JAKOB E. LANGE

FLORA AGARICINA DANÌCA

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PUBLISHED UNDER THE AUSPICES OF THE
SOCIETY FOR THE ADVANCEMENT OF MYCOLOGY IN DENMARK AND
THE DANISH BOTANICAL SOCIETY

COLLABORATORS:
N. F. BUCHWALD, M. P. CHRISTIANSEN, C. FERDINANDSEN,
POUL LARSEN, F. H. MØLLER, Ø. WINGE
ET AL.

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INTRODUCTION

MORE than a hundred years ago the famous botanical work *Flora Danica,* which dates back to 1763, began to publish illustrations of fungi, chiefly *Hymenomycetes* based on Schumacher's water colours. However the new attempt was soon discontinued and for more than half a century very little of real value in this field appeared. The latter part of the 19th century saw a revival in different countries. The illustrated works of Elias Fries, Cooke, Barla, Bresadola and others (in many ways of paramount value) contributed very much to the awakening of interest in this branch of mycology and they are still helpful in the identification of critical species.

However the need for reliable and exact illustrations of the fleshy fungi is as great as ever. While most other plants can be easily and perfectly preserved, in different ways, for future examination in herbaria and museums, such methods generally give less satisfactory results for the majority of the larger fungi, because their characteristic shape, as well as their colours are lost in the preparation. Thus it has come to pass that while pictures of the flowering plants are constantly declining in scientific value, because they cannot give the minute details on which the identification of a species more and more depends, the case is just the reverse for the fleshy fungi. "A good figure is better than a full page of letterpress." Even the most painstaking and carefully worded description will often fail to give that clear and exact idea of the varying colours and forms of a mushroom which a good portrait will give at a glance.

But to be of any real value for the modern mycologist illustrations should be far more exact in every detail than the older pictures, or even than the majority of more recent publications. Modern technique — when fully brought to bear on this object — should make it possible to surpass the old masters.

If such illustrations are to be really useful for scientific work certain criteria must be strictly upheld. All details such as hairs, scales, flocci on the cap and stem, the position and texture of the veil etc. must be rendered as exactly as possible (a portrait of a fungus should bear examination under a reading lens). But what may be deemed of even greater importance

is that all the figures (or at least all figures in the same genus) should be painted by the same hand. — A series of portraits of one species, painted by different artists, will very often be unidentifiable. The conception of colours, the rendering of scalyness etc. depend on eye and hand, and consequently such pictures may show differences which do not really exist; while on the other hand portraits even of closely allied species if executed by the same artist will bring out clearly the specific differences.

By far the best results will be attained when the mycologist himself paints the portraits of the species he has studied. It is true a more artistic effect can be obtained in illustrations executed by a trained artist; but most artistic effects (side-lights, shades etc.) are scientific defects.

Finally the value of such pictures will be greatly increased if the collection is fairly complete. Identification is far more easy and certain when all the allied species can be synchronically inspected. But this is by far the most difficult demand to fulfil. The majority of the species are comparatively rare — many extraordinarily so — and even during a life-time of field-work many rare species may not be discovered, so that they will only be known to the mycologist from pictures and descriptions; — but this only renders the good portraits still more important to the student of these plant.

In the present work the author has attempted to comply with the rules here laid down. Having devoted most of his spare time during more than 40 years to this work he has succeeded in determining and painting about 1100 species of Agarics*; and in later years eminent collaborators have sent to him such rare species as he himself has not met with, in order to make the collection as complete as possible. — The material for the portraits has always been living specimens determined by the author. And by figuring not only the plant itself but also spores and other miscroscopical details the identification has been made as sure and easy as possible. Finally the technical execution of the chromolithographic reproductions of the original watercolours has been supervised by the author-artist himself to ensure the most painstakingly exact colouring and design.

With regard to the text the author has deemed it unnecessary to give longwinded and detailed descriptions, especially of the more common and well known species. But he has tried, by means of critical notes, to shed light on such cases where the synonymy is entangled or where the delimitation of the species is difficult or disputed. Considerable stress is laid upon ecological facts: the interdependence of certain fungi with the different trees, the

* The original water-colours are in the Museum of the Bot. Garden, Copenhagen, another set in the author's privat possession.

nature of the soil in which a particular mushroom will grow etc. Finally the text gives spore-dimensions and other microscopical details. Whenever not expressly stated otherwise, these are derived from the specimens which have served as models for the portraits. To facilitate the use of the work for identification of the species a "key" has been made up for each genus, based on micro- and macroscopical characters. This key will generally also give a taxonomic arrangement for the genus in question, according to the views of the author*.

The study of the fleshy fungi in Denmark has in recent years attracted considerable and growing interest, originating in the work and investigations of such prominent scientists as E. Rostrup, E. Chr. Hansen and Sev. Petersen in the 80es and 90es of last century. — The introduction of the microscope and the more thoroughgoing and exact methods of investigation have rendered this interesting study even more attractive. All over the world eminent mycologists are leading the way further into this rich field, in spite of its risky paths, its pitfalls and blind alleys. — It is sincerely hoped, that the present work will be useful in clearing up obscure points and elucidating important facts, thus becoming a real helpmate to those who — like the author — have come to love this secluded but charming field within the realm of the vegetable kingdom.

The author's best thanks are due to the Danish Botanical Society and the Society for the Advancement of Mycology for their sponsoring of the work. The Carlsberg Fond and the Rask-Ørsted Fond, the two leading scientific foundations of Denmark, have most generously granted their financial guarantee to what otherwise would be a risky undertaking.

The author also wishes to express his gratitude to co-workers in the mycological field who in many ways have rendered him valuable assistance and thus ensured the relative completeness of the work. To mycological friends and colleagues all over the world, who by showing their interest in the work have cheered him on and strengthened his belief in the workability of the plan, he extends his heartfelt thanks. — Special thanks are due to Mr. A. A. Pearson, the well known English Mycologist who, as on many former occasions, has looked over the proofs and offered most valuable linguistic advice.

Odense, May 1935.

Jakob E. Lange.

* More details can be had from the author's monographic studies in Dansk Botanisk Arkiv (*Studies in the Agarics of Denmark, I—X.* 1914—35).

AGARICACEÆ

I. AGARICEÆ

A. LEUCOSPORÆ

AMANITA

Tissue of cap distinct from that of the stem. Universal veil distinct from the cuticle. Stem bulbous. Ring present (rarely obliterate). Spores subspheric or ovate, rather large.

THE genus *AMANITA* which is made up of large and conspicuous species, — some of which are very poisonous, while others are edible — is undoubtedly the best figured and described genus among the Agarics. The illustrations of *A. muscaria* and *A. phalloides* are almost legion, and even less important species are mentioned in almost every mycological textbook. However even in this genus no little uncertainty prevails, more especially with regard to some of the less prominent species and certain intermediate forms. Still the differences — even if slight — are generally sufficiently marked to be discernible in a really good colour-portrait.

Taxonomy. For purposes of classification the genus is naturally divided in a main group, *Eu-Amanita,* and an auxiliary one, the ringless *Amanitopsis.*

Amanitopsis was raised to generic rank by ROZE; but I do not deem this innovation sufficiently justified.

FRIES also included in Amanita *A. lenticularis* which after having been transferred to *Lepiota* has now found its place in a new genus *Limacella* (Earle) Maire.

The taxonomy of *Eu-Amanita*, as Fries sees it, almost entirely rests upon the nature of the universal veil, whether it 1) forms a volva with a membranaceous, free edge or 2) is circumcised or 3) broken up irregularly into squamules or finally 4) totally obliterate. However in several instances these characteristics are not clearly pronounced and some confusion exists. But by making use of the microscope and taking into account the size and shape of the spores, it will often be more easy to place critical or intermediate forms. For although the spores in this genus do not present very striking differences, still they are sufficiently

different (and constant) to be used for dividing the genus in sections or subgenera. Thus in *Amanitopsis* the spore is twice as large as usual in the genuine Amanitas. And within the main group two types of spores can be fairly well distinguished: the subglobular and the ovate. — Cystidia are generally present on the edge of the gills; but as they are rather uniform (globular or balloonshaped) they are comparatively unimportant for the taxonomy.

KEY

TO THE SPECIES FIGURED

I. Eu-Amanita

Both ring and universal veil present. Spores medium, subglobular or ovate.

A. Sphærosporæ. Spores subglobular.

α. Volvatæ. Bulb with membranaceous, free volva. Cap generally naked (without remnants of veil).

a. Cap white.

1. Ring somewhat torn, adhering to the gills. Stem somewhat fibrillose shaggy ... ... 1. *A. virosa*

2. Ring entire. Stem almost glabrous ... ... *(A. phalloides* var. *verna)*

b. Cap coloured.

1. Cap olive-green or yellowish ... ... 2. *A. phalloides*

2. Cap somewhat fuscous with a tinge of reddish brown.

* Bulb large. Outside of ring dirtgray... ... ... 3. *A. porphyria*

** Bulb small. Outside of ring yellowish ... ... 3 a. *A. porphyria* var. *recutita*

β. Circumcisæ. Volva circumcised, thus forming a narrow, ringlike edge on the bulb and warty dots or cottony patches on the cap.

a. Cap white to ivory, with whitish, large patches or dots. Edge even.

1. Very large. Stem and edge with a loose, flocculose-granular coating ... ... *(A. strobiliformis)*

2. Medium to rather small. Stem and edge not mealy ... ... 4. *A. mappa*

b. Cap yellow to pallid ochre, often almost naked (dots pure white); edge striate.

1. Cap yellow; ring entire ... ... 5. *A. junquillea*

2. Cap pale ochre; ring rudimentary ... ... 5 a. *A. junquillea* var. *exannulata*

B. Ovisporæ. Spores (generally broadly) ovate.

α. Volvatæ. (No Danish species; *A. cæsarea*, *A. coccola* etc. in Southern Europe).

β. Circumcisæ.

a. Cap scarlet or orange.

1. Robust, with white patches on the cap ... ... 6. *A. muscaria*

2. Slender. Cap naked ... ... 6 a. *A. muscaria* var. *aureola*

b. Cap pallid, fuscous or rubescent.

1. Flesh not turning reddish when cut or bruised.

* Bulb almost globose with a narrow free edge. Ring almost even. Warts pure white ... ... 7. *A. pantherina*

** Bulb oval (or almost wanting), not distinctly marginate. Ring lineato-striate.

† Warts on cap whitish or pale gray.

° Stem slender, somewhat hollow. The coating on the cap mealy or membraneous, deciduous.

• Medium. Coating mealy-membraneous.

˙ Cap somewhat fuscous ... ... 8. *A excelsa*

˙˙ Cap whitish-pale ... ... 8 a. *A. excelsa* forma *pallida*

•• Very large. Coating mealy, very thin, soon disappearing ... ... 8 b. *A. excelsa* forma *maxima*

°° Stem shorter, firm and solid. Warts mucronate, persistent 9. *A. spissa*

†† Warts on cap, on edge of ring and base of stem originally pale sulphur.

° Cap some shade of dirt-brown ... ... 10. *A. aspera*

°° Cap whitish ... ... 10 a. *A. aspera* var. *Francheti*

2. Flesh turning reddish in all its parts when cut or bruised ... 11. *A. rubescens*

II. Amanitopsis

No ring. Margin of cap sulcate. Spores globose, large.

A. Cap naked. Volva splitting open in the top, sheath-like.

α. Cap (and volva) pale gray or white.

a. Cap light gray ... ... 12. *A. vaginata*

b. Cap white ... ... 12 a. *A. vaginata* var. *fungites*

β. Cap (and volva) fulvous or yellow.

a. Cap fulvous ... ... 12 b. *A. vaginata* var. *fulva*

b. Cap yellow ... ... (*A. vaginata* var. *crocea)*

B. Cap with woolly patches (or a hood on top), brownish-fuscous.

Volva circumcised ... ... 13. *A. strangulata*

(Cap pale yellowish: vide no. 5 a).

SPECIFIC DESCRIPTIONS AND NOTES

I. Eu-Amanita

A. *Sphærosporæ*

α. Volvatæ

1. **A. virosa** Fr. (Plate 2. fig. A.)

Whole plant milkwhite. Cap 5—7 cm, somewhat conical. Stem slender, fibrillose shaggy, with a rather narrow bulb and an incomplete ring, which generally is torn and partly adhering to the gills' edge.

Spores globular, 8—9½ μ diam, with a tiny pedicel.

Rather rare and often solitary in mixed woods and woods of Fagus only, Aug.—Sept.

A. virosa has a somewhat defective appearance. The cap is often more or less unsymmetrical, the ring abortive. In this it differs from the American species *A. bisporigera* Atk., which is smaller but quite normal (except for the two-spored basidia).

A. phalloides var. *verna* (Bull.) Fr. is larger, with a perfectly convex cap, an almost smooth stem and a complete, entire ring.

2. **A. phalloides** Fr. (Plate 1. fig. D.)

Cap 6—10 cm, convex, somewhat greenish (either olivaceous or pallid with a tinge of yellow). Stem of the same colour, but paler, with a big, subglobular, white bulb.

Spores ovato-globose, 8—10½ × 7—8 μ.

Rather common and often gregarious, in mixed frondose woods (Fagus, Quercus, Corylus), Aug.—Sept.

2 a. **A. phalloides** forma *citrina*. (Plate 1. fig. C.)

Cap and stem light lemon-yellow (slightly olivaceous in the centre of the cap).

Spores 8—10 × 7½—8 μ. Edge of gills set with globular cystidia. — Rather rare.

A. phalloides var. *verna* (Bull.) Fr. *(A. bulbosa alba* Pers.)

This variety has been met with once in Sjælland (1918) by F. H. Møller. It seems to be rather rare in Europe, while it is common in north-eastern North America (where it seems to take the place of the greenish form). The North American type is a very stately plant, rather larger and taller than the ordinary *A. phalloides* in Denmark and otherwhere. (Not figured by me).

3. **A. porphyria** (Alb. & Schw.) Fr. (Plate 1. fig. A.)

Cap 5—8 cm, convex or slightly gibbous, of a pale fuscous hue, with a slight tinge of

reddish-brown. Stem rather tall, whitish. Ring somewhat fuscous on the outside. Bulb rather large, subglobose.

Spores globular, $7^1/_2$—$9^1/_2$ μ, with a tiny pedicel.

Rather rare, in woods of Picea, on mossy ground, Aug.—Sept.

3 a. **A. porphyria** var. *recutita* Fr. (sensu Quélet). (Plate 1. fig. B.)

Altogether smaller than the main species (cap 4—5 cm). Volva somewhat torn, leaving dots or patches on top of cap. Ring yellowish beneath. Bulb small, ovate.

Spores globular, $8^1/_2$—$9^1/_2 \times 7^1/_2$—$8^1/_2$ μ.

Rare and solitary (wood of Fagus).

A. recutita of Barla, Sev. Petersen, et al. does not belong here. — By the partly disrupted universal veil my plant forms a transition to *Circumcisæ*.

A. strobiliformis Vitt. (sensu Ricken).

This large and conspicuous species is characterised by a whitish cap with large warts or patches of a grayish colour and by having the stem as well as the edge of the cap covered with a loose, floccose-pulverulent coating. The spores are subglobate-oval, about $10 \times 8^1/_4$ μ (in other finds a little longer). Found by F. H. Møller, under Tilia in Låland (1922) and later by Ebbesen under Tilia and Fagus in the same province, but not yet met with and figured by me.

β. Circumcisæ

4. **A. mappa** (Batsch) Fr. (*A. citrinus* Schaeff.). (Plate 2. fig. B.)

Cap 4—7 cm, subglobate to convex, ivory-white or slightly yellowish in the middle, set with coarse whitish dots or patches which are rather persistent. Edge even. Stem often rather thin; basic bulb globular, large, with a rather broad, circumcised edge.

Spores ovato-globose, $9^1/_2 \times 7^1/_2$ μ.

Very common in woods of Fagus (even where the soil is a rather crusty and dry humus), and also met with in coniferous woods, often gregarious and persisting till late in the season.

I prefer the name *A. mappa*, although *A. citrina* is older, because the name *A. citrina* leads to confusion as it has been used to designate forms of almost all the neighbouring species. Moreover the name is rather inappropriate, as *A. mappa* is rarely — if ever — lemon-coloured.

5. **A. junquillea** Quél. (Plate 2. fig. C.)

Cap 5-7 cm, convex, of a rich or more pale yellow colour, somewhat ochry in the middle, sparingly set with deciduous, snow-white patches or dots; edge striate. Bulb ovate, with a rather thin, inconspicuous free edge.

Spores ovate-subspherical, 8½—9×7—7½ μ. Edge of gills set with ovate or almost globular, 12—16 μ broad cystidia.

Very rare. Met with in a wood of Picea.

This is the *A. citrina* of Gonn. & Rabenhorst and *A. gemmata* Fr. sensu MAIRE. However as the description of FRIES in Hymenomycetes Europæi does not at all fit this species, and as moreover the name *A. gemmata* has been used by BARLA a. o. for other Amanitas, I do not see any good reason for discarding the name *A. junquillea.*

5 a. **A. junquillea** var. *exannulata* n. n. (Plate 2. fig. D.)

Differing from the main form by paler colour (maize yellow, edge whitish) and a very fugacious, rudimentary or almost obliterate ring.

In woods of Picea and Pinus, amongst needles. Very rare.

This is the *Amanitopsis adnata* of W. G. Smith. But even when the ring is entirely absent it cannot be mistaken for a true Amanitopsis.

B. *Ovisporæ*

6. **A. muscaria** (L.) Fr. (Plate 3. fig. B.)

Cap 8—14 cm, convex, scarlet (chrome-yellow under the epiderm) with numerous wart-like white dots or patches. Bulb roundish, with several more or less distinct, ringlike, squamulose, pale yellowish belts or zones.

Spores broadly ovate, 9½—10½×7—8 μ.

Common in coniferous plantations, — especially under Pinus — and in woods of Betula, often in great numbers till rather late in the season.

The large liver-brown variety *regalis* Fr., known from woods of Fagus in Sweden, I have never met with, although Denmark abounds in beechwoods.

Neither have I found the yellow, somewhat slender variety with yellowish warts, *A. muscaria* var. *formosa* Pers. But in the eastern States of U. S. A. the scarlet main form seems to be totally replaced by this rich yellow type (and the still smaller *A. flavoconia* Atk.), while the large scarlet type is said to be predominant on the Pacific coast and is also occasionally met with in eastern Canada.

6 a. **A. muscaria** forma *aureola* (Kalchbr.). (Plate 3. fig C.)

Smaller and more slender than the main form, and destitute of warts because most of the upper part of the universal veil remains attached to the top of the ovate-ellipsoid bulb.

Spores ovate, 9×7 μ.

Rare. Under Betula and Sarothamnus in grass.

It hardly deserves a proper name, being a mere phenotypical form.

7. **A. pantherina** (DC) Fr. (Plate 3. fig A.)

Cap 6—8 cm, convex or slightly gibbous, pale date-brownish or somewhat dirtbrown, set with fairly persistent, rather small, pure white fragments of the universal veil. Edge somewhat striate. Stem often rather short, with a narrow and almost even ring. Bulb roundish, with a rather thick, distinct, ringlike edge.

Spores broadly ovate, 8—12 × 6½—7½ μ.

Not uncommon, chiefly in the outskirts of woods of Fagus, more rarely met with in grassy spaces in plantations of Picea.

Very easily recognized by the pure white panther-spots.

8. **A. excelsa** Fr. (Plate 4. fig. A.)

Cap 7—10 cm, convex or slightly gibbous, minutely innato-fibrillose, rather dark fuscous or more pale, with a thin coating of somewhat deciduous, whitish, granulate-mealy patches. The ring is distinctly striate. The stem is rather tall and slender, with indistinct, subfuscous, concentric zones, somewhat swollen at the base and deeply seated in the ground.

Spores ovate, 8—10 × 5½—7 μ. Edge of gills set with large globular cells.

Not uncommon in coniferous woods, often rather early (even in July).

A. ampla Pers. I regard as synomymous. *A. excelsa* is a very variable species according to habitat and weather. Nos. 8 a, 8 b and even no. 9 may be regarded as such phenotypical forms.

8 a. **A. excelsa** forma *pallida.* (Plate 5. fig. A.)

Somewhat smaller (cap about 6 cm), fuscous-pallid to almost white.

Spores broadly ovate, 9 × 6½ μ.

Rarer than the main form. Woods of Picea.

8 b. **A. excelsa** forma *maxima* (*A. Personii* Fr.?). (Plate 4. fig. B.)

Twice as large (cap up to 13 cm, stem 16—18 cm), whitish-pale, dirt-grayish in the centre, almost devoid of mealy patches (while in bud the cap is covered with a whitish very thin coating — almost like a bloom — consisting of a single layer of globose cells).

Spores 8 × 6 μ.

Rare and solitary in mixed woods.

The description of *A. Personii* by FRIES fits my plant like a glove, but the plant hardly deserves a specific name. GILBERT attaches the name *A. Personii* to a species close to *A. (Limacella) lenticularis.* — *A. excelsa,* although very variable, can hardly be made to include the *A. excelsa* of SCHROETER, which is said to have a "shining yellow" cap, nor that of COOKE, which is greenish-olive.

9. **A. spissa** Fr. (Plate 5. fig. C.)

Cap 8—11 cm, dirtgray, densely set with small, mucronate, ashy-white warts, which

are rather firmly attached to the cuticle. Stem stout, with a somewhat depressed, obovate bulb with concentric, fuscous zones. The gills sometimes turn fuscous when bruised.

Spores ovate, 8½—10 × 6—7 μ. Sterile cells on edge of gills globose, 18—30 μ.

Not common, chiefly in woods of Fagus, often in open spaces, July—Sept.

A. valida Fr., the more firm form with acute pyramidal warts, is hardly a distinct variety. It is even doubtful if *A. spissa* is specifically distinct from *A. excelsa*. Probably it is only a robust open-air form, while the typical *A. excelsa* grows in dense coniferous plantations. GILBERT (loc. cit.) unites nos. 8 – 9 under the name *A. ampla* (Pers.).

10. **A. aspera** Quél. (Fr.?). (Plate 5. fig. B.)

Cap 7—9 cm, convex, varying in colour from fuscous-brown to pallid dirtbrownish, but always densely set with rather small, conical warts like those of the preceding species, but of a light sulphur-yellow colour (soon discolouring to pallid or dirtgray). Squamules of the same light sulphur colour also embellish the edge of the ring and the somewhat bulbous base of the stem.

Spores broadly ovate, 9 × 6¼ μ.

Uncommon, in frondose woods (Fagus, Quercus, Corylus), generally solitary.

10 a. **A. aspera** var. *Francheti* Boud. (Plate 6. fig A.)

Microscopically as well as macroscopically like the main species but for the whitish (in the middle slightly yellowish) cap. — Rarer than the main form.

The name *A. aspera* is a very misused one. The *Ag. asper* of FRIES (Hymenomycetes Europæi) may be the dark fuscous-brown form mentioned above.

11. **A. rubescens** (Pers.) Fr. (Plate 6. fig. C.)

Cap 7—12 cm broad, brownish fleshcolour to almost white, with rather small, more or less firmly attached granules or warts of a dirty whitish colour. Stem of the same colour, its subbulbous base with indistinct concentric zones. All parts turn brownish red when cut or bruised.

Spores ovate, 8—9 × 5—5½ μ.

Very common both in frondose and coniferous woods till late in the season.

A. rubescens forma *annulo-sulphurea* Gill. (*A. magnifica* Quélet (nec Fries)).

Smaller and more slender. Ring and apex of stem tinged pale sulphur-yellow. — This little form is met with occasionally in shady plantations of Picea and Betula. (Not figured).

II. Amanitopsis

12. **A. vaginata** (Bull.) Fr. (Plate 6. fig. B.)

Cap 4—8 cm, at first ovate, then expanded, gray or somewhat livid-pale, edge sulcate. Stem of the same colour, but paler, ringless. Basal volva splitting open in the top, ovate, base contracted.

Spores globose, 9—12 μ in diameter.

Very common, chiefly in frondose woods, generally solitary.

A very widely distributed species, to be met with even under subarctic conditions. Several more or less distinct colour-forms exist, the more prominent of which are:

12 a. **A. vaginata** var. *fungites* Batsch. (Plate 6. fig. D.)

Generally rather small (cap 4—5 cm). Whole plant almost pure white.

Rather rare (in frondose woods), but widely distributed (Europe—U. S. A.)

12 b. **A. vaginata** var. *fulva* (Schaeff.) Fr. (Plate 7. fig. B.)

Often rather large. Cap bright fulvous or light mahogany; stem and volva with a tinge of the same colour.

Rather common, but almost exclusively in woods of Betula, on somewhat boggy ground.

This is the most prominent variety of the lot. Several authors regard it as a distinct species.

A. vaginata var. *crocea* Quél.

A beautiful yellow form which has been met with in Sjælland in 1920 (and later years) by H. T. Manicus (and also by Ferdinandsen and Winge). It differs from var. *fulva* by the colour of the cap which is a rich yellow (only the disc somewhat flushed with fulvous).

13. **A. strangulata** Fr. (Plate 7. fig. C.)

Larger than *A. vaginata*. Cap up to 12 cm broad, fuscous-brown, set with coarse, dirt-grayish warts or patches from the circumcised volva. For the rest not materially differing from subfuscous varieties of A. vaginata, to which it is linked by intermediate forms.

Spores globose, about 12 μ (10½—13) in diameter.

Rather rare, in frondose woods (Quercus, Fagus).

Several authors have adopted the name *A. inaurata* for this stately Agaric.

LIMACELLA

Cap glabrous, subviscid to glutinous; tissue distinct. Stem annulate, without any trace of a basal volva. Spores subspheric, rather small.

The new genus *Limacella* was created by Earle (emended later by Maire) principally for *Agaricus lenticularis*. Fries placed this species in *Amanita*, in spite of its bulbless stem. And recent investigations (Maire) have so far born out this taxonomy, as they have shown that it has certain anatomical traits in common with Amanita, not with Lepiota — to which genus most post-Friesian authors have transferred it. However *L. lenticularis* is in other ways so far from *Amanita*, so closely related to some of the viscid *Lepiotas* that it seems natural to overcome the dilemma by creating an intermediate genus to include some Lepiotoid species as well as the Amanitoid ones. — However I do not include in *Limacella* such species as *Lepiota glioderma* Fr., in which the tissue of cap and stem are not distinct from each other and which are therefore more Armillarioid and should be placed accordingly.

1. **L. lenticularis** (Lasch) Maire (*Amanita lenticularis* (Lasch) Fr.) (Pl. 7. fig. A.)

Cap 7—11 cm, at first almost ovate, then expanded, alutaceous or very pale tan with a slight flush of fleshcolour, viscid. Ring broad, often becoming somewhat olivaceous, set with drops of water in wet weather. Stem clavate, of the same colour, but paler.

Spores subglobose, 5—6 × 5 μ (or spheric-ovate, $5^{3}/_{4} \times 4$ μ), with a minute, oblique pedicel.

Rather common, often gregarious, in woods of Picea on moist ground. More rarely met with in boggy places under Fraxinus and other deciduous trees.

Limacella lenticularis is often called *Agaricus guttatus* Pers.; but I do not adopt this name, because Schaeffer used it somewhat earlier for a species of *Tricholoma*.

[*L. illinita* (Fr) Maire (*Lepiota illinita* Fries), which is common in northern Sweden and also to be met with on the other side of the Atlantic (I have found it in Canada), has hitherto been sought in vain in Denmark. It is remarkable for its ovate, white, glutinous cap and slender stem with a somewhat abortive ring.]

LEPIOTA

Tissue of cap generally distinct from that of the stem. Ring present (rarely obliterate). Universal veil obsolete or concrescent with cuticle of stem and cap. Gills mostly free. Spores of very various size and shape, but never globular.

Lepiota is a much larger and more heterogeneous genus than *Amanita*, but nevertheless fairly well distinguished from the adjoining genera, *Amanita* and *Armillaria*, although it will hardly be possible to indicate any absolute characters, common to all the species.

As a leading character for the genus *Lepiota* ELIAS FRIES particularly emphasizes that the tissue of the cap is distinct from, not continuous with that of the stem. This is certainly true of such species as *L. procera, L. clypeolaria* etc., and even the minor species can by this trait easily be distinguished from small *Mycenas* or *Collybias*. But in *L. amianthina* and its allies the tissue of stem and cap run into each other without any visible distinction. For this reason some authors transfer these species to *Armillaria* or single them out into a special genus *Cystoderma* (FAYOD).

FRIES also describes the *Lepiotas* as having a universal veil concrescent with the cuticle (while the cap of the *Armillarias* is without such coating). This characterisation fits very well if such species as e. g. *L. granulosa* are kept in view, as here the universal veil forms a peronate, squamulose coating on the stem, which originally is continuous with a similar tissue on the cap. But in *L. rhacodes, L. cristata* etc. no trace of such a universal veil is to be seen, the scales on the cap beeing simply formed by the cracking of the — originally smooth and naked — cuticle itself.

The gills in most cases are perfectly free, in some of the larger species even separated from the stem by a kind of collar or an open space. Also in this respect the *Cystodermas* show a transition to the *Armillarias*, in which the gills are more or less adnate.

Even the ring, the most conspicuous characteristic of the *Lepiotas*, may be rudimentary or almost 0. In *L. cortinarius* it is reduced to cobweb-like filaments; in many of the smaller species it is fugacious, appendiculate at the edge of the cap or barely visible as a narrow edging to the peronate, hose-like coating on the stem. Some of these species are by certain authors referred to a special genus *Schulzeria* Bres.

Finally some few of the species here described differ from the rest by having pale green or subfuscous sporepowder. Instead of referring them to other genera — *Inocybe, Psalliota* etc. — as some authors have done, I retain them in *Lepiota* on account of their intimate relation to neighbouring, pure white-spored species.

But although great diversities exist and no single character can be regarded as absolutely decisive all the true *Lepiotas* are characterised by possessing some or most of the above-mentioned characters.

The microscopical characters also show great diversity, in contradistinction to what is the case in *Amanita*. The spores vary very widely as well in size as in shape. The "index" for the largest spores *(L. procera)* is about 150, while for the smallest ones *(L. granulosa, L. echinella)* it is only about 10. The form of the spore varies from broadly ovate to narrowly fusiform and almost projectile-shaped. Especially the two latter kinds of spore are particular to this genus. The projectile- or wedge-shaped spore is met with in quite a number af species but more or less pronounced. It is characterised by having a somewhat truncate base and a lateral pedicel. The epispore is always smooth. The basidia seem to be constantly 4-spored in all the species. Cystidia are present or wanting in very closely related species, hence this

character cannot be used for characterising, the principal tribes but may come in useful as a mark of distinction in critical cases. They vary in outline from subglobose to hairshaped. Facial cystidia have never been observed in this genus. The microscopic texture of the cuticle of the cap and its coating by remnants of the universal veil is very variable. The two extreme types are the totally fibrillose cuticle *(L. excoriata* etc.*)* and the micaceous (f. inst. *L. seminuda*), in which the surface of the cap is made up of globular or almost globular cells. These differences afford very useful sectional characters.

Taxonomy. The classification of FRIES has to a large extent withstood the criticism of more modern mycologists. But the introduction of microscopic characters in the diagnoses not only gives more precision to the characterisation of the species, it also makes it possible more exactly to define the groups and mark out their boundary-lines. And this to me has resulted in a partial rearrangement and reconstruction of the original Friesian sections.

Excluding from the classification the section B of FRIES (species with a viscid cuticle) of which none are figured in this work — and of which at least *L. illinita* should be transferred to the vicinity of *Limacella lenticularis*, — and setting apart as distinct subgenera the *Cystodermas (L. granulosa* etc.*)* and *Leucobolbitius* (*L. cepæstipes* and its allies) the true *Lepiotas* without materially altering the Friesian classification can be arranged in three distinct main sections: *Proceræ*, *Clypeolariæ* and *Micaceæ*.

Proceræ Fr. (extended to include *Annulosæ* Fr. except *L. cepæstipes* etc.) comprises only large or rather large species, with a distinct, free ring. The cap is smooth while in bud, but often cracking into coarse scales when expanding. The spores are large (8—16 μ long), ovate.

Clypeolariæ Fr. Medium-sized or small species. Cap squamulose from the beginning or cracking into minute squamules, rarely almost smooth, innato-fibrillose. The stem is either peronate up to the ring or sparingly set with minute squamules from base upward. The spores are either small or rather large, but then somewhat fusiform or projectile-shaped.

Micaceæ Lange. Small species. Cuticle of globular cells which either form a parenchymoid, micaceous tissue or a dense granular-mealy coating. Spores either projectile-shaped or very small, ovate.

The two subgenera can be thus characterised:

LEUCOBOLBITIUS Lange. Medium to rather small species with a slender stem and an ovate, submembranaceous cap, which, when expanding, becomes sulcato-striate, because the cuticle splits from the edge up, somewhat after the manner of a *Bolbitius*. Spores obtuse, ovate, medium to rather large.

CYSTODERMA Fayod. Medium-sized species with a peronate stem, the tissue of which is continuous with that of the cap. The surface of the cap is granulate, the gills not absolutely free. Spores minute, ovate.

The minor taxonomic points will be found in the key.

KEY

TO THE SPECIES FIGURED

I. Eu-Lepiota

Tissue of cap and stem distinct. Edge of cap not fisso-sulcate.

A. Proceræ

Cap when in bud smooth. Ring free. Spores ovate, large (index 45 or more).

α. *Macrosporæ.* Spores 12 × 7 μ or more.

a. Squamulosæ. Cuticle of cap soon cracking into coarse scales. Stem squamulose, bulbous.

1. Scales dark brown, large ... ... 1. *L. procera*

2. Scales ochraceous or pale crust-brown, minute ... ... 2. *L. umbonata*

b. Lævigatæ. Cuticle entire (or somewhat squamuloso-fibrillose towards the edge, whitish. Stem almost bulbless ... ... 3. *L. excoriata*

β. *Metasporæ.* Spores 11 × 6 μ or less.

a. Squamulosæ. Cuticle cracking into large scales. Stem bulbous.

1. Scales brown... ... ... 4. *L. rhacodes*

2. Scales whitish ... ... 4 a. *L. rhacodes* var. *puellaris*

b. Lævigatæ. Cuticle remaining entire (white). Stem almost without bulb ... ... 5. *L. naucina*

B. Clypeolariæ.

Rather large to very small species. Cuticle squamulose, rarely almost glabrous. Stem more or less squamulose-peronate, rarely naked. Ring generally inferior or fugacious. Spores either small or rather large, but then more or less acuminate, ellipsoid to fusiform or projectile-shaped.

α. *Acutesquamosæ.* Rather large to small. Cap from the beginning set all over with mucronate, conical, innate or deciduous scales.

a. Gills dichotomous. Stem only sparingly scaly. Rather large... ... 6. *L. acutesquamosa*

b. Gills undivided. Stem (and ring on the outside) densely peronate-scaly.

1. Medium. Scales brownish-black, innate to the whitish, fibrillose, subcutaneous tissue of the cap. Apex of stem exuding drak drops ... ... 7. *L. hystrix*

2. Scales deciduous, hazel or darker brown.

* Medium. Scales dark brown or bistre on brown ground. Spores 5—6 μ long ... ... 8. *L. echinacea*

** Small (cap 2—3½ cm). Spores 4—5 μ long.

† Scales on cap bistre brown ... ... 9 a. *L. echinella* var. *a.*

†† Scales on cap hazel-brown ... ... 9 b. *L. echinella* var. *b.*

β. *Squamuloso-lævigatæ*. Medium to very small. Cuticle cracking into squamules, rarely fibrillose-smooth.

a. Fusisporæ. Spores rather large (9 – 18 μ), more or less acuminate, fusiform or ellipsoid.

1. Epiderm broken up into granular squamules.

* Scales brownish or pale. Spores fusiform, 12—18 μ.

† Cap 4—8 cm, of various colours ... ... 10 a. *L. clypeolaria*

†† Cap 2—4 cm, ochraceous ... ... 10 b. *L. clypeolaria* var. *minor*.

** Scales bistre. Spores ellipsoid, 9—11 μ ... ... 11. *L. gracilis*

2. Epiderm almost smooth.

* Cap somewhat gilvous. Spores ellipsoid fusiform ... ... 12. *L. lævigata*

** Cap white.

† Stem floccoso-peronate. Spores ellipsoid about 12 μ ... 13. *L. alba*

†† Stem almost glabrous, slender. Spores oblong-ellipsoid, about 10 μ ... ... 14. *L. serena*

b. Stenosporæ. Spores medium (rarely over 10 μ), narrow, more or less projectile-shaped with a truncate base.

1. Epiderm broken up into small, innate, granular squamules.

* Scales very pale crust-brown. Veil arachnoid. Stem with flat basal bulb ... ... 15. *L. cortinarius*

** Scales some other colour. Veil not arachnoid.

† Scales dark green, becoming fuscous, base of stem strigose 16. *L. Grangei*

†† Scales some other colour.

° Scales almost black ... ... 17. *L. pseudo-felina*

°° Scales not black.

˙ Cap very small (1—2 cm), somewhat tomentoso-pilose, pale dirtbrown ... ... 18. *L. tomentella*

˙˙ Cap 2—5 cm. Cuticle fulvous bay or fulvous pink.

• Cuticle fulvous bay. Stem with squamules of same colour ... ... 19. *L. castanea*

•• Cuticle fulvous-pink. Stem almost glabrous ... ... 20. *L. cristata*

2. Cuticle almost smooth or indistinctly squamulose with adpressed scales.

* Cap pale fulvous or gilvous.

† Medium (3—6 cm) ... ... 21. *L. fulvella*

†† Rather small. Stem slender ... ... 21 a. *L. fulvella* forma *gracilis*

** Cap almost white, small ... ... 22. *L. albo-sericea*

c. Ovisporæ. Spores medium to very small, ovate, obtuse.

1. Cuticle coloured, somewhat squamulose.

* Squamules fuscous-purple or fuscous-vinaceous.

† Spores about 8 μ ... ... 23. *L. brunneo-incarnata*

†† Spores about 5 μ.

° Scales rather broad. Stem peronate with a dense squamulose felt ... ... 24. *L. fusco-vinacea*

°° Scales minute. Stem almost glabrous ... ... 25. *L. lilacea*

** Squamules some other colour.

† Squamules on cap dingy fleshcolour or dusky ochre, on stem whitish ... ... 26. *L. subincarnata*

†† Squamules fuscous or black.

° Spores 6—7 μ long.

* Squamules almost black ... ... 27. *L. felina*

** Squamules bistre, paler towards the edge ... ... 28. *L. setulosa*

°° Spores 4—5 μ long. Squamules black ... ... 29. *L. micropholis*

2. Cuticle white, fibrillose. Very small ... ... 30. *L. cygnea*

C. Micaceæ.

Rather small or very small species. Cuticle of globular cells, micaceous or granular-mealy. Spores rather small or very small.

α. *Genuinæ.* Spores and gills white.

a. Stem (and young cap) flushed with lavender ... ... 31. *L. Bucknallii*

b. Not so.

1. Cap and stem granular-mealy.

* Cap dirtgray or pallid ... ... 32. *L. Hetieri*

** Cap white, becoming somewhat pinkish ... ... 33. *L. rufescens*

2. Cap micaceous, whitish with a tinge of fleshcolour. Stem glabrous.

* Cap 1—2 cm ... ... 34. *L. seminuda*

** Cap 1 cm ... ... 34 a. *L. seminuda* forma *minima*

β. *Anomalæ.* Spores and gills coloured.

a. Spores pale green. Gills bluish-green ... ... 35. *L. Eyrei*

b. Spores pallid fuscous, rubescent. Gills dark red ... ... 36. *L. hæmatosperma*

II. Leucobolbitius

Tissue of cap and stem distinct. Edge of cap (when expanding) fisso-sulcate, membranaceous. Spores ovate, medium to rather large.

α. Squamules on cap pallid ochry or brigth yellow. Taste somewhat bitter.

a. Squamules pale ochre or crust-brownish ... ... 37. *L. cepæstipes*

b. Squamules chrome-yellow... ... ... 38. *L. lutea*

β. Squamules and central part sepia-grayish. Not bitter ... ... 39. *L. Brebissonii*

III. Cystoderma

Tissue of cap and stem somewhat concrescent. Cuticle granulate. Stem peronate. Spores minute, ovate.

α. Cap red or brown. Cystidia present, hairshaped.
  a. Cap bright red. Stem stout, subbulbous ... ... 40. *L. cinnabarina*
  b. Cap brown. Stem not bulbous ... ... 41. *L. granulosa*

β. Cap yellowish or pale. Cystidia absent
  a. Cap ochraceous ... ... 42. *L. amianthina*
  b. Cap whitish with a tinge of fleshcolour ... ... 43. *L. carcharias*

SPECIFIC DESCRIPTIONS AND NOTES

I. Eu-Lepiota

A. *Proceræ*

1. **L. procera** (Scop.) Fr. (Plate 8. fig. B.)

Very large and tall. Cap 10—12 cm broad, slightly umbonate; umbo and rather coarse scales on disc fuscous, paler and more shaggy towards the edge. Gills separated from the stem by broad collarium. Stem tall, tapering from the somewhat bulbous base, scaly all over with subfuscous scales. Ring double, free, large.

Spores ovate, 13—18 × 8½—10½ μ.

Not uncommon but often solitary, chiefly in open spaces in or just outside frondose woods.

2. **L. umbonata** (Schum.) Lange. (Plate 8. fig. C.)

Smaller than the preceding species. Cap about 8 cm, with a prominent, somewhat mammiform umbo. Cuticle very pale ochraceous or almost alutaceous, broken up into minute granular squamules. Ring somewhat narrower than in no. 1.

Spores ovate, 12—16 × 7½—9½ μ.

Not uncommon, in grassy spaces in coniferous and frondose woods, on hill-slopes etc.

Intermediate forms between nos. 1 and 2 are occasionally met with. It forms a transition to *L. mastoidea* Fr., the most gracile type of this stirpe. *L. gracilenta* Krombh. (sensu Ricken) only differs in having a narrow, membranaceous ring.

3. **L. excoriata** (Schaeff.) Fr. (Plate 8. fig. A.)

Rather large but more short-stemmed than the preceding species. Cap 8—10 cm, almost smooth, somewhat fibrillose and excoriate-shaggy towards the edge, whitish-pale, slightly umbonate. Stem almost cylindric, with a narrow ring and slightly thickened, rooting base.

Spores oval, 12—16 × 8—10 μ. Cystidia on edge of gills obtusely fusiform, 50 × 10 μ.

Rather common in grass- and stubble-fields, always in light and sandy soil. Often gregarious.

4. **L. rhacodes** (Vitt.) Fr. (Plate 9. fig. C.)

Very large. Cap 8—12 cm, darker or more pale grayish brown, cuticle breaking up into coarse, somewhat imbricate scales. Stem bulbous, shorter than in *L. procera* and devoid of scales. Ring large, free, double. The flesh turns rhubarb-red or pinkish when cut.

Spores oval, 8½—11 × 6 μ.

Common and often in large numbers in woods of Picea; more rarely to be met with in frondose woods, under hedges etc.

4 a. **L. rhacodes** var. *puellaris* Fr. (Plate 9. fig. B.)

About half the size of the type-form. Cap about 5 cm, almost pure white and not quite so coarsely scaly. The flesh remains almost white.

Spores oval, 8—9 × 5—5½ μ. Cystidia obovate-bottleshaped, about 16 μ broad.

Rarer than the typical *L. rhacodes*, with which it is connected by intermediate forms. *L. nympharum* Kalchbr., as described and figured by Bresadola and Barla, is such a one.

5. **L. naucina** Fr. (*Ag. lævis* Krombh.). (Plate 9. fig. A.)

Medium. Cap 6—8 cm, almost pure white, smooth and silky. Gills white but turning pale fleshcolour with age. Stem cylindric, smooth, with a narrow, free ring.

Spores broadly ovate, 8—9½ × 5¼—5½ μ, with a large central gutta. When examined under the microscope they have a slight pinkish tint, but the sporepowder is white.

Rather rare, and often solitary, in gardens, under hedges etc. (rarely met with in woods of Picea).

A good and well illustrated description of this Agaric is given by the American mycologist Atkinson. But it has been described under a legion of names: *Annularia lævis* (Krombh.) Schulz. (Sporepowder said to be pinkish), *L. densifolia* Gill., *L. pudica* (Bull.) Quél. etc. *Psalliota cretacea* as figured in Fries: Ätliga och giftiga svampar is also very much like it, but is said to have spores like *Psalliota campestris*.

B. *Clypeolariæ*

α. Acutesquamosæ

6. **L. acutesquamosa** (Weinm.) Fr. (Plate 10. fig. F.)

Rather large. Cap 7—10 cm broad, subumbonate, set with somewhat deciduous, acuminate, pyramidal, dark brown scales. The cuticle soon breaks up into smaller scales, between

which the subcutaneous, whitish-fibrillose tissue becomes visible. Gills forked, narrow, crowded. Stem whitish-pale, brownish below and sparsely brown-scaly. Smell rank, disagreeable.

Spores cylindric-ellipsoid, narrow, obliquely pedicellate, 7—8 × 2½—3 μ. Cystidia obovate-subrotund, 8—16 μ broad.

Rather common, often in garden-beds, shrubberies etc.

Large specimens of this species are sometimes misnamed *L. Friesii.* But the true *L. Friesii* (Lasch) Fr. should have large, adpressed, brown scales only, no pyramidal ones.

7. **L. hystrix** Møller & Lange n. sp. (Plate 10. fig. E).

Medium. Cap 4—5 cm, convex. The cuticle is broken up, from the beginning, into innate, pyramidal, rather coarse scales which are brownish-black at the apex, grayish-brown and fibrillose at the base. Near the edge the scales are smaller, the subcutaneous tissue almost white. The felty edge of the cap overreaches the gills. Gills not forked, rather crowded, minutely edged with black (sub lente!). The stem is 5—6 cm × 6—10 mm, densely peronate-tomentose, cowered with erect, brownish-black scales up to (and on the lower side of) the ring. Apex white, often exuding dark umber-brown drops.

Spores narrow ellipsoid with an oblique pedicel, 6½—2½ μ. Cystidia clubshaped, apex somewhat capitate, contents somewhat fuscous. The scales are made up of hyphæ; only the very tip has some vesiculose, ovate or roundish cells.

Rare, in frondose woods.

Probably often confounded with *L. acutesquamosa,* but very distinct. I formerly referred it to *L. hispida* (*L. hispida* f. *minor,* as figured by Bresadola, may be a form of it). But *L. hispida* of Fries is something quite different. *L. hystrix* was first figured in my "Studies" V., pl. 1 c, as *L. hispida.* (The figure does not show the dark drops on the stem).

8. **L. echinacea** Lange n. sp. (Plate 10. fig. D.)

Medium. Cap 4—6 cm broad, densely set with deciduous, erect, mucronate scales of a somewhat darker, umber colour. Gills not forked, narrow. Stem up to the ring densely clad with a brown, felty-pilose coating and recurved brown scales, (also the ring has some brown scales on the edge.)

Spores oval, 5—6 × 2¾—3 μ. Basidia 4-spored. Cystidia absent. On black soil in boggy woods (under Fraxinus etc.). Very rare.

This species is very close to *L. echinella,* but larger. I formerly referred it to *L. fuscosquamea* Peck. But modern American authors (vide Kauffman: The genus Lepiota in the United States) apply this name to a species with longer spores. It is also close to *L. hispida,* differing i. a. in the lack of marginal cystidia. (First figured in "Studies" II. sub nom. *L. hispida*).

L. hispida (Lasch) Fr.

I have seen specimens, collected by M. P. Christiansen which I think belong to this species, as depicted by Fries (Icon. sel.), and after him by Barla (loc. cit.). It is larger and taller than no. 8; and

the gill edge is set with somewhat inflated, clavate cystidia. It differs from the Friesian description in having the unexpanded cap densely set with acute, conical scales (like the allied species); but the scales are very loose and may occasionally be rubbed away when the fungus pushes up through a deep layer of humus and foliage. — It grows in similar localities as no. 8.

L. echinella Quél.

The typical form of this species, with somewhat pinkish flesh, I have never seen; and QUÉLET himself evidently did not know much about it. But F. H. MØLLER has met with a form (in Falster) which probably is the true *L. echinella*. To *L. echinella* in an extended sense may be referred the two forms described below, nos. 9 a and 9 b.

9 a. **L. echinella** var. *eriophora* (Peck) Lange (*L. eriophora* Peck). (Plate 12. fig H.)

Small and dwarfy. Cap 2—4 cm, convex, densely set with small, bistre-brown or umber, acute, erect scales on a paler substratum. Stem short (2—3 cm), peronate by a felty-scaly, dense coating of the same colour which extends over the lower surface of the woolly ring.

Spores oval, 4—5 × 2 1/2—2 3/4 µ. The squamules on the cap are made up of 1) cylindrical, more or less inflated cells that form long, articulate, 4—9 µ broad, brownish hyphæ and 2) globose cells, up to 35 µ in diameter. Cystidia absent.

Rare, in deciduous woods, on moist ground.

This form exactly squares the description given for *L. eriophora* Peck (from U. S. A.), and I therefore make use of this name.

9 b. **L. echinella** var. *asperula* (Atk.) Lange (*L. asperula* Atk.). (Plate 10. fig. C).

Small and dwarfish. Cap about 2 cm, strongly convex, pallid, set with very minute, erect, acute scales of a light hazel-brown colour. Stem short, clad with similar or almost granular scales. Ring very narrow.

Spores 4 1/4 × 2 1/2 µ. Cystidia absent. Scales almost exclusively made up of subglobose cells with brownish contents.

Rare, in coniferous and mixed woods.

It is very close to the preceding species (joined with it in "Studies" II). And some American authors also look upon them as identic. The description of *L. asperula* given by KAUFFMAN (Agaricaceæ of Michigan) evidently is adapted to include both forms. It seems to me highly probable that *L. globularis* Quél. also is identical, although the author does not mention the scales on the stem. (Figured in "Studies" II. as *L. echinella*).

β. Squamuloso-lævigatæ

a. FUSISPORÆ

10. **L. clypeolaria** (Bull.) Fr. (Plate 11. fig. D.)

Medium. Cap 4—7 cm, somewhat umbonate. The umbo, which generally is some shade of brown, is at first very minutely piloso-squamulose. The rest of the cuticle (which

shades off into whitish towards the margin) is broken up in minute granular scales. The stem is tall and rather slender, felty-squamulose up to the fugacious ring.

Spores fusiform, 13—19 × 5½ μ. Edge of gills sparingly set with inflated, sack-shaped, 10—20 μ broad cells.

Common as well in frondose as in coniferous woods till late in the autumn, but generally solitary.

It varies considerably in size and colour. Even almost white specimens are occasionally met. An extreme little form is:

10 a. **L. clypeolaria** var. *minor* Lange n. var. (Plate 11. fig. E.)

Small. Cap about 2½ cm, pale clay-brownish ochre. The stem turns yellow inside and outside when bruised.

Spores 13½—15 × 5½—6 μ. Cystidia small and inconspicuous, fusiform or bottle-shaped, 30 × 11 μ. The pilose, pointed squamules on the umbo are made up of agglutinated, hairlike hyphæ.

Rare. Found in a park under Æsculus.

Plate 39 in COOKE'S Illustrations *(L. metulæspora)* is a fairly good portrait of this form, and I therefore formerly called it *L. clypeolaria* var. *metulispora.* But as *L. metulispora* was created by BERKELEY and BROOME under the erroneous impression that *L. clypeolaria* had small, ellipsoid spores it is now regarded as a mere synonym of *L. clypeolaria.*

11. **L. gracilis** (Quél.) Rea. (Plate 11. fig. F.)

Small or rather small. Cap 2—4 cm, convex, dark bistre to rufous bistre in the centre, pallid towards the edge, cuticle broken up into minute, granular squamules. Stem whitish, towards the base sparingly set with minute, grayish squamules.

Spores ellipsoid, 9—11 × 5—5¼ μ.

In frondose woods, on humus ground. Rather rare.

Dark forms have a certain likeness to *L. felina* and were referred by me to this species in "Studies" II. because of its relationship with *L. clypeolaria,* of which *L. felina* was regarded as a variety by Fries.

12. **L. lævigata** Lange. (Plate 11. fig. C.)

Small. Cap 1½—2½ cm, slightly umbonate, almost smooth, (slightly floccose-fibrillose towards the edge), central part gilvous or pale fulvous-ochry, edge pale. Veil fugacious, mostly attached to the edge of the cap. Stem about 3 cm × 3 mm, white, below the veil sparingly covered with cottony floccose scales. Odour faint, rather sweet.

Spores ellipsoid-fusiform, 11½—13½ × 4½ μ.

Growing in open grassy spaces, in troops. Rare.

First figured in "Studies" II. (1915) as *L. gracilis* var. *lævigata* Lange. REA describes as well my *L. lævigata* (Transact. Brit. Mycol. Soc., Vol. XVII) as a somewhat larger (but hardly specifically distinct) form which he calls *L. pratensis.* (But it is doubtfull if BULLIARD'S *Ag. clypeolarius* var. *pratensis* really belongs here).

13. **L. alba** (Bres.) Sacc. (sensu Rea) (*L. clypeolaria* var. *alba* Bres.). (Plate 11. fig. A.)

Medium to rather small. Cap 3—4½ cm, slightly umbonate, white at first, almost smooth (sub lente slightly flocculose); later on somewhat silky-filamentose. Stem white, at first cottony floccose, but soon becoming almost glabrous. (I have never seen it yellow-spotted as described by Bresadola).

Spores ovate, ellipsoid-subfusiform, 10½—14 × 5½—6 μ. Basidia 4-spored. Cystidia inflated-clubshaped, about 25 × 8—9 μ.

Rather rare; chiefly met with on grassy banks in outskirts of coniferous woods.

Bresadola regards it as a variety of *L. clypeolaria*, but the spores are different. In "Studies" II. (1915) I referred it to *L. erminea* Fr., and it probably is the *L. erminea* of Ricken, Schroeter et al. But Ricken's *L. erminea* has much longer spores. Krombholz's figure of *Ag. ermineus* is a fairly good portrait of my plant.

14. **L. serena** Fr. (Plate 11. fig. B.)

Rather small. Cap 1¾—4 cm, at first obtusely conical, then expanded and subumbonate, milk-white (umbo slightly ochre), almost smooth (cuticle formed of silky fibrils, some of which are detached at the end, forming minute, barely visible flocci). Edge overreaching. Gills lanceolate, crowded, free, remote (½ mm from the stem). Stem rather tall, slender, slightly clavate (2—5 mm above, 3—7 mm below), white, glabrous, with a small membranaceous ring in the upper half. Taste almost none.

Spores oblong-ellipsoid, 9—10 × 3¾—4 μ. Cystidia inflated bottle-shaped (body about 15 μ broad, neck shorter or longer, often somewhat wavy, 3 μ broad). Cuticle made up of fibrils of cylindric cells (about 150—200 × 10—15 μ).

Under Fraxinus and Betula, on somewhat boggy ground, gregarious. Rare.

It has a superficial likeness to a white *L. cepæstipes*, but the edge of the cap is not sulcate-striate. — More slender and silky than *L. albo-sericea*. Rea's description of *L. erminea* Fr. comes pretty near to my plant, but the gills of this species are said to be sinuate, adfixed, and the smell and taste radish-like. Also the cap is considerably broader. — Rea gives the spore-dimensions for *L. serena* as 5—6 × 4 μ, but Quélet has: ellipsoid, 10 μ long (like mine).

b. Stenosporæ

15. **L. cortinarius** Lange. (Plate 10. fig. B.)

Rather large. Cap 5½—7½ cm, fleshy, at first somewhat campanulate, then expanded, gibbous; cuticle pale crust brown, soon cracked into minute, granular squamules. Veil arachnoid, extending to the incurved, overreaching edge of the cap. Gills separated from the stem by a very narrow collarium, lanceolate, whitish. Stem 6—7 cm × 1 cm, attenuated from the subbulbous, somewhat depressed base, minutely fibrillose; base sparingly set with floc-

cose squamules, whitish, with a slight tinge of the colour of the cap. Odour faint, not unpleasant.

Spores somewhat projectile-shaped with an oblique pedicel, $8 \times 3^1/_4$ μ. Cystidia obovate, about 10 μ broad.

In wood of Abies, in troops on the dead needle bed. (Also met with once in mixed frondose wood).

First described in "Studies" II. (1915). A very distinct species.

16. **L. Grangei** (Eyre) Lange (*Schulzeria Grangei* Eyre). (Plate 10. fig. A.)

Rather small. Cap 2—4 cm, when in bud somewhat felty-pilose, soon cracked into minute granules, which are dark bluish green in the middle, paler towards the edge, on a whitish substratum. Later the squamules are discoloured into almost black (towards the edge subfuscous), while the basic colour becomes dirty rufescent. Veil whitish, membraneous-cottony, slightly granulate on the lower side, chiefly appendiculate at the edge of the cap. Stem 4—6 cm × 4—6 mm, attenuated upward, at the base clad with strigose, coarse, rufescent hairs, and up to the veil set with granular, bluish-green squamules. Smell faint (slightly after the manner of *L. cristata*).

Spores projectile-shaped, $8^1/_2$—$11 \times 3^1/_4$—$3^3/_4$ μ. Cystidia club-shaped, crowded, 30×6—9 μ.

Rare, in frondose woods, in troops on deep bed of decaying foliage.

When old and discoloured it may by confounded with *L. felina* or *L. castanea*. — Eyre, who first found and described this remarkable species, referred it to the ringless genus *Schulzeria*. But the veil is just as well developed as in *L. castanea* etc. — *L. ochraceocyanea* Kühner is probably synonymous.

17. **L. pseudo-felina** Lange n. sp. (Plate 12. fig. C.)

Very small. Cap 1—$1^1/_3$ cm, campanulate, sootblack, cuticle at first minutely pilose-tomentose, then broken up into minute, granular squamules on a whitish ground. Gills free, not crowded; edge somewhat fimbriate. Stem $4^1/_2$ cm × 2 mm, whitish, rufescent from base upward, with dispersed, blackish granules below the rudimentary ring.

Spores projectile-shaped (or almost bicornute), 9—$10^3/_4 \times 3^1/_4$—4 μ. Cystidia clavate or subventricose, 30—35 × 8—9 μ. The hairs on the cap are 120—160 μ long and about 12 μ broad, monocellular with grayish contents.

In a frondose wood, solitary.

Smaller than *L. felina* and with longer, projectile-shaped spores. More blackish than *L. castanea*. I have only met this little Agaric once. It evidently is very close to *L. tomentella* and might be regarded as a variety of this species.

18. **L. tomentella** Lange. (Plate 14. fig. D.)

Very small. Cap 1—2 cm, at first campanulate-convex, then expanded, tomentose-hairy

(the central part hirto-squamulose), pallid clay-brownish, the cuticle soon breaking up into minute squamules. Gills rather broad, white. Stem 3—4 cm × 1½—3 mm, whitish, becoming flushed with dirty fleshcolour. Partial veil fibrillose. Below the veil the stem is sparingly set with clay-brownish flocci. Odor faint, sweet.

Spores projectile-shaped, 7½—8 × 3 μ. Cystidia clavate, 7 μ broad.

Rare, in mixed frondose woods, in troops on the ground.

First described in "Studies" V. (1923).

19. **L. castanea** Quél. (Plate 12. fig. G.)

Small. Cap 2—4 cm, chestnut-brown or fulvous-bay, edge paler, cuticle soon broken up (from edge centrewards) into minute, granular squamules. Gills whitish, but often becoming more or less rufous (like the cap and stem) with age or when bruised. Ring often rudimentary. Stem attenuated upward from the subbulbous, white base, sparingly clad with brownish-rufous, minute scales up to the ring-mark.

Spores projectile-shaped, 9—13 × 3¾—5 μ, occasionally almost bicornute. Cystidia hair-shaped, rather broad and obtuse.

Not uncommen, as well in coniferous as in frondose woods, in small troops.

20. **L. cristata** (Alb. & Schw.) Fr. (Plate 12. fig. A.)

Rather small. Cap 3—4 cm. Cuticle brownish red, at first continuous, but soon disrupted, except at the disc, into minute, dispersed granules on a white, fibrillose subcutaneous base. Ring fugacious. Stem a somewhat brownish-pale flesh-colour, almost glabrous, silky-fibrillose. Smell strong, disagreable.

Spores projectile-shaped, 6—7½ × 3 μ. Cystidia inflated obovate, crowded.

Common, often numerous, in garden-beds, refuse-heaps etc. in shady localities on humus ground.

21. **L. fulvella** Rea (*L. Boudieri* Bres. ext.). (Plate 12. fig. F.)

Rather small to medium. Cap 3—5 cm, slightly umbonate, at first almost smooth but soon becoming somewhat fibrilloso-squamulose with adpressed scales. The colour is doe-brownish fulvous, gilvous-pale towards the edge. Gills whitish, the edge sometimes slightly edged with the cap-colour. Stem about 4—5 cm × 4—6 mm, below the fugacious ring slightly floccoso-tomentose, paler than the edge of the cap.

Spores projectile-shaped, 8—9 × 3½ μ. Cystidia ovato-clavate, about 20 × 10, contents hyaline or slightly coloured.

In woods, in moist humus places, somewhat gregarious, but not common.

The form here figured is the one with the marginate gills, described by Bresadola sub nom. *L. Boudieri*. The colouring of the edge is never conspicuous and should not be used as a specific character.

21 a. **L. fulvella** forma *gracilis* (*L. helveola* Bres. var. *Barlæ* Bres.). (Plate 12. fig. D.)

Small. Only differing from the main species by the taller and more slender, distinctly gilvous-squamulose stem and the smaller, more brightly gilvous cap.

Spores projectile-shaped, $7^1/_2$—8×3 μ.

Rarer than the main species.

BRESADOLA describes this form sub nom. *L. helveola* var. *Barlæ*. But the spores differ from those of *L. helveola*, and it therefore cannot belong here. As also his synonymy is hopelessly confused, I think it better to discard his name altogether. But I am inclined to regard this little Agaric only as a form, not as a distinct variety.

22. **L. albo-sericea** P. Henn. (?). (Plate 12. fig. B.)

Small or very small. Cap $1^1/_2$—$2^1/_2$ cm, campanulate, then somewhat expanded-gibbous, white (centre with a slight tinge of brownish), at first smooth, then slightly silky-fibrillose and adpressedly squamulose. Stem about 4 cm × 2—3 mm, (base slightly swollen), white, somewhat rubescent from base upward, below the ring slightly cottony squamulose-tomentose. Ring white, membranaceous.

Spores projectile-shaped, $9 \times 4^1/_2$ μ. Cystidia hairshaped, about 5 μ broad.

Found under Æsculus in park, and in frondose woods on humus ground. Rather rare.

HENNING'S description, especially of the spores, is somewhat divergent. The larger from of *L. parvannulata*, which FRIES describes as having a "silky" cap and to be growing in woods, may be identical.

c. OVISPORÆ

L. meleagris (Sow.) Fr.

This species is characterised by a comparatively small cap (about 4 cm) with dark red-brown squamules and a comparatively slender, squamulose stem. The entire plant turns red when touched.

It has been met with growing in small clusters on tanner's bark in a greenhouse (LANGE, Fyn, 1903), but has not been figured and thoroughly investigated.

L. Badhamii B. et Br.

Larger than the preceding species and with larger, dark purple-brown scales. The stem is paler, slightly pinkish, with a somewhat moveable ring. The flesh turns saffron-red in a few seconds.

The spores are pip-shaped, $6^1/_4$—8×3—4 μ.

Met with (in Sjælland, 1922) by I. FERDINAND.

The interrelation of the two above mentioned species requires further investigation. *L. Badhamii* also shows some affinity to *L. rhacodes*.

23. **L. brunneo-incarnata** Chod. et Mart. (sensu rest.). (Plate 13. fig. F.)

Rather small. Cap 3—4 cm, somewhat fleshy, slightly umbonate. The rather thick cuticle is soot-brown with a tinge of purple, disintegrating — when the cap expands — into squamules which at the disc are rather large and flat, towards the edge granular and paler, on a whitish to pale vinaceous ground. Gills moderately crowded, cream. Stem rather short, 3 cm × 5—6 mm, pale vinaceous with zones of granular, red-brown squamules below, whitish above the narrow (on the lower side sootbrown-reddish) ring.

Spores oval, 7—9 × 4½—4¾ μ. Basidia 4-spored. Cystidia broadly clavate, about 36 × 7—10 μ. The squamules are made up of 3—8 μ broad, brownish, septate hyphæ.

On naked humus soil in outskirts of woods. Rare.

KONRAD & MAUBLANC figure this species very well (loc. cit.), but they also include a small-spored species which I think is rather a form of no. 24 or 25.

24. **L. fusco-vinacea** Møller & Lange n. sp. (Plate 13. fig. H.)

Medium or rather small. Cap up to 4½ cm, expanded-umbonate. The dark fuscous-red-brown, somewhat felty cuticle breaks up (except at the disc) into rather broad, adpressed scales (smaller and somewhat acuminate towards the edge). The subcutaneous tissue between the scales is fibrous-silky, pale vinaceous. The edge of the cap overreaches the gills with a tomentose brim. The gills are undivided, rather crowded. The stem is rather stout (6 cm × 6—8 mm), below the ring densely tomentose-fibrillose, somewhat vinaceous above, fuscous below, paler and fibrillose above the ring which is fibrillose-membranaceous, whitish. Flesh of cap white, of stem pallid.

Spores oval, 4½ × 2½ μ. Cystidia crowded, cylindric-clavate, 25—35 × 6—9 μ.

Solitary, edge of drive in wood of Picea and frondose trees, amongst Glechoma etc. on black soil. Very rare.

This species differs from no. 23 by the small spores and the felty-peronate coating. Possibly this plant is the one figured by BARLA sub nom. *L. helveola* Bres., which PATOUILLARD calls *L. Barlæ*. I have only seen fully expanded specimens of this little Agaric. But according to F. H. MØLLER the young cap has minute, acuminate scales on the disc, thus approaching *Acutesquamosæ*.

25. **L. lilacea** Bres. (Plate 13. fig. G.)

Small. Cap 2—4 cm. When in bud the cuticle is smooth, dark brown with a tinge of vinaceous; but it very soon breaks up, from edge centrewards, into minute granular squamules, dispersed on the white-fibrillose subcutaneous tissue. Stem short (3—4 cm) with a narrow, fugacious ring (which is sootbrown underneath), somewhat rufescent, almost glabrous.

Spores oval, 5—5½ × 3 μ. Cystidia crowded, ovato-clavate, 9—13 μ broad.

On a lawn, growing in great numbers dispersed in the new-sown grass.

26. **L. subincarnata** Lange n. sp. (Plate 13. fig. I.)

Small. Cap 1 1/2—2 1/2 cm, of a pallid dirty fleshcolour (or more brownish or dusty ochre), at first on the disc minutely hirto-squamulose (scales acuminate, formed of agglutinated hairs); later on somewhat cracked-granulate. The stem is whitish and white-flocculose, later becoming rubescent and at last dirtbrown (inside and outside). Odour very faint, sweetish.

Spores oval or ovate, 6—7 × 3 1/2—4 μ. Cystidia obtusely fusiform, 30 × 7—8 μ.

In coniferous (and frondose) woods. Rare.

I described this species in "Studies" II., referring it to *L. Forquignonii* Quél. (in the sense of RICKEN). But after having seen specimens (collected by F. H. MØLLER) which answer considerably better to the Quéletian conception of *L. Forquignonii* (more especially in having olivaceous scales on the cap) I now propose a new name for my species.

27. **L. felina** (Pers.) Fr. (sensu Rea). (Plate 12. fig. E.)

Rather small. Cap about 2 1/2 cm, conic-convex. When in bud the whole cap is black — the umbo covered by minute, erect, acuminate squamules of agglutinate hairs; but when it expands the cuticle — except at the umbo — disintegrates into minute granules on a whitish ground. The stem is rather tall, minutely fibrillose, towards the base somewhat dirtgray with darker squamules, above the middle with a membranaceous ring which is dark gray below.

Spores ovate-ellipsoid, 6 1/2–7 1/2 × 3 3/4–4 1/3 μ. Cystidia clavate to obtusely fusiform, 5–8 μ broad.

In woods of Picea, solitary. Rare.

The dark-squamulose small Lepiotas *L. gracilis* Quél, *L. pseudo-felina* Lange and *L. felina* (sensu Rea) are most easily distinguished by their spores. But their synonymy is rather hopelessly entangled. The plant here described as *L. felina* is the form mentioned by REA (loc. cit.), a pinophilous Agaric in contradistinction to the two others. RICKEN'S species is different (vide no. 17).

28. **L. setulosa** Lange n. n. (Plate 13. fig. C.)

Very small. Cap 1—1 1/2 cm, at first — more especially in the middle — clad with pilose, erect squamules (of agglutinate fibrils), fuscous, soon breaking up into minute granules on a white subhymenial tissue. Ring incomplete, fuscous. Stem about 3 cm, pallid, towards the base sparingly set with minute, fuscous granules.

Spores ovate, 6—6 1/2 × 3 1/2—4 μ.

In a dense copse of Corylus.

First described in "Studies" V. sub nom. *L. minuta*; but as this name is preoccupied I now call it *L. setulosa.*

29. **L. micropholis** B. et Br. (Plate 13. fig. D.)

Very small. Cap 1 1/2 cm, conical-expanded, minutely granulate-squamulose with blackish-

gray flocci. Stem short, almost glabrous, white above, slightly flesh-coloured below, with a narrow ring which is fuscous beneath.

Spores ovate, 4—5 × 2¾—3¼ μ. Cystidia clavate, 7—9 μ broad.

In flower-pot in a palmhouse.

The two last mentioned tiny species are very intimately related, perhaps not specifically distinct; but their habit is different.

30. **L. cygnea** Lange n. sp. (Plate 13. fig. A.)

Very small. Cap 1½—2 cm, campanulate, then expanded, pure white, somewhat silky-fibrillose, edge at last slightly rimose. Gills narrow, crowded. Stem 3 cm × 2 mm, hollow, glabrous (slightly flocculose at first), with an entire, horizontal ring.

Spores ellipsoid, 6½ × 3½ μ. Basidia 4-spored. Cystidia about 45 μ long, cylindrical-hair-shaped, obtuse or somewhat capitate, about 7 μ broad, base somewhat swollen. The fibrils of the cuticle are simple, cylindric, 10—20 μ broad.

Met with in a moist wood, on peaty ground, under Alnus. (Also in Oregon, U. S. A.)

Very close to *L. albo-sericea*, but smaller and with different spores. It has the stature of *L. parvannulata* Fr.; but this species has a fibrillose stem and an inferior ring and its cap becomes somewhat yellowish.

C. *Micaceæ*

α. Genuinæ

31. **L. Bucknallii** B. & Br. (Plate 13. fig. E.)

Small. Cap 2—3 cm, somewhat umbonate, whitish, minutely mealy, when young with a tinge of lavender. Stem densely mealy, pale, almost white towards the apex, lavender below the rudimentary ring.

Spores projectile-shaped, 7½—8 × 3 μ. The meal on the cap consists of globular cells, 20—43 μ in diameter.

Rather rare, in moist, frondose woods.

32. **L. Hetieri** Boud. (Plate 14. fig. J.)

Rather small. Cap semiglobate-campanulate, then expanded-convex, up to 4½ cm, at first dirty whitish, becoming ashy dirt-brownish, somewhat rufescent when old and wet, densely mealy-granulate. Gills whitish, then somewhat grayish, rather crowded. Stem rather tall and slender (4½—6 cm × 3 mm), mealy like the cap, base apparently subbulbous (in reality only clad by a mealy-mycelioid coating). The velum is mostly appendiculate, mealy-membraneous. Taste and smell absent. Flesh whitish, rufescent in the stem, from base upward.

Spores narrow, with truncate base and oblique pedicel, 5—5½ μ. Globose cells on cap 25—30 μ.

Under Fagus on peaty ground. Rare.

33. **L. rufescens** (B. & Br.) Lange *(L. rosea* Rea). (Plate 14. fig. I.)

Small. Cap up to 3 cm broad, campanulate-convex, densely floccose-mealy with a floccoso-fimbriate edge, cream-white, when touched becoming pinkish fleshcolour in places (and with age more rufescent). Gills moderately crowded, whitish. Stem short (3—4 cm × 3—4 mm), densely floccose-mealy up to the mealy ring, white, dingy flesh-colour towards the base. The flesh becomes slightly rubescent when cut.

Spores oval, 4½—5 × 3 μ. Cystidia somewhat clubshaped, rather short, 25 × 8 μ, sometimes with a short, hairshaped appendix, but rather sparse. The mealy coating consists exclusively of globose cells, 25—50 μ in diameter.

Deciduous woods, in small troops. Rare.

Looks like an overgrown, coarse *L. seminuda.* — *L. rosea* Rea is hardly specifically distinct. Even *L. sistrata* Fr. may be identical. *L. rufescens* was originally regarded as a variety of *L. granulosa* with which it has nothing to do (vide Cooke, loc. cit., pl. 213 a).

34. **L. seminuda** Fr. (Plate 14. fig. B.)

Very small. Cap 1—2½ cm, cuticle micaceous but not mealy, whitish, with a tinge of pale fleshcolour, especially in the middle. Veil membraneous, fugacious. Stem slender, whitish above, rubescent below, 3—5 cm × 1½—2 mm.

Spores oval-ellipsoid, 4 × 2½ μ. Cuticular cells globose.

In small troops as well in frondose as in coniferous woods. Not uncommon.

34 a. **L. seminuda** forma *minima.* (Plate 14. fig. A.)

Still smaller (0,8 cm), slightly umbonate, milk-white. Stem very slender (less than 1 mm thick), rufescent from the base up, not fibrillose.

Spores 3½—4 × 2 μ. Cells of the cuticle 20—30 μ in diameter. Rarer than the main form.

When the fugacious veil is overlooked it may be mistaken for a small *Mycena* or *Collybia.*

β. Anomalæ

35. **L. Eyrei** (Massee) Lange *(Chlorospora Eyrei* Massee). (Plate 13. fig. B.)

Small. Cap 1½—2½ cm. Cuticle densely covered by a pallid dirt-brownish, granulate-mealy coating. Veil disrupted, forming appendiculate denticles on edge. Gills light bluish green, later somewhat darker bluish. Stem slender, covered like the cap, especially downward, with dirtbrownish meal. Sporepowder pale green.

Spores oval, $3^3/_4 \times 2^1/_2$ µ. Meal made up of globular, yellowish, 20—40 µ broad cells.

Rare. On black mould in frondose wood.

Rea refers this species to a new genus, *Glaucospora.*

36. **L. hæmatosperma** (Bull.) Boud. *(L. echinata* (Roth) Quél.). (Plate 14. fig. C.)

Small and dwarfish. Cap $1^1/_2$—2 cm, fuscous-brown or dark clay, granulate-mealy all over. Veil mostly appendiculate. Gills deep pinkish bloodred, soon discolouring and becoming somewhat fuscous. Stem peronate-mealy by dark dirt-brownish meal, red to flesh-colour inside.

Spores $4^1/_2$—$5^1/_2 \times 2^1/_2$—$3^1/_4$ µ, oval, hyaline, with a slight brownish tint.

Not uncommon in mouldy black soil (garden-beds, rubbish-heaps etc.)

The spore-powder, which is pallid dirtgray, becomes somewhat reddish when exposed to the sun. For the sake of the coloured spore-powder this little Agaric has been placed in *Inocybe, Psalliota, Psathyra,* and even in a new genus, *Melanophyllum,* created for it by Velenovsky.

36 a. **L. hæmatosperma** forma *gracilis.* (Plate 14. fig. E,)

Smaller (cap about 1 cm), with an almost glabrous, ringless, pinkish stem.

In garden-beds, under perennial plants. Rarer than the main form.

II. Leucobolbitius

37. **L. cepæstipes** (Sow.) Fr. (Plate 14. fig. F.)

Medium to rather small. Cap 2—3 cm high and broad, ovate-parabolic, slightly umbonate, edge incurved, at last more expanded, at first glabrous, then, except at the umbo, cracking into minute granular squamules (somewhat concentric, very sparse towards the edge). The colour is pallid ochry or pallid crust-brownish in the middle, whitish towards the edge. The epiderm soon becomes radiato-striate (as in *Bolbitius vitellinus*) about 1 cm in. — The gills are very thin and very crowded, narrow lanceolate. The stem is rather slender and thin (4—7 cm × 3—5 mm), slightly incrassated below, glabrous, white, with a fugacious, membraneous, annulate veil. The flesh is bitterish. — Springing from a mycelium of white strands.

Spores roundish ovate, sligthly impressed on the ventral side, smooth, 6—$8^1/_2 \times 4^3/_4$—$5^1/_2$ µ, contents very pale pinkish with a big oildrop. Cystidia pyriform or somewhat clubshaped, about 15 µ broad with or without a short, hairlike, about 3 µ broad appendix. The squamules on the cap are made up of hyaline, somewhat wavy, 3—6 µ thick filaments.

Kragenæs, 1934 (F. H. Møller and G. Ebbesen), on fermenting sawdust, aggregate.

38. **L. lutea** (Bolt.) Quél. (Plate 14. fig. G.)

Rather small, entirely yellow. Cap $1^1/_2$—2 cm high, parabolic, with a prominent, deeper

yellow umbo; below the umbo sprinkled with detachable, minute, granular, chrome-yellow flocci, becoming striate from edge up and at last splitting after the manner of a *Bolbitius*. Gills paler yellow, free, rather broad. Stem of the same colour, thin, with a membranaceous, apical ring and swelled at the base into an ovate, about 5 mm broad bulb. Flesh slightly bitter.

Spores ovate, 8—10 × 5—6 μ. Cystidia on edge clavate-vesiculose or inflated fusiform, 25—55 × 10—15 μ. Granules on cap made up of oblong cells.

In "fern-soil" (a fibrous humus). (F. H. MØLLER, 1934).

39. **L. Brebissonii** Godey (*L. cepæstipes* var. *cretacea* Grev.). (Plate 14. fig. H.)

Medium to rather small. Cap parabolic, 2—3 cm high, then expanded, disc sepia-gray. The cuticle (from the small hood in the centre towards the edge) disrupting into very minute, dispersed flocci or granules, which shade off into whitish downward, on a white ground. When the cap begins to expand the edge becomes minutely and densely striate, later on fisso-sulcate (as in *Coprinus*), half way up. Gills thin, lanceolate, white, crowded at first, then rather distant. Stem slender and thin (6—7 cm × 3—4 mm (above) and 5—7 mm (below)) almost glabrous, white, hollow. Not bitter.

Spores obliquely ovate, 9—10¼ × 5½—6 μ, with a germination-pore, contents hyaline with a big central drop. Cystidia inflated club-shaped, 60 × 13 μ, without appendix. Basidia roundish ovate, 16 × 8 μ.

On the ground in bed of dead foliage (Fagus) in frondose wood with solitary Pinus-trees (M. P. CHRISTIANSEN, Køge, 1934).

III. CYSTODERMA

40. **L. cinnabarina** (Alb. et Schw.) Fr. (Plate 15. fig. F.)

Medium. Cap 4—5 cm, coarsely granulate, rufous-cinnabar, rather fleshy. Gills almost free. Stem subbulbous, stout, short, peronate and coarsely granulate up to the ring, whitish above, concolorous with the cap below (but slightly paler).

Spores oval, 4½ × 2½—2¾ μ. Cystidia hairshaped, acute or somewhat sagittate, small.

Rather rare in frondose-coniferous woods.

Very close to *L. granulosa*. The figured specimens represent an extreme form.

41. **L. granulosa** (Batsch) Fr. (Plate 15. fig. E.)

Rather small to medium. Cap 3—5 cm, rufous-brown, paler towards the edge, coarsely granulate; gills somewhat attached. Stem cylindric, peronate, tomentose-granulate up to the ring, of the same colour (whitish above).

Spores oval, 4—5 × 2½—3 μ. Cystidia hairshaped, acute, small, 2—3 μ broad. Cells on

the surface of the cap subglobular, mixed with others which are almost cylindric, irregularly bent or wavy.

Rather rare, in coniferous woods, in mossy, shady places (where it becomes rather slender) or in more open spaces (somewhat dwarfish).

L. adnatifolia Peck (from U. S. A.) is synonymous.

42. **L. amianthina** (Scop.) Fr. (Plate 15. fig. C.)

Rather small. Cap 2—5 cm, pale yellow ochre, granulate all over. Veil often appendiculate. Gills somewhat adnate. Stem peronate, of the same colour, granulate-squamulose, generally slender.

Spores oval, $6—7 \times 3^1/_2$ µ. Cystidia absent.

Very common in moss and on needle-beds in coniferous woods, often forming small fairy-rings.

43. **L. carcharias** (Pers.) Fr. (Plate 15. fig. D.)

Rather small. Cap 2—4 cm, whitish, with a tinge of fleshcolour, surface minutely granulate, edge often denticulate from the appendiculate veil. Gills slightly adfixed. Stem peronate up to the horizontal ring, granulate, of the same colour, but becoming somewhat dirt-brownish fleshcolour with age.

Spores ovate, $4^1/_2—5 \times 3—3^3/_4$ µ. Cystidia absent.

Common, often numerous (even in circles) in coniferous woods (chiefly Picea).

ARMILLARIA

Tissue of stem concrescent with that of the cap. Cuticle not granulate-verrucose. Gills decurrent or only slightly attached. Stem with a distinct, inferior or median ring.

Armillaria in the original Friesian sense is not a "good genus", the species of which show real affinity to each other. It is more of a motley crowd of species having nothing in common save some sort of annulus. I have been inclined to break it up altogether, distributing the several species among the neighbouring genera. However, on second thoughts, I refrain. For even if the majority of the species can be disposed of in this way, some few of the main species are difficult to place; if not retained in the original genus. While such species as *A. constricta, A. cingulata* etc. naturally fit in between certain *Tricholomas*, other species within *Pholiota (A. denigrata), Cortinarius (A. bulbigera)*, or in the vicinity of *Collybia (A. mucida), A. mellea* and other species can find no natural home, if the genus *Armillaria* be demolished.

The species thus retained in *Armillaria* can be characterised as intermediate between

Lepiota (particularly *Cystoderma*) on the one side, *Tricholoma* and *Clitocybe* (more especially such species as *Tricholoma aurantium*, *Clitocybe ectypa)* on the other. *Agaricus aurantius* Schaeff. is almost exactly intermediate between *Tricholoma* and *Armillaria*. I place it in *Tricholoma*, in the vicinity of *T. striatum*, on account of its viscid cuticle and exannulate stem.

The species of *Armillaria* (as here conceived) seem to be somewhat xylophilous, although not necessarily so, not even *A. mellea*, the most wood-loving of the lot. It is well known that its black rhizomorphs not only thrive in the tissues of living trees and decaying stumps, but also are met with as far-running creepers in the black humus layer of the forest-soil.

The spores within the genus are of two types: The Tricholomoid species have small, broadly ovate spores, while the Clitocyboid have larger, ovate spores. But of the rarer species little is known.

To *Armillaria* as here delimitated also belong *A. imperialis* Fr. (of the *A. mellea*-group) and *A. Laschii* Fr. But these very rare species are only known to me from literature.

KEY

TO THE SPECIES FIGURED

A. Clitocybæ (Fr.) (Armillariella Karsten).
Gills decurrent. Cap pilose-squamulose, honey-yellow ... ... 1. *A. mellea*
B. Tricholomata (Fr.). Gills not decurrent.
α. Cap rufous-brown or fulvous-red.
a. Spores ovate. Cap dry.
1. Cap brown. Stem sparingly fibrillose-scaly... ... ... 2. *A. robusta*
2. Cap fulvous-red. Stem peronate with fulvous-red scales ... ... 3. *A. focalis*
b. Spores subglobular. Cap viscid ... ... *(A. (Lepiota) glioderma)*
β. Cap pale crust-brown. Stem granulate ... ... 4. *A. irrorata*

SPECIFIC DESCRIPTIONS AND NOTES

A. *Clitocybæ*

1. **A. mellea** (Vahl) Fr. (Plate 15. fig. A.)

Varying in size, often large. Cap 4—12 cm, ochry or honey-yellow, more or less scaly with pilose, fuscous to chrome-yellow squamules. Gills somewhat decurrent. Stem often subbulbous, whitish to dirty ochre, more or less scaly, with a white, yellow-floccose ring.

Whole plant discolouring, becoming dirtbrown or almost black with age. Densely cæspitose or fasciculate. Very variable. (Fig. A on pl. 15 depicts a rather pale form).

Spores roundish ovate, $7^1/_2$—$9 \times 5^1/_2$—7 µ.

Exceedingly common, on and around decaying stumps, at the base of living trees or on the ground, springing from blackish, rhizomorphoid strands.

2. **A. robusta** (Alb. & Schw.) Fr. (Plate 16. fig. C.)

Large and robust. Cap 7—9 cm, innato-fibrillose squamulose, brown, edge paler, subfulvous. Gills crowded, emarginate, almost free, white, subrufescent with age. Stem firm, attenuated downwards, fibrillose squamulose with light red squamules up to the membranaceous, shaggy, whitish ring; apex white, granulate. Slight smell of cucumber.

Spores ovate-ellipsoid or oval, 5×3 µ (or $4^1/_2 \times 3$ µ). Cystidia absent.

Rare. Growing under Pinus, in woods of Picea.

3. **A. focalis** Fr. (Plate 16. fig. B.)

Medium. Cap 6—7 cm, coarsely fibrillose-squamose, fulvous, edge lighter red, at first appendiculate with remnants of the veil. Gills white, at last slightly rubescent, emarginate-free. Stem somewhat attenuated downward with fulvous red, fibrillose scales up to the shaggy ring, slightly granulate above. Smell very slight, of cucumber.

Spores subspheric oval, $4 \times 2^1/_2$ µ. Edge of gills set with crowded, erect hairs.

Rare. Met with in a wood of Picea and Pinus.

Nos. 2 and 3 are very intimately related. If the hairy gill-edge is a constant character it is a good mark of distinction. But I have not met with this species for the last 30 years.

A. glioderma (Fr.) Lange.

A very distinct species, characterised by the viscid, detachable, fulvous cuticle of the campanulate-convex, about 5 cm broad cap and by the rather tall stem, which is fibrillose-squamulose with concolorous scales. The flesh has a farinaceous smell. The spores are globose, about 4 µ diam.

The species seems to have a northern distribution. It has been met with once, in Falster, by F. H. Møller.

As the tissue of the cap is somewhat concrescent with that of the stem, the gills not free, I think it preferable to place this species in *Armillaria*. Fries included it in *Lepiota*, and recent authors have removed it to *Limacella*.

4. **A. irrorata** (Quél.) Lange. (*Lepiota irrorata* Quél.). (Plate 15. fig. B.)

Medium to rather small. Cap 3—$4^1/_2$ cm, at first semiglobate-campanulate, then expanded gibbous, smooth, creamy ochre or alutaceous crust-brownish. Gills whitish, crowded, somewhat truncate, free or slightly attached. Stem cylindric to subclavate, rather short and firm

(5 cm × 0,6—0,9 cm), below the ragged (partly appendiculate) ring granulate from somewhat zonate, minute squamules of a dirt-brownish colour. (Also the lower side of the ring has such squamules). In moist weather the stem exudes yellowish, shining drops. The flesh is white, firm. The smell faint, the taste slightly rankish.

Spores oval, 4—4½ × 2¾ µ. Cystidia very dispersed, vesiculose-bottleshaped or vesiculose-cylindric, 12—15 µ broad, 35 µ long.

Under Fagus, on the ground (M. P. CHRISTIANSEN, Sjælland, 1934).

It is generally regarded as a *Lepiota*. But the tissue of the cap is not distinct from that of the stem. Within *Lepiota* its nearest allies seem to be the *Cystodermæ*. GILBERT has created a new genus for it: *Lepiotella*.

TRICHOLOMA

Tissue of cap not distinct. Gills not decurrent. Stem more or less fleshy (not cartilaginous), generally ringless.

TRICHOLOMA is one of the largest genera in the Agaricaceæ, the European flora probably numbers considerably over one hundred species, many of which are large and conspicuous. As only natural in such a large tribe rather wide differences exist between the several species. Still the genus is very well defined, and only in a few cases can any doubt arise as to whether a species belongs to *Tricholoma* or not. Some few are Armillarioid, having a ring or ringlike zone on the stem; in some others the gills are subdecurrent or provided with a decurrent tooth so as to recall *Clitocybe*. And some few species have a somewhat cartilaginous, slender stem, after the manner of *Collybia*.

The microscopical characters are even more uniform than the macroscopic ones. In the great majority of species the spores are small, ovate and with a smooth, thin epispore. Only the subgenus *Melanoleuca* and some few others are characterised by somewhat larger, granulate-spinulose spores, and *T. sulphureum* and its allies have comparatively large spores. Cystidia are rare. The *Melanoleucas* are known from their harpoonlike cystidia; but in the genuine *Tricholomas* characteristic cystidia are hardly ever met with; even if the edge of the gills in some few cases is set with hairshaped or inflated, sterile cells. I only know of one case of twospored basidia. The most conspicuous anatomical difference is that shown by the cuticle. In a very few cases it is parenchymoid, being made up of a layer of subrotund-polyhedrous cells. All the rest have a fibrillose cuticle; but the tissue is either formed of very fine, irregularly interwoven fibrils or of coarser, subparallel ones. These differences seem to afford good sectional characters.

Taxonomy. With regard to the taxonomic arrangement of the species various views may be held. The more conservative way would be to maintain the Friesian groups intact.

But this is hardly possible if a fairly natural taxonomy is to be attained. First of all the *Hygrophana* will not hold together. The majority of its species form a very natural group (here set apart in the subgenus *Melanoleuca* Pat. — which also comprises some few species from other groups). And of the rest *T. sordidum* is very close to *T. nudum* and should be placed in its immediate neighbourhood. Of the other main groups nos. 3—6 *(Rigida, Sericella, Guttata* and *Spongiosa)* are so vaguely characterised, that they are hardly worth upholding. *Limacina* and *Genuina* are much more distinct and natural groups, which I am inclined to maintain with slight alterations. — But the most satisfactory way to dispose of the several species will be to arrange them in "stirpes" around the leading types. The student who becomes familiar with these "typical" species (most of which are common) will have a good foundation for building up a more complete knowledge of the genus.

Tricholoma seems to be a genus with a distinctly northern distribution. Very few species are reported from the tropics, while the North-American flora as well as that of the cis-alpine countries on this side of the Atlantic abound in species of the various groups.

KEY

TO THE SPECIES FIGURED

I. Eu-Tricholoma

Texture of the cuticle of the cap fibrillose.

A. Tricholomata vera

Gills' edge devoid of cuspidate, harpoon-like cystidia.

α. Fibrosa. Cuticle made up of subparallel hyphæ (generally either viscid or somewhat felty-squamulose)

a. Limacina. Cap somewhat viscid (except no. 7).

1. Colour somewhat rufous. Gills becoming spotted with same colour.

* Stem peronate with orange-fulvous scales ... ... 1. *T. aurantium*

** Stem not squamulose-peronate.

† Stem sulphur-pale inside ... ... 2. *T. flavobrunneum*

†† Stem whitish-pale inside.

° Robust. Cap pallid incarnate-brownish ... ... 3. *T. populinum*

°° Less robust. Cap rufous-brown or bay.

˙ Cap smooth.

• Strong "mealy" smell ... ... 4. *T. pessundatum*

•• No farinaceous smell ... ... 5. *T. ustale*

˙˙ Cap fibrillose-striate or imbricate.

• Cap viscid, minutely fibrillose-striate ... ... 6. *T. striatum*

•• Cap perfectly dry, becoming imbricate-scaly ... 7. *T. imbricatum*

2. Colour yellow, gray or white
  * Cap yellow or gray.
    † Cap yellow.
      ° Gills bright yellow. Cap smooth or subsquamose ... ... 8. *T. equestre*
      °° Gills whitish. Cap with innate, dark fibrils ... ... 9. *T. sejunctum*
    †† Cap some shade of gray.
      ° Cap with radiating, blackish fibrils. Centre almost black 10. *T. portentosum*
      °° Centre not blackish; fuscous fibrils less distinct, on whitish or sulphur ground ... ... 10 a. *T. portentosum* var. *leucoxanthum*
  ** Cap whitish or white.
    † Cap with a flush of olivaceous.
      ° Cap very minutely streaked with pale fuscous fibrils... 11 a. *T. spermaticum* forma
      °° Cap almost smooth, somewhat conical ... ... 11 b. *T. spermaticum* forma *umbonatum*
    †† Cap pure white or with a tinge of yellowish.
      ° Cap pure white. Almost inodorous ... ... 12. *T. columbetta*
      °° Cap somewhat ochre-yellowish in the middle. Sweet-smelling ... ... 13. *T. resplendens*

b. Genuina. Cap felty-squamulose (innato-fibrillose in no. 23), not viscid.

1. Xylophila. Groving on stumps. Cap purplish-velutinous. Gills yellow ... ... 14. *T. rutilans*

2. Humicola. Growing on the ground.
  * Colours reddish-brown. Gills becoming spotted with same colour.
    † Cap lanuginoso-squamulose. Stem almost glabrous... ... 15. *T. vaccinum*
    †† Cap subsquamulose. Stem granulate ... ... 16. *T. psammopus*
      (Cuticle smooth at first, then broken up in imbricate scales: vide no. 7).
  ** Colours gray or whitish.
    † Cap felty squamulose, piloso-squarrose or almost glabrous.
      ° Cap some shade of gray.
        ˚ Cap piloso-squarrose. Stem swollen below, grayish, with dark punctiform granules above ... ... 17. *T. atrosquamosum*
        ˚˚ Cap felty-squamose. Stem almost cylindric, whitish.
          • Gills with age flushed with salmon-pink ... ... 18. *T. orirubens*
          •• Not so.
            ▫ Basidia 2-spored. Cap gray... ... ... 19. *T. bisporigerum*
            ▫▫ Basidia 4-spored.
              x Cap blackish. No trace of cortina or ring... 20. *T. terreum*
              xx Cap blackish to pale fuscous. Stem annulate or edge shaggy fibrillose.

) Cap fuscous grayish. Stem with a cottony ring above ... ... 21. *T. cingulatum*

)) Cap blackish to mouse-gray. Edge shaggy-fibrillose. (No ring, but often a cobweb-like cortina).

° Medium. Cap rather obtuse... ... ... 22. *T. myomyces*

°° Small. Cap acuminate ... ... *(T. myomyces* var. *triste)*

°° Cap whitish, almost glabrous.

˚ Medium. Cap rather obtuse ... ... *(T. myomyces* var. *argyraceum)*

˚˚ Small, with a conically umbonate cap... ... ... 22 a. *T. myomyces* var. *albo-conicum*

†† Cap streaked with minute, innate, fuscous fibrils. (Vide also no. 10) ... ... 23. *T. virgatum*

β. *Contexta.* Cuticle made up of irregularly interwoven, entangled hyphæ. (Cap generally dry and almost smooth).

a. Guttata. Cap whitish, with pale brownish, drop-like squamules. Edge slightly tomentose ... ... 24. *T. guttatum*

b. Glabrata. Not so.

1. Echinospora. Spores rather large, verrucose-prickly. (Cap white; gills crowded).

* Stem with a narrow ring ... ... 25. *T. (Armillaria) constrictum*

** Stem ringless, slender, rooting ... ... 26. *T. leucocephalum*

2. Sublævispora. Spores almost smooth.

* *Collybiaria.* Small species. Cap rarely over 4 cm. Gills somewhat crowded.

† Spores ovate ellipsoid.

° Cap dark violaceous fuscescent. Gills sulphur-whitish 27. *T. ionides*

°° Cap somewhat pinkish or flesh-coloured. Gills white.

˚ Subfasciculate. Stem slender, tough ... ... 28. *T. persicolor*

˚˚ Solitary. Stem short, rather fleshy ... ... 29. *T. carneum*

†† Spores subglobose, very minute. Gills yellow.

° Gills very narrow. Somewhat fleshy ... ... 30. *T. pseudo-flammula*

°° Gills rather broad. Small and thin... ... ... 31. *T. fallax*

** *Carnosa.* Larger species.

† *Subsicca.* Cap not truly hygrophanous.

° Nigrescentia. Gills pale to dark gray, blackening with age. (Vide also no. 49).

˚ Spores ellipsoid. Gills crowded ... ... 32. *T. leucophæatum*

˚˚ Spores almost globose. Gills thick and distant... ... 33. *T. crassifolium*

°° Læticoloria. Gills whitish or bright coloured.

˚ *Macrospora.* Spores rather large (averaging 9 µ or more).

• Whole plant sulphur-yellow... ... ... 34. *T. sulphureum*

•• Whole plant whitish ... ... 35. *T. inamoenum.*

˙˙ *Mesospora.* Spores smaller.

• Gills somewhat distant, thickish.

) Gills not becoming flushed with salmon-pink.

▫ Robust, creamy white... ... ... 36. *T. album*

▫▫ Smaller, alutaceous-white, flushed with pale tan 37. *T. lascivum*

)) Gills becoming flushed with pale pinkish flesh-colour.

▫ Gills gray. Spores ovate... ... ... 38. *T. sudum*

▫▫ Gills whitish to pale sulphur.

x Cap dull greenish or fuscous. Stem with fuscous squamules or fibrils ... ... 39 a. *T. saponaceum* var. *ardosiacum*

xx Cap and stem pale sulphur or whitish.

" Pale sulphur. Stem somewhat swollen ... 39 b. *T. saponaceum* var. *napipes*

"" White. Stem not swollen, somewhat rooting... ... ... 39 c. *T. saponaceum* var. *cnista*

•• Gills crowded, thinner.

) Vernal. Cap white, alutaceous or tan.

▫ Large, milky-white. Gills not very narrow ... 40. *T. gambosum*

▫▫ Smaller, alutaceous to tan. Gills very narrow 41. *T. graveolens*

)) Autumnal.

▫ Spores 5—6 μ long. (No trace of lilac or blue colours).

x Cap and gills paler or darker dirtgray ... 42. *T. panæolum*

xx Not so.

" Somewhat bitter. Gills whitish.

▪ Cap cinnamon. Very robust. Spores ovate ... ... 43. *T. acerbum*

▪▪ Cap rufous bay, expallent (or whitish). Not robust. Spores roundish ovate... 44. *T. amarum*

"" Mild. Whole plant some shade of gilvous alutaceous ... ... 45. *T. geminum*

▫▫ Spores about 7 μ long.

x Whole plant pale alutaceous flesh-colour. Smell sweet, aromatic ... ... 46. *T. irinum*

xx Stem, cap or gills some shade of blue or violet. Smell slight.

" Gills pallid. Stem somewhat scaly, flushed with blue. Cap not violaceous ... ... 47. *T. personatum*

"" Gills blue to pale lilac. Cap and stem somewhat violaceous ... ... 48. *T. nudum*

†† *Hygrophana.* Distinctly hygrophanous species.

° Whole plant somewhat lilac.

* Rather fleshy, somewhat clustered, soon becoming dirt-brownish ... ... 49. *T. sordidum*

** Flesh very thin. Cap depressed; gills somewhat decurrent. Not fuscescent... ... ... 50. *T. calathus*

°° Whole plant watery dirtbrown. Smell rancid ... ... 51. *T. putidum*

B. Melanoleuca

Gills' edge with cuspidate, harpoonlike cystidia. Spores oval, rather large, minutely verrucose.

α. Gills whitish (not becoming isabelline or pale gilvous).

a. Very large, soon becoming cyathiform.

1. Stem tall, with darker lines. Cap fuscous. Gills somewhat decurrent... ... ... 52. *T. grammopodium*

2. Stem short. Cap pale tan. Gills not decurrent ... ... (*T. sp.* (*T. brevipes* Bres.))

b. Medium to small, not cyathiform.

1. Stem slender (as long as or longer than diameter of cap).

* Small (cap 3—4 cm). Cap pale gray... ... ... 53. *T. humile* var. *fragillimum*

** Medium. Cap fuscous.

† Gills emarginate... ... ... 54. *T. melaleucum*

†† Gills adnato-decurrent ... ... 55. *T. stridulum*

2. Stem short or rather short.

* Fuscous. Stem very short, soon becoming dirtbrown inside 56. *T. brevipes*

** Dingy white, alutaceous or tin-gray.

† Rather large (cap averaging 8 cm), slightly umbonate.

° Cap when young horn-brownish, then ashy-whitish. Stem slightly mealy above... ... ... (*T. strictipes*)

°° Cap tin-gray. Stem not mealy above... ... ... 57. *T. strictipes* var.

†† Medium to small (cap 4—8 cm), whitish-gray. Umbo prominent... ... ... 58. *T. exscissum*

β. Gills becoming more or less isabelline, ochry or gilvous. (Vide also *T. brevipes* Bres.).

a. Cap very dark umber. Stem short ... ... 59. *T. arcuatum* forma *robustum*

b. Cap somewhat ochraceous tan. Stem slender ... ... 60. *T. cognatum*

II. Dermoloma

Cuticle of cap made up of subglobular-angular cells.

Small. Cap gray to somewhat fuscous. Odour mealy ... ... 61. *T. cuneifolium*

SPECIFIC DESCRIPTIONS AND NOTES

I. Eu-Tricholoma

A. *Tricholomata vera*

α. Fibrosa

a. *Limacina*

Stirpe 1: *aurantium.*

1. **Tricholoma aurantium** (Schaeff.) Rick. (*Armillaria aurantia* Fr.). (Plate 18. fig. D.)

Large. Cap 5—10 cm, firm, fulvous-orange, becoming brown from centre outward, scaly with innate, granular squamules in the middle, viscid. Gills emarginate-free, white, but soon becoming somewhat rufous. Stem stoutish, peronate-squamulose with numerous belts of scales (which are dirty fulvous below, bright fulvous-orange above), terminating in a ringlike zone, above which the stem is white. Smell of cucumber; taste bitter.

Spores subglobose-ovate, 4—4½ (5) × 2½—3 μ. Cystidia absent.

Not uncommon, in woods of Picea, often in troops or rings.

Stirpe 2: *ustale.*

2. **T. flavobrunneum** Fr. (Plate 18. fig. C.)

Medium. Cap 5—8 cm, convex-plane, somewhat umbonate, slightly viscid, more or less fibrilloso-squamulose, brown to maroon. Gills pale sulphur, becoming spotted with rufous brown. Stem cylindric or attenuated downward, pale, but rufous-fibrillose all over, inside pale sulphur, (while the flesh of the cap is whitish). Smell farinaceous. The whole plant becomes discoloured, the gills getting a scorched appearance with age.

Spores oval-globose, 5 × 4 μ (or ovate 5½ × 3¼ μ).

Common, on somewhat boggy ground under Betula.

3. **T. populinum** Lange. (*T. pessundatum* Fr. * *stans* f. *campestre* Fr.). (Plate 17. fig. D.)

Very large. Cap 8—12 cm, firm and fleshy, not umbonate, pale brownish with a slight tinge of flesh-colour (darker with age); edge paler, slightly viscid, almost smooth. Gills white, rufescent with age. Stem stout, rather short, whitish, becoming rufous-pallid. Subcæspitose. Smell very strong, of meal.

Spores ovate-oval, 5½ × 3½ μ. Cystidia absent.

Not uncommon, always in the vicinity of Populus (P. monilifera, tremula, canescens), in open, grassy spaces.

According to R. Maire *T. suffocatum* Roze & Rich. is identical. (Vide also "Studies" IX, 1933).

4. **T. pessundatum** Fr. (sensu restr.). (Plate 16. fig. D.)

Rather large. Cap about 8 cm, fleshy, without fibrils, but on the disc somewhat spotted with darker, droplike, small spots. The colour is rufous, towards the edge somewhat fulvous and at the margin almost whitish flesh-coloured. Gills whitish, slowly tinged with flesh-colour. Stem slender and rather tall (11 × 1,5 cm), whitish, minutely fibrillose-striate, towards the base sligthly brownish. Strong smell of meal.

Spores ovate, $4^1/_2 \times 2^3/_4$ μ, with a large central gutta.

Solitary, in wood of Picea and Pinus. Rare.

Answers very well to the form figured by FRIES in Icones selectæ, pl. 28 B. sub nom. *Ag. pessundatus* * *stans* forma *montana*. But the subspecies *stans* probably had better be discarded. FRIES himself was in doubt and remarks (Icon. sel.) that „if it is inodorous it should undoubtedly be regarded as a distinct species;" — but all the forms of *T. pessundatum* (sensu lat.) seem to have a strong farinaceous smell.

5. **T. ustale** Fr. (Plate 17. fig. C.)

Medium. Cap 5—8 cm, convex or slightly umbonate, fulvous bay, viscid, smooth. Gills whitish, dark rufescent with age. Stem comparatively slender, pale, becoming flushed with rufous from base upward. No farinaceous smell. The whole plant becomes dark, as if scorched, with age.

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

Common in woods of Fagus.

6. **T. striatum** (Schaeff.) Quél. (*T. albobrunneum* (Pers.) Fr.). (Plate 16. fig. A.)

Medium to rather small. Cap 5—6 cm, somewhat conical-convex or slightly umbonate, minutely lineato-striate with innate fibrils, rufous brown, viscid. Gills white, rufescent with age. Stem cylindric, somewhat rufescent, darker below, somewhat squamulose above. Smell very faint, of meal.

Spores ovate-ellipsoid, 5 × 3 μ.

This species is met with, but rather unfrequently, in plantations of Pinus, on sandy ground.

7. **T imbricatum** Fr. (Plate 18. fig. B.)

Medium. Cap 4—9 cm, dry, somewhat conical, dark fulvous-brown, smooth when in bud, with a strongly involute edge, but soon expanding and breaking up (from edge in) into somewhat imbricate, more or less coarse scales. Gills whitish, rufescent with age. Stem somewhat thickened downward and somewhat rooting, pale, brownish-rufescent with age.

Spores spheric-obovate, $5—5^1/_2 \times 3^3/_4—4$ μ (or $5^1/_2—6^1/_4 \times 4—4^1/_4$ μ).

Not uncommon, but strictly confined to woods of Pinus.

This species is easily distinguished from *T. vaccinum* by its originally smooth cap without a shaggy-woolly edge. The dry cuticle distinguishes it from all the preceding species to which it in other respects is closely allied.

Stirpe 3: *equestre.*

8. **T. equestre** (L.) Fr. (Plate 19. fig. C.)

Rather large or medium. Cap fleshy, 4—9 cm, becoming flat or difform, light yellow, slightly scaly and pale brownish in the middle, viscid. Gills sulphur-yellow. Stem stout, whitish to pale yellowish.

Spores ovate-oval, $5^1/_2$—$7^1/_2$ μ.

Not uncommon, in sandy soil, in plantations of Pinus.

9. **T. sejunctum** (Sow.) Fr. (Plate 20. fig. B.)

Rather large. Cap 6—9 cm, slightly viscid; the basic colour is a pale or somewhat brighter chrome-yellow; but from the almost fuscous umbo towards the edge the surface is partly covered by radiating, anastomosing, minute, subfuscous fibrils. Gills very broad, white to slightly sulphur. Stem with indistinct, pallid-dingy, spot-like scales above, cylindrical, rather stout, whitish to pale sulphur. Smell faint (reminding of T. sulphureum). Flesh with a bitterish aftertaste.

Spores almost spheric, 5—$5^1/_2 \times 4$—$4^1/_2$ μ.

In woods of Fagus. Rare.

10. **T. portentosum** Fr. (Plate 19. fig. B.)

Large, (cap 7—10 cm), but flesh rather thin. The substratum of the cuticle is pallid, but almost totally covered by minute, fuscous fibrils, radiating from the nearly black centre. Viscid. Gills white or flushed with pale sulphur, broad. Stem stout, cylindrical, white (or flushed with pale sulphur), often deeply rooting. Taste slight, not bitter.

Spores broadly oval, $5 \times 3^1/_2$ μ.

Rather common, more especially in woods of Fagus with old Pinus-trees (or vice versa).

T. tumidum as figured by Barla (Flore mycologique) seems to be a form of this species.

10 a. **T. portentosum** var. *leucoxanthum* Gill. (Plate 20. fig. C.)

Differing from the main form by a somewhat paler cap, the fundamental colour of which in some parts is pale sulphur, in others whitish, thinly covered by very minute, radiating, subfuscous fibrils from the olive-fuscous centre outward. Taste slight, of meal, with a very faint rankish aftertaste.

Spores oval, 4—$5 \times 3^1/_4$—$3^1/_2$ μ.

In wood of young Fagus and old Pinus silvestris (with the main form).

But for the white, smooth stem, entirely devoid of fuscous fibrils or squamules, this form answers very well to the descriptions of *T. fucatum* Fr. (The typical *T. fucatum* I have never met). Barla's figure (loc. cit.) of *T. fucatum* evidently is *T. sejunctum).*

11 a. **T. spermaticum** Fr. forma. (Plate 20. fig. A.)

Large. Cap, when expanded, 9—10 cm, viscous in wet weather, thin-fleshed, with a small, somewhat acute umbo, dirtbrownish to somewhat olivaceous-pale, umbo subfuscous, edge whitish, everywhere (sub lente) with a very minute network of innate, slightly darker fibrils, (paler and more lineate towards the edge). Gills very broad, white (on the face slightly yellowish). Stem cylindric, somewhat rooting, total lenght 9—10 × 1,2—1,5 cm, smooth, white with a slight flush of sulphur. Flesh with a very slight farinaceous or cucumber-like smell and a faintly bitterish aftertaste.

Spores broadly oval, $5\,^1/_2$—$6\,^1/_4 \times 4$ μ; contents pluri-guttulate.

In woods of Fagus. Rare.

Intermediate between T. spermaticum, portentosum and sejunctum, but probably nearest to *T. spermaticum.*

11 b. **T. spermaticum** Fr. forma *umbonatum* (Plate 19. fig. A.)

Rather large. Cap 6—8 cm, slightly viscid, somewhat conical, when fully expanded with a conical umbo and deflected edge, whitish, with a flush of olive-brownish or olive-greenish, faintly lineate (sub lente). Flesh thin. Gills rather broad, deeply emarginate, edge slightly eroded. Stem cylindrical, tall, somewhat fibrilloso-striate, rooting, total length 9—14 cm. Smell faint, unpleasant, rank; taste slightly rancid.

Spores subspheric-ovate, 6—$7 \times 4\,^1/_2$—5 μ, with numerous small oildrops.

In woods of Fagus. Rare.

My specimens differ from the current descriptions by their rather conical, strongly umbonate cap.

12. **T. columbetta** Fr. (Plate 22. fig. B.)

Large. Cap 6—10 cm, subviscid towards the edge, at first convex, pure white, smooth, becoming minutely silky with innate fibrils, when old occasionally with violet spots. Gills white, rather crowded. Stem stout, cylindrical, somewhat rooting, minutely fibrillose, firm. Almost tasteles and without smell.

Spores broadly oval, $6 \times 4\,^1/_2$ μ, with numerous small oildrops, (or $5\,^1/_4 \times 4$ μ, with central oildrop.)

Rather rare, in woods of Fagus.

Stirpe 4: *resplendens.*

13. **T. resplendens** Fr. (Plate 17. fig. B.)

Medium. Cap 5—6 cm, convex, alutaceous-white, centre with a flush of ochraceous, viscid when wet (not shining when dry). Flesh rather thin. Gills very crowded, thin, emarginate, pure white. Stem cylindric, base tapering, even, apex slightly flocculose, solid and firm, about 12 mm thick. Taste mild. Smell agreeable, aromatic-sweetish (apricot, mushroom).

Spores oval-globose, $4^1/_2 \times 3^3/_4$ µ. Cystidia absent.

Plantation of Picea (only met with once).

From young specimens of *Collybia maculata* this species in easily recognized by the sweetish smell, the even stem and the constant colour. Ricken's *T. resplendens* does not belong here.

b. *Genuina*

Stirpe 5: *rutilans.*

14. **T. rutilans** (Schaeff.) Fr. (Plate 21. fig. D. and D[1])

Medium to rather large. Cap 5—8 cm, basic colour chrome-yellow, partly or completely covered by a velutinous or plush-like tomentum of a deep purplish-crimson colour (which in old specimens in rainy weather may wear entirely away). Gills bright chrome-yellow, with a minutely fimbriate edge. Stem paler than the cap, fibrilloso-floccose.

Spores subspheric-ovate, $5—7 \times 4—4^1/_2$ µ. Cystidia inflated, large vesiculose-clavate, about 90×20 µ.

Very common, on coniferous stumps.

By its xylophilous habit, its cystidiose gills etc. this species differs materially from all other Tricolomas. But for its ringless stem it might be transfered to *Armillaria.*

T- decorum Fr. (Quél.).

This beautiful species, which is met with on both sides of the Atlantic, probably is most appropriately placed in this stirpe; although it also shows some affinity to *Clitocybe ectypa.* — I have not yet met with it in Denmark, but I have seen typical specimens in the Adirondacks (New York State). Bresadola places it in *Pleurotus*, but it has no natural connection there.

Stirpe 6: *vaccinum.*

15. **T. vaccinum** (Pers.) Fr. (Plate 18. fig. A.)

Medium to rather small. Cap 4—6 cm, convex, subumbonate, rufous, felty-squamulose, edge shaggy-woolly. Gills whitish, discolouring. Stem slender, fibrillose or somewhat squamulose, paler than the cap, somewhat hollow.

Spores subspheric-ovate, 5×4 µ.

Not uncommom, in coniferous woods.

16. **T. psammopus** (Kalchbr.) Fr. (Plate 21. fig. B.)

Rather small to medium. Cap convex, 3—6 cm, fibrillose, at last squamulose, pallid rufous tan. Gills with a flush of the same colour, broad. Stem densely set with small granular flocci of the same colour, base darker, apex whitish, smooth.

Spores subspheric-ovate, $5—6 \times 4—4^1/_2$ µ.

Not uncommon in plantations of Larix, and strictly confined to this tree.

Stirpe 7: *myomyces.*

17. **T. atro-squamosum** (Chév.) Sacc. (Plate 22. fig. D.)

Rather large to medium. Cap 6—8 cm, plano-convex with a woolly-shaggy or felty free edging, centre almost black, paler or even whitish towards the edge, with a plushy, dark coating which on the disc forms erect, pilose scales, while towards the ege it is reduced to adpressed fibrils. Gills truncate, edge somewhat eroded, grayish white. Stem somewhat conical, rather stout, grayish, more or less granulate above with blackish squamules, and minutely striate-fibrillose with fuscous fibrils below. Smell slight, somewhat farinaceous.

Spores ovate-oval, $6^1/_2 \times 4$ (or $4^1/_2$) μ. Cystidia subfasciculate, but sparse, basidioform, pale grayish, 30×7—10 μ.

Rather rare, but often in troops, in deep beds of dead foliage in woods of Fagus.

Ricken describes this species very well sub nom. *T. ramentaceum* (Bull.); but *Armillaria ramentacea* in the Friesian sense is a distinctly annulate species from open grassy spaces. *T. squarrulosum* of Bresadola is almost identical, differing only from small specimens of my plant by the habitat (coniferous woods) and by somewhat larger spores. Rea applies the name *murinaceum* to it; but murinaceum is a very much misused name which has been applied to all kinds of Agarics and had better be discarded altogether. My specimens were intermediate between the descriptions of *T. atro-squamosum* and *T. squarrulosum.* I therefore think Konrad & Maublanc are right in reducing *T. squarrulosum* to varietal rank.

18. **T. orirubens** Quél. (Plate 22. fig. A.)

Rather large to medium. Cap 5—8 cm, somewhat umbonate, when young dark gray, pallid towards the margin, subtomentose, towards the centre densely set with small, blackish, pilose squamules. It soon becomes more dirtbrownish. Veil none. Gills at first whitish, with or without vestiges of a blackish edging, with age becoming flushed with pale pink. Stem rather tall, cylindric, white, base slightly flushed with greenish-blue. Odour slight, mealy; aftertaste somewhat bitterish. The mycelium is pale sulphur.

Spores oval-subspheric, $4^1/_2$—$4^3/_4 \times 3^3/_4$ μ. Basidia 4-spored.

Moist ground in woods of Fagus. Rare.

When young it bears a certain likeness to *T. virgatum*, which however is more conical and very acrid. The pinkish colouring is often very faint.

19. **T. bisporigerum** Lange. (Plate 21. fig. C.)

Rather small. Cap $3^1/_2$ cm, convex, rather fleshy, ash-gray, minutely felty and slightly squamulose, edge paler. Gills somewhat distant, slightly eroded, whitish. Stem cylindrical, rather slender, $5^1/_2$ cm $\times$ 6—9 mm, white, minutely fibrillose. Almost devoid of taste and smell.

Spores broadly ovate, $6^1/_2$—$7 \times 4^1/_2$—$4^3/_4$ μ. Basidia about 6 μ broad, with two very long (7 μ) sterigmata.

In woods of Fagus, mossy ground. — Only seen once.

This little species will require further study. It is the only two-spored species within the genus hitherto described. But it may be only a form of *T. myomyces.* First described in "Studies" IX. (1933).

20. **T. terreum** (Schaeff.) Bres. (Plate 22. fig. C.)

Medium. Cap 5—7 cm, strongly convex or somewhat gibbous, rather fleshy, dark gray (centre blackish), densely covered with minute velutinous squamules; edge somewhat paler, involute, minutely pubescent (not woolly-fibrillose). Veil absent. Gills gray, slightly edged with black in places, rather broad. Stem whitish, firm, solid. Almost devoid of smell and taste.

Spores subspheric-oval, 5—6 × 4—4 1/2 (or 5 3/4—6 × 4 3/4) µ. Basidia 4-spored.

Rather uncommon, in frondose woods.

This species (very well described and figured by Bresadola (Iconographia myc.)) is clearly distinguished from dark forms of *T. myomyces* by the slightly pubescent, not shaggy-woolly edge with no trace of a cortina. Nüesch's *T. terreum* (Die Ritterlinge) is a cortinate species, while his *T. hordum* Fr. probably belongs here. The Friesian conception of *T. terreum* seems to cover divers forms of *T. myomyces.*

21. **T. cingulatum** (Fr.) Lange. (*Armillaria cingulata* Fr.). (Plate 23. fig. C.)

Rather small to medium. Cap 4—6 cm, pale gray or dirt-brownish, squamulose-fibrillose. Gills whitish. Stem slender, whitish, with a narrow, cottony, whitish ring above and slightly fibrillose-squamulose below.

Spores narrowly ovate, 4—5 × 2 1/2 (or 5— 5 1/2 × 3 1/4) µ. Basidia 4-spored.

Not rare, on moist ground, probably always under Salices (S. cinerea etc.).

22. **T. myomyces** (Pers.) Lange. (Plate 21. fig. A.)

Medium to small. Cap 3—7 cm, varying in colour from blackish gray to pallid, more or less densely clad with pilose squamules and tomentum; margin somewhat shaggy or woolly-fibrillose, often connected with the stem by a cobweb-like, very fugacious cortina. Gills grayish to pure white (often tinged chrome-yellow with age). Stem whitish to pure white, often rather short.

Spores ovate or ovate-ellipsoid, 6 × 3 3/4 µ (occasionally somewhat smaller, 5 × 3 1/2 µ).

Very common, often in large rows or "fairy-rings", as well in coniferous as in frondose woods.

This very common little Agaric is the bearer of quite a number of names, which various authors apply to diverse forms of the species. I do not see any real reason for upholding the majority of these "small species" which run completely into each other. The form here figured (cortinate, dark gray) almost equals *T. gausapatum* Fr. The form most commonly met with in coniferous plantations is often called *T. chrysites* (if it turns yellow in decaying) or *T. argyraceum.* Konrad (loc. cit.) uses the name *T. scalpturatum;* but *Ag. scalpturatus* Fr. is an intirely different species. — Three of the extreme forms may deserve special mention and rank as subspecies.

T. myomyces var. *argyraceum* Fr. (sensu str.).

Rather large, (5—8 cm), but with thin flesh, almost pure white, only in the very centre sparsely set with fuscous fibrils and flocci.

Rare. Met with in mixed woods (Fagus with old stumps of Pinus). (Not figured).

T. myomyces var. *triste* (Fr.) Lange. (*T. triste* (Scop.) Fr.)

Small. Cap about 3 cm, with a prominent conical umbo, dark gray. An extreme form with an unusually distinct cortina and somewhat squamulose stem.

Met with by me in garden-shrubberies. (Not figured).

22 a. **T. myomyces** var. *albo-conicum* Lange n. var. (Plate 23. fig. B.)

Small. Cap 2—4 cm, conical, then expanded, with acute conical umbo, pale grayish while in bud, later almost white, with dispersed, pallid-gray, minute fibrils. Gills white, rather narrow. Stem pure white, smooth, rather short and thin. Smell and taste absent. — There is no veil, but the edge of the cap is minutely fibrillose.

Spores 5 × 3 μ, oval.

Gregarious in a frondose wood, grassy space under Betula.

Close to var. *triste*, but whitish and without squamules on the stem.

23. **T. virgatum** Fr. (Plate 23. fig. D.)

Medium. Cap 5—7 cm, somewhat conical, gray, lineate with minute, radiating, darker fibrils. Gills pale gray, broad, with or without a black edging. Stem tall, rather slender, whitish. Flesh very bitter and acrid.

Spores subspheric-ovate, 6½—7½ × 5—5½ μ.

Common, chiefly in woods of Fagus.

I refer this species to the *myomyces*-stirpe, although the virgate, not felty-squamulose cap approaches it to *T. portentosum* etc., with which it has also the thin cuticular hyphæ in common.

β. Contexta

a. *Guttata*

Stirpe 8: *guttatum.*

24. **T. guttatum** Barla (nec al.). (Plate 24. fig. E.)

Rather large. Cap 6—7 cm, convexo-plane, slightly gibbous, flesh rather thick, cuticle clay-brownish, darkest and even in the middle, towards the edge disintegrated into small drop-like, innate squamules on a whitish base. Edge hirto-squamulose and quite pale. Gills somewhat crowded, almost free, cream. Stem rather short (5—6 cm) and stout (1,3—1,6 cm), slightly rooting, whitish-pale, dingy ochre towards the base. Flesh (particularly that of the stem) very firm, almost hard, white. Smell sweetish-aromatic, slightly farinaceous, but faint.

Spores broadly ovate, 5 × 3¼—3½ μ. Cystidia absent. Basidia 6 μ broad.

In park on naked soil under Ulmus; (only met once).

T. guttatum seems to be very differently conceived by the mycological authors. COOKE's figure (loc. cit.) depicts an entirely different plant. RICKEN and NÜESCH take *T. guttatum* to be a synonym of *T. acerbum*, which is very far form my species. The American *T. nobile* Peck seems to be very close, almost identical, but for the globose spores.

b. *Glabrata*

1. ECHINOSPORA

Stirpe 9: *constrictum.*

25. **T. constrictum** (Fr.) Rick. (*Armillaria constricta* Fr.). (Plate 17. fig. A.)

Rather small. Cap 3—4 cm, strongly convex, almost glabrous, white, very fleshy. Gills very crowded, thin and narrow, white. Stem slightly attenuated upward, white, slightly fibrillose-floccose up to the apical, narrow ring, solid and rather firm. Smell strong of meal.

Spores broadly oval, 7×5 µ, granulate-verrucose. Hyphæ of cuticle completely interwoven, 4 — 6 µ broad.

Grassy pastures, in spaces where the grass is scorched by horse-urine. Rather rare.

26. **T. leucocephalum** Fr. (sensu Rob. Fries). (Plate 24. fig. A.)

Rather small. Cap 4 cm, convex, somewhat gibbous, silky shining, pure white; flesh comparatively thick. Gills crowded, thin, almost free. Stem slender, somewhat Collybioid, slightly incrassated below, with a conical tap-root. Odour strong, farinaceous.

Spores broadly oval, $8^3/_4$—8×5 µ, coarsely verrucose. Cystidia absent.

This species is eminently characterised by the verrucose spores (first described by ROB. FRIES (loc. cit.)); but already E. FRIES (Monographia Hym. Suec.) draws attention to its relationship to *T. constrictum.* RICKEN's *T. leucocephalum* (with smooth spores, distant, rather broad gills that turn pink with age) is probably a slender form of the *saponaceum*-stirpe.

2. SUBLÆVISPORA

* *Collybiaria*

Stirpe 10: *ionides.*

27. **T. ionides** (Bull.) Fr. (Plate 25. fig. D.)

Small. Cap about 3 cm, somewhat violet, soon becoming dirt-brownish, convex-flat. Gills rather narrow and crowded, white, with a tinge of sulphur. Stem slender, somewhat paler than the cap, violet above, fuscescent below with whitish, rather stiff hairs at the base. Smell and taste somewhat farinaceous.

Spores narrow ellipsoid, 6—$6^1/_2 \times 3$ (or $5^1/_2$—$6 \times 2^3/_4$) µ.

Rather rare, in frondose and coniferous woods.

28. **T. persicolor** Fr. (Plate 24. fig. G.)

Small. Cap 3—4 cm, convex-flat, slightly gibbous, smooth, light fleshcolour, with a tinge of pink (slightly brownish in the middle). Flesh thin. Gills rather narrow, crowded, almost white. Stem slender, somewhat cartilaginous, concolorous with the cap (paler and slightly fibrillose above, tomentoso-strigose below). Generally subfasciculate.

Spores narrow ellipsoid, $5 \times 2^1/_2\ \mu$.

In pastures and on commons near the sea-shore. Rather rare.

T. persicolor is very close to *T. carneum* but more Collybioid and somewhat fasciculate. I think it deserves specific rank instead of being made a variety of *T. ionides*, as done by some authors.

29. **T. carneum** (Bull.) Fr. (Plate 24. fig. C.)

Small. Cap 2—3 cm, convex, pale pinkish fleshcolour, with incurved edge. Gills very narrow. Stem cylindric, rather short, of the same colour, slightly squamulose above, paler towards the naked base.

Spores oval, $5 \times 2^1/_2\ \mu$.

In mossy grassland (open spaces in woods, meadow-land etc.). Not common.

30. **T. pseudo-flammula** Lange. (*T. cerinum* (Pers.) Nüesch (nec Fr.)). (Plate 24. fig. B.)

Rather small. Cap $2^1/_2$—5 cm, comparatively fleshy, edge strongly incurved (in large specimens wavy), slightly felty, sulphur-yellow; the rest of the cap fulvous-orange. Gills extremely narrow (1—2 mm), very crowded, arcuate, slightly emarginate or almost decurrent, yellow to slightly fulvous. Stem almost cylindric or widened above, short (2—4 cm), rather stout and firm, of the same colours as the cap, brownish towards the white-felty base. Flesh sulphur-yellow. Taste slightly rank or a little bitterish.

Spores subspheric-ovate, 3—$3^1/_4 \times 2$—$2^1/_2\ \mu$. Spore-powder pure white.

In plantations of Picea, often numerous, in deep needlebeds, but not common.

Some authors (e. g. Nüesch) use the name *T. cerinum* for this species. But none of the specimens depicted by Fries under this name bear any likeness to my plant (he describes it as having white flesh and dirty wax-coloured cap). Large specimens with a stout, obconical stem are almost Clitocyboid; and it is not improbable that Fries has created his *A. (Clitocybe) venustissimus* on such specimens of *T. pseudo-flammula*. (Vide Icones sel. pl. 50).

31. **T. fallax** Peck. (*T. chrysenterum* (Bull.?) Bres.). (Plate 24. fig. F.)

Small. Cap 2 cm, thin, yellow (of one colour), rather flat. Gills paler yellow than in no. 30, broader (3—4 mm), somewhat ventricose. Stem rather slender, cylindric. Flesh yellowish.

Spores subspheric-oval, 3—$3^1/_2 \times 2^1/_4$—$2^1/_2\ \mu$.

Dense plantations of Picea, solitary. Rare.

Bresadola figures this species sub nom. *T. chrysenterum*. But *T. chrysenterum* of Fries is a fagophilous plant. Nüesch's description of *T. fallax* is very good, except that he gives somewhat larger dimensions for the spores than Peck (and I myself) have found.

** *Carnosa*

† Subsicca

° Nigrescentia

Stirpe 11: *leucophæatum.*

32. **T. leucophæatum** Karst. (Plate 25. fig. E.)

Medium. Cap 4—7 cm, convex flat, dirt-gray, not hygrophanous, innato-fibrillose, towards the edge somewhat felty. Gills pale dirtgray, rather crowded, almost free. Stem rather tall, cylindrical or somewhat swollen, whitish above, dirt-gray, somewhat sulcate-striate towards the base, about 1 cm thick, with a short "root". Flesh pale grayish, fuscous over the gills. All parts turn blackish (at first somewhat bluish-black) when touched.

Spores oblong-oval, 6—6 1/2 × 3 3/4 µ.

In moist woods of Picea. Rare.

The species seems to be allied to *A. (Collybia) semitalis* Fr., but the cap of this latter species is said to be glabrous and hygrophanous, of a darker sootbrown colour. It is in most respects very close to *Clitocybe gangrænosa*, but the gills are deeply emarginate, almost free. Karsten in later years created a new genus *Lyophyllum* for it. — *C. tumescens* Peck (from U. S. A.) seems to be identical.

Clitocybe infumata Bres. and *T. trigonospora* Bres. might be sought for here but are retained in *Clitocybe* on account of their affinity to Clitocybe *Difformes.

33. **T. crassifolium** (Berk.?) Ricken. (Plate 25. fig. C.)

Rather large. Cap 5 1/2—6 1/2 cm, at first convex, then flat or slightly depressed, dirt-brownish, edge almost white, with age darker gray. Gills at first dirty whitish, then ashy gray to dark fuscous (when touched becoming blackish blue and at last sepia at the edge), rather broad, emarginate, distant and thick (somewhat succulent). Stem at first white, smooth, then somewhat grayish, with blackening fibrils below, rather short (5 cm) and thick (1 1/4—1 3/4 cm), base subbulbous (1 3/4—2 cm). Flesh blackening like the other parts, bitterish, with a somewhat rancid smell.

Spores subspheric, 6—7 × 5 1/2—6 µ or 7—7 1/2 × 6—6 1/4 µ, rather thick-walled, with a large central oil-drop or several smaller ones.

Frondose woods (Fagus). Rare.

Bresadola (Iconographia, pl. 198) depicts a form with a more slender, somewhat cartilaginous stem sub nom. *Collybia crassifolia.* This form shows some affinity to Clitocybe *Difformes. — *Ag. crassifolius* Berk. is hardly identical.

°° Læticoloria

* *Macrospora*

Stirpe 12: *T. sulphureum.*

34. **T. sulphureum** (Bull.) Fr. (Plate 25. fig. F.)

Medium. Cap 4—7 cm, convex or somewhat gibbous, sulphur, often flushed with a pale

brownish colour in the middle. Gills broad, very distant, sulphur. Stem tall, slender, concolorous. Smell very strong, nauseous.

Spores ellipsoid, somewhat lemonshaped, 9—10½ × 5—5½ μ.

Common in frondose woods.

35. **T. inamoenum** Fr. (Plate 29. fig. B.)

Medium. Cap 5—6 cm, convex-expanded, whitish alutaceous, a little more brownish in the middle, smooth, edge slightly tomentose. Gills very broad, broadly emarginate, distant, pallid, with a flush of yellowish. Stem slender, (7 cm × 8 mm), yellowish-white, smooth, slightly fibrillose-lineate, somewhat rooting. Smell like that of T. sulphureum.

Spores obliquely ovate, 8½—9½ × 6—6½ μ.

Rare. Met with on mossy ground in plantations of Picea.

Is almost a whitish *T. sulphureum*, but pinophilous. From *T. lascivum* it is clearly distinguished by the taller stem, broader and more distant gills and larger spores.

** *Mesospora*

Stirpe 13: *album*.

36. **T. album** (Schaeff.) Fr. (Plate 27. fig. D.)

Medium to rather large. Cap 5—10 cm, convex, slightly gibbous, alutaceous-white (slightly ochry in the middle), the edge in large specimens often somewhat grooved. Gills rotundato-adfixed, almost free, white, (when decaying often spotted black). Stem rather stout, slightly flocculose at the apex, white. Smell disagreeable, rankish. Aftertaste acrid, (rhizome of Calla).

Spores ovate, 5½—6 × 3¾—4 μ.

Rather common, on meadowy or boggy ground, probably always under Betula.

Like Romell (Hymenomycetes of Lappland) I look upon the large form of *T. album* here figured as identical with *T. raphanicum* Karst.

37. **T. lascivum** Fr. (Plate 27. fig. C.)

Medium to rather small. Cap 4—7 cm, subumbonate, alutaceous to very pale tan. Gills deeply emarginate, white. Stem somewhat acuminate at the base, whitish, generally with a flush of paler tan midway. Smell at first somewhat sweetish aromatic (Syringa), but soon becoming nauseating. Taste bitterish, slightly acrid.

Spores oval, 6—7 × 3½—3¾ μ.

Rather common in deciduous woods, especially under Quercus (but also in beechwoods).

This species is almost too close to *T. album* and may be regarded as a variety. Is is less robust, often flushed with clay-brownish. I have never seen it blackening and never met with it under Betula.

Stirpe 13: *saponaceum.*

38. **T. sudum** Fr. (Plate 26. fig. D.)

Rather large to medium. Cap 5—7 cm, convex, slightly gibbous, moist, but not viscid, smooth, water-gray, edge paler. Gills less distant than in T. saponaceum, at first whitish, soon becoming gray, broadly emarginate. Stem cylindrical, 1—1 1/2 cm thick, somewhat rooting-acuminate, slightly fibrillose-striate (or very slightly white-flocculose), whitish, solid, downward somewhat flushed with flesh-colour when old. (The whole plant has a tendency to become slightly tinged with the same colour). Smell faint, farinaceous-rancid. Taste slight, farinaceous with a bitterish aftertaste.

Spores narrowly ovate, 5 1/2—6 1/2 × 3 1/2—3 3/4 μ.

In plantations of Pinus and Picea. Rather rare.

39 a. **T. saponaceum** Fr. var. *ardosiacum* Bres. (Plate 26. fig. C.)

Medium. Cap 5—7 cm, fleshy, somewhat umbonate, brownish- or olivaceous-gray, indistinctly innato-squamulose. Gills broad, rather distant, whitish. Stem solid, paler than the cap, more or less fuscous-squamulose or -fibrillose, attenuated downward, rather stout. The whole plant (more especially the gills) becomes flushed with salmon-pink with age. Smell faint, not farinaceous but rather vapid.

Spores ovate, 5 1/2—6 × 3 1/2—4 μ.

Not uncommon. In woods (Fagus, Picea).

Cooke's fig. in Illustrations (pl. 216) of *T. saponaceum* represents this form.

39 b. **T. saponaceum** var. *napipes* Krombh. (Plate 25. fig. B.)

Medium to rather large. Cap 5—8 cm, strongly umbonate, yellowish. Gills pale sulphur. Stem somewhat rooting, slightly ventricose, without any dark scales or fibrils, yellowish. For the rest as in no. 39 a.

Spores broadly ovate, 5—5 1/2 × 3 1/2—4 μ.

Not uncommon, in woods of Picea, but often of a less conspicuous type: paler, stem less stout, cylindrical.

This pallid form is depicted by Bresadola (Iconographia, pl. 85) as the typical *T. saponaceum.*

39 c. **T. saponaceum** var. *cnista* (Fr.) Lange. (*T. cnista* Fr.). (Plate 26. fig. A.)

Medium. Cap 5—7 cm, convex-expanded with a subconical umbo, almost silky, whitish (dingy-pale in the middle). Gills white, very broad, soon becoming flushed with pinkish tints. Stem white, cylindric, slightly rooting (root somewhat acuminate), comparatively short, rather firm. Smell faint, slightly aromatic (Psalliota—Marasmius oreades).

Spores subspheric ovate, 5 1/2—6 × 3 3/4—4 μ.

Woods of Fagus, on hard and dry humous ground; rather rare.

The much disputed *T. cnista* Fr. has been interpreted in many ways. BRESADOLA applies the name to a *Melanoleuca* and is followed in this by NÜESCH and RICKEN. But the broad, reddening gills forbid such interpretation. To my mind the present plant is the true *T. cnista* Fr., but it hardly deserves specific rank.

Stirpe 14: *gambosum.*

40. **T. gambosum** Fr. (Plate 26. fig. B.)

Large. Cap 7—13 cm, very fleshy, cream or alutaceous-white, often irregular. Gills rounded behind, very crowded (but not narrow), white. Stem solid, very stout, white. Odour farinaceous.

Spores oval, 5—3¼ μ.

Rather common (in May and June) in grass, under hedgerows etc., often rather numerous, even in fairy-rings.

41. **T. graveolens** (Pers.) Fr. (sensu Schroet.). (Plate 27. fig. A.)

Rather small. Cap 3—5 cm, subglobose-convex, very fleshy and firm, alutaceous-pale to pale or dingy tan. Gills very narrow and crowded, arcuate, alutaceous. Stem solid, whitish, becoming somewhat fuscous from base upward (inside and outside). Odour farinaceous.

Spores oval, 5 × 2¾ μ.

In woods of Fagus, rather rare (June, July).

Several authors (e. g. RICKEN) include nos. 40—41 under the common name *T. Georgii* (Clus.) Fr., together with other varieties. The *T. graveolens* here described answers very well to the diagnosis of SCHROETER (loc. cit.), while other authors describe a form that turns almost soot-brown with age. REA uses the name *T. Georgii* exclusively for a form very close to my *T. graveolens. T. albellum* Fr. as figured by BARLA (loc. cit. pl. 41) equals my *T. gambosum.*

Stirpe 15: *panæolum.*

42. **T. panæolum** Fr. (Plate 27. fig. B.)

Medium to rather large. Cap 5—8 cm, pallid to dark dirty gray, convex, often irregular (edge often somewhat grooved) and spotted with dark, droplike spots (Lactarius blennius). Gills dirtgray with a tinge of fleshcolour, crowded. Stem short, paler than the cap, solid, fibrillose-striate. Flesh white. Sporeprint pale dingy fleshcolour.

Spores broadly ovate, 5 × 3¼ μ. Cystidia absent.

Not uncommon and generally in large numbers (often clustered), in pastures, on commons near the sea etc.

43. **T. acerbum** (Bull.) Fr. (sensu Rick.). (Plate 23. fig. A.)

Large and robust. Cap 6—11 cm, convex, at last somewhat depressed, at first pale tan, later pallid cinnamon (edge paler), generally coarsely grooved at the edge, at last slightly felty. Gills crowded, whitish, becoming pallid and at last dingy rufescent from edge in. Stem stout, solid, pallid, somewhat dingy cinnamon below, slightly flocculose above, towards the

base with a network of fibrils (only conspicuous in fully developed specimens). Flesh firm, without any particular smell, but with a disagreeable bitterish after-taste.

Spores broadly ovate, $4^3/_4 \times 3^1/_2$ µ, with a large gutta.

Rare. Open spaces in frondose woods (Fagus, Quercus).

According to RICKEN *T. conspicuum* (Lasch) and *T. guttatum* (Schaeff.) Fr. are synonymous (vide no. 24). RICKEN refers this species to the section GENUINA, while FRIES placed it in SPONGIOSA. I think it natural to attach it to *T. panæolum.*

44. **T. amarum** (Fr.) Quél. (*Leucopaxillus amarus* (Fr.?) Kühner). (Plate 24. fig. D.)

Medium. Cap 5—8 cm, convex, soon flat or slightly depressed, rufous-bay, fading off towards the margin through rufous-tan to alutaceous; edge often wavy and somewhat grooved; surface minutely tomentose. Gills creamy white, very crowded, thin, rather narrow, slightly emarginate, with a decurrent tooth. Stem almost cylindric, 0,8—1,4 cm thick, short or somewhat elongated, white, minutely flocculose-tomentose. Flesh very bitter and with a somewhat farinaceous smell (reminding of Tricholoma lascivum, but fainter).

Spores broadly ovate to roundish-ovate, with a big oildrop, $4^1/_2$—$5^1/_2 \times 4$—$4^1/_4$ µ (not visibly punctate when magnified 600 ×). Edge of gills with thin, hyphoid hairs (about 45×2 µ). Cuticle of cap made up of interwoven, pale brown hyphæ, about 3—5 µ broad.

In woods of Picea. Collected by F. H. MØLLER in Låland, Oct. 1935 (and 1922).

A white (with age somewhat alutaceous) form, var. *albo-alutaceum* F. H. Møller n. var., has been met with by its author in several places in Låland and Falster.

45. **T. geminum** (Paul.) Fr. (sensu Sev. Petersen). (*Rhodopaxillus truncatus* (Schaeff.?) Maire). (Plate 25. fig. A.)

Medium to rather large. Cap 5—9 cm, fleshy, edge incurved. Colour gilvous-tan or pale fleshcolour-ochre. Minutely flocculose. Gills narrow, arcuate, slightly emarginate to subdecurrent, paler than the cap, crowded. Stem firm, solid, rather short, almost white, slightly fibrillose-striate, often a little thicker and slightly mealy-grannulate above. Faint sweetish smell. Sporepowder with a tinge of fleshcolour or salmon.

Spores broadly ovate, 6×4 µ (or $5^3/_4 \times 4$ µ).

Not uncommon in woods of Picea, often in small troops.

SEV. PETERSEN (loc. cit.) describes this species very well under the Pauletian name. But later BRESADOLA has applied the name *A. truncatus* Schaeff. (which FRIES uses for a *Hebeloma*) to it, and MAIRE has referred it to *Rhodopaxillus;* but it can hardly be the Friesian *Hebeloma truncatum* which he describes with ferruginascent gills. — It is highly probable that *Clitocybe opipara* Fr. is a synonym to *T. geminum* (which FRIES only knew from description). (Vide Icones sel. pl. 49 a).

46. **T. irinum** Fr. (Plate 28. fig. B.)

Large to very large. Cap 7—14 cm, very fleshy, convex-flat or slightly gibbous, alutaceous-pale with a tinge of fleshcolour. Gills crowded, almost of the same colour. Stem

whitish, fibrilloso-venose, stout and solid. Flesh white. Smell sweetish-aromatic (Iris florentina).

Spores ellipsoid, 7—8 × 3½—4 μ.

Not uncommon, in troops or rows on somewhat boggy ground (chiefly under Fraxinus).

From pallid lilac forms of the *nudum*-stirpe it is most easily distinguished by the aromatic smell.

Stirpe 16: *nudum.*

47. **T. personatum** Fr. (ex parte). (*T. personatum* var. *anserinum* Berk.). (Plate 28. fig. A.)

Large. Cap 6—10 cm, slightly umbonate, alutaceous-white to pale dirtgray. Gills crowded, dingy whitish, with a flush of dirtgrayish fleshcolour when old. Stem stout, somewhat incrassated below, pallid, more or less flushed with violet-blue, somewhat scaly-fibrillose. Flesh white.

Spores ovate-oval, 6¼—7½ × 4—5 μ.

Rather common, till late in the season, in open frondose woods, under hedges, in grass.

The pallid (never violet or lilac) gills and the at first bluish, scaly (not mealy) stem distinguish this species from discoloured forms of *T. nudum.*

48. **T. nudum** (Bull.) Fr. (Plate 28. fig. C.)

Rather large. Cap 6—10 cm, convex-flat, dark watery fuscous-violet, soon discolouring. Gills crowded, pale violet, becoming pale dingy lilac. Stem solid, pale violet-blue, mealy above. Flesh more or less tinged with the same colours.

Spores ovate-oval, 7 × 4½ (or 8 × 5) μ.

Very common, often in large "fairy rings", especially in plantations of Picea (but also met with in woods of Fagus), even late.

T. glaucocanum Bres. is an intermediate form between nos. 47 and 48, while *T. sævum* Gill. (Les Champignons) is a fairly typical *T. personatum.*

†† Hygrophana

49. **T. sordidum** Fr. (Plate 30. fig. D.)

Rather small to medium. Cap 4—7 cm, watery brownish-lilac, becoming altogether fuscous-brownish, thin, often deformed. Gills pale bluish lilac, soon discolouring. Stem slightly fibrillose, rather thin, often crooked or bent, colour of cap. Flesh of the same colour, but paler. Often somewhat clustered.

Spores ovate-ellipsoid, 6½—7½ × 3½—3 μ.

Common in richly manured garden beds, rubbish heaps etc. till late in the season.

50. **T. calathus** (Fr.) Rick. (*Clitocybe calathus* Fr.). (Plate 30. fig. E.)

Small. Cap 3—4 cm, submembranaceous, soon depressed (slightly umbonate), margin distinctly striolate, dingy pale lilac. Gills rather crowded, very pale lilac, subdecurrent. Stem slender, smooth, paler than the cap.

Spores 6—6½ × 3½ μ.

Rare. The specimens painted grew under Betula in mixed, open frondose wood.

Although this species has a Clitocyboid (almost Omphaloid) character, its close proximity to *T. sordidum* makes it preferable to place it in this stirpe, as an extreme form.

Stirpe 17: *putidum.*

51. **T. putidum** Fr. (nec Quél.). (Plate 30. fig. B and B¹ (dry)).

Rather small, very fragile and watery. Cap 4—7 cm, convex-expanded, with a small umbo, watery dirtbrown, glabrous, minutely pellucido-striate at the edge when wet, pale dirtbrownish or clay when dry. Gills rather crowded, somewhat emarginate-adnexed, dirtgrayish. Stem 5—6 cm × 5—9 mm, even, pale, with a very thin coating of whitish, subfibrillose (not flocculose) pruina, somewhat hollow with age, brittle and often flattened. Flesh of cap and stem watery dirtbrown. Smell rancid farinaceous, but not very strong.

Spores oval, 6 × 3¾ μ.

Not uncommon in humid woods of Picea.

This species is not too well known by the various authors. FRIES' figure (Icon. selectæ) is unsatisfactory. BARLA'S (loc. cit.) gives a better impression of its habit, but shows the flesh white. The minute striation is overlooked by both authors. REA and QUELET describe under the same name a large-spored species which does not belong here. COOKE'S figure is dubious. — It differs from *Collybia inolens* in being brownish, not gray, and in the less slender stem without a white-flocculose apex. (*T. lixivium* Fr. (to which I formerly referred this plant) differs in having white, inodorous flesh).

B. *Melanoleuca*

Stirpe 18: *melaleucum.*

52. **T. grammopodium** (Bull.) Fr. (Plate 29. fig. C.)

Large to very large. Cap 8—11 cm, soon depressed, with a rather prominent umbo, fuscous-brown, expallent, umbo somewhat darker. Gills arcuato-decurrent, rather narrow, white, becoming whitish-pale. Stem attenuated upward, tall, paler than the cap, striate with darker lines. Flesh whitish, slowly turning fuscous-brown from base upward.

Spores oval, 8—9 × 5½ μ, minutely verrucose. Basidia 4-spored. Cystidia harpoonlike (acuminate, barbed with crystalloid spinelets at the top).

Not common, but generally in rows or troops, in moist places in woods.

The *T. grammopodium* of MURRILL (white cap, emarginate gills) hardly belongs here.

T. sp. (*T. brevipes* Bres. nec. al.).

Large to very large. Cap 9—13 cm, clay-brownish to pale tan, depressed, umbonate (umbo somewhat darker). Gills whitish-pale (or with a flush of clay-yellowish). Stem very short and stout.

Spores and cystidia not investigated.

Only met with once in park, on lawn, a large circle. Not figured.

This species or form is very well figured by BRESADOLA (Iconographia). But it is not the *T. brevipes* of other authors. From *T. grammopodium* it differs chiefly by its short stem and paler colours.

53. **T. humile** Fr. var. *fragillimum* (Pers.) Fr. (Plate 30. fig. C.)

Small. Cap 2—3 cm, expanded, umbonate, pale gray, somewhat darker in the middle. Gills white, emarginate, ventricose. Stem very thin, cylindric, slender (4 cm × 3 mm), fuscous-gray from base upward, soon becoming dirtbrown inside.

Spores and cystidia of the usual Melanoleuca-type.

Not uncommon, rather solitary, at roadsides and other grassy open spaces.

54. **T. melaleucum** (Pers.) Fr. (Plate 29. fig. A.)

Medium to rather small. Cap 4—7 cm, convex-plane with a somewhat darker umbo, generally brownish fuscous. Gills emarginate, white or whitish. Stem slender or medium, pallid, somewhat fibrillose-striate with darker fibrils, somewhat incrassated downward. Flesh becoming dirt-brownish from base upward.

Spores and cystidia as usual.

Common in woods and in the open.

Chiefly distinguished from *T. grammopodium* by a less distinctly lineate stem and considerably smaller dimensions. A somewhat shorter, very dark (pitch-brown) form with a dark fuscous stem, *T. Friesii* Bres., is occasionally met with in frondose woods.

55. **T. stridulum** Fr. (?) var. *pallidipes* Lange. (Plate 31. fig. F.)

Medium to rather small. Cap 5—6 cm, rather flat, slightly umbonate, dark fuscous-brown. Gills narrow, somewhat arcuate, adnato-decurrent, white. Flesh of stem remaining white for a long time.

Spores and cystidia as usual.

Rather solitary, in wood of Fagus. Rare.

Very close to *T. grammopodium*, being almost a miniature of this species. My plant is very like the form figured by BRESADOLA (Iconographia, pl. 123) but even more pale-stemmed and with much more whitish flesh.

56. **T. brevipes** (Bull.) Fr. (Plate 29. fig. D.)

Medium. Cap 5—7 cm, convex, obsoletely umbonate, dark fuscous when young. Gills

white, deeply emarginate. Stem very short, stout (3—4 cm × 1—1,2 cm), whitish, slightly fibrillose, subconic, rapidly becoming dark dirt-brown inside.

Spores and cystidia as usual.

Rather common, late in the season in compost- and leafmould heaps, garden-beds, on lawns etc. — but often less typical than the figured specimens, more *melaleucum*-like.

T. strictipes Karst.

Rather large or large. Cap 6—13 cm (averaging 8 cm), at first watery horn-brownish gray, then whitish ashy gray (like Clitocybe nebularis), slightly umbonate. Gills flatly emarginate, subdecurrent, whitish. Stem rather slender (but not tall), not striate, cylindric, at first slightly mealy, but soon glabrous. Flesh whitish, remaining pale in the stem.

Spores and cystidia as usual.

Not figured. I have met this form growing on heaps of rotten straw, chaff etc. in a garden.

KARSTEN'S species is quoted as a probable synonym of *T. evenosum* (Sacc.) by KONRAD & MAUBLANC (loc. cit.). I find this very likely, but then *T. strictipes* should be maintained as the older name.

57. **T. strictipes** var. (*T. Schumacheri* Fr.?). (Plate 31. fig. A.)

Rather large. Cap 7—9 cm, convex-flat (edge involute), slightly gibbous, pale gray (Clitocybe nebularis). Gills flatly emarginate, with a decurrent denticle. Stem solid, of medium hight, not powdered, but everywhere innato-fibrillose (dirt-brownish lines on a pallid ground). Flesh in cap white (thick in the centre, thin towards the margin); that of the stem pallid.

Spores as usual. Cystidia rather sparse, hairshaped-subulate, slightly incrassated at the base (7 μ), without crystalloid setulæ, free portion about 25 μ long.

On moist ground in frondose woods. Rare.

It seems to me not at all unlikely that this is the true *T. Schumacheri* of FRIES, which various authors have interpreted in different ways. The only marked difference is that in my plant the flesh of the cap is rather thin. The figure in Flora Danica (tab. 2267[1]) fits fairly well. KILLERMAN (Pilze aus Bayern) also ascribes to *T. Schumacheri* spores of the same type (granulate, spheric-ellipsoid, 7 × 5 μ).

58. **T. exscissum** (Fr.). (Plate 31. fig. C.)

Medium. Cap 4—8 cm, convex-flat, at last somewhat depressed, with a prominent, almost mammiform, dark gray umbo, slightly hygrophanous, ashy gray. Gills whitish, rather narrow, slightly emarginate. Stem rather short (3½—6 cm), almost cylindric, absolutely glabrous. Flesh whitish-pale everywhere.

Spores as usual. The figured specimens were entirely devoid of cystidia, but in another find the gills had the ordinary type of cystidia.

Growing in the open (grassy clearing in wood, pasture outside a plantation etc.).

BRESADOLA also describes *C. exscissum* as devoid of cystidia; (but his figure depicts a much more slender, white form).

59. **T. arcuatum** (Bull.) Fr. (?) sensu restr. forma *robustum.* (Plate 31. fig. D.)

Large. Cap 8—11 cm, plano-convex, Vandyke-brown, somewhat shining. Gills at first whitish-isabelline, later pale gilvous-ochre, emarginate with a decurrent tooth. Stem short (5 cm), rather stout, whitish, somewhat fibrillose-striate with minute lines that become pale gilvous. Flesh of stem slightly gilvous, whitish at the base and in the cap. Smell faint.

Spores and cystidia as usual.

Mixed wood. Only met with in a single locality.

Fries describes *T. arcuatum* as having white gills, but the various figures in Bulliard's tab. 443 (Hist. Champ. Fr.) are yellowish-gilled (vide Sev. Petersen loc. cit.). Bresadola uses the name *T. arcuatum* for the form that is here called *T. cognatum. T. phæopodium* of Bresadola (which does not equal *Ag. phæopodius* Fr. which is a form of *Collybia butyracea)* differs in having a dark fuscous stem.

T. humile var. *evectum* Grove may be synonymous.

60. **T. cognatum** (Fr.) Gill. (*T. arcuatum* (Bull.) Bres.; *T. arcuatum* var. *cognatum* Fr.) (Plate 30. fig. A.)

Medium to rather large. Cap 6—8 cm, convex-flat, light ochraceous tan, (somewhat isabelline at first, becoming gilvous ochre with age). Gills at first isabelline, then gilvous-ochraceous, emarginate. Stem slender and tall (about 7 cm), subbulbous, fibrillose-striate, coloured like the cap.

Spores and cystidia as usual.

Not uncommon in grassy borders of roads, drives in woods and similar places. (Rather frequent in open grassland as well in Iceland (Poul Larsen) as in central Norway (Lange)).

This is the most distinct of all the species, characterised by the slender stem and the gilvous-ochry colours of all its parts. Bresadola's figure is excellent, but depicts rather over-ripe specimens. I have met with an intermediate form: cap more brownish, café au lait, stem pallid, less slender. This form squares exactly with *Melanoleuca cognata* in the sense of Konrad & Maublanc (loc. cit.). The species 52—60 are very intimately related, hardly specifically different, although varying very much in size, stature and colours.

II. Dermoloma

Stirpe 19: *cuneifolium.*

61. **T. cuneifolium** Fr. (Plate. 31. fig. B.)

Dwarfish. Cap 1½—3 cm, convex or subumbonate-expanded, paler or darker dirtgray, often somewhat wrinkled and cracking. Gills almost triangular, attenuated-free, whitish, rather distant. Stem short, rather thin, slightly attenuated downwards, whitish, hollow. Distinct mealy smell.

Spores broadly ovate, 4½—5 × 3—3½ μ. Cystidia absent. Basidia 4-spored. The cuticle of the cap is parenchymoid, being made up of subglobular or polyhedrous cells.

Not uncommon, on grassy borders of roads through woods or in the open.

To this group probably also belong some other small species, e. g. *T. caelatum* and *T. atrocinereum.*

Besides the species here described and figured several other species are on record from Denmark, e. g. the characteristic Inocyboid *T. inodermum* Fr. (of which I have seen specimens, collected by POUL LARSEN), and *T. quinquepartitum* Fr. (found by F. H. MØLLER).

CLITOCYBE

Tissue of cap continuous with that of the stem. Gills more or less decurrent. Stem almost glabrous, not cartilaginous. Large to rather small species.

Although the difference in gill-attachment is the only distinct character that separates *Clitocybe* and *Tricholoma* the two genera would be fairly well distinguished if it were not for the group *Difformes*, in which many species have almost Tricholomoid gills. The boundary-line towards the other neighbouring genus, *Omphalia*, is not so easily discernible (some authors even prefer to join the two in one). The most useful fieldmark is simply the smaller size of nearly all the *Omphalias* (cap rarely exceeding 3 cm). But in doubtful cases it is the somewhat cartilaginous (not fleshy or pulpy) texture of the stem in the *Omphalias* that settles the question. But it must be admitted that some of the larger *Omphalias* are not much more than a hair's breadth from their next door neighbours in *Clitocybe*.

Clitocybe is generally made to include the subgenus *Laccaria (Russuliopsis)*. This little distinct group is rather unique. The gills are thick, somewhat mealy (from the spores); the spores are in most cases large and prickly. *Laccaria* may deserve generic rank just as well as e. g. *Hygrophorus*. But intermediate species — such as the American *C. ochropurpurea* Berk. — make me doubtful as to the value of such an innovation. — *Clitocybe*, as here defined, also includes some species, which have been placed in *Lepista* (under *Paxillus*). Their spores are white, their gills not distinctly Paxilloid, and I see no good reason for keeping them apart from the main lot.

Among the genuine *Clitocybes* much more uniformity reigns than within *Tricholoma*. Peronate, viscid or velutinous types are almost absent. But the group *Hygrophanæ* is much larger and more diversified than the corresponding group in *Tricholoma*. The microscopic examination confirms this impression of general uniformity. Cystidia are of rare occurrence, and the spores are never large. Some few species are distinguished by having prickly or granulate spores (especially the little group *Inversæ*).

The original Friesian taxonomy for the genus leaves a good deal to be desired. When the *Laccarias* are removed to a special subgenus (as they certainly ought to be) the Friesian group *Versiformes* dwindles into mere nothingness and its few remaining species had better be shifted over to *Genuinæ*. The genuine *Clitocybes* then will fall into two main sections: *Carnosæ* and *Hygrophanæ*. But it remains to dispose of the somewhat cæspitose and carti-

larginous species which already FRIES segregated into a special group *(Difformes)*, and which are partly Collybioid, partly Tricholomoid, without naturally falling within the limits of either of these genera. In order not to deviate from the Frisian taxonomy, except when absolutely necessary, I retain them in *Clitocybe*. For the same reason I also resist the temptation to transfer the Clitocyboid *Cantharelli* to *Clitocybe*, as done by various authors.

When we come to the subdivisions within the original Friesian sections the classification leaves more to be desired. The hygrophanous species he arranged in two series: *Cyathiformes* and *Orbiformes*, chiefly according to the more or less pronounced depression of the cap. And the non-hygrophanous species were on the same principle divided into *Disciformes* and *Infundibuliformes*. Here I am inclined to deviate from the Friesian path. 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 aukward, and the same holds true for *C. catina* and *C. cerussata*, *C. brumalis* and *C. ditopoda*.

By introducing spore-characters certain improvements of the taxonomy can be attained to. But unfortunately the microscopic differences whitin the main groups are hardly so characteristic and marked that the taxonomy can be mainly built up upon them. It will be seen in the key how far I have deemed it advisable to go in this direction.

KEY

TO THE SPECIES FIGURED

I. EU-CLITOCYBE

Gills not Hygrophoroid. Spores smooth or minutely spinulose-punctate.

A. GENUINÆ.

Not fasciculate. Stem not Collybioid.

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

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

1. Gills white to alutaceous-white.

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

** Spores ovate.

† Cap white to somewhat alutaceous ... ... 2. *C. gigantea*

(Vide also *C. nebularis* var. *alba*).

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

2. Gills (and cap) becoming dirt-brownish... ... ... 4. *C. Alexandri*

(Vide also *Tricholoma grammopodium*).

b. Mesomorphæ. Cap averaging less than 7 cm.

1. *Microsporæ.* Index (length × breadth of spore in μ) < 35.

* COLORATÆ. Cap not white.

(Gills repeatedly dichotomous: vide *Cantharellus).*

† Spores ovate or fusiform, smooth.
° Flesh turning black when cut. Gills gray ... ... 5. *C. gangrænosa*
(Vide also under *Difformes*).
°° Flesh not turning black.
˙ Spores fusiform ... ... 6. *C. inornata*
˙˙ Spores not fusiform.
• Smell of anise.
▫ Cap more or less greenish... ... ... 7. *C. odora*
▫▫ Cap dingy white ... ... 7 a. *C. odora* var. *alba*
•• 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. Young cap convex.
" Gills white to cream-yellow ... ... 9. *C. clavipes*
"" Gills with a tinge of alutaceous flesh-colour ... ... 10. *C. subinvoluta*
▪▪ Cap somewhat infundibuliform.
" Cap whitish-alutaceous or somewhat pink ... ... 11. *C. infundibuliformis*
"" Cap hazel or dirty brownish.
x Cap brownish, slightly squamulose. Stem rather tall... ... ... 12. *C. squamulosa*
xx Cap clay- or horn-coloured. Stem short ... ... 13. *C. trullæformis*
)) Small species; cap < 3 cm.
▪ Spores ovate.
" Gills dirt-grayish... ... ... *14. C. hirneola* var. *ovispora*
"" Gills white... ... ... 15. *C. parilis*
(Vide also *C. rivulosa*, no. 21).
▪▪ Spores almost clavate... ... ... 16. *C. fusco-squamula*
†† Spores almost spheric, minutely spinuloso-punctate ... 17. *C. inversa*

** Albatæ. Cap white.
† Rather large species; cap averaging 5—9 cm.
◦ Spores medium (over 6 μ long).
˙ Spores fusiform. Cap dingy whitish (vide *C. inornata*, no. 6).
˙˙ Spores ovate.
• Large, very fleshy (vide *C. nebularis* var. *alba*, no. 3 a).
•• Smaller; smell of anise (vide *C. odora* var. *alba*, no. 7 a).

°° Spores small (< 6 μ long).
˄ Stem rather slender ... ... 18. *C. cerussata* (et varr.)
˄˄ Stem rather stout ... ... 19. *C. phyllophila*

†† Smaller species.
° Flesh bitterish ... ... 20. *C. gallinacea*
°° Flesh not bitter.
˄ Gills rather crowded.
• Growing in grass.
▫ Cap whitish fleshcolour ... ... 21. *C. rivulosa*
▫▫ Cap white or slightly alutaceous ... ... 22. *C. dealbata*
•• Growing amongst needles or foliage (pure white) 23. *C. candicans*
˄˄ Gills distant... ... ... 24. *C. ericetorum*

2. *Macrosporæ.* Index (lenght × breadth of spore in μ) > 35.
* Cap brownish red. Gills white. Smell farinaceous... ... ... 25. *C. sinopica*
** Cap subochraceous, dirtbrown or somewhat amethyst.
† Cap medium, somewhat ochre or honey-colour ... ... 26. *C. ectypa*
†† Cap small, gills thick.
° Cap clay-brownish. Flesh bitter ... ... 27. *C. pachyphylla*
°° Cap and gills somewhat amethyst... ... ... 28. *C. sandicina*

β. *Hygrophanæ.* Cap submembranaceous, hygrophanous.
a. Cap minutely innato-fibrillose, rather fleshy (vide *C. ectypa*, no. 26).
b. Cap glabrous or slightly pruinate.
1. Macrosporæ. Spores rather large (index > 40).
Cap fuscous to livid gray, somewhat cup-shaped... ... ... 29. *C. cyathiformis*
2. Microsporæ. Spores small (index < 30).
* Subfuscæ. Cap brownish or grayish fuscous.
† Spores minute (less than 5 μ long).
° Dark gray. Strong smell of meal... ... ... 30. *C. ditopoda*
°° Clay-coloured to livid. Smell faint ... ... 31. *C. brumalis*
†† Spores over 5 μ long (ovate or ellipsoid).
° Cap dirt-gray or livid-pale.
˄ Stem silvery-white above, subfuscous below, tough, elastic, rather tall... ... ... 32. *C. dicolor*
˄˄ Stem almost of one colour, paler than the cap.
• Cap umbilicate-cyathiform.
▫ Pallid fuscous or cloudy-datebrown, (very slight mealy odour)... ... ... 33. *C. vibecina*
▫▫ Dark fuscous (no smell?) ... ... 33 a. *C. vibecina* var. *pseudo-obbata*
•• Cap convexo-plane or slightly depressed (smell faint)... ... ... 34. *C. metachroa*
°° Cap dark date-brown, convex ... ... 35. *C. mortuosa*

** Læticolores. Cap whitish or somewhat alutaceous with a tinge of fleshcolour or ochre-brownish.
† Spores ovate-ellipsoid.
° Cap horn-brownish to alutaceous-ochre.
˄ Strong smell of anise. Stem not tough. Solitary..... 36. *C. fragrans*
˄˄ Smell very faint.
• Stem tough, subfasciculate. No bitter taste ... ... 37. *C. obsoleta*
•• Flesh bitterish ... ... 38. *C. fritilliformis*
°° Cap hyaline-white ... ... 39. *C. angustissima*
(Vide also *C. fragrans* var. *depauperata*, no. 36 a).
(Under Hygrophanæ microsporæ might also be sought *Ag. (Tricholoma) calathus* (with pale lilac cap)).
†† Spores subspheric. Cap tinged with pale fleshcolour ... 40. *C. diatreta*

B. Difformes.
Generally more or less fasciculate. Stem somewhat cartilaginous.
α. Whole plant white or whitish. Spores ellipsoid ... ... 41. *C. connata*
β. Cap horn-brownish or dark fuscous. Spores roundish or angular.
a. Spores globular or broadly oval.
1. Spores broadly oval... ... ... 42 a. *C. aggregata* var. *ovispora*
2. Spores globular.
* Densely fasciculate. Cap almost smooth.
† Cap horn-brownish ... ... 42 b. *C. aggregata* var. *sphærospora*
†† Cap pitch-brown to fuliginous ... ... 43. *C. conglobata*
** In small fascicles of two or three. Cap with raised, darker veins... ... ... 44. *C. coffeata*
b. Spores angular.
1. Fasciculate. Spores triangular wedge-shaped ... ... 45. *C. trigonospora*
2. Subsolitary. Spores rhomboid ... ... 46. *C. infumata*

II. Laccaria

Gills thick, somewhat Hygrophoroid. Spores rather large or large, generally spinulose.

α. (Spores ovate, smooth: vide *C. pachyphylla* (27) and *C. sandicina* (28)).
β. Spores subspheric, spinulose.
a. Cap medium to rather small. Basidia 4-spored.
1. Whole plant amethyst ... ... 47 a. *C. laccata* var. *amethystina*
2. Colour rufous to fleshcolour.
* Medium to rather large and tall ... ... 47 b. *C. laccata* var. *proxima*
** Rather small and short... ... ... 47 c. *C. laccata* var. *rosella*
b. Cap very small (1 cm.)
1. Somewhat flesh-coloured. Basidia 2-spored ... ... 48. *C. tortilis*
2. Grayish. Spores rather small ... ... *(C. nana* var. *microspora)*

SPECIFIC DESCRIPTIONS AND NOTES

I. Eu-Clitocybe

A. *Genuinæ*

α. Carnosæ

a. *Giganteæ*

1. **C. geotropa** (Bull.) (Fr.?). (Plate 34. fig. D.)

Very large and tall. Cap, when fully expanded, 10—15 cm, alutaceous white when young (somewhat darker alutaceous with a tinge of fleshcolour when old), 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), attenuated upward. Faint agreeable odour.

Spores subglobose, $6^3/_4 \times 5^1/_4$ μ (or a little broader, $6^1/_2 \times 5^3/_4$ μ).

Rather common, often in rows, in somewhat open spaces, outskirts of frondose woods etc. till late in the season.

A very distinct and conspicuous species. Unfortunately the various descriptions of *C. geotropa* by Fries are bewildering and contradictory. *Ag. geotropus* in his Monographia is a smaller plant, close to *C. inversa.* His description in Hymenomycetes Eur., if not quite satisfactory, is more to the point. And it is very likely that also his *C. maxima* belongs here (although he attaches it to *C. infundibuliformis).*

2. **C. gigantea** (Sow.) Fr. (Plate 33. fig. F.)

Very large or even gigantic. Cap, when fully expanded, 15—25 cm, broadly infundibuliform, without umbo, when young creamy white, but soon becoming dingy alutaceous (and slightly squamulose in the middle). The edge is more or less distinctly grooved. The gills are somewhat furcate, crowded, decurrent, narrow. The stem is comparatively short and very stout (often over 3 cm thick), of the same colour.

Spores broadly ovate, $6^1/_2 \times 4$ μ.

Not uncommon, always in grass, in rows or arcs in gardens, borders of roads, under hedges etc.

Rea and other authors follow Fries in referring this species to *Paxillus (Lepista).* I see no weighty reasons for this. Not only are the spores pure white, but the gills are distinct, and it should at any rate not be widely separated from *C. candida* Bres. which to my mind is hardly anything but a young *C. gigantea* of moderate stature. — *C. gigantea* is of a parasitic nature, killing the grass in a belt or ring where it grows.

3. **C. nebularis** (Batsch) Fr. (Plate 32. fig. E.)

Large to very large. Cap (when fully expanded) 7—15 cm, convex or plane-convex, very fleshy, cloudy-gray. Gills crowded, somewhat paler like the stem which is stout, of medium lenght, somewhat attenuated upward.

Spores ovate-ellipsoid, 6—7 1/2 × 3 1/2 μ (or 5 1/2—7 × 3 1/2 μ).

Very common, chiefly in coniferous woods, often in vast fairy-rings (up to 9 m diameter with over 200 fully developed fruit-bodies). It is a late species, which in mild autumns is met with up to the end of November.

3 a. **C. nebularis** var. *alba* Lange. (Plate 32. fig. F.)

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

Spores ellipsoid, 6 1/2 × 3 3/4 μ.

Single specimens of this variety are occasionally found in the vicinity of the main form; but it is also met with in large troops.

This form may be confounded with other white fleshy *Clitocybes* (*C. cerussata* sensu RICKEN evidently belongs here), but is easily distinguished by means of the comparatively large spores.

4. **C. Alexandri** Gill. (*Paxillus extenuatus* (Scop.) Fr.). (Plate 33. fig. F.)

Large. Cap 7—12, at first convex with strongly incurved edge, then rather flat. The whole plant is of a dirt-gray or clay-brownish colour, which at first is rather pale, but soon turning darker and pervading gills, flesh etc. The gills are decurrent and rather crowded. The swollen base of the stoutish stem is surrounded by a clump of needles etc. The flesh is dry and tough, persisting (almost like *Lycoperdon cælatum*). Sporepowder white.

Spores broadly oval, 4 3/4—6 × 3—4 1/4 μ.

Not uncommon, gregarious in woods of Picea.

I have adopted GILLET's name because the older name *Paxillus extenuatus* (Scop.) Fr. may lead to confusion, more especially because his description in Hymenomycetes Europæi is misleading, although the figure in Icones selectæ is fairly good. Pl. 280 in COOKE's Illustrations, said to represent *C. elixa*, evidently depicts *C. Alexandri.*

b. *Mesomorphæ*

1. MICROSPORÆ

* *Coloratæ*

5. **C. gangrænosa** Fr. (Plate 32. fig. B.)

Medium to rather large. Cap 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. Gills rather crowded, at first adnate, then somewhat decurrent, pale dirtgray. Stem somewhat obliquely rooting, cylindric or slightly attenuated upward, fibrillose-striate, of the same colour. Flesh (when cut) and gills (when bruised) rapidly turning inky-black (like the whole plant with age). Smell almost absent. Sporepowder white.

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

Rare, met with both in frondose wood (Alnus) and in mixed wood (Fagus-Picea).

This rare species is very little known. FRIES only knew it from descriptions. It is said to be foetid, but my specimens, when fresh, were almost inodorous. NÜESCH's *Tricholoma gangræenosum* is intirely different. My plant is very intimately related to *Tricholoma leucophæatum* (vide pag. 58).

6. **C. inornata** (Sow.) Fr. (Plate 34. fig. B.)

Medium. Cap 4—6 cm, plano-convex, slightly umbonate and depressed about the umbo, edge involute, minutely tomentose and somewhat grooved. The surface is at first covered by a whitish, tomentose bloom, but soon becomes dingy alutaceous and at last dirt-gray. Gills adnato-decurrent, whitish, then dirt-brownish. Stem ascendent, at first (chiefly above) white-tomentose, of the same colour as the cap, $^1/_2$—1 cm broad. The hymenophore is somewhat horn-brownish. Sporepowder white.

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

Rather rare in woods of Fagus.

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

7. **C. odora** (Bull.) Fr. (Plate 34. fig. A.)

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. Strong odour of anise.

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

Common, in frondose woods as well as under conifers.

7 a. **C. odora** var. *alba* Lange. (*C. Trogii* Fr. sensu Cooke). (Plate 36. fig. A.)

Medium. Cap about 5 cm, slightly depressed and somewhat umbonate, alutaceous-white. For the rest like the main form.

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

Rather rare. I have only met with it in woods of Picea.

My plant squares with COOKE's figure of *C. Trogii;* but I see no reason for raising it to specific rank. It is a mere albino of *C. odora.*

8. **C. subalutacea** (Batsch (?)). (Plate 33. fig. G.)

Medium to rather small. Cap 3—4 cm, convex, at last slightly depressed, of a dull, pallid-dingy alutaceous colour (more brownish when old), minutely tomentose-fibrillose, later somewhat squamulose. Gills decurrent, distant, rather thick (but not waxy), somewhat anastomosing at the base and occasionally bifurcate, of the same colour. Stem somewhat paler, generally slightly incrassated below, with a contracted, rootlike base, rather short,

indistinctly squamulose above and subtomentose. Flesh whitish, of a faint, agreeable smell (Marasmius oreades). Spore-powder white.

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

Not uncommon, in woods and copses under frondose trees or in mixed acerose-frondose plantations (Larix, Picea). (Plate 32. fig. D.)

This rather ordinary looking but characteristic species is not easy to place. The descriptions given for *C. subalutacea* do not fit my plant too well. And it might be preferable to give it a new name.

9. **C. clavipes** (Pers.) Fr. (Plate 32. fig. D.)

Medium. Cap mostly 4—6 cm, plano-convex, at first slightly umbonate, colour somewhat variable (subfuscous—olivaceous), edge always rather pale. Gills decurrent, somewhat creamy. Stem tall, conically attenuated upward, somewhat paler than the cap, fibroso-striate.

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

Rather common, in coniferous woods.

10. **C. subinvoluta** W. G. Sm. (?). (Plate 34. fig. E.)

Rather large. Cap 5 cm, broadly umbonate, slightly depressed, edge involute. Colour pale dingy brownish-incarnate, faintly tomentose-pruinate. Gills of almost the same colour, but paler, decurrent, easily detachable, slightly anastomosing. Stem attenuated upward (1 cm), subbulbous (2 cm), whitish below, but for the rest of the same colour as the cap. Flesh whitish-pale in the cap and the lower part of the stem, tinged with fleshcolour above. Spore-powder pure white.

Spores ovate or somewhat pipshaped, $5^1/_2$—$6 \times 3^1/_2$—4 µ.

Rare. Met with in a wood of Fagus and Betula.

This species has the stature of *C. clavipes*, but different colours. The Batschian figure of *C. subinvoluta* in Cooke's Illustrations (pl. 108 A) may belong here.

10 a. **C. subinvoluta** W. G. Sm. (?) var. (Plate 34. fig. G.)

Large. Cap up to 8 cm, at first convex-gibbous, at last plano-infundibuliform, edge involute and somewhat grooved, pale fleshcolour or trout-red. Gills rather crowded, strongly decurrent, of a pale yellowish fleshcolour. Stem clavate, 1—1,2 cm above, 2—2,2 cm below, of the same colour as the cap (whitish below), rather tall, slightly fibrillose. Smell sweetish, faintly aromatic.

Spores spheric-ovate with an oblique pedicel, $6 \times 4^1/_2$ µ (incl. pedicel).

Wood of Fagus.

This is an intermediate form between no. 10 and *C. geotropa*. Probably the figure in Cooke's Illustrations, pl. 177, depicts the same species (larger specimens) sub nom. *C. geotropa subinvoluta*. The spores are shown somewhat warty, but this is a mistake (vide Rea loc. cit., pg. 283). Bresadola's figure of *C. geotropa* var. *subinvoluta* (Iconographia, pl. 167) hardly belongs here, while his illustration of *C. geotropa* (pl. 166) is very close.

11. **C. infundibuliformis** (Schaeff.) Fr. (Plate 32. fig. C.)

Rather small to rather large. Cap 3—8 cm, thin-fleshed, soon becoming 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, generally rather short and not stout.

Spores pipshaped, 6—7 × 3½—4 µ.

Common in frondose and mixed woods.

Very variable in size and colour.

12. **C. squamulosa** (Pers.) Fr. (Plate 35. fig. B.)

Rather small to medium. Cap 2½—4½ cm, soon becoming deeply infundibuliform. The colour of the cap is hazel-brownish, central part minutely squamulose. Gills decurrent, pallid. Stem tall, slightly attenuated upwards, paler than the cap and somewhat fibrillose-striate.

Spores pipshaped, 7—8 × 4 µ.

Rather rare, in plantations of Picea, among moss in open spaces.

Very intimately related to *C. infundibuliformis.*

13. **C. trullæformis** Fr. (Plate 35. fig. E.)

Medium. Cap 3—6 cm, at first depressed, then somewhat infundibuliform, minutely flocculose-tomentose when young, but soon glabrous, often indistinctly zoned, at first whitish dirtgray to clay, later more brownish clay, when old often irregularly wavy or ruffled, thin-fleshed, not hygrophanous. Gills rather narrow, truly decurrent, often branched, when old often irregularly anastomosing and crispate, not pure white. Stem short and comparatively stout, somewhat elastic-tough, coarsely fibrose-striate, pallid dirtgray with a tinge of fleshbrown, its base attached to a lump of earth. Flesh white, under the gills with hyaline-grayish line. Odour somewhat sourish-musty (like some species of Polyporus).

Spores broadly pipshaped, 6—6½ × 4—4¼ µ.

Gregarious on naked soil under Corylus, rather early (July—Aug.)

14. **C. hirneola** Fr. var. *ovispora* Lange n. var. (Plate 36. fig. C.)

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 flexuose, equal or somewhat attenuated downwards, apex white-powdered. Spore-powder white.

Spores ovate, 7 × 4 µ.

Rare. Met with in a plantation of Picea, in open space among grass and heather, gregarious.

This little species has the stature of an *Omphalia.* The whitish flesh in cap and stem and the non-hygrophanous (only somewhat expallent) cap distinguish it from *Hygrophanæ.*

The typical form of *C. hirneola* — which has subglobose spores ($5^1/_2 \times 4^1/_4$ μ) and dirtgrayish spore-powder — I have never met, but it has recently been found in Sweden (SETH LUNDELL) and is also described by REA from England.

15. **C. parilis** Fr. (Plate 33. fig. B.)

Small. Cap 2—3 cm, plano-convex, gray, minutely fusco-squamulose in the middle, edge paler, even. Gills very decurrent, subdistant, white. Stem about 2 cm, of the same colour as the cap (paler below), not hollow. Flesh white. Faint mealy odour.

Spores ovate, $5^1/_2 \times 3$ μ. Cystidia absent.

Amongst moss and needles, open spaces in woods of Picea (more rarely Fagus). Rather rare.

My plant diverges from the current descriptions by having white gills. — *C. parilis* sensu RICKEN with subspheric spores is probably a form of *C. hirneola.*

16. **C. fusco-squamula** Lange. (Plate 32. fig. A.)

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, somewhat meandering.

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

Under Abies, gregarious in a plantation.

Very close to *C. parilis;* the main difference is the long and narrow spores. It might be called *C. parilis* var. *stenospora,* and it is remarkable that the mycological authors describe *C. parilis* with either ovate or elongated spores. As REA gives the dimensions of the spores for *C. parilis* as 9×3 μ, his finds probably belong here.

17. **C. inversa** (Scop.) Fr. (Plate 35. fig. D.)

Medium to rather large. Cap generally 5—7 cm, at first convex (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 with age, especially when it has been repeatedly soaked in wet weather. Expallent when dry, but not really hygrophanous. The young plant is generally gilvous-alutaceous, with almost milkwhite gills, the mature, watersoaked specimens are fulvous or even rufo-fulvous with alutaceo-fulvous gills. — The gills are strongly decurrent, crowded. The stem often ascendent, somewhat paler than the cap, thin or fairly stout.

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

Very common, often in rings or arcs, especially in woods of Picea till late in the season. More rarely met with in frondose woods.

This common species — so variable in colour and shape according to age and weather — has given rise to a number of names, which hardly deserve to be upheld. (*C. splendens, C. flaccida* etc.). Even *C. gilva* Fr. may be a form of the same species. Entirely foreign to this group of spherosporic Clitocybes are *C. flaccida* and *C. splendens* of BRESADOLA. And *C. gilva* of REA, with "villose" edge, hardly belongs here.

** *Albatæ*

18. **C. cerussata** Fr. (ext.)

Medium to rather large. Cap 5—8 cm, rather fleshy at the disc, at first somewhat convex or even slightly gibbous, then depressed and plano-infundibuliform, at first white, as if whitewashed, but becoming pallid alutaceous (with or without a flush of fleshcolour) when this white bloom wears away or becomes pellucid in places (especially in rainy weather). In this stage it is almost hygrophanous. Gills whitish, moderately crowded, adnate to somewhat decurrent. Stem rooting, ascendent, with a strigose-tomentose base.

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

The main form grows in deciduous woods, often gregarious or in clusters in deep foliage-beds. Not uncommon. Two forms have been figured:

18 a. **C. cerussata** var. *pithyophila* (Fr.) Lange. (*C. pithyophila* (Secr.) Fr.). (Pl. 36. fig. E.)

Differing from the main form by a more straight and often somewhat taller stem, and the habitat.

Spores ovate, 4—$4^1/_4 \times 2^3/_4$—3 μ.

Common in dense plantations of Picea, in rows or arcs, till late in the autumn.

18 b. **C. cerussata** forma (*C. catina* Fr.?). (Plate 36. fig. C.)

Differing by a more deeply depressed, at last somewhat infundibuliform cap with truly decurrent gills. The spores are as in the main form.

This form was met with on mossy ground under Betula, amongst grass and dead foliage.

Both forms, especially the latter, are very close to the main type. A more distinct variety (or probably a true species) is:

19. **C. phyllophila** Fr. (Plate 35. fig. A.)

Rather large. Cap 5—11 cm, convex-plane, at last slightly depressed, thin-fleshed, 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 acuminate, felty-pilose).

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

Gregarious, but not fasciculate, in a wood of Fagus.

The silky-white, not subhygrophanous cap, the creamy gills and the more roundish spores as well as the more stoutish growth distinguish this rare Agaric from the typical *C. cerussata*. — Of the figures in COOKE'S Illustrations (pl. 121) of *C. cerussata* the upper figures have the stature of my *C. phyllophila*, while the lower ones represent *C. cerussata* proper fairly well. *C. cerussata* sensu RICKEN is *C. nebularis* var. *alba*. BRESADOLA'S *C. phyllophila* (Iconographia, tab. 144) does not belong here.

20. **C. gallinacea** (Scop.) Fr. (Pate 34. fig. C.)

Very small. Cap 1½ cm, convex to plano-convex, dirty white, edge even. Gills white, adnate, horizontal, crowded. Stem thin (2 mm), slightly wavy, not hollow, apex slightly flocculose. Taste disagreeable, rank and bitter, but faint.

Spores oval, 5½—6½ × 3½—4 μ.

In an old orchard amongst grass and litter, under trees.

NÜESCH'S *C. gallinacea* is a larger plant with "intensiv erdartig widerlich" smell and "entschieden scharf" taste. REA'S *C. gallinacea* has much larger spores (9 × 4 μ).

21. **C. rivulosa** (Pers.) Fr. (Plate 34. fig. F.)

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

Spores ovate-ellipsoid, 5—5½ × 3 μ.

Not uncommon, in moss and grass on sandy ground (road-banks, pastures). More rarely met with in more shady places (borders of roads through woods etc.)

Although this species is not really white, it is so intimately related to *C. dealbata* that it must needs be placed in Albatæ.

22. **C. dealbata** (Sow.) Fr. (Plate 33. fig. E.)

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. Smell faint.

Spores broadly ovate, 4 × 3—3¼ μ.

Not uncommon on grassy commons, railway-slopes etc.

When water-soaked it may be mistaken for a *C. fragans* or other hygrophanous species, but it is of a firmer texture altogether.

23. **C. candicans** (Pers.) Fr. (Plate 33. fig. A.)

Small. Cap membranaceous, 1½—2½ cm, pure white, convex-flat or slightly depressed. Gills white, crowded or very crowded, thin, slightly decurrent. Stem thin, at last somewhat hollow.

Spores ovate-ellipsoid, 5—5½ × 3 μ.

Not uncommon (but never fasciculate as depicted by FRIES), gregarious in woods of Picea, on dead needles.

The phyllophilous form (Icon. sel., pl. 51 b) is occasionally met with in moist places, under Alnus etc. It generally has a more ascendent stem and an oblique, somewhat cottony root, and it may deserve specific rank.

24. **C. ericetorum** (Bull.) Fr. (Plate 33. fig. C.)

Rather small. Cap $3^1/_2$—$3^3/_4$ cm, depressed (disc slightly convex), edge involute, irregularely wavy, smooth, alutaceous-white. Gills distant (without connecting veins), rather thin, decurrent, white. Stem 3 cm × 5—6 mm, cylindric or slightly attenuated downward, glabrous, white, solid, not tough. Smell and taste almost absent.

Spores spheric ovate, $5^1/_2 \times 4^1/_4$ μ, with an acute pedicel. Hyphæ of the trama very thin (3 μ), interwoven. Basidia narrowly clubshaped. Base of gills about 340 μ thick.

In grass, roadborder in a copse, on loamy soil, a few specimens.

It differs from *Camarophyllus pratensis* by the white colour, about 3 times thinner gills, and more ovate spores. *Camarophyllus virgineus* has large, more oblong spores.

2. MACROSPORÆ

25. **C. sinopica** Fr. (Plate 35. fig. F.)

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 ascendent, 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.

In somewhat open spaces, under trees and about hedges. Rare.

The gills in my specimens were not "confertissimæ", as FRIES has it.

26. **C. ectypa** Fr. (Plate 36. fig. F.)

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 thick, somewhat club-shaped, 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. Fibrils on disc septate, pale datebrown, about 7 μ broad.

Rare. In bog among Carices and Hepaticæ, July.

BRESADOLA'S *C. ectypa* does not belong here. *C. ectypa* has a certain likeness to the ringless form of *Armillaria mellea* known as *Clitocybe tabescens* (Scop.) Bres.

27. **C. pachyphylla** Fr. (Plate 36. fig. G.)

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 downward, about 3 cm long, hollow above, colour of cap. Taste slight, bitterish, disagreeable.

Spores broadly ovate, 7—8 × 5 μ.

In open spaces, chiefly in woods of Picea, amongst grass and dead needles. Uncommon.

Probably *C. absinthiata* Lasch is not specifically different. But I have never noticed any smell of absinth in my specimens. *Collybia incomis* Karst. evidently is synonymous, and so is *Collybia clusilis* in the sense of KONRAD & MAUBLANC (but nor of FRIES). *C. pachyphylla* forms a transition to *Laccaria.*

28. **C. sandicina** Fr. (Plate 40. fig. A.)

Small. Cap about 1 cm, submembranaceous, hygrophanus; when fresh of a dingy fleshcolour-amethyst (when dry mealy-subsquamulose, more pallid); always without striation. Gills broad behind, subdecurrent, distant, rather thick (not visibly mealy), fleshcolour-amethyst. Stem 1½ cm, slightly incrassated above (1½ mm), not hollow, smooth, in- and outside of a brownish fleshcolour with a flush of amethyst.

Spores ovate, with a rather large pedicel, 10 × 6 μ, smooth. Basidia 2-spored, about 7 μ thick (sterigmata about 6 μ). Cystidia absent.

Some few solitary specimens collected in mixed wood, on the ground, on naked soil (foot-path).

The smooth, ovate spores distinguish this species from small specimens of *C. (laccata* var.) *amethystina;* and if *Laccaria* be extended to comprise smooth-spored species, it would find its place close to *Laccaria laccata.*

It may be of more common occurrence, but is easily overlooked on account of its likeness to *C. laccata.* — My specimens were considerably smaller than those described by FRIES, but for the rest quite typical.

β. Hygrophanæ

1. *Macrosporæ*

29. **C. cyathiformis** (Bull.) Fr. (Plate 38. fig. E.)

Medium to rather large. 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 or pale clay). Gills paler than the cap, not crowded, subdecurrent (at last often brownish). Stem somewhat paler than the cap, often rather tall, apex with a white silky coating that connects the base of the gills and forms a filamentose reticulation on the stem.

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

Rather common, till late in the season, in outskirts of woods amongst grass, needles and dead foliage.

This species varies considerably in size and colour. 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* is probably nothing more than a gigantic and somewhat fleshy *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. *C. expallens* (Pers.) (Icones selectæ, pl. 56^3) according to FRIES is also to be regarded as a form of this species (while *C. expallens* Fr. (loc. cit., pl. 56^2) is something different).

2. *Microsporæ*

* SUBFUSCÆ

30. **C. ditopoda** Fr. (Plate 38. fig. A.)

Rather small. Cap 2—4 1/2 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 "farinaceous" odour.

Spores almost spherical, 3—3 1/2 × 2 1/2—2 3/4 μ.

Rather common, till late in the autumn in woods of Picea, gregarious.

31. **C. brumalis** Fr. (Plate 38. fig. D.)

Rather small to medium. Cap 3 1/2—5 cm, somewhat fleshy, convex, then depressed and at last somewhat irregularly convexo-infundibuliform, livid brownish or rather dark dirty clay (whitish argillaceous when dry); edge even (or at last slightly striate). Gills whitish 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 × 3—3 1/4 μ.

Rare, in woods of Abies and Picea.

Well characterised by the tinge of clay-colour in all its parts, and by the minute (but not spherical) spores.

32. **C. dicolor** (Pers.) Lange. (Plate 38. fig. B.)

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

Spores oval, 6—6 3/4 × 3 3/4—4 μ.

Not uncommon, among fallen sticks and branches etc. in plantations of Picea, in small troops.

Very well characterised by the rather tall, very tough stem which is whitish above and fuscescent below. KONRAD & MAUBLANC figure it very well (loc. cit, pl. 295) sub nom. *C. vibecina* Fr., but I prefer to use the ancient Persoonian name, because the use of the name vibecina — which by most authors is applied to a farinaceous-smelling species — will lead to confusion.

33. **C. vibecina** Fr. (sensu Rick. pro parte, vix Fr.). (Plate 37. fig. A.)

Rather small. Cap 2—5 cm, very hygrophanous, at first plano-convex, then somewhat depressed, minutely striate, pale fuscous (dirty 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 paler (not darker towards the base), apex naked, not tough and elastic as in no. 32. Faint smell (and taste) of cucumber or meal (only noticeable when pressed between the fingers).

Spores ovate-ellipsoid, 5—6 1/2 × 3—3 1/4 μ.

Not uncommon in woods of Picea and Pinus, till late in the year. More rarely in mixed, frondose-coniferous woods.

The descriptions given by FRIES differ considerably from mine and probably cover a form of *C. dicolor*. The *C. vibecina* of BRESADOLA is also very dubious. RICKEN describes it very well; but he also mentions another form which is "grösser, eleganter, geruchlos" and which may be *C. dicolor*.

33 a. **C. vibecina** var. *pseudo-obbata* Lange. (Plate 37. fig. B.)

Rather small. 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, flesh very thin. 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 ovate-ellipsoid, 5 1/4 × 3 μ.

Amongst moss and Calluna in a young plantation of conifers.

Darker and more infundibuliform than no. 33. I have not noticed any cucumber-smell in this variety. It has a superficial likeness to *C. obbata* as represented by FRIES' figure in Icones selectæ (tab. 57 1). But nearly all modern authors regard *C. obbata* as a large-spored species, close to *C. cyathiformis*

34. **C. metachroa** Fr. (Plate 37. fig. D.)

Rather small. 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 faint, not farinaceous.

Spores ovate-oval, 6—6 1/2 × 3 3/4 μ.

Gregarious, often in rows, on mossy ground in woods of Picea. Not uncommon.

Nos. 32—34 are very closely allied and rather difficult to distinguish, especially late in the autumn when early frost may have altered their hue and transparency.

35. **C. mortuosa** Fr. (Plate 38. fig. C.)

Small. Cap 1,8—2,8 cm, convex, at last plano-convex or slightly depressed, watery date-brown (when fresh minutely striate at the edge), paler when dry. Gills rather crowded, pale and dingy livid, horizontal, slightly decurrent. Stem 3 1/2—5 cm × 2—3 mm, cylindric, rather tough, glabrous, concolorous with the cap. Flesh also of the same dirty brownish colour. Very slight "mealy" taste and "cucumber" smell.

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

On mossy humid ground, in a wood of Picea.

My plant differs from the description of FRIES in not having very crowded gills. The colour of the cap reminds one of Entoloma nidorosum, but is somewhat paler and more livid.

*** LÆTICOLORES

36. **C. fragrans** (Sow.) Fr. (Plate 37. fig. F.)

Rather small. 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 colour of the cap. Stem paler than the cap, often rather tall or elongated in the deep bed of moss in which it preferably grows. Odour of anise (but often rather faint).

Spores ellipsoid, 7—8 × 3 1/2—4 μ.

Common, both in frondose and coniferous woods, under hedgerows etc., often in deep moss among grass.

Paler specimens with a darker disc occur, but I cannot see any specific difference between *C. fragrans* and this form (*C. suaveolens* (Schum.) Fr.).

36 a. **C. fragrans** var. *depauperata* Lange. (Plate 37. fig. G.)

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.

Found in a heap of decaying sticks and dead foliage, outskirt of copse.

The larger spores distinguish it from *C. angustissima*, with which it may easily be confounded.

37. **C. obsoleta** (Batsch) Fr. (Plate 36. fig. B.)

Rather small. Cap 2 1/4—4 1/2 cm, pale horn-brownish with a flush of fleshcolour, 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.

Chiefly met with on naked soil under hedges (Cratægus etc.), gregarious or subfasiculate, late in the season. Not uncommon.

The somewhat larger spores and want of bitter taste distinguish it from *C. fritillæformis*. — Fries describes *C. obsoleta* as growing chiefly in coniferous woods; and I have seen pinophilous specimens from Sweden which might represent the species, as conceived by him. They were more fragrantoid than mine.

38. **C. fritillæformis** (Lasch) Fr. (Plate 36. fig. D.)

Rather small. Cap about 4 cm, at first somewhat depressed-umbilicate, then plano-infundibuliform, dirtbrownish horn-colour, somewhat hygrophanous, edge slightly striate (when dry pale, whitish or dingy alutaceous), somewhat flaccid and tough. Gills narrow, truly decurrent, not particularly crowded, occasionally furcate, of the same colour. Stem slightly attenuated upward, tough, glabrous, somewhat darker brownish than the cap. Smell reminding of old mushrooms. Taste bitterish, quinine-like.

Spores obovate pipshaped, $5 \times 3^1/_2$ μ.

In woods of Fagus, in deap leaf-mould. Rare.

It bears a certain likeness to small specimens of *C. trullæformis*, and like this species it sometimes becomes deformed with age with crispate gills.

39. **C. angustissima** (Lasch) Fr. (Plate 37. fig. E.)

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

Spores oval, $4—4^1/_2 \times 3$ μ.

Found in deep moss under a Syringa-hedge at a road-bank.

40. **C. diatreta** Fr. (Plate 37. fig. C.)

Rather small or small. 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 colour of the cap, flexible, somewhat hollow. Almost inodorous.

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

Gregarious, in woods of Picea. Rather uncommon.

B. *Difformes*

41. **C. connata** (Schum.) Fr. (Plate 38. fig. F.)

Medium to rather large, fasciculate. Cap (when fully expanded) 4—8 cm, 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, somewhat wavy and at last somewhat hollow; but often some of the fruit-bodies in each cluster are short-stemmed and imperfect.

Spores ellipsoid, 6—7 × 3 1/2—3 3/4 µ.

Not uncommon, in moist places, black soil on sloping roadbanks etc. in frondose woods, generally in fascicles of 5—10 fruit-bodies, the whole cluster springing from white cottony strands of mycelium.

Easily distinguished from all other white Clitocybes by its distinctly fasciculate growth.

In more exposed localities, on drier ground a smaller, more short-stemmed, pallid chalk-whitish form occurs. This may be *C. opaca* (Sow.) sensu SCHROETER. But neither *C. opaca* sensu REA (with globose spores), nor *C. opaca* of COOKE (l. c., tab. 176), which is a non-fasciculate species, belong here.

42 a. **C. aggregata** (Schaeff.) var. *ovispora* Lange. (*C. decastes* Fr. sensu Nüesch). (Plate. 40. fig. G.)

Large, fasciculate. 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 fleshcoloured). Stem rather slender, 1—1,3 cm thick, solid, tough, whitish, with a flush of the same colour as the cap towards the attenuated base. Smell and taste almost none.

Spores broadly oval, 6 × 3 3/4—4 µ. Cystidia absent.

Rare. Growing in grassy roadborders in frondose woods (Fagus).

Distinguished from all the other forms within this stirpe by the oval spores.

42 b. **C. aggregata** var. *sphærospora* Lange. (Plate 39. fig. A.)

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 somewhat cartilaginous.

Spores spherical, about 5 µ diametre. Cystidia absent.

Not uncommon, in clusters of 5—20 fruitbodies, springing from a perpendicular, string-like "root".

This is *C. decastes* Fr. in the sense of BRESADOLA.

42 c. **C. aggregata** forma *reducta*. (Plate 40. fig. F.)

Rather large, subfasciculate. Cap 4—7 cm, convex-expanded, subumbonate, of a watery livid horn-brown colour, 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 thick, minutely white-atomate above. Inodorous.

Spores spherical, 5—6 µ diam. Gills' 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.

Grassy road-borders, under trees, in small clusters.

Probably *Tricholoma Conradii* Karst. is identical; but the plant is hardly a distinct variety, still less a proper species.

43. **C. conglobata** (Vitt.) Fr. (Plate 39. fig. D.)

Densely bulboso-cæspitose. Caps varying in size from 2—8 cm, at first somewhat campanulate, often deformed by mutual pressure, at last expanded and slightly umbonate, of a pitch-brown colour that fades to fuscous-gray. Gills whitish, adnate (subdecurrent or rotundate). Stem white, mostly short and thick, concrescent in a bulbous tuft.

Spores almost spherical, $5 \times 4^1/_2$ μ. Cystidia hair-shaped.

At border of road, in grass around an old tree (Populus).

My specimens answer very well to the descriptions given by Fries and Nüesch and also to that of Bresadola in Fungi Tridentini; but in Iconographia he uses the name *Ag. cinerascens* Bull. for the same plant, transfering the name *C. conglobata* to another, almost white species.

44. **C. coffeata** Fr. (Plate 39. fig. C.)

Rather large, subsolitary or in twos or threes. Cap 5—6 cm, plano-convex, somewhat bullate, dingy date-brown, 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.

Spores spherical, $5—6 \times 5—4^1/_2$ μ.

A rare species, met with in woods of Picea.

It is more Tricholomoid than its allies. My plant answers fairly well to the Friesian description, except that the disc is not "nigropunctatus". *Tricholoma cartilagineum* (Bull. sensu Rick.) evidently is identical; but *T. cartilagineum* in the Friesian sense is an entirely different plant.

The subcartilaginous, more or less fasciculate species of which nos. 42—44 are representatives, make up a stirpe (aggregata) of very closely allied forms, for which no end of names have been coined (vide „Studies" VIII.).

45. **C. trigonospora** Bres. (Plate 39. fig. B.)

Rather small. Cap 4—5 cm, convex, subfuliginous umber, edge somewhat paler, minutely innato-fibrillose. Gills somewhat distant, broad, thick, dirtgray, broadly adnate, slightly emarginate with a minute denticle, edge at last blackish. Stem rather short and tough, whitish above, dirt-grayish below, 5—6 cm × 0,6—1,5 cm. Flesh white (somewhat grayish in the stem), slowly shading off into blackish tones. Fasciculate (with a few subsolitary, somewhat larger specimens).

Spores obliquely triangular-wedge-shaped, $7—8 \times 5^1/_2—6$ μ, with a big drop.

Collected by Poul Larsen (Oct. 1935) near Kolding, Jylland, in a wood of Fagus.

As it grew in the vicinity of *Amanita muscaria*, it is likely that there had been coniferous trees in the wood. Bresadola records it from coniferous or mixed woods.

46. **C. infumata** Bres. forma *nana*. (*Trich. cinerascens* (Bull.) Rick.). (Plate 31. fig. E.)

Rather small. Cap 4—6 cm, convex, dirty gray-brown, minutely lineato-fibrillose (sub lente) and in fully developed specimens with very minute raised veins. Gills broad, moderately crowded, emarginate, pale gray. Stem white, dirt-grayish below, very slightly white-pruinose above, rather short and firm, tough, 4—5 cm × 1 cm. Flesh white, becoming gray in the maggot-holes. Smell and taste slightly rancid. The edge of the gills becomes somewhat fuscous-blackish (but slowly).

Spores lozenge-shaped or (in side-view) obliquely lemon-shaped, with a big central guttule, 8—8¾ × 5 μ. (BRESADOLA has 10—12 × 6—8 μ).

Wood of Fagus. Rare.

The name *Ag. cinerascens* Bull. is older, but is used in so many different ways that I prefer to adopt an undisputed, newer one. *Ag. cinerascens* (Bull.) Fr. is a species close to Tricholoma panæolum. *Clitocybe cinerascens* (Bull.) Bres. is a densely fasciculate, round-spored species, while *Tricholoma cinerascens* (Bull.) Rick. evidently is synonymous with C. infumata, and *Clitocybe cinerascens* sensu NÜESCH includes both. The figure in BREDADOLA'S Iconographia is a bad copy of that in Fungi Tridentini.

The above-named two somewhat Tricholomoid species (nos. 45—46) are placed here on account of their rather close affinity to the *Aggregatæ*. They are characterised by a more or less pronounced tendency to take on blackish hues, especially at the edge of the gills, and by having rather exceptionally formed, triangular or rhomboid spores. — Some authors also place *Tricholoma crassifolium* here; but it is altogether more Tricholomoid, although it has the subspheric spores of *C. coffeata* etc.

II. LACCARIA

47 a. **C. laccata** (Scop.) Fr. var. *amethystina* Bolt. (Plate 40. fig. B.)

Rather small. Cap 2—4, when fresh of a beautiful deep amethyst, which in drying becomes a dull, mealy or hoary lilac-pallid. Gills of the same colour, very thick and distant, becoming mealy. Stem often somewhat deformed, of the same colour.

Spores spherical, echinulate, 9—11 μ diam. (excl. of spinelets). Basidia 4-spored.

Very common, in frondose as well as coniferous woods.

47 b. **C. laccata** var. *proxima* Boud. (Plate 40. fig. E.)

Rather large and tall. Cap 4—7 cm, convex-expanded, fulvous, very hygrophanous, (fulvous-ochre, furfuraceo-squamulose fibrillose when dry), thin-fleshed. Gills broad, adnate, pinkish fleshcolour, edge eroded, mealy when old. Stem tall (up to 12 cm), somewhat clavate, coarsely striate-fibrillose, of the colour of the cap, base white-tomentose. Taste slightly bitterish.

Spores ovate-globose, minutely echinulate, 7½—9 × 6¾—7½ μ (excl. the spinelets); spinelets 1 μ. Basidia 4-spored. Edge of gills set with dispersed, crispate hairs.

In Sphagnum, Betula-bog.

Specimens which — macrospically — can hardly be distinguished from this large and showy variety, are commonly met with in similar localities; but I have often found their spores large and globose like those of the typical C. laccata. Probably the form of the spore is not constant.

47 c. **C. laccata** var. *rosella* Batsch. (Plate 40. fig. C.)

Rather small. Cap 1½—4 cm, rufous fleshcolour (mealy-squamulose, alutaceous-fleshcolour when dry). Gills pinkish fleshcolour, becoming white-mealy. Stem generally rather short, often somewhat deformed, colour of cap.

Spores spherical, 9—10½ diam., spinulose. Basidia 4-spored.

Exceedingly common, as well in coniferous as in frondose woods.

48. **C. tortilis** (Bolt.) Fr. (sensu Bres.). (*C. echinospora* Speg.). (Plate 40. fig. D.)

Very small. Cap 0,5—1,2 cm, membranaceous, coarsely pellucido-striate, pinkish fleshcolour (striæ more saturated). Gills very distant. Stem very short and thin (1 cm × 1 mm); for the rest like no. 47 c.

Spores globose, spinulose, 11—12½ μ (excl. the spinelets), rarely less, occasionally up to 14 or 15 μ. Basidia generally two-spored, but one- and three-spored basidia may be met with (the former produce the very large spores).

Not uncommon in naked soil under trees (Abies, Fagus etc.), gregarious.

The best description is that given by Spegazzini for *C. echinospora.* But although the Boltonian name is occasionally applied to larger forms as well, I think it designates the same species. All larger forms will be found to belong to *C. laccata* var. *rosella.* It is very well figured by Bresadola (Iconographia), while Barla's figure (l. c.) is more ambiguous.

C. (Laccaria) nana Massee var. *microspora* Lange. n. var.

Very small. Cap 0,8 cm, submembranaceous, convex-flat, ashy gray, disc somewhat darker, without striation, densely granulate-mealy. Gills white, rather narrow and thin, attenuated behind, distant. Stem pale ashy gray, short, thin, white-powdery. Smell absent. Spore-powder white.

Spores subspheric, warty spinulose, 5 μ diam. Basidia with 4 (3—2) sterigmata. Cystidia awlshaped-conical, 6—12 μ broad. The meal on the cap consists of conidiiform, lanceolate-ellipsoid cells, 12×5 μ.

Growing in humus, rotten stump (of Populus), a single specimen.

This very strange little Agaric stands in a similar relation to *Mycena* as the genuine Laccarias to *Clitocybe.* But the thin gills separate it as well from the typical *Laccarias* as from *Nyctalis. (Nyctalis cryptarum* Secr. evidently is very close). Massee's species differs chiefly by having very large, globate spores, 15—16 μ diam. It requires further study.

JAKOB E. LANGE

FLORA AGARICINA DANICA

Vol. I.

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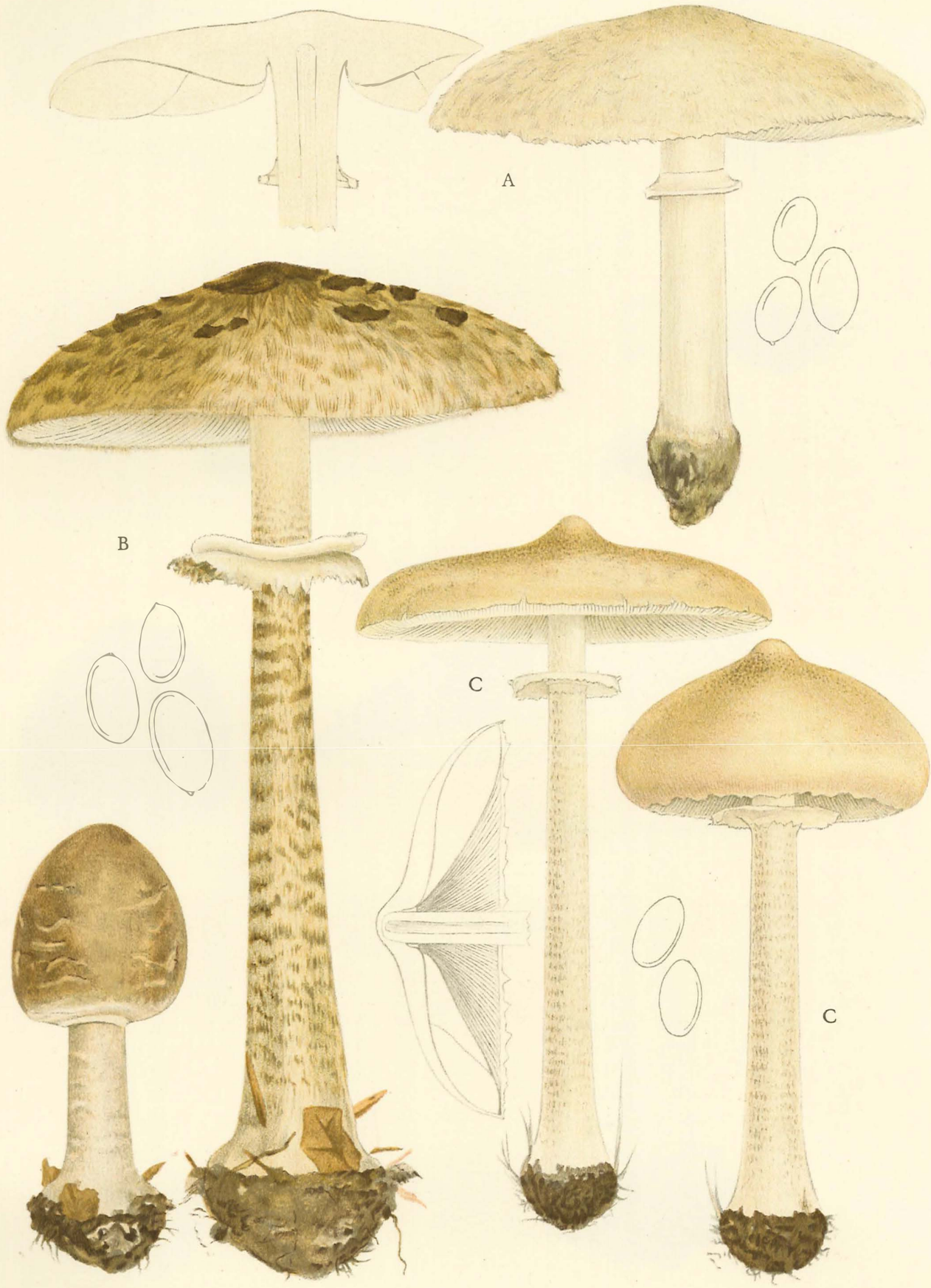
A. AMANITA EXCELSA f. PALLIDA B. AMANITA ASPERA C. AMANITA SPISSA

A. AMANITA ASPERA var. FRANCHETI
B. AMANITA (AMANITOPSIS) VAGINATA
C. AMANITA RUBESCENS
D. AMANITA VAGINATA var. FUNGITES

A. LIMACELLA (AMANITA) LENTICULARIS B. AMANITA VAGINATA var. FULVA C. AMANITA (AMANITOPSIS) STRANGULATA



A. LEPIOTA EXCORIATA B. LEPIOTA PROCERA C. LEPIOTA UMBONATA

A. LEPIOTA NAUCINA B. LEPIOTA RHACODES var. PUELLARIS C. LEPIOTA RHACODES

A. LEPIOTA GRANGEI
B. LEPIOTA CORTINARIUS
C. LEPIOTA ECHINELLA var. ASPERULA
D. LEPIOTA ECHINACEA
E. LEPIOTA HYSTRIX
F. LEPIOTA ACUTESQUAMOSA

A. LEPIOTA ALBA
B. LEPIOTA SERENA
C. LEPIOTA LÆVIGATA
D. LEPIOTA CLYPEOLARIA
E. LEPIOTA CLYPEOLARIA var. MINOR
F. LEPIOTA GRACILIS

A. LEPIOTA CRISTATA B. LEPIOTA ALBO-SERICEA C. LEPIOTA PSEUDO-FELINA D. LEPIOTA FULVELLA fm. GRACILIS
E. LEPIOTA FELINA F. LEPIOTA FULVELLA G. LEPIOTA CASTANFA H. LEPIOTA ECHINELLA var. ERIOPHORA

A. LEPIOTA CYGNEA B. LEPIOTA EYREI C. LEPIOTA SETULOSA D. LEPIOTA MICROPHOLIS E. LEPIOTA BUCKNALLII
F. LEPIOTA BRUNNEO-INCARNATA G. LEPIOTA LILACEA H. LEPIOTA FUSCO-VINACEA I. LEPIOTA SUBINCARNATA

A. LEPIOTA SEMINUDA f. MINIMA B. LEPIOTA SEMINUDA C. LEPIOTA HÆMATOSPERMA D. LEPIOTA TOMENTELLA
E. LEPIOTA HÆMATOSPERMA f. GRACILIS F. LEPIOTA CEPÆSTIPES. G. LEPIOTA LUTEA H. LEPIOTA BREBISSONII
I. LEPIOTA RUFESCENS J. LEPIOTA HETIERI

A. ARMILLARIA MELLEA
B. ARMILLARIA IRRORATA
C. LEPIOTA AMIANTHINA
D. LEPIOTA CARCHARIAS
E. LEPIOTA GRANULOSA
F. LEPIOTA CINNABARINA

A. TRICHOLOMA STRIATUM B. ARMILLARIA FOCALIS C. ARMILLARIA ROBUSTA D. TRICHOLOMA PESSUNDATUM

A. TRICHOLOMA CONSTRICTUM B. TRICHOLOMA RESPLENDENS C. TRICHOLOMA USTALE D. TRICHOLOMA POPULINUM

A. TRICHOLOMA VACCINUM B. TRICHOLOMA IMBRICATUM C. TRICHOLOMA FLAVOBRUNNEUM
D. TRICHOLOMA AURANTIUM

A. TRICHOLOMA SPERMATICUM f. UMBONATUM B. TRICHOLOMA PORTENTOSUM C. TRICHOLOMA EQUESTRE

A. TRICHOLOMA SPERMATICUM forma B. TRICHOLOMA SEJUNCTUM C. TRICHOLOMA PORTENTOSUM var. LEUCOXANTHUM

A. TRICHOLOMA MYOMYCES B. TRICHOLOMA PSAMMOPUS C. TRICHOLOMA BISPORIGERUM
D. and D1. TRICHOLOMA RUTILANS

A. TRICHOLOMA ORIRUBENS B. TRICHOLOMA COLUMBETTA C. TRICHOLOMA TERREUM
D. TRICHOLOMA ATRO-SQUAMOSUM

A. TRICHOLOMA ACERBUM B. TRICHOLOMA MYOMYCES var. ALBO-CONICUM C. TRICHOLOMA CINGULATUM
D. TRICHOLOMA VIRGATUM

A. TRICHOLOMA LEUCOCEPHALUM
B. TRICHOLOMA PSEUDO-FLAMMULA
C. TRICHOLOMA CARNEUM
D. TRICHOLOMA AMARUM
E. TRICHOLOMA GUTTATUM
F. TRICHOLOMA FALLAX
G. TRICHOLOMA PERSICOLOR

A. TRICHOLOMA GEMINUM
B. TRICHOLOMA SAPONACEUM var. NAPIPES
C. TRICHOLOMA CRASSIFOLIUM
D. TRICHOLOMA IONIDES
E. TRICHOLOMA LEUCOPHÆATUM
F. TRICHOLOMA SULPHUREUM

A. TRICHOLOMA SAPONACEUM var. CNISTA
B. TRICHOLOMA GAMBOSUM
C. TRICHOLOMA SAPONACEUM var. ARDOSIACUM
D. TRICHOLOMA SUDUM

A. TRICHOLOMA GRAVEOLENS B. TRICHOLOMA PANÆOLUM C. TRICHOLOMA LASCIVUM D. TRICHOLOMA ALBUM

A. TRICHOLOMA PERSONATUM B. TRICHOLOMA IRINUM C. TRICHOLOMA NUDUM

A. TRICHOLOMA MELALEUCUM B. TRICHOLOMA INAMOENUM C. TRICHOLOMA GRAMMOPODIUM
D. TRICHOLOMA BREVIPES

A. TRICHOLOMA COGNATUM B. and B¹. TRICHOLOMA PUTIDUM C. TRICHOLOMA HUMILE var. FRAGILLIMUM
D. TRICHOLOMA SORDIDUM E. TRICHOLOMA CALATHUS

A. TRICHOLOMA STRICTIPES var. B. TRICHOLOMA CUNEIFOLIUM C. TRICHOLOMA EXSCISSUM
D. TRICHOLOMA ARCUATUM f. ROBUSTUM E. CLITOCYBE INFUMATUM
F. TRICHOLOMA STRIDULUM var. PALLIDIPES

A. CLITOCYBE FUSCO-SQUAMULA B. CLITOCYBE GANGRÆNOSA C. CLITOCYBE INFUNDIBULIFORMIS
D. CLITOCYBE CLAVIPES E. CLITOCYBE NEBULARIS F. CLITOCYBE NEBULARIS var. ALBA

A. CLITOCYBE CANDICANS B. CLITOCYBE PARILIS C. CLITOCYBE ERICETORUM D. CLITOCYBE ALEXANDRI
E. CLITOCYBE DEALBATA F. CLITOCYBE GIGANTEA G. CLITOCYBE SUBALUTACEA

A. CLITOCYBE ODORA B. CLITOCYBE INORNATA C. CLITOCYBE GALLINACEA D. CLITOCYBE GEOTROPA
E. CLITOCYBE SUBINVOLUTA (?) F. CLITOCYBE RIVULOSA G. CLITOCYBE SUBINVOLUTA var. (?)

A. CLITOCYBE PHYLLOPHILA
D og D¹. CLITOCYBE INVERSA
B. CLITOCYBE SQUAMULOSA
E. CLITOCYBE TRULLÆFORMIS
C. CLITOCYBE CERUSSATA forma
F. CLITOCYBE SINOPICA

A. CLITOCYBE ODORA var. ALBA
B. CLITOCYBE OBSOLETA
C. CLITOCYBE HIRNEOLA var. OVISPORA
D. CLITOCYBE FRITILLÆFORMIS
E. CLITOCYBE CERUSSATA var. PITHYOPHILA
F. CLITOCYBE ECTYPA
G. CLITOCYBE PACHYPHYLLA

A. CLITOCYBE VIBECINA
B. CLITOCYBE VIBECINA var. PSEUDO-OBBATA
C. CLITOCYBE DIATRETA
D. CLITOCYBE METACHROA
E. CLITOCYBE ANGUSTISSIMA
F. CLITOCYBE FRAGRANS
G. CLITOCYBE FRAGRANS var. DEPAUPERATA

A. CLITOCYBE DITOPODA
B. CLITOCYBE DICOLOR
C. CLITOCYBE MORTUOSA
D. CLITOCYBE BRUMALIS
E. CLITOCYBE CYATHIFORMIS
F. CLITOCYBE CONNATA

A. CLITOCYBE AGGREGATA var. SPHÆROSPORA
B. CLITOCYBE TRIGONOSPORA
C. CLITOCYBE COFFEATA
D. CLITOCYBE CONGLOBATA

A. CLITOCYBE SANDICINA B. CLITOCYBE (LACCARIA) LACCATA var. AMETHYSTINA C. CLITOCYBE (LACCARIA) LACCATA var. ROSELLA
D. CLITOCYBE (LACCARIA) TORTILIS E. CLITOCYBE (LACCARIA) LACCATA var. PROXIMA
F. CLITOCYBE AGGREGATA forma REDUCTA G. CLITOCYBE AGGREGATA var. OVISPORA