MEDDELELSER OM GRØNLAND
UDGIVNE AF
KOMMISSIONEN FOR VIDENSKABELIGE UNDERSØGELSER I GRØNLAND
BD. 147 · NR. 11

DEN BOTANISKE EKSPEDITION TIL VESTGRØNLAND 1946

MACROMYCETES

PART II

GREENLAND AGARICALES

(PLEUROTACEAE, HYGROPHORACEAE, TRICHOLOMATACEAE, AMANITACEAE, AGARICACEAE, COPRINACEAE, AND STROPHARIACEAE)

BY

MORTEN LANGE

WITH 35 FIGURES IN THE TEXT

KØBENHAVN
C. A. REITZELS FORLAG
BIANCO LUNOS BOGTRYKKERI A-S
1955

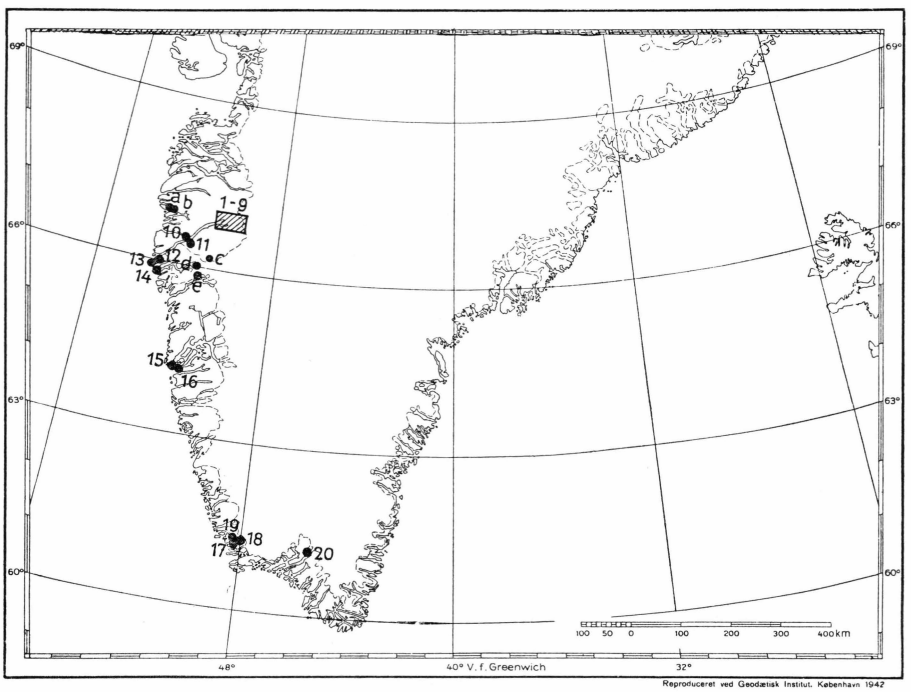

Fig. 1. Map of South Greenland, showing localities visited.

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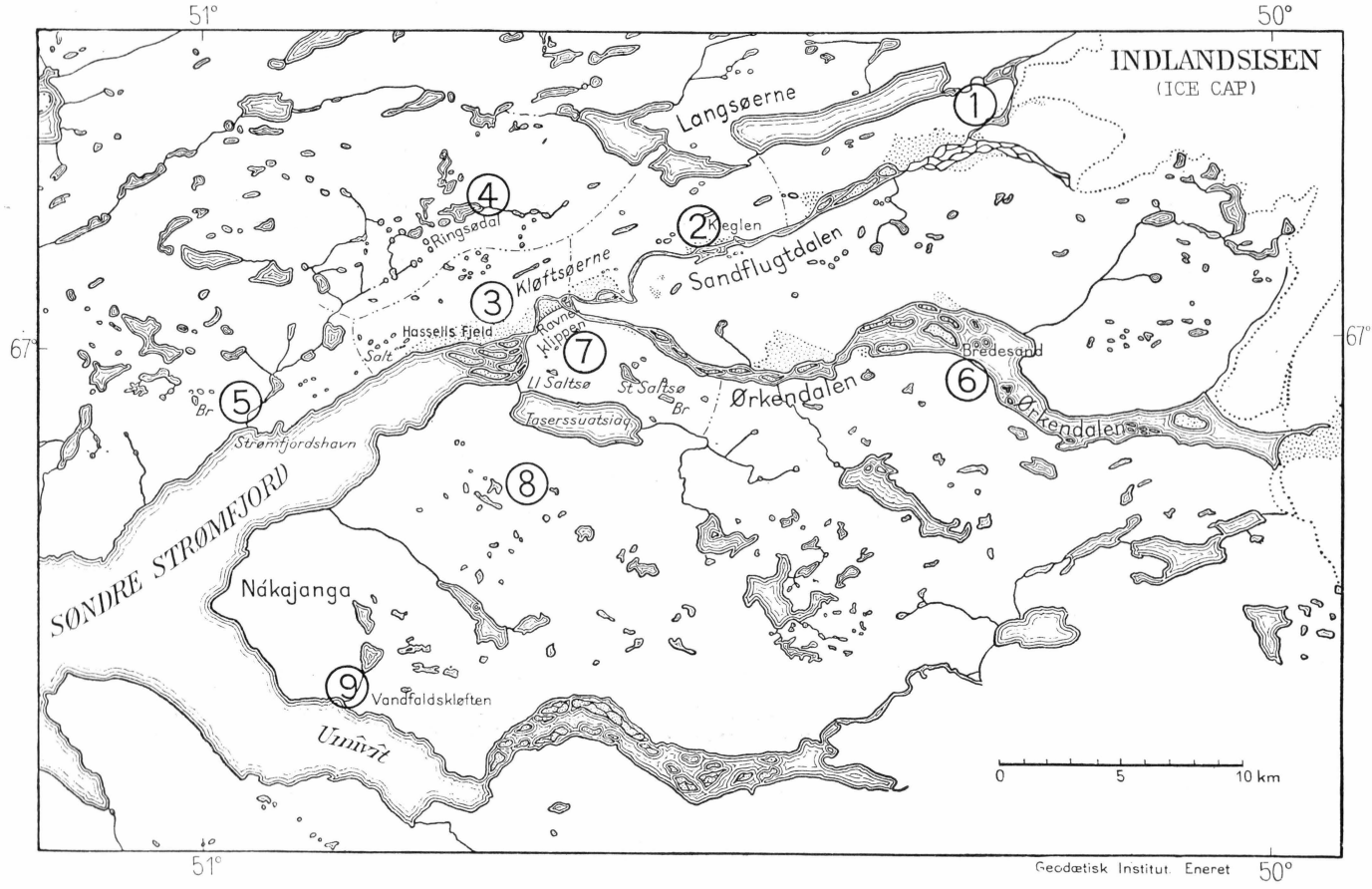

Fig. 2. Map of inner Sdr. Strømfjord area.

INTRODUCTION

Previous studies: The Agaric flora of Greenland is almost as poorly known as that of remote tropical areas. ROSTRUP has published several papers on Greenland Fungi, where he has listed a good number of Agarics. The identifications (by ROSTRUP himself and by SEVERIN PETERSEN) were mostly based on material preserved in alcohol, and although the material does not exist any more, it is quite evident that several misidentifications were made. Other specimens were referred to species, the interpretation of which is now obscure, so ROSTRUP's records must in very many cases be disregarded. — Records from other sources are very scant and hardly more reliable. Most of them stem from very early expeditions and are included in ROSTRUP's lists.

The Greenland *Gasteromycetes* have been treated in a previous publication forming Part I of this series. (M. LANGE 1948).

Material: The main material dealt with in this paper was collected by the author, who was attached to the botanical expedition to West Greenland 1946 as mycologist. Details of the itinerary of the expedition are given by BÖCHER (1949). The localities visited were the following (cp. Figs. 1—2).

Narssarssuaq, 61° 11′ N. — 13. July (20).
Ivigtut, 61° 12′ N. — 9.—11. July, 15. July, 11. Sept.—1. Oct. (17—19).
Godthåb, 64° 10′ N. — 19.—20. July, 5.—8. Sept. (15—16).
Kangâmiut, 65° 48′ N. — 1. Sept. (14).
Pâ, 66° 00′ N. — 23. July (12)
Itivdlínguaq, 66° 30′ N. — 24. July (10).
Søndre Strømfjord (head of fjord), 66° 50′ — 67° 00′ N. — 25. July—31. Aug. (1—9).

The facilities for field work and collecting were more favourable than usually on expeditions. For identification of material I had access to a small compound microscope and a few books: J. E. LANGE's Flora Agaricina Danica and a couple of monographs. At Sdr. Strømfjord and Ivigtut I could establish a primitive working room, where drawings and

Fig. 3. Rich *Salix-Betula* copse at Ivigtut.

descriptions were made. The colours were matched with J. E. LANGE's colour chart (1926), reference here to is given in some descriptions (as e. g. L. b 8). In some cases I have indicated the corresponding colour after RIDGWAY (1912). Such colour names are capitalized.

The specimens collected were dried — mostly under rather unsatisfactory conditions. More interesting specimens were also preserved in alcohol and for cytological studies fixed in ALLEN's modification of BOUIN's fluid.

The final identification was based on the original descriptions of macroscopical features and a detailed laboratory study of the microscopical characters of the dried specimens.

Additional specimens were obtained from the Herbarium of the Botanical Museum, Copenhagen and from botanists collecting in Greenland: K. HOLMEN, KNUD JAKOBSEN, C. A. JØRGENSEN, Th. SØRENSEN, and others. The Botanical Museum in Oslo has kindly let me have access to a rather large number of specimens collected in East Greenland (72° —74° N.) by SCHOLANDER, VAAGE, and KNABEN. The preserved material is listed for each species. — The specimens (excl. the Oslo collections) are in the Copenhagen Museum.

The termination of this study has been deferred to this late date in order to acquire material for comparison, and in this way add to the cor-

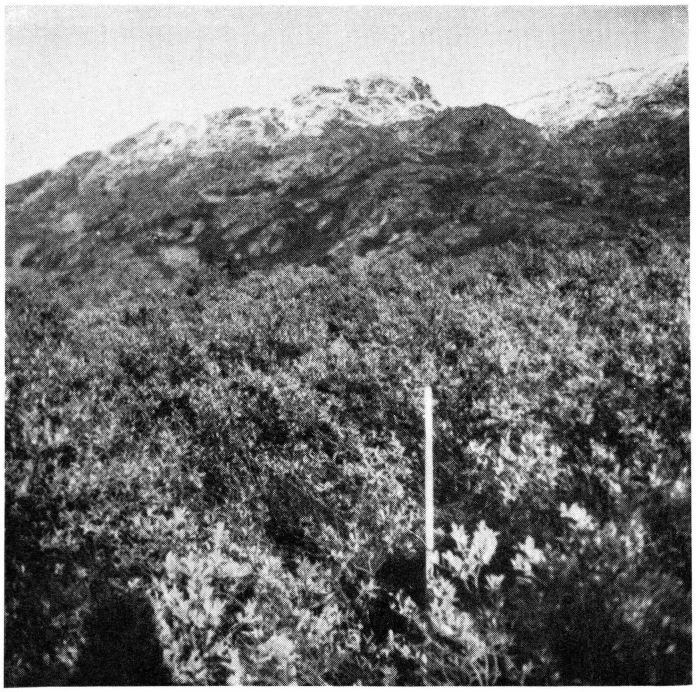

Fig. 4. *Salix* copse at Ivigtut.

Fig. 5. Dwarf shrub heath, rich in lichens. Ivigtut.

Fig. 6. *Salix* copse and creek. Hassells Fjeld, Sdr. Strømfjord.

rectness of the identification. Besides collecting in Denmark I have had the opportunity to collect material in the U.S.A. and in several alpine stations. I have a large number of specimens from the regions around Abisko, Lappland (North Sweden, 68° 20′ N.) collected in 1945 and 1951. Minor collections were made in Iceland 1947, Storlien, North Sweden 1950, Tromsø, Norway (69° 40′ N.), 1951, and in Swiss and French Alps, 1952 and 1953. Very important American material of the genera *Mycena* and *Cystoderma* were placed at my disposal by Dr. A. H. SMITH.

The present paper is restricted to deal with the one half of the agarics brought home. I do not as yet feel competent to publish my material of the very difficult species in the *Cortinariaceae*. Very many species, especially of *Cortinarius*, *Inocybe* and *Hebeloma* are left in the remaining material but the identification of several of these is very difficult. An account of this family and of the rather few species of the other remaining families will appear later.

Taxonomy: In its main lines the taxonomic arrangement follows the system proposed by SINGER (1950). For reasons set forward elsewhere (M. LANGE & HANSEN 1954) I have preferred to reconstitute the family *Pleurotaceae*, clearly related to the *Aphyllophorales*, and a few other alterations in the *Tricholomataceae* have been found necessary.

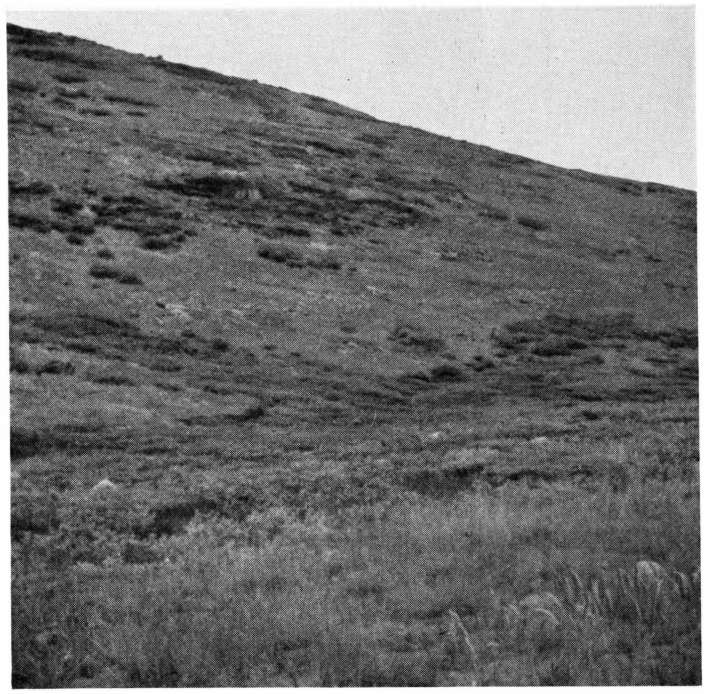

Fig. 7. South slope of Hassells Fjeld.

Fig. 8. Valley on south slope of Hassells Fjeld, alt. 300—400 m.

The main one is the inclusion of *Leptotus*, which I find closely related to species of *Omphalina*. It is placed first in the family and may represent a transition to *Pleurotaceae*, as indicated by KÜHNER & ROMAGNESI (1953).

In a few cases I have found SINGER's generic concept too narrow or too unclear. I have thus not been able to follow him in the separation of *Hemimycena*, and with SMITH and HESLER (1939) I prefer to preserve the temperate species of *Hygrophoraceae* in one genus. The separation of *Psilocybe* and *Deconica* seems also unnecessary. I do not follow KÜHNER & ROMAGNESI in uniting *Psilocybe*, *Stropharia*, and *Hypholoma* — mostly for practical reasons, as the name proposed by these authors — *Geophila* — is untenable and the choice of another name will cause no end of new combinations.

Descriptions: Full descriptions are presented of new or badly known taxa. Tor the remaining species short notes are given, i. a. on deviating characters or characters not usually recorded. Where no notes are included, the specimens were found typical in all respects.

Distribution: The distribution is indicated for most species. Primarily is given the distribution in Greenland according to own field notes and collections studied. It should be remembered that almost all my own material is from only three main stations, in West and South Greenland. Previous records, not substantiated by material, has been considered as far as they could be looked upon as reliable. Most of them are drawn from ROSTRUP (1888, 1891, 1894), a few from FERDINANDSEN (1910).

In addition to this I have tried to compute the present knowledge of the occurrence of the species in other arctic and alpine regions. The Svalbard flora is listed by DOBBS (1942) and HAGEN (1950). The fungi of the Canadian arctic are given by DEARNESS (1923) and LINDER (1947). Most of these papers summarize older records, but the lists are still very unsatisfactory and deficient. The lists from Iceland, (LARSEN (1931), CHRISTIANSEN (1941) and LANGE (1949)) are much more complete. There exists a very detailed study from the Færöes (MØLLER, 1945), which material may be considered here as well, in spite of the southern position of these woodless islands.

For alpine regions in Scandinavia I have drawn on the information given by BLYTT (1905) from Norway, and on the short lists of species from Abisko published by ROMELL (1911) and by myself (1946). Most records are, however, taken from my own unpublished material from Abisko, Tromsø and Storlien. There are remarkably few accounts of alpine fungi from Central Europe, and also my own material, occasionally cited below, is rather scant and the indications from this area correspondingly meager.

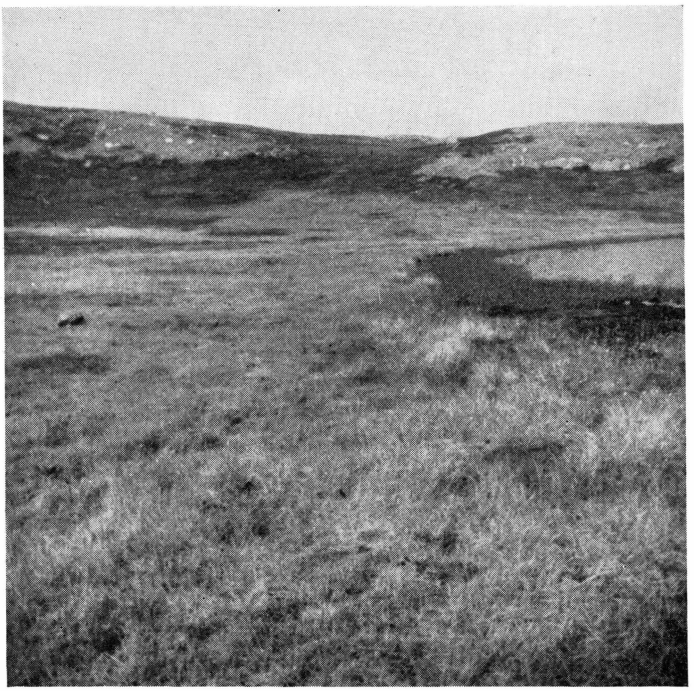

Fig. 9. Lake shore with *Menyanthes*. Hassells Fjeld, 400 m alt.

Fig. 10. Sand dunes with *Salix*. Bredesand, Sdr. Strømfjord.

The general distribution of the species is normally not commented on. With few exceptions, mostly new taxa, all species mentioned are known both from Europe and America. The occurrence of some few of them in alpine regions in South America is indicated after the lists in SINGER (1953); some records from Altai are given after SINGER (1943).

Ecology: The ecology of the species was made the subject of a special study in the field. Occasional mention of ecological points will be found below, but the bulk of the material is reserved for separate publication. It should, however, be kept in mind that the inner Sdr. Strømfjord area is an extremely dry continental locality, (cp. BÖCHER 1949 b) while the climate is more or less oceanic in the other stations visited.

A light subalpine wood of *Betula pubescens* was the main collecting field at the short stay at Narssarssuaq. The protected lowland vallies at Ivigtut harbours rich humid *Salix* copses with a few isolated stands of *Alnus crispa* and scattered *Betula pubescens* and *Sorbus americana*. Heaths with a few *Juniperus* and *Salix* among *Betula glandulosa* and *Empetrum* cover, however, the larger area.

Alnus, *Sorbus* and *Betula pubescens* are lacking at the stations further to the north, while *Juniperus* occurs but sparingly. The *Salix glauca (callicarpaea)* shrubs are low and scattered at the oceanic stations, Godthåb, Kangâmiut and Pâ, while well developed *Salix* copses occur at the head of Sdr. Strømfjord, especially at the base of protected north facing slopes. More elevated or less protected north slopes in this area harbours dwarf shrub heath with *Betula nana*, *Vaccinium uliginosum* subsp. *microphyllum* and *Ledum decumbens* growing in deep moss carpet, while the south slopes are covered by subarctic vegetation on loess soil with a few scattered *Salix*. Sand dunes, almost without vegetation, are met along the river vallies. High alpine vegetation with snow beds and fell fields dominates from about 400—500 m alt. Important plants here are such arctic and alpine species as *Salix herbaceae*, *Lycopodium selago*, or, on north slopes, *Cassiope tetragona*.

Rivulets, mountain streams, bogs and lakeshores provide special habitats at all stations. *Sphagnum* occurs throughout though rarely forming carpets. Some of the lakes at Sdr. Strømfjord are slightly saline and the fungus flora on the shores very meager (cp. BÖCHER 1949 b).

A detailed study of the vegetation at the stations visited is published by BÖCHER (1952, 1954).

Panellus KARST.

Panellus ringens (FR.) ROMAGN.

ML 50, Narssarssuaq, 13. July, in small flocks on thin branches of *Betula pubescens*, mostly on dead branches still on the tree, breaking through the bark.

Cap with hyaline pellicle of gelatinous hyphae over a strongly yellowish hypoderm, not too well separated from trama proper, which is made up of thickwalled, 4—5 μ broad hyphae with lumen about 2 μ broad; gill trama similar, but faintly brownish violaceous, interwoven, subhymenium prominent, of strongly interwoven, thickwalled hyphae; clamp connections numerous in trama, mostly typical medallions (cp. M. LANGE & HANSEN 1954); hymenium yellowish, some basidia of a clear yellow colour, 20—26 $\times$ 4.5—5 μ; 4-spored, spores allantoid, very narrow, 5—6.5 $\times$ 1.3—1.6 μ, faintly amyloid, cystidia none.

Distribution: The species is said to be northern, its distribution is however difficult to estimate, as it is often confused with *P. violaceofulvus*. I made only one collection in Greenland, and have sought it in vain in Lappland, LUNDELL and NANNFELDT have distributed it from North Sweden (no. 231), and ROMAGNESI found it in France.

Panellus serotinus (FR. ex SCHRAD.) KÜHNER

Found by HARTZ on branches of *Sorbus americana* at Tassermiut (60° 05′ N.) (ROSTRUP 1891). The material is not preserved, but a misidentification is hardly possible. I have frequently met the species growing on *Sorbus* in Denmark. It is recorded from Lappland (Abisko) by ROMELL (1911).

Resupinatus S. F. GRAY

Resupinatus algidus (FR.) var. dendrocystis n. var.

(Fig. 11)

ML 640, Ivigtut 26. Sept. ML 653, ibid. 28. Sept. both on branches of *Sorbus americana*.

A var. *algido* differt cheilocystidiis dendriformibus praesentibus.

Typus die 26. Sept. 1946 ad Ivigtut, Groenlandia orientalis sub numero ML 640 lectus in Museo Botanico Hauniensis depositus.

Small, cap hardly reaching 1 cm diam., strongly tomentose to almost glabrous, dark grayish to pallid brownish, gills pallid gray; stipe almost absent.

Tomentum on cap (where present) made up of agglutinated, 3 μ broad hyphae, when absent the cap is covered with a very thin pellicle of nongelatinous hyphae; trama proper of gelatinous hyphae, 2—3 μ thick, almost hyaline, with clamp connections, lower part of trama less gelatinous and brownish. Pleurocystidia frequent, awlshaped, thick-walled, upper part strongly incrusted, 35—65 × 14—18 μ, cheilocystidia

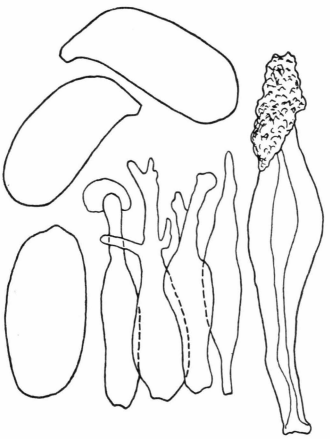

Fig. 11. *Resupinatus algidus*. ML 640. Spores, (× 2500) Cheilocystidia, and pleurocystidium. (× 800).

numerous but deeply immersed and easily overlooked, thinwalled with a branched neck, or faintly capitate and covered with mucilage, pilocystidia few, similar to pleurocystidia but not incrusted, basidia 4-spored, spores 8.5—10 × 4.5—5 μ, almost cylindric with an oblique apicel, non-amyloid.

The two collections differ rather much in colour; this is however, usual for the species. With one exception the current descriptions of the species and the presumably identical *R. atrocoeruleus* and *R. reniformis* do not mention the presence of cheilocystidia. PILAT (1936) records cheilocystidia of a different shape in his *R. atrocoeruleus* f. *australis*. I have not been able to locate cheilocystidia in Danish material, while a specimen from Abisko, Sweden, proved identical with the Greenland material in this and other characters. It may well be a distinct, northern form, and very likely the actual type described by FRIES (1857) as growing on birch in North Sweden.

Distribution: No other records from Greenland. Also found in Abisko, Sweden, on *Salix*. The main form of the species is widely distributed.

Lentinellus Karst.

Lentinellus omphalodes (Fr.) Karst.

ML259, Sdr. Strfj., Sandflugtdalen, 8. Aug., on lower part of *Salix* branches in large copse; ML381, ibid., 24. Aug., on dead *Salix*, almost covered with sand, on open desert-like plane; ML526, Ivigtut, 11. Sept., on *Salix* branch covered with thick moss carpet, ML558, ibid., 14. Sept.

The four collections are very unlike each other, the two first are small, about 1 cm across, with a short, lateral stem, 526 has also an almost smooth lateral stem, while in 558 it is long, central, and grooved, and both have larger caps, 3—4 cm across. The microscopical characters are fairly uniform, the spores finely warty and amyloid, 4.8—6.0 × 3.8 —4.3 μ, but the two larger forms have a well developed cortex on the cap, made up of brown, parallel hyphae with thick walls; this cortex is almost absent in the small specimens, which could be referred to *L. tridentinus* (Sacc.) Sing. The larger ones are possibly better called *L. bisus* (Quel.) Kühner & Maire, but the material forms a nice intergrading series, and the specific or even varietal rank ascribed to these taxa is dubious.

Distribution: The species was found but rarely in the dry Sdr. Strømfjord area while common in *Salix* copses at Ivigtut. I have found forms of the larger type in Abisko, and "*L. tridentinus*" was originally found in the Alps by Bresadola. The species is common both in Europe and America. A very poor, small specimen from East Greenland represents almost certainly this species from a far northern station, growing on *Salix* covered with sand (Mygbugten, (73° 31′ N.), 2. Aug. 1930, leg. Scholander).

Flammulina Karst.

Flammulina velutipes (Fr. ex Curt.) Sing.

ML525, Ivigtut, 11. Sept., on *Salix*; ML559, ibid., 14. Sept.

Distribution: Quite common in the Ivigtut area, on *Salix*, but not noted from other Greenland localities. Also found in Lappland, in the upper birch zone on *Salix* (ML 3625), and on the Færöes (Møller). Probably found as far north as the non-herbaceous species of *Salix* grows, at least in humid stations.

Hygrophorus Fr.

Hygrophorus pratensis Fr.

ML601, Grønnedal, Ivigtut, 18. Sept., on south slope in grass under low *Salix*, *Betula* and *Juniperus*; ML610, Ivigtut, 21. Sept., in *Alchimilla alpina*.

Distribution: Only the two above mentioned finds were made. The specimens were typical in all respects. The species is presumably a

southern element in the Greenland flora. It is known from Iceland (LARSEN 1931) and from the Færöes (MØLLER 1945).

Hygrophorus turundus FR.

(Fig. 12)

ML198, Sdr. Strfj., Hassells Fjeld, 4. Aug., in mosses in *Sphagnum* carpet on lake shore, 400 m alt.

H. turundus is quite close to *H. miniatus*, but well developed specimens differ in several morphological characters (cp. J. E. LANGE 1940), and the spores are consistently larger than in *H. miniatus*. SMITH &

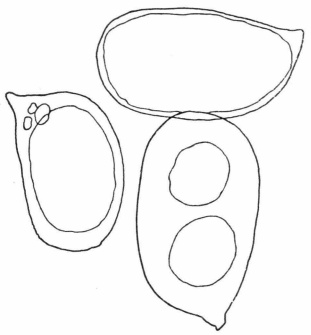

Fig. 12. *Hygrophorus turundus*. (ML198). Spores (× 2200).

HESLER (1942) call it *H. miniatus* var. *sphagnophilus* PECK, but I see no difference between their plant and the European form. The present material was not too profusely developed, but had the characteristic large spores (11.5—13.8 × 6.2—7.8 μ), on almost exclusively 4-spored basidia.

Distribution: Besides the above record, I have only a somewhat dubious field record of the species from Ivigtut. MØLLER (1945) found it on the Færöes and a find from Iceland (M. LANGE 1949) must also be referred here. *H. cantharellus*, which DEARNESS (1923) mentions from arctic Canada, may well be this species, but for the rest I know no arcto-alpine records of the species, which is widely distributed in peat bogs in Europe and America.

Hygrophorus coccineus FR.

ML506, Godthåb Skibshavn, 9. Sept. on slopes with grass bitten by sheep.

SMITH & HESLER (1942) separates *H. coccineus* and *H. puniceus* on the presence of a well developed pellicle in the latter. My specimens were in this and other respects truly belonging in *H. coccineus*.

Distribution: Only found once by me, and probably confined to the outer coastal areas of Greenland. May be *H. coccineus* recorded by ROSTRUP (1891) from Igaliko (60° 59′ N.) actually should be referred here, which possibly also holds true for *H. puniceus* f. *minor* recorded by CHRISTIANSEN from Iceland (1941). It seems sporadic in the arcto-alpine areas.

Hygrophorus marchii BRES.

ML554, Ivigtut, 14. Sept., in deep moss in open *Betula-Salix* copse; ML621, ibid., 22. Sept., in moist heath in *Dicranum*, *Salix* and *Betula* scattered.

Very close to *H. reai* var. *insipida*, but less viscid and generally somewhat larger. The species is hardly so well known that an estimate of the distribution is worth while. It is well described from the Færöes by MØLLER (1945).

Hygrophorus vitellinus FR. sensu MØLLER

(Fig. 13)

ML158, Sdr. Strfj., near air field, 31. July, low heath with *Betula nana*; ML269, Sdr. Strfj., Nákajanga, 10. Aug. in snow bed, in mosses, 600 m alt.; ML584, Ivigtut, 18. Sept. in snow bed with *Salix herbacea*.

The macroscopical details are well figured by MØLLER (1945) — The pellicle is made up a few, 2—3 μ broad hyphae over a compact yellowish layer, the upper part of which is gelatinous, — all these layers are poorly

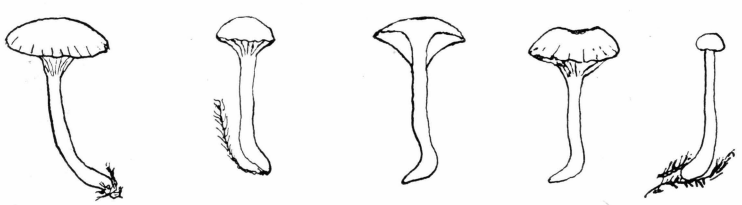

Fig. 13. *Hygrophorus vitellinus*. ML584 ($\times$ 1)

developed in some specimens, — trama proper interwoven, of 7—10 μ broad almost colourless hyphae, gill trama interwoven, some hyphae up to 8 μ broad, but most of them much more narrow, with clampconnections, a few lactifers seen in trama, basidia 4-spored, about 40 $\times$ 7—8 μ, spores 7.5—9 $\times$ 4.0—5 μ, subcylindric with an oblique pedicel.

Hygrophorus nitidus B. & C. is considered synonymous by SMITH and HESLER (1942). As described by them, it differs by much broader cells in gill trama, and a more slender stipe, which however, is given so by FRIES. *H. ceraceus* is short-stemmed, but the pileus does not fade to whitish.

Distribution: The species here dealt with is recorded, besides from the Færöes, also from Iceland (LARSEN 1931). It is quite common in Greenland; besides in Sdr. Strømfjord and at Ivigtut I found it also in Kangâmiut 1. Sept. It is undoubtedly the *H. ceraceus* of ROSTRUP from the mountains at Narssaq (60° 55′) 1891. It may be a distinct taxon, probably identical with *H. hudsonianus* JENNINGS, from arctic Canada. This species differs according to SMITH and HESLER (l. c.) through long hairs on stem and lack of pellicle, but none of these characters are in my opinion necessarily decisive.

Hygrophorus violeïpes n. sp.

(Fig. 14)

ML571, Ivigtut, 17. Sept., in small flocks in wet heath area, in moss, 400 m alt.; ML586, ibid., 18. Sept., in snow bed with *Lycopodium complanatum* and *Empetrum*; ML620, ibid., 22. Sept., in moist *Dicranum*, in heath with *Salix* and *Betula*.

Pileus 1—2 cm latus, plano-convexus, postea expansus, depressus, nitido-flavidus, pallescens, viscidus; lamellae latae, longe decurrentes, concolores; stipes glaber, viscidus, violaceus, praesertim ad apicem versus puberulum. Pellicula gelatinosa; trama lamellarum intermixta, fibulosa. Sporae magn. 7.5—9.5 × 5.0—6.2 μ.

Typus die 17. Sept. 1946 ad Ivigtut Groenlandia occidentalis sub numero ML571 lectus, in Museo Botanico Hauniensi depositus.

Cap 1—2 cm broad, plano-convex at first, then expanded and depressed in the middle, bright yellow, (L. b5—17, Deep Chrome-Orange) paler when old or dry and then often tinged pale lilac (Pearl Gray, L. a7), somewhat viscid, but hardly slimy, shining; edge incurved at first, somewhat dentate with short striae; flesh concolorous, rather thin; gills broad, thick, distant, 14—18 L, 2—3 tiers of l, long decurrent, concolorous with cap and also faintly violaceous in age; stem 1.5—3.5 (4.5) × 0.15—0.3 cm, terete, slightly widened above, clear violet (Vinaceous Gray, Eupatorium Purple or even Dull Indian Purple) especially on apex, or in some specimens paler, yellowish to almost whitish, glabrous, viscid, but hardly slimy even when wet, at base with a violet, scanty felt; flesh concolorous or more pallid yellow in centre, almost solid. Odour and taste slight.

Cap surface with a few, thin hyphae over a pellicle of hyaline, somewhat gelatinous hyphae, poorly separated from a compact layer of yellowish hyphae; trama interwoven, hyphae up to 6—7 μ broad, in older specimens broader, up to 10—12 μ, a few oleiferous vessels and some yellowish amorphous congregations also present, gill trama interwoven, broad hyphae up to 10—12 μ, but often not more than up to 6 μ, and most of them more narrow, hymenium yellow with bright yellow content

in basidia, other tissues pale yellow, clamp connections present; cystidia absent, basidia 4-spored, about $40 \times 8.5\ \mu$, spores $7.5—9.5 \times 5.0—6.2\ \mu$, with a $\pm$ oblique pedicle, nonamyloid; stem at apex with hairs $15—30 \times 6\ \mu$.

The species is close to *H. vitellinus* as here conceived, hardly differing in any other character than the violaceous stipe. In view of the un-

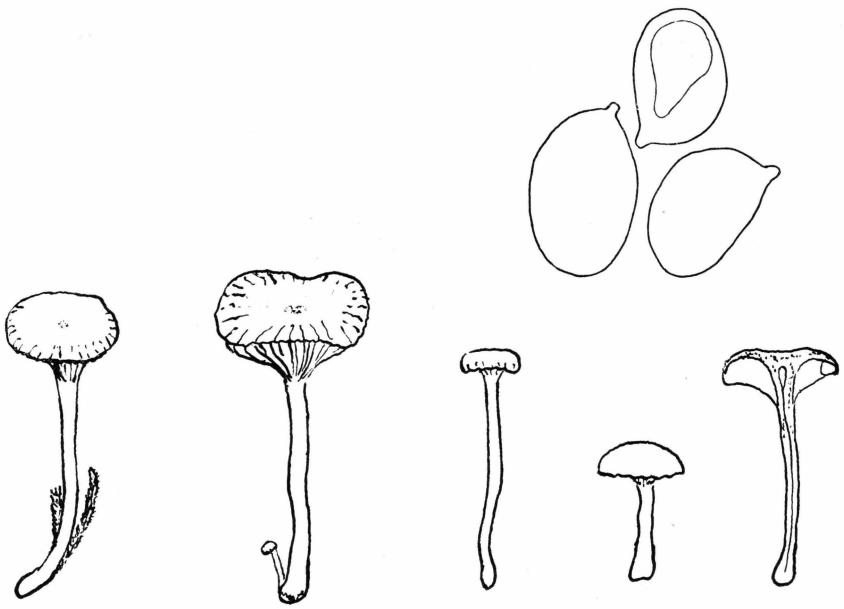

Fig. 14. *Hygrophorus violeïpes.* ML 571. Carpophores (× 1), spores (× 2500).

certainty of the correct identification of *H. vitellinus* I prefer to describe the present form as a distinct species. If *H. vitellinus* sensu MØLLER is found distinct from *H. vitellinus* of other authors then it could be regarded as a less common variety of *H. violeïpes. H. laetus* has also a violaceous stem, but is well distinguished from *H. violeïpes.*

Distribution: The species is common in the Ivigtut-area in humid stations, and also abundant at Kangâmiut but I did not find it at Sdr. Strømfjord, where the climate probably is too dry. I have found it on several alpine stations in Lappland.

Hygrophorus sp.

ML 623, Ivigtut, 22. Sept., a single specimen under a *Juniperus* shrub.

The specimen had the external characters of *H. russo-coriaceus.* The cap had a pellicle of gelatinous hyphae over a narrow, yellowish com-

pact hypoderm, the gill trama was almost parallel, made up of a few rows of 8—15 μ broad hyphae, spores 6—7 $\times$ 3.5—3.8 μ.

I have had no good material of *H. russo-coriaceus* for comparison but the trama characters remove the present species from the *H. niveus* group. ROSTRUP (1888) records *H. virgineus* from Jakobshavn 69° 13′ N., and both LARSEN, CHRISTIANSEN and this author found this species or the probably identical *H. niveus* in Iceland. Further studies in oceanic regions of Greenland may well substantiate ROSTRUP's record, as also his record of *H. conicus* from Ujaragssuit (70° N.) and Danmarks Ø (E. Gr. 70° 27′ N.). During a short stay in Kangâmiut I noted several species of *Hygrophorus*, including *H. laetus*, but the material was destroyed during the transportation.

Leptotus KARST.

Leptotus lobatus (FR.) s. lat.

ML29, Grønnedal by Ivigtut, 11. July, on *Mnium pseudopunctatum* etc. in small stream; ML63, Narssarssuaq, 13. July, on moss; ML80, Godthåb, 17. July, in wet *Drepanocladus — Eriophorum scheuchzeri* soc.; ML348, Sdr. Strfj., Hassells Fjeld, 22. Aug., on edge of lake in wet moss, 400 m alt. — Neriap qíngua (61°45′ N.), leg. HARTZ, det. ROSTRUP; Tigssaluk leg. HARTZ, det. ROSTRUP; Gåseland (E. Gr. 70° N.), det. ROSTRUP; Marrait (70° 28′ N.), 19. Sept. 1947, leg. K. JAKOBSEN, det. M. LANGE.

KÜHNER & ROMAGNESI recognise four species in this group, viz. *L. muscigenus*, *L. lobatus*, *L. retirugus* and *L. conchatus*. The three first of these names are used by various authors without consistent distinction, and the present author is not as yet prepared to accept or reject the specific criterions proposed by KÜHNER & ROMAGNESI. However, all specimens studied by me belong in their *L. lobatus*, with clamp connections and with spores about 7.5—10.5 $\times$ 5.5—7.5 μ, with the possible exception of ML348, similar in other respects but with spores 9—13 $\times$ 3—5 μ, born mostly on 2-spored basidia.

Distribution: The species is quite common in Greenland, not very frequent in the dry Sdr. Strømfjord area where is was met mostly at high altitude (up to 620 m), but even abundant at some of the oceanic stations at Godthåb and Ivigtut. ROSTRUP gives several records in his publications (1888, 1891, 1894). Under one name or the other the species is included in almost all lists from other arctic areas: (Svalbard (DOBBS 1942, HAGEN 1950), Bjørneøia (KARSTEN 1872), Jan Mayn (LARSEN 1924), Ellesmere Land (ROSTRUP 1906), Arctic Canada (DEARNESS 1923, LINDER 1947) Iceland (LARSEN 1931)), and also found on the Færöes (MØLLER 1945) and in Lappland (M. LANGE 1946). SINGER (1954) records it from Tierra del Fuego.

Omphalina QUEL.

Omphalina acerosa (FR.) n. comb.

(*A. Pleurotus acerosus* FR.)

ML350, Sdr. Strfj., Hassells Fjeld, 22. Aug. on steep loess slope along small path in low mosses, 350 m alt.

The species differ from *Omphalina rustica* and its allies in no material character except the excentric, short stem. The pellicle is made up of dark brown hyphae, upper trama layer paler, the hyphae with incrusting, brown pigment on wall, similar hyphae scattered in lower, subhyalin trama, clamp connections present; spores 8—9.5 × 4.8—5.8 μ, nonamyloid as the tissues; cystidia absent.

With the true members of *Pleurotaceae* the species has very little in common, it lacks thickwalled hyphae with medallions, specially developed cystidia, gelatinous tissue and allantoid or narrow cylindric spores. Furthermore it is most often growing on the ground, more rarely on very rotten wood, so it also shares ecological characters remarkably well with *Omphalina rustica* and its allies.

Distribution: Only record from Greenland; also met by me at Abisko, Sweden, in lower alpine zone (ML3700). No other arcto-alpine records known to me.

Omphalina obscurata (KÜHNER) n. comb.

(*Omphalia obscurata* KÜHNER 1953). Syn. *Omphalia rustica* (PERS.) sensu J. E. LANGE

ML6, Grønnedal by Ivigtut, 9. July, dry river bed; ML25, ibid., 11. July, in small mosses under *Salix*; ML59, Narssarssuaq, 13. July; ML156, Sdr. Strfj., Hassells Fjeld, 31. July, on naked, dry loess. — Antarctic Havn (E. Gr. 71° 58′ N.), 4. Aug. 1930, leg. SCHOLANDER; Payer Land (E. Gr. 74° 25′ N.), 22. July 1930, leg. KNABEN.

Cap 0.8—1.0 cm broad, convex flat at first, but soon depressed in the middle, dark brownish bistre with fine and inconspicuous, darker scales, minutely pointed in young specimens, edge slightly striate, incurved at first, hygrophanous, dull pallid brown when dry; flesh thin, concolorous; gills moderately broad, narrow in front and behind, subdistant, decurrent, concolorous with cap, edge faintly darker than face; stem 1 × 0.1 cm, often curved, slightly widened below, concolorous, in young specimens clad with short, dark hairs; flesh dark, base clad with white mycelium. Smell and taste faint.

Epiderm of 1—2 layers of thickwalled, 8—12 μ broad hyphae, very prominently zonated by incrusted pigment, ends often slightly projecting, trama proper of 4—8 μ broad, somewhat interwoven hyphae, in places

somewhat incrusted with pigment, gill trama similar, but more brownish, subregular-interwoven, subhymenium brownish, also lower part of some basidioles thickwalled and faintly brownish especially near gills edge; clamp connections present, cystidia absent, basidia mostly 4-spored, in some specimens 2-spored, 28—36 × 6—7 μ, spores rather broad, 7.5—10.0 × 5.0—7.0 μ, nonamyloid.

This is evidently the species which J. E. LANGE called *O. rustica*, but as most authors have had a different concept of *O. rustica* I prefer to accept the name recently proposed by KÜHNER (KÜHNER & ROMAGNESI 1953). The strongly incrusted hyphae in the epiderm characterize the species quite well.

Distribution: *O. obscurata* is common in Greenland, and I found it at all stations visited, including Godthåb, Pâ, Itivdlinguaq. On Nákajanga in Sdr. Strfj. it was found i. a. on fell field at an altitude of 700 m, well corresponding to its occurrence in N. E. Greenland. The species is truly belonging to the most typical elements in the arcto-alpine flora. I have collected it in very high zones in Abisko, Sweden (M. LANGE 1946), and also in other North Swedish localities and in St. Bernard in the Alps at 2500 m alt. It is almost certainly the species recorded as *O. rustica* from Iceland by CHRISTIANSEN (1941), from arctic Canada as *O. griseopallida* by LINDER (1947), and from alpine meadows in South America by SINGER (1953). It is, however, also of common occurrence on poor soil in lowland areas in N. Europa and N. America.

Omphalina philonotis (FR.) QUEL.

ML 60, Narssarssuaq, 13. July, in *Sphagnum* bog.

FAVRE (1948) and several previous authors recognise two early fruiting species of *Omphalina* growing on *Sphagnum*, *O. philonotis* and *O. sphagnicola*. I have studied a very extensive material of these species and find them to intergrade. If they are finally deemed identical the name *O. philonotis* has priority. American authors deal with similar plants under the name *O. gerardiana* (PECK) which SINGER believes to separate from the group on the presence of clamp connections. I find scattered clamps on some hyphae both in Danish material and in the present material from Greenland, which, if distinction exists, should be placed in *O. philonotis* rather than in *O. sphagnicola* on account of small size and narrow spores (8—10 × 4.1—5.7 μ).

Distribution: I have no other reliable record of this species from Greenland. In Lappland I found it in the lower alpine zones (M. LANGE 1946). It is very likely that it does not grow in the northernmost area of its bryophyte host.

Omphalina epichysium (Fr.) Quel. var. **ichmadophila** Fr.

ML199, Sdr. Strfj., Hassells Fjeld, 4. Aug., in wet carpet of *Aulacomnium turgidum* with scattered *Sphagnum* and *Carex rariflora* around lake, 400 m alt., ML223, ibid., Kløftsøerne, 6. Aug., similar locality.

ML199 was 2-spored with 25—30 μ long sterigmata; probably an artifact, as the material for the rest was quite typical. Favre (1948) prefers to treat this non-lignicolous form under a distinct name as *O. oniscus* (Fr.).

Distribution: The species was found quite frequent in the Sdr. Strømfjord area, (up to 620 m alt. (Nákajanga)), but was not noted in other localities. It is probable that *O. onisca* recorded from Narssaq on Disko by Rostrup (1891) belongs here. It is not infrequent in the lower alpine zones around Abisko (ML3659, ML3679). It is widely distributed outside the arcto-alpine areas on both sides of the Atlantic, although it may be most frequent in the north.

Omphalina demissella n. sp.

(Fig. 15)

ML8, Grønnedal near Ivigtut, 9. July, in river bed, in low mosses or on naked soil; ML26, ibid., 11. July, in small flocks in low mosses on gravel under *Salix*; ML64, Narssarssuaq, 13. July, a large flock on fine red gravel with scattered small mosses and grass.

Statura *Galerae hypnorum* similis. Pileus 0.2—0.7 cm latus, primo convexus, leviter umbonatus, deïnde depressus, obscure cinnamomeus ad argillaceus, hygrophanus, primo fibrillis adpressis vestitus, margine initio paulum involuto; lamellae subdecurrentes, pallidae; stipes tenuis, puberulus, pileo pallidior. Hyphae tramales fibulosae; pleurocystidia lageniformia, magn. 40—55 × 12—16 μ, cheilocystidia nulla. Sporae magn. 6.0—8.0 × 4.0—5.5 μ, non amyloïdes.

Typus die 11. Julii 1946 ad castra Grønnedal prope Ivigtut sita Groenlandiae occidentalis sub numero ML26 lectus, in Museo Botanico Hauniensi depositus.

Cap 0.2—0.7 cm broad, at first convex with a small umbo, then more or less depressed in the middle, Cinnamon Brown or Clay Color (L.g7, h2), darker in the middle, hygrophanous, pallid when dry, obscurely striate, when young with minute, adpressed hairs, margin slightly incurved when young, then straight or somewhat lobed, flesh thin, gills moderately broad, narrow in front and behind, short decurrent, subdistant, 10L, one tiers of l, pallid or almost white, stem 0.6—1 × 0.05—0.1 cm, flexuose, widened a little at both ends, with a minute pubescence, paler than cap or concolorous, flesh pallid, solid. Smell and taste faint.

Trama of cap homogeneous, faintly brownish in upper layer but without incrusted pigment, hyphae 10 μ broad with clamp connections, some few oleiferous vessels seen and also scattered masses of amorphous brownish material, pleurocystidia scattered, lageniform 40—55 × 12—16

μ, hyaline, cheilocystidia none seen, pilocystidia similar to pleurocystidia, scattered on young caps, basidia 4-spored, about 22×6 μ, spores 6.0—8.0 × 4,0—5.5 μ, nonamyloid, often sticking together in tetrades in squash mounts.

The species has the stature of a small *Galerina hypnorum*. It is close to *O. grisella*, but the spores are shorter and broader, and the pleurocystidia, absent in *O. grisella*, is a constant feature in the whole material. *O. demissa* as depicted by J. E. LANGE (1936) is more flesh coloured and with a richer colour on the gills; it also lacks cystidia.

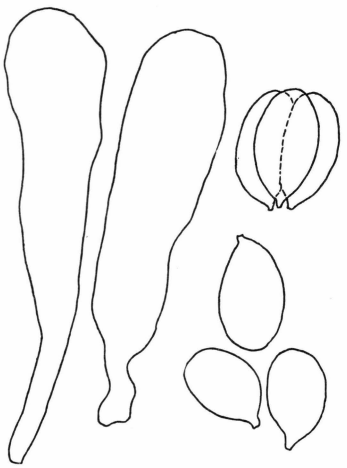

Fig. 15. *Omphalina demissella*. ML64. Pleurocystidia (× 1200) and spores (× 2200).

Distribution: Besides the material listed above I know of only one other record of the species, from a very similar locality at Abisko Lappland (ML3930). It is, however, small and inconspicuous, and may well occur outside the arcto-alpine regions.

Omphalina pyxidata (FR.) QUEL.

ML416, Sdr. Strfj., Hassells Fjeld, 28. Aug. in rich snow-bed vegetation of mosses.

The material was found typical in all respects. The trama of the cap is made up of incrusted, brown hyphae with clamp connections, spores 7.5—10 × 4.5—6 μ.

Distribution: The species seems to be uncommon in Greenland. HAGEN (1950) mentions it from Svalbard. It is found in Lappland in the mountains up to about 600 m alt. (M. LANGE 1946). Outside the arcto-alpine areas it seems to be widely distributed, SINGER records it from South America (1953).

Omphalina ericetorum (Fr.) n. comb.
(*A. Omphalia ericetorum* Fr. 1821)

ML85, Godthåb, 18. July, on peaty soil on low mountain ground; ML96a, Sdr. Strfj., Itivdlínguaq, 24. July, on *Sphagnum*; ML542, Grønnedal near Ivigtut, 12. Sept. — Kûgssuaq, (70° 21′) 12. Aug. 1947, on moss in meadow close to small stream, leg. K. Jakobsen; "Kingua Tasiusaq" 1889, leg. Hartz, det, E. Rostrup.

Møller (1945) tries to separate a tall, two-spored form on *Sphagnum* as *O. pseudoandrosaceus* (Bull.) Fr. My observations cannot support this distinction. Two-spored basidia were met in smaller or larger number in most collections, and the difference in habitat is insignificant. ML542 is a rather remarkable specimen with an almost merulioid hymenophore. It was infected by a hyphomycete and sterile.

Distribution: This species is exceedingly common in arcto-alpine areas. I have found it in all Greenland localities visited by me, in the Sdr. Strømfjord area up to 700 m alt. Rostrup (1888) records it from 23 localities, extending as far north as Umanak Timilia (73° 59′ N.), Ferdinandsen gives records from East Greenland: Danmarks Havn and Thermometerfjeldet (76° N.), Dobbs (1942), and Hagen (1950) give several records from Svalbard, and Poul Larsen (1931) and Christiansen (1941) found it frequent on Iceland. In Scandinavia I have met it as far north as Tromsø, and in the mountains at Abisko it reaches 1700 m alt. It is common in the Alps above the timber line. Dearness (1923) records it from Herschell Island in western, arctic Canada. From most of the above records it is evident that the authors have studied both *O. ericetorum* (generally given as *Omphalia umbellifera*) and *O. flava*. The two species grow together in the areas, and seem to reach the same altitudes, at least in Lappland, where I have studied their distribution in greater detail. *O. ericetorum* is widely distributed outside the arcto-alpine area.

Omphalina flava (Cooke) n. comb.
(*Agaricus umbelliferus* f. *flavus* Cooke 1881—91)

ML7, Ivigtut, Grønnedal, 9. July; ML18, Ivigtut 16. July, in *Rhacomitrium* on path over rock, 200 m alt.; ML86, Godthåb, 18. July, on low peaty soil over rocks; ML398a, Sdr. Strfj., Hassells Fjeld, 28. July, on north slope in deep moss. — Færingehavn (63° 42′ N.) 18. June 1947, leg. Jakobsen; Mainland behind Archer (E. Gr. 72° 15′ N.), 10. Aug. 1930, leg. Scholander.

The species is easily separated from *O. ericetorum* on macroscopic characters. The colour of the whole plant is egg-yellow, fading to almost pure white, the gills are but moderately decurrent and the stem without any dull olivaceous tinge on apex. The anatomy of the tissues shows, however, but little difference, except for the faint yellow colour of the

sections. The trama is covered by a very poorly defined pellicle of thin hyphae, trama proper interwoven, of 4—6 μ broad, hyaline hyphae without clamp connections, gill trama similar, subregular or somewhat interwoven. The spores furnish a reliable distinguishing character as they are more narrow and oblique, 7.5—9.0 × 4.0—4.9 μ. I have only observed 4-spored basidia.

Distribution: The species is common in Greenland, and has there probably in the main the same area as *O. ericetorum*. It is, however, in all probability a more oceanic species, as in the Sdr. Strømfjord area it was found exclusively on north slopes in fairly high altitude (500—700 m), while common all over in the coastal areas. Most of the records given above for *O. ericetorum* may include *O. flava* as well; four out of six plants referred by ROSTRUP to *O. umbellifera* belong here. (Danmarks Ø. (E. Gr., 70° N.), Kronprinsens Ø (69° N.), Kangardluarsuqsuaq). I have noted it as quite common in Lappland, up to 1700 m alt., and found it frequent in the Alps (Mt. Blanc, Jungfrau) over the timber line. BLYTT (1905) mentions it as common in the Norwegian mountains, up to 1900 m. alt., but rare or absent under the timber line. MØLLER (1945) has described it from the Færöes. I have never met it in the Danish lowlands, and it seems to be one of the few species restricted to arcto-alpine regions.

Lyophyllum KÜHNER

Lyophyllum erosum (FR.)

ML 95, Godthåb, 18. July.

A single but typical specimen, distinctly rooting, but without any visible remnants of rotten agaric substratum (cp. M. LANGE 1954).

Distribution: One other find was made in Godthåb 6. Sept. but besides these two records I know of no other finds from Greenland. From other arcto-alpine areas it seems almost unknown. MØLLER, however, found it on the Færöes.

Lyophyllum atratum var. sphaerosporum (KÜHN. & ROM.) M. LANGE (syn. *L. ambustum* (FR.))

ML 538, Grønnedal near Ivigtut, 12. Sept. on burnt spot in *Salix* copse.

A large flock of specimens, most of them with globose, smooth spores but a few specimens with both globose and oblong spores ranging from 4.5 × 4.3 to 6.4 × 4.2 μ; the long ones seem to be more thinwalled (cp. M. LANGE 1954).

Distribution: Found in the upper birch wood zone at Abisko (ML 3755) but for the rest I believe it unrecorded from arcto-alpine

areas, where, by the way, I think suitable habitats are rare. FRIES originally recorded it from the mountains of Smolandia. It is widely distributed in Europe and America.

Calocybe KÜHNER

Calocybe pseudo-flammula (J. E. LANGE) n. comb.

(*Tricholoma pseudo-flammula* J. E. LANGE 1933)

(Fig. 16)

ML352, Sdr. Strfj., Hassells Fjeld, 22. Aug., a small flock under neath a creeping, large *Betula nana*, on loess soil covered with leaves, 100 m alt.

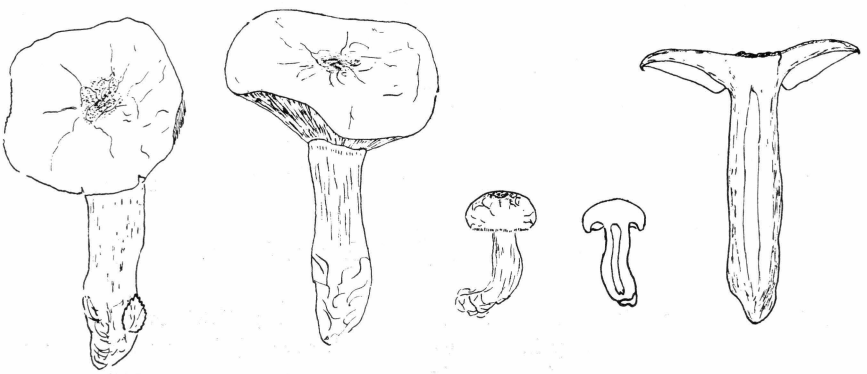

Fig. 16. *Calocybe pseudo-flammula*. ML352. (× 2:3).

The specimens were slightly frost-bidden, but in all macroscopical features like the plant depicted by J. E. LANGE. The pileus cuticle is made up of interwoven, 3—7 μ broad fibrills, with some inflated cells, 12—20 μ broad, filled with yellow sap, and also some inter-cellular, amorphous, dark yellow material, trama proper of narrow cells, almost hyaline, gill trama subregular-interwoven of similar hyphae, clamp connections present; cystidia absent, basidia with carminophilous granules, 4-spored, 18—20 × 5 μ; spores ovate, 3.8—4.5 × 2.9—3.2 μ, nonamyloid. Specimens preserved in alcohol give a brilliant greenish yellow colour to the fluid.

The nomenclature in this group seems hopelessly confused and the name *C. pseudo-flammula* has been chosen because of the close resemblance to the plant described by J. E. LANGE. It may, however, very well be the same as *C. cerina* sensu SINGER although the characters of the cuticle seem intermediar between this species and *C. chysenteron* sensu KÜHNER & ROMAGNESI. *C. alpestris* (BRITZ.) is also very similar, but more slender and small.

Distribution: The only Greenland record. Species of the group have been recorded from alpine localities in central Europe, Caucasus,

and the Altai mountains (SINGER). I would not be surprised if "*Tricholoma sulphureum*", recorded from the Færöes by ROSTRUP (1901) actually has been specimens of this species.

Calocybe sp.

ROSTRUP (1891) records "*Tricholoma ionides* (BULL.), *T. carneolum* FR., and *T. boreale* FR.". They are probably all species of *Calocybe*.

Laccaria BERK. & BR.

Laccaria laccata (FR.) BERK. & BR. s. lat.

The different species of the stirps *laccata* are widely distributed in the arcto-alpine areas, but most of the older records are too incomplete to permit a more precise identification. This holds true i. a. for ROSTRUP's record from Mudderbugten 69° 50′ N. (1891) and from Tasiussaq (E. Gr. 65° 37′ N.) (1904), HAGEN's from Jan Mayn (1950), and DOBBS from Svalbard (1942). Probably most of them belong in *L. laccata* var. *montana* MØLLER.

Laccaria laccata (FR.) BERK. & BR.

(Fig. 17 d)

ML 5, Grønnedal by Ivigtut, 9. July, in moss in river bed; ML 38, Ivigtut, 11. July; ML 96, Godthåb, 18. July in low heath with *Juncus trifidus* and *Salix herbacea*, — — Julianehåb (60° 43′ N.), 30. June 1946, leg. WIENBERG RASMUSSEN.

Very variable, some specimens large, approaching var. *proxima* but most of them small and dull, to be referred to var. *montana* MØLLER. Easily distinguished from the other species through four-spored basidia and the spores smaller tha 10 μ diam.

Distribution: A common species in Greenland, also found frequent in Sdr. Strømfjord from Pâ to the head of the fjord. It is a true member of the arcto-alpine flora, recorded from Iceland by LARSEN and CHRISTIANSEN (as var. *rosella* f. *pusilla* LARSEN) and from the Færöes (as var. *montana*). In Lappland I have found it at Abisko up to about 1300 m alt., and I have noted it in the alps above the timber line at Mt. Blanc (2200 m) and St. Bernard (2550 m), it seems at least in the upper zones attached to the herbaceous *Salix*, and further studies may prove the variety described by MØLLER to be a distinct species.

Laccaria tetraspora SINGER

(Fig. 17 b)

ML 4, Grønnedal by Ivigtut, 9. July, on naked gravel among stones.

The fruit bodies are smaller than in *L. laccata*, the spores larger with prominent spines, 9.5—12 × 9—11 μ, most of them globose, basidia 11—15 μ broad, 4-spored, clamp connections present.

Distribution: Easily confused in the field with *L. laccata* var. *montana*, so it may be the species recorded by some of the authors who have not given precise details about their find. Only this one specimen from Greenland could be referred here, but it may well have been overlooked in the field. SINGER (1952) found it in Tierra del Fuego.

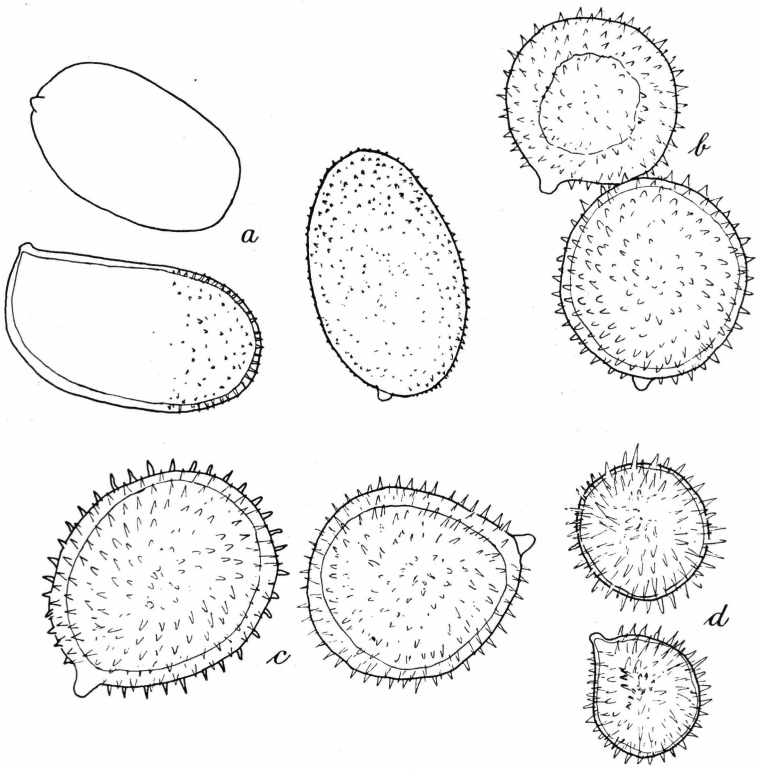

Fig. 17. Spores of *Laccaria* spp. a: *L. trullisata* (ML384). b: *L. tetraspora*, (ML4), c: *L. tortilis* (ML592), d: *L. laccata* (ML38). (× 2200).

Laccaria tortilis (FR.) BOUD.

(Fig. 17 c)

ML592, Grønnedal by Ivigtut, 18. Sept. in small fascicles in *Alnus* copse.

This is a very small species with a rather striking reddish violaceous colour on the gills contrasting to the dull colour of the cap. The basidia are narrow and 2-spored, 50—70 × 7.5—9.5 μ and the spores subglobose, 12—15.5 × 9—11.5 with 1.5 μ long spines, clamp connections are present but very rare.

I have two collections from Peary Land (ca. 82° N.) leg. K. HOLMEN which have the same large spores (11—14 × 9—11 μ) but the 2-spored basidia are broader (12 μ) and clamp connections are frequent.

They may belong in this species, but may also be referred to *L. altaica* SINGER. Two other specimens from N. E. Greenland seem still closer to *L. altaica*, viz. Geographical Society Ø (71° 52′ N.) 17. Aug. 1930, leg. SCHOLANDER, and Terneøen, Hudson Land (71° 30′ N.) 31. July 1930, leg. SCHOLANDER.

Distribution: I have a single record of this species from the upper birch zone at Abisko (ML3783), but besides that I belive little is known about its arcto-alpine distribution. It is quite common both in Europe and America, often recorded as *L. echinospora* (SPEG.) SING.

Laccaria trullisata (ELLIS) PECK forma **rugulospora** f. nov.
(Fig. 17a)

ML384, Sdr. Strfj., Sandflugtdalen, 24. Aug., near very scattered individuals of *Salix glauca*, on rather moist sand between dunes. —— Antarctic Havn, E. Gr. 71° 58′ N., 11. Aug. 1930, leg. SCHOLANDER.

A f. *trullisata* differt sporis pro maxima parte subtilissime spinoso-verruculoisi.

Typus die 24. Aug. 1946 ad sinum Sdr. Strømfjord, Groenlandia orientalis sub numero ML384 lectus in Museo Botanico Hauniensis depositus.

The fruit bodies were smaller than usually described, but in other respects typical; the basidia are mostly 4-spored, 35—50 × 10—12 μ, spores 12—15.5 × 7.5—8.5 μ, rather thickwalled, appears smooth but when stained yellow-brownish by Iodine some of them can be seen to be minutely but distinctly echinulate.

I have studied a Danish find of the species, and found the same minutely verrucose spores. From other places it is always described as smooth spored, but the very fine markings may well have escaped notice. Until this problem is cleared, I prefer to treat my material as a distinct form.

Distribution: The typical form is reported from both sides of the Atlantic, growing in sand dunes. I know of no other record from the far north.

Clitocybe (FR.) STAUDE

Clitocybe leucophylla (FR.) n. comb.
(*Omphalia leucophylla* FR.)

ML117, Sdr. Strfj., near Airfield, 29. July, in heath bog; ML386, Sdr. Strfj., near Keglen, 26. Aug., in moist heath.

Trama of cap with brown incrusting pigment in upper layers, gill trama parallel, of 6—9 μ broad hyphae; pleurocystidia cylindric sack-shaped, long, about 60 × 8—10 μ; basidia 20—25 × 7 μ, 4-spored; spores broadly rounded to almost subspheric with very fine spines, spores and tissues nonamyloid, clamp connections present.

The microscopical characters of the tissues support the suggestion of SINGER (1950) to transfer this species to *Clitocybe*, it has, however, also some traits in common with the species around *Omphalina maura* — *O. clusilis*, a group which in its turn hardly could be retained inside *Omphalina*.

Distribution: Quite common in the Sdr. Strømfjord area, growing in moist localities in moss, and found on north slopes up to 600 m alt., but not recorded by me from other Greenland localities, nor seems it to be known from other arcto-alpine stations.

Clitocybe ditopa (FR.) GILL. forma

ML317, Sdr. Strfj. Ravneklippen, 18. Aug. in *Betula nana* heath, in moss on north slope; numerous.

The plant was quite typical except for the slightly large spores (4.0—5.0 × 3.0—3.4 μ)

Distribution: Besides a dubious record from the Ivigtut district, only known from this single find in Greenland. To my knowledge not reported from other arcto-alpine areas.

Clitocybe vibecina (FR.) QUEL. sensu J. E. LANGE

ML579, Ivigtut, 16. Sept. in heath with *Betula*, edge of *Salix* copse.

Distribution: *Clitocybe brumalis*, recorded by ROSTRUP (1888) from Jakobshavn, may be this or the foregoing species, but besides that I know no other finds from Greenland or other arcto-alpine areas. The gray, hygrophanous *Clitocybe* seem to be rare in these regions.

Clitocybe diatreta (FR.) KUMMER

ML388, Sdr. Strfj., north slope near Icecap, 26. Aug., in deep moss.

Distribution: Se below under *C. dealbata*.

Clitocybe dealbata (FR.) STAUDE

ML547, Ivigtut, 14. Sept., in deep moss in open *Betula-Salix* vegetation; ML624, ibid., 22. Sept. in *Salix* copse and snow bed.

Distribution: *C. dealbata* was found scattered in the Ivigtut area; it is previously recorded from Qutdligssat by ROSTRUP (1891). In Iceland it has been met by both LARSEN and CHRISTIANSEN and in Lappland I have collected it several times in the upper birch zone. Some of the older records may well cover *C. diatreta*, of which species I know

only the abovementioned one find, and it is not impossible that also *C. rivulosa* may be a better identification of some of the finds. An unripe specimen (ML1) from Ivigtut is with great doubt referred to *C. rivulosa*. An other unripe specimen, ML155 from Sdr. Strømfjord is with no less doubt referred to *C. subalutacea*. SINGER has described a series of species in this group, among which *C. steppicola* and *C. Vassilievae* are fairly close to these specimens, but have considerably smaller spores. Until further studied I believe it best to consider the bulk of the arcto-alpine species of the group as belonging in *C. dealbata* — one of the few poisonous species in the region.

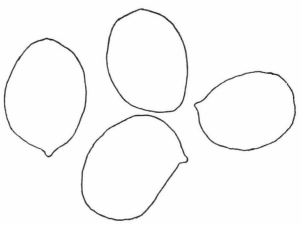

Fig. 18. *Clitocybe odora* f. *subsphaerospora*. ML261. Spores (× 2500).

Clitocybe odora (FR.) STAUDE f. **subsphaerospora** n. f.

(Fig. 18)

ML261, Sdr. Strfj., near Ravneklippen, 8. Aug., a large specimen in *Salix* copse in moss and grass.

A f. *odora* differt colore paene albo sporisque subsphaericis.

Typus die 8. Aug. 1946 ad sinum Sdr. Strømfjord Groenlandiae occidentalis sub numero ML261 lectus, in Museo Botanico Hauniensi depositus.

The specimen was of an almost pure white colour, but for the rest quite typical in macroscopical characters. The spores were, however, rather aberrant, 5.6—6.7 × 4.4—4.7 μ, almost subglobose to short elliptic. *C. odora* var. *anisearia* (PECK) KAUFF. comes closest in this respect with spores 6—8 × 4—5 μ, and is frequently white.

Distribution: The only record of the species from Greenland. The type is known from Iceland (LARSEN, CHRISTIANSEN).

Clitocybe infundibuliformis (FR.) QUEL. s. lat.

ML294, Kløftsøerne, Sdr. Strfj., 15. Aug., on north slope in deep moss; ML389, ibid., close to Icecap, 26. Aug., in moss and leaves under *Betula nana*; ML412, ibid., Hassells Fjeld, 28. Aug., under *Betula nana* in *Aulacomnium turgidum*, 300 m alt.; ML633, Ivigtut, 22. Sept. on dry south slope in *Betula* and *Salix*. — Moskusoksefjord, (E. Gr. 73° 24′ N.), 6. Aug. 1930, leg. SCHOLANDER; Geographical Society Ø (E. Gr. 73° 02′ N.), 18. Aug. 1930, leg. VAAGE (2 coll.).

The material showed great variation in spore size and shape, in ML389 the spores measured 6.6—8.7 × 3.2—3.9 μ, while in ML412 they were 6.2—7.8 × 4.0—4.7 μ.

Many authors have segregated distinct species in the complex around *C. infundibuliformis*, which I, however, here prefer to treat in a broad manner, as my material does not fit well with any of these segregates, nor present significant and consistent characters to make the erection of new taxa advisable. The closest form may be *C. altaica* SING. (1943) found in Altai above the timber line. It differs in much broader spores (7—8.5 × 5—6 μ).

Distribution: Quite frequent in the Sdr. Strømfjord area, rare or absent in other stations visited, but recorded from Godhavn (69° 14′ N.) by ROSTRUP (1888), and appearently rather common in N. E. Greenland. Not infrequent in other arcto-alpine areas, Iceland (CHRISTIANSEN), Færöes (MØLLER), Abisko, in lower alpine zones (own record), often occurring in rather dry places.

Clitocybe pseudectypa n. sp.

(Figs. 19—21)

ML405, Sdr. Strfj., Hassells Fjeld. 28. Aug., in deep *Hylocomium* and *Peltigera* with *Cassiope tetragona* on steep north slope, 500 m alt. — *Betula* and *Salix* spp. absent.

Statura *Clitocybes tabescentis* similis. Pileus 2.5—8 cm latus, convexus, deïnde expansus, manifesto umbonatus, dilute badius, subsquamulosus, ceraceo-nitens, margine primo involuto, carne valida, lamellae angustae, confertae, longe decurrentes, pallide cinnamomeae; stipes cylindraceus, 5—8 cm longus, 0,4—0.5 cm crassus, basi attenuatus, eodem cum pileo colore, subglaber, odore paulum farinaceo. Cuticula ex hyphis cinnamomeis, parallelis composita; trama lamellarum intermixta, fibulosa. Sporae ellipticae, magn. 5—6.2 × 3.0—3.4 μ, non amyloïdes.

Typus die 28. Aug. 1946 in pulvinari profundo Hylocomii subfasciculatus altitudine 500 m in monte Hassells Fjeld ad sinum Sdr. Strømfjord sito Groenlandiae occidentalis sub numero ML405 lectus, in Museo Botanico Hauniensi depositus.

Cap 2.5—8 cm broad, convex, then expanded with a small but distinct umbo, Russet to pale Chestnut (L. h1—k8), umbo darker, with indistinct, waxy scales, edge incurved when young, without veil but with minute yellowish denticles; flesh rather thick, watery brown, gills narrow and close, arcuate, several tiers of l, long decurrent, almost white at first, but soon Light Pinkish Cinnamon, edge straight; stem 5—8 × 0.4—0.5 cm, cylindrical, slightly flexuose and often tapering downwards, smooth, slightly pruinose at apex, almost solid, concolorous with cap, darkest above, base with white felt; smell and taste acidulous, slightly farinaceous.

Cuticle of cap of few compact layers of parallel, brown hyphae, here and there forming scales, trama proper pale brownish, interwoven, hyphae 2—6 μ, gill trama subparallel of 3—7 μ broad hyphae with

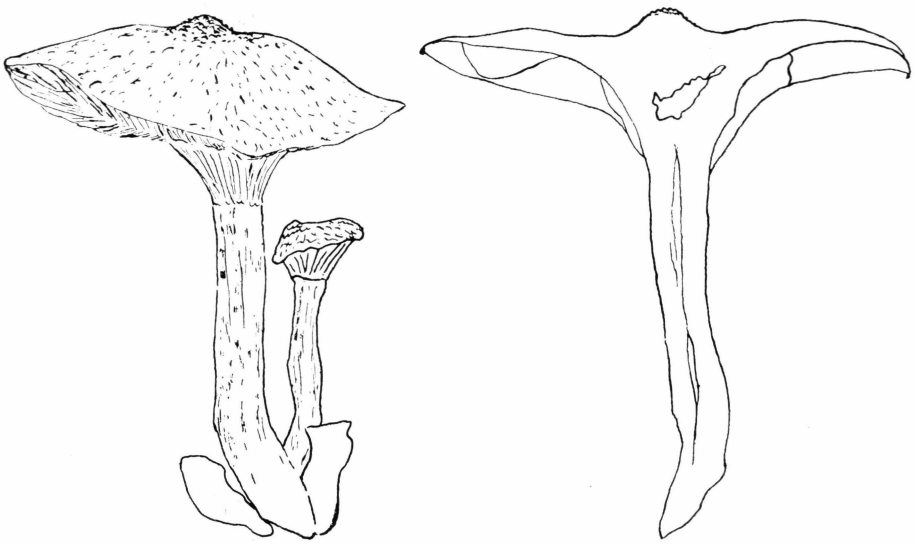

Fig. 19. *Clitocybe pseudectypa.* ML405. Carpophores ($\times$ 1).

clamp connections, subhymenium interwoven, rather prominent; cystidia absent, basidia 30—35 $\times$ 5.5—6 μ, no carminophilous granules,

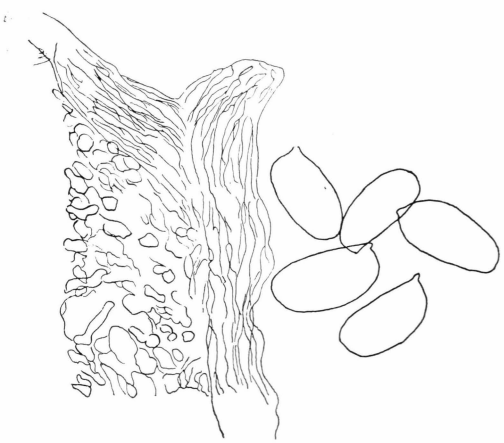

Fig. 20. *Clitocybe pseudectypa.* ML405. Epicutis and trama ($\times$ c. 600), spores ($\times$ 2500).

4-spored, spores elliptic, 5—6.2 $\times$ 3.0—3.4 μ with distinct apiculus, nonamyloid.

Several specimens in small fascicles in deep moss. The species has the habit of *Clitocybe (Armillaria) ectypa* and *C. tabescens.* It differs in

the presence of clamp connections, and in smaller spores. In some dried specimens a layer over the cuticle was seen. It looked like hymeniform, thinwalled cells; it was not demonstrated in the sections made of fixed material, and may very well have been a parasiting fungus developed under the drying process.

Only record.

Tricholoma (Fr.) Staude

Several "*Tricholoma*" species have been recorded from Greenland by Rostrup, often under obscure names. No material is preserved, and the records largely disregarded here.

Tricholoma atrosquamosum (Chev.) Sacc.

ML667, Ivigtut, under *Betula pubescens* on south slope, 29. Sept.

The specimens were typical in all respects except for the very variable, but rather large spores, 6.5—10.0 × 4.8—6.0 μ, and a corresponding occurrence of both 4-spored and 2-spored basidia, rare in this genus.

Distribution: Only record from Greenland, and not known from other arcto-alpine areas; very likely a distinctly southern species in Greenland, attached to the birch wood.

Melanoleuca Pat.

Melanoleuca cognata (Fr.) Konr. & Maubl.

ML207, Sdr. Strfj., Hassells Fjeld, 4. Aug. in Salix copse, 300 m alt.

Distribution: This pretty and conspicuous plant was only met once by me in Greenland; it is, however, quite widespread in arcto-alpine areas. Both Larsen and Christiansen found it on Iceland, Singer (1943) found it in Altai, and I have met it abundant in the upper birch zone in Lappland (M. Lange 1946).

Melanoleuca oreina (Fr.) Kühner & Maire

(Fig. 21)

ML157, Sdr. Strfj., 31. July, on heath near airfield; ML203, ibid. Hassells Fjeld, 4. Aug., on north slope in moss; ML353a, b, ibid., 22. Aug. in moist moss, 300 m alt; ML391, ibid., Keglen, 26. Aug., in moist heath, ML399, ibid., Hassells Fjeld, 28. Aug., boggy area with *Salix arctophila* and *Aulacomnium palustris*.

The specimens are referred to *M. oreina* with some doubt. In general they fit the Friesian description quite well, also as regards ecology,

but the different collections are quite variable and may in fact represent more than one species.

They are all rather small (cap 2.5—5 cm broad) but varies in colour from dark brown in ML353 to pallid grayish in ML157. The gills are narrow and close in some specimens, more distant and broader in others, but always white. Some plants have a collybioid, slender stem, 0.3 cm broad, while in others it is up to 0.6 cm broad, and the stem colour varies from almost white to dark brown.

Fig. 21. *Melanoleuca oreina* ML353a (left), b (centre, right) (×1).

The microscopical characters are uniform: Spores 6.5—8.0 × 5.0—6.5 μ, distinctly warty-amyloid in Iodine, pleurocystidia absent or very rare, about 25 × 8 μ, hardly pointed, a few cheilocystidia with thin walls, 20—25 × 4—8 μ, normally found, clamp connections absent.

Distribution: By me met in the Sdr. Strømfjord area only, in moist heaths. It is very likely that some of ROSTRUP's *Tricholoma* species should be referred here (*T. melaleucum*, *T. excissum*, *T. subpulverulentum* (ROSTRUP 1891)), as also the several specimens collected in N. E. Greenland by SCHOLANDER et al. It is not known from Iceland and the Færöes, but for the rest, I find the species too ill defined to comment on its distribution.

Collybia (FR.) STAUDE

Collybia dryophila (FR.) STAUDE

ML2, Grønnedal by Ivigtut, 7. July, in deep moss, up to 300 m alt.; ML20, Ivigtut, 9. July, in moss and dwarf shrubs; ML270, Sdr. Strfj. Nàkanjanga, 9. July, in moss and dwarf shrubs; ML270, Sdr. Strfj. Nákanjanga, 10. Aug., in deep moss on north slope.

Most Greenland specimens have a dark cap, but pallid gills and stem. The spores are slightly larger than normal, about 6—8 × 3—4 μ.

Distribution: Common in the oceanic stations visited, such as Ivigtut, Godthåb and Pâ, but in the continental Sdr. Strømfjord area confined to north slopes and rare even there. Previously recorded from Greenland by ROSTRUP from Ujaragssuit (70° 30′ N.) (1888) and Kangarssuk (61° 10′ N.) (1891). CHRISTIANSEN found it in Iceland, and in Lappland it grows in the lower alpine zones over the timber line (M. LANGE 1946). BLYTT (1905) mentiones it as common species in the Norwegian mountains up to 1600 m alt. The plant is truly cosmopolitaneous, SINGER (1953) records it i. a. from mountain regions in Brasil in *Sphagnum*.

Collybia cookei (BRES.) ARNOLD

ML249, Sdr. Strfj,. Ravneklippen, 8. Aug., a small flock in moss in *Salix* copse.

Very small specimens with a long pseudorhiza attached to a yellow sclerotium. The trama is made up of very broad hyphae (up to 16 μ broad), without clamp connections (4-spored). It may be a distinct species as typical Danish material of *C. cookei* has clamp connections and narrow trama hyphae.

Distribution: See under *C. cirrhata*.

Collybia cirrhata (FR.) QUEL.

ML127, Sdr. Strfj., Hassells Fjeld, 29. July, on decayed *Leccinum scabrum*; ML279, ibid., north slope of Nâkanjanga, 10. Aug., on decayed *Leccinum*, 680 m alt.

The species differs from the Greenland specimen of *C. cookei* through more narrow hyphae in the trama (3—6 μ broad), and are without sclerotia.

Distribution: The species was found to be quite common in the Sdr. Strømfjord area and around Ivigtut, mostly (or always?) on *Leccinum scabrum*. I have found it on the same host in Lappland, in the upper birch zone, but know of no other arcto-alpine records. It is widely distributed in its various forms, but the characters of the Greenland specimen of *C. cookei* indicate that eventually more intersterile units could be added to the three delimitated by ARNOLD using American material.

Collybia obscura FAVRE

(Fig. 22)

ML3, Grønnedal by Ivigtut, 9. July, in deep moss under *Betula glandulosa* shrubs; ML208, Sdr. Strfj., 4. Aug., in deep moss under *Vaccinium uliginosum*; ML240, ibid., north slope of Hassells Fjeld, 6. Aug., in deep moss among *Ledum* and

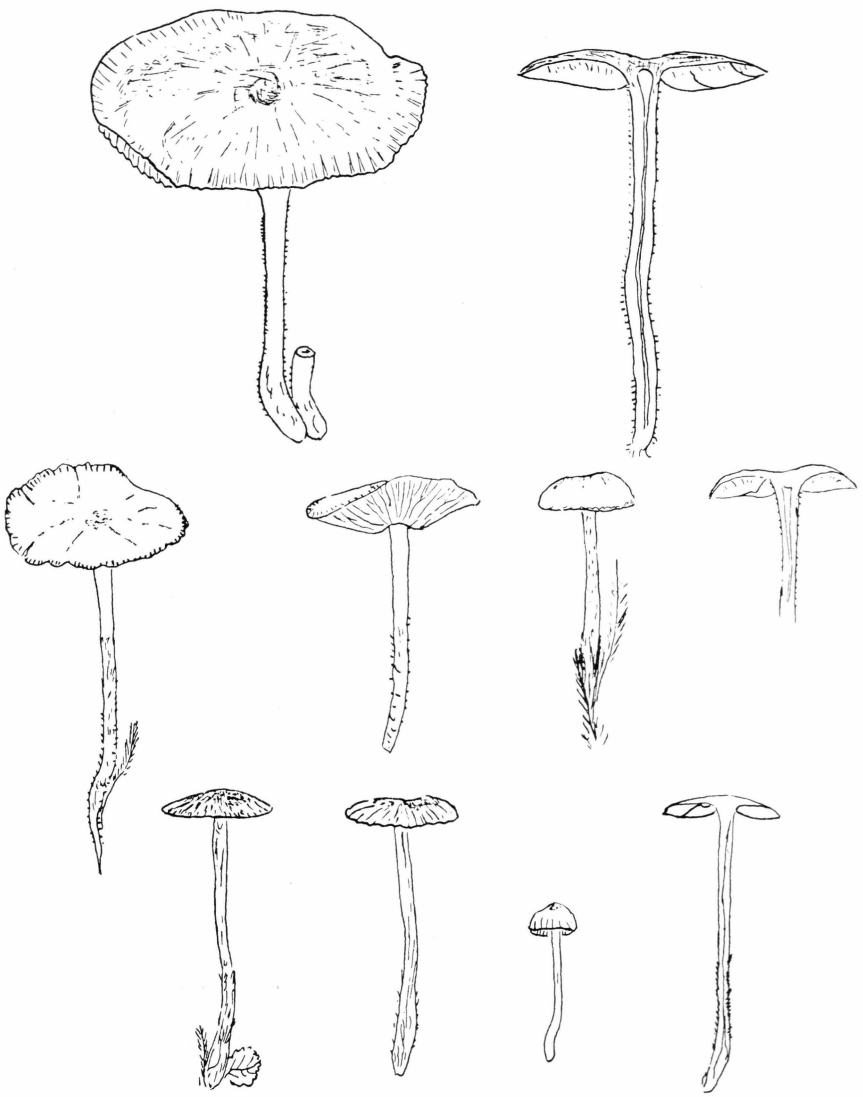

Fig. 22. *Collybia obscura*. ML602 (upper row), ML240 (middle), ML572 (below) (×1).

Betula nana, 450 m alt.; ML411, ibid., 28. Aug., steep north slope, in deep moss and *Cassiope tetragona*, 480 m alt.; ML572, Ivigtut, 17. sept., in moss and leaves of *Betula glandulosa*; ML602, Ibid., 18. Sept., in moss on heath.

The species is described by FAVRE (1948). The present material is in the main in accordance with this description, but shows a fairly broad variation as to size and colour. Most of the specimens from Sdr. Strømfjord are somewhat pale, and may even remind of *Collybia confluens* in stature. However, they all share the distinguishing character of *C. ob-*

scura, viz. the extracellular, small globules of dark red brown matter, found in all parts of the trama, though more or less conspicuous. The globules are dissolved in KOH, where the tissues attain a lemon yellow colour. Further studies may varrant the erection of new taxa in the group, but the present collections show too much intergradation to support such steps.

Distribution: Not uncommon in the heaths at Ivigtut and Sdr. Strømfjord, and even quite frequent at higher altitudes, on north slopes in deep moss among dwarf shrubs. Also found in the mountains in Lappland (M. LANGE 1946, as *Marasmius fuscopurpureus*). I have met the species now and then in Danish heath bogs (M. LANGE 1948 b p. 130), but it seems less frequent here than further to the north.

Marasmius FR.

Marasmius epidryas KÜHNER

(Fig. 23)

ML217, Sdr. Strfj., Hassells Fjeld, 4. Aug., on *Vaccinium uliginosum* in heath bog; ML296, ibid., St. Saltsø, 15. Aug. on dead *Dryas*, leg. BÖCHER; ML342a, ibid., Nàkajanga Umivit, 21. Aug. on *Dryas*, leg. BÖCHER; ML358, ibid. Hassells Fjeld, 22. Aug. on *Dryas*; ML570, Ivigtut, Webers Havn, 15. Sept. on *Dryas*, 300 m. alt. —— Loch Fine Fjord, (E. Gr. 74° 0′ N.), 25. July 1930, leg. SCHOLANDER.

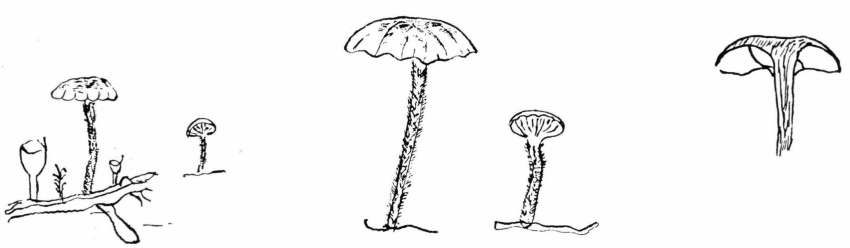

Fig. 23. *Marasmius epidryas*. ML217 (left × 1, right × 2).

The species resembles a small *Xeromphalina*, but the spores are non-amyloid and the epicutis of the cap is hymeniform with brown sclerocystidia. The pleurocystidia are very prominent, 50—60 × 10 × 4—5 μ.

Distribution: Excellently described from the Alps by KÜHNER, and probably almost entirely confined to *Dryas* and consequently limited to arcto-alpine areas. All my Greenland finds are recorded above. I have sought it in vain in Lappland, but SINGER (1943) found it to be frequent in the Altai.

Marasmius androsaceus (FR.) FR.

ML651, Ivigtut, Nordlandet, 27. Sept., on *Juniperus* needles.

Distribution: Only found rarely and scattered in the Ivigtut area, and apparently uncommon in arcto-alpine areas. It is not recorded from Iceland, rare in Lappland (M. LANGE 1946) and on the Færöes only found on conifer needles. This indicates a temperature requirement for the plant, as in its European and American area it grows quite frequently on *Eriophorum* leaves, on *Vaccinium uliginosum* and other material present in abundance far to the north.

Marasmius epiphyllus (FR.) FR.

ML321, Sdr. Strfj. 20. Aug., on *Salix* leaves in small copse on dry south slope of Hassells Fjeld.

Distribution: Only found once by me, but also recorded from Greenland by ROSTRUP (1891) (Ujaragssuit by Vaigat, 70° 30′ N., on *Salix* leaves), an other record given in the same paper gives *Carex* leaves as substratum and is highly dubious. I have found it on *Salix* leaves in the lower alpine zones in Lappland, and it is very probable that it follows the non-herbaceous *Salix* species to their northern limit.

Delicatula FAYOD

Delicatula delectabilis (PECK) KÜHN. & ROMAGN.
(syn. *Omphalia gracillima* (FR.) s. J. E. LANGE)

ML609, Ivigtut, 21. Sept.

Distribution: Only record from Greenland, if ROSTRUP's *Marasmius epiphyllus* from Disko (1891), growing on *Carex* leaves should not be referred here. No other arcto-alpine records known to me.

Mycena (PERS.) S. F. GRAY

Very few species of *Mycena* have been recorded from arcto-alpine areas. ROSTRUP mentions *M. galericulata* and *M. debilis* from Greenland and *M. pumila* from Ellesmere Land but adds no descriptions, thus leaving no possibility of a re-identification of the plants, no longer preserved. The same holds true for CHRISTIANSEN's record of *M. leptocephala* from Iceland. LARSEN's description of *M. avenacea* from Iceland leaves, however, no doubt as to the identity of the species, but it has not yet been collected in Greenland. In the surveys of distribution are thus

only included MØLLER's records from the Færöes and my own finds from Lappland and otherwhere. The classification and nomenclature for this genus is mainly that of SMITH 1947. All species listed below, new taxa excepted, are known from America and with a single exception also from Europe.

Mycena fibula (FR.) KÜHNER

ML77, Godthåb, 17. July 1946, along roadside in moist heath; ML123, Sdr. Strfj. Hassells Fjeld, 29. July in moss in shade of rock, a small flock.

Distribution: Uncommon in Greenland. Besides above finds only noted once, from Ivigtut. Also rare in the alpine zones in Lappland (M. LANGE 1946), Færöes (MØLLER), Mt. Blanc in the alps, just above timber line (ML4127). It seems very widespread and is found as far south as in the *Nothofagus*-regions in South America (SINGER 1953).

Mycena delicatella (PECK) SMITH
(syn. *M. lactea* var. *pithya* FR. sensu J. E. LANGE)

ML643, Ivigtut, Nordlandet 27. Sept., under creeping *Juniperus*, on needles.

Distribution: Only arcto-alpine record known to me. Suitable habitats are rare in the area.

Mycena citrinovirens n. sp.
(Fig. 24)

ML642, Ivigtut, Nordlandet, 27. Sept. under *Juniperus* on needles.

Pileus 0.7—0.8 cm latus, flavo-citrinis, centro striisque marginalibus olivaceo-cinereis, carne laete flava; lamellae emarginato-decurrentes, laete flavae, stipes 5—6 cm altus, 0.1—0.15 cm crassus, apice primo olivaceo-sordidus, deïnde pallide cinereus, omnibus partibus glaber, siccus. Cheilocystidia claviformia. Basidia bispora. Sporae magn. 8.5—10.2 × 6.0—8.0 μ, non amyloïdes.

Typus die 27. Sept. 1946 sub Junipero ad Ivigtut Groenlandiae occidentalis sub numero ML642 lectus, in Museo Botanico Hauniensi depositus.

Cap 0.7—0.8 cm broad, hemisphaeric-campanulate, of a clear yellow colour (L.1 1—3) the centre and striae flushed with grayish olive, when dry pallid yellow all over, almost smooth; flesh thin, pale yellow, gills moderately broad, strongly emarginate with a decurrent denticle, very pale yellow; stipe 5—6 × 0.1—0.15 cm, terete, straight, dark grayish brown on apex when young, when older pale grayish all over, glabrous, dry, polished, base white-felty, flesh pale, almost solid. No smell and taste noticed.

Pellicle thin, hyalin, hardly subgelatinous in KOH, with fine projections, trama yellowish, no distinct hypoderm, but more inflated above,

hyphae 10—18 μ broad, in lower layer and gill trama 8—15 μ broad, elements rather short, subhymenium not prominent, not gelatinous but splitting ealisy from trama, basidia 2-spored, about 30×7 μ, some basidioles cystidia-like, pointed or bifurcate; cheilocystidia clavate with projections numerous and short or long and few, body 7—9 μ, broad, in dense brim on edge, spores 8.5—10.2 $\times$ 6.0—8.0 μ, dark yellow in Iodine, (almost?) nonamyloid, trama brownish vinaceous in Iodine.

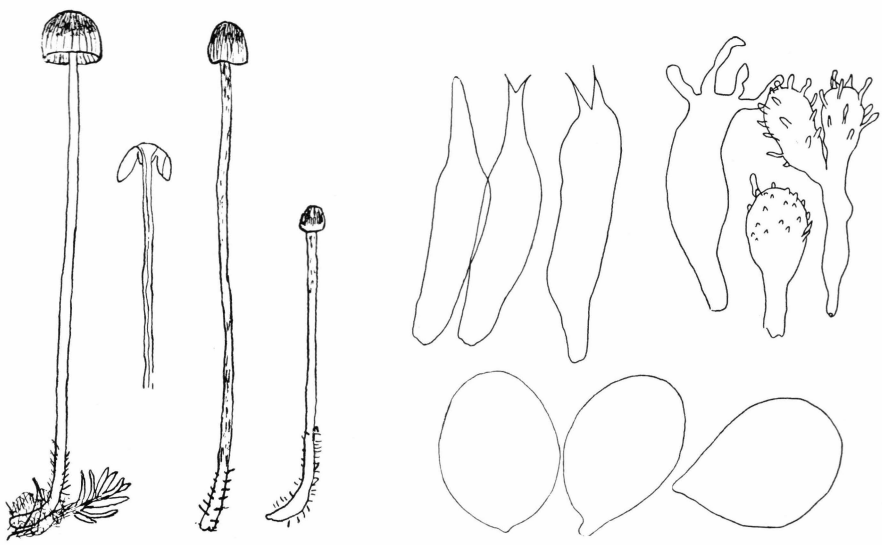

Fig. 24. *Mycena citrinovirens*. ML642. Carpophores ($\times$ 1), pleurocystidia, basidium and cheilocystidia ($\times$ 1800), spores ($\times$ 2500).

The species has a superficial likeness to *M. epipterygia* but seems more closely related to *M. flavifolia* and *M. caroliniensis* of the section *Adonidae*. I have only made this single collection of the species, but the specimens were very nicely developed, well protected under a juniper branch creeping over the ground.

Mycena rubella QUEL.

ML574, Ivigtut, 16. Sept., on *Salix* twigs in fern leaves; ML597, ibid., Grønnedal, on *Alnus* leaves, 18. Sept.; ML626, Ivigtut, 22. Sept. on *Juniperus* needles.

The nomenclature and species concept in the red species of sect. *Adonidae* is hopelessly confused. The present material is very uniform, and corresponds exactly to J. E. LANGE's picture (1936). The pleurocystidia are large, acuminate and inflated below, while the cheilocystidia are very inconspicuous, hairshaped. The spores measure 8.5—9.0 $\times$ 4.5—

5.0 μ, and are nonamyloid, while the trama is faintly pseudoamyloid. Basidia 2-spored.

Distribution: I know of no other arcto-alpine records, but the species and its close relatives are widely distributed.

Mycena pura (Fr.) Quel.

ML124, Sdr. Strfj. Hassells Fjeld, 29. July, under *Salix* on dry slope; ML331, ibid., 20. Aug.

The few specimens found of this species were quite typical, of the lilac-gray form.

Distribution: Very rare both at Sdr. Strømfjord and at Ivigtut, and confined to the richest copses where a leaf layer develops. Also found in Lappland at Abisko in the upper birch zone (M. Lange 1946) exceptionally at higher altitudes up to 1100 m alt. attached to low *Salix*. In Norway it reaches 1500 m alt. according to Blytt (1905). It is a cosmopolitan species, found as far to the south as in Tierra del Fuego (Singer 1953).

Mycena rubromarginata (Fr.) Quel.

ML528, Ivigtut, 11. Sept., in *Salix* copse; ML546, ibid., 14. Sept., on *Salix* branch in moss.

The species is very well described by Kühner & Yen (1949).

Distribution: In Greenland I have found *M. rubromarginata* in the Ivigtut area only, where it was very common in the *Salix* copses, in moist places. It seems to be common in other alpine areas, as I have met it at Abisko (1000 m alt.), Storlien above the timber line and Mt. Blanc in France (2400 m alt.). It is, however, also quite common in lowland localities, both in N. Europe and N. America.

Mycena citrinomarginata Gill.

ML230, Sdr. Strfj. Kløftsøerne, 6. Aug., in very wet *Salix* copse; ML575, Ivigtut 16. Sept., in *Salix* copse in deep moss; ML631, ibid., Grønnedal, 24. Sept., under *Alnus*.

Distribution: The species is rare at Sdr. Strømfjord and Godthåb, but common in *Salix* copses at Ivigtut. Like *M. rubromarginata* it seems widely distributed in arcto-alpine areas, probably attached to *Salix* and *Alnus*. At Abisko I found it up to 1100 m alt. where it grows among herbaceous *Salix*. Møller found it on the Færöes among grass and moss.

Mycena leptocephala (FR.) GILL. sensu SMITH

ML346, Sdr. Strfj., Hassells Fjeld, 22. Aug., in wet moss on edge of lake 400 m alt.; ML407, ibid., 28. Aug. in rich, moist *Salix* copse.

None of the specimens cited were very typical, but they had the distinct nitrous smell, and the microscopical characters were satisfactorily close.

Distribution: Not uncommon in the Ivigtut area and at Godthåb, more scattered at Sdr. Strømfjord. Also recorded from the montane and alpine zones in Lappland (M. LANGE 1946) where it is quite common in the upper birch woods and occurs scattered up to about 900 m alt.

Mycena stannea (FR.) QUEL.

ML529, Ivigtut, 11. Sept. in *Salix* copse; ML543, ibid., 14. Sept., in moss in *Salix* copse, gregarious; ML577, ibid., 16. Sept., in deep moss in *Salix* copse.

The hypoderm is quite distinct, made up of one to two layers of inflated cells over a filamentous trama.

Distribution: Common in the Ivigtut area in the *Salix* copses, and of a similar distribution as *M. rubromarginata*, although probably more attached to the fairly woodlike areas. I have no convincing specimens from other arcto-alpine stations.

Mycena aetites (FR.) sensu KÜHNER
(*M. ammoniaca* FR. sensu J. E. LANGE)

ML184, in moist heath in low moss, Sdr. Strfj., 2. Aug.

This species is generally rather stout, but not large, with gray gills. The pellicle is made up of several layers, hypoderm and trama not well separated, of inflated cells with brown sap.

Distribution: *M. aetites* seems confined to grass fields or open mossy areas. The species seems uncommon in Greenland, the above record is probably the only one from Greenland, and I have but one convincing specimen from other arcto-alpine areas, from Iceland (M. LANGE 1949). SMITH includes this species in his *M. stannea*. I think, however, that it deserves specific rank; its ecology and stature is at any rate quite distinct from the woodinhabiting, slender *M. stannea*.

Mycena urania (FR.) GILL.

ML409, Sdr. Strfj., Hassells Fjeld, 500 m alt., 28. Aug., in deep moss.

Cap 0.5—0.8 cm broad, almost conic at first, then hemispheric, grayish-violaceous (L. a5 and paler shades), pale towards the edge, with dark

striae, smooth, edge crenulate; flesh thin, pale violaceous; gills rather narrow and close, faintly emarginate-adnexed, pale violaceous, edge finely eroded; stem 2—2.5 × 0.1—0.15 cm, terete, dark violet, flesh paler, hollow, fibrillose, base with minute whitish felt. Taste almost none.

Pellicle poorly differentiated with minute projections, pale brownish hypoderm of loosely interwoven hyphae, prominent in umbo, thin on margin, lower layer of trama similar, but somewhat more dense in the mediostratum, hyphae up to 20 μ broad, gill trama similar; pleurocystidia rare, similar to pear-shaped clavate cheilocystidia, with low projections, 20—28 × 9—12 μ; basidia 4-spored; spores 7—8.5 × 4—4.5 μ, weakly amyloid, trama pseudoamyloid.

Distribution: Only met once in Greenland, but also recorded at the timber line at Storlien (ML3293). Probably rare here as it seems to be elsewhere. Although described from Europe it seems more common in N. America.

Mycena psammicola (Berk. & Br.) Sacc.

ML634, Ivigtut 25. Sept., in deep moss in *Salix* copse.

This small *Galerina*-like species is quite close to *M. metata*. The Greenland find, two specimens only, is referred here pending further studies of the complex, but concurs in all details with the description given by Smith. It is certainly not possible to indicate anything about the distribution of this illknown and overlooked species.

Mycena metata (Fr.) Quel.

ML318, Sdr. Strfj., Ravneklippen, 18. Aug., in moss in *Betula nana* vegetation on north slope; ML576, Ivigtut, 16. Sept., in deep moss in *Salix* copse.

Both collections were typical (two-spored with pleurocystidia scattered) and must be referred here in spite of the unusual habitat for this species, usually confined to conifer-wood.

Distribution: The species seems rare in arcto-alpine areas, I know of no other records.

Mycena filopes (Fr.) Quel.

ML222, Sdr. Strfj., Kløftsøerne, 6. Aug. under *Salix glauca*, edge of bog; ML544, Ivigtut, 14. Sept. in open *Salix-Betula* vegetation in rich moss carpet.

Distribution: This species, exceedingly common both in Europe and N. America, seems to be rare to the far north. I have a single specimen from the upper birch forest in Lappland, but know of no other arcto-alpine records. At Sdr. Strømfjord I found it up to 500 m alt.

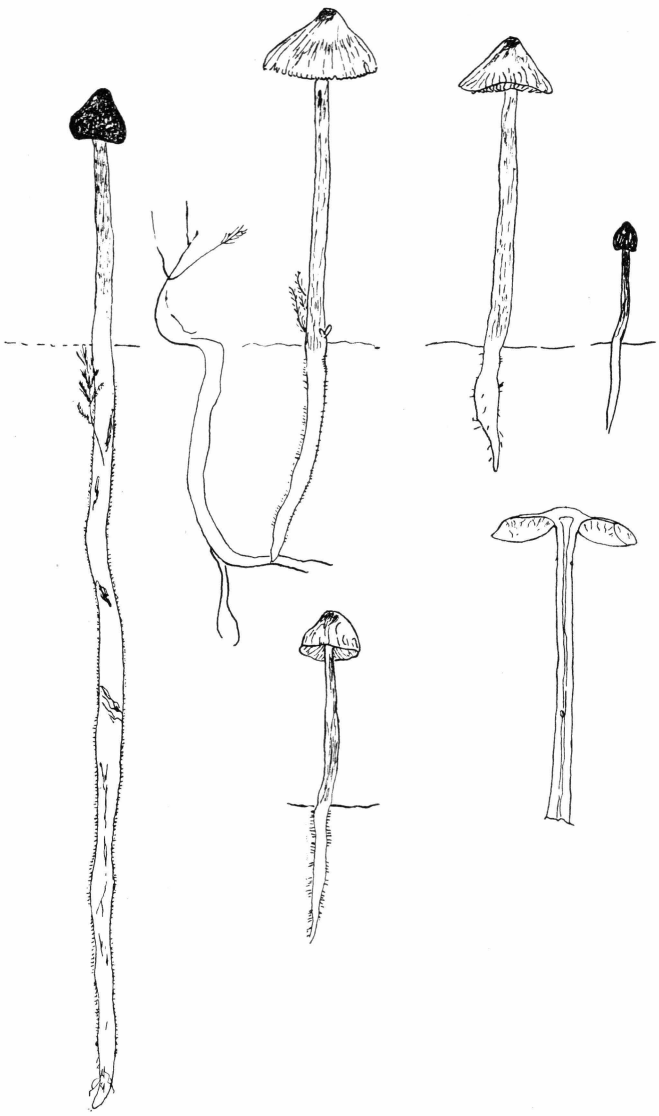

Fig. 25. *Mycena megaspora*. ML583 (young specimen to the left ML564). (× 2:3).

Mycena megaspora KAUFF.

(Fig. 25)

ML503, Godthåb, 6. Sept.; ML530, Ivigtut, 11. Sept., in *Salix* copse; ML544, ibid. 14. Sept. in *Salix* shrub; ML564, ibid, 16. Sept., in *Empetrum* vegetation rich in lichens; ML583, ibid., 18. Sept., in deep moss in *Vaccinium uliginosum-Betula nana* heath.

Cap 1.3—2.5 (3.5) cm broad, campanulate-umbonate when young, then broadly convex with a broad umbo, almost black when young, then

paler or darker brown, radialy rugulose, somewhat waxy-shining, edge incurved when young, indistinctly striate; flesh watery gray; gills broad on middle, venose from behind, subdistant (35—40 L) deeply emarginate to almost free, dark gray to almost white, pale on margine; stipe 5—15 × 0.2—0.6 cm, cylindric or tapering upwards, with a very long pseudorhiza, dark brownish shining, pruinose when young, pseudorhiza pallid, felty and pliant; hollow, flesh fibrillose, darker than in cap.

Pellicle of cap of narrow hyphae with dense projections, hypoderm of 1—2 layers of narrow or inflated short elements with brown sap, trama of 10—15 μ broad hyphae, not pigmented, gill trama similar, subregular (trama and hypoderm in young specimens of more narrow elements); pleurocystidia absent, cheilocystidia 6—13 μ broad, irregularly clavate with shorter or longer processes, basidia 2-spored in 544, spores 11—14.2 × 7.1—8.7 μ, 4-spored in the rest, spores 9.0—12.8 × 6.0—7.2 μ.

Smith finds the species 2-spored, but gives a single record of a 4-spored form too. I fail to find any consistent difference between this species and *M. uracea* Pearson, which also seems attached to dwarf shrubs, especially *Empetrum*.

Distribution: Very common in the oceanic stations, Godthåb and Ivigtut, where it is found especially in *Empetrum* vegetation, the pseudorhiza probably attached to the roots. Not met in the Sdr. Strømfjord area. I have a single specimen from the upper birch zone at Abisko. The species seems widely distributed both in Europe and N. America, mostly in heath bogs, it seems however that the 2-spored form is dominant in the USA and the 4-spored in Europe.

Mycena hemisphaerica Peck

(syn. *M. parabolica* Fr. sensu J. E. Lange)

ML536, Ivigtut, 11. Sept.; ML604, ibid., 18. Sept., on *Sorbus* stump.

The species is close to *M. galericulata*, but the colour of the cap is darker in young stages, the cap more fragile and the stem slender. Its microscopical characters agree with the description by Smith; the small embedded cheilocystidia are mostly 8—11 μ broad, spores 7.5—9.0 × 4.8—5.1 μ, 4-spored basidia dominant, the pellicle is subgelatinous over a hypoderm of 1—2 layers of ± inflated cells with brown sap, trama cells 10—25 μ broad.

Distribution: The species is not well known enough to evaluate the distribution. I found it a few times in the Ivigtut area on stumps of *Salix* and *Sorbus*.

Mycena subconcolor SMITH

(Fig. 26)

ML585, Ivigtut, 18. Sept., in small flocks and subfasciculate on heath soil, wet place under *Betula nana*, *Vaccinium uliginosum*, and *Salix glauca*.

Cap 1—2 cm broad, convex, almost flat or slightly depressed when old, dark grayish brown, paler towards margin, dark striate $^2/_3$ in, the striae narrow towards margin, almost glabrous, pellicle detachable, slightly viscid, young margin incurved; flesh thin, pliant, paler than cap, grayish; stem 1.5—2.5 × 0.1—0.2 cm, slightly curved, concolorous with cap or paler, pruinose-while above, glabrous-shiny but not viscid, hollow, pliant. Taste lightly farianceous or almost mild.

Fig. 26. *Mycena subconcolor*. ML585 (× 1).

Pellicle not well differentiated, upper trama layer of gelatinous hyphae, 3—10 μ broad, some of them brown refractive, others hyaline, with clamp connections, lower part of trama nongelatinous, brown, gill trama similar, subregular, some hyphae brown, 4—8 μ broad, gills edge of narrow, subgelatinous hyphae, some of them irregularly swollen, up to 10 μ broad, basidia mostly 4-spored, some 2-spored, 35 × 8 μ, spores thick-walled, elliptic-subcylindric, 9—12.5 × 5.7—6.7 μ, amyloid. No gelatinous layer on stem.

Distribution: Only known from this find and from the type locality in the Californian mountains.

Mycena concolor (J. E. LANGE) KÜHNER

ML310, Sdr. Strfj., 18. Aug., in *Betula nana* — *Aulacomnium turgidum* heath, on north slope of Ravneklippen.

Distribution: No other arcto-alpine records.

Mycena pseudopicta (J. E. LANGE) KÜHNER

(*M. misera* (FR.) sensu SMITH?)

ML97, Itivdlínguaq, 24. July, a single specimen in *Sphagnum*.

The microscopical characters of the scant material are almost intermediary of *M. pseudopicta* and *M. concolor*. An other collection (ML605

Ivigtut, 20. Sept. on litter of *Vaccinium uliginosum*) had all the microscopical characters of *M. pseudopicta*, but came close to *M. cinerella* in stature. It may be an inodorous form of this latter species, close to var. *subviscida* KAUFF. & SMITH.

Distribution: Also known from Iceland (M. LANGE 1949). It seems rather uncommon in Europe, and of a very scattered occurrence. The N. American records are not quite convincing.

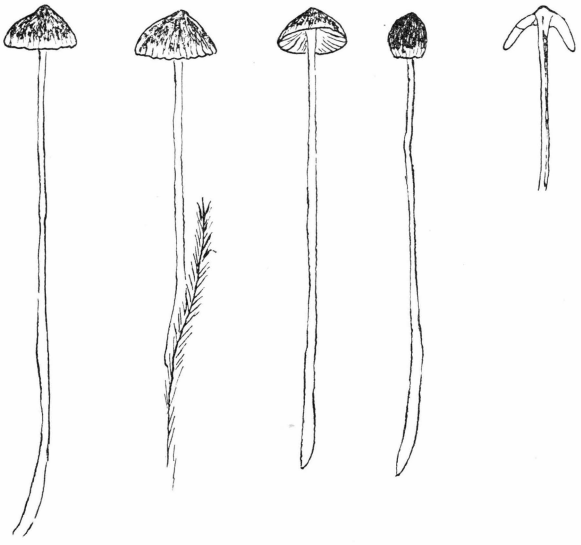

Fig. 27. *Mycena epipterygia* var. *badiceps*. ML302 (× 1).

Mycena epipterygia (FR.) S. F. GRAY var. **badiceps** n. var.

(Fig. 27)

ML302, Sdr. Strfj., Ravneklippen, 18. Aug., in moss on deep humus layer, in smah flocks; ML349, ibid. Hassells Fjeld, 22. Aug., in *Aulacomnium palustre* witll *Salix arctophila*; ML396, ibid. Sandflugtdalen, 26. Aug., on north slope in moss, 100 m from Icecap; ML504, Godthåb, 6. Sept.

A var. *epipterygia* differt pileo fuligineo-nigricante.

Typus die 18. Aug. 1946 ad sinum Sdr. Strømfjord Groenlandiae occidentalis sub numero ML302 lectus, in Museo Botanico Hauniensi depositus.

Cap 0.8—1.2 cm broad, campanulate-convex with a small umbo (almost ovate at first), bistre to almost black in centre (L. c2—3), narrow zone on edge pale (L.f8) honey yellow, denticulate, striate almost to centre, pellicle viscid, detachable; gills narrow, ca. 22 L, two tiers of l, decurrent, white at first, then pallid grayish, pale on margin; stem 4—7 × 0.1—0.15 cm, terete, slightly swollen below, white pruinose and lemon yellow when young, dark grayish brown on upper part when older, viscid,

flesh hollow, base white, felty. Smell and taste pronounced, farinaceous-acid. Sporeprint white.

Pellicle with fine projections over a prominent gelatinous layer of 1 μ broad hyphae with clamp connections, hypoderm indistinct, of 1—2 layers of 6—12 μ broad hyphae with brown sap, trama proper brownish under hypoderm or hyaline throughout, of inflated, 6—20 μ broad hyphae, gill trama similar, subregular, subhymenium of 3 μ broad hyphae, gelatinous only towards the edge, where it supports 7—11 μ broad cystidia with branched but rather short projections; basidia 2-spored, 27—30 $\times$ 8 μ, spores 9—12 $\times$ 5.5—7.3 μ, dropshaped, amyloid, trama vinaceous-pale in Iodine.

The outstanding dark brown colour was characteristic for these and all other Greenland collections of the species. In microscopical characters and in general stature this variety comes closest to var. *lignicola* SMITH, and it is probably identical with a form described under this name from Washington, USA (SMITH 1947 : 428). SMITH hesitated to ascribe taxonomic rank to it, but the constancy in the colour characters in the Greenland material seems to warrant the erection of a distinct variety, which probably is a taxon on the same level as those often given specific rank as *M. epipterygioides* and *M. viscosa*.

Distribution: The typical form of *M. epipterygia* is recorded from the Færöes (MØLLER) and found by me in Lappland. I have met the variety here described nowhere outside Greenland, where it on the other hand was common both at Sdr. Strømfjord up to 500 m alt, at Kangamiut at Godthåb and at Ivigtut. As to its possible occurrence in USA see above.

Mycena spp. div.

Four collections of *Mycena* spp. could not be identified. ML214 (Sdr. Strfj.) had the habit of *M. sanguinolenta* but no juice, and micr. characters differed; ML297 (ibid.) is rather close to *M. pelliculosa*, but umbonate and without pleurocystidia; ML644 is close to *M. gypsea* sensu KÜHNER, and finally ML645 (from Ivigtut) has the habit of *M. hiemalis* but strongly amyloid spores. They represent species probably undescribed, but the material in all collections is very scant.

Mycenella (J. E. LANGE) SING.

Mycenella salicina (VEL.) SING.

(Fig. 28)

ML216, Sdr. Strfj., 4. Aug. in low moss in dried out creek, in *Vaccinium uliginosum* — *Betula nana* heath; ML410, ibid., 28. Aug., in rich *Salix* copse in humid moss, near creek.

Cap 0.6—1.2 cm broad, campanulate, dark bistre brown to almost black, hardly hygrophanous, glabrous, edge undulate, gills moderately

broad, distant, 10—12 L, 15 l, almost free, with grayish-brown flush behind, stem 2.0 × 0.15 cm slightly widened below, pallid on top, the rest concolorous with cap, puberulent from cystidia.

Pellicle distinct, hardly gelatinous, hyalin to pallid brown, hypodermal layer very prominent, of loosely woven, dark brown hyphae, 10—12 μ broad, trama proper thin, grayish, opaque, the hyphae more narrow, gill trama interwoven, subhyaline, hyphae 8—10 μ broad; basidia mostly 4-spored, 9 μ broad; cystidia scattered on face, acuminate, about 50 × 10 × 3—4 μ, often with globule on top or with a glutinous

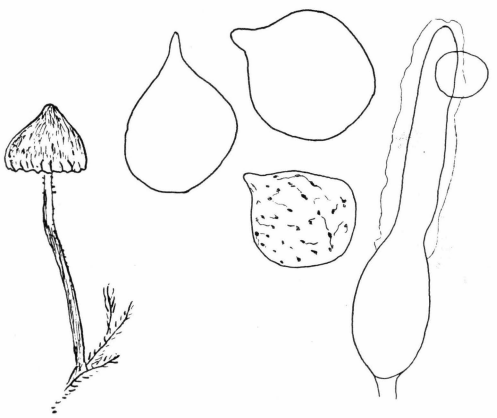

Fig. 28. *Mycenella salicina*. ML216. Carpophore (× 1), pleurocystidium (×1200) and spores (×2200).

sheet, spores globose, smooth, some with prominent apiculus, some almost without, some with granular content, 6.7—9.5 × 5.6—7.6 μ. Spores and all tissues nonamyloid.

Distribution: Only the two finds given above from Greenland. Besides that not recorded outside Central Europe to my knowledge.

Xeromphalina Kühner & Maire

Xeromphalina fulvobulbillosa (R. Fries) Kühner

ML527, Ivigtut, 11. Sept. in heath with dwarf shrubs and *Betula*; ML573, ibid., in heath, 16. Sept.

Distribution: The species was found to be extremely common in the Ivigtut area in rather dry heaths. I did not note it in other stations, but it is given from Sdr. Strømfjord by Rostrup (1891). It seems to have its main distribution in the northern conifer woods, but is clearly not dependent on the presence of conifers, as in Greenland it was never found around junipers.

Fig. 29. *Amanita vaginata*. Godthåb 6. Sept. 1946.

Amanita PERS. ex S. F. GRAY

Amanita vaginata (FR.) QUEL.

(syn. *A. nivalis* GREV., *A. hyperborea* KARST.)

(Fig. 29)

ML509, Godthåb, 6. Sept.; ML614, Ivigtut, 21. Sept. under *Alnus*, —— Narssaq (60° 55′ N.), 17. June 1888, leg. ROSENVINGE, det. ROSTRUP; Narssarssuaq, 7. July 1947 leg. TH. SØRENSEN; Nûgssuaq (ca. 70° 40′ N.) several stations, leg. JAKOBSEN 1947.

Large slender gray forms as well as smaller gray or white forms were met. The smaller forms had remnants of velum left on cap as small scales, but the entire material forms an intergrading series leaving no possibility for the establishing of *A. nivalis* as a distinct taxon.

Distribution: Widely distributed in Greenland, where already ROSTRUP (1888, 1891) registered it from several stations, ranging as far north as Uperniviarssuk, but apparently restricted to the oceanic areas. It was not met by me in the Sdr. Strømfjord area but besides the finds recorded above I found it in Kangâmiut and Narssarssuaq. It is discribed from Iceland by CHRISTIANSEN, and in Lappland it grows up to 1200 m alt. (M. LANGE 1946). I have also met it in the Swiss alps in about 2600 m alt. (Schildhorn), and several older descriptions of the species under various names give records from mountain regions.

Amanita muscaria (Fr.) S. F. Gray

Found by Rosenvinge at Sinigtok by Julianehåb (60° 43′ N.) (Rostrup 1891). Not met with by me and probably restricted to the best developed birch woods far to the south in Greenland. It seems absent in the birch wood at Abisko but I have found it as far north as Hemmingsfjord south of Tromsø in rich birch wood.

Agaricus L. ex. Fr.

The species have been identified with aid of the monograph of Møller (1950, 1952). No indication of distribution can be given in this genus until more specimens from other areas have been studied and classified into the narrow taxa employed in recent works on the genus. There are, however, previous records of different *Agaricus* species from several arcto-alpine stations, even from Greenland, where Rostrup (1888, 1891, 1894) mentions *A.* "*campestris*".

The material collected by *Scholander* et al. contains several specimens of *Agaricus* from E. Greenland (72—74° N.). None of them can be identified with certainty, but the *campestris* group and the *arvensis* group are both represented.

All specimens found by me were collected and are listed below.

Agaricus arvensis Fr.

ML170, Sdr. Strfj., south slope of Hassells Fjeld, 2. Aug.; ML196, ibid., 2. Aug.

Well developed specimens of the typical form.

Agaricus fissuratus (Møller) Møller

Kûtsiaq, North coast of Nûgssuaq, 11. Aug. 1947, leg. C. A. Jørgensen.

Agaricus campestris Fr. var.

ML115, Sdr. Strfj., 27. July, on clayey sand on the airfield area.

A rather peculiar form of the *Campestris*-group, with a distinct ring, and subglobose, relatively large spores, 8—9 × 6—7 μ.

Agaricus salicophilus n. sp.

(Fig. 30—31)

ML132, Sdr. Strfj., Ravneklippen 26. July, in sand; ML167, ibid., Hassells Fjeld 29. July, in *Salix* copse on dry south slope; ML168 ibid., 2. Aug.; ML398, Sdr. Strfj., Sandflugtdalen, 26. Aug., in sand with *Betula nana* and *Salix*, dune close to Icecap.

Fig. 30. *Agaricus salicophilus*. ML167. Carpophore (× 1:2), cheilocystidia (× 1200) and spores (× 2500).

Pileus usque ad 18 cm latus, late convexus, pallide cinnamomeus, fibrillo-squamulosus, carne valida, alba, rufescente; lamellae liberae, primo canescentes, deïnde obscure fuscus; stipes 8—15 cm altus, 3—4 cm crassus; anulus validus, infra radiatim fissus. Odor debilis, aromaticus. Cheilocystidia catenas breves formantia. Sporae magn. 7—9 × 6.5—7.2 μ.

Typus die 29. Julii 1946 sub Salice ad sinum Sdr. Strømfjord Groenlandiae occidentalis sub numero ML167 lectus, in Museo Botanico Hauniensi depositus.

Cap broadly convex, slightly depressed on middle when old, up to 18 cm broad, pale brownish (Cinnamon Buff) almost glabrous when

young, but soon breaking up in fine fibrillose scales, slightly yellowish when bruised, margin incurved when young, tomentose; flesh thick, white, slightly and slowly staining brownish-rhubarb colour when cut; gills moderately broad, close, free, and often clearly separated from stem, at times forming collarium, grayish chocolade colour when young, choco-

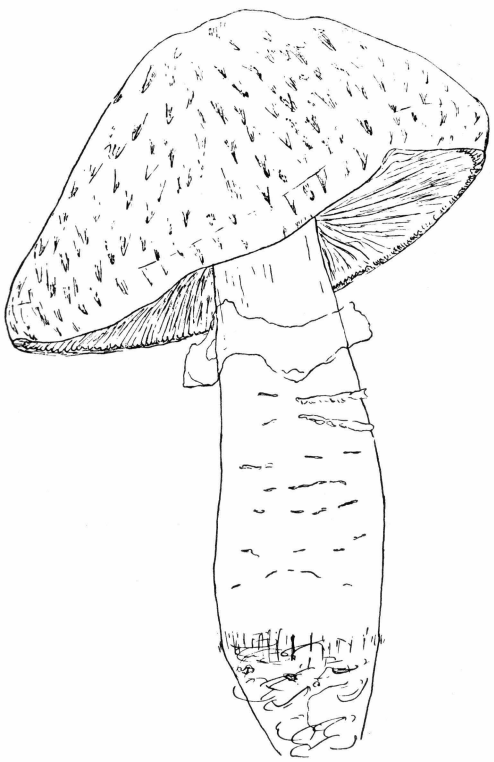

Fig. 31. *Agaricus salicophilus.* ML168. (×1:2).

lade brown when old; stem stout, 8—15 × 3—4 cm, cylindric, tapering at both ends, almost rooting, whitish, in some specimens slightly yellowish above and pale brownish under the ring which is prominent, broad and lax with a stellate splitting structure underneath, below the ring are seen 2—3 belts of ± appressed, broad scales; flesh solid, turning pale rhubarb brownish especially at base. Smell aromatic but rather slight.

Cheilocystidia short chains of globose or oval cells, the outer cell often with a fingerlike appendix; up to 25 μ broad but mostly 10—15 μ, filled with dark brown sap; basidia mostly 4-spored, but 2- and 3-spored ones not uncommon especially near margin 25—30 × 8—9 μ; spores dark brown, subglobose to almost globose, 7—9 × 6.5—7.2 μ.

The species comes closest to *A. augusta*, but is generally paler, the palest specimens recalling *A. arvensis*. The subglobose spores separate the species well from both *A. augusta* and *A. arvensis*. It was found exclusively in the Sdr. Strømfjord area, at low altitude (less than 100 m) on south slopes.

Cystoderma FAYOD

Cystoderma granulosum (FR.) FAYOD

ML114, Sdr. Strfj., Ravneklippen, 26. July, on north slope in moss and *Ledum*; ML154, ibid., near Airfield, 31. July, in moist moss under *Salix* in rather dry heath; ML192, ibid., 2. Aug., in deep moss in moist heath under *Betula* and *Salix*; ML295, Sdr. Strfj., Bredesand, 15. Aug., on north slope; ML335, Sdr. Strfj., on north slope, 500 m alt.; ML385, Sdr. Strfj., 100 m from Icecap, 26. Aug., on north slope; ML568, Ivigtut, Taylers Havn, 15. Sept. in deep moss on south slope. — — Geographical Society Ø (E. Gr., 72° 51′ N.), 16. Aug. 1930, leg. SCHOLANDER.

Entire material typical, but often poorly coated with globose cells.

Distribution: Quite common in deep moss beds, especially on north slopes at Sdr. Strømfjord, only noted once in the Ivigtut area, but recorded far to the north in East Greenland. The most common species of the genus around Abisko, Lappland, where it was found already by ROMELL (1911) and recorded up to 1250 m alt. by me. There is an old record of the species from the Færöes (ROSTRUP 1901).

Cystoderma amianthinum (FR.) FAYOD

ML194, Sdr. Strfj., 2. Aug., in deep moss in moist heath with *Betula* and *Salix*; ML313, ibid., north slope of Ravneklippen, 18. Aug.; ML390 ibid., near Icecap, 26. Aug. on north slope; ML578, Ivigtut, 16. Sept., in deep moss in heath, ML588, ibid., 18. Sept., in mild snow bed, in *Lycopodium complanatum*, *Sieglingia* and *Empetrum*.

The species is very variable, here as elsewhere, in microscopical features. The spores are weakly amyloid, and varies from almost globose to oblong (extremes: ML390: — 4.9—6.3 × 4.0—4.8 μ — ML578: 6.1—7.8 × 3.4—4.0 μ), also other features vary, but in no close correspondance with the spore variation. The globose cells in the epiderm are dark brown and incrusted in ML578, and very pallid in the long-spored ML588.

Distribution: Not very common in the Sdr. Strømfjord area where it occurs mainly on low, moist heaths, but contrary to *C. granulosum* quite frequent around Ivigtut. In Lappland I have not found it above

the upper birch zone. It is recorded from Iceland by CHRISTIANSEN. Presumably it is more southern than *C. granulosum*.

Coprinus (FR.) S. F. GRAY

Coprinus macrocephalus BERK.

ML42, Ivigtut, 11. July, gergarious on dung heap.

Spores 12.5—14.5 × 7.0—8.2 μ.

Distribution: The only record from Greenland. The species may be a native of the area, with a natural habitat provided by dung of larger mammals. The present find is, however, from a dungheap of cow- and horsedung strongly mixed with remnants of imported fodder. It is recorded also from Iceland (CHRISTIANSEN) and the Færöes (MØLLER).

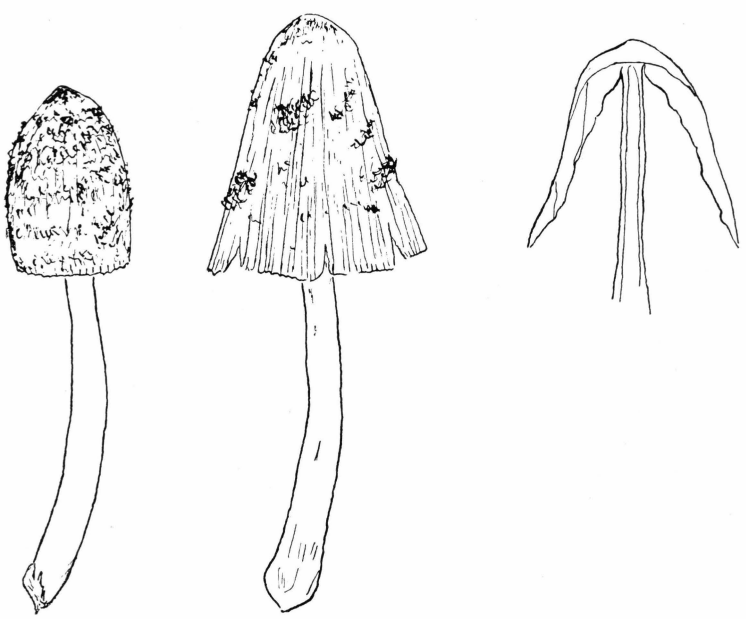

Fig. 32. *Coprinus lagopus* var. *sphaerosporus* ML401 (× 1).

Coprinus lagopus FR. var. sphaerosporus KÜHNER & JOSS.

(Figs. 32, 34 a)

ML401, Sdr. Strfj., Hassells Fjeld, 28. Aug., in *Salix* copse, in deep moss (*Climacium* etc.).

Cap 3.5—4.5 cm high, young bud glandiform, expanding and finally revolute around an inconspicuouse pallid clay brown umbo; in young

stages densely clad with white fibrills forming recurving, fine scales, easily worn off, almost naked before cap splits on edge and deliquesce; flesh thin; gills narrow, crowded, faintly emarginate, pallid gray when young, almost black when spores ripen, edge eroded, white in places; stem 7—8 × 0.4 cm, thickened at base, white, sparingly clad with with fibrills; flesh thin, white, hollow.

Cystidia and basidia not seen in revived material, spores subspheric mitriform, 7.0—8.0 × 6.0—6.9 μ, fuscous brown, germpore very broad and distinct, episporium separable.

The material fits well with the description given by KÜHNER & JOSSERAND. It in not unlikely that the variety should have specific rank, and it is probably identical with *C. lagopides* KARST., *C. jonesii* PECK and *C. funarium* METROD.

Distribution: Only find from Greenland. No non-coprophilous member of the *C. lagopus*-group seem previously reported from arcto-alpine areas.

Coprinus filamentifer KÜHNER

(Fig. 33, 34b)

ML76, Ivigtut, 15. July, on dung heap, subfasciculate.

Bud 0.8—1.5 cm high, narrow subcylindric, covered with a pure white veil reaching stem, soon breaking up in small squarrose scales under neath of which is seen the greyish cinnamon, pale cap, finely striate, with very unprominent disc; gills narrow (0.1 cm broad) moderately crowded, free, light grayish before spores ripen, edge paler; flesh very thin, pale cinnamon on disc; stem 6—8 × 0.1—0,13 cm, attenuated upwards and downwards, base pointed; fibrillose felty like cap, slightly hollow, distinctly hollow when ripe; flesh cinnamon. — Cap splitting in age, gills deliquescing, flesh hardly so, spores ripening almost simultaneously and blackening gills.

Felt on cap of narrow, branched cells, 2—4 (7) μ broad, pileus trama of isodiamtric or slightly elongated, inflated cells, gill trama subparallel — interwoven, hyalin, hyphae 3—6 μ broad; pleurocystidia hyaline, scattered, inflated sackshaped, 60—90 × 20—28 μ, cheilocystidia similar to balloonshaped, sometimes with a long branched projection and mixed with branched hyphae similar to veil, basidia dimorphous, 18—30 × 7—8.5 μ, 4-spored, paraphyses 12—18 μ broad; spores Cinnamon Brown, 6.0—8.0 × 4.9—5.2 μ.

The above description is drawn from specimens raised in culture, but checks well with the notes and observations on the original material.

Distribution: Only Greenland record, and probably not yet recorded from other areas outside France.

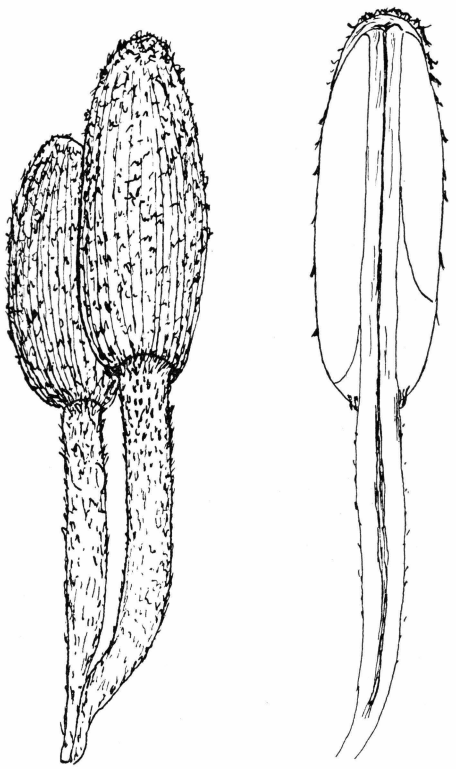

Fig. 33. *Coprinus filamentifer* ML76. Specimens raised in culture (× 2).

Coprinus stercorarius Fr.

ML43, Ivigtut, 11. July, several specimens scattered on dung heap.

The specimens were deeply rooting, attached to sclerotia. Spores 9—10 × 5.5—6.5 μ. The material was brought in culture, where it proved homothallic and produced sclerotia and fruit bodies on artificial medium.

Distribution: As for *C. macrocephalus*, but not known from Iceland.

Coprinus martinii Favre

(Fig. 34 c)

ML351, Sdr. Strfj., 22. Aug., in wet moss on edge of lake, deeply rooting in the moss and probably springing from leaves or stems of *Carex*.

Cap covered with globose, warty cells, 25—45 μ broad; basidia 23—33 × 10—13 μ, 4-spored; spores 11.9—15.4 × 7.7—9.0 μ, with remnants of hyaline episporium; clamp connections seen on some septa.

The species is a non-coprophilous, large-spored type of the *C. stercorarius* series.

Distribution: Reported from *Sphagnum*-bogs in Switzerland by FAVRE (1948) and from France (KÜHNER & ROMAGNESI 1953), but besides that, I know only the one record above.

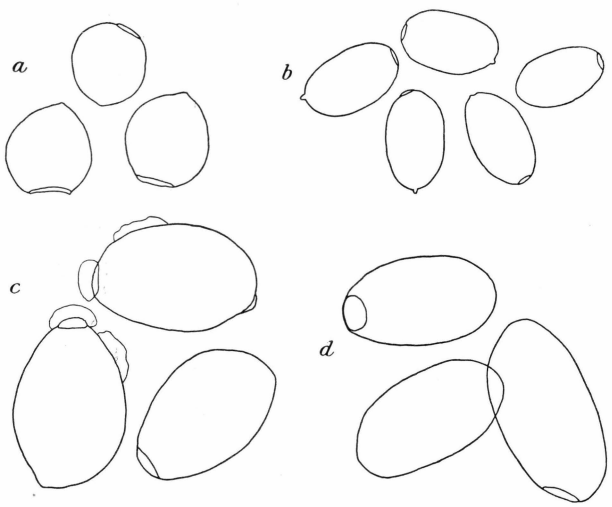

Fig. 34. Spores of *Coprinus* spp. a: *C. lagopus* var. *sphaerosporus* (ML401), b: *C. filamentifer* (ML76), c: *C. martinii* (ML351), d: *C. pyrrhantes* (ML58) (× 1800).

Coprinus domesticus (FR.) S. F. GRAY

ML120, Sdr. Strfj., Hassells Fjeld, 28. July, on *Salix* stump on dry south slope; ML341, ibid., 20. Aug., on *Salix* leaves in small copse.

The plant develops from a yellow ozonium, the cap in button stage covered with yellowish to hyaline, almost globose cells with walls about 1 μ thick; spores under microscope Tawny Olive, ovate, adaxial side often slightly concave, 7.2—9.5 × 4.3—5.2 μ.

The species was brought in culture (ML120) and developed a rich, fibrillose yellow mycelium without clamp connections, but no fruit bodies.

Probably very close to *C. xantothrix* ROMAGN., and to *C. domesticus* sensu J. E. LANGE, but not fitting exactly into the current descriptions of species in the group.

Distribution: Quite common in dry *Salix* copses on south slopes in Sdr. Strømfjord (up to 250 m alt.), but not met in other Greenland stations, nor as far as I know recorded from other arcto-alpine stations.

Coprinus pyrrhantes Romagn.

ML58, Narssarssuaq, 13. July, gregarious to subfasciculate on soil and small branches by small streem in birch wood.

Cap 0.5—0.8 cm high, campanulate, fisso-sulcate-grooved, Chesnut (L. k8) when young, paler in age, grayish in the grooves, micaceous when young, almost naked when older, hardly deliquescing, gills narrow, moderately crowded, free, pallid brown, then dark grayish brown, stem 2—3 × 0.1—0.15 cm, straight, pallid, finely cystidiose, faintly hollow.

Spores 11.0—12.5 × 5.9—7.9 μ, elliptic, adaxial side often concave, with large excentric germpore, distinctly flattened, brown, basidia 3-morphous, 25—35 × 10—11.5 μ, 4-spored, cheilocystidia pearshaped-globose, about 20—30 μ broad, with pale brown content, globose cells from cap surface similar, brown.

The description given by Yen and Romagnesi fits my plant well, except that the spores in the present find are faintly larger.

Distribution: Only record from Greenland. Met by me in several quite similar localities in birch wood just below the timber line at Abisko, Lappland, but for the rest I believe the species has not yet been reported on from outside France.

Coprinus angulatus Peck

ML34, Ivigtut, Grønnedal, 11. July, on charcoal of imported wood and *Salix* twigs; ML187, Sdr. Strfj., Hassells Fjeld, 2. Aug., on charcoal on old fireplace, 300 m alt.; ML540, same place as ML34, 12. Sept.

The material was brought in culture and found interfertile with European and American strains of the species.

Distribution: Only two burnt-over spots were encountered on my excursions in Greenland, and the species was found on both. I have met it also in the upper birch zone at Abisko and at Storlien in North Sweden, but no other finds from arcto-alpine areas are known to me.

Coprinus bisporus J. E. Lange

ML44, Ivigtut, 11. July, fasciculate on dung heap; ML65, ibid., 15. July.

The material was grown in culture and found homothallic and identical with Danish strains (M. Lange 1952).

Distribution: As for *C. macrocephalus*. — Found by Møller on the Færöes, and by myself in the upper birch zone at Abisko and Storlien.

Coprinus miser KARST.

ML243, Sdr. Strfj., near Ravneklippen, 8. Aug., on dung of *Lagopus* in *Salix* copse; ML402, ibid., Hassells Fjeld, 28. Aug., same ecology.

Distribution: The only two records from Greenland, but also raised in laboratory from dung of mosque oxe from N. E. Greenland and probably not uncommon in arcto-alpine stations on dung. I have met it at Abisko in 750 m alt., and HEIM (1947) found it in the alps.

Psathyrella (FR.) QUEL.

Psathyrella velutina (FR.) SING.

ML57, Narssarssuaq, 13. July; ML287a, Sdr. Strfj., near airfield, 11. Aug.

A rather small and dull form of this difficult species complex, probably close to *P. rigidipes* PECK. The spores are but slightly roughened, cheilocystidia 60—100 × 5—6 (neck) × 8—11 μ (head), with yellowish, refractive content; pleurocystidia are rare to absent.

Distribution: Only the two abovementioned finds are known from Greenland, and I know of no other arcto-alpine records.

Psathyrella spp. div.

The genus is very poorly represented in the flora of Greenland. Besides the above species I only made 4 collections which with great doubt are referred as follows: ML22, Ivigtut, road side, 10. July — ad *P. nolitangere*; ML189a, Sdr. Strfj., near airfield, 1. Aug. on muck from ditch ad *P. trepida*; ML250, ibid., north slope of Ravneklippen, 8. Aug., — ad *P. subnuda*; ML251, ibid., 8. Aug., on *Salix* branches and leaves — ad *P. fibrillosa*.

None of the specimens checked completely with the current descriptions and the material was not too good. The identification of *P. fibrillosa* could, however, be regarded as fairly certain.

Panaeolus (FR.) QUEL.

Panaeolus campanulatus (FR.) QUEL.

ML41, Ivigtut, 11. July, on dung heap; ML67, ibid., probably from same mycelium, 15. July.

The material was quite typical and well developed, it was brought in culture and produced fruit bodies.

Distribution: Only finds from Greenland, but recorded both from Iceland and the Færöes (CHRISTIANSEN, MØLLER).

Panaeolus ater (J. E. LANGE) nov. stat.

(*P. fimetarius* var. *ater* J. E. LANGE 1936)

ML113, Sdr. Strfj., below Ravneklippen, 26. July, in sand among scattered vegetation of *Salix* and *Elyna*.

The specimens were quite typical in spite of the peculiar habitat, they grew half way buried in sand.

Distribution: Only find from Greenland. Beside this, I know only one other arcto-alpine record, which furthermore is highly dubious: Iceland, (CHRISTIANSEN) "on horse dung".

Anellaria KARST.

Anellaria semiovata (FR.) PEARSON & DENNIS

ML81, Godthåb, 18. July, roadside, on horsedung.

The material, a rather small specimen, was brought in culture and found heterothallic, probably tetrapolar.

Distribution: Only Greenland record; found in Iceland, on the Færöes (LARSEN, MØLLER), and in Lappland in the upper birch zone, but always on cow or horsedung, BLYTT (1905) found it up to 1100 m alt. in the Norwegian mountains. — It seems a very widely distributed species. SINGER found it on alpine meadows in South America (SINGER 1953).

Stropharia (FR.) QUEL.

Stropharia aeruginosa (FR.) QUEL. var. **alpina** nov. var.

(Fig. 35)

ML205, Sdr. Strfj., Hassells Fjeld, 4. Aug., in *Stereocaulon* — *Polytrichum* on fell field, 380 m alt.; ML274, ibid., Nàkajanga, 10. Aug., in deep *Rhacomitrium* on fell field, 700 m alt.; ML395, ibid., near Icecap, 26. Aug., on north slope.

A var. *aeruginosa* differt stipite sicco, pileo subviscido, sporis magn. 8.5—10.5 × 5.5—6.9 μ.

Typus die 10. Aug. 1946 prope vicum Nàkajanga ad sinum Sdr. Strømfjord situm Groenlandiae occidentalis in altitudine 700 m sub numero ML274 lectus, in Museo Botanico Hauniensi depositus.

The present variety has the stature of the type but the stem is dry and the cap only subviscid; both cap and stem are scaly in young specimens.

Pellicle of few layers of subgelatinous hyphae, 2 μ broad, with clamp connections, hypoderm brown in KOH, trama proper almost hyaline, pleurocystidia typical gloeocystidia, about 45—60 × 12—16 μ, promi-

nently pointed; cheilocystidia clavate, capitate or not, 25—50 μ long, apex 5—11 μ; basidia 4-spored, spores 8.5—10.5 $\times$ 5.5—6.9 μ.

The spores are constantly larger than in the type, and also the shape of the cheilocystidia is aberrant, which, together with the dry stem and moderately developed gelatinous hyphae on cap, makes it very likely that the taxon will be regarded a distinct species, when the complex around *S. aeruginosa* is further studied.

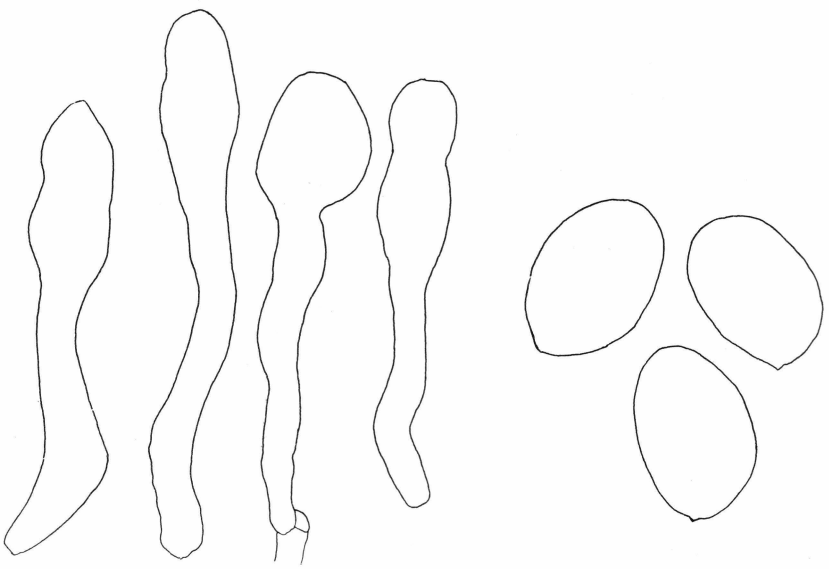

Fig. 35. *Stropharia aeruginosa* var. *alpina*. ML395. Cheilocystidia ($\times$1500) and spores ($\times$2000).

Distribution: Restricted to typical alpine habitats, and in Greenland only noted in the Sdr. Strømfjord area, where it, however, was rather uncommon. The same variety was found on Iceland (M. LANGE 1949), growing under similar conditions. BLYTT (1905) found *S. aeruginosa* over the birch zone in 1000 m alt. in Dovre Mts., Norway, it may wel have been var. *alpina*.

Hypholoma (FR.) KUMMER

Hypholoma myosotis (FR.) comb. nov.

(*A. Psilocybe myosotis* FR. 1821)

ML226, Sdr. Strfj., Kløftsøerne, in peatbog in *Sphagnum*, 6. Aug.; ML521, Ivigtut, in moist heath, 11. Sept.; ML587, ibid., 18. Sept., in moist moss.

Distribution: The species seems to be rather rare in Greenland, I know of no previous records and only made the abovementioned three finds. It is common in Iceland according to CHRISTIANSEN, and recorded

from the Færöes (var. *pumila*) by MØLLER. In Lappland it is met up to about 1200 m alt. (M. LANGE 1946).

Hypholoma elongatum (FR.) RICKEN

ML228, Sdr. Strfj., Kløftsøerne, 6. Aug., in *Sphagnum* in bog; ML344, ibid., Hassells Fjeld, 22. Aug., in wet moss on edge of lake, 400 m alt.; ML413, ibid., 28. Aug., in wet moss in *Salix* copse; ML553, Ivigtut 14. Sept., in deep *Sphagnum* under *Betula*.

Most specimens have spores 8.5—11.5 × 6.0—7.0 μ, ML344 however 10.9—13.1 × 5.9—7.7 μ, and cystidia and epicutis indicate transitions to *H. polytrichi* especially for ML228 and ML413. *Naematoloma laeticolor* MØLLER, described from the Færöes, comes close, but may be nothing but an ecotype of *H. elongata*, not growing in *Sphagnum*, similar to the form mentioned by me in a previous publication (M. LANGE 1948 b).

Distribution: The species is not common in Greenland, and generally found in small number. It is found in Iceland (LARSEN) and on the Færöes (MØLLER, cp. above). In Lappland it reaches but little above the timber line (M. LANGE 1946).

Psilocybe (FR.) KUMMER

Psilocybe coprophila (FR.) KUMMER forma

ML505, on sheeps dung, Godthåb, 6. Sept.

A form with very large spores (ad var. *subcoprophila* BRITZ.) 14.5—19 × 8.7—10 μ, cheilocystidia inflated below, with a rather long beak, 35—45 × 10—11 × 2—3.5 μ.

The material was brought into culture. It was found tetrapolar but the interfertility-reactions with other strains of this polymorphous species were inconclusive.

Distribution: Large-spored forms are reported both from Iceland (CHRISTIANSEN) and from the Færöes (MØLLER). In Lappland I have found the species up to about 1300 m alt., also large-spored. I know only the above one find from Greenland, but it may very well be common around sheep farms, and may also occur on dung of native mammals.

Psilocybe merdaria (FR.) RICKEN

ML23, Ivigtut, 9. July, on garden refuse, in grass and *Urtica*, gregarious; ML82, Godthåb, 18. July, in garden on horsedung mixed with soil; ML83, ibid., 18. July, on roadside.

All collections were brought into culture, the species is tetrapolar, and the strains were all found interfertile with both Danish and American material.

Distribution: No other finds are recorded from Greenland, where it as yet has not been collected on dung from native animals. Found in Iceland by LARSEN and on the Færöes by MØLLER, who regarded his small, dark specimens as a distinct variety, var. *exigua*. His description fits my Greenland material exactly, but fruit bodies developed in culture from these specimens are exactly like the normal form, and the variety should not be regarded as a separate taxon. No other arcto-alpine records are known to me.

Psilocybe montana (FR. ex PERS.) KUMMER
(syn. *P. atrorufa* (FR.) KARST.)

ML71, Ivigtut, 15. July, among *Empetrum*, *Ledum* and *Betula glandulosa* on heath; ML118, Sdr. Strfj., Hassells Fjeld, 27. July, in moss in shade of rock, on south slope; ML382, ibid., Sandflugtdalen, 24. Aug., in sand.

P. montana is made up of several distinct taxonomic units, a closer study of these taxa will appear shortly. ML118 is typically representing what is usually called *P. atrorufa*, with spores averaging $7.8 \times 5.4 \times 4.7$ μ, ML71 is a form with small, subglobose spores, $6.9 \times 5.3 \times 4.6$ μ, while ML382 is rather distinct in several respects and i. a. has large spores, $8.9 \times 6.1 \times 5.2$ μ.

Distribution: Occuring scattered both at Ivigtut, Godthåb, and Sdr. Strømfjord and presumably a frequent species in arcto-alpine areas. Recorded from Iceland (LARSEN, CHRISTIANSEN) and from the Færöes (MØLLER) and found quite commonly by me in the Lappland mountains, up to 1600 m alt. Also frequent in the alps, where I have collected it at 2550 m alt. at St. Bernard, and at 2300 m alt. on Mt. Blanc.

Psilocybe physaloides (FR.) KARST.

ML210, Sdr. Strfj., Hassells Fjeld, 4. Aug. in *Elyna* heath; ML364, ibid., on *Elyna* tussoc under *Salix*, 21. Aug.

Distribution: The species is too often confused with *P. montana* to permit a fair evaluation of its distribution. It seems however constantly attached to grass, and accordingly it cannot reach the higher alpine zones where grass is too poorly developed to serve as substratum.

Psilocybe sp.

ML129, Sdr. Strfj., Hassells Fjeld, 29. July, in rather moist *Elyna* vegetation.

A rather distinct form, close to *P. montana* and *P. physaloides*, with slender cheilocystidia, not inflated much below, and large spores, subglobose in face view, averaging $8.4 \times 6.3 \times 5.2$ μ. — Only a single find.

Psilocybe crobula (Fr.) Romagn.

ML522, Ivigtut, 11. Sept., on stem of *Archangelica*; ML591, ibid., in *Alnus* copse on debries; ML633a, ibid., 22. Sept.

Distribution: Only found in the Ivigtut area, and not recorded from other arcto-alpine areas.

Kuehneromyces Sing. & Smith

Kuehneromyces mutabilis (Fr.) Singer & Smith

ML531, Ivigtut, 11. Sept., on *Betula*; ML639, ibid., 29. Sept., on *Salix* branch.

Distribution: By me met exclusively in the Ivigtut area, growing on rather thick branches or stumps, and probably restricted to the southernmost part of Greenland. Larsen and Christiansen rapports it from Iceland, growing on birch, and I have met it in the upper birch zone at Abisko, but it is probably lacking in the true arcto-alpine areas, where no suitable substratum is found. It seems to grow on fairly thick branches only.

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Postscript.

Several important papers on the Agaric flora of Siberia have not been available in Denmark. They are listed in a recent publication by B. P. Vacilikov: The study of the toadstools in SSSR (in Russian). Akad. Nauk SSSR, Moskva 1953.

Færdig fra trykkeriet den 26. februar 1955.