albido-argillaceous, adnate, then arcuato-decurrent, rather crowded. Stem rather short, hollow, of the same colour or a little more fuscous, base strigose. Smell very faint, not distinctly "farinaceous".

Spores ovate, minute, $4—4^3/_4 \times 3—3^1/_4\ \mu$ ocellate (1929) or $3^1/_2 \times 2^1/_2\ \mu$ (1896).

Fig. specim. (D. A. 143): Årup, wood of Picea, Oct. 1896. — Also found at Søbysøgård, wood of Abies, Nov. 1929. — Well characterized by the tinge of clay-colour in all parts and by the small (but not spherical) spores. (The measurement 1896 was made at low power ($\times$ 250) and is therefore less reliable).

29. **C. dicolor** (Pers.). *C. vibecina* Fr. (ex Konrad).

Diagn.: Cap 3—5 cm., at first plano-convex then plano-infundibuliform, hyaline-grayish (dry almost white), edge very minutely striate, centre somewhat darker, but not umbilicate. Gills narrow, grayish white, somewhat decurrent. Stem rather tall, very tough, at last somewhat hollow, a little thicker below, slightly fibrillose, not mealy at the top but minutely white-silky, subfuscous downward, base white-villose. Almost inodorous (no mealy smell).

Spores oval, $6—6^3/_4 \times 3^3/_4—4\ \mu$. Basidia 4-sp.

Fig. specim. (D. A. 146): Årup, gregarious amongst fallen sticks and branches in plantation of Picea, Nov. 1914. Not uncommon, often in small troops, in similar localities.

Very well characterized by the tough, comparatively tall stem which is white above but fuscescent below. KONRAD's figures and description are very good (*Icones Selectæ Fung.* 295); but I prefer to reintroduce the Persoonian name *dicolor*, because the name *vibecina* is used by most authors for a farinaceous-smelling species of a totally different type.

Persoon's diagnosis is very good (*Mycologia Europaea III*, pg. 82): "dicolor, pileo orbiculari, umbilicato, cinereo, dein albescente, lamellis confertis, subdecurrentibus, dilutioribus; stipite subcompresso, basi obscure cinereo. . . . In pinetis . . . Pileus subpellucidus, 2 unc. fere latus . . . Stipite pruina alba tectus . . .". It is generally, — but I think erroneously, referred to *C. metachroa*. —

Evidently *C. expallens* Fr. (which Quélet takes to be a synonym for *C. vibecina*) is very close. But most of the forms referred to *expallens* belong to the *cyathiformis*-tribe.

30. **C. vibecina** (Fr.?) Rick. (ex parte).

Diagn.: Cap 2—5 cm., very hygrophanous, at first plano-convex then somewhat depressed, minutely striate, pale fuscous (sordid

whitish (or with a tinge of alutaceous) when dry. Gills rather decurrent, fuscous (but not quite so dark as in C. ditopoda). Stem of the same colour as the cap, but somewhat paler, (not darker towards the base), apex naked, not tough and elastic as in no. 29. Faint smell (and taste) of cucumber or meal (not nearly so strong as in *C. ditopoda*, only noticeable when pressed between the fingers).

Spores oval-ellipsoid, 5—6$^1/^2$ × 3—3$^1/_4$ μ.

Fig. specim. (D. A. suppl.): Langesø Nordskov, gregarious in wood of Fagus and Picea, Nov. 1928. In woods of Pinus and Picea, often gregarious, late in the year. Not uncommon. Besides the farinaceous-smelling form Ricken mentions another "grösser, eleganter, geruchlos", which may be a form of no. 29. — The description given by Fries (e. g. in *Icones selectæ*) differs considerably from the plant here described and probably covers a form of *C. dicolor*. According to Fries the gills are much paler ("griseoalbidæ"), the cap likewise ("griseolividus"), the stem "cavus" and "elasticus". — The *C. vibecina* of Bresadola (*Iconographia Myc.* pl. 179) is also very dubious.

31. **C. v.** var. *pseudo-obbata* n. v.

Diagn.: Cap 2$^1/_2$—3$^1/_2$ cm., at first plano-convex, then deeply umbilicate and at last infundibuliform, fuliginous-fuscous, edge minutely striate, very hygrophanous, very thin-fleshy. Gills decurrent, fuscous-gray, somewhat distant. Stem 4—5 cm. × 3—4 mm., slightly hollow, somewhat paler than the cap, not white-silky. Almost inodorous.

Spores 5$^1/_4$ × 3 μ, ovate-ellipsoid. Basidia 4-sp. Cyst. 0.

Fig. specim. (D. A. 142): Gelsted, amongst moss and Calluna in a young plantation (conifers), Oct. 1917.

It is very close to no. 30, but darker, more infundibuliform. I have not noticed the faint but characteristic "cucumber-smell" of no. 30 in this variety. — I formerly called this form *C. obbata* Fr., and the figure (tab. 57^1) and description of *C. o.* in *Icones selectæ* fairly well represent it. But as nearly all modern authors use the name *C. o.* for a large-spored species of the *cyathiformis*-tribe, I now refer it to *vibecina* as a distinct variety.

32. **C. metachroa** Fr.

Diagn.: Cap 2—4$^1/_2$ cm., at first convexo-plane, then depressed (edge minutely striate), fuscous-gray or grayish-fuscous, paler gray when dry. Gills crowded, at first horizontal, then somewhat descendent, pallid-fuscous. Stem rather short, even, apex slightly white-flocculose, not tough, at last somewhat hollow. — Smell slight, not farinaceous.

Spores ovate-oval, 6—6$^1/_2$ × 3$^3/_4$ μ. Cyst. 0. Basidia 4-sp.

Fig. specim. (D. A. 145): Kirkeby, gregarious on mossy ground

in wood of Picea, Oct. 1904. — Also in similar locality Søby Søgård etc. gregarious. — Nos. 29—32 are very closely allied and rather difficult to distinguish, especially as they appear late in the autumn when early frost may alter their hue and transparency not a little.

33. **C. mortuosa** Fr.

Diagn.: Small. Cap 1.8—2.8 cm., convex, at last plano-convex or slightly depressed, almost date-brown (when fresh minutely striate at the margin), paler when dry. Gills rather crowded (not "confertissimis" as given by Fries), pale and dingy livid (with a faint flush of yellowish) horizontal, slightly decurrent. Stem $3^1/_2$—5 cm. × 2—3 mm., cylindric, rather tough, glabrous, colour of cap, stuffed. Flesh also of the same colour (pith paler). Very slight "mealy" taste and "cucumber-smell".

Spores ovate or ellipsoid, somewhat obliquely pedicellate, 7 × 4 μ. Cyst. 0.

Fig. specim. (D. A. suppl.): Håre Bjerge, on mossy, humid ground, in wood of Picea, Oct. 1928.

The stem is almost Collybioid. Except for the almost free gills *Collybia clusilis* (ex Schroeter) might be regarded as a sphagnophilous form of this species. The colour of the cap reminds one of *Hypholoma hydrophilum* or *Entoloma nidorosum*, etc., but is somewhat paler and more livid.

* *Læticolores.*

34. **C. fragrans** Sow.

Diagn.: Cap $2^1/_2$—$4^1/_2$ cm., plano-convex or slightly umbilicate, watery alutaceous with an ochraceous tinge, minutely striate or almost even, Gills slightly decurrent, whitish with a slight flush of the same colour. Stem paler than the cap, equal or slightly thicker below, often rather tall or elongated in the deep bed of moss. — Odour of anise, (often rather faint).

Spores 7—8 × $3^1/_2$—4, ellipsoid.

Fig. specim. (D. A. 147): Hjallese, frondose wood, Oct. 1895. Common, as well in frondose as coniferous woods, chiefly amongst grass and deep moss, also in hedgerows etc.

Pale specimens with a darker disc occur, but I cannot see any specific difference between *C. fr.* and these form (*C. suaveolens* Schum.).

34 b. **C. fragrans** var. *depauperata* n. v.

Diagn.: Almost white, and without the characteristic odour of the main species but for the rest very much like a slender C. fragrans. —

Spores ellipsoid, 7 × $3^1/_2$ μ.

Fig. specim. (D. A. 149): Hjallese, edge of frondose wood in deep heep of rotten sticks and decaying foliage, Nov. 1906.

I formerly referred this plant to *C. angustissima* (no. 36), from which it only diverges by being a little more alutaceous and having less decurrent gills. But all authors agree on *C. augustissima* as a minute-spored species, and the spore-size is too constant a character to be set aside.

35. **C. obsoleta** (Batsch).

Diagn.: Cap $2^1/_4$—$4^1/_2$ cm., pale hornbrownish with a flush of flesh-colour, edge without striæ (when dry dingy alutaceous-white), plano-convex, then slightly depressed, somewhat fleshy. Gills whitish, rather crowded, adnate, then slightly decurrent. Stem tough, soon hollow, rather short, often compressed, at first pallid with a whitish, subfibrillose bloom, but soon becoming dirtgray-clay-brownish (from base upward). Smell very faint of C. fragrans.

Spores ellipsoid, $6^1/_2 \times 3$—$3^1/_4$ μ.

Fig. specim. (D. A. 148): Odense, growing gregariously under hedge (of Cratægus) on the ground, somewhat subfasciculate, Nov. 1916, (and in other similar places, always late in the year). — C. obsoleta is rather differently conceived. Fries describes it as growing chiefly in coniferous woods (where I have never met with it). It cannot be confounded with no. 34, but it bears a certain likeness to small specimens of *C. trullæformis*, which however has broader spores, truly decurrent gills etc.

36. **C. angustissima** (Lasch).

Diagn.: Cap convex, $3^1/_2$ cm., at last slightly depressed, margin very slightly striate, alutaceous-white (white when dry). Gills crowded, thin, rather narrow, decurrent, white. Stem slender, wavy, paler than the cap, somewhat fibrillous-rooting.

Spores oval, 4—$4^1/_4 \times 3$ μ. Basidia 4-spored.

Fig. specim. (D. A. suppl.): Langesø, in deep moss on a road-side-bank, under Syringa-hedge, solitary, Aug. 1922. — Inodorous.

38. **C. diatreta** Fr.

Diagn.: Cap $1^1/_2$—$3^1/_2$ cm., convex (edge at first incurved and faintly white-pruinose), pale alutaceous fleshcolour, edge without striation (except in old specimens). Gills pallid, somewhat decurrent. Stem rather slender, whitish with a flush of the same colour, flexible; somewhat hollow. Almost inodorous.

Spores broadly oval, $3^1/_2$—$4^1/_2 \times 2^1/_2$—3 μ.

Fig. specim. (D. A. 150): Vormark Falleskov, Gregarious in dense wood of Picea, amongst needles, Oct. 1900. Rather uncommon.

B. DIFFORMES.

39. **C. connata** (Schum.).

Diagn.: Fasciculate, medium to rather large. Cap (when fully expanded) 4—8 cm. broad, convex, edge in large specimens often irregularly wavy, almost pure white. Gills subdecurrent, rather narrow and crowded, white, often pale yellowish when old. Stem in well developed specimens rather tall and slender, wavy, somewhat flexible, at last somewhat hollow; but often some of the fruitbodies in each fascicle are short-stemmed and imperfect.

Spores 6—7 × $3^1/_2$—$3^3/_4$ μ, ellipsoid.

Fig. specim. (D. A. 136): Årup, on moist, black soil on sloping roadbank in frondose wood, Oct. 1905. — It is met with rather frequently in similar places, generally in fascicles of 5—10, the whole cluster springing from white cottony strings of mycelium. Easily distinguished from all other white Clitocybes by its fasciculate growth.

In more exposed localities, on drier ground, a smaller, more short-stemmed somewhat bulbous-fasciculate, pallid chalk-whitish form is met with. This may be *C. opaca* (Sow.), which according to SCHROETER has similar spores. — *C. connata* according to REA (loc. cit.) has globose, minutely punctate spores and cannot belong here, although its macroscopic characters are almost the same *C. opaca* of COOKE (loc. cit. tab. 176) is a non-fasciculate species

40 a. **C. aggregata** (Schaeff.) α, *sphærospora.* (*C. decastes* Fr. ex Bres.).

Diagn.: Large, fasciculate. Cap 5—12 cm., soon irregularly wavy, depressed and slightly gibbous, dingy ochre-brownish, expallent. Gills whitish (with a flush of dingy cream-yellowish or alutaceous), crowded, rather narrow, hardly decurrent. Stem whitish, apex slightly white-pruinose, solid, rather tall, 1—2 cm. thick. Flesh white, thin, except at the disc, somewhat cartilaginous.

Spores spheric, about 5 μ diam. Cyst. 0. Basidia 4-sp.

Fig. specim. (D. A. 112): Højsholt near Tommerup, in grass on bank of drive in frondose wood, in clusters (5—9 fruitbodies springing from a perpendicular, stringlike "root"), Aug. 1915.

40 b. **C. agg.** β, *ovispora.* (*C. decastes* Fr. ex Nüesch.).

Diagn.: Large, subfasciculate. Cap 7—13 cm. broad, flaccid, irregularly crenulated, expallent, livid ochre-brownish, at last more flesh-brownish, edge slightly white-pruinose. Gills somewhat decurrent, whitish with a flush of alutaceous (later slightly flesh-coloured). Stem rather slender, 1—$1^1/_4$ cm. thick, solid, tough, whitish, slightly alutaceous flesh-coloured towards the attenuated base. Smell and taste almost 0.

Spores broadly oval, 6 × $3^3/_4$—4 μ. Bas. 4-sp. Cyst. 0.

Kirkeby, "Løvehaven", gregarious, in small fascicles in grass

on border of drive through wood of old beeches (Fagus), Oct. 1909 (and Sept. 1914).

No. 40 α and 40 β are so like each other in all ways that I do not think it advisable to regard them as distinct species, although the sporeform is different. — No. 40 β I have only met with in one place, while the round-spored form is rather common in similar localities, (but often with more deformed, discoloured fruitbodies, of a much more commonplace appearance). One of these forms is:

40 c. **C. agg.** forma *reducta.* (*Tricholoma Conradii* Karst.).

Diagn.: Cap 4—7 cm., fleshy, convex expanded, subumbonate, of a watery livid-hornbrown colour (edge paler), apparently smooth but (sub lente) slightly virgate or radiately wrinkled, shining as if wet. Gills narrow, whitish, slightly rounded behind, crowded. Stem rather short, fleshy-tough, 1—1.8 cm. thich, minutely white-atomate above. — Fasciculate, inodorous.

Spores spherical, 5—6 μ diam. Gill's edge set with hyphoid, erect, $1^1/_2$—2 μ broad, about 30 μ long hairs, which are crowded in some places, entirely wanting in others.

Fig. specim. (D. A. suppl.): Odense and Tarup, on grassy border of road, and on lawn, under Ulmus etc., Nov. 15 1929.

Very well described by KARSTEN ("*Kritisk Öfversigt*" and "*Hattsvampar*"). Vide also SACCARDO V (sub *T. patulum*).

41. **C. coffeata** Fr.(?). *Tricholoma cartilagineum* (Bull.) Rick. (nec Fries).

Diagn.: Rather large, subsolitary. Cap 5—6 cm. broad, plano-convex, somewhat bullate, dingy datebrown, edge paler. Cuticle somewhat shining, rather thick and cartilaginous with slightly elevated, radiating, somewhat retiform ribs. Gills crowded, adnate or slightly decurrent, dingy white. Stem not hollow, medium (about 1 cm thick), somewhat cartilaginous, whitish, flushed with the colour of the cap, cylindric or subfusiform. — Generally growing 1—3 fruitbodies joined together.

Spores spherical, $5^1/_2$—6 × 5—$5^1/_2$ μ.

Fig. specim. (D. A. 113): Hæsbjerg (Våsemose), wood of Picea, Oct. 1905 (and 1897), gregarious. —

A rather distinct form, in habit a *Tricholoma*, differing from the preceding species by the subsolitary growth, the wrinkled-ribbed cuticle and the habitat. My plant answers fairly well to the descriptions given by Fries, except that the disc is not "nigro-punctatus". — *Tricholoma cartilagineum* in the Friesian sense is an entirely different plant.

42. **C. conglobata** (Vitt.).

Diagn.: Densely bulboso-cæspitose. Caps varying in size from 2—8 cm., at first somewhat campanulate, often deformed by mutual

pressure, at last expanded (slightly umbonate), of a pitch-brown colour that fades to fuscous-gray, somewhat cartilaginous. Gills whitish, adnate (subdecurrent or rotundate). Stems white, mostly short and thick, concrescent into a bulbous tuft. —

Spores almost spherical, $5 \times 4^1/_2\ \mu$. Cystidia hairshaped.

Fig. specim. (D. A. 97): Hjallese, several dense tufts around old Populus on border of road, Sept. 1897 (and in several other similar localities).

Distinguished from the other fasciculate forms by its bulbous habit, its almost black caps; microscopically by the hairshaped cystidia on the gills' edge. — My specimens answer very well to the descriptions given by FRIES and NÜESCH (*Die Ritterlinge*), and also to that of BRESADOLA in *Fungi Tridentini*. But in his "*Iconographia*" he uses the name *Ag. cinerascens* Bull. for the same plant, while transferring the name *conglobatum* to another, almost whitish species. QUÉLET regarded *conglobatum* as a variety of *aggregatum*, but I think it may as well be kept apart.

The series of subcartilaginous, more or less fasciculate, coloured species which make up the main body of the group *Difformes* of Fries (besides including some species which he placed in *Tricholoma*) form a very difficult group with a very intricate and bewildering synonymy. — To *C. aggregata sphærospora* evidently belong SCHAEFFER's type-figure with the round spores (*Icones* tab. 305—6) and also *C. aggregata* in the sense of REA, RICKEN and NÜESCH. But even *Ag. fumosus* ex Schroeter (loc. cit.) and *C. decastes* of Bresadola appear to me to be identical. — To *C. aggregata ovispora* I refer *C. decastes* of Nüesch. But Ricken regards *C. decastes* as a synonym for *Trich. molybdineum* (Bull.), which he describes as a triangular-spored species with blackening flesh (a rather unhappy attempt in "identification"!). Probably *C. tumulosa* (Kalchbr.) Rea (with oval spores) also belongs here, although the colour is said to be somewhat darker. *Tricholoma patulum* Fr. (at least in the sense of Britzelmayer) also is identic. Fries himself suggested its affinity to *Difformes*.

Ag. fumosus (Pers.) is a name I would rather discard altogether. PERSOON's own descriptions are contradictory. COOKE (loc. cit.) depicts under this name two distinct forms: a solitary, brown species (tab. 175) and a cæspitose gray one (645). The former is fairly like Fries' figure (*Icones sel.*) of *C. fumosa* which Ricken identifies with *Tricholoma cinerascens* Bull. (although his description of this species differs widely from Fries' description of *fumosa*).

II. LACCARIA.

43 a. **C. laccata** (Scop.) forma *amethystina* (Bull.).

Diagn.: Cap $1^1/_2$—4 cm., strongly hygrophanous, amethyst or deep violet, (pallid, ashy lilac when dry). Gills very distant,

thick, of the same colour, whitish-mealy with age. Stem of the same colour.

Spores spherical, spinulose, 9—11 μ diam.

Fig. specim. (D. A. 154): Hjallese, frondose wood, Oct. 95. Very common.

43 b. **C. laccata** forma *rosella* (Batsch).

Diagn.: Colour of the whole plant pinkish fleshcolour.

Spores identic. Basidia 4-spored. (1905).

Fig. specim. (D. A. 154 b): Hjallese, frondose wood, Oct. 97. — Exceedingly common.

Especially on low ground under Betula a large, squamulose, subfulvous form (cap up till 6 cm. broad, stem very tall, fibrillose) is often met with. It answers completely to the figure in Bresadola's *Iconographia* of *C. laccata* var. *proxima* Boud., except for having spores of the normal globose type, while Boudier's variety has subglobose (in the figure: ovate) spores.

44. **C. tortilis** (Bolt.).

Diagn.: Cap very small, 0.5—1.2 cm., membranaceous, pellucid and coarsely radiato-striate, pinkish fleshcolour. Gills very distant. Stem very short and thin (1 cm. × 1 mm.), of the same colour.

Spores globose, spinulose, 10—11 μ diam. Basidia 2-spored. — Spores (exclus. the spinules) 11—12$^1/_2$, rarely less, occasionally up to 14—15 μ. These latter are produced (always?) on 1-spored basidia) (1925). Also some few 3-spored basidia are met with (1926).

Fig. specim. (D. A. 155): Hjallese, on naked soil, walk in frondose wood, Aug. 1900, gregarious. Also under Abies in park (Husmandsskolen, Odense) etc.

Although small specimens of var. *rosella* are not always easily distinguished from *C. tortilis* by the naked eye, I think it is rightly separated from *C. laccata.*

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Index.

Explanation of Plates.

PLATE I.

Fig. 1 a—c. *Omphalia velutina.*
- 2 a—c. — *rustica.*
- 3 a—d. — *griseopallida.*
- 4 a—c. — *rosella.*
- 5 a—b. — *tenuistipes.*
- 6 a—b. — *albidopallens.*
- 7 a—b. — *bisphærigera.*
- 8 a—b. — *leucophylla.*
- 9 a—b. — *asterospora.*
- 10 a—c. — *striæpilea.*
- 11 — *viridis.*
- 12 a—b. — *pseudo-picta.*
- 13 a—b. — *graveolens.*
- 14 a—d. — *cuspidata* var.
- 15. *Pleurotus craspedius.*
- 16 a—c. — *roseola.*
- 17 a—c. — *fuscifrons.*
- 18 a—b. — *Rhacodium.*
- 19 a—b. *Clitocybe fuscosquamula.*
- 20 a—b. — *subalutacea.*

Jakob E. Lange pinx.

PLATE II.

All spores magnified 800 times, cystidia etc. 300 times.

OMPHALIA.

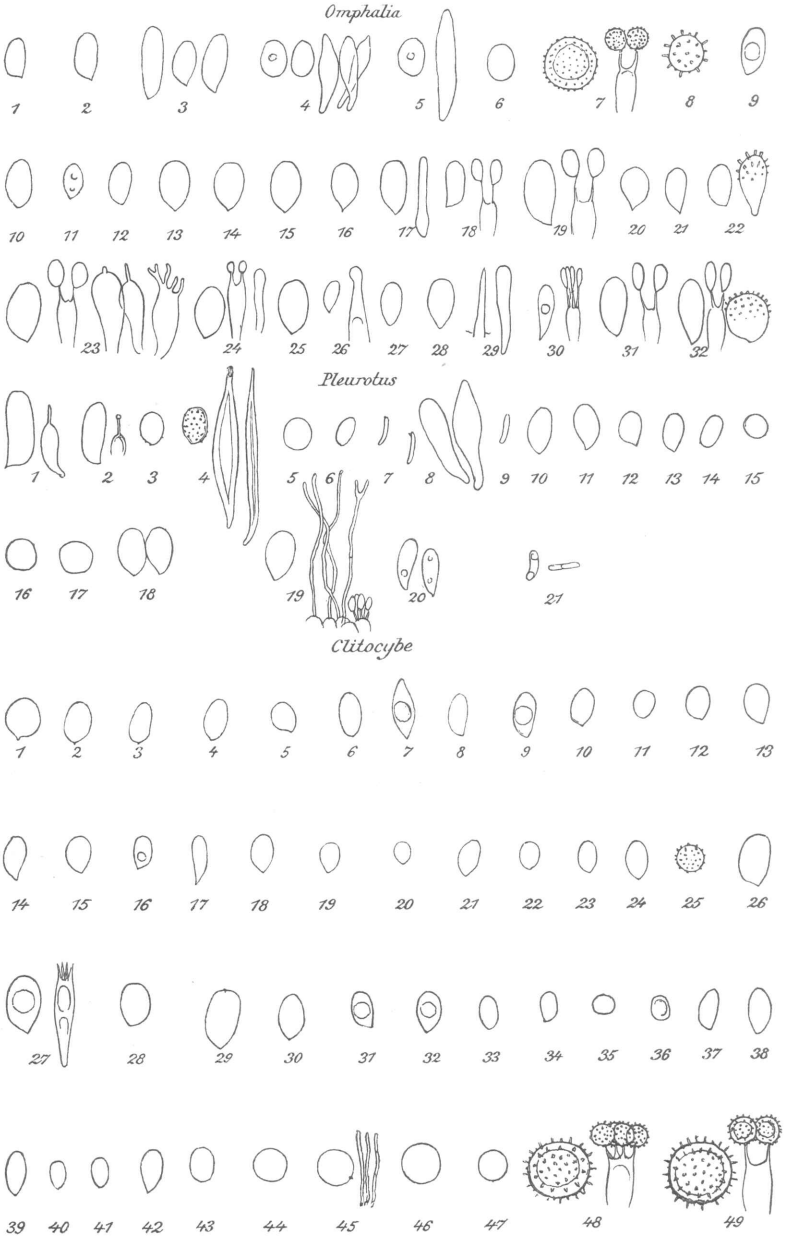
Fig. 1. *hydrogramma*, spore.
- 2. *umbilicata*, spore.
- 3. *sphagnicola*, spore.
- 4. *maura*, sp. cyst.
- 5. *leucophylla*, sp. cyst.
- 6. *striæpilca*, sp.
- 7. *bisphærigera*, sp. basid.
- 8. *asterospora*, sp.
- 9. *graveolens*, sp.
- 10. *pyxidata*, sp.
- 11. *scyphoides*(?), sp.
- 12. *chrysoleuca*(?), sp.
- 13. *umbellifera*, sp.
- 14. *viridis*, sp.
- 15. *abiegna*, sp.
- 16. *demissa*, sp.
- 17. *rosella*, sp. cyst.
- 18. *grisella*, sp. basid.
- 19. *griseopallida*, sp. basid.
- 20. *rustica*, sp.
- 21. *campanella*, sp.
- 22. *picta*, sp. cyst.
- 23. *pseudo-picta*, sp. basid. cyst.
- 24. *speirea*, sp. basid. cyst.
- 25. *tenuistipes*, sp.
- 26. *Swartzii*, sp. cyst.
- 27. *gracillima*, sp.
- 28. *integrella*, sp.
- 29. *caricicola*, basid. cyst.
- 30. *cuspidata* var., sp. basid.
- 31. *crispula*, sp. basid.
- 32. *polyadelpha*, sp. basid. cyst.

PLEUROTUS.

Fig. 1. *corticatus*, sp. cyst.
- 2. *ostreatus*, sp. cyst.
- 3. *pulvinatus*, sp. cyst.
- 4. *petaloides*, sp. cyst. hair.
- 5. *ulmarius*, sp.
- 6. *lignatilis*, sp.
- 7. *serotinus*, sp.
- 8. *serotinus* var. *flaccida*, sp. cyst.
- 9. *mitis*, sp.
- 10. *acerosus*, sp.
- 11. *acerosus* var., sp.
- 12. *limpidus*, sp.
- 13. *mutilus*, sp.
- 14. *roseolus*.
- 15. *fuscifrons*.
- 16. *applicatus*, sp.
- 17. *Rhacodium*, sp.
- 18. *chioneus*, sp.
- 19. *striatulus*, sp. hairs.
- 20. *pubescens*, sp.
- 21. *nidulans*, sp.

CLITOCYBE.

Fig. 1. *geotropa*, sp.
- 2. *gigantea*, sp.
- 3. *nebularis*, sp.
- 4. *nebularis alba*, sp.
- 5. *Alexandri*, sp.
- 6. *gangrænosa*, sp.
- 7. *inornata*, sp.
- 8. *odora*, sp.
- 9. *odora* var. *Trogii*, sp.
- 10. *subalutacea*, sp.
- 11. *clavipes*, sp.
- 12. *subinvoluta*, sp.
- 13. *infundibuliformis*, sp.
- 14. *squamulosa*, sp.
- 15. *trullæformis*, sp.
- 16. *parilis*, sp.
- 17. *fuscosquamula*, sp.
- 18. *hirneola*, sp.
- 19. *catina*, sp.
- 20. *phyllophila*, sp.
- 21. *rivulosa*, sp.
- 22. *dealbata*, sp.
- 23. *candicans*, sp.
- 24. *gallinacea*, sp.
- 25. *inversa*, sp.
- 26. *sinopica*, sp.
- 27. *ectypa*, sp.
- 28. *pachyphylla*, sp.
- 29. *cyathiformis*, sp.
- 30. *mortuosa*, sp.
- 31. *metachroa*, sp.
- 32. *dicolor*, sp.
- 33. *vibecina*, sp.
- 34. *vibecina* var. *pseudoobbata*, sp.
- 35. *ditopoda*, sp.
- 36. *brumalis*, sp.
- 37. *obsoleta*, sp.
- 38. *fragrans*, sp.
- 39. *fragrans* var., sp.
- 40. *angustissima*, sp.
- 41. *diatreta*, sp.
- 42. *connata*, sp.
- 43. *aggregata* var. *ovisp.*, sp.
- 44. *aggregata*, sp.
- 45. *aggregata* var. *depaup.*, sp.
- 46. *coffeata*, sp. [hairs.
- 47. *conglobata*, sp.
- 48. *laccata*, sp. basid.
- 49. *tortilis*, sp. basid.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1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19 20 21 22
23 24 25 26 27 28 29 30 31 32
Pleurotus
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21
Clitocybe
1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25 26
27 28 29 30 31 32 33 34 35 36 37 38
39 40 41 42 43 44 45 46 47 48 49

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