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Crepidotus Notebook 6

L. R. Hesler

CREPIDOTUS

(Translation from Kuhner & Romagnesi, Flore Analytique des Champignons Superieurs, pp. 75-78. 1953, by Miss Carol Adam.)

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All Crepidotus which we have been able to examine some rather young examples possess in their first stage a normally placed, more or less central stipe (19) (20). Most of them are ligneous or epiphytic, the largest ones coming on trunks or stumps, the smallest on fallen branches or dead stalks (21).

A. Pileus small (often 1.5-2 cm.), ordinarily pure white (rarely sulfurous), always opaque (from the first, and even during humid weather), the cuticle is spider-like or tomentose being strongly aerial, never transparent, striate, lacking in separable gelatinous strata. Spores are in mass not always yellow-brown, but sometimes more or less reddish, which explains why the type species of the group (C. variabilis) was placed by Fries, not in Crepidotus, but in the Claudopus, and that Patouillard created for it, in order to separate it from Claudopus with the angular spores, the genus LEPTONIOPUS Pat. (1887)

B. Spores pale cream: when several caps grow imbricated, the spores which are deposited on the caps are simply pale-ochre tinted; or on paper, they appear cream. Lamellae white, then cream-ochre, rarely of a pink-salmon or vivid coral image. Spores are very elongated, 8-11(13) x 2.7-3.5(4) µ, subarched, obliquely narrowed at the base, smooth [Fig. 130 *B]. Hyphae without clamps. Intermediary species between Pleurotellus and Crepidotus. C.--L66F. Schweiz. Zeitsch. f. Pilzk. (13) p. 145, chioneus. Pers. (Syn.: P. septicus ss. Rick.)..PUBESCENS ss. Schroet. [Fig. 130] (Pleurotus Fr.)

B. Spores rosy-brown or ochre-brown in mass.—Group of C. variabilis Fr. ex. Pers. (Most of the types distinguished here below cannot be identified without the aid of a microscope; they were confused by previous authors and are perhaps related by intermediaries.) (22).

C. Cap often tinted with more or less clear sulfur color, at least in places (but also entirely pale cream). Spores elliptical-subfusiform, most often 8-10 x 4.5-5 m, very finely asperulate [Fig. 131*]. AC.-L132D, pubescens Sow. (Syn.: D. tericola ss. Favre.).....LUTEOLUS Lamb.

C. Cap pure white.

D. Lamellae tint tends finally to be more or less reddish, as that of the spores. Spores distinctly punctate under the objective at immersion.

E. Spores cylindric or ellipsoid, 5.5-7.5 x 2.7-4 µ, finely asperulated-punctate [Fig. 132B]. TC.-KM 303_3. L133F.....VARIABILIS ss Pat. [Fig. 132A].

E. Spores elliptical, subamygdaliform or subglobose, larger.

F. Spores long ellipsoid, 7-9 x 5.7-7.5 µ, clearly punctate-echinulate [Fig. *133[. C.-KM 303_4, sphaerosporus Pat. L132D, ed.....CRSATII Rabenh.

F. Spores shortly ellipsoid-pruiform (subamygdaliform), 5.7-8.5 x 4.5-6 µ, clearly, but minutely punctate-spinulous. AR.-L133E.....SUBSPHAEROSPORUS (Lange.)

F. Spores ellipsoid-pruiform, 7.5-8(9) x 4-5 µ, clearly rugose-verrucose, narrower and more pointed at one end. AR.-RM (2) p. 137. Pilat p. 66; 24.....EPIBRYUS ss Romagn. (20)

D. Spores are yellow-brown in a mass, without a reddish reflection, smooth or with indistinct punctation, pruniform or amygdaliform, 5.5-9 x 4-5.5 µ. Lamellae are washed with brownish tinge, without rosy reflection. PR.....AMYGDALOSPORUS Kuhn. nov. sp. [Fig. *134) (22).

A. Species that do not have these characteristics. Spores never reddish en masse.

G. Pileus either larger than 1.5 cm., or the cuticle gelatinous, separable or hygrophanous in the fresh state, olive-grey, brownish, clayish-grey or hyalin-white. Lamellae are quite regular, not veiny, even near the stipe.....typical Crepidotus

H. Cap without remarkable gelatinization of the pileus cuticle nor of the edge of the lamellae. Cap hygrophanous (wet), grey-claying-earthy, or at least hyalin, and then sometimes striate at the margin (but opaque and sometimes snow white in dry weather), rather large, often 2-4 cm. or more. Clamped hyphae.

I. Spores spherical, 4-6 µ, punctate-verruculose. Cap white-cream-hyalin and finely pruinous under a magnifying glass, then glabrous and hyalin-brownish, but never very deep, sometimes striate on the margin. On wood, AR.-SMF (53) p. 216. (Syn.: C. scalaris ss. Rick.).....APPLANATUS Fr. ex Pers. ss. Karst. (23)

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H. Cap with a separable gelatinous cuticle; edges of the lamellae bearing a thin filament, viscoud and tenacious. Hygrophanous and relatively large cap (exceeding often 3 cm.). Hyphae without clamps. Spores amygdaliform (tonsil shaped), smooth, 7-9.5 x 5-6 µ.

J. Cap glabrous or covered with a rust or appressed yellow-brown, always light and often disjoined, on an olive-grey or brownish-hyalin background, becoming yellowish or whitish upon drying. C.-M303.1. L132A.....MOLLIS Fr. ex Schaef. (24)

J. Cap densely flecked with fine ochre-brown specks, evident to the naked eye, at least in the discal region, more or less appressed. R.-Fr. 124, 4. Ckc. 499 (534).....var. salolepis Fr.

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K. Cap owing its beautiful brilliant cinnabar-red coloration to the contents of subfusiform cystidia which render it velvety, 0.5-1.2 cm. broad. Lamellae with a carmin colored edge. Spores ellipsoidal 7-8.5 x 4.5-5.7 µ, very finely verruculose. Rotten wood. TR.-Friesia (3) p. 94.....CINNABARINUS Peck.

K. No vivid red colorations.

L. Small species; lamellae regular.

M. On rotting wood. Pileus with a non-gelatinous cuticle, dull pruinose under a lens.....cf. Naucoria haustellaris

M. On herbaceous stalks. Pileus more or less striate, with a gelatinous cuticle, becoming varnished after rains (but at first villose-tomentose).....cf. Geophila phillipsii

L. Larger species, with lamellae clearly veined on the faces, often irregularly crisped, notably toward the support (25).....cf. Perillus parmoides, p. 46.

NOTES & OBSERVATIONS ON CREPIDOTUS

19. One could wonder if there really exist some species that are resupine (resupinated) at the origin in this genus. However, Fries states that his C. epibryus, a white, silky species, that comes on large mosses, is resupinate, regular, almost cupulate, sessile, without the rudiment of the stipe, adnate at the top, with lamellae concurring at the center.

20. The C. epibryus Rick., at first described by him under the name of depluens Batsch, would also be truly resupinate if the illustration that shows it is accurate, from which one could doubt, because the lamellae concur here toward a very excentric point; one is dealing with a very different species from that of Fries, gathered on naked ground with a reddish grey cap under a silky-white down grayish lamellae. Spores 10-12 x 5-6 µ.

21. There has also been described some terricolous species; let us cite, besides fragilis, C. depluens ss. Rick, which seems to be a Dochmiopus by its cap of 2-3 cm., white, tomentous-silky, and its almost punctate spores (elliptical, 8-9 x 5-6 µ) and would be noticeable because of its cap with thick flesh (2-4 mm.), fixed laterally by a lengthened base, almost in the shape of a tongue. Some others have been gathered on living mosses, as the C. epibryus Fr. (see note 19), and three species arranged by Pilat in the special section of the Muscicolae: C. carpatrossicus, Pilat, minute, noticeable because of its relatively very elongated stipe; spores 8-9 x 7-8 µ, very subtly punctate, muscigenus Vel., 2-4 mm., spores pointed at the top,

7-8 x 3.5-4.8 µ, verrucose, and subepibryus Pilat, 5-10 mm., with spores longly elliptical, 6-7.5 x 5-5.7 µ, verrucose.

22. For more details about species of this group, we return to the work of J. Favre (Schweiz. Zeitschr. f. Pilzk. (13) p. 145, 1935), and to the Monograph of Pilat. This latter describes notably two species with non-rosy, smooth spores: C. bresadolae Pilat (=C. pubescens Bres., Icon. Myc., 790, 2), species found ordinarily on wet soil, rarely on very strongly rotten wood which is on the soil, with long elliptical spores (cinnamon in mass), 8.5-12 x 5-6 µ, flattened on one side; C. lundellii Pilat, mostly scattered in forests of mountains and northern, with relatively fleshy cap, with deep ochre shaded to dirty clay colored lamellae, with subamygdaliform (tonsil formed) spores, 7-10.5 x 5.7-7.5 µ, most often 8 x 6 µ. On the other hand, his C. caspari Vel. is little different from fragilis (spores rounded at the end, 7-8(8.5) x 5-5.6 µ). Among the species with more or less verrucose spores one (C. subverrucisporus Pilat) is noticeable because of its ochre-clayish lamellae, without pinkish tints, tonsil shaped spores, 7-9 (9.5) x 5.5-6 µ; his C. microsporus (Karst. ss. Romell) would be (with difficulty) distinguished from variabilis by its narrower spores (6-7.2 x 3-3.7 µ); C. velenovskyi Pilat is tiny (-13 mm.), ellipsoid, thrust in on the side, with spores 8-10 x 5.6-6 µ; C. wakefieldiae Pilat, equally very small (2-4 mm.), is more noticeable by its globose spores 5-6 µ.

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surface, rusty-brown, becoming very finely tomentose-squamulose: the appressed squama stand out in a deep shade on a clearer background.

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DOCHMIOPUS ET PLEUROTUS CHIONEUS

Favre, Jules. Les Dochmiopus de la region de Geneve et Pleurotus chioneus. Schweizerische Zeitschrift für Pilzkund 13:145-150. 1935.

(Translation by Mrs. Carol Adam Bradford)

If one consults the usual mycological flora regarding Dochmiopus, one verifies that D. variabilis is always indicated as being the most common. In the region of Geneva, it did not seem to be thus. It is D. sphaerosporus that I observed most often, a species that Ricken, for example, does not even point out, whereas he says of variabilis: "en masse, common." On the other hand, a third species, still little known, and that I gathered a few times does not seem to be very rare. I believe that it concerns D. terricola (Britz.) which has a synonym D. pubescens (Bresad.). Macroscopically these three species, white or very little colored, are quite akin. They resemble each other very much also, when they are young and when their lamellae are still pale with little white, such as P. septicus, pubescens, dictyorrhizus, chioneus, etc. The last among them could perhaps, at first, be taken for a Dochmiopus, because its spores are not white, but cream, which gives to the lamellae a tint of very marked pale fleshy-yellowish.

Here is the description of these three species of Dochmiopus and, by right of comparison, that of Pleurotus chioneus.

Dochmiopus sphaerosporus Pat.

Figure 1.

Cap up to 20 mm in diameter, at first dome shaped, then plane, attached laterally and showing, on the side of the point of fixation, two rounded lobes being recovered a little among the large individual ones. It is entirely white, villous-tomentous around the point of attachment, finely felty-pubescent elsewhere. Margin is rolled up a long time, finely pubescent-tomentous.

Stipe nul or rudimentary, and then short, eccentric, and cemented, in its length, on the lower face of the cap where it forms a bulging; it is white, villous-felty.

Lamellae not close, a little thick, wide, ventricose, rounded behind, at first white, then rather dark dirty flesh-brownish color. Number of lamellulae variable (up to seven).

Flesh tender, white, non-odorous, insipid, rather thick at the center of the cap.

Basidia are tetrasporic, 25-31 x 8-11 μ (without the sterigmata). Cells are differentiated from the margin of the lamellae that are very elongated, a little sinuous-vermiform and most often irregularly torulose-tubercular, not projecting, but penetrating deeply in the trama, 3-8 μ in width, without counting the bulgings. Spores are slightly yellowish-brownish under the microscope, dirty ochre tinted brown in a clump (approaching h_2 of the scale of Lange), shortly ellipsoidal

to sub-spherical, finely echinulate, 6-10 x 4.5-8 μ, with an apicule that is not very projecting.

I have observed this species from the end of August to the end of December, always on dead wood, in the following localities: Bois de la Bâtie and Sentier des Falaises, in Geneva, on the shore of the Rhône, on clematis; Noulin de Vert, at Cartigny (canton of Geneva), gathered by M. G. Perrenoud; wood, between Esery and the Pont de Viaison, near Annemasse (Haute-Savoie), on dead branches of Robinia Pseudaccacia; neck of the Réré, 1000 m., near Bonneville (Haute-Savoie), at the foot of an epicea; high-swamps of Glières, 1420 m., near Petit-Bornand (Haute-Savoie), on dead branches of Pinus montana; Vesancy, near Gex (Ain), on a rotting post; under Montauges, in the neck of the Valserine, near Bellegarde (Ain), under dead branches of foliage; high-swamp of Chenalotte, 900 m., near Russey (Doubs), on dead branches of epicea.

As the figures show a - d, fig. 1, representing a series of very young examples, this species, originally , has a very distinct and central stipe that becomes very rapidly eccentric.

The variability of the size of the spores is rather considerable, not only in a same spore deposit, but especially from one locality to the other. The average dimension of all my observations is 7.7 x 6.5 μ, and it is around these figures that most of the gatherings are ranged. The largest spores proceed from the examples of Montauges: 7.5-10 x 6-8 μ, average

8.7 x 7.3 μ, the smallest of those of Chenalotte, 6-7.5 x 5-6 μ, average 6.5 x 5.4 μ.

Dochmiopus variabilis (Pers.)

Figure 2.

Cap up to 30 mm, at first convex then expanding plane rather rapidly, showing an indentation and two rounded lobes at the point of fixation, entirely white, villous in the proximity of the attachment, very finely pubescent-felty on its other parts, with a margin rolled up a long time but being able to be reflected among well developed specimens.

Stipe almost always nul or, if it exists, rudimentary and forming only a short bulging that is not very projecting on the lower surface of the cap near its point of fixation, white, finely villous.

Lamellae radiating from a point eccentric to the cap, a little thick, bulging, rounded behind, not very close, white at first then rather dark dirty ochre tinted brown. Lamellulae are rather numerous.

Flesh tender, white, non-odorous, insipid, rather thick at the center of the cap.

Basidia are tetrasporic. Cells are differentiated from the margin of the lamellae that are elongated-vermiform, irregularly torulose-tubercular, 5-8 μ in width, without counting the bulgings. Spores are very pale yellowish-brownish under the microscope, rather dark ochre tinted brown in a pile, elliptical,

with a rather marked apicule, very finely and shortly echinulate, 5.5-7 x 2.8-3.5 μ, on average 6.2 x 3.2 μ.

Habitat. Wood between Esery and the bridge of Viaison, near Annemasse (Haute-Savoie), on dead branches of Rubus especially, but also on Robinia pseudaccacia and other rotting branches of foliage trees, December 23, 1934.

Dochmiopus terricola (Britz.)

Figure 3.

Cap up to 40 mm., at first convex then plane, showing near the point of fixation two rounded lobes between which is found the stipe when it exists. It is villous at the center and very finely pubescent-felty in its other parts, of a very pale ochre yellow tinted shade, then bright and ochre tinted citrine at the center. Upon dessication, this color becomes notably accentuated. The margin is rolled up for a very long time, but it can be completely stretched—reflected among very developed specimens.

Stipe sometimes nul, but existing rather often, even among old individual ones, eccentrical, cemented on all its length on the lower face of the cap, white, tomentous-felty.

Lamellae not very close, a little thick, rather broad, ventricose, slightly decurrent on the stipe when it exists, rounded behind in the contrary case, white at first then rather dark dirty ochre tinted brown. Lamellulae are rather numerous (up to seven).

Flesh is tender, white, non-odorous, insipid, relatively thick.

Basidia are tetrasporic, 27 x 7 μ (without the sterigmata). Cells differentiated from the margin of the lamellae that are very elongated, vermiform, irregularly inflated, width of 4-7 μ, without counting the inflations, not very projecting beyond the edge, but penetrating deeply in their trama. Spores of very pale brownish-yellow under the microscope, rather dark ochre tinted brown in mass, almost smooth, with very fine punctuation, hardly discernable in oil-immersion 1/12, ellipsoidal, 8-13 x 4-5.5 μ, average 9.7 x 4.8 μ.

Habitat. Observed in December under shrubs at the edge of the Rhone in Geneva, at the Bois de la Batie, and in a forest between Esery and the bridge of Viaison, near Annemasse (Haute-Savoie), especially on dead branches of clematis, but also on Rubus, Rosa and other branches of leafy bushes.

What name must one designate to this species? It is evidently Crepidotus pubescens of Bresadola[1].

The figures, the diagnosis and particularly the dimension of the spores correspond perfectly well. The only divergence concerns the color of the cap which is said to be white, whereas that of the plant in the neighborhood of Geneva is ochre tinted yellow. But as this shade is very pale, on fresh examples at least, perhaps it has escaped the Italian mycologists.

Several years previously, Britzelmayr[2]) created a species, Claudopus terricola the description of which perhaps does not apply as well as that of Bresadola to the mushroom described here above. However it seems well that the two mycologists may have made reference to the same plant. Here is the translation of the diagnosis of Britzelmayr:

A. (Claudopus) terricola B. fig. 186; cap is whitish, grayish or brownish white, 10 mm. in width; without stipe, lamellae rather close, pinkish, brownish, 1-2 mm. in width; spore mass is pinkish flesh color; spores 10-11 x 6 μ, rounded-elongated; akin to A. variabilis Pers. and depluens Batsch. Summer, autumn; forest road, on the ground and the debris of plants.

On the whole, the characteristics of the species of Britzelmayr agree relatively well with those of C. pubescens and those of the mushroom being considered here. The principal difference exists in the color of the spore case, paler according to the indication of Britzelmayr. However, if one is not careful, especially with the little mushrooms, to gather the spores in a pile, the shade that one observes is necessarily lighter. The width of the spores indicated for C. terricola is very slightly larger. But these differences are so minimal that one can admit, I believe, the synonymy (similarity) of Crepidotus pubescens and of Claudopus terricola, and it is the latter of these names which possesses priority.

One can naturally not maintain this species in the genus

Claudopus such as one admits it now, with spores that are angular and pink, nor in the genus Crepidotus, since it possesses all the particularities of the genus Dochmiopus Pat., of which the characteristics have been clearly pointed out by M. R. Kühner[3]). Furthermore its affinities with D. variabilis are the narrowest.

Pleurotus chioneus (Pers.)

Figure 4.

Cap attaining 12 mm in diameter, of pure white, finely pubescent-tomentous, fixed laterally, at first convex, with a very rolled up margin, then plane, split on the side of its point of attachment and showing two rounded lobes.

Stipe nul or rudimentary.

Lamellae radiating from an eccentric point situated near the indentation of the cap, rather close, rounded behind, thin, white then of pale flesh yellow.

Flesh is tender, white, not thick.

Basidia with 4 spores, 20-25 x 6-8 μ. Cells differentiated from the margin of the lamellae that are finished by a filiform prolongment attaining up to 40 μ in length. Spores are oblong-lanceolate, acute on the apicular side, rounded at the other extremity, with a dorsal profile generally straight or slightly concave, rarely a little swelled, smooth, hyalin, 8-11(13) x

28-4 μ, average 9.6 x 3.3 μ. Spore mass cream color (between C and D of the scale of Crawshay).

Habitat. Wood between Esery and the bridge of Viaison near Annemasse (Haute-Savoie), on twigs and dead leaves, 23 of December 1934.

More so than for the preceeding species it is embarrassing to give a name to this one, its name having varied a great deal in the course of time. The authors that have spoken of it the most recently have applied to it three different designations. Kühner[3] describes it under the name of Pleurotus chioneus (Pers.), Lange[4] names it Pleurotus pubescens (Sow.) and Pilát[5] Pleurotus septicus Fr. It is necessary to add still that Bresadola[6] has created a species called Pleurotus commixtus, which corresponds perfectly to the one described here. It is useless to investigate whether one of the three older names created by Persoon, Sowerby, and Fries applies better than the others to the mushroom studied in these pages, because the little white pleurote that they show are too difficult to distinguish macroscopically. It is thus to the microscopic characteristics that one must make appeal and accord priority to the interpretation of the first mycologist having described a pleurote with spores similar to that which is being considered here. Quélet, before all the other authors gave in 1879[7]), the first sporic characteristics concerning one of these little white pleurote. He calls it chioneus Pers. and attributes to it a pruniform spore, very elongated and white (0mm01)." In 1887, Saccardo[8]) gives to

P. septicus spores that are elliptical-subglobulous, aculeolate-apiculate at the bottom, of 8-10 x 6-7 μ. Finally[9], in the description that Quelet makes in 1888 of P. pubescens, one finds the following indication: spore ovoid-oblong (0mm01).

Thus, one must give the name chioneus to the one of these little pleurote of which the spores are the longest and our species ought then to be named Pleurotus chioneus Pers., sensu Quélet.

Macroscopically, it is not easy to distinguish these four species. However, Pleurotus chioneus, the smallest, is always characterized by its lamellae taking with age a pale flesh yellow shade and not ochre tinted brownish as the three others. Among the three Dochmiopus one will recognize without trouble D. terricola with its yellow brownish cap and not purely white, especially if one takes the precaution to let it dry out, for this shade becomes much more vivid, whereas that of the two other species remains white or becomes stained a little with gray. It is hardly possible on the other hand to separate D. variabilis from D. sphaerosporus. This latter, it is true, does not attain as large a size as the first, its stipe persists longer, its lamellae are slightly clearer, but these differential characteristics are so relative and so bound, that one would not dream of utilizing them with certitude.

Microscopically, nothing easier than to determine the four mushrooms. The differentiate cells of the lamellae (of which the filiform prolongment is characteristic of several

little pleurote) and the lanceolate spores distinguish *P. chioneus*. And if the three *Dochmiopus* have the same marginal cells, their spores on the other hand are quite distinct: subspherical and echinulate for *D. sphaerosporus*, elliptical-elongated, large, hardly punctate for *D. terricola*, elliptical, small, finely echinulate for *D. variabilis*.

Herodotus

Translations from Pilát

CREPIDOTUS (Fr.) Quel.

(Translation by Carole Adam, pp. 5-10, from Pilát: Monographie des especes europeenes du genre Crepidotus Fr., 1948.)

Tiny mushrooms or of medium size, growing on rotting wood or other vegetal debris, more rarely on living mosses, rarely on the ground. Thin fleshy cap, with a surface which is generally a little tomentose or shaggy, more rarely glabrous, rarely with a gelatinous layer; of a rather small size most often (1-5 cm.) or small (0.1-1 cm.). A stipe is often developed, but generally visible only in youth. It ceases soon to grow, and as the cap continues to grow rapidly, the stipe disappears almost completely at maturity, and the cap is then sessile (attached only) at the side. When the cap is appressed on the substratum with a part of the dorsal surface, a part of the cap (dorsal) surface can also become attached secondarily in certain species. More rarely the stipe is visible also in maturity and distinctly developed, but in this case it is generally curved in an arc or half circle and is laterally attached to the substratum. Lamellae are soft and fleshy, at first generally white or pale, more rarely intensely colored in youth, later colored by the spores brown, argillaceous brown, to rubiginous, or brown with a flesh pink tint. Spores are spherical or ellipsoidal, smooth or aculeate or verrucose, brown, yellow brown, argillaceous or ochre flesh color. Cheilocystidia are almost always developed on the edge of the lamellae, but generally not very striking, with thin walls, fusiform-bottle shaped or of similar forms, with thin walls, not too different from the sterile basidia. Always without cystidia on the surface of the lamellae.

DISTRIBUTION: The species of this genus are distributed over almost the entire surface of the globe. The non-European species are not very well known, and it is quite difficult to indicate the total number of species. The same species as in Europe seem to grow also in America. There have been described, at least in the temperate zone, a much larger number of species than that which exists in reality. Our monographX reviews the representatives in Europe and in the temperate zones of Asia. I have not had on hand a single species of North America that does not also grow in Europe. One can conclude from its distribution that the genus Crepidotus is of a very old origin and that it seems to represent one of the archtypes of the Agaricineae.

AFFINITIES: From the phylogeny point of view the genus Crepidotus is rather inhomogenous. All totaled, one can say that it is related to the genus Pleurotus, among the mushrooms, with brown spores. Some authors have tried to divide it in several genera, but, in my opinion, without great success. For this reason, I adhere more or less to Fries, and divide it only into 12 sub-genera. This concerns almost exclusively only the primitive types of Agaricineae with brown spores, just as we place the primitive types of mushrooms with white spores in the genus Pleurotus.

The evolution of the Agaricineae was evidently achieved in a polyphyletic manner, and we cannot at all expect homogenous forms among the primitive types. Thus for example the shade of color of the spore system is very variable among the different species, and there are perhaps no two species with exactly the

same tint of spores. Then some difficulties are caused by the species with a very tiny ~~receptacle~~ carpophore, where the spores are often not very numerous and leave only very little powder on paper; it is also very difficult to determine the shade of color, even by comparison. Because of the great variability in the color of the spores in this genus, I do not consider legitimate the genus Dachmiopus Pat., recognized especially by the French mycologists. Its examples are evidently in all characteristics so narrowly related to certain (species of) Crepidotus with brown spores, that one can not at all in this case accentuate the weak rose tint of the spore system, as I shall demonstrate.

The genus Crepidotus Fr. that I place under the independent sub-family of Crepidotoideae forms in my opinion a transition between the Pleurotoideae with a hyalin spores and the mushrooms with colored spores. In the course of evolution it has given rise to a whole series of genera that we place today in other different sub-families. These characteristics (affinities) are approximately the following:

1. The genus Crepidotus has the closest and narrowest similarities to the sub-family of Naucorioideae. It is especially Crepidotus haustellaris Fr., which is very similar to the genus Naucoria in all respects, and there are authors which place it under the name of Naucoria effugiens Quél. in this genus. Konrad and Maublanc place the Crepidotoideae in our manner among the Pleurotoideae, but I believe it is not a very good solution, for by the coloration of the spores, their ornamentation, and cheilocystidia, they are more similar to Naucoricoideae. R.

Singer who, I believe, overestimates in his phylogenetic system the importance of shades of color in the spore system, divides the genus Crepidotus in the manner of Fries into two genera, as also the French authors do this (Crepidotus Fr. and Dochmiopus Pat.). And he does not place these genera one beside the other, but he places his genus Crepidotus with a rust spore system among the Cortinaoideae relating it with the genus Flammula, and the genus Dochmiopus Pat., with reddish brown spores among the Pleurotoideae. In his recent work (Lilloa 13:74, 1947) Singer has changed his opinion and no longer looks at Dochmiopus as generically different from Crepidotus. An erroneous opinion on the genus Dochmiopus and its importance in the system is, in my opinion, also expressed by Patouillard, the author of the said genus, who places it directly after the genus Claudopus, with rose spores, costees (Entomoloideae=Rhodogomosporeae). The species of the genus Dochmiopus Pat. have not, aside from a pale rose tint of the spores, anything in common with the sub-family of Entomoloideae, and, on the contrary, are extraordinarily similar to species of the genus Crepidotus, with a sporic system of a characteristic brown. Rea places Crepidotus variabilis Pers. and Cr. cesatii Rab. (=Cr. sphaerosporus Pat.) even directly in the genus Claudopus, and thus he mixes into one genus some examples of two sub-families absolutely different.

The rose color of the spores, or rather the rose tint only, of their color is not at all in my opinion a very important characteristic from a phylogenetic point of view, because the rose coloration of the spores is repeated in different genera

of groups that are most varied of the Agaricineae, which he makes us place far from one another in the system, because aside from the rose tint of the spore system they have no other characteristics in common. Thus the Entomoloideae, for example, have no similarity to the genus Volvaria and Pluteus. A rusty spore is found also in the genus Rhodotus which is evidently related to the genus Crepidotus, but which is also related to the sub-family of Pleurotoideae. Likewise, the genus Phyllotopsis Gilb. and Donk (P. nidulans), which I placed as a section of the genus Pleurotus in my monograph of this genus, has also a rosy sporic system. Then we find a rosy spore system among the genera Rhodopaxillus R. Maire and Rhodocybe R. Maire, which evidently belongs to the near relative of the genus Tricholoma. The Jugasporaceae (Clitopiloideae) have also a rosy spore system. Thus I cannot see in the weak rose tint of the spores of the genus Dochmiopus Pat. a characteristic of cardinal importance when the other morphological and anatomical characteristics agree with those of other species with brown spores of the genus Crepidotus Fr.

2. Evidently we find certain relationships of the genus Crepidotus also with the family of Entomoloideae, but rather in the morphology of the ~~receptacle~~ carpophore than in the anatomical characteristics. A similar transition type is the genus Claudopus Fr. of which the ~~receptacle~~ carpophore corresponds in its form completely to the ~~receptacles~~ carpophores of the genus Pleurotus; however the spores are costées, rose, just as we find them also among other genera of the sub-family of Entomoloideae.

3. We find certain relationships also with the family of Jugasporaceae which has also a pink spore system. - again rather in the exterior formation of the ~~receptacles~~ carpophores than in anatomical similarities. A similar relationship with the genus Clitopilus is, for example, Clitopilus chioneus (Pers.) Pilát (=Clitopilus pleurotelloides [Kühner] Joss.) and also Cl. pinsitus (Fr.) Joss. The first of these species was described for the first time by Kühner as a type of the genus Octojuga Kuhner, said to distinguish itself from the genus Clitopilus by the greater number of sides on the spores. Clitopilus pinsitus Fr., formerly placed in the genus Pleurotus, has some spores with sides that are not very well defined, and thus its relationships to the genus Pleurotus are indubitable and the evolutionary branch of the genus Pleurotus to the genus Clitopilus is thus evident.

4. The genus Crepidotus has also some close similarities with the genus Pleurotus and all the sub-family of the Pleurotoideae. Pleurotus septicus Fr. (in the sense of Schroeter and Pilát, not of Bresadola and Favre) relates the genus Crepidotus to the sub-genus Pleurotellus of the genus Pleurotus. This species has white lamellae in youth, then becoming yellow and later almost brown, and the carpophores are, at maturity, very easily confused with species of the genus Crepidotus. It goes without saying that the brown coloration of the lamellae in Pleurotus septicus Fr. at maturity is not at all because of the spores—at least not principally—but is due to the resinous brown excretions of the basidia and the subhymenium. Under the microscope the spores are subhyaline and only in some old specimens, they are sometimes yellowish brown. The spores, however, are not of pure white, but

generally a bit yellowish-brown. In the form of the spores it is similar to other species of the genus Pleurotus-Pleurotellus, and there would be no sense in transferring it to the genus Crepidotus only because ~~of~~ the sporic system is not pure white.

5. A characteristic genus also of the same type as the genera Pleurotus, Crepidotus, Claudopus or Clitopilus is Melanotus Pat. (Tax. Hym. 175. 1900--Murrill, Agar. of Tropical North America - VII, Mycologia 10:16. 1918). By the form of the carpophores it completely reminds one of the genus Crepidotus, but it has deeper colored lamellae at maturity and its spores are deep-brown-purple with the apical germ-pore very distinct. It shows thus a crepidotical type of the genus Hypholoma Fr. en. Pat. Several species seem to belong to the genus Melanotus, for example, Melanotus musicola B. and C. (Crepidotus musicola Sacc., Syll. Fung. 5:883. 1887) of Cuba, then Melanotus fumosifolius Murrill, Mycologia 10:16, 1918 (=Mypidotus fumosifolius Murrill, North Amer. Fl. 10:156. 1917) of the isle of Jamaica. In the herbarium of the Museum of Natural History in Paris I found a specimen of the species Melanotus bambusinus, of which I have made a microscopic study (Crepidotus bambusinus, Herbarium missionis Tunquini occidentalis No. 4464, H. Bon.). The genus Melanotus Pat. is from the anatomical point of view so close to the genus Hypholoma Fr. em. Pat. that it should belong, evidently from the phylogenetic point of view, to the neighboring group of genera that form the sub-family of Coprinoideae. It resembles the genus Crepidotus Fries only in the form of the carpophores. In spite of this it shows a branch of evolution which probably had its origin also in genus Crepidotus Fr.

6. Crepidotus panuoides Fr. occupies a special position in the genus Crepidotus Fr., because it forms a transition between the genus Crepidotus Fr. and the family of Paxillaceae which in turn has very close similarities with the Boletaceae. Since it has a bilateral trama, most of the most modern authors place it directly in the genus Paxillus. However it is distinguished rather by the form of the carpophores, and also by other traits it makes one think of close similarities with the genus Crepidotus; I have therefore placed it as a special sub-genus in Crepidotus. Gilbert has created for this mushroom a separate genus, Tapinella Gilbert 1931, where it belongs perhaps together with the other American species, Tapinella corrugata Atkinson 1900. The bilateral trama, as it is not a characteristic of great importance from the phyllogenetic point of view in my opinion, for it is found, for example, in the family of Paxillaceae, that is to say in perhaps the most primitive family of all the Agaricineae, which unites Agaricineae with the Boletaceae, and again in Amanita which we regard as the most perfectly organized as the Agaricineae.

As one sees from that which precedes, the genus Crepidotus is related by numerous forms of transition with other genera, sub-families and families of Agaricineae, and gives us thus a partial glimpse of the polyphyletic evolution of this group of mushrooms.

The synoptical table of affinities is approximately as follows:

Crepidotus haustellaris→Naucoria→Naucorcoideae

Clitopilus→Entolomoideae (Rhodogoniosporae)

Dochmiopus→Clitopilus pleurotelloides→Jugasporaceae

Pleurotus septicus→Pleurotellus→Pleurotoideae

Melanotus→Hypholoma→Coprinoideae

Crepidotus serbicus→Cr. macedonicus→Cr. panuoides→Paxillus→ Paxillaceae.

REMARKS: The best and surest characterisation to distinguish between the different characteristics of the genus Crepidotus Fr. are the spores. Their form and size vary a lot in the different species, also the quality and coloration of the cellular membrane are very different, and they give thus a number of reliable characteristics by the difficult systematics of this neglected genus. The spores are smooth or verrucose or aculeate, sometimes very distinctly, sometimes very weakly. In the species in which the verrucosity of the cellular membrane is very weak, it is poorly visible under the microscope and it is quite recommended to study the spores of these mushrooms, with great care and under a considerable magnification.

In order to soften the dried matter in order to obtain microscopic preparations, I obtained the best results with a solution of 10% of KOH in water. When we transport ~~with a stick in a glass~~ a drop of this alcaline solution on a glass slide and place there a fragment of lamella—preferably of the edge, which we transfer with the moistened point of a needle in preparation—it softens in the drop in a few seconds. By weak pressure on the cover glass on top we easily obtain a sufficient thinness of the preparation without the hymenium's being too dispersed.

CREPIDOTUS (Fr.) Quel.

(Translation by Carole Adam, pp. 5-10, from Pilat: Monographie des especes europeenes du genre Crepidotus Fr., 1948.)

Tiny mushrooms or of medium size, growing on rotting wood or other vegetal debris, more rarely on living mosses, rarely on the ground. Thin fleshy cap, with a surface which is generally a little tomentose or shaggy, more rarely glabrous, rarely with a gelatinous layer; of a rather small size most often (1-5 cm.) or small (0.1-1 cm.). A stipe is often developed, but generally visible only in youth. It ceases soon to grow, and as the cap continues to grow rapidly, the stipe disappears almost completely in maturity and the cap is then sessile (attached only) at the side. When the cap is appressed on the substratum with a part of the dorsal surface, a part of the cap surface can also become attached secondarily in certain species. More rarely the stipe is visible also in maturity and distinctly developed, but in this case it is generally curved in an arc or half circle and is laterally attached to the substratum. Lamellae are soft and fleshy, at first generally white or pale, more rarely intensely colored in youth, later colored by the spores brown, argillaceous brown, to rubiginous, or brown with a flesh pink tint. Spores are spherical or ellipsoidal, smooth or aculeate or verrucose, brown, yellow brown, argillaceous or ochre flesh color. Cheilocystidia are almost always developed on the edge of the lamellae, but generally not very striking, with thin walls, fusiform-bottle shaped or of similar forms, with thin walls, not too different from the sterile basidia. Always without cystidia on the surface of the lamellae.

DISTRIBUTION: The species of this genus are distributed over almost the entire surface of the globe. The non-European species are not very well known, and it is quite difficult to indicate the total number of species. The same species as in Europe seem to grow also in America. There have been described, at least in the temperate zone, a much larger number of species than that which exists in reality. Our monography reviews the representatives in Europe and in the temperate zones of Asia, I have not had on hand a single species of North America that does not also grow in Europe. One can conclude from its distribution that the genus Crepidotus is of a very old origin and that it seems to represent one of the archtypes of the Agaricineae.

AFFINITIES: From the phylogenis point of view the genus Crepidotus is rather inhomogenous. All totaled one can say that it is related to the genus Pleurotus among the mushrooms, with brown spores. Some authors have tried to divide it in several genera, but in my opinion without great success. For this reason, I adhere more or less to Fries, and divide it only in 12 sub-genera. This concerns almost exclusively only the primitive types of Agaricineae with brown spores, just as we place the primitive types of mushrooms with white spores in the genus Pleurotus.

The evolution of the Agaricineae was evidently achieved in a polyphyletic manner, and we cannot at all expect homogenous forms among the primitive types. Thus for example the shading of color of the spore system is very variable among the different species, and there are perhaps no two species with exactly the

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The genus Crepidotus Fr. that I place under the independent sub-family of Crepidotoideae forms in my opinion a transition between the Pleurotoideae with a hyalin spores and the mushrooms with colored spores. In the course of evolution it has given origin to a whole series of genera that we place today in different other sub-families. These characteristics (affinities) are approximately the following:

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Singer who, I believe, overestimates in his phyllogenic system the importance of shades of color in the spore system, divides the genus Crepidotus in the manner of Fries in two genuses, as also the French authors do this (Crepidotus Fr. and Dochmiopus Pat.). And he does not place these genera one beside the other, but he places his genus Crepidotus with a rust spore system among the Cortinaoideae relating it with the genus Flammula, and the genus Dochmiopus Pat., with reddish brown spores among the Pleurotoideae. In his recent work (Lilloa 13:74, 1947) Singer has changed his opinion and no longer looks at Dochmiopus as generically different from Crepidotus. An erroneous opinion on the genus Dochmiopus and its importance in the system is in my opinion, also expressed by Patouillard, the author of the said genus, who places it directly after the genus Claudopus, with rose spores, costees (Entomoloideae=Rhodogomosporeae). The species of the genus Dochmiopus Pat. have not, aside from a pale rose tint of the spores, anything in common with the sub-family of Entomoloideae, and, on the contrary, are extraordinarily similar to species of the genus Crepidotus, with a sporic system of a characteristic brown. Rea places Crepidotus variabilis Pers. and Cr. cesatii Rab. (=Cr. sphaerosporus Pat.) even directly in the genus Claudopus, and thus he mixes some examples of two sub-families absolutely different in one genus.

The rose color of the spores, or rather the rose tint only of their color is not at all in my opinion a very important characteristic from a phylogenetic point of view, because the rose coloration of the spores is repeated in different genera

of groups that are most varied of the Agaricineae, which he makes us place far from one another in the system, because aside from the rose tint of the spore system they have no other characteristics in common. Thus the Entomoloideae, for example, have no similarity to the genus Volvaria and Pluteus. A rusty spore is found also in the genus Rhodotus which is evidently related to the genus Crepidotus, but which is also related to the sub-family of Pleurotoideae. Likewise, the genus Phyllotopsis Gilb. and Donk (P. nidulans), which I placed as a section of the genus Pleurotus in my monography of this genus, has also a rosy sporic system. Then we find a rosy spore system among the genera Rhodopaxillus R. Maire and Rhodocybe R. Maire, which evidently belongs to the near relative of the genus Tricholoma. The Jugasporaceae (Clitopiloideae) have also a rosy spore system. Thus I cannot see in the weak rose tint of the spores of the genus Dochmiopus Pat. a characteristic of cardinal importance when the other morphological and anatomical characteristics agree with those of other species with brown spores of the genus Crepidotus Fr.

2. Evidently we find certain relationships of the genus Crepidotus also with the family of Entomoloideae, but rather in the morphology of the receptacle than in the anatomical characteristics. A similar transition type is the genus Claudopus Fr. of which the receptacle corresponds in its form completely to the receptacles of the genus Pleurotus; however the spores are costees, rose, just as we find them also among other genera of the sub-family of Entomoloideae.

3. We find certain relationships also with the family of Jugasporaceae which has also a pink spore system. - again rather in the exterior formation of the receptacles than in anatomical similarities. A similar relationship with the genus Clitopilus is, for example, Clitopilus chioneus (Pers.) Pilat (=Clitopilus pleurotelloides [Kuhner] Joss.) and also Cl. pinsitus (Fr.) Joss. The first of these species was described for the first time by Kuhner as a type of the genus Octojuga Kuhner, said to distinguish itself from the genus Clitopilus by the greater number of sides on the spores. Clitopilus pinsitus Fr., formerly placed in the genus Pleurotus, has some spores with sides that are not very well defined and thus its relationships to the genus Pleurotus are indubitable and the evolutionary branch of the genus Pleurotus to the genus Clitopilus is thus evident.

4. The genus Crepidotus has also some close similarities with the genus Pleurotus and all the sub-family of the Pleurotoideae. Pleurotus septicus Fr. (in the sense of Schroeter and Pilat, not of Bresadola and Favre) relates the genus Crepidotus to the sub-genus Pleurotellus of the genus Pleurotus. This species has white lamellae in youth, then becoming yellow and later almost brown, and the carpophores are, at maturity, very easily confused with species of the genus Crepidotus. It goes without saying that the brown coloration of the lamellae in Pleurotus septicus Fr. at maturity is not at all because of the spores—at least not principally—but is due to the resinous brown excretions of the basidia and the subhymenium. Under the microscope the spores are subhyaline and only in some old specimens, they are sometimes yellowish brown. The spores, however, are not of pure white, but

generally a bit yellowish-brown. In the form of the spores it is similar to other species of the genus Pleurotus-Pleurotellus, and there would be no sense in transferring it to the genus Crepidotus only because ~~mf~~ the sporic system is not pure white.

5. A characteristic genus also of the same type as the genera Pleurotus, Crepidotus, Claudopus or Clitopilus is Melanotus Pat. (Tax. Hym. 175. 1900--Murrill, Agar. of Tropical North America - VII, Mycologia 10:16. 1918). By the form of the carpophores it completely reminds one of the genus Crepidotus, but it has deeper colored lamellae at maturity and its spores are deep-brown-purple with the apical germ-pore very distinct. It shows thus a crepidotical type of the genus Hypholoma Fr. em. Pat. Several species seem to belong to the genus Melanotus, for example, Melanotus musicola B. and C. (Crepidotus musicola Sacc., Syll. Fung. 5:883. 1887) of Cuba, then Melanotus fumosifolius Murrill, Mycologia 10:16, 1918 (=Hypidotus fumosifolius Murrill, North Amer. Fl. 10:156. 1917) of the isle of Jamaica. In the herbarium of the Museum of Natural History in Paris I found a specimen of the species Melanotus bambusinus, of which I have made a microscopic study (Crepidotus bambusinus, Herbarium missionis Tunquini occidentalis No. 4464, H. Bon.). The genus Melanotus Pat. is from the anatomical point of view so close to the genus Hypholoma Fr. em. Pat. that it should belong, evidently from the phyllogenetic point of view, to the neighboring group of genera that form the sub-family of Coprinoideae. It resembles the genus Crepidotus Fries only in the form of the carpophores. In spite of this it shows a branch of evolution which probably had its origin also in genus Crepidotus Fr.

6. Crepidotus panuoides Fr. occupies a special position in the genus Crepidotus Fr., because it forms a transition between the genus Crepidotus Fr. and the family of Paxillaceae which in turn has very close similarities with the Boletaceae. Since it has a bilateral trama, most of the most modern authors place it directly in the genus Paxillus. However it distinguishes itself rather by the form of the carpophores and also by other traits it makes one think of close similarities with the genus Crepidotus; I have therefore placed it as a special sub-genus in Crepidotus. Gilbert has created for this mushroom a separate genus, Tapinella Gilbert 1931, where it belongs perhaps together with the other American species, Tapinella corrugata Atkinson 1900. The bilateral trama, as it is not a characteristic of great importance from the phyllogenetic point of view in my opinion, for it is found, for example, in the family of Paxillaceae, that is to say in perhaps the most primitive family of all the Agaricineae, which unites Agaricineae with the Boletaceae, and again in Amanita which we regard as the most perfectly organized as the Agaricineae.

As one sees from that which precedes, the genus Crepidotus is related by numerous forms of transition with other genera, sub-families and families of Agaricineae and makes us thus have a glimpse in part of the polyphyletic evolution of this group of mushrooms.

The synoptical table of affinities is approximately as follows:

Crepidotus haustellaris→Naucoria→Naucorcoideae

Clitopilus→Entolomoideae (Rhodogoniosporae)

Dochmiopus→Clitopilus pleurotelloides→Jugasporaceae

Pleurotus septicus→Pleurotellus→Pleurotoideae

Melanotus→Hypholoma→Coprinoideae

Crepidotus serbicus→Cr. macedonicus→Cr. panuoides→Paxillus→ Paxillaceae.

REMARKS: The best and surest characteristic to distinguish between the different characteristics of the genus Crepidotus Fr. are the spores. Their form and size vary a lot in the different species, also the quality and coloration of the cellular membrane are very different, and they give thus a number of reliable characteristics by the difficult systematics of this neglected genus. The spores are smooth or verrucose or aculeate, sometimes very distinctly, sometimes very weakly. In the species in which the verrucosity of the cellular membrane is very weak, it is poorly visible under the microscope and it is quite recommended to study the spores of these mushrooms, with great care and under a considerable magnification.

In order to soften the dried matter in order to obtain microscopic preparations, I obtained the best results with a solution of 10% of KOH in water. When we transport with a stick in a glass a drop of this alcaline solution on a glass slide and place there a fragment of lamella—preferably of the edge, which we transport with the moistened point of a needle in preparation—it softens in the drop in a few seconds. By weak pressure on the glass on top we easily obtain a sufficient thinness of the preparation without the hymenium's being too dispersed.

CREPIDOTUS (Fr.) Quel.

(Translation by Carole Adam, pp. 5-10, from Pilat: Monographie des espoces europeenes du genre Crepidotus Fr., 1948.)

Tiny mushrooms or of medium size, growing on rotting wood or other vegetal debris, more rarely on living mosses, rarely on the ground. Thin fleshy cap, with a surface which is generally a little tomentose or shaggy, more rarely glabrous, rarely with a gelatinous layer; of a rather small size most often (1-5 cm.) or small (0.1-1 cm.). A stipe is often developed, but generally visible only in youth. It ceases soon to grow, and as the cap continues to grow rapidly, the stipe disappears almost completely in maturity and the cap is then sessile (attached only) at the side. When the cap is appressed on the substratum with a part of the dorsal surface, a part of the cap surface can also become attached secondarily in certain species. More rarely the stipe is visible also in maturity and distinctly developed, but in this case it is generally curved in an arc or half circle and is laterally attached to the substratum. Lamellae are soft and fleshy, at first generally white or pale, more rarely intensely colored in youth, later colored by the spores brown, argillaceous brown, to rubiginous, or brown with a flesh pink tint. Spores are spherical or ellipsoidal, smooth or aculeate or verrucose, brown, yellow brown, argillaceous or ochre flesh color. Cheilocystidia are almost always developed on the edge of the lamellae, but generally not very striking, with thin walls, fusiform-bottle shaped or of similar forms, with thin walls, not too different from the sterile basidia. Always without cystidia on the surface of the lamellae.

DISTRIBUTION: The species of this genus are distributed over almost the entire surface of the globe. The non-European species are not very well known, and it is quite difficult to indicate the total number of species. The same species as in Europe seem to grow also in America. There have been described, at least in the temperate zone, a much larger number of species than that which exists in reality. Our monography reviews the representatives in Europe and in the temperate zones of Asia. I have not had on hand a single species of North America that does not also grow in Europe. One can conclude from its distribution that the genus Crepidotus is of a very old origin and that it seems to represent one of the archtypes of the Agaricineae.

AFFINITIES: From the phylogenic point of view the genus Crepidotus is rather inhomogenous. All totaled one can say that it is related to the genus Pleurotus among the mushrooms, with brown spores. Some authors have tried to divide it in several genera, but in my opinion without great success. For this reason, I adhere more or less to Fries, and divide it only in 12 sub-genera. This concerns almost exclusively only the primitive types of Agaricineae with brown spores, just as we place the primitive types of mushrooms with white spores in the genus Pleurotus.

The evolution of the Agaricineae was evidently achieved in a polyphyletic manner, and we cannot at all expect homogenous forms among the primitive types. Thus for example the shading of color of the spore system is very variable among the different species, and there are perhaps no two species with exactly the

same tint of spores. Then some difficulties are caused by the species with a very tiny receptacle, where the spores are often not very numerous and leave only very little powder on paper; it is also very difficult to determine the shade of color, even by comparison. Because of the great variability in the color of the spores in this genus, I do not consider legitimate the genus Dechmiopus Pat., recognized especially by the French mycologists. Its examples are evidently in all characteristics so narrowly related to certain (species of) Crepidotus with brown spores, that one can not at all in this case accentuate the weak rose tint of the spore system, as I shall demonstrate.

The genus Crepidotus Fr. that I place under the independent sub-family of Crepidotoideae forms in my opinion a transition between the Pleurotoideae with a hyalin spores and the mushrooms with colored spores. In the course of evolution it has given origin to a whole series of genera that we place today in different other sub-families. These characteristics (affinities) are approximately the following:

1. The genus Crepidotus has the closest and narrowest similarities to the sub-family of Naucorioideae. It is especially Crepidotus haustellaris Fr., which is very similar to the genus Naucoria in all respects, and there are authors which place it under the name of Naucoria effugiens Quel. in this genus. Konrad and Maublanc place the Crepidotoideae in our manner among the Pleurotoideae, but I believe it is not a very good solution, for by the coloration of the spores, their ornamentation and cheilocystidia, they are more similar to Naucoricoideae. R.

Singer who, I believe, overestimates in his phyllogenic system the importance of shades of color in the spore system, divides the genus Crepidotus in the manner of Fries in two genuses, as also the French authors do this (Crepidotus Fr. and Dochmiopus Pat.). And he does not place these genera one beside the other, but he places his genus Crepidotus with a rust spore system among the Cortinacoideae relating it with the genus Flammula, and the genus Dochmiopus Pat., with reddish brown spores among the Plearotoideae. In his recent work (Lilloa 13:74, 1947) Singer has changed his opinion and no longer looks at Dochmiopus as generically different from Crepidotus. An erroneous opinion on the genus Dochmiopus and its importance in the system is in my opinion, also expressed by Patouillard, the author of the said genus, who places it directly after the genus Claudopus, with rose spores, costess (Entomoloideae=Rhodogomosporeae). The species of the genus Dochmiopus Pat. have not, aside from a pale rose tint of the spores, anything in common with the sub-family of Entomoloideae, and, on the contrary, are extraordinarily similar to species of the genus Crepidotus, with a sporic system of a characteristic brown. Rea places Crepidotus variabilis Pers. and Cr. cesatii Rab. (=Cr. sphaerosporus Pat.) even directly in the genus Claudopus, and thus he mixes some examples of two sub-families absolutely different in one genus.

The rose color of the spores, or rather the rose tint only of their color is not at all in my opinion a very important characteristic from a phylogenetic point of view, because the rose coloration of the spores is repeated in different genera

of groups that are most varied of the Acaricineae, which he makes us place far from one another in the system, because aside from the rose tint of the spore system they have no other characteristics in common. Thus the Entomoloideae, for example, have no similarity to the genus Volvaria and Pluteus. A rusty spore is found also in the genus Rhodotus which is evidently related to the genus Crepidotus, but which is also related to the sub-family of Pleurotoideae. Likewise, the genus Phyllotopsis Gilb. and Donk (P. nidulans), which I placed as a section of the genus Pleurotus in my monography of this genus, has also a rosy sporic system. When we find a rosy spore system among the genera Rhodopaxillus R. Maire and Rhodocybe R. Maire, which evidently belongs to the near relative of the genus Tricholoma. The Jurenaceae (Clitopiloideae) have also a rosy spore system. Thus I cannot see in the weak rose tint of the spores of the genus Eccilia Fat. a characteristic of cardinal importance when the other morphological and anatomical characteristics agree with those of other species with brown spores of the genus Crepidotus Fr.

2. Evidently we find certain relationships of the genus Crepidotus also with the family of Entomoloideae, but rather in the morphology of the receptacle than in the anatomical characteristics. A similar transition type is the genus Claudopus Fr. of which the receptacle corresponds in its form completely to the receptacles of the genus Pleurotus; however the spores are costaea, rose, just as we find them also among other genera of the sub-family of Entomoloideae.

3. We find certain relationships also with the family of Jugasporaceae which has also a pink spore system. - again rather in the exterior formation of the receptacles than in anatomical similarities. A similar relationship with the genus Clitopilus is, for example, Clitopilus chioneus (Pers.) Pilat (=Clitopilus pleurotelloides [Kuhner] Joss.) and also Cl. pinsitus (Fr.) Joss. The first of these species was described for the first time by Kuhner as a type of the genus Octojuga Kuhner, said to distinguish itself from the genus Clitopilus by the greater number of sides on the spores. Clitopilus pinsitus Fr., formerly placed in the genus Pleurotus, has some spores with sides that are not very well defined and thus its relationships to the genus Pleurotus are indubitable and the evolutionary branch of the genus Pleurotus to the genus Clitopilus is thus evident.

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REMARKS: The best and surest characteristic to distinguish between the different characteristics of the genus Crepidotus Fr. are the spores. Their form and size vary a lot in the different species, also the quality and coloration of the cellular membrane are very different, and they give thus a number of reliable characteristics by the difficult systematics of this neglected genus. The spores are smooth or verrucose or aculeate, sometimes very distinctly, sometimes very weakly. In the species in which the verrucosity of the cellular membrane is very weak, it is poorly visible under the microscope and it is quite recommended to study the spores of these musaroceae, with great care and under a considerable magnification.

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CREPIDOTUS

Key to European Species

by Albert Pilát

(Translation by L. R. Hesler)

1a. Spores entirely smooth.....2

1b. Spores in general punctate or warty, verrucose or aculeate (prickled). Frequently the roughness or the verrucosity of the cell membrane must be examined carefully and under great magnification.....16

1c. Spores with longitudinal parallel ribs. In side view (spores) appearing ellipsoid or amygdaliform, and when the ribs are poorly developed the spores appear round. In one view of the spore apex, that is in a transverse optical section, the spore appears pentagonal to octagonal. Spores sub-hyaline or faintly ochraceous-brown-rose. Sporee (deposit?) rose. Cf. the genus Clitopilus! Species growing on wood or mosses, which are confused with the genus Crepidotus, cf.....30

2a. Stipe distinctly developed and also distinctly visible in the adult carpophore.....3

2b. Stipe none, or stipe visible only in the young carpophore, at maturity sessile on the substratum, or narrowed in form toward the base.....4

3a. Carpophore (pileus) brown, clay (or), dark-gray, then dusky, stipe distinct, more often the pileus semi-circular, grayish-dark-brown or brown. Fungus of the aspect of Naucoria to which it is related,—growing on dead twigs and on wood of trees and shrubs.....
.....C. haustellaris (Fr.) Quel. (p. 36)

3b. Carpophore clear dingy fawn (rust), almost whitish, with stipe reddish-brown. On leaves and stalks of dead herbs, more rarely on other plants.....
.....C. phillipsii (B. & Br.) Sacc. (p. 40)

4a. Carpophore (pileus) usually less than 20 mm.....5

4b. Carpophore usually more than 20 mm.....10

5a. Spores ellipsoid-elongate.....6

5b. Spores ellipsoid or broadly ellipsoid.....7

5c. Spores spherical, hyaline. Carpophore small, in the form of a shell, gray to black.....Pleurotus applicatus (Batsch) Fr.

5d. Spore ellipsoid-cylindric to subcylindric-fusiform, strongly narrowed obliquely toward the base, 7-9 x 2.3-3 μ, hyaline or faintly brownish or yellowish. Lamellae white, later yellowish brown when dry. Carpophore minute, membranous, in the form of a shell, white, 5-10 mm. diam.....Pleurotus septicus Fr.*

6a. Spores perfectly smooth. On branches or on soil.....C. bresadolae Pilat (p. 46) (= fuliveccus Bres.)

6b. Spores finely punctate. More often on twigs of higher plants, more rarely on wood of trees or leaves of shrubs.....C. luteolus Lamb. (p. 58)

7a. Spores ellipsoid, sub-amydaliform.....+7

7b. Spores short-ellipsoid to subspherical.....9

+7a. Spores in water yellowish-brown, in KOH dark rusty. Carpophore (pileus) 8-14 mm. broad, round, with a very short lateral stipe or generally without stipe and sessile, surface rusty, sulfur powdery toward the margin. Spores ovoid-ellipsoid, smooth, 9-10 x 6-6.8 μ.....C. hibernicus Pearson (p. 73)

+7b. Spores not themselves colored, darker in KOH.....8

8a. Spores perfectly smooth.....C. lundellii Pilat (p. 48)

8b. Spores minutely verrucose. Especially on bark of Robinia pseudacacia.....C. subverrcisporus Pilat (p. 51)

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*Pleurotus septicus sensu Schroeter et Pilat=Pleurotus chioneus sensu Quelet, Favre, Bresadola. Pleurotus chioneus sensu Pilat=Clitopilus pleurotelloides (Kuhner) Joss. But this name does not have priority because the species of older authors are identical, e.g. Pleurotus canus Quelet in Bresadola, Agaricus arenarius Lasch,? Pleurotus hobsonii Berk., Pleurotus perpusillus auctorum p. p.? Pleurotus juniperi Vel., Pleurotus epilobii Velenovsky,? Pleurotus subplicatus Karsten, Pleurotus striatulus Lange, Pleurotus alveolus Velenovsky, ?Pleurotus subsepticus Hennings.

9a. Pileus white, slightly yellowish-ocher when dry. Lamellae at maturity clay-brown. Spores smooth..... .....C. lundellii var. subglobisporus Pilat (p. 50)

9b. Pileus white. Spores smooth, hyaline or subhyaline, mostly ovoid, 7.5-9.5 x 4.5-6 µ, generally with eight longitudinal ridge, more or less distinct, which show better when the spore in the preparation is with its long axis parallel to the axis of the microscope (Clitopilus pleurotelloides [Kuhner] Joss..... .....Clitopilus chioneus (Pers.) Pilat

9c. Pileus cinnabar to nearly carmine. Lamellae edges carmine, whitish in youth, then ocher to rusty. Spores globose, ovoid, to subpyriform, very finely and obscurely distinctly verruculose..C. cinnabarinus Pk.(p. 71)

10a. Pileus surface covered with a gelatinous layer which is easily separable.....11

10b. Pileus not covered with a gelatinous layer.....12

11a. Pileus glabrous, white or whitish, then yellowish ocher.....C. mollis (Schaeff.) Quel. (p. 24)

11b. Pileus at maturity ocher clear-yellowish, with darker appressed squamules..C. mollis var. calolepis (Fr.) Pilat (p.28)

12a. Recalling all the likeness of C. mollis but the gelatinous layer not as distinctly developed..... .....C. mollis var. pseudoapplanatus Pilat (p. 30)

12b. Species of other characters.....13

13a. Spores less than 7 µ long. Species growing on wood.....14

13b. Spores more than 7 µ long. Species growing on soil or on wood or on vegetable debris buried in the soil.....15

14a. Spores spherical, 5-5.5 µ. Trama of lamellae not bilateral.....C. serbicus Pilat (p. 21)

14b. Spores mostly ellipsoid or ovoid, 5.5-6.5 x 3-4 µ. Gill trama bilateral. Lamellae distant..... .....C. panuoides Fr. (p. 18)

15a. Spores mostly ovoid, not amygdaliform, 7-8.5 x 5-5.6 µ..... .....C. caspari Vel. (p. 44)

15b. Spores mostly ovoid, citriniform, mostly amygdaliform, 7-10 x 4.8-5 µ, darker than in C. caspari..... .....C. fragilis Joss. (p. 42)

16a. Spores perfectly spherical. Pileus large, 1.5-5 cm. broad.....17

16b. Spores not perfectly spherical, however they are somewhat short ellipsoid or ovoid or spherical, but never regularly spherical. Pileus usually small.....19

17a. Spores 6-7.5 μ in diameter..... .....C. applanatus var. globiger (Berk.) (p. 36)

18b. Pileus surface rusty brown, finely tomentose, later usually darker tomentose-squamulose, the background lighter (in color).....C. applanatus var. crocophyllus (Berk.)

19a. Pileus 3-4 cm. broad. Spores spherical to ovoid-pyriform, 5.5-6.2 x 4.6-5 μ.....C. macedonicus Pilat (p. 22)

19b. Pileus smaller.....20

20a. Pileus 5-8 mm. broad, yellowish-citrin. Lamellae citrin to more yellowish brown. Spores spherical or mostly ellipsoid, aculeate, 5-6.5 x 5-6 μ..... .....C. larseni Pilat (p. 74)

20b. Species with other characters.....21

21a. Pileus cinnabar. Lamellae edges carmine..... .....C. cinnabarinus Fr. (p. 71)

21b. Pileus of a different color.....22

22a. Spores minute, short cylindric-ellipsoid, very finely and short-verrucose, 5.5-7 x 2.8-3.5 μ..... .....C. variabilis (Pers.) Quel. (p. 52)

22b. Spores ellipsoid, narrowed toward the apex, obliquely pointed-verruculose, subargillaceous, 6-7.2 x 3-3.7 μ. Possibly only a variety of the preceding species from which it is distinguished by slightly different form of spores.....C. microsporus (Karst.) Pilat (p. 56)

22c. Spores larger or of different form.....23

23a. Spores spherical-ovoid to subspherical.....24

23b. Spores longer (more oblong), ovoid, amygdaliform or ellipsoid.....25

24a. Carpophore minute. Pileus 1-2 mm. broad. Stipe almost always distinctly developed, also at maturity, sessile only on living mosses. Spores subspherical or short-ovoid, with wall very finely verruculose, 8-9 x 7-8 μ in diameter.....C. carpatorossicus Pilat (p. 70)

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24c. Carpophore larger. Pileus 5-20 mm. diameter, on decaying wood. Without stipe or with an entirely white stipe. Spores ovoid-rounded, distinctly pointed-verruculose, 7-10 x 6-8 μ.....C. cesatii Rab. (p. 60)

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30b. Pileus 15-40 mm. broad, semi-orbicular or flabelliform, narrowed wedge-shaped at the base, pure white or a little yellowish, frequently lobed at the margin. Lamellae white, then ocher to rose tinted. Spores ellipsoid-amygdaliform, with ridges common and in optical section obscurely visible heptagonal or octagonal; they (spores) are then almost regularly ellipsoid-amygdaliform, 7.5-9 x 4.6-5.3 μ. (Claudopus pseudo-pinsitus Kuhner,? Pleurotus passeckerianus Pilat).....Clitopilus pinsitus (Fr.) Joss.

CREPIDOTUS

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by Albert Pilat

(Translation by L. R. Hesler)

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3b. Carpophore clear dingy fawn (rust), almost whitish, with stipe reddish-brown. On leaves and stalks of dead herbs, more rarely on other plants.....C. phillipsii (B. & Br.) Sacc. (p. 40)

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5c. Spores spherical, hyaline. Carpophore small, in the form of a shell, gray to black.....Pleurotus applicatus (Batsch) Fr.

5d. Spore ellipsoid-cylindric to subcylindric-fusiform, strongly narrowed obliquely toward the base, 7-9 x 2.3-3 μ, hyaline or faintly brownish or yellowish. Lamellae white, later yellowish brown when dry. Carpophore minute, membranous, in the form of a shell, white, 5-10 mm. diam.....Pleurotus septicus Fr.*

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9a. Pileus white, slightly yellowish-ocher when dry. Lamellae at maturity clay-brown. Spores smooth..... .....C. lundellii var. subglobisporus Pilat (p. 50)

9b. Pileus white. Spores smooth, hyaline or subhyaline, mostly ovoid, 7.5-9.5 x 4.5-6 µ, generally with eight longitudinal ridge, more or less distinct, which show better when the spore in the preparation is with its long axis parallel to the axis of the microscope (Clitopilus pleurotelloides [Kuhner] Joss..... .....Clitopilus chioneus (Pers.) Pilat

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29b. Spores 6-7.5 x 5-5.7 μ, short ovoid, finely but distinctly verruculose, aculeate, brown rust pale clay, non-guttulate. On living mosses or on sandy soil among mosses.....C. subepibryus Pilat (p. 68)

30a. Pileus 4-15 cm. broad, at first with a small stipe, then sessile at a point, quite similar in form to C. variabilis. Lamellae rather close, white, ivory, then pale ocher with a slight rose tint. Spores ellipsoid-amygdaliform, with 5-8 rather distinct longitudinal ridges, and in horizontal optical section the spore is distinctly pentagonal-octagonal, under the microscope perfectly hyaline. (Crepidotus [Octojuga] variabilis Fayod non Fr. nec Pers., Octojuga pleurotelloides Kuhner, Octojuga fayodi K. & H., Clitopilus pleurotelloides [Kuhner] Joss., Pleurotus romellianus Pilat..Clitopilus chioneus (Pers.) Pilat

30b. Pileus 15-40 ma. broad, semi-orbicular or flabelliform, narrowed wedge-shaped at the base, pure white or a little yellowish, frequently lobed at the margin. Lamellae white, then ocher to rose tinted. Spores ellipsoid-amygdaliform, with ridges common and in optical section obscurely visible heptagonal or octagonal; they (spores) are then almost regularly ellipsoid-amygdaliform, 7.5-9 x 4.6-5.3 μ. (Claudopus pseudo-pinsitus Kuhner,? Pleurotus passeckerianus Pilat).....Clitopilus pinsitus (Fr.) Joss.

2. CREPIDOTUS SERBICUS Pilát

Crepidotus serbicus Pilát in Bull. Soc. Myc. of France, 53: 82, 1937. (Transl. from Pilát, p. 21)

Cap 3-10 cm, ochre or ochre-brown, tomentose-shaggy, lighter at a young age, effuso-reflexed, concoid, elongated and slightly narrowed at the base, sessile on the side and a part of the back, thin flesh, thin and furrowed at the edge, lobed and undulated in maturity. Lamellae olive ochre tinted, branched, often undulated, decurrent at the base, moderately spaced. Flesh whitish, pale ochre and fragile when dry, liberally interlaced with hypha, with rather thick partitions, hyalin, thickness of 3-5.5 μ. Cuticles not differentiated. Trama of the lamellae not bilateral. It is composed of hyaline hypha, with rather thick partitions, thickness of 2.5-3.5 μ. Subhymenium has thickness of 15-20 μ. Basidia cylindrical-clavate, 20-30 x 3.5-4 μ. Spores pale clay brown or ochre yellowish brown, distinctly colored under the microscope, regularly spherical, with a little apiculus, smooth, generally with a small oil-drop, 5-5.5 μ in diameter.

Translated from Pilát

3. CREPIDOTUS MACEDONICUS Pilát

Pileus developed unilaterally, conchoidal, elongated, sessile by the flank or in part effuso-reflexed, adhering to the substratum with the base contracted, 3-4 cm broad, with part stretched out more or less in a half-circle and part of the base more or less contracted in a corner, suggesting strongly Crepidotus panuoides Fr. in its form, size and coloration, tomentose shaggy on the surface, when dry roughly shaggy, thin and fragile flesh. Lamellae rather close, clayish brown, deep brown in exsiccati, thin and fleshy. Tramal hypha thick, 5-15 μ, subhyaline, with very thin and later limp partitioned, freely inter-laced in all directions, not bilateral. Edges of the lamellae homomorphic. Thickness of the lamellae 50-70 μ. Trama of the cap of hyalin hyphae, limp, freely inter-laced in all directions, most often thickness of 4-8 μ, continue to the surface of the cap in shaggy piles. Cuticle not developed. The hyphae at the surface of the cap end obtusely and are 5-8 μ broad. Basidia, 15-25 x 4-7 μ, indistinct. Subhymenium of hyphae 5-6 μ not very distinctly developed. Cystidia none. Spores spherical or ovoid-pyriform, clayish yellowish brown, distinctly verrucose, contracted in a distinct apiculus, with or without a drop of oil, 5,5-6,2 x 4,6-5 μ. (Description based on dried specimens!)

4. CREPIDOTUS MOLLIS

(Transl. from Pilat, p.24)

Cap 3-5(8) cm broad, semi-circular, ovoidal to reniform, entirely or almost sessile, often slightly narrowed to a wedge at the base, around the base shaggy tomentose, white, elsewhere on the surface smooth and glabrous, more rarely with squamulae that are appressed brown, white or whitish, then yellowish ochre, later clayish yellowish, elastic, hygrophanous, in the humid state with transparent lamellae at the edge of the cap, covered over at the surface with a gelatinous zone, which may be peeled and is elastic like gum, thin and a little involute at the edge. The receptacles grow generally in several examples one on top of another or imbricated. Stipe none or lateral and entirely stunted, whitish and shaggy white. Lamellae close, narrow, and decurrent at the base, later rather broad and even ventricose, at first pale, then cinnamon colored, dirty brown to gray brown. On the surface, the cap is covered by a thin bed, 20-25 μ thick, of hypha, yellowish brown, sometimes projecting, shaggy-tomentose, very evident, 4-6 μ broad, brown, but with rather thin partitions, that later dissolve into mucilage coloring the mucilage a little bit brown, and at this time the mucilage is also covered with spores that stick together there upon falling there. Under this thin superficial bed is the gelatinous, gummy bed, thickness of 100-180 μ, composed of gelatinous, agglutinated hyphae, with a breadth of 4-5 μ, more or less parallel to the

surface of the cap, hyaline, then becoming brown. It is only under this gummy bed that the properly said trama of the cap continues, composed of interlaced hyphae in all directions, hyaline, with thin partitions, very branched and tortuous, 5-7 μ broad. Trama 1-2 mm thick, except in the small pilei. Moderate taste, weak odor, not striking. Basidia 26-30 x 7-8.5 μ. The edges of the lamellae are heteromorphic, with hyaline cheilocystidia, cylindrical-fusiform, elongated, 30-60 x 6-15 μ, rather resembling the immature basidia, then longer and thicker, being thin here, rather inflated elsewhere. Spore mass rusty brown. Spores under the microscope are rusty, ovoidal-ellipsoidal, smooth, with a granular content, (6.5)8-9(10) x 5-6 μ.

4. CREPIDOTUS MOLLIS var. CALOLEPIS

(Transl. from Pilát, p.28)

Cap is ochre brown when dry, dark brown squamulose, white tomentose at the base. It is distinguished from the type by its pilei with a surface covered by brown, appressed squamulae, and flecked, that are formed by the most elevated bed, thin, with yellowish brown hypha, thickness of 6-9 μ, often incrusted with granules at the end, and ending obtusely, which cover the gelatinous layer at the surface. The gelatinous layer (bed) has a thickness of 100-200 μ, composed of hyphae having a thickness of 5-6 μ, subhyaline. Under the gelatinous layer there is sometimes a thin layer of brown tinted hypha, which separate it from the cap trama proper, composed of hyphae of 5-9 μ, with thin partitions, hyaline, non-gelatinous, freely interlaced-coralloidal in all directions. The rain easily takes away the brown superficial layer, which forms squamulae at the surface of the cap, and it is therefore distinctly developed only in specimens growing in dry weather (cf. also Schuberth, Zeitschrift für Pilzkunde, 9:77, 1933). Basidia 20-30 x 6-8 μ. Cheilocystidia 30-40 x 10-18 μ. Spores are ovoidal-ellipsoidal, 7-9.5 x 5-6.5 μ. Spore development is a dull rusty brown color.

Distribution: On wood of leafy trees, but most often on tremble (Populus tremulus) in Northern forests with a dry climate. Then it grows, however, in all the temperate zone of the Northern hemisphere and in Australia (?), in summer and in autumn, exactly as the type. In Europe it is much rarer than the type. The

gelatinous layer is relatively thicker in the young receptables than in maturity, because it does not get thick anymore, whereas the trama formed by a cottony tissue, non-mucous enlarges its volume considerably in maturity. This variety is found most often on Populus tremulus, but it is not rare on other deciduous trees. It generally has more inflated and a little broader cystidia than the type; but this form isn't a constant characteristic and indeed I do not think that one should attribute a greater systematic importance to it. I have seen the following specimens:

- -.

4. CREPIDOTUS MOLLIS var. PSEUDOAPPLANATUS

(Transl. from Pilát, p. 30)

Pileus 4-5 cm broad, with flesh 1-2 mm thick, whitish or sub-ochre, tomentose-appressed. Trama of the cap of hyaline hypha, 4-6 μ thick, with thin partitions, interlaced in all directions. Indistinct gelatinous layer, thickness of about 100 μ, with brownish, agglutinated, indistinct hyphae. Without thick hypha characteristic at the surface of the cap. Spores are usual in this type, ovoidal-ellipsoidal, 8-9 x 5-6 μ. In the form of the pilei and of the surface of the cap it rather resembles C. panuoides Fr., but the spores are completely different.

Pilát: Translation by PT

Pilat: CREPIDOTUS

IV. Subgenus Sphaerocrepidotus

5. Crepidotus applanatus (Pers. ex Fr.) Karsten, Tab. 2-11

applanatus sensu Quélet, Rea = C. fragilis Joss.
applanatus sensu Ricken, Velenovsky = C. mollis (Schaeff.) Quel.
atkinsonii Bres. = C. applanatus (Pers.) Karsten

Carpophore 1.5-5 cm. broad, at maturity broader than long, distinctly lateral, in youth usually spathulate or eccentric-stipitate, then with a short basal stalk, finally sessile almost at a single point at the side. In the young stage the stipe is almost always distinctly developed. While the pileus is entirely young it is subcentral, then eccentric, lateral and at maturity reduced to at the base to a point, villous or hirsute, which is ivory-white. Because the stipe almost ceases growth, it is then suppressed by the more luxuriant growth of the pileus. Pileus at maturity auriculate-reniform or sessile-flabelliform, sessile with a white villous area at the substratum, the surface more often distinctly hygrophanous, but not gelatinous, merely the flesh moist, in youth slightly hygrophanous, for a long time ivory white, then strongly hygrophanous along the margin, insipid isabella (isabelle) or dingy yellowish, on drying soon ochraceous, glabrous, merely slightly hirsute on the surface at the base, the margin thin, in youth distinctly and narrowly incurved, then rounded, circular,

or subglobose, when wet the margin distinctly striate by the lamellae showing through, on the surface the cuticle not distinctly developed. In youth, the carpophores mostly by their light coloring resembling the pileus and the lamellae of the genus Pleurotus Fr. LAMELLAE very close, of unequal length, simple, rarely slightly forked, at first narrow, then of medium height (breadth), more narrow toward the margin and toward the base, in age rounded-free, and slightly softened, in youth (and) for a long time white, then clay-rusty, on drying (becoming) ocher, with the edge entire, concolorous, in age the lamellae entirely dark clay-brown. FLESH thin, tender, in the young stage merely elastic, white when dry, isabelle when wet, without any gelatinous zone, composed of close hyphae 4-12 μ, smooth, hyaline, faintly sinuate. Cuticle of the pileus filiform (filamentous), of close hyphae 4-10 μ , on the whole slightly differentiated from the trama, merely certain hyphal ends on the cap surface closely and slightly erect. BASIDIA with 4 spores, clavate, 17-25-5.5-7.5 μ, with erect delicate sterigmata. Without PLEUROCYSTIDIA. CHEILO-CYSTIDIA numerous, cylindric-clavate, apex obtuse (rounded), close (crowded?), apex slightly capitate but more often slightly striking, smooth, hyaline, delicate walled, 25-50 x 6-9 μ. SPORES clay-ocher, darker than the lamellae. Spores under the 'scope rather light brownish, spherical, with a slight apiculus at the base, 5-6.5 μ, finely punctate verruculose. Warts (punctations) 20-35 in number on one half of the spore, uniformly distributed on the entire surface, without a smooth

hilum on the surface. Taste and odor slightly fungoid, slightly noticeable.

DISTRIBUTION: On trunks and stumps of rotting or more often of half-decomposed deciduous trees, more rarely on conifers; species very abundant especially in mountainous forests. Much more rare in low country. In the Carpathians very abundant especially on beech wood. In summer and autumn, in any temperate zone of the northern hemisphere, and also in Africa and Australia.

REMARKS: Josserand has published a very good description of this fungus. A noteworthy phenomenon in this species is, among others, the great difference between youth and maturity. The young carpophores resemble well the species of Pleurotus; it is not until maturity that it manifests completely the characters of Crepidotus. Kauffman has described this (species) under the name Crepidotus stipitatus Kauffman; this is probably C. scalaris var. stipitata Killerman. But the same carpophores at maturity are also confused in the mycological literature. Crepidotus applanatus sensu Ricken and Velenovsky is C. mollis, sensu Quélet and Rea probably C. fragilis Josserand. From C. mollis it is distinguished by the absence of a gelatinous zone on the cap surface and by its entirely different spores. Identical with C. applanatus seems also C. scalaris Fr. Ricken gives for this species spherical spores, 6-7 μ. In the herbarium at Stockholm I found a single collection (specimen) determined thus: it is a young and poorly developed but nevertheless

C. applanatus. In Fries' herbarium at Uppsala is a collection labelled Agaricus nephrodes Berk. & Curt. collected by Ravenel in South Carolina. It is identical with C. applanatus. In the same herbarium I found a very poor collection of Agaricus malachius B. & C. from the Sprague herbarium. It has spherical spores, 5-6 μ, subverruculose, nearly smooth. A like collection is also in Ravenel, Fungi Carol. exsicc. fasc. 3, No. 2, from the Kew herbarium, described as C. mollis.

VARIABILITY: This species (is) rather variable (&) exhibits a series of forms difficult to define. The more characteristic is that with a squamulose-tomentose pileus, which is very ~~distant~~ distinct.

Var. fulvifibrillosus (Murr.) comb. nov.

C. fulvifibrillosus Murr., N. A. Flora 10:153. 1917.

C. applanatus var. kuzyanus Pilat, Actis Mus. Nat. Prague 2B:73. 1940.

?C. dorsalis Pk., N. Y. Mus. Rept. 24:1872. Kauffman, Agar. Mich. p. 525. 1918.

Cf. pls. 10-11, under the name "var. crocophyllus (Berk.) Pilat."

CARPOPHORES 3-4 cm. diameter, semi-circular flabelliform to tongue-shaped-flabelliform, almost without stipe, sessile at a side-point, attaching itself by a part of the back, slightly hygrophanous, 0.5-0.7 cm. thick. PILEUS rusty brown tomentose, then usually very finely tomentose-squamose appressed dark rusty

brown, lighter on the base. FLESH white, watery-fleshy soft, when dried cottony-coriaceous, about 4 mm. thick at the base of the pileus, 2-3 mm. at the middle. LAMELLAE 4-5 mm. broad, rather ventricose and crowded, pale ocher in youth, at maturity soft fleshy and rusty brown cinnamon. CUTICLE of the pileus of crowded hyphae 7-10 μ, delicately walled, slightly brownish, freely interwoven, with the tips sinuous in the form of hairs, rounded, narrowed above the cross-wall, 100-180 μ long. Under them a zone of compressed and glutinous hyphae, (the zone) 50-80 μ thick, passing from the cap trama of hyphae very freely interwoven, as in cotton, hyaline, of unequal thickness (4-10 μ), walls delicate. BASIDIA 22-28 x 6-8 μ, hyaline. SPORES regularly spherical, brown, very finely verruculose, usually uniguttulate, 5-6 μ diam. There are among the hairs (pubescence) sometimes spores 3 x larger, as in C. mollis Schaeff. Spores brown. The lamellae of this variety are (in color) saffron brighter than in the type.

DISTRIBUTION: On decaying trunks of deciduous trees, in the temperate zone of the northern hemisphere. (Point) rare in the Carpathians, but much more rare than the type.

Var. globiger Berk. Linn. Jour. 13:158. (Sacc., Syll. Fung. 5:879. 1887).

Resembles C. applanatus, but the spores are slightly larger, spherical, verruculose, pale clay.

DISTRIBUTION: Cayuga Lake Basin, N. Y., Murrill, 1898. (Specimen here as C. applanatus determined by Bresadola as C. dorsalis Pk. = C. globiger Berk.

6 - Crepidotus haustellaris

Generally isolated receptacle. Cap 0.5-1.5 cm in diameter, rounded kidney-shaped, convex flat, thin, fragile, clayish brownish gray, then deeper, rather cinnamon brown, smooth, finely pulverulent, villose, to glabrous, uniform at the edge or indistinctly striate by transparence, a little paling, weakly hygrophanous, in youth granulated villous whitish or farinous cristalline, then in part or entirely becoming glabrous, with an edge at first narrowly involute, then flat, striate toward the edge upon drying.

Stipe almost always distinctly developed, a little eccentric in youth, then very eccentric to sublateral, curved at the side, short, length of 0.5-4 mm, thickness of 0.5-0.8 mm, whitish when fresh, being crossed sometimes with a mycelian white disc at the base, which attaches it to the substratum, in youth covered with bloom as by dew, whitish, then becoming rather glabrous, grey brown to brown, when dry most often concolored at the cap. A part of the cap is generally also appressed at the substratum and often attaches itself there a little on crossing—but most often the cap is free. Stipe most often curved-under, directly under the cap and sometimes, therefore, not very visible at first sight.

Lamellae are rather large and close, becoming attached back to the stipe, more or less concolored at the cap, in maturity rusty clay color, rather deep, lighter on the edge, thin (70-90 μ), often a little undulated. Hyphae are almost hyaline, relatively thin, thickness of 3-5 μ.

Basidia have 2 or 4 sterigmata, 15-20 x 6-8 μ.

Spores pale greyish brown. Flesh of the cap has thickness of about 200 μ, with hypha that have thin partitions, pale brownish color, almost hyaline, at the surface of the cap ressembling cheilocystidia by the final (end) hairs that are clavate, most often straightened, apex capitate, almost hyaline, 25-40 x 3.5-6 μ. Such hairs are also on the stipe. Cheilocystidia not very striking, resembling the basidia, but longer, rounded at the top in the shape of a head, 30-40 x 4-5 μ, at the end a thickness of 7.5 μ. Spores are pale brown, largely ellipsoidal-form of a bean, very little contracted at the base, almost flat on one side, with a not very distinct apiculus, with one or several drops of oil not very refractive on the interior, with a smooth membrane, 8-9(10) x 5.5-6.5(7) μ. Pileus cuticle, where it is developed, is formed in age by dried, flattened hyphae, deeper than the trama of the cap: their ends in the form of hair has a length up to 40 μ and breadth of 2-4 μ; these ends are often incrusted. Trama of the cap of hypha interwoven in all directions, 3-5 μ thick, hyaline. Trama of the lamellae of hypha of the same kind.

Variation: form Capreae Vel. p. sp. (Crepidotus Capreae Velenovsky, Novitates Mycologicae Novissimae p. 76, 1947).

Lighter carpophore, with cap of pale ochre, 1-1.6 cm in diameter, striate half-way. Stipe is concolored to the cap, covered with bloom, white. Lamellae are rather light, pale clay color in the exsiccate. Spores as in this type.

On a rotting branch of Salix capraea to Mnichovice, VIII - 1943, h. NMP147350.

Remarks: The description of Crepidotus haustellaris Fr. given by Fries is not too clear. The illustration given by Cooke and his description given also by other English authors, are not too exact. But it is not very probable that they refer to another mushroom. The other European authors accept this species in our manner.

With the species understood in this way, Naucoria effugiens Quel. and Crepidotus mubi Berk. are identical. The size of the stipe is rather variable as also its insertion in the cap. Once the cap is perfectly lateral, elsewhere only a little eccentric. From the point of view of anatomy, it is necessary to compare this species rather with the genus Naucoria than with the genus Crepidotus —but on the other hand it resembles more the Crepidota in the shape of the cap: for example, Crepidotus Phillipsii B. and Br., is certainly very similar to them—although the spores are quite different.

Crepidotus Ragazzianus Bres., described from oriental Africa (Fekerie-Chemb) is also identical with Crepidotus haustellaris Fr. The description and illustration of Bresadola correspond to it, and there is also an agreement microscopically. In the herbarium at Stockholm there is found the original exsiccatae of Bresadola. It has ellipsoidal spores, bean shaped, rusty, pale yellowish color, 9-10 x 5-6.5 μ. At the surface of the cap, I found hairs with a thickness of 5-6 μ, rusty brown, granulated. In this herbarium is still found another labelled example as Crepidotus Ragazzianus Bres. leg. Torrend, in Portugal on Eucalyptus, III-1902. This exsiccata also, although rather badly preserved, corresponds well to Crepidotus

haustellaris Fr.

The south-African species Crepidotus proteus Kalchbr. has also a distinct stipe. It has spores that are largely ellipsoidal, relatively deep brown, with a distinct germinative pore, 7-8 x 5-6 µ. It belongs rather to the genus Melanotus Pat.

7. CREPIDOTUS PHILLIPSII (Berk. & Br.) Sacc.

Pileus 2-8 mm broad, reniform or subcircular, most often with a contour of two lobes, very thin, almost pellucid, generally a little curved, undulated on the margin, sometimes however almost regular, strongly striate by the lamellae which are interglistening, smooth, glabrous, clear pale fallow to ochre colored, lighter between the striae, acute on the margin, largely reflexed in youth. Stipe very short and very flexible, most often inserted at the fold between the two lobes of the cap, more rarely very excentric, length 1-3 mm, and thickness of about 0.5 mm, reddish brown or tinted pale ochre, slightly thickened at the base and generally attached to the substratum by a sparse, white and undulated mycelium, otherwise a little silky at the surface by the white fibers, elsewhere glabrous. Lamellae are rather close together, narrow, of unequal length, mixed with lamellae that are shorter of one or two different lengths, tho largest at the stipe, little by little becoming contracted toward the margin of the cap, pale brownish fallow. The entire thin membranous receptacle, at the time of the destruction of the preparation of a consistency slightly gelatinous. Spore deposit brown. Spores light brown under the microscope, very pale, in youth almost hyaline, ellipsoidal to ellipsoidal-elongated, with a germ pore not very distinct at the top, smooth, 7-7 x 3-3.5 μ. Basidia clavate, 15-20 x 5.5-7 μ. Cheilocystidia narrow bottle-shaped with a filiform neck, generally flexible to contracted in form of a rosary, 15-20 x 3-4 μ. Cuticular hyphae pale colored, septate, free, more or less inter-laced, radiating, thickness of 4-5 μ.

8 CREPIDOTUS FRAGILIS Joss.

Soc. Mycol. France 53: 218-220. 1937.

(Translation by Mrs Carole Adam Bradford)

Macroscopic characteristics

Cap 20-70 mm, of a very variable form: either flattened and pleuropodic as C. mollis, ~~or~~ zoom erected in a twisted conk as Pleurotus geogenius; regular or irregular, tender and fragile, rather thin, slightly hygrophanous (the flesh is), very dry; when saturated: slightly gray, clayish, earthy, even fuliginous; when dry: snow white; entirely decorated with a grooved felting which, when the cap is half dehydrated, produces a striking effect of rimosity which combs the cap with snow white and clayish gray streaks. Thin margin, narrowly rounded and hemmed with white on the young specimen; regular, but, more often, sinuous-scalloped-lobed. Non-defined cuticle.

Flesh is very thin at the margin, then thick toward the base, tender and slight, dark gray when saturated, white when dry, deprived of gelatinous layer.

Lamellae very close, very unequal: 9-15 lamellulae; simple rather narrow, thin, resembling the peculiarities of the form of the cap, rounded toward the base, more rarely ending in a point; fragile, at first almost white, then very pale clay color, then deep clay color; dark earthy color completely at the last. Edge entire or rough (?), a little paler.

Stipe noticeably absent, reduced to a point of attachment, felty white.

Spores in mass: deep clay color, earthy (olive tinged).

Microscopic characteristics

Basidia are 4-sporous, 25-33 x 7-8 µ.

Spores sometimes heterogenous but generally pointed, amygdaliform (tonsil shaped), bulging, with a summit sometimes stretched in an obtuse papilla; often with a large guttule; apicule is sub-null; smooth membrane, thinned out at the top, without one's being truly able to distinguish a pore; 7-9(10) x 4.8-5.8 µ.

No pleurocystidia. ? I found them in Bas' material

Numerous cheilocystidia, common, more or less cylindrical, a little sinuous, obtuse, not capitate, 25-40 x 6-10 µ.

Flesh composed of entangled hyphae, 6-20 µ broad, in which one sees a very thin layer with a parallel appearance, surmounted itself by the superficial felting, formed with very entangled, delicate hyphae, strongly vacuolated, 3-10 µ in diameter. No gelatinous zone.

Gill trama with large mediostrate formed with filamentous hyphae, 4-10(20) µ in diameter, regularly disposed, but undulous. Sub-hymenium is sub-cellular.

Clamps are present in the cuticle.

Common fungus odor and taste.

Habitat and distribution

Isolated or gregarious, on the ground or on rotten wood (Picea?). Moulin-chabaud (Ain), 14-9-1934, in company of M. Maury.—Bois de Laye, near Villefranche (Rhône), 10-7-1936. —Bois du Casino de Charbonnières (common of the Tour de Salvagny; Rhône), 25-9-1935.

Observations:

This species, of an extremely variable form, will be recognized by its delicate flesh, lacking any gelatinous layer, with its silky, rimous cuticle, streaked with snow white and clayish gray, finally by its pointed-tonsil formed, smooth spores.

Before describing now C. applanatus auct. mult., we shall make some remarks in regard to it that we have neglected in the discussion at the beginning, in order not to slow up proceedings.

C. applanatus of Bresadola has wider ~~larger~~ and less close lamellae than ours: small disagreement. This author attributes to his plant smooth spores, but the study of exsiccata coming from his herbarium has shown us that there was none of them. He synonymizes his species with C. dorsalis of Peck. This inclination does not seem to us to be well founded. Likewise, Bresadola makes a certain error when he identifies his applanatus to that of Ricken which is surely quite different and very close to C. mollis.

North America, in contrast to the old continent, is rich in Crepidota having round and punctuated spores. It is thus that Kauffman [22] gives C. crocophyllus, dorsalis, putrigenus,

stipitatus, malachius, and applanatus. Alone, the last three, extremely similar, can fit to our species. C. stipitatus resembles a very stipitated simple form of malachius. The last (1) has spores that are a little too large, lamellae a little too wide and also, a general tint that is not at all very satisfying. C. applanatus stays alone in line, and certainly, its description fits perfectly our French subjects: the applanatus of the Americans is ours.

We shall say, finally, that there has been indicated as synonyms to applanatus a certain C. globiger Berk., an exotic species about which we have been able to obtain no information. There are besides, a great number of exotic Crepidota with round and punctate spores of which it is difficult to say whether they are akin to our species or to the little Dochmiopius of the group of sphaerosporus.

9. Crepidotus caspari Velenovsky

Cap 2-5 cm diam., expanded flat obliquely, to hardly convex, cutting off at the edge and often torn; at maturity generally lobed to multiple lobed, surface glabrous, entirely non-hygrophanous, white, smooth, tomentose-ciliated, white only at the insertion, rounded or flabelliform, without stipe, sessile by the flank or at the base contracted in a corner. Flesh white.

Lamellae rather close, longer and shorter, delicate, very broad, rounded at the base, clayish ochre shade.

Cheilocystidia not very striking, in the shape of a bottle, with a head at their apex, or curved, of very variable shape. Basidia 20-25 x 7-8 μ. Trama of the cap with hypha that are rather freely interlaced wadded, thickness of 6-10 μ, generally refracted above the partitions and inflated in places, with thin walls, hyaline. Cuticle of the cap is non-differentiated. Spores are smooth, yellowish ochre tint or pale yellowish clayish rusty, lighter than in Crepidotus fragilis Joss., largely ovoid, with an apiculus at the base, not of tonsil shape, not guttulated, 7-8(8.5) x 5-5.6 μ.

Remarks: Species is closely related and very much resembling Crepidotus fragilis Josserand and Crepidotus bresadolae Pilat, which both grow also on soil or on vegetal debris buried in the ground. Crepidotus fragilis Joss. is distinguished by its deeper spores (also by its deeper spore wall, brown tending toward olive), in the form of a lemon or tonsil, with a large drop of oil distinct

in the plasmic content. Crepidotus pubescens Bres. is distinguished by its elongated spores, pale, of elongated ellipsoidal form, not tonsil shaped.

Crepidotus caspari Vel. is almost glabrous and does not have on the surface of the cap a torn furrowed cuticle, and at the half dry state it is not striolate, furrowing deeper when wet, as it is the case in Crepidotus fragilis Joss.

Without having seen the original specimens, one cannot say with certainty what is Crepidotus depluens of some authors. The agaric of Persoon and Bresadola, designated by this name, belong to the Rhodogoniosporae. Crepidotus depluens of Schroeter is perhaps identical with Crepidotus caspari Vel. Crepidotus depluens of Velenovsky (Ceské houby, p. 555) is perhaps identical with Crepidotus fragilis Joss., and it is perhaps also the case for the agaric described by Rea (British Basidiom. p. 455) under the name of Crepidotus epigaeus (Pers.) B. & C. and figured by Cooke on plate 516 A.

10. CREPIDOTUS BRESADOLAE n.n.

(Transl. from Pilát, p.46)

Cap 1-2.5 cm broad, 1 cm long, eccentric, thin fleshy, reniform or ovoidal, with a lateral, insignificant stipe, later without stipe, sessile on the side or in part attached also by the back, sometimes elongated subflabellate and sessile by the white shaggy base without a trace of a stipe. Lamellae moderately close, or rather distant, rather thick, at first white, then pale cinnamon or rusty yellowish clay color, with the edges most often paler. Flesh soft, white, almost without odor. Spore deposit cinnamon. Spores under the microscope quite pale clay color, non-guttulate, with an almost homogeneous content, more rarely cloudy, quite smooth, elongated ellipsoidal, pointed at the base with an insignificant oblique apiculus, flattened at one side, in the form of a slightly elongated bean, 8.5-12 x 5-6 μ. Basidia 25-30 x 7-8 μ. Hyphae of the trama are hyaline, 4-12 μ broad, rather abundantly partitioned, with thin partitions and generally narrowed above the partitions.

On soil, twigs, humus, etc., Czechoslovakia, Germany, Poland, Sweden, Italy, England.

Lange believes that C. scalaris Fr. belongs to C. pubescens Bres. But in the sense of Ricken it belongs to C. applanatus. Among most this species is quite obscure.

C. pubescens Bresadola 1930 has nothing in common with

Agaricus pubescens Flora Danica t 1073/2, 1792 which is a synonym of Crepidotus variabilis Pers., and this is why I employ another name to designate the species of Bresadola.

11. CREPIDOTUS LUNDELLII Pilat

Pileus 0.5-2 cm., more or less rounded or kidney-shaped, at first sessile by a dwarfed stipe, very excentric or lateral, that later is almost not at all visible and the cap is then sessile at a point with two lobes stretching around it in such a way that it is cordiform cut toward the point of insertion, almost stretched out by the flank or later also a little attached by the back, white on the surface, when dry pale ochre-like yellow, appressed or almost glabrous tomentose, only at the base shaggy white or attached to the substratum by a shaggy felt, membranous fleshy, for a long time involute at the margin, white. Stipe stunted, even in youth hardly visible, shaggy white, smaller than in Crepidotus variabilis or Cr. terricola, later disappearing completely. Lamellae ~~rather~~ moderately spaced, whitish in youth, then pale brownish a long time, later and in the dried mushroom deep ochre color to dirty dark clay color. Trama of the cap about 300 μ thick, with hyphae of thickness of 4-10 μ, with thin septa, a little inflated, hyaline, irregular, but not too close, interwoven, from the time of the maturity of the mushroom without plasmic content. Basidia 16-20 x 5 μ. Subhymenium not conspicuous. Cuticle of the cap not developed. Cheilocystidia abundant on the edges of the lamellae, round-headed, claviform, in form of a bottle, hyaline, 25-40 x 8-15 μ. Spores ovoidal-ellipsoidal, subamygdaline, pale yellowish-brown, with a distinct excentric apiculus, with a smooth membrane and with plasmic content a little nebulous, with or without drops of oil, 7-10.5 x 5.8-7.5 μ, most often 8 x 6 μ.

12. CREPIDOTUS SUBVERRUCISPORUS Pilat

This resembles greatly Crepidotus lundellii Pilát, but the spores of it are more ellipsoidal-fusiformed, very weakly punctate-verrucose. From Crepidotus epibryus Fr., it is distinguished by its more compact fleshy receptacles, drying up less. Lamellae are clayish ochre color (without a weak reddish-rust tint as the Crepidotus epibryus Fr.), and spores are lighter colored under the microscope, many less verrucose than in the species mentioned. The pileus in youth with an insignificant stipe or often also without a stipe, later attached at a single point, without a stipe, rounded or largely kidney-shaped, later generally with two lobes up to the point of insertion, white on the surface, weakly yellowish ochre color when dried, tomentose, more tomentose shaggy at the base, for a long time with an involute edge. Lamellae white, then pale clayish color, when dry clayish ochre color, without reddish tint, spaced and rather broad? thick. Basidia 25-35 x 6-7.5 μ. Cheilocystidia are cylindrical, curved, obtuse at the end, more rarely in form of a bottle, hyaline, with thin partitions, 35-50 x 5.5-7 μ. Spores largely ellipsoidal-fusiform (tonsil-shaped), pale clayish color, very finely verrucose, with a small apicule at the base, most often contracted at the top, more rarely largely rounded, not guttulated or with only a small drop of oil with a plasmic content most often very nebulous, 7-9 (9.5) x 5.5-6 μ.

13. CREPIDOTUS VARIABILIS (Pers.) Quél.

Cap 0.5-3 cm in diameter, at first convex, soon stretched flat conchoidal, with two rounded lobes embracing the dwarfed stipe or rather the point by which the cap is attached to the substratum, entirely white, white shaggy around the point of attachment, elsewhere very finely tomentose villose, longely involute at the edge, in adult specimens even raised.

Stipe visible only in youth, later almost non-stipitate, most often it is visible only as a small swelling at the point by which the cap is attached to the substratum, white, finely shaggy.

Lamellae diverging from an eccentric point, fleshy, rounded toward the base, rather distant, white or whitish in youth, then ochre tinted dirty brown shaded with pink, later deeper; lamellulae shorter, numerous.

Flesh thin, white, without taste and without odor, thicker at the middle of the cap.

Basidia with four spores. Cheilocystidia are elongated clavate or fusiform, often irregularly forked in form of a rosary, sometimes also branched at the end and irregularly swollen, thickness of 5-8 μ, length of 35-50 μ. Spores are rather deep, ochre tinted brown to flesh tint. Spores under the microscope very pale yellowish brown, shortly cylindrical ellipsoidal, rounded at the top and refracted—tonsil shaped, with a rather distinct apiculus at the base, very finely and shortly verrucose, 5.5-7 x 2.8-3.5(4) μ, most often

6.3 x 3.2 μ. Trama of the cap 300-500 μ thick, of hyaline hyphae, interwoven in all directions, 3-5 μ broad with thin walls, hyaline. Cuticle not differentiated from the trama of the cap.

REMARKS: Crepidotus variabilis is a species which in mycological literature and in the herbaria is quite confused with species apparently similar to it. Thus, for example, Libert in Cryptogamae Arduennae No. 221 in the exsiccatae designated as Crepidotus variabilis, in the specimen preserved in the herbarium of the National Museum of Prague five carpophores are found, of which one is Crepidotus terricola Britz.-Faure, two are Pleurotus septicus Fr., and two receptacles Crepidotus cesatii Rab. Also in other collections of exsiccatae this species is poorly determined, thus, for example, Saccardo: Mycotheca Italica No. 1405, includes Pleurotus septicus Fr., Petrak: Fl. Bohemica and Moravicia exsicc. II Ser.I. Abt., Lfg. 31, No. 1504 includes under the name of Claudopus variabilis Pers. some specimens of the species Clitopilus pleurotelloides gathered in Slovaquie at Prenčov (Quercus, 22-VII-1892) by A. Kmef.

Crepidotus variabilis in Mycologia Fennica 3: 112, of Karsten, (is) also confused. His description refers essentially rather to Crepidotus cesatii Rab., but he confused there the true Crepidotus variabilis ("occurit forma sporis minoribus 6 x 3-4 μ").

The young receptacles of Crepidotus variabilis are often determined as Crepidotus chimonophilus B. and Br. Thus, for example, the specimens (10 in all) in the herbarium of Stockholm thus labeled comprise only the youngest receptacles of Cr. variabilis. Also the specimens published under this name in the collection of exsiccata

of Sydow: Mycotheca Germanica No. 551 and 1202, 2052 only comprise typical Crepidotus variabilis. Crepidotus herbarum Peck. seems to be identical with Crepidotus variabilis Pers. of Europe. The description and data of American authors concerning the spores of this species point at least all in this direction (ellipsoidal, 6-7.5 x 3-4 μ). Kauffman gives Claudopus variabilis only in the key of the genus Claudopus, but not in the text of his Agaricaceae of Michigan, and he has therefore probably not known it, at least under this name. Under Cr. herbarum as a set-off, Peck writes that it is abundant in the United States. Also, Crepidotus albidus E. and Ev. seems to be identical with our European species. It is true that the authors describe it as glabrous, but the dimensions given for the spores in the original diagnosis (5 x 3.5 μ) fit Crepidotus variabilis. The authors mentioned give the coloration of the lamellae as pale, then yellowish brown. Kauffman reproduces only the original diagnosis upon remarking that it is very similar to Crepidotus herbarum Peck. The original type material is preserved, according to Kauffman, in the Herbarium of the University of Michigan. Singer (Lilloa 13: 62, 1947) has studied the type of this species and he has found that it has spherical spores, subspherical or shortly ellipsoidal, 5-6.8 x 4.8-6 μ, pale brown and smooth, and he regards it as a good, independent species.

14. CREPIDOTUS MICROSPORUS (Karsten sensu Romell) Pilát

Species of close affinity to Crepidotus variabilis, perhaps only a race of this species. Macroscopically it resembles most the carpophores of Crepidotus lundellii Pilat, but it has very small spores, like Crepidotus variabilis, but of a different form.

Cap 1-3 cm in diameter, rounded or reniform, perhaps non-stipitate even in early youth, soon partly effuso-reflexed, sessile on a part of the back or almost on the side and a little refracted in a corner toward this part, conchoidal (the largest specimens cut in lobes at the edge), white on top, ochre tinted pale yellowish color when dry, rather grossly shaggy tomentose, with bristly, granulated down, and, on the same down, sessile at the substratum.

Lamellae are rather spaced (subdistant), probably whitish in youth, on dried specimens rusty clayish brown, a little lighter than the Crepidotus versutus, when dry at maturity. The shaggy bed at the surface of the cap freely interwoven, composed for the most part of vertical piles of hyphae formed by hyaline cells, cylindrical, 3-4 μ broad.

Trama of the cap of hyaline hyphae also, with thin walls, rather freely and irregularly interwoven, 3-5 μ thick. Trama of the lamellae of analogous hyphae. Cuticle not developed. Spores ellipsoidal, narrowed toward the summit, obliquely pointed at the base, finely bristled-verrucose, clayish brown, a little deeper and of a little different tint than in Crepidotus variabilis, 6-7.2 x 3-3.7 μ.

DISTRIBUTION: On rotting branches of Salix caprea, lying on the ground, in Sweden, not far from Stockholm (Enskade), 9-IX-1900, leg. Lars Romell. Type: Herbarium Romell-Stockholm, No.10218.

REMARKS: It is distinguished from Crepidotus variabilis by its more considerable carpophores and then especially by the spores that are of the same size as those of Crepidotus variabilis, but of a different form. Crepidotus microsporus Romell has ellipsoidal spores, a little more elongated, tapered toward the top and a little deeper clayish brown. Crepidotus variabilis Pers. has spores that are shortly ovoidal-ellipsoidal, truncated sub-rounded at the top, light brownish shade. That the mushroom of Romell be truly identical with the species of Karsten does not seem absolutely certain to me.

Karsten describes under the name of Dochmiopus variabilis Pers. a mushroom, of which the spores are 9-14 x 5-8 µ. This size would correspond rather well with the species that I described under the name of Crepidotus bresadolae Pilát. Under the name of Dochmiopus microsporus, Karsten describes a species with spores of 6 x 3-4 µ. In my opinion this mushroom is identical with Crepidotus variabilis in the sense of other authors. Evidently it is not impossible that it be identical with the mushroom designated by this name by Romell. As I have not persuaded myself of the original of Karsten which mushroom he designated thus, I present the mushroom of Romell under the name of Karsten, by which Romell designated it.

In the herbarium of Romell at the Museum of Stockholm there is still an example designated by the name of Claudopus variabilis var. microsporus Romell, Herbarium Romell 10221, Stockholm: Björnneset,

13-VIII-1905. This mushroom is entirely different, because it belongs to the genus of Clitopilus. It is a species of affinity to Clitopilus pinsitus (Fr.). Josserand, who nevertheless distinquishes it from it by its narrower spores (6.5-7.5 x 3.5-4.5 μ). I designate it as Clitopilus arwidsonii Pilat.

15. CREPIDOTUS LUTEOLUS Lamb.

Pileus 1-3 (4) cm. broad, convex then expanded, at the point, by which it is attached, with two rounded lobes, with the little stipe between them, or a stipe completely developed. It seems to exist most often only in youth and disappears later almost completely. Pileus shaggy in the middle, elsewhere finely villose, tomentose, very pale yellowish ochre color, then bright yellowish color, in the middle ochre-like citron which is often striking in dried out specimens, at the margin for a long time involute, at maturity often entirely applanate or semi-circular flabelliform. Stipe often void, but sometimes visible often in older specimens, excentric in all its length to the inferior surface of the cap, white, tomentose. Lamellae subdistant, rather thick and rather broad, fleshy, slightly decurrent on the stipe, when the latter is developed, otherwise rounded below, at first white, then dirty brown ochre, rather dark. Lamellules are rather numerous. Flesh thin, white, without taste and odor, a little thicker than in Cr. variabilis Pers. Basidia with 4 spores, 27 x 7 μ. Cheilocystidia cylindrical, claviform or cylindrical-thin, sinuous, irregularly swollen, but penetrating rather deeply the trama of the lamellae. Spores dark ochre brown. Hyphae are hyalin, with thin partitions, thickness of 4-6 μ, rather abundantly partitioned and thinned out above the partitions. Pileus cuticle not differentiated. Spores under the microscope are very pale yellowish brown, almost smooth, only very finely dotted, oblong ellipsoidal, obliquely pointed at the base in a small apiculus, 8-11 (13) x 4-5.5 μ, generally uniguttulated.

16. CREPIDOTUS CESATII Rab.

Pileus recurved, sessile or almost sessile, cupulate, then reflexed and conchoidal, often bilobed toward the base, and down below split up to the base, generally more or less rounded, submembraneous, 0.5-2 cm broad, shaggy at the base, otherwise finely villous on the surface, pure white, long with an involute villose border (edge). Stipe non-existent or dwarfed in form of a little excentric swelling which is shaggy and white. Lamellae are rather spaced, of medium thickness and breadth, fleshy, radiated around an excentric point, at first white, pale, then pale flesh color, finally rusty flesh color to rusty, with numerous shorter lamellules. Flesh very thin toward the margin of the cap, a little thick at the center, soft, white, of a mild taste, almost without odor. Lamellae edges heteromorphic, with hyaline cheilocystidia, sometimes a little contracted in a rosary, 30-50 x 5.5-8 μ, sometimes divided at the end in two to three spheric or rounded excrescences, or simply terminating in the form of a bottle. Spore deposit ochre-colored reddish fallow tinge. Spores under the microscope light, pale yellowish brown, globose-ovoidal, finely but distinctly punctate-verrucose, 7-9 (10) x 6-7.5 (8) μ. Hyaline hypha, with thin partitions, thickness of 3-5 μ. Cuticle of the cap of divided hypha, irregularly interlaced, thickness of 3-3.5 μ. Basidia claviform, with a granulous content, containing many drops of oil, 16-20 x 4-6 μ.

17. CREPIDOTUS VELENOVSKYI Pilát

Carpophores scattered on dead sprigs, small, 1-3 mm in diameter only, conchoidal, non-stipitate, sessile on the side or a part of the back, often closed in a hood, on the surface pale brown tinted when dry, almost glabrous, only slightly covered with bloom villose, long striate on the margin and involute, sessile at the substratum, rather abundantly speckled by white hairs, at the edge generally lobed and notched, very finely membranous, sub-transparent.

Lamellae concolored as the cap, pale brownish, with a lighter border, very distant, most often undulated, decurrent at the base.

Flesh of the cap of 80-90 µ thick, of hypha that are not very distinct, interwoven rather densely, later often softened, subhyaline, thin, 1.5-5 µ thick. Cuticle of the cap non-differentiated.

Hyphae of the trama of the cap passing to the trama of the lamellae. Hymenial elements are not very distinct. Cheilocystidia hardly distinctive, rare, filiform-claviform, 20-30 x 3-4 µ. Spores rusty yellowish, largely ovoidal-tonsil shaped, distinctly verrucose, some uni-guttulated, others with homogeneous content, 8-10 x 5.6-6 µ.

DISTRIBUTION: On dead twigs of Juniperus communis, in Bohemia at Solopisky, not far from Prague, 29-X-1925, leg. J. Velenovský, h. NMP 147309.

REMARKS: Very minute species, but characteristic in its affinity to Crepidotus epibryus Fr., as the verrucose spores prove.

It is distinguished nevertheless from this species in its macroscopic aspect, as well as by its slightly larger spores.

Velenovský has designated this mushroom in the herbarium as Crepidotus juniperi Vel. But under this name, he has described later another mushroom that he found on dead branches of Juniperus communis at Obrusice 1940. The original description by Velenovský of the species Crepidotus Juniperi Vel., Novitatis Mycological Novissimal p. 77, 1947, refers to this second mushroom, as I am convinced by the study of the original specimen that is really Clitopilus chioneus Pers. He has never described the mushroom that I call Crepidotus Velenovskýi.

18. CREPIDOTUS WAKEFIELDIAE Pilát

Small carpophores, 2-4 mm in diameter, sessile at the substratum, in youth on a small part of the back, distant sub-conchoidal on the flank, always without distinct stipe, at the top whitish to a dirty brownish tint, fleshy membranous-thin, with a very thin edge, when dry slightly involute, shaggy sessile at the base, and often attached to the substratum by long white mycelial shaggy fibers.

Lamellae are distant, often at the number of 12-16 only, rarely more than 20, distant from the base, narrow, breadth hardly 1/2 mm, dirty, clayish brown, most often of the same length or in the larger carpophores intermixed with shorter lamellulae. Hyphae are subhyalin, densely interlaced parallel, thickness of 3.5-5.5 μ in the flesh of the cap.

Spherical spores, with a rather large apiculus and thus almost spherical pyriform, clayish brown, distinctly, densely, and finely verrucose, not guttulate or with a small drop of oil, 5-5.7(6)μ diameter

DISTRIBUTION: On rotting wood and bark of leafy trees in England. Manchester, Comm. Miss B.Harthan, X-1944. Typus! Herbarium Kew - Donhead St. Mary, legit. Dunston, 15-I-1946. Herbarium Kew.

REMARKS: This very interesting species, known up to the present only in two localities of England, recalls, by the size and the form of the carpophore, Crepidotus velenovskyi Pilat, but has spherical spores. It is distinguished from Crepidotus cesatii Rab. by its carpophores, as also by its much smaller spores, perfectly spherical,

with a large distinct apiculus. Crepidotus cesatii always has spherical-ellipsoidal spores, without a striking apiculus, of a lighter coloration, with a pinkish tint rather than marked clayish brown.

19. CREPIDOTUS EPIBRYUS (Fr.) Quél.

Pileus 5-10 mm, sessile, suspended or resupinate, by the flank, semicircular in youth, unguiform, with a narrowly involute edge, then flat, in its contour weakly tubercular, generally bilobed to the point at which the cap is suspended, thin, white, not yellowing, very finely villose, silky, non-hygrophanous and non-striate. Lamellae take their origin either on the side or more often very excentric, and are rather close, fm, unequal, with lamellae of half-length, rather large and rounded on the edge, at first white, then very pale pinkish brown, with an entire edge and a little paler. Basidia are claviform, with 2 or 4 sterigmata, 30-35 x 8-10 µ. Cheilocystidia irregularly lobed, most often with a body part and a distinct neck, but at the neck often sinuous, rather refracting, distinct, 40-50 x 7.5-13 µ. Spores tonsil-shaped, with a rather pointed base, rather large, but distinctly heterodiametric, distinctly coarsely verrucose, non-guttulated, 7.5-10 x 4.5-5.5 µ.

20. CREPIDOTUS SUBEPIBRYUS Pilat

This resembles a great deal Crepidotus epibryus (Fr.) Quél, but it is smaller, with smaller spores. Pileus 0.5-1 cm of diameter, rounded or reniform, more rarely a little elongated, not stipitate, sessile by a central or excentric point and thus cupuliform to scutelliform, later conchoidal to effuso-reflexed, conchoidal, thin, membranous, almost downy, with a thin margin, a little elevated, with a whitish or ochre-tinted surface, appressed tomentose to almost glabrous. Lamellae ochre rusty, narrow and few, convergent toward the point of insertion. Flesh thickness of 300-350 μ, not differentiated in layers of different histological composition, composed of hyphae that are densely interwoven, branched coralloidly in all directions, shortly articulated, hyaline, thickness of 3.5-6 μ, forming a plectenchyma more downy toward the surface of the cap. Cuticle not developed. Basidia are densely compressed, with thin partitions, hyaline, 25-30 x 5.5-6 μ. Subhymenium not very distinctly developed. Cheilocystidia rather spaced on the edges of the lamellae, in form of a bottle, with a fleshy head, more or less spherical, 16-25 x 8-9 μ, with thin partitions, hyalin, smooth. Spores shortly ovoid, finely but distinctly verrucose-bristly, pale clayish rusty brown, non-guttulated, 6-7.5 x 5-5.7 μ.

2. CREPIDOTUS SERBICUS Pilát

Crepidotus serbicus Pilát in Bull. Soc. Myc. of France, 53: 82, 1937. (Transl. from Pilát, p. 21)

Cap 3-10 cm, ochre or ochre-brown, tomentose-shaggy, lighter at a young age, effuso-reflexed, concoid, elongated and slightly narrowed at the base, sessile on the side and a part of the back, thin flesh, thin and furrowed at the edge, lobed and undulated in maturity. Lamellae olive ochre tinted, branched, often undulated, decurrent at the base, moderately spaced. Flesh whitish, pale ochre and fragile when dry, liberally interlaced with hypha, with rather thick partitions, hyalin, thickness of 3-5.5 μ. Cuticles not differentiated. Trama of the lamellae not bilateral. It is composed of hyaline hypha, with rather thick partitions, thickness of 2.5-3.5 μ. Subhymenium has thickness of 15-20 μ. Basidia cylindrical-clavate, 20-30 x 3.5-4 μ. Spores pale clay brown or ochre yellowish brown, distinctly colored under the microscope, regularly spherical, with a little apiculus, smooth, generally with a small oil-drop, 5-5.5 μ in diameter.

3. CREPIDOTUS MACEDONICUS Pilát

Pileus developed unilaterally, conchoidal, elongated, sessile by the flank or in part effuso-reflexed, adhering to the substratum with the base contracted, 3-4 cm broad, with part stretched out more or less in a half-circle and part of the base more or less contracted in a corner, suggesting strongly Crepidotus panuoides Fr. in its form, size and coloration, tomentose shaggy on the surface, when dry roughly shaggy, thin and fragile flesh. Lamellae rather close, clayish brown, deep brown in exsiccati, thin and fleshy. Tramal hypha thick, 5-15 μ, subhyaline, with very thin and later limp partitioned, freely inter-laced in all directions, not bilateral. Edges of the lamellae homomorphic. Thickness of the lamellae 50-70 μ. Trama of the cap of hyalin hyphae, limp, freely inter-laced in all directions, most often thickness of 4-8 μ, continue to the surface of the cap in shaggy piles. Cuticle not developed. The hyphae at the surface of the cap end obtusely and are 5-8 μ broad. Basidia, 15-25 x 4-7 μ, indistinct. Subhymenium of hyphae 5-6 μ not very distinctly developed. Cystidia none. Spores spherical or ovoid-pyriform, clayish yellowish brown, distinctly verrucose, contracted in a distinct apiculus, with or without a drop of oil, 5,5-6,2 x 4, 6-5 μ. (Description based on dried specimens!)

4. CREPIDOTUS MOLLIS

(Transl. from Pilat, p.24)

Cap 3-5(8) cm broad, semi-circular, ovoidal to reniform, entirely or almost sessile, often slightly narrowed to a wedge at the base, around the base shaggy tomentose, white, elsewhere on the surface smooth and glabrous, more rarely with squamulae that are appressed brown, white or whitish, then yellowish ochre, later clayish yellowish, elastic, hygrophanous, in the humid state with transparent lamellae at the edge of the cap, covered over at the surface with a gelatinous zone, which may be peeled and is elastic like gum, thin and a little involute at the edge. The receptacles grow generally in several examples one on top of another or imbricated. Stipe none or lateral and entirely stunted, whitish and shaggy white. Lamellae close, narrow, and decurrent at the base, later rather broad and even ventricose, at first pale, then cinnamon colored, dirty brown to gray brown. On the surface, the cap is covered by a thin bed, 20-25 μ thick, of hypha, yellowish brown, sometimes projecting, shaggy-tomentose, very evident, 4-6 μ broad, brown, but with rather thin partitions, that later dissolve into mucilage coloring the mucilage a little bit brown, and at this time the mucilage is also covered with spores that stick together there upon falling there. Under this thin superficial bed is the gelatinous, gummy bed, thickness of 100-180 μ, composed of gelatinous, agglutinated hyphae, with a breadth of 4-5 μ, more or less parallel to the

surface of the cap, hyaline, then becoming brown. It is only under this gummy bed that the properly said trama of the cap continues, composed of interlaced hyphae in all directions, hyaline, with thin partitions, very branched and tortuous, 5-7 μ broad. Trama 1-2 mm thick, except in the small pilei. Moderate taste, weak odor, not striking. Basidia 26-30 x 7-8.5 μ. The edges of the lamellae are heteromorphic, with hyaline cheilocystidia, cylindrical-fusiform, elongated, 30-60 x 6-15 μ, rather resembling the immature basidia, then longer and thicker, being thin here, rather inflated elsewhere. Spore mass rusty brown. Spores under the microscope are rusty, ovoidal-ellipsoidal, smooth, with a granular content, (6.5)8-9(10) x 5-6 μ.

4. CREPIDOTUS MOLLIS var. CALOLEPIS

(Transl. from Pilát, p.28)

Cap is ochre brown when dry, dark brown squamulose, white tomentose at the base. It is distinguished from the type by its pilei with a surface covered by brown, appressed squamulae, and flecked, that are formed by the most elevated bed, thin, with yellowish brown hypha, thickness of 6-9 μ, often incrusted with granules at the end, and ending obtusely, which cover the gelatinous layer at the surface. The gelatinous layer (bed) has a thickness of 100-200 μ, composed of hyphae having a thickness of 5-6 μ, subhyaline. Under the gelatinous layer there is sometimes a thin layer of brown tinted hypha, which separate it from the cap trama proper, composed of hyphae of 5-9 μ, with thin partitions, hyaline, non-gelatinous, freely interlaced-coralloidal in all directions. The rain easily takes away the brown superficial layer, which forms squamulae at the surface of the cap, and it is therefore distinctly developed only in specimens growing in dry weather (cf. also Schuberth, Zeitschrift für Pilzkunde, 9:77, 1933). Basidia 20-30 x 6-8 μ. Cheilocystidia 30-40 x 10-18 μ. Spores are ovoidal-ellipsoidal, 7-9.5 x 5-6.5 μ. Spore development is a dull rusty brown color.

Distribution: On wood of leafy trees, but most often on tremble (Populus tremulus) in Northern forests with a dry climate. Then it grows, however, in all the temperate zone of the Northern hemisphere and in Australia (?), in summer and in autumn, exactly as the type. In Europe it is much rarer than the type. The

gelatinous layer is relatively thicker in the young receptables than in maturity, because it does not get thick anymore, whereas the trama formed by a cottony tissue, non-mucous enlarges its volume considerably in maturity. This variety is found most often on Populus tremulus, but it is not rare on other deciduous trees. It generally has more inflated and a little broader cystidia than the type; but this form isn't a constant characteristic and indeed I do not think that one should attribute a greater systematic importance to it. I have seen the following specimens:

- -.

4. CREPIDOTUS MOLLIS var. PSEUDOAPPLANATUS

(Transl. from Pilát, p. 30)

Pileus 4-5 cm broad, with flesh 1-2 mm thick, whitish or sub-ochre, tomentose-appressed. Trama of the cap of hyaline hypha, 4-6 μ thick, with thin partitions, interlaced in all directions. Indistinct gelatinous layer, thickness of about 100 μ, with brownish, agglutinated, indistinct hyphae. Without thick hypha characteristic at the surface of the cap. Spores are usual in this type, ovoidal-ellipsoidal, 8-9 x 5-6 μ. In the form of the pilei and of the surface of the cap it rather resembles C. panuoides Fr., but the spores are completely different.

6 - Crepidotus haustellaris

Generally isolated receptacle. Cap 0.5-1.5 cm in diameter, rounded kidney-shaped, convex flat, thin, fragile, clayish brownish gray, then deeper, rather cinnamon brown, smooth, finely pulverulent, villose, to glabrous, uniform at the edge or indistinctly striate by transparence, a little paling, weakly hygrophanous, in youth granulated villous whitish or farinous cristalline, then in part or entirely becoming glabrous, with an edge at first narrowly involute, then flat, striate toward the edge upon drying.

Stipe almost always distinctly developed, a little eccentric in youth, then very eccentric to sublateral, curved at the side, short, length of 0.5-4 mm, thickness of 0.5-0.8 mm, whitish when fresh, being crossed sometimes with a mycelian white disc at the base, which attaches it to the substratum, in youth covered with bloom as by dew, whitish, then becoming rather glabrous, grey brown to brown, when dry most often concolored at the cap. A part of the cap is generally also appressed at the substratum and often attaches itself there a little on crossing—but most often the cap is free. Stipe most often curved-under, directly under the cap and sometimes, therefore, not very visible at first sight.

Lamellae are rather large and close, becoming attached back to the stipe, more or less concolored at the cap, in maturity rusty clay color, rather deep, lighter on the edge, thin (70-90 µ), often a little undulated. Hyphae are almost hyaline, relatively thin, thickness of 3-5 µ.

Basidia have 2 or 4 sterigmata, 15-20 x 6-8 µ.

Spores pale greyish brown. Flesh of the cap has thickness of about 200 μ, with hypha that have thin partitions, pale brownish color, almost hyaline, at the surface of the cap ressembling cheilocystidia by the final (end) hairs that are clavate, most often straightened, apex capitate, almost hyaline, 25-40 x 3.5-6 μ. Such hairs are also on the stipe. Cheilocystidia not very striking, resembling the basidia, but longer, rounded a t the top in the shape of a head, 30-40 x 4-5 μ, at the end a thickness of 7.5 μ. Spores are pale brown, largely ellipsoidal-form of a bean, very little contracted at the base, almost flat on one side, with a not very distinct apiculus, with one or several drops of oil not very refractive on the interior, with a smooth membrane, 8-9(10) x 5.5-6.5(7) μ. Pileus cuticle, where it is developed, is formed in age by dried, flattened hyphae, deeper than the trama of the cap: their ends in the form of hair has a length up to 40 μ and breadth of 2-4 μ; these ends are often incrusted. Trama of the cap of hypha interwoven in all directions, 3-5 μ thick, hyaline. Trama of the lamellae of hypha of the same kind.

Variation: form Capreae Vel. p. sp. (Crepidotus Capreae Velenovsky, Novitates Mycologicae Novissimae p. 76, 1947).

Lighter carpophore, with cap of pale ochre, 1-1.6 cm in diameter, striate half-way. Stipe is concolored to the cap, covered with bloom, white. Lamellae are rather light, pale clay color in the exsiccate. Spores as in this type.

On a rotting branch of Salix capraea to Mnichovice, VIII - 1943, h. NMP147350.

Remarks: The description of Crepidotus haustellaris Fr. given by Fries is not too clear. The illustration given by Cooke and his description given also by other English authors, are not too exact. But it is not very probable that they refer to another mushroom. The other European authors accept this species in our manner.

With the species understood in this way, Naucoria effugiens Quel. and Crepidotus Ru___ Berk. are identical. The size of the stipe is rather variable as also its insertion in the cap. Once the cap is perfectly lateral, elsewhere only a little eccentric. From the point of view of anatomy, it is necessary to compare this species rather with the genus Naucoria than with the genus Crepidotus —but on the other hand it resembles more the Crepidota in the shape of the cap: for example, Crepidotus Phillipsii B. and Br., is certainly very similar to them—although the spores are quite different.

Crepidotus Ragazzianus Bres., described from oriental Africa (Fekerie-Chemb) is also identical with Crepidotus haustellaris Fr. The description and illustration of Bresadola correspond to it, and there is also an agreement microscopically. In the herbarium at Stockholm there is found the original exsiccatae of Bresadola. It has ellipsoidal spores, bean shaped, rusty, pale yellowish color, 9-10 x 5-6.5 μ. At the surface of the cap, I found hairs with a thickness of 5-6 μ, rusty brown, granulated. In this herbarium is still found another labelled example as Crepidotus Ragazzianus Bres. leg. Torrend, in Portugal on Eucalyptus, III-1902. This exsiccata also, although rather badly preserved, corresponds well to Crepidotus

haustellaris Fr.

The south-African species Crepidotus proteus Kalchbr. has also a distinct stipe. It has spores that are largely ellipsoidal, relatively deep brown, with a distinct germinative pore, 7-8 x 5-6 µ. It belongs rather to the genus Melanotus Pat.

7. CREPIDOTUS PHILLIPSII (Berk. & Br.) Sacc.

Pileus 2-8 mm broad, reniform or subcircular, most often with a contour of two lobes, very thin, almost pellucid, generally a little curved, undulated on the margin, sometimes however almost regular, strongly striate by the lamellae which are interglistening, smooth, glabrous, clear pale fallow to ochre colored, lighter between the striae, acute on the margin, largely reflexed in youth. Stipe very short and very flexible, most often inserted at the fold between the two lobes of the cap, more rarely very excentric, length 1-3 mm, and thickness of about 0.5 mm, reddish brown or tinted pale ochre, slightly thickened at the base and generally attached to the substratum by a sparse, white and undulated mycelium, otherwise a little silky at the surface by the white fibers, elsewhere glabrous. Lamellae are rather close together, narrow, of unequal length, mixed with lamellae that are shorter of one or two different lengths, tho largest at the stipe, little by little becoming contracted toward the margin of the cap, pale brownish fallow. The entire thin membranous receptacle, at the time of the destruction of the preparation of a consistency slightly gelatinous. Spore deposit brown. Spores light brown under the microscope, very pale, in youth almost hyaline, ellipsoidal to ellipsoidal-elongated, with a germ pore not very distinct at the top, smooth, 7-7 x 3-3.5 µ. Basidia clavate, 15-20 x 5.5-7 µ. Cheilocystidia narrow bottle-shaped with a filiform neck, generally flexible to contracted in form of a rosary, 15-20 x 3-4 µ. Cuticular hyphae pale colored, septate, free, more or less inter-laced, radiating, thickness of 4-5 µ.

9. Crepidotus caspari Velenovsky

Cap 2-5 cm diam., expanded flat obliquely, to hardly convex, cutting off at the edge and often torn; at maturity generally lobed to multiple lobed, surface glabrous, entirely non-hygrophanous, white, smooth, tomentose-ciliated, white only at the insertion, rounded or flabelliform, without stipe, sessile by the flank or at the base contracted in a corner. Flesh white.

Lamellae rather close, longer and shorter, delicate, very broad, rounded at the base, clayish ochre shade.

Cheilocystidia not very striking, in the shape of a bottle, with a head at their apex, or curved, of very variable shape. Basidia 20-25 x 7-8 μ. Trama of the cap with hypha that are rather freely interlaced wadded, thickness of 6-10 μ, generally refracted above the partitions and inflated in places, with thin walls, hyaline. Cuticle of the cap is non-differentiated. Spores are smooth, yellowish ochre tint or pale yellowish clayish rusty, lighter than in Crepidotus fragilis Joss., largely ovoid, with an apiculus at the base, not of tonsil shape, not guttulated, 7-8(8.5) x 5-5.6 μ.

Remarks: Species is closely related and very much resembling Crepidotus fragilis Josserand and Crepidotus bresadolae Pilat, which both grow also on soil or on vegetal debris buried in the ground. Crepidotus fragilis Joss. is distinguished by its deeper spores (also by its deeper spore wall, brown tending toward olive), in the form of a lemon or tonsil, with a large drop of oil distinct

in the plasmic content. Crepidotus pubescens Bres. is distinguished by its elongated spores, pale, of elongated ellipsoidal form, not tonsil shaped.

Crepidotus caspari Vel. is almost glabrous and does not have on the surface of the cap a torn furrowed cuticle, and at the half dry state it is not striolate, furrowing deeper when wet, as it is the case in Crepidotus fragilis Joss.

Without having seen the original specimens, one cannot say with certainty what is Crepidotus depluens of some authors. The agaric of Persoon and Bresadola, designated by this name, belong to the Rhodogoniosporae. Crepidotus depluens of Schroeter is perhaps identical with Crepidotus caspari Vel. Crepidotus depluens of Velenovsky (Ceské houby, p. 555) is perhaps identical with Crepidotus fragilis Joss., and it is perhaps also the case for the agaric described by Rea (British Basidiom. p. 455) under the name of Crepidotus epigaeus (Pers.) B. & C. and figured by Cooke on plate 516 A.

10. CREPIDOTUS BRESADOLAE n.n.

(Transl. from Pilát, p.46)

Cap 1-2.5 cm broad, 1 cm long, eccentric, thin fleshy, reniform or ovoidal, with a lateral, insignificant stipe, later without stipe, sessile on the side or in part attached also by the back, sometimes elongated subflabellate and sessile by the white shaggy base without a trace of a stipe. Lamellae moderately close, or rather distant, rather thick, at first white, then pale cinnamon or rusty yellowish clay color, with the edges most often paler. Flesh soft, white, almost without odor. Spore deposit cinnamon. Spores under the microscope quite pale clay color, non-guttulate, with an almost homogeneous content, more rarely cloudy, quite smooth, elongated ellipsoidal, pointed at the base with an insignificant oblique apiculus, flattened at one side, in the form of a slightly elongated bean, 8.5-12 x 5-6 μ. Basidia 25-30 x 7-8 μ. Hyphae of the trama are hyaline, 4-12 μ broad, rather abundantly partitioned, with thin partitions and generally narrowed above the partitions.

On soil, twigs, humus, etc., Czechoslovakia, Germany, Poland, Sweden, Italy, England.

Lange believes that C. scalaris Fr. belongs to C. pubescens Bres. But in the sense of Ricken it belongs to C. applanatus. Among most this species is quite obscure.

C. pubescens Bresadola 1930 has nothing in common with

Agaricus pubescens Flora Danica t 1073/2, 1792 which is a synonym of Crepidotus variabilis Pers., and this is why I employ another name to designate the species of Bresadola.

11. CREPIDOTUS LUNDELLII Pilat

Pileus 0.5-2 cm., more or less rounded or kidney-shaped, at first sessile by a dwarfed stipe, very excentric or lateral, that later is almost not at all visible and the cap is then sessile at a point with two lobes stretching around it in such a way that it is cordiform cut toward the point of insertion, almost stretched out by the flank or later also a little attached by the back, white on the surface, when dry pale ochre-like yellow, appressed or almost glabrous tomentose, only at the base shaggy white or attached to the substratum by a shaggy felt, membranous fleshy, for a long time involute at the margin, white. Stipe stunted, even in youth hardly visible, shaggy white, smaller than in Crepidotus variabilis or Cr. terricola, later disappearing completely. Lamellae rather spaced, whitish in youth, then pale brownish a long time, later and in the dried mushroom deep ochre color to dirty dark clay color. Trama of the cap about 300 μ thick, with hyphae of thickness of 4-10 μ, with thin septa, a little inflated, hyaline, irregular, but not too close, interwoven, from the time of the maturity of the mushroom without plasmic content. Basidia 16-20 x 5 μ. Subhymenium not conspicuous. Cuticle of the cap not developed. Cheilocystidia abundant on the edges of the lamellae, round-headed, claviform, in form of a bottle, hyaline, 25-40 x 8-15 μ. Spores ovoidal-ellipsoidal, subamygdaline, pale yellowish-brown, with a distinct excentric apiculus, with a smooth membrane and with plasmic content a little nebulous, with or without drops of oil, 7-10.5 x 5.8-7.5 μ, most often 8 x 6 μ.

12. CREPIDOTUS SUBVERRUCISPORUS Pilat

This resembles greatly Crepidotus lundellii Pilát, but the spores of it are more ellipsoidal-fusiformed, very weakly punctate-verrucose. From Crepidotus epibryus Fr., it is distinguished by its more compact fleshy receptacles, drying up less. Lamellae are clayish ochre color (without a weak reddish-rust tint as the Crepidotus epibryus Fr.), and spores are lighter colored under the microscope, many less verrucose than in the species mentioned. The pileus in youth with an insignificant stipe or often also without a stipe, later attached at a single point, without a stipe, rounded or largely kidney-shaped, later generally with two lobes up to the point of insertion, white on the surface, weakly yellowish ochre color when dried, tomentose, more tomentose shaggy at the base, for a long time with an involute edge. Lamellae white, then pale clayish color, when dry clayish ochre color, without reddish tint, spaced and rather thick. Basidia 25-35 x 6-7.5 μ. Cheilocystidia are cylindrical, curved, obtuse at the end, more rarely in form of a bottle, hyaline, with thin partitions, 35-50 x 5.5-7 μ. Spores largely ellipsoidal-fusiform (tonsil-shaped), pale clayish color, very finely verrucose, with a small apicule at the base, most often contracted at the top, more rarely largely rounded, not guttulated or with only a small drop of oil with a plasmic content most often very nebulous, 7-9 (9.5) x 5.5-6 μ.

13. CREPIDOTUS VARIABILIS (Pers.) Qu61.

Cap 0.5-3 cm in diameter, at first convex, soon stretched flat conchoidal, with two rounded lobes embracing the dwarfed stipe or rather the point by which the cap is attached to the substratum, entirely white, white shaggy around the point of attachment, elsewhere very finely tomentose villose, longely involute at the edge, in adult specimens even raised.

Stipe visible only in youth, later almost non-stipitate, most often it is visible only as a small swelling at the point by which the cap is attached to the substratum, white, finely shaggy.

Lamellae diverging from an eccentric point, fleshy, rounded toward the base, rather distant, white or whitish in youth, then ochre tinted dirty brown shaded with pink, later deeper; lamellulae shorter, numerous.

Flesh thin, white, without taste and without odor, thicker at the middle of the cap.

Basidia with four spores. Cheilocystidia are elongated clavate or fusiform, often irregularly forked in form of a rosary, sometimes also branched at the end and irregularly swollen, thickness of 5-8 μ, length of 35-50 μ. Spores are rather deep, ochre tinted brown to flesh tint. Spores under the microscope very pale yellowish brown, shortly cylindrical ellipsoidal, rounded at the top and refracted-tonsil shaped, with a rather distinct apiculus at the base, very finely and shortly verrucose, 5.5-7 x 2.8-3.5(4) μ, most often

6.3 x 3.2 μ. Trama of the cap 300-500 μ thick, of hyaline hyphae, interwoven in all directions, 3-5 μ broad with thin walls, hyaline. Cuticle not differentiated from the trama of the cap.

REMARKS: Crepidotus variabilis is a species which in mycological literature and in the herbaria is quite confused with species apparently similar to it. Thus, for example, Libert in Cryptogamae Arduennae No. 221 in the exsiccatae designated as Crepidotus variabilis, in the specimen preserved in the herbarium of the National Museum of Prague five carpophores are found, of which one is Crepidotus terricola Britz.-Faure, two are Pleurotus septicus Fr., and two receptacles Crepidotus cesatii Rab. Also in other collections of exsiccatae this species is poorly determined, thus, for example, Saccardo: Mycotheca Italica No. 1405, includes Pleurotus septicus Fr., Petrak: Fl. Bohemica and Moravicia exsicc. II Ser.I. Abt., Lfg. 31, No. 1504 includes under the name of Chaudopus variabilis Pers. some specimens of the species Clitopilus pleurotelloides gathered in Slovaquie at Prenčov (Quercus, 22-VII-1892) by A. Kmef.

Crepidotus variabilis in Mycologia Fennica 3: 112, of Karsten, (is) also confused. His description refers essentially rather to Crepidotus cesatii Rab., but he confused there the true Crepidotus variabilis ("occurit forma sporis minoribus 6 x 3-4 μ").

The young receptacles of Crepidotus variabilis are often determined as Crepidotus chimonophilus B. and Br. Thus, for example, the specimens (10 in all) in the herbarium of Stockholm thus labeled comprise only the youngest receptacles of Cr. variabilis. Also the specimens published under this name in the collection of exsiccata

of Sydow: Mycotheca Germanica No. 551 and 1202, 2052 only comprise typical Crepidotus variabilis. Crepidotus herbarum Peck. seems to be identical with Crepidotus variabilis Pers. of Europe. The description and data of American authors concerning the spores of this species point at least all in this direction (ellipsoidal, 6-7.5 x 3-4 μ). Kauffman gives Claudopus variabilis only in the key of the genus Claudopus, but not in the text of his Agaricaceae of Michigan, and he has therefore probably not known it, at least under this name. Under Cr. herbarum as a set-off, Peck writes that it is abundant in the United States. Also, Crepidotus albidus E. and Ev. seems to be identical with our European species. It is true that the authors describe it as glabrous, but the dimensions given for the spores in the original diagnosis (5 x 3.5 μ) fit Crepidotus variabilis. The authors mentioned give the coloration of the lamellae as pale, then yellowish brown. Kauffman reproduces only the original diagnosis upon remarking that it is very similar to Crepidotus herbarum Peck. The original type material is preserved, according to Kauffman, in the Herbarium of the University of Michigan. Singer (Lilloa 13: 62, 1947) has studied the type of this species and he has found that it has spherical spores, subspherical or shortly ellipsoidal, 5-6.8 x 4.8-6 μ, pale brown and smooth, and he regards it as a good, independent species.

14. CREPIDOTUS MICROSPORUS (Karsten sensu Romell) Pilát

Species of close affinity to Crepidotus variabilis, perhaps only a race of this species. Macroscopically it resembles most the carpophores of Crepidotus lundellii Pilat, but it has very small spores, like Crepidotus variabilis, but of a different form.

Cap 1-3 cm in diameter, rounded or reniform, perhaps non-stipitate even in early youth, soon partly effuso-reflexed, sessile on a part of the back or almost on the side and a little refracted in a corner toward this part, conchoidal (the largest specimens cut in lobes at the edge), white on top, ochre tinted pale yellowish color when dry, rather grossly shaggy tomentose, with bristly, granulated down, and, on the same down, sessile at the substratum.

Lamellae are rather spaced (subdistant), probably whitish in youth, on dried specimens rusty clayish brown, a little lighter than the Crepidotus versutus, when dry at maturity. The shaggy bed at the surface of the cap freely interwoven, composed for the most part of vertical piles of hyphae formed by hyaline cells, cylindrical, 3-4 μ broad.

Trama of the cap of hyaline hyphae also, with thin walls, rather freely and irregularly interwoven, 3-5 μ thick. Trama of the lamellae of analogous hyphae. Cuticle not developed. Spores ellipsoidal, narrowed toward the summit, obliquely pointed at the base, finely bristled-verrucose, clayish brown, a little deeper and of a little different tint than in Crepidotus variabilis, 6-7.2 x 3-3.7 μ.

DISTRIBUTION: On rotting branches of Salix caprea, lying on the ground, in Sweden, not far from Stockholm (Enskade), 9-IX-1900, leg. Lars Romell. Type: Herbarium Romell-Stockholm, No.10218.

REMARKS: It is distinguished from Crepidotus variabilis by its more considerable carpophores and then especially by the spores that are of the same size as those of Crepidotus variabilis, but of a different form. Crepidotus microsporus Romell has ellipsoidal spores, a little more elongated, tapered toward the top and a little deeper clayish brown. Crepidotus variabilis Pers. has spores that are shortly ovoidal-ellipsoidal, truncated sub-rounded at the top, light brownish shade. That the mushroom of Romell be truly identical with the species of Karsten does not seem absolutely certain to me.

Karsten describes under the name of Dochmiopus variabilis Pers. a mushroom, of which the spores are 9-14 x 5-8 μ. This size would correspond rather well with the species that I described under the name of Crepidotus bresadolae Pilát. Under the name of Dochmiopus microsporus, Karsten describes a species with spores of 6 x 3-4 μ. In my opinion this mushroom is identical with Crepidotus variabilis in the sense of other authors. Evidently it is not impossible that it be identical with the mushroom designated by this name by Romell. As I have not persuaded myself of the original of Karsten which mushroom he designated thus, I present the mushroom of Romell under the name of Karsten, by which Romell designated it.

In the herbarium of Romell at the Museum of Stockholm there is still an example designated by the name of Claudopus variabilis var. microsporus Romell, Herbarium Romell 10221, Stockholm: Björnneset,

13-VIII-1905. This mushroom is entirely different, because it belongs to the genus of Clitopilus. It is a species of affinity to Clitopilus pinsitus (Fr.). Josserand, who nevertheless distinquishes it from it by its narrower spores (6.5-7.5 x 3.5-4.5 μ). I designate it as Clitopilus arwidsonii Pilat.

15. CREPIDOTUS LUTEOLUS Lamb.

Pileus 1-3 (4) cm. broad, convex then expanded, at the point, by which it is attached, with two rounded lobes, with the little stipe between them, or a stipe completely developed. It seems to exist most often only in youth and disappears later almost completely. Pileus shaggy in the middle, elsewhere finely villose, tomentose, very pale yellowish ochre color, then bright yellowish color, in the middle ochre-like citron which is often striking in dried out specimens, at the margin for a long time involute, at maturity often entirely applanate or semi-circular flabelliform. Stipe often void, but sometimes visible often in older specimens, excentric in all its length to the inferior surface of the cap, white, tomentose. Lamellae subdistant, rather thick and rather broad, fleshy, slightly decurrent on the stipe, when the latter is developed, otherwise rounded below, at first white, then dirty brown ochre, rather dark. Lamellules are rather numerous. Flesh thin, white, without taste and odor, a little thicker than in Cr. variabilis Pers. Basidia with 4 spores, 27 x 7 μ. Cheilocystidia cylindrical, claviform or cylindrical-thin, sinuous, irregularly swollen, but penetrating rather deeply the trama of the lamellae. Spores dark ochre brown. Hyphae are hyalin, with thin partitions, thickness of 4-6 μ, rather abundantly partitioned and thinned out above the partitions. Pileus cuticle not differentiated. Spores under the microscope are very pale yellowish brown, almost smooth, only very finely dotted, oblong ellipsoidal, obliquely pointed at the base in a small apiculus, 8-11 (13) x 4-5.5 μ, generally uniguttulated.

16. CREPIDOTUS CESATII Rab.

Pileus recurved, sessile or almost sessile, cupulate, then reflexed and conchoidal, often bilobed, toward the base, and down below split up to the base, generally more or less rounded, submembraneous, 0.5-2 cm broad, shaggy at the base, otherwise finely villous on the surface, pure white, long with an involute villose border (edge). Stipe non-existent or dwarfed in form of a little excentric swelling which is shaggy and white. Lamellae are rather spaced, of medium thickness and breadth, fleshy, radiated around an excentric point, at first white, pale, then pale flesh color, finally rusty flesh color to rusty, with numerous shorter lamellules. Flesh very thin toward the margin of the cap, a little thick at the center, soft, white, of a mild taste, almost without odor. Lamellae edges heteromorphic, with hyaline cheilocystidia, sometimes a little contracted in a rosary, 30-50 x 5.5-8 μ, sometimes divided at the end in two to three spheric or rounded excrescences, or simply terminating in the form of a bottle. Spore deposit ochre-colored reddish fallow tinge. Spores under the microscope light, pale yellowish brown, globose-ovoidal, finely but distinctly punctate-verrucose, 7-9 (10) x 6-7.5 (8) μ. Hyaline hypha, with thin partitions, thickness of 3-5 μ. Cuticle of the cap of divided hypha, irregularly interlaced, thickness of 3-3.5 μ. Basidia claviform, with a granulous content, containing many drops of oil, 16-20 x 4-6 μ.

17. CREPIDOTUS VELENOVSKYI Pilát

Carpophores scattered on dead sprigs, small, 1-3 mm in diameter only, conchoidal, non-stipitate, sessile on the side or a part of the back, often closed in a hood, on the surface pale brown tinted when dry, almost glabrous, only slightly covered with bloom villose, long striate on the margin and involute, sessile at the substratum, rather abundantly speckled by white hairs, at the edge generally lobed and notched, very finely membranous, sub-transparent.

Lamellae concolored as the cap, pale brownish, with a lighter border, very distant, most often undulated, decurrent at the base.

Flesh of the cap of 80-90 μ thick, of hypha that are not very distinct, interwoven rather densely, later often softened, subhyaline, thin, 1.5-5 μ thick. Cuticle of the cap non-differentiated.

Hyphae of the trama of the cap passing to the trama of the lamellae. Hymenial elements are not very distinct. Cheilocystidia hardly distinctive, rare, filiform-claviform, 20-30 x 3-4 μ. Spores rusty yellowish, largely ovoidal-tonsil shaped, distinctly verrucose, some uni-guttulated, others with homogeneous content, 8-10 x 5.6-6 μ.

DISTRIBUTION: On dead twigs of Juniperus communis, in Bohemia at Solopisky, not far from Prague, 29-X-1925, leg. J. Velenovský, h. NMP 147309.

REMARKS: Very minute species, but characteristic in its affinity to Crepidotus epibryus Fr., as the verrucose spores prove.

It is distinguished nevertheless from this species in its macroscopic aspect, as well as by its slightly larger spores.

Velenovsky has designated this mushroom in the herbarium as Crepidotus juniperi Vel. But under this name, he has described later another mushroom that he found on dead branches of Juniperus communis at Obrusice 1940. The original description by Velenovský of the species Crepidotus Juniperi Vel., Novitatis Mycological Novissimal p. 77, 1947, refers to this second mushroom, as I am convinced by the study of the original specimen that is really Clitopilus chioneus Pers. He has never described the mushroom that I call Crepidotus Velenovskýi.

18. CREPIDOTUS WAKEFIELDIAE Pilát

Small carpophores, 2-4 mm in diameter, sessile at the substratum, in youth on a small part of the back, distant sub-conchoidal on the flank, always without distinct stipe, at the top whitish to a dirty brownish tint, fleshy membranous-thin, with a very thin edge, when dry slightly involute, shaggy sessile at the base, and often attached to the substratum by long white mycelial shaggy fibers.

Lamellae are distant, often at the number of 12-16 only, rarely more than 20, distant from the base, narrow, breadth hardly 1/2 mm, dirty, clayish brown, most often of the same length or in the larger carpophores intermixed with shorter lamellulae. Hyphae are subhyalin, densely interlaced parallel, thickness of 3.5-5.5 μ in the flesh of the cap.

Spherical spores, with a rather large apiculus and thus almost spherical pyriform, clayish brown, distinctly, densely, and finely verrucose, not guttulate or with a small drop of oil, 5-5.7(6)μ diameter.

DISTRIBUTION: On rotting wood and bark of leafy trees in England. Manchester, Comm. Miss B.Harthan, X-1944. Typus! Herbarium Kew - Donhead St. Mary, legit. Dunston, 15-I-1946. Herbarium Kew.

REMARKS: This very interesting species, known up to the present only in two localities of England, recalls, by the size and the form of the carpophore, Crepidotus velenovskyi Pilat, but has spherical spores. It is distinguished from Crepidotus cesatii Rab. by its carpophores, as also by its much smaller spores, perfectly spherical,

with a large distinct apiculus. Crepidotus cesatii always has spherical-ellipsoidal spores, without a striking apiculus, of a lighter coloration, with a pinkish tint rather than marked clayish brown.

19. CREPIDOTUS EPIBRYUS (Fr.) Quél.

Pileus 5-10 mm, sessile, suspended or resupinate, by the flank, semicircular in youth, unquiform, with a narrowly involute edge, then flat, in its contour weakly tubercular, generally bilobed to the point at which the cap is suspended, thin, white, not yellowing, very finely villose, silky, non-hygrophanous and non-striate. Lamellae take their origin either on the side or more often very excentric and are rather closed in, unequal, with lamellae of half-length, rather large and rounded on the edge, at first white, then very pale pinkish brown, with an entire ridge and a little paler. Basidia are claviform, with 2 or 4 sterigmata, 30-35 x 8-10 µ. Cheilocystidia irregularly lobed, most often with a body part and a distinct neck, but at the neck often sinuous, rather refracting, distinct, 40-50 x 7.5-13 µ. Spores tonsil-shaped, with a rather pointed base, rather large, but distinctly heterodiametric, distinctly largely verrucose, non-guttulated, 7.5-10 x 4.5-5.5 µ.

20. CREPIDOTUS SUBEPIBRYUS Pilat

This resembles a great deal Crepidotus epibryus (Fr.) Quél, but it is smaller, with smaller spores. Pileus 0.5-1 cm of diameter, rounded or reniform, more rarely a little elongated, not stipitate, sessile by a central or excentric point and thus cupuliform to scutelliform, later conchoidal to effuso-reflexed, conchoidal, thin, membranous, almost downy, with a thin margin, a little elevated, with a whitish or ochre-tinted surface, appressed tomentose to almost glabrous. Lamellae ochre rusty, low and rare, convergent toward the point of insertion. Flesh thickness of 300-350 μ, non-differentiated in layers of different hystological composition, composed of hyphae that are densaly interwoven, branched coralloidly in all directions, shortly articulated, hyaline, thickness of 3.5-6 μ, forming a plectenchyma more downy toward the surface of the cap. Cuticle not developed. Basidia are densely compressed, with thin partitions, hyaline, 25-30 x 5.5-6 μ. Subhymenium not very distinctly developed. Cheilocystidia rather spaced on the edges of the lamellae, in form of a bottle, with a fleshy head, more or less spherical, 16-25 x 8-9 μ, with thin partitions, hyalin, smooth. Spores shortly ovoid, finely but distinctly verrucose-bristly, pale clayish rusty brown, non-guttulated, 6-7.5 x 5-5.7 μ.

Crepidotus

Translations from Kühner & Romagnesi

CREPIDOTUS

(Translation from Kuhner & Romagnesi, Flore Analytique des Champignons Superieurs, pp. 75-78. 1953, by Miss Carol Adam.)

Bibl. Pilát A: Monograph of the European species of the genus Crepidotus Fr. (Atlas of the Mushrooms of Europe, T, VI, 1948). - Singer R.: Contributions toward a Monograph of the genus Crepidotus (Lilloa, XIII, p. 59-95, 1947).

This genus is inseparable from the other Pleurotaceous agarics to which it is related or linked by C. pubescens, at least for almost all species of Europe. Pyrrhoglossum of Singer is in fact Gymnopilus with an aborted stipe. C. hibernicus Pilát, gathered by A. A. Pearson in England, seems equally related to Naucoriaceae by its spores tending toward rusty color in the strong bases.

All Crepidotus which we have been able to examine, some rather young examples possess in their first stage a normally placed, more or less central stipe (19) (20). Most of them are ligneous or epiphytic, the largest ones coming on trunks or stumps, the smallest on fallen branches or dead stalks (21).

A. Pileus small (often 1.5-2 cm.), ordinarily pure white (rarely sulfurous), always opaque (from the first, and even during humid weather), the cuticle is spider-like or tomentose being strongly aerial, never transparent, striate, lacking in separable gelatinous strata. Spores ~~are~~ in mass not always yellow-brown, but sometimes more or less reddish, which explains why the type species of the group (C. variabilis) was placed by Fries, not in Crepidotus, but in the Claudopus, and that Patouillard created for it, in order to separate it from Claudopus with the angular spores, the genus..DOCHMIOPUS Pat. (1887)

B. Spores pale cream: when several caps grow imbricated, the spores which are deposited on the caps are simply pale-ochre tinted; or on paper, they appear cream. Lamellae white, then cream-ochre, rarely of a pink-salmon or vivid coral image. Spores are very elongated, 8-11(13) x 2.7-3.5(4) µ, subarched, obliquely narrowed at the base, smooth [Fig. 130 *B]. Hyphae without clamps. Intermediary species between Pleurotellus and Crepidotus. C.--L66F. Schweiz. Zeitsch. f. Pilzk. (13) p. 145, chioneus. Pers. (Syn.: P. septicus ss. Rick.)..PUBESCENS ss. Schroet. [Fig. 130] (Pleurotus Fr.)

B. Spores rosy-brown or ochre-brown in mass.—Group of C. variabilis Fr. ex. Pers. (Most of the types distinguished here below cannot be identified without the aid of a microscope; they were confused by previous authors and are perhaps related by intermediaries.) (22).

C. Cap often tinted with more or less clear sulfur color, at least in places (but also entirely pale cream). Spores elliptical-subfusiform, most often 8-10 x 4.5-5 m, very finely asperulate [Fig. 131*]. AC.-L132D, pubescens Sow. (Syn.: D. tericola ss. Favre.).....LUTEOLUS Lamb.

C. Cap pure white.

D. Lamellae tint tends finally to be more or less reddish, as that of the spores. Spores distinctly punctate under the objective at immersion.

E. Spores cylindric or ellipsoid, 5.5-7.5 x 2.7-4 µ, finely asperulated-punctate [Fig. 132B]. TC.-KM 303_3. L133F.....VARIABILIS ss Pat. [Fig. 132A].

E. Spores elliptical, subamygdaliform or subglobose, larger.

F. Spores long ellipsoid, 7-9 x 5.7-7.5 µ, clearly punctate-echinulate [Fig. *133[. C.-KM 303_4, sphaerosporus Pat. L132D, ed.....CESATII Rabenh.

F. Spores shortly ellipsoid-pruiform (subamygdaliform), 5.7-8.5 x 4.5-6 µ, clearly, but minutely punctate-spinulous. AR.-L133E.....SUBSPHAEROSPORUS (Lange.)

F. Spores ellipsoid-pruiform, 7.5-8(9) x 4-5 µ, clearly rugose-verrucose, narrower and more pointed at one end. AR.-RM (2) p. 137. Pilat p. 66; 24.....EPIBRYUS ss Romagn. (20)

D. Spores are yellow-brown in a mass, without a reddish reflection, smooth or with indistinct punctation, pruniform or amygdaliform, 5.5-9 x 4-5.5 µ. Lamellae are washed with brownish tinge, without rosy reflection. PR.....AMYGDALOSPORUS Kuhn. nov. sp. [Fig. *134) (22).

A. Species that do not have these characteristics. Spores never reddish en masse.

G. Pileus either larger than 1.5 cm., or the cuticle gelatinous, separable or hygrophanous in the fresh state, olive-grey, brownish, clayish-grey or hyalin-white. Lamellae are quite regular, not veiny, even near the stipe.....typical Crepidotus

H. Cap without remarkable gelatinization of the pileus cuticle nor of the edge of the lamellae. Cap hygrophanous (wet), grey-claying-earthy, or at least hyalin, and then sometimes striate at the margin (but opaque and sometimes snow white in dry weather), rather large, often 2-4 cm. or more. Clamped hyphae.

I. Spores spherical, 4-6 μ, punctate-verruculose. Cap white-cream-hyalin and finely pruinous under a magnifying glass, then glabrous and hyalin-brownish, but never very deep, sometimes striate on the margin. On wood, AR.-SMF (53) p. 216. (Syn.: C. scalaris ss. Rick.).....APPLANATUS Fr. ex Pers. ss. Karst. (23)

I. Spores amygdaliform (tonsil-shaped), 6.5-9 x 4.5-6 μ, smooth. Cap finely webby-fibrillose, even radiate-fibrillose on the margin, velvety on the disc. When it is half dehydrated, it is streaked with snow-white and clayish-grey. Sometimes terrestrial. AR.-SMF (53) p. 216. L132E, autochtonus.....FRAGILIS Joss.

H. Cap with a separable gelatinous cuticle; edges of the lamellae bearing a thin filament, viscous and tenacious. Hygrophanous and relatively large cap (exceeding often 3 cm.). Hyphae without clamps. Spores amygdaliform (tonsil shaped), smooth, 7-9.5 x 5-6 μ.

J. Cap glabrous or covered with a rust (yellowish) or appressed tomentum, ~~yellow-brown~~, always light and often disjoined (separate) on an olive-grey or brownish-hyalin background, becoming yellowish or whitish upon drying. C.-KM303$_1$. L132A.....MOLLIS Fr. ex Schaef.$_1$ (24)

J. Cap densely flecked with fine ochre-brown specks, evident to the naked eye, at least in the discal region, more or less appressed. R.-Fr. 124, 4. Cke. 499 (534).....var. calolepis Fr.

G. Pileus either small (less than 1.5 cm.), or the lamellae veined on the faces and often crisped.

K. Cap owing its beautiful brilliant cinnabar-red coloration to the contents of subfusiform cystidia which render it velvety, 0.5-1.2 cm. broad. Lamellae with a carmin colored edge. Spores ellipsoidal 7-8.5 x 4.5-5.7 μ, very finely verrucose. Rotten wood. TR.-Friesia (3) p. 94.....CINNABARINUS Peck.

K. No vivid red colorations.

L. Small species; lamellae regular.

M. On rotting wood. Pileus with a non-gelatinous cuticle, dull pruinose under a lens.....cf. *Naucoria haustellaris*

M. On herbaceous stalks. Pileus more or less striate, with a gelatinous cuticle, becoming varnished after rains (but at first villose-tomentose).....cf. *Geophila phillipsii*

L. Larger species, with lamellae clearly veined on the faces, often irregularly crisped, notably toward the support (25).....cf. *Paxillus panuoides*, p. 46.

Kühner - Romagnesi

NOTES & OBSERVATIONS ON CREPIDOTUS

19. One could wonder if there really exist some species that are ~~resupine~~ at first resupinate ~~at the origin in this genus.~~ in this genus However, Fries states that his C. epibryus, a white, silky species, that comes on large mosses, is resupinate, regular, almost cupulate, sessile, without the rudiment of the stipe, adnate at the ~~top~~ back, with lamellae concurring at the center.

20. The C. epibryus Rick., at first described by him under the name of depluens Batsch, would also be truly resupinate if the illustration that shows it is accurate, from which one could doubt, because the lamellae concur here toward a very excentric point; one is dealing with a very different species from that of Fries, gathered on ~~mixed~~ bare ground with a reddish grey cap under a silky-white down grayish lamellae. Spores 10-12 x 5-6 μ.

21. There has also been described some terricolous species; let us cite, besides fragilis, C. depluens ss. Rick, which seems to be a Dochmiopus by its cap of 2-3 cm., white, tomentous-silky, and its almost punctate spores (elliptical, 8-9 x 5-6 μ) and would be noticeable because of its cap with thick flesh (2-4 mm.), fixed laterally by a lengthened base, almost in the shape of a tongue. Some others have been gathered on living mosses, as the C. epibryus Fr. (see note 19), and three species arranged by Pilat in the special section of the Muscicolae: C. carpatrossicus, Pilat, minute, noticeable because of its relatively very elongated stipe; spores 8-9 x 7-8 μ, very subtly punctate, muscigenus Vel., 2-4 mm., spores pointed at the top,

7-8 x 3.5-4.8 µ, verrucose, and subepibryus Pilat, 5-10 mm., with spores longly elliptical, 6-7.5 x 5-5.7 µ, verrucose.

22. For more details about species of this group, we return to the work of J. Favre (Schweiz. Zeitschr. f. Pilzk. (13) p. 145, 1935), and to the Monograph of Pilát. This latter describes notably two species with non-rosy, smooth spores: C. bresadolae Pilat (=C. pubescens Bres., Icon. Myc., 790, 2), species found ordinarily on wet soil, rarely on very strongly rotton wood which is on the soil, with long elliptical spores (cinnamon in mass), 8.5-12 x 5-6 µ, flattened on one side; C. lundellii Pilat, mostly scattered in forests of mountains and northern, with relatively fleshy cap, with deep ochre shaded to dirty clay colored lamellae, with subamygdaliform (tonsil formed) spores, 7-10.5 x 5.7-7.5 µ, most often 8 x 6 µ. On the other hand, his C. caspari Vel. is little different from fragilis (spores rounded at the end, 7-8(8.5) x 5-5.6 µ). Among the species with more or less verrucose spores one (C. subverrucisporus Pilat) is noticeable because of its ochre-clayish lamellae, without pinkish tints, tonsil shaped spores, 7-9 (9.5) x 5.5-6 µ; his C. microsporus (Karst. ss. Romell) would be (with difficulty) distinguished from variabilis by its narrower spores (6-7.2 x 3-3.7 µ); C. velenoskyi Pilat is tiny (-13 mm.), ellipsoid, thrust in on the side, with spores 8-10 x 5.6-6 µ; C. wakefieldiae Pilat, equally very small (2-4 mm.), is more noticeable by its globose spores 5-6 µ.

23. Pilat attaches C. fulvifibrillosus Murr., as a variety, to applanatus, which he found again in Europe (even though rarely), and which is distinguished by the cap with a finely tomentose

surface, rusty-brown, becoming very finely tomentose-squamulose: the appressed squama stand out in a deep shade on a clearer background.

24. Ricken distinguishes from mollis, with spores 9-10 x 5.5-6 µ, of which he says the flesh is almost gelatinous, from C. applanatus, with spores 7-8 x 4-5.4 µ, with very watery flesh but not gelatinous, with cap-margin striate. But he does not describe the true applanatus Fr. ex Pers., for these latter authors do not point out for their species the separable gelatinous pellicle, that applanatus of Ricken possesses as in mollis.

25. Pilat gives as relatives of Paxillus panuoides two species with a non-bilateral trama, C. serbicus Pilat, with subglobose spores 5-5.5µdiam., and C. macedonicus Pilat, with verrucose spores 5.5-6.2 x 4.6-5 µ. The affinities of the species, of which one has been seen only dry by the author, seem to us problematical.

CREPIDOTUS FRAGILIS Joss.

Soc. Mycol. France 53: 218-220. 1937.

Macroscopic characteristics

Cap 20-70 mm, of a very variable form: either flattened and pleuropodic as C. mollis, or erected in a twisted conk as Pleurotus geogenius; regular or irregular, tender and fragile, rather thin, slightly hygrophanous (the flesh is), very dry; when saturated: slightly gray, clayish, earthy, even fuliginous; when dry: snow white; entirely decorated with a grooved felting which, when the cap is half dehydrated, produces a striking effect of rimosity which combs the cap with snow white and clayish gray streaks. Thin margin, narrowly rounded and hemmed with white on the young specimen; regular, but, more often, sinuous-scalloped-lobed. Non-defined cuticle.

Flesh is very thin at the margin, then thick toward the base, tender and slight, dark gray when saturated, white when dry, deprived of gelatinous layer.

Lamellae very close, very unequal: 9-15 lamellulae; simple rather narrow, thin, resembling the peculiarities of the form of the cap, rounded toward the base, more rarely ending in a point; fragile, at first almost white, then very pale clay color, then deep clay color; dark earthy color completely at the last. Edge entire or rough (?), a little paler.

Stipe noticeably absent, reduced to a point of attachment, felty white.

Spores in mass: deep clay color, earthy (olive tinged).

Microscopic characteristics

Basidia are 4-sporical, 25-33 x 7-8 µ.

Spores sometimes heterogenous but generally pointed, amygdaliform (tonsil shaped), bulging, with a summit sometimes stretched in an obtuse papilla; often with a large guttule; apicule is sub-null; smooth membrane, thinned out at the top, without one's being truly able to distinguish a pore; 7-9(10) x 4.8-5.8 µ.

No pleurocystidia.

Numerous cheilocystidia, common, more or less cylindrical, a little sinuous, obtuse, not capitate, 25-40 x 6-10 µ.

Flesh composed of entangled hyphae, 6-20 µ broad, in which one sees a very thin layer with a parallel appearance, surmounted itself by the superficial felting, formed with very entangled, delicate hypha, strongly vacuolated, 3-10 µ in diameter. No gelatinous zone.

Gill trama with large mediostrate formed with filamentous hyphae, 4-10(20) µ in diameter, regularly disposed, but undulous. Sub-hymenium is sub-cellular.

Clamps are present in the cuticle.

Common fungus odor and taste.

Habitat and distribution

Isolated or gregarious, on the ground or on rotten wood (Pucea?). Moulin-chabaud (Ain), 14-9-1934, in company of M. Maury.—Bois de Laye, near Villefranche (Rhône), 10-7-1936. —Bois du Casino de Charbonnières (common of the Tour de Salvagny; Rhône), 25-9-1935.

Observations:

This species, of an extremely variable form, will be recognized by its delicate flesh, lacking any gelatinous layer, with its silky, rimous cuticle, streaked with snow white and clayish gray, finally by its pointed-tonsil formed, smooth spores.

Before describing now C. applanatus auct. mult., we shall make some remarks in regard to it that we have neglected in the discussion at the beginning, in order not to slow up proceedings.

C. applanatus of Bresadola has larger and less close lamellae than ours: small disagreement. This author attributes to his plant smooth spores, but the study of exsiccata coming from his herbarium has shown us that there was none of them. He synonymizes his species with C. dorsalis of Peck. This inclination does not seem to us to be well founded. Likewise, Bresadola makes a certain error when he identifies his applanatus to that of Ricken which is surely quite different and very close to C. mollis.

North America, in contrast to the old continent, is rich in Crepidota having round and punctuated spores. It is thus that Kauffman [22] gives C. crocophyllus, dorsalis, putrigenus,

stipitatus, malachius, and applanatus. Alone, the last three, extremely similar, can fit to our species. C. stipitatus resembles a very stipitated simple form of malachius. The last (1) has spores that are a little too large, lamellae a little too wide and also, a general tint that is not at all very satisfying. C. applanatus stays alone in line, and certainly, its description fits perfectly our French subjects: the applanatus of the Americans is ours.

We shall say, finally, that there has been indicated as synonyms to applanatus a certain C. globiger Berk., an exotic species about which we have been able to obtain no information. There are besides, a great number of exotic Crepidota with round and punctate spores of which it is difficult to say whether they are akin to our species or to the little Dochmiopius of the group of sphaerosporus.