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NOTES ON THE GENUS PSATHYRELLA—II

Three new species of Psathyrella

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(With 3 Plates and 22 Text-figures)

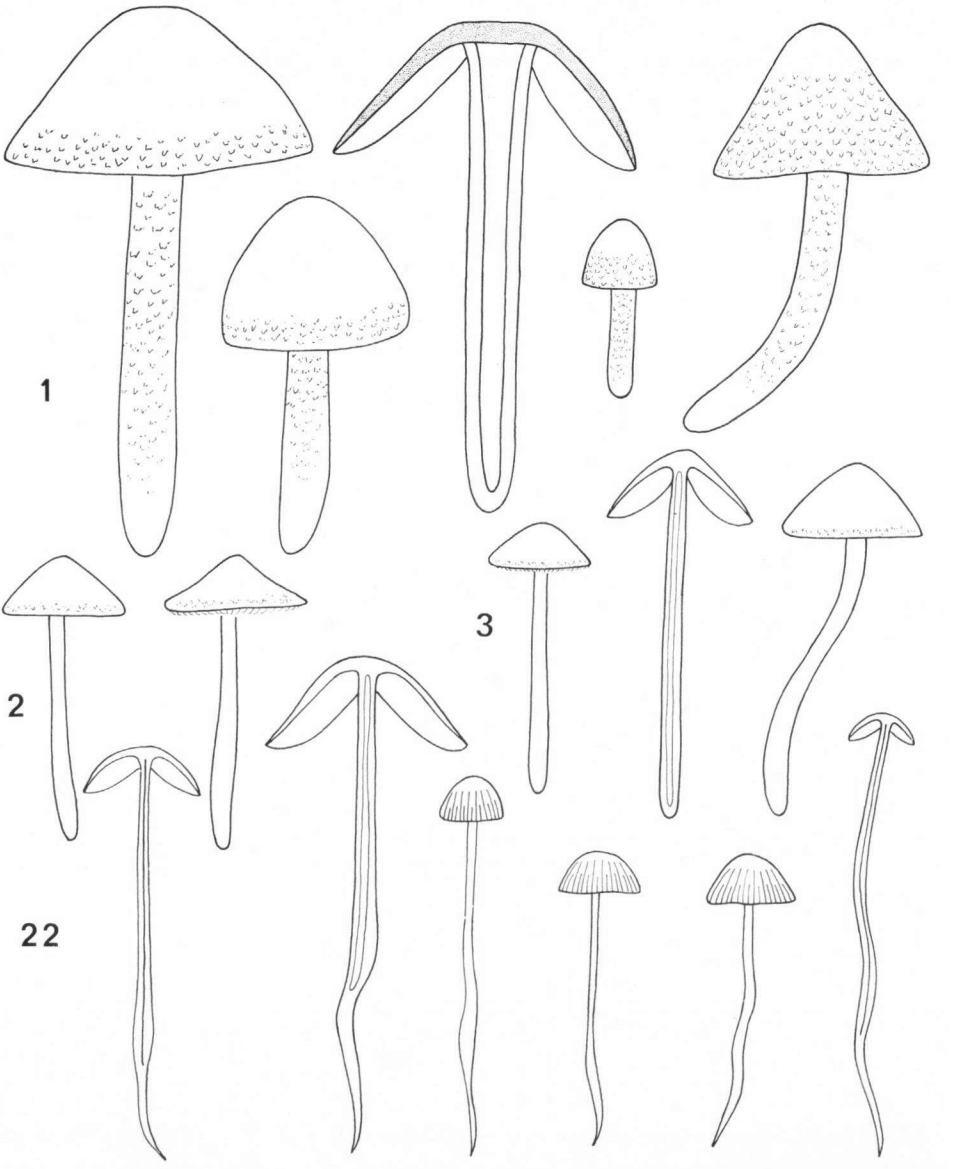
Description of three new and very striking species of *Psathyrella: P. amstelodamensis* (thick-walled muricate cystidia, abundant veil, phaseoliform spores, spore-print dark reddish-brown), *P. narcoticus* (stem conspicuously rooting, strong smell of scatol, cheilocystidia covered with abundant mucoid deposits, staining bluish-green in NH_4OH), *P. pervelata* (very thick and scaly universal veil, subcapitate to subutriform cystidia, flesh of cap hardly and trama of gills not pigmented).

During the past ten years the species of the genus *Psathyrella* have had our very special attention, the result of which being that our herbarium now contains some 470 collections of this genus, practically all of them provided with elaborate notes and habit sketches and quite a few with colour-photographs. We have come to realise that while studying the species of this genus one should be very much aware of a number of considerations, listed below, which have to be taken into account in distinguishing new species of this genus.

(i) Within one and the same species the size of the carpophores is practically of no importance. Only quite recently we undertook a thorough examination of what looked like being a very interesting, be it minute, specimen of *Psathyrella*, only to discover in the end that it represented *P. spadiceogrisea*, which normally is quite a large species.

(ii) Within one and the same species the habit of the carpophores and the shape of the cap vary very considerably and so are of little importance; both depend very much on age and the usual environmental variation.

(iii) The colour of the cap in this genus is extremely variable. The cap is (usually strongly) hygrophanous and the process of drying out already begins in the early stages. Most caps also usually readily loose pigment on ageing and through rain. This point was already stressed by us in an earlier paper (Kits van Waveren, *1971:* 257, 277) and the very same goes for the hygrophanous species of *Conocybe* (Watling, *1971:* 281; Kits van Waveren, *1970:* 122). Kühner & Romagnesi (*1953:* 355) state that in *P. gracilis* the trama of the cap is "sensiblement incolore (seulement un peu brunie sur les jeunes dans la moité supérieure de la chaire piléique, ou même uniquement dans l'hypoderme), totalement hyaline sur adulte dans le chapeau". But we found that although in old specimens of this species the prevailing colour is



FIGS. 1-3. *Psathyrella amstelodamensis*, habit sketches. — 1. Amsterdam, Amsterdamse Bos, 9 June and 27 July 1960. — 2. Amsterdam, Amsterdamse Bos, 27 July 1960 (different locality). — 3. Denekamp, Singraven, 28 Oct. 1961. — (Natural size.)

FIG. 22. *Psathyrella narcotica*, habit sketches. Bakkum, 22 Nov. 1969. — (Natural size.)

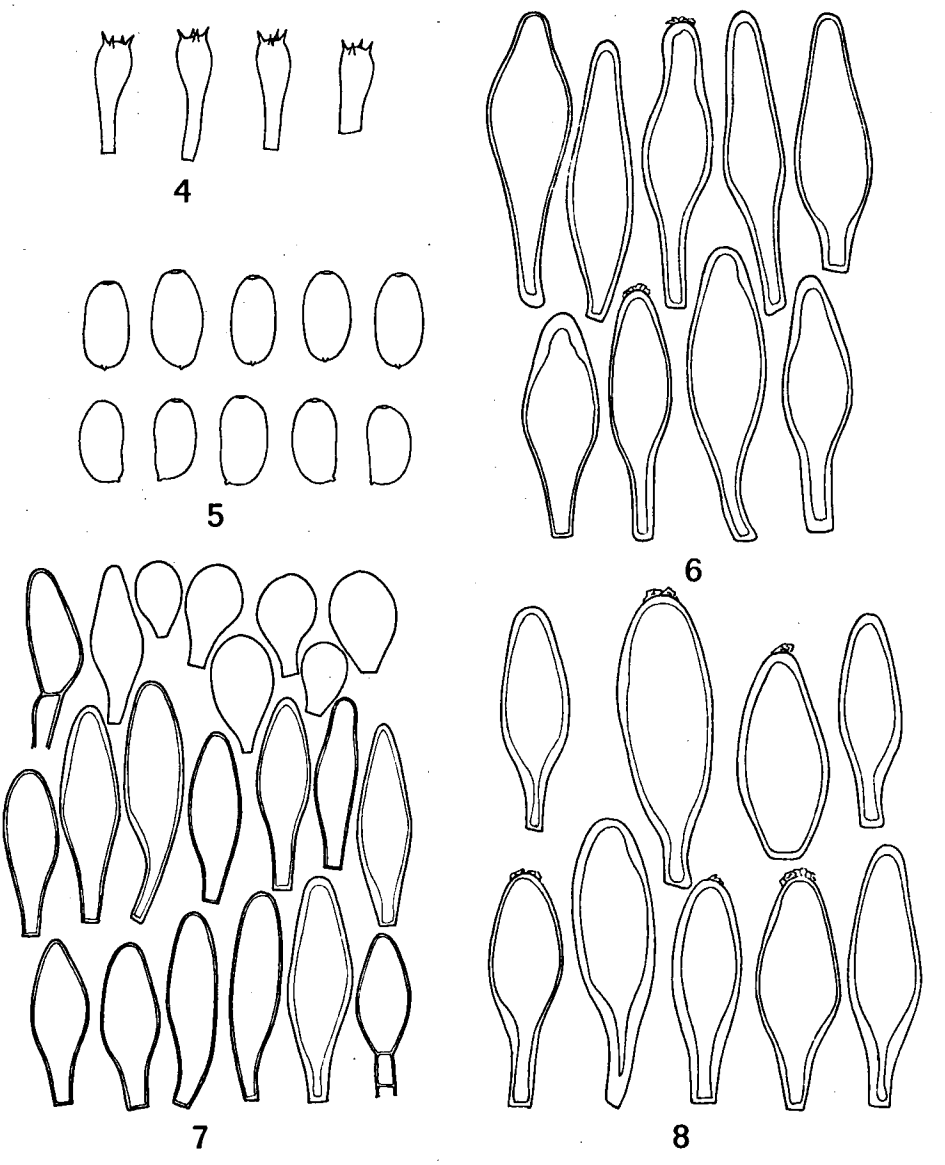
mud-grey, some shade of brown, particularly in the centre, is practically always present, whereas the caps of primordia are definitely reddish-brown.

(iv) In species which possess a universal veil, this veil may not only partly or completely disappear on ageing and through rain, but the extent to which the veil is primarily developed may also vary. We have found specimens, which undoubtedly represented *P. fulvescens* Romagn., but were provided with such a large amount of velar tissue that at first sight they were believed to be a different species.

(v) Within one and the same species the size and shape of the spores is—as we all know—subject to some variation. The size and shape of the pleurocystidia, however, often designated as being very specific, may vary a good deal more (Kits van Waveren, *1971:* 271 and the pleurocystidiograms for *P. microrrhiza*, p. 276). Kühner & Romagnesi (*1953:* 358) correctly describe the pleurocystidia of *P. microrrhiza* as "tantôt obtuses, tantôt aigues, selon les formes". Moreover we found, as was to be expected, both in *Coprinus* (Kits van Waveren, *1968:* 156 *fig. 22, 23* for *C. velox*) and in *Psathyrella* the pleurocystidia in young specimens to be distinctly smaller than those in old specimens. In *P. amstelodamensis*, to be described below, we found the walls of the pleurocystidia in mature specimens very thick (0.9–2.7 μ and sometimes locally up to 3.2–3.6 μ) and the cells distinctly brown, whereas in young specimens the thickness of the walls was considerably less, the cells besides being colourless. In any species of *Psathyrella* differences in individual maturity between the pleurocystidia of carpophores of seemingly the same age or even between the pleurocystidia on one and the same gill, no doubt account for the existing and sometimes considerable differences in size and shape of these cells.

(vi) We fully agree with Orton's statement (*1960:* 367) that "facial cystidia will be found to be more consistent in shape and therefore taxonomically more important than the marginal." Nevertheless we feel the marginal cells (practically always of two types: cystidia and spheropedunculate cells) should always be studied carefully as the overall picture of the cellular lining may turn out to be of some taxonomic value and in quite a few instances indeed is very characteristic (Kits van Waveren, *1971:* 277).

(vii) The smaller the difference between a new species of *Psathyrella* to be described and one already well known, but rare, the larger the number of collections on which this new species is to be based, should be. Such in view of the possibility that the small difference found, may lie within the range of the normal variation of the already known species, of which—because of its being rare—the variability still is little known or unknown. This is why in a previous paper (Kits van Waveren, *1971:* 265) we described with considerable reluctance two new forms of *P. gracilis*. Both *P. gracilis* f. *clavigera* and *P. gracilis* f. *albolimbata* were based on only but still four collections. If, on the other hand, like in two of the three species to be described below (the third species is based on four collections) the difference with any known species is very outstanding, we feel it is fully justified to base the new species on only one collection.



FIGS. 4-7. *Psathyrella amstelodamensis* Dorst, 1 Dec. 1963. — 4. Basidia. — 5. Spores. — 6. Pleurocystidiogram. — 7. Cheilocystidiogram. (Fig. 5: × 1212; Figs. 4, 6, 7: × 575).

FIG. 8. *Psathyrella amstelodamensis*, Amsterdam, Amsterdamse Bos, 27 July 1960. Pleurocystidiogram (× 575)

Bearing these seven points in mind, we wish to describe the following three new and very remarkable species of *Psathyrella*.

ACKNOWLEDGEMENTS.—We are greatly indebted to Mr. and Mrs. M. Montessori, who by giving a very substantial donation to "Persoonia" enabled us to give colour-pictures of two of our species. We also wish to thank very much indeed Dr. R. A. Maas Geesteranus for making the Latin descriptions of the three new species.

Psathyrella amstelodamensis Kits van Waveren, *spec. nov.*

Plate 9, Figs. 1–12

Pileus 10–40 mm latus, primo campanulatus, margine recto vel interdum incurvato, postea conico-campanulatus vel conicus, demum convexus, nonnumquam subumbonatus vel apice applanatus vel umbilicatus, exstrius, udus rugulosus, obscure purpureo-umbrinus, mox obscure ochraceo-umbrinus, hygrophanus, siccus alutaceus vel pallide ochraceus.

Velum album, luxurians e floccis et fascibus fibrillosis formatum. Flocci margine adpressi denticulati interdum apicem attengentes, haud appendiculati.

Lamellae 2–4 mm latae, anguste adnatae, perconfertae, ex ochraceo obscure rubiginosae, acie albae.

Stipes 30–60 × 2–10 mm, fistulosus, aequalis, apice parum attenuatus, haud radicatus, albus, minute fibrilloso-striatus, normaliter veli reliquis lanoso-flocculosis obtectus, ad apicem vulgo a lamellis striatus.

Caro in pileo 2–3 mm crassa, obscure umbrina, in stipite alba.

Odor nullus.

Sporae accumulatae rubiginosae, ellipsoideae, phaseoliformes, (7.2–)8.1—9.9(–10.8) × (4.1–)4.5–5.4 μ, poro germinativo c. 1 μ diam., in aqua observatae pallide rubiginosae.

Basidia 4-sporigera, 16–25 × 8–9.6 μ.

Pleurocystidia 40–75 × 10–25 μ, numerosissima, fusiformia, ventricosa, lageniformia, clavata, saepe pedunculata, apice obtuse rotundata, crasse tunicata, 0.9–1.8(–3.6) μ, praesertim ad basin, apicibus muricatis, cinnamomea in NH_4OH.

Cheilocystidia 30–57.5 × 10–22.5 μ, numerosissima, pleurocystidiis similia, tunicis minus crassis. Cellulae spheropedunculatae 10–25 × 7.5–25 μ, cheilocystidiis intermixtae paucae.

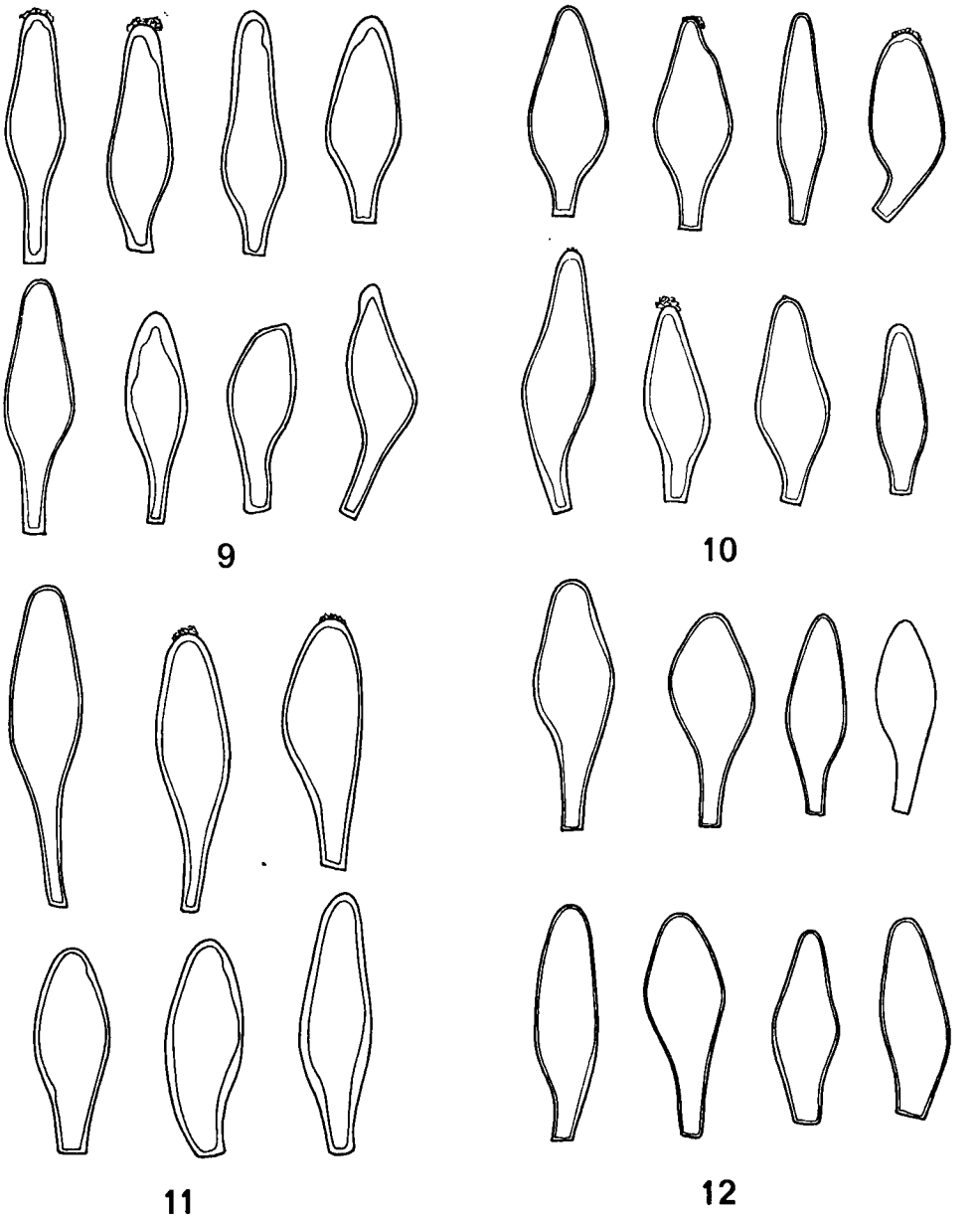
Cuticula pilei cellularis, cellulae 24–48 μ diam.

Ad terram argillosam, mensibus VII—XII.

TYPUS.—The Netherlands, Noord-Holland, Amsterdam, Amsterdamse Bos, 27 Juli 1960, *E. Kits van Waveren* (L).

MARKED KEY CHARACTERS.—Fairly strongly developed universal veil; spores phaseoliform and rather pale reddish-brown; dark reddish-brown spore-print; exceedingly numerous, very thick-walled, muricate, ventricose or fusiform or clavate and often pedunculate pleurocystidia and very numerous similar but thinner-walled cheilocystidia.

MACROSCOPIC CHARACTERS.—*Cap* 10—40 mm broad, firm and slightly fleshy, in the early stages campanulate with marginal area perpendicular or sometimes even somewhat incurved or appressed against the stem, later variable in shape, conical-campanulate or conical, finally expanding to convex, sometimes with large but indistinct umbo, sometimes flattened or even provided with a small umbilicus at the apex, not striate or only striatulate at the margin, with smooth surface, slightly to distinctly rugulose when moist, dark purplish-brown (M. 2.5 YR 3/2; 10 R 3/2, 3/3, 3/4) to very dark brown (M. 7.5 YR 3/2), soon dark ocre-brown, slightly paler towards the margin, hygrophanous, drying out to alutaceous or very pale brown



FIGS. 9-12. *Psathyrella amstelodamensis*. — 9, 10. Denekamp, Singraven, 28 Oct. 1961. Pleurocystidiograms of two different specimens (× 575). — 11, 12. Amsterdam, Amsterdamse Bos, 27 July 1960. Pleurocystidiograms. 11. Of mature specimen. 12. Of young specimen. (Both figs.: × 575).

(M. 10 YR 8/3), the centre remaining pale ocre (M. 10 YR 7/4), while drying and when dry neither micaceous nor showing traces of pink.

Veil rather strongly developed, white, in young specimens forming numerous appressed denticle-like flocci and bundles of fibres (sometimes arranged in zones), reaching up to 1/2–1/3 from the margin inwards to even up to the apex and a dense zone along the margin of the cap, not appendiculate, rarely less developed but then still present as scattered fibres and minute flocci either up to 1/2–2/3 from the margin inwards or near the margin only.

Gills ventricose, 2—4 mm broad, ascending and narrowly adnate, conspicuously crowded, in the early stages pale brown, then brown with a trace of purple, finally via dark purplish-brown to strikingly dark chocolate-brown or red-brown (M. 5 YR 3/3; 7.5 YR 3/2), with white edges, in dried herbarium material strikingly crowded and dark reddish-brown with white edge.

Stem 30–60 × 2–10 mm, cylindrical, often very slightly and gradually thickening towards the base, hollow, not rooting, white, surface minutely fibrous-striate, normally covered with rather woolly-floccose velar remnants, sometimes only with scattered velar fibres, the apex pruinose and coarsely striate from the gills.

Flesh of cap 2—3 mm thick in centre and very dark brown or greyish brown; of stem white but inner lining of cavity very pale brown.

Smell indistinctive.

Spore-print dark reddish-brown (M. 5 YR 4/2, 4/3).

Pigmentation (studied at 60 × enlargement under binocular lens, for technique see Kits van Waveren, *1971:* 249). Flesh of cap between "ridges" of gills rather dark ocre-brown (M. 7.5 YR 5/4, 4/4, darker towards centre of cap and paler towards the edge); "ridges" of gills towards the centre of the cap dark brown (M. 7.5 YR 4/2), towards the margin dark yellowish brown (M. 10 YR 3/4, 4/4). Trama of the gills along the base very distinctly brown (paler than M. 7.5 YR 4/4, also 7.5 YR 5/6), in the basal 1/3–1/2 portion of the gills yellowish-brown (slightly more yellow than M. 10 YR 6/3), gradually changing into greyish-yellow (M. 5 Y 7/3) in the peripheral 2/3–1/2 portion and at the edge pale grey (M. 5 Y 7/2).

MICROSCOPIC CHARACTERS.—*Spores* ellipsoid, in lateral view phaseoliform, sometimes subcylindrical and sometimes slightly and irregularly narrowing towards the base, (7.2–)8.1–9.9(–10.8) × (4.1–)4.5–5.4 μ with small ($\pm$ 1 μ) and fairly distinct pore and with very small hilar appendix, pale brown with a trace of red (M. 5 YR 5/4; 7. 5 YR 5/4) when mounted in water and dark redbrown in NH_4OH (colour fading after a while), thin-walled, not opaque.

Basidia 4-spored, 16–25 × 8–9.6 μ.

Pleurocystidia exceedingly numerous, variable in shape, ventricose, fusiform, clavate, often pedunculate, the stalk gradually passing into the much wider body, the apex always very obtuse, 40–75 × 10–25 μ; walls in mature specimens almost always very thick (0.9–1.8 μ but often locally up to 2.7 μ or sometimes even 3.2–3.6 μ), the thickest part (often with considerable narrowing of the lumen) normally at or near the base of the cell, but fairly often at the apex; apex often muricate, encrusted with crystals or/and minute granular deposits; mature pleurocystidia appear distinctly pale brown when the microscope is focussed on the surface of the cells; when the microscope is focussed on the equatorial plane the walls in optical section appear pale yellowish.

Marginal cystidia exceedingly numerous, of the same shape as but smaller than the pleurocystidia, 30–57.5 × 10–22.5 μ, the walls of practically all thickened but thinner than those of the pleurocystidia, often with encrustations at the apex, either colourless (thin walls) or slightly brown (thicker walls); in between them a fairly small number of spheropedunculate cells, 10–25 × 7.5–15 μ, which may easily be overlooked.

Pigmentation under microscope (tissue mounted in NH_4OH 10 %). Hyphae of hypodermis fairly strongly coloured by brownish membranal pigment with great numbers of yellow coloured hyphal septa and very numerous encrustations on both the narrow hyphae of the hypodermis and the broad hyphae of the underlying flesh. Trama of the gills distinctly but not very strongly brownish by membranal pigment (strongest at the base); a fair number of yellow hyphal septa and rather few encrustations.

Cap cuticle cellular, diameter of cells 24–48 μ.

Caulo- and *pileocystidia* none.

Clamps present at the narrow, colourless superficial hyphae of the stem.

HABITAT.—Terrestrial in rich and particularly clayey soil by roadsides or in deciduous woods. June—December. Very rare.

COLLECTIONS EXAMINED.—The Netherlands, Overvssel. Denekamd. Estate "Singraven", 28 Oct. 1961, *E. Kits van Waveren* (L). Noord-Holland, Amsterdam, Amsterdamse Bos 9 June 1960, 27 July 1960, two localities (type, L), *E. Kits van Waveren*. Noord-Brabant, Dorst near Breda, 18 Sept. 1963, 1 Dec. 1963, *P. B. Jansen* (L).

OBSERVATIONS.—Although the shape and size of the specimens from the four localities vary considerably (see Plate 9 and Figs. 1–3) and although the two specimens of the Denekamp collection showed rather few velar remnants, the specimens of these five collections no doubt represent one and the same species; their microscopical and very typical characters are fully identical and the dried specimens of these five collections all look strikingly alike.

At first sight the description, given above seems to fit in rather well with the description and Plate 12 of *P. olympiana*, given by Smith (*1941:* 36). There are, however, a few striking differences. The main and most important difference lies in the development of the universal veil, of which Smith (basing his description on no less than four collections from widely dispersed localities!) stated that in *P. olympiana* only "scattered remains of the rudimentary veil" are present and that the veil is "distinct though scanty". Kühner & Romagnesi (*1953:* 369) state of the veil of *P. olympiana* (this species by them believed to be "assez commun") that it is "présent, bien que rudimentaire". Singer (*1962:* 508) even ranks *P. olympiana* under *Psathyrella* subgenus *Homophron* (Britz.) Sing., the species of this subgenus according to Singer having "veil none". In all three collections from the Amsterdamse Bos the veil was rather strongly developed (see Plate 9), velar flocci in young and even semi-mature specimens even reaching up to the apex in abundance. As for the specimens from Dorst, the only notes the excellent mycologist, Mr. P. B. Jansen took down for his find were: "*Psathyrella* with *Inocybe* cystidia and a lot of veil" and the very good water colour picture of these specimens made by the late Mrs. M. Jansen-van der Plaats shows a narrow marginal zone full of white velar remnants, which in the youngest specimen depicted, reach up to midway the centre of the cap and a woolly-hairy coating of the stem.

Smith further describes the colour of the mature gills as being "drab" (= between grey and brown), whereas in all our specimens it was strikingly dark chocolate-brown to red-brown, this colour, no doubt, mainly being due to the rather pale

reddish-brown colour of the spores. The gills of all our dried material still are strikingly red-brown.

Smith's specimens were growing "on old wood and debris of elder and cotton wood", whereas the specimens of all our collections were terrestrial and always growing in clayey soil (in one of our Amsterdam collections a cluster was growing in rich soil against a small and hardly visible rotting tree stump).

Next, Smith describes the cystidia as being "fusoid, ventricose to subcylindric" and having their walls "usually slightly thickened, especially towards the apex". In our material the pleurocystidia indeed also were fusoid and ventricose, but often clavate, their walls, however, being very thick in mature specimens and usually thickest at or near their base (with narrowing of the lumen) or equally thick all over. Sometimes only they were thickest at the apex. Also, the apices of the cystidia, depicted by Smith, are decidedly either very acute or subacute, whereas in our material the apices are conspicuously obtuse.

On the basis of these differences we believe our species not to be conspecific with *P. olympiana.*

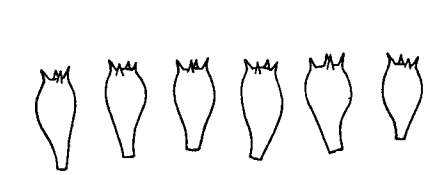
The pleurocystidia of young specimens are colourless and their walls are decidedly thinner. Among the very thick-walled pleurocystidia of mature specimens a varying but usually small number of thinner walled ("young") pleurocystidia are always found.

If the species of *Psathyrella* subgenus *Homophron* are to be defined as having no universal veil, like Singer (*1962:* 507) and Kühner & Romagnesi (*1953:* 369) do, neither *P. olympiana* nor *P. amstelodamensis* should be listed with the species of subgenus *Homophron.* The reason being that according to Smith *P. olympiana* has "scattered remnants of a rudimentary veil", *P. amstelodamensis* even having a conspicuous universal veil. This is why indeed Kühner & Romagnesi do not place *P. olympiana* in the *Homophron* section. Nevertheless Singer does list *P. olympiana* with the species of subgenus *Homophron.*

If, however, the presence of thick-walled muricate pleurocystidia is the deciding criterium for the species of subgenus *Homophron,* our species most certainly qualifies for that subgenus and so does *P. olympiana.*

Psathyrella macquariensis Singer (*1959:* 392) listed by Singer (*1962:* 508) under subgenus *Homophron,* has according to Singer's description bean-shaped spores, a veil, which is said to be "not conspicuous", and pleurocystidia, which, although "not or very little encrusted" have walls which are not thickened.

Psathyrella subcernua (S. Schulz.) Sing., on account of its muricate cystidia also listed by Singer under subgenus *Homophron,* has, according to Schulzer von Müggenburg (*1877:* 427) a cap, which is "valde dilute umbrino-albido". Maire (*1952:* 51) calls the colour of the cap of this species "alutacé pâle" (thus as in *P. cernua*) and the spores small (6.5–8 × 3–3.5 μ). According to Kühner & Romagnesi (*1953:* 373, Note 23) the spores of this species are "très petites", measuring 7–7.7 × 3.7–4.2 μ. According to von Höhnel (*1907:* 99) the pleurocystidia of this species are "zerstreut stehende kurze, dickbauchige, oben im kurzen



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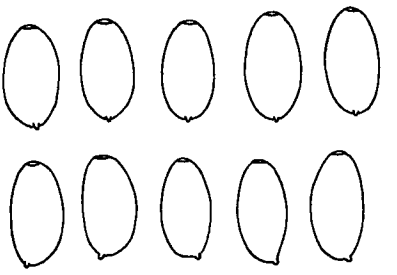

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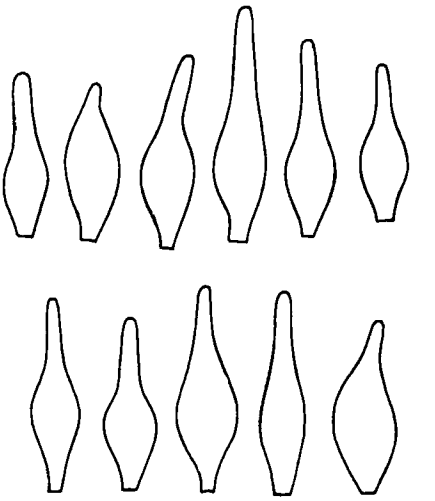

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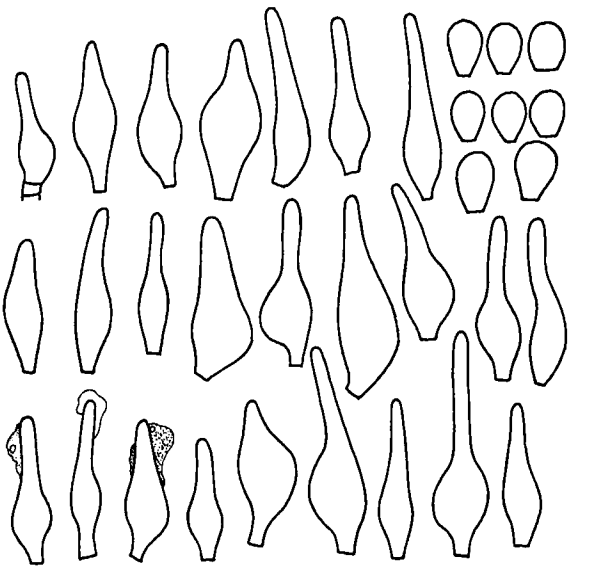

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FIGS. 13-16. *Psathyrella narcoticus* (Bakkum, 22 Nov. 1969). — 13. Basidia. — 14. Spores. — 15. Pleurocystidiogram. — 16. Cheilocystidiogram. (Figs. 13, 15, 16: × 575; Fig. 14: × 1212).

Fortsätze bis zum Verschwinden des Lumens verdickte, 26–30 × 14–20 μ Cystiden", very much, therefore, like those of *P. cernua* and very unlike those of our species.

Psathyrella spadicea (Schaeff. ex Fr.) Sing., *P. pygmaea* (Bull. ex Fr.) Sing. and *P. cernua* (Vahl ex Fr.) Moser, all three species with muricate pleurocystidia, of course are quite different species.

For a moment we believed that—because of the thick-walled cystidia—our species might be Orton's (*1960:* 379) *Psathyrella xanthocystis*, according to Orton conspecific with *Drosophila jerdonii* (Berk. & Br.) sensu Kühn. & Romagn. as described by Kühner & Romagnesi (*1953:* 359). But Orton's species has a "fugacious pendulous ring", an appendiculate veil, forming "dentate scales at margin at first", the spores are not phaseoliform (having described *P. flexispora* and other species in the genus *Psathyrella* with phaseoliform spores, Orton would certainly have noticed such spores in *P. xanthocystis*) and the pleurocystidia, although being thick-walled are—judging from Orton's figure 495—only so near the apex. The apex, besides, is very acute and the cystidia are described as "acutely lageniform or fusiform with short point, apex 3–5 μ". Our species has no annulus, the veil is not appendiculate, the spores are phaseoliform and the shape of the cystidia is quite different. Orton's figure 200, depicting a carpophore of his species, does not resemble our species in the least.

Psathyrella muricellata (Sing.) Sing. as described by Singer (*1938:* 13) also has thick-walled muricate cystidia, but the cap is strongly striate ("diaphano-striato usque centrum in udo"), so it cannot be more or less fleshy like in *P. amstelodamensis* and besides the cap is only 15 mm broad and there is no veil ("velo omnino deficiente").

Bresinsky (*1966:* 14) described a species, which he called *Psathyrella* cf. *olympiana* and which undoubtedly must be the same as our *P. amstelodamensis*, his description fully covering our description of the latter. It is particularly noteworthy that he described the cap as being "rundlich mit weissen Velumresten" and as being "glockig-breitkegelig-verflacht".

Psathyrella narcotica Kits van Waveren, *spec. nov.*

Figs. 13–16, 22

Pileus 9–20(–26) mm latus, submembranaceus, e semigloboso campanulatus postec subconvexus demum tantum subexpansus, ½–⅓ pellucido-striatus, primo melleo-gilvus, mox cinerascens demum murinus et ravidus, centro subochraceus, hygrophanus, sicco albus-alutaceus.

Velum nullum.

Lamellae ascendentes, strictae, ad pilei marginem rotundatae, subdistantes, 1–3 mm latae, primo cinereae mox obscure purpureo-ravidae, modice vel late sinuato-adnatae, acie albae.

Stipes 25–62 × 1–2(–2.5) mm, aequalis, apice parum attenuatus, albus, fistulosus, radicatus (10–25 mm).

Caro in pileo 0.5–2 mm crassa, mellea vel gilva, in stipite alba.

Odor fortis, *Coprino narcotico* similis.

Sporae accumulatae purpureo-atratae, (9.5–)9.9–11.7 × 5–5.9 μ, ellipsoideo-amygdaliformes poro germinativo magno, 1.5—2 μ diam., in aqua observatae rubiginosae.

Basidia 4-sporigera.

Pleurocystidia 35–55 × 10–15 μ, dispersa, lageniformia, hyalina, tenui-tunicata.

Cheilocystidia 27.5–50 × 7.5–15 μ, numerosa, lageniformia, tenui-tunicata, hyalina, apicibus collisque materia mucoidea granulosa ope NH_4OH virescente obtecta. Cellulae spheropedunculatae 10–15 × 7.5–10 μ, cheilocystidiis intermixtae.

Cuticula pilei cellularis, cellulae 16–72 μ.

Ad terram inter gramines.

Typus:—The Netherlands, Noord-Holland, Bakkum ("Koningsbos"), 22 Nov. 1969, *E. Kits van Waveren* (L).

MARKED KEY CHARACTERS.—Strong smell of scatol (exactly like *Coprinus narcoticus*), conspicuously rooting stem, very little pigment in flesh of cap and practically none in trama of gills (cap predominantly grey), spores 9.9–11.7 × 5–5.9 μ, lageniform pleuro- and cheilocystidia, the latter abundantly covered with mucoid deposits at the apices and along the necks, staining bluish-green in NH_4OH 10 %.

MACROSCOPIC CHARACTERS.—*Cap* 9–20(–26) mm broad, semiglobose to campanulate, in final stages only slightly expanded, strongly striate up to 2/3 from margin inwards, in the early stages pale yellowish brown (slightly paler than M. 10 YR 5/4 or slightly browner than M. 2.5 Y 7/4, 6/4), the striate part from margin inwards very soon becoming distinctly greyer (M. 2.5 Y 6/2; 10 YR 6/2 and sometimes 5 Y 6/1), in later stages grey to pale brownish-grey (M. 10 YR 6/1, 6/2; 2.5 Y 6/2), only the centre very slightly browner, in final stages dark grey (M. 10 YR 4/1, 4/2) in centre dark greyish-brown (M. 10 YR 4/3) and at the margin distinctly purplish-grey (M. 5 YR 4/1), rapidly and strongly hygrophanous to almost white, alutaceous (M. 10 YR 8/1, 8/2, 2.5 Y 8/2) only at the apex very pale brown (M. 10 YR 8/3), neither rugulose, nor micaceous, nor showing traces of pink.

Veil absent on both cap and stem, not seen even in young specimens.

Gills ascending, straight or ventricose only near the margin of the cap, moderately or even broadly adnate, not crowded, 1–3 mm broad, in early stages light grey to slightly purplish-grey (M. 5 YR 6/1, 6/2) with only a trace of brown (M. 10 YR 6/3) at the base, in later stages darker purplish-grey (M. 5 YR 5/1), towards the base hardly a trace of brown (M. 10 YR 6/2) and at the base sometimes pale yellowish-brown (slightly paler than M. 10 YR 5/4), in the final stages dark to very dark purple-grey (M. 5 YR 4/1 or even 3/1) but at the base with still a faint trace of brown (M. 10 YR 4/2); edge white and minutely flocculose.

Stem cylindrical but usually slightly and gradually thickening towards the somewhat thickened base, 25–65 × 1–2(–2.5) mm excluding the very marked root, white but pale isabelline in lower 1/2–1/3, apex pruinose, hollow; root 10–25 mm, tapering towards its end, neither hollow nor fixed to either wood or dung.

Flesh of cap 0.5–2 mm thick in centre, pale yellowish-brown (somewhat paler than M. 10 YR 5/4), of stem alongside gills concolorous with cap, otherwise whitish, but pale isabelline in lower 1/2–1/3.

Smell strongly of scatol, exactly like *Coprinus narcoticus*.

Spore-print purple-black.

Pigmentation (studied at 60 × enlargement, for technique, see Kits van Waveren, *1971:* 249). Flesh of cap between "ridges" of gills very pale brown, paler than M. 10 YR 7/2, rather towards M. 2.5 Y 7/2 and M. 5 Y 7/2; "ridges" of gills very pale yellowish-brown (M. 10 YR 8/3; 5 Y 7/3); trama of gills hyaline, very pale grey (M. 10 YR 7/1; 5 Y 7/1), practically colourless, only a trace of yellowish-brown at the base (M. 2.5 Y 7/2).

MICROSCOPIC CHARACTERS.—*Spores* ellipsoid-amygdaliform, (9.5–)9.9–11.7 × 5–5.9 μ, with large (1.5–2 μ) distinct pore and small hilar appendix, fairly dark reddish-brown (M. 2.5 YR 3/6) when mounted in water and very dark red-brown in NH_4OH, wall fairly thick, not opaque.

Basidia 4-spored, 17.6–22.4 × 9.6–10.8 μ.

Pleurocystidia scattered, lageniform, 35–55 × 10–15 μ (ventricose part), hyaline, thin-walled, often a few minute bluish-green (in NH_4OH) granular deposits on the apex.

Marginal cystidia very to fairly densely packed, of the same lageniform but more variable shape as, but smaller than the pleurocystidia, 27.5–50 × 7.5–15 μ (ventricose part), hyaline, thin-walled; in between them a variable and mostly small number of inconspicuous small spheropedunculate cells, 10–15 × 7.5–10 μ; everywhere on the apices and along the necks of the cystidia very small, medium-sized and large (diameter up to 16 μ) irregularly shaped, often elongated but also globose, minutely to coarsely granular deposits, which stain very bright bluish-green in NH_4OH 10 %.

Pigmentation (tissue mounted in NH_4OH 10 %). Hyphae of hypodermis only slightly coloured by yellowish-brown membranal pigment, few yellow coloured hyphal septa and hardly any encrustations. Trama of the gills practically colourless, a trace of yellowish-brown membranal pigment at the base only, no yellow hyphal septa and no encrustations.

Cap cuticle cellular, diameter of cells 16–32 μ.

Caulo- and *pilocystidia* none.

Clamps present at the narrow colourless superficial hyphae of the stem.

HABITAT.—terrestrial, in grass.

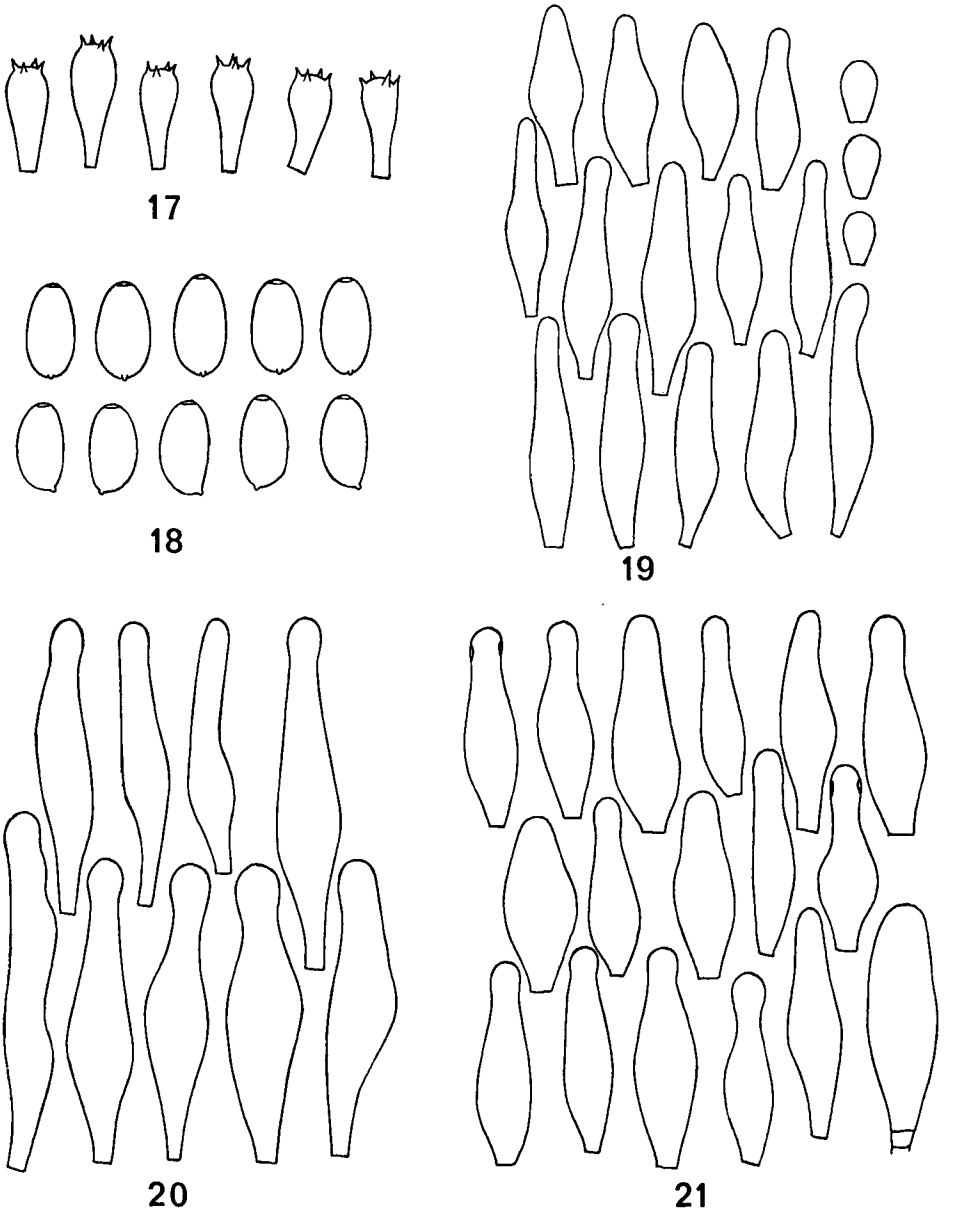
COLLECTIONS EXAMINED.—The Netherlands, Noord-Holland, dunes of County Watersupply just north of Bakkum ("Koningsbos"), 22 Nov. 1969, *E. Kits van Waveren* (type, L).

OBSERVATIONS.—In vain we have searched the literature for a species of *Psathyrella* having the extraordinary combination of the following outstanding characters: very strong 'narcoticus' smell, strongly rooting stem, predominantly grey cap, rather large spores and cheilocystidia covered with masses of mucoid deposits, staining bluish-green in NH_4OH.

Some 20 specimens of all stages were growing gregariously, but not cespitose, in grass, very close to a very small well, where cattle come and drink. The cap of the largest specimen (diam. 26 mm) had a somewhat different colour, being yellowish-brown (M. 10 YR 5/4) all over, obviously being slightly more pigmented than the other specimens.

In the literature we have come across only two species of *Psathyrella* in the description of which a very marked smell is mentioned. Peck (*1872:* 70) described *P. odoratus* Peck as having a "strong odor, resembling *Sambucus pudens*". Apart from the fact that this smell is quite different from the smell of our plant, which smells of *Coprinus narcoticus*, Peck's species is described as having a "dark reddish-brown or chestnut colored" cap, which is "dirty white or clay colored with a pinkish tinge, subatomaceous and radiately wrinkled when dry". The colour of the gills is "dingy flesh, then rosy brown, finally black" and no root is mentioned.

Next, Møller (*1945:* 179) described *P. saponacea*. His very elaborate description



FIGS. 17-21. *Psathyrella pervelata* (Amsterdam, Amsterdamse Bos, 30 Sept. 1961). — 17. Basidia. — 18. Spores. — 19. Cheilocystidiogram. — 20. Pleurocystidiogram of mature specimen. — 21. Pleurocystidiogram of young specimen. (Figs. 17, 19, 20, 21: × 575; Fig. 18: × 1212).

For Fig. 22, see p. 296.

does not mention the presense of a root, the species has a rudimental veil, "pallid eye-blue" gills in young specimens, a "distinct soap-like smell (like that of *Tricholoma saponaceum*)" and "broadly capitate" pleurocystidia. No mention is made of mucoid deposits on the cheilocystidia. So this species cannot be conspecific with our species either.

Psathyrella pervelata Kits van Waveren, *spec. nov.*

Plates 10, 11, Figs. 17-21

Pileus primo 8–14 mm latus, 10–20 mm altus, cylindrico-campanulatus, centro pallide ochraceus, marginem versus albus, demum 25–35 mm latus, convexus vel applanatus, ½—⅔ pellucido-striatus, murinus, ad marginem cinereus, centro subochraceus, hygrophanus, siccus albus vel subisabellinus.

Velum luxurians, album, appendiculatum, primo ad margimem squamulis distincte pannosis ornatus et squamulis flocculosis dispersis erectis et recurvatis vel praecipue discum.

Lamellae 7–5 mm latae, primo albae, dein cinereae, demum ravidae, subventricosae, anguste, adnatae, acie albae.

Stipes 50–75 × 2–4 mm, aequalis, apice parum attenuatus, fistulosus, haud radicatus, fragilis, albus, exannulatus.

Caro in pileo 1–2 mm crassa, pallide cinerea, centro subisabellina, in stipite alba.

Odor nulles.

Sporae accumulatae purpureo-atratae, (8.1-)9–9.9 × 4.5–5 μ, ellipsoidea-amygdaliformes, poro germinativo magno, 1,5-1.8 μ diam., in aqua observatae rubiginosae.

Basidia 4-sporigera, 20.8–25.6 × 9.6–10.4 μ.

Pleurocystidia 60–80 × 10–17.5 μ, dispersa, fusiformia, manifeste subcapitata vel subutriformia. hyalina, tenui-tunicata.

Cheilocystidia 32.5–57.5 × 10–12.5 μ, pleurocystidiis similia, hyalina, tenui-tunicata. Cellulae spheropedunculatae 12.5–15 × 7.5–10 μ, cheilocystidiis intermixtae, creberrimae.

Cuticula pilei cellularis, cellulae 16–56 μ diam.

Ad terram argillosam.

Typus.—The Netherlands, Noord-Holland, Amsterdam, Amsterdamse Bos, 30 Sept. 1961, *E. Kits van Waveren* (L).

MARKED KEY CHARACTERS.—Heavily developed woolly-scaly white universal veil; very little pigment in trama of both cap and gills, the former being predominantly grey; subcapitate to subutriform cystidia.

MACROSCOPIC CHARACTERS.—*Cap* in the early stages cylindrical-campanulate to campanulate, 8–14 mm broad and 10–20 mm high, not striate, pale ocre (M. 7.5 YR 6/6) to pale brown (M. 10 YR 7/4) in the centre, still paler (M. 10 YR 8/4) towards the edge, the peripheral 1/3—1/2 being white; in the process of ripening the cap expands via convex to finally plane (sometimes with vague umbo), 25–35 mm broad, loosing practically all brown colour, becoming striate up to 1/3–1/2 from margin inwards and predominantly mouse-grey, near the margin very pale grey (M. 7.5 YR 7/0), towards the centre darker grey (M. 2.5 Y 6/0; 5 YR 7/1, 6/1; 10 YR 6/1), in the centre in the end with only a trace of brown (M. 2.5 Y 7/2); hygrophanous, drying out to just white with a trace of isabelline in the centre, while drying and when dry neither micaceous, nor rugulose, nor showing traces of pink.

Veil strongly developed, white and consisting of a very thick, woolly-floccose, easily detersible coating on both cap and stem, particularly in the younger stages forming appendiculate conspicuous ragged, large (up to 2 × 2 mm!) scales at the

margin of the cap and a dense fibrillose woolly-scaly covering of erect and recurved flocci, the coating of the stem being increasingly woolly-scaly towards the base.

Gills in early stages pure white, later via pale grey to grey (M. 2.5 Y 6/0, 5/0; 10 YR 5/1), finally dark grey with a trace of purple (M. 5 YR 4/1), ascending, slightly ventricose, 3–5 mm broad, narrowly adnate, edge white.

Stem in mature specimens 50–75 × 2–4 mm, very slightly and gradually thickening towards the base, fragile, pure white, shining in upper part (not covered by the velar coating of the lower ± 3/4 portion), not rooting, apex pruinose, hollow, no annulus.

Flesh of cap in centre 1–2 mm thick, very pale grey with a trace of isabelline, flesh of stem white.

Smell indistinctive.

Spore-print purple-black.

Pigmentation (studied at 60 × enlargement under binocular lens, for technique, see Kits van Waveren, *1971:* 249) Flesh of cap between "ridges" of gills pale yellowish with a trace of brown (± M. 2.5 Y 8/4) and towards the margin increasingly paler (M. 5 Y 7/3); 'ridges' of gills in central half of the cap light olive-brown (M. 2.5 Y 5/6), towards the margin increasingly paler, via pale olive (M. 5 Y 6/4) to pale yellow (M. 5 Y 7/4) near the margin of the cap. Trama of the gills in basal half very pale yellowish-brown (± M. 5 Y 7/3) and in peripheral half practically colourless (M. 5 Y 7/2), at the edges M. 5 Y 7/1.

MICROSCOPIC CHARACTERS.—*Spores* ellipsoid-amygdaliform, (8.1–)9–9.9 × 4.5–5 μ, with large and distinct pore (1.5–1.8 μ) and small hilar appendix, fairly dark reddish-brown (M. 2.5 YR 3/6) when mounted in water and very dark brown in NH_4OH, wall fairly thick, subopaque.

Basidia 4-spored, 20.8–25.6 × 9.6–10.4 μ.

Pleurocystidia scattered, fusiform with broadly rounded apices, almost all of them distinctly subcapitate to subutriform, 60–80 × 10–17.5 μ (ventricose part) × 6–8 μ (below apex) × 7.5–10 μ (apex), hyaline, thin-walled.

Marginal cystidia in fairly large numbers and of the same shape as but smaller than the pleurocystidia, 32.5–57.5 × 10–12.5 μ (ventricose part), hyaline; in between them rather large numbers (± 60 % of all marginal cells) of fairly small spheropedunculate cells (12.5–15 × 7.5–10 μ).

Pigmentation (tissue mounted in NH_4OH 10 %): Hyphae of hypodermis very pale brownish-yellow by membranal pigment in the absence of yellow hyphal septa and encrustations. Trama of gills practically colourless, very pale yellowish in the basal part, neither yellow hyphal septa nor encrustations.

Cap cuticle cellular, the cells rather irregularly shaped and mostly rather large, diam. 16–56 μ.

Caulo- and *pileocystidia* none.

Clamps present at the superficial hyphae of the stem.

Veil consisting of chains of narrow but mostly quite broad, cylindric or slightly fusiform hyphae, 32—80 × 6.4—25.6 μ, mostly 40—64 × 14.4—19.2 μ, constricted at the hyphal septa (cellular picture as a result identical with that of the veil of the species of the *Lanatuli* group of *Coprinus*).

HABITAT.—Terrestrial in clayey soil.

COLLECTIONS EXAMINED.—The Netherlands, Noord-Holland, Amsterdam, Amsterdamse Bos, 30 Sept. 1961, *E. Kits van Waveren* (type, L).

OBSERVATIONS.—The very heavily developed veil, the shape of the cystidia and the almost complete lack of pigment in both the trama of the cap and of the gills are characteristic of this species. This lack of pigment results in the cap in the early

stages being white in the peripheral half and in the later stages being mouse-grey due to the spore-covered gills, shining through. Among the pleurocystidia of one of the young specimens we came across an occasional cell, which had a slight thickening of the wall just below the subcapitate apex (see fig. 21).

Smith has described a number of species with a more or less heavily developed and often appendiculate white veil. Most of these species are quite different from *P. pervelata* (quite different colour of the cap, veil appressed and not forming erect, recurved scales and flocci, quite different spore-size, quite different shape of the cystidia, densely cespitose growth, etc.) The only two species, which seem to come rather close to *P. pervelata* are *P. candidissima* Smith (*1950:* 122) and *P. hirta* Peck (*1898:* 197), the latter species having been elaborately redescribed by Smith (*1934:* 483). The cap of *P. candidissima*, a strikingly white species, is said to be "at first coated with a layer of snow white fibrils more or less radially arranged and which become aggregated into fascicles before disappearing entirely", but the cap is "snow white when young, scarcely changing colour in age" and the gills are "snow white, becoming 'light drab' ", the stems are thick (4–6 mm), the spores have an indistinct germ-pore and the pleurocystidia are distinctly plump (32–40 × 10–15 μ).

As for *P. hirta*, Peck described the cap as being "when young adorned with erect or spreading tufts of white, easily detersible hairs" and also stated that the species "has some points of similarity to *P. gossypina* and *P. pennata*". But the gills are called "adnate and often furnished with a decurrent tooth", the species is believed to grow on dung or "dungy ground", the spores are very small (5–5.5 × 2.5–3 μ) and no description of the cystidia is given. The description given by Smith of cap, veil and stem of *P. hirta* tallies very well with our species. The cap is being called "pure white at first, becoming ochraceous tawny with a russet tinge, fading to ochraceous buff, when young covered by recurved or erect fibrillose scales, margin fringed", the stem is called "very fragile, at first densely covered by a white fibrous coating of recurved fibrous scales"; but the spores are very large (10–12 × 5–6 μ and of the type they were even found to be larger, 12–14 × 5.5–7.5 μ) and the cystidia are merely fusoid-ventricose, not subcapitate-subutriform.

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EXPLANATION OF PLATES 9–11

PLATE 9

Psathyrella amstelodamensis. Amsterdamse Bos; at left, 9 July 1960, at right, 27 July 1960. (Slightly enlarged.)

PLATES 10, 11

Psathyrella pervelata, Amsterdamse Bos; 30 September 1961. (Slightly enlarged.)

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