# Icones Farlowianae

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# Icones Farlowianae

## ILLUSTRATIONS OF THE LARGER FUNGI OF EASTERN NORTH AMERICA

BY

WILLIAM GILSON FARLOW

With Descriptive Text by

EDWARD ANGUS BURT

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# The Preface

BY W. G. FARLOW

ONE of the aims of the author in preparing the present work has been to furnish to those who are not in the possession of large libraries and collections the means of identifying the more striking and characteristic of our larger fungi. During the pursuit of his studies which have occupied a considerable number of years, he has himself met with many difficulties and he has often felt that, if there were only in existence a work giving good illustrations and full descriptions of our principal species, his progress in the study would have been greatly helped. A good many persons, attracted by the numerous and striking forms of fungi which abound in this country, have been deterred from attempting to study them by the difficulty of finding descriptions of them in the scattered literature on the subject which is not readily obtained and not always easily understood. For such persons the quickest and most practical way would be, by a comparison of living specimens with good plates and adequate descriptions, to obtain a definite knowledge of a certain number of forms which they could refer to as types and, with these as a starting point, proceed in their study.

The author has also had in mind another object which concerns more strictly specialists than beginners. At present the scientific knowledge of our fungal flora is derived almost wholly from descriptions of species some of which are peculiar to this country while others are supposed to be identical with European species. In the case of fungi like *Hymenomycetes*, which include what are popularly called toadstools and the like, it is unfortunately true that, in many cases, neither descriptions nor dried material suffice to give a clear idea of the general appearance. While fully recognizing the value of descriptions and dried material the writer is convinced that the nomenclature of our species cannot be said to be ultimately settled until the botanists of different parts of

this country and of Europe have been able by means of colored habit-pictures to compare the described species of this country with those of other countries. Although the species here represented form but a small part of the whole number of species which belong in our flora, it is hoped that they will prove of value to experts in mycology as well as to the less advanced student.

In offering to the public a work which professes to appeal not only to the learned but to the unlearned, the writer is aware that his position may appear to some to be venturesome; but the very great expense incurred in producing the plates has made it necessary to adapt the work to as large a circle of readers as possible. Both classes of readers naturally desire plates which shall combine accuracy with artistic excellence but, as far as the printed matter is concerned, the minute and technical details which are intended for specialists are likely to be rather dreary reading for the amateur while, on the other hand, diffuse popular accounts are superfluous for the expert. It being out of the question to strike a happy mean between the two extremes, it was thought best to give in an Introduction a short historical account of some of the principal illustrated works on fungi, followed by a brief popular account of the structure and classification of the fungi to be treated. The main portion of the work consists of plates of 100 characteristic species with descriptions so arranged that, by the use of different kinds of type, the reader will be able to distinguish at a glance between the general and popular account of the species represented which is intended for the general reader and the more scientific and technical notes and comments intended for special botanists.

In the preparation of the plates the writer has been fortunate in securing the coöperation of Mr. Joseph Bridgham, whose previous training in a field of natural science allied to botany had given him an accuracy as an observer which, combined with his talent as an artist, admirably fitted him for the work although not himself a student of fungi. While it may be left to the reader to pass judg-

ment on the result, the author desires to express his keen appreciation of the zeal and enthusiasm which Mr. Bridgham has throughout manifested in the work. The drawings were made under the direct supervision of the author, from fresh material collected in numerous expeditions made in company with Mr. Bridgham to different parts of the country for the purpose or, in some cases, from fresh material sent to Cambridge. As preparation of the plates has required several years, the original drawings have been revised or entirely redrawn when new material afforded an opportunity for improvement.

Microscopic details of the different species are not given on the same sheet as the colored habit-plates, for the reason that an artistic effect is better secured by grouping the microscopic figures on a separate page than by interpolating them among colored figures. An attempt was made to use an optical scale of colors but there were practical difficulties in the way, since there is no general scale in use to which the combinations of colors used by lithographers in different countries can be referred. Were it practicable to use such a scale the descriptions of the colors in the text would be more accurate than is possible at the present day.

The execution of the drawings, after a consultation with Mr. Donald Ramsay, was intrusted to the Boston Heliotype Printing Company. Mr. Ramsay manifested great interest in the work and, although the company of which he was the head had not previously attempted the reproduction of colored drawings of fungi, he expressed a willingness to undertake the work. The sudden death of Mr. Ramsay during the progress of the work makes it only possible for the writer to express his thanks to his successors for their care and skill in continuing the work so well begun under Mr. Ramsay's direction, and it seems that, judging by the result, one is warranted in congratulating the Heliotype Company on their success in producing lithographs which preserve a high degree of the softness and artistic finish of the originals.

# The Preface

In the selection of the species to be illustrated the writer has, of course, to some extent, been dependent on circumstances, for it is hardly possible to count on securing fresh material of any desired species at any particular time; since the appearance of fungi depends very much on the prevailing moisture. It was not thought best to confine the illustrations to species found only in this country for, of the species which may very properly be said to be characteristic of this country, there are a good many found also in Europe. The aim has been to give a fair representation of the different genera which are commonly found here, selecting such species as are noteworthy on account of their frequency, their structural peculiarities or their known edible or poisonous qualities and, in the case of dangerous species, the related forms which might be mistaken for them. Of course, a list of 100 species cannot be supposed to include all even of our common forms and it is to be desired that, sooner or later, we may have illustrations of all of our species. The great cost, however, is a serious if not an insuperable obstacle. The writer feels that he has undertaken quite enough in venturing to include as many as 100 species, for the chances of his being repaid for his outlay are not sufficiently flattering to warrant his promising or, at present, even contemplating a continuation.

# Introduction to the Text

BY E. A. BURT

DURING the years 1889-1911, Dr. Farlow collected the larger fungi in various parts of New England, New Brunswick and the Adirondack Mountains of New York in accordance with the plan outlined in his preface, which seems to have been written before 1902, and had drawings made under his direction of the freshly collected fungi in the earlier years by Mr. Joseph Bridgham and from 1902 to 1911 by Mr. L. C. C. Krieger. A memorandum of November 1, 1892, lists drawings of 43 of the species brought out in this volume as already completed or nearing completion. Printing of the plates in an edition of 500 copies was begun in September, 1891, and completed in 1908. Drawings of several hundred more species of fungi, collected and studied between 1889 and 1911, are arranged for reference in the Farlow Library and Herbarium.

On the collecting expeditions no attempt was made to prepare a complete and exact description for publication of each species drawn. Instead of this, more or less complete descriptive field notes were made, a spore fall taken, and the specimen dried for future reference or, less frequently, preserved in alcohol. These studies were a work of research in identification both of foreign species which occur in eastern North America and of our indigenous American species, and also in completing the record by paintings of the very best quality from the standpoint of scientific and artistic excellence. The ample resources of his library and herbarium could not be carried about by Dr. Farlow on these exploratory trips, and the determinations of the species were necessarily more or less tentative—in a few instances no determination was made. There was some correspondence with European mycologists and with Peck about certain species. In fact, several perplexing species seem to have been printed and made available for this volume primarily to afford colored plates for such correspondence.

# Introduction to the Text

Each year brought its new set of gatherings to be described while fresh, drawn and cared for, and large demands on Dr. Farlow's time by other botanical work, correspondence throughout the world, and also by his large and growing mycological library. In this continuous accumulation of his later years, he seems never to have been able to take time to review the determinations of the hundred and three plates already printed and to prepare the text which should appeal both to the learned and the unlearned. It is a great loss to mycology that he did not do this, because he had a world of memories about each gathering and could always deeply interest those who were so fortunate as to hear him. Since Dr. Farlow did not prepare his own text for his great work, it has seemed best to intrude into it no more of the work of another than absolutely necessary for the accurate description of the species. For those who would read more of a popular nature about any species, there has been given under the head of Illustrations, all the references possible to figures of Atkinson, Hard, Kauffman, McIlvane and Peck where a great deal of such matter may be found—sufficient probably to meet the need which Dr. Farlow recognized.

With regard to identity of the species, more definite knowledge is available now of both European and American species than there was at the time when Dr. Farlow and the writer were carrying on their researches, independently but in touch with each other, in different parts of New England. Some of the conclusions of those earlier years have been modified by the present writer to whom criticism should be directed for all shortcomings or errors which exist in the descriptive text, but it is his hope that none such may be found, for he would contribute these pages, as would his fellow students of those former days, as a wreath to the memory of our revered and inspired teacher and friend who taught us to aim always for the utmost in accuracy and excellence.

*St. Louis, Missouri. February* 22, 1928.

# Description and Plates

# ICONES FARLOWIANAE

## PLATE I

**Amanita solitaria** [Bull.] Fries, Syst. Myc. 1: 17. 1821.

Illustrations: Bulliard, Champ. Fr. *pl.* 48; Boudier, Icones *pl.* 3; Bresadola, Icones Myc. *pl.* 11; Hard, Mushrooms *pl.* 2.

*Edible*

Fructifications large, with pileus 8–15 cm. in diameter, convex, becoming expanded-plane, white or whitish, with the surface covered when young with pyramidal, appressed warts which are erect, cottony and white at the center and somewhat buff towards the entire, even margin when pileus is fully expanded; gills free, crowded, white or a little cream color; spores white, even, $11-14 \times 6-7\frac{1}{2}\ \mu$; stem bulbous at first, as in the plate, and with the volva in the form of several series of blunt, more or less colored scales, finally becoming more radicated below, equal above the bulb, solid, 1–2 cm. thick, whitish; annulus pendant, white, more flocculent on the under side, soon disappearing; no odor; flesh white.

Solitary. On the ground in gravelly soil of thin woods of maple, etc. Massachusetts and widely distributed in United States. August. Infrequent.

# PLATE 2

## Top

**Omphalia Gerardiana** Peck, N. Y. State Mus. Rept. **26**: 54. 1874; **45**: 37. 1893.

A small, sphagnum-loving species about 5 cm. high, with pileus thin, funnel form, fragile, hygrophanous, sorghum brown to Natal brown, rough with blackish points, the margin striatulate when moist; gills decurrent, close, some of them forked, a little paler than the pileus; spores white, even, 7–10 × 4–5 $\mu$; stem 3–4 cm. long, 1–2 mm. thick, cartilaginous, hollow, equal, a little darker than the pileus, glabrous or somewhat silky striate.

Solitary. On sphagnum moss in peat bogs and among white cedars. Massachusetts to Michigan. May to October. Local.

## Bottom

**Amanita porphyria** Fries, Syst. Myc. **1**: 14. 1821.

Illustrations: Albertini & Schweinitz, Consp. Fung. *pl.* 11. *f.* 1; Barla, Champ. Alp. Marit. *pl.* 3. *f.* 5–6; Bresadola, Icon. Myc. *pl.* 6; Kauffman, Agar. Mich. *pl.* 117; Gillet, Champ. Hym. *pl.* 2 (17); Patouillard, Tab. Anal. *f.* 304.

Fructification small, about 10 cm. high, with pileus 4–6 cm. in diameter, convex, fawn color to wood brown, glabrous, moist or slightly viscid, the margin even; gills white, slightly adnexed, close, thin; spores globose, 7½–8½ $\mu$ in diameter; stem slender, up to 8 cm. long, 5–6 mm. thick, cylindric, bulbous at the base, stuffed, soon hollow, glabrous, whitish to pale brown; annulus superior, membranous, becoming tinged with pale brown, pendant; volva in the form of a thin cup, buried in the ground with the bulbous base.

On swampy ground among alders and willows and other frondose species, as in Purgatory swamp, Dedham, Massachusetts, where the specimens for the plate were collected. July. Rare.

# PLATE 3

**Amanita verna** [Bull.] Fries, Syst. Myc. **1**: 13. 1821.

Illustrations: Bulliard, Champ. Fr. *pl.* 108; Boudier, Icones *pl.* 2; Bresadola, Icon. Myc. *pl.* 4; Barla, Champ. Alp. Mar. *pl.* 1. *f.* 7–9; *pl.* 4. *f.* 1–4; Cooke, Illus. *pl.* 3 (3); Dufour, Atlas *pl.* 1. *f.* 1; Atkinson, Mushrooms *text f.* 59–60; Hard, Mushrooms *text f.* 16; Kauffman, Agar. Mich. *pl.* 116; Peck, N. Y. State Mus. Rept. **48** *pl.* 41.

*Poisonous*

Fructifications medium to large, 7–20 cm. high, with pileus 6–12 cm. broad, ovate at first, then convex and expanded, white, viscid when moist, soon dry and often shining, glabrous, the margin even; flesh white, odor strong and nauseous; gills white, free, close, very numerous; spores white, even, subglobose, 9–12 × 8–9 $\mu$; stem 7–20 cm. long, 6–15 mm. thick, white, cylindric above the bulbous base, glabrous or somewhat floccose scaly, becoming hollow, bearing an ample white pendant annulus, closely sheathed at the base by the remains of the membranaceous volva.

Solitary or gregarious. On the ground in both coniferous and frondose woods, borders of woods, thickets, and rarely on lawns. July to October. Widely distributed and common.

*Amanita verna* is our most dangerous toadstool, both because it contains amanita-toxin which causes death in more than half the cases where this species is eaten and also because its tuberous, volva-covered base is so deeply and firmly imbedded in the ground that the stem is likely to be broken off and the base left behind in the ground when growing among edible fungi of somewhat similar aspect should the latter be gathered hurriedly in considerable quantity for eating. Without its bulbous base and volva, the upper portion of *A. verna* resembles specimens with the gills still white of the common mushroom *Agaricus campestris* and the still more abundant and also edible *Lepiota naucina*. One who gathers mushrooms should learn to recognize *A. verna* at sight and also by its highly distinctive and slightly nauseous odor when brought close to the nose. Dr. Farlow noted this odor as like that of earth in which turnips or carrots have been growing.

The writer would not advise to attempt to distinguish from *A. verna* any possible white form of *Amanita phalloides* unless the specimen was growing in unmistakable association with colored specimens of *A. phalloides*.

# PLATE 4

**Amanitopsis volvata** Peck, N. Y. State Mus. Rept. 24: 59. 1872.

Illustrations: Murrill, Mycologia 5: *pl.* 86, 87. *f.* 2.

*Poisonous*

Fructification small, 5–10 cm. high, with pileus 5–6 cm. in diameter, convex, then expanded, whitish, tilleul buff and vinaceous buff towards the center, with small floccose appressed scales, the margin striate; gills free, white, numerous; spores white, even, 9–11 × 4½–6 μ; stem 5–10 cm. long, 5–10 mm. thick, whitish, equal or slightly tapering upward, stuffed, sometimes becoming hollow in New England gatherings, minutely floccose-scaly; no annulus; volva 2–3 cm. in diameter, large, firm, loose, brownish, sheathing the base of the stem.

Solitary. On the ground in mixed woods. Cambridge, Magnolia, Pride's Crossing and Sharon, Massachusetts, and westward. July to October. Rather rare.

The genus *Amanitopsis* is distinguished from *Amanita* by the absence of an annulus although rudiments of the annulus may be seen in very young specimens. *Amanitopsis vaginata* is the common species of the genus and is readily distinguished from *A. volvata* by glabrous pileus and globose spores 8–10 μ in diameter.

# PLATE 5

**Lepiota procera** [Scop.] Fries, Syst. Myc. **1**: 20. 1821.

Illustrations: Fries, Sverig. Svamp. *pl.* 3; Atkinson, Mushrooms *pl.* 25; Farlow, Yearb. U. S. Agr. **1897**: 463. *pl.* 26; Hard, Mushrooms *pl.* 6; Kauffman, Agar. Mich. *pl.* 132; Peck, N. Y. State Mus. Rept. **48**: *pl.* 18.

*Edible*

Fructification very large, up to 15–25 cm. high, with pileus 7–15 cm. broad, ovate at first, becoming campanulate-convex and expanded, umbonate, fleshy, soft, with the cuticle avellaneous to cinnamon, torn into separable brownish scales or patches by the expansion of the pileus and exposing the floccose, white flesh under and between the scales, the margin fimbriate, fibrillose; gills free, remote from the stem, broad, crowded, white or whitish; spores white, $15–16 \times 10\ \mu$; stem very long and slender, bulbous below, 6–12 mm. in diameter above, cylindric or tapering upward, colored like the pileus, with the surface broken up or variegated with small brownish scales, hollow or stuffed with some delicate, long fibrils; annulus rather thick, movable, rather persistent.

Solitary or gregarious. On the ground in meadows, pastures and open, grassy woods. August to October. Widely distributed.

This mushroom, often called "The parasol mushroom," is highly regarded as an edible species but has not been found in such abundance by the writer as to afford more than herbarium specimens.

# PLATE 6

**Lepiota brunnea** Farlow & Burt, n. sp.

Type: in Farlow Herb. and Burt Herb.

Fructifications large, 5–15 cm. high, with pileus 8–18 cm. broad, hemispherical to convex, becoming plane or slightly depressed at the center, with the persistent cuticle wood brown to fawn color, intact on the disk but elsewhere torn with the underlying flesh into large scales somewhat concentrically arranged and with their tips slightly rolled upward, the flesh between the scales floccose-fibrillose and lighter colored; flesh soft, whitish, changing to reddish or slightly brownish upon exposure to the air—especially in the stem—of agreeable taste, no especial odor; gills free, not remote from the stem, crowded, up to 12 mm. broad, whitish to brownish, becoming browner in drying; spores white, even, $10–12 \times 6\frac{1}{2}–7\frac{1}{2}$ $\mu$, often slightly truncate at one end; stem 5–15 cm. long, 1–2 cm. thick, hollow, bulbous at the base, with the bulb up to 4 cm. in diameter, above the bulb cylindric or somewhat tapering upward, striate and cinnamon brown below the annulus, paler and silky above it; annulus prominent, thick, at first fixed, finally free and movable.

Solitary or in cluster of 2 or 3 fructifications. In greenhouses and fertile soil. Allston, Cambridge, Jamaica Plain, Peabody, and Lynn, Massachusetts. October and November.

This species has been heretofore locally referred to *Lepiota rhacodes* and *L. excoriata*, from both of which it differs in the much browner color of pileus and stem, striate stem, less remote gills, and smaller spores truncate at one end. *L. rhacodes* is excellently illustrated by Boudier, Icones *pl.* 10 and exactly described by him and by Rea. The writer believes that the European concept of *L. rhacodes* should not be modified to fit these American specimens.

# PLATE 7

**Lepiota americana** Peck, N. Y. State Mus. Rept. **23**: 71. 1873; 49. *pl.* 44. *f.* 6–10.

Illustrations: Atkinson, Mushrooms *text f.* 82; Hard, Mushrooms *text f.* 34; Murrill, Mycologia **3**: *pl.* 49. *f.* 6; McIlvane, Mushrooms *pl.* 15.

*Edible*

Fructifications 8–12 cm. high, with pileus 4–12 cm. broad, ovate, becoming campanulate to convex, umbonate or subumbonate, cuticle at first reddish brown (russet vinaceous) and continuous, splitting up into rather large, scattered scales of the same color, elsewhere whitish when young, drying fawn color to russet vinaceous, the margin obscurely striate; gills free, close, white; spores white, even, 8–11 × 6–8 $\mu$; stem 7–12 cm. long, 5–10 mm. thick at apex, usually enlarged below into a ventricose or clavate base, stuffed at first, then hollow, white at upper end, below becoming colored like the pileus by handling or in drying; annulus fixed, sometimes evanescent; odor and taste mild; all parts become dull vinaceous red in drying.

On the ground, on sawdust, and near stumps. New England to Missouri. Widely distributed but not abundant. July to October.

*Lepiota Badhamii* of Europe reddens also in drying but is of somewhat different aspect, not striate on margin of the pileus and has spores only 6–7 × 3–4 $\mu$.

## PLATE 8

**Lepiota acutesquamosa** [Weinm.] Fries, Epicr. 14. 1836–1838.
Illustrations: Cooke, Illus. *pl.* 14 (24); Hard, Mushrooms *text f.* 38.
*Edible*

Fructification of medium size, 6–10 cm. high, with pileus 5–12 cm. broad, hemispherical, then convex-expanded, obtuse or broadly umbonate, soft, fleshy, cinnamon to tawny, covered with small, pointed, erect, deciduous, wart-like squamules which leave areolate scars; gills white, free, rarely branched, very crowded; spores white, even, 6–7 × 2½–3 μ; stem 6–10 cm. long, 6–15 mm. thick, cylindric or tapering upward somewhat from the bulbous base, hollow or with some cottony strands, covered below the annulus with brownish fibrils and floccose scales; annulus floccose-membranaceous, fixed, soon pendant, sprinkled with brownish scales on the under side; flesh white, odor rather strong and disagreeable.

Gregarious. On the ground in grass, near buried wood, and in forests. Allston and near Boston, Massachusetts. September to November. Of wide range but infrequent.

*L. Friesii* differs only in more numerously branched gills but there are so numerous intergradations in this respect that one might well follow Bresadola, Icones Myc. *pl.* 27, and include *L. acutesquamosa* under *L. Friesii* which has priority.

# PLATE 9

**Lepiota felina** Persoon, Syn. Fung. 261. 1801.

Illustrations: Quelet, Champ. Jura, Suppl. 11: *pl.* 11. *f.* 1; Cooke, Illus. *pl.* 943A (1108); Patouillard, Tab. Anal. *f.* 505.

Fructification small, 3–6 cm. high, with pileus 2–5 cm. broad, conical to convex, somewhat umbonate, thin, whitish under the numerous blackish to dark brown floccose scales; gills free, close, white; spores white, even, $7\frac{1}{2}$–$8 \times 3\frac{1}{2}$–$4\ \mu$; stem 3–6 cm. long, 2–5 mm. thick, usually rather slender, cylindric or slightly tapering upward from the somewhat bulbous base, hollow, brown, floccose scaly up to the evanescent floccose annulus.

On the ground and in moss in coniferous woods. New Hampshire, Vermont and westward. August and September. Widely distributed but infrequent.

The stem of the specimen used for the central figure of this plate was unusually thick for *L. felina*, and suggests the closely related *L. fuscosquamea* Pk. Dr. Robert Fries approved the reference to *L. felina* for Dr. Farlow.

## PLATE 10

**Lepiota granulosa** [Batsch] Fries, Syst. Myc. **1**: 24. 1821.

Illustrations: Batsch, Elench. Fung. *pl.* 6. *f.* 24; Cooke, Illus. *pl.* 18. (39). *upper f.*

*Edible*

Fructifications 2–5 cm. high, with pileus 3–5 cm. broad, thin, convex, becoming expanded, sometimes somewhat umbonate, rough with numerous granular or branny scales, often radiately wrinkled, rusty yellow or tinged with brick red; gills emarginate or rounded behind and slightly adnexed, white; spores minute, even, $4–5 \times 2\frac{1}{2}–3\ \mu$; stem short, 2–5 cm. long, 2–5 mm. thick, stuffed or hollow, cylindric or slightly tapering upward, whitish above the annulus, below it colored like the pileus and covered also with rusty brown granules; flesh white or reddish tinged, of pleasant taste.

Abundant on decaying pine leaves in pine woods in Vermont and westward. August to October.

*L. amianthina*, as understood by the writer, occurs in the same localities as *L. granulosa* and differs from it only by having the gills adnate; the spores are small also—$4–5 \times 2\frac{1}{2}–3\ \mu$—in these specimens having adnate gills. At present there is disagreement between European mycologists concerning the dimensions of spores *L. granulosa* and *L. amianthina;* Boudier gives the spores of *L. amianthina* as $8–9 \times 4–4\frac{1}{2}\ \mu$ and Rea and Bresadola as $4–5 \times 3\ \mu$.

## PLATE 11

**Lepiota naucina** Fries, Epicr. 16. 1836–1838.

*Lepiota naucinoides* Peck, N. Y. State Mus. Rept. **29**: 66. 1878; **48**: 162. *pl.* 19. 1896.

Illustrations: Atkinson, Mushrooms *pl.* 24; Bresadola, Icones Myc. *pl.* 25; Hard, Mushrooms *text f.* 33; Kauffman, Agar. Mich. *pl.* 135, 136; Krombholz, Abbild. *pl.* 24. *f.* 20–23; Ricken, Blätterpilze *pl.* 84. *f.* 2.

*Edible*

Fructification 5–10 cm. high, with pileus 3–9 cm. broad, subglobose at first, then convex to somewhat expanded, fleshy, soft, glabrous, only rarely broken into scales and granules on the surface, white or smoky white, the flesh white; gills free, close, rather broad, white at first, slowly changing to pinkish and then smoky brown with age; spores white, even, 8–11 × 5–7 $\mu$; stem 5–10 cm. long, 6–10 mm. thick, cylindric or slightly thickened at the base, stuffed, then hollow, white or smoky white; annulus membranaceous, thick, persistent, white.

Gregarious. On the ground in lawns, pastures, meadows, and cultivated fields. From New England westward. September and October. Common.

*L. naucina* is of excellent flavor; it occurs in such great abundance throughout the region which has been under the writer's observation—from Massachusetts to Kansas—that he ranks it among our first half dozen mushrooms. In Vermont it is sometimes present in corn fields so that it might be gathered by bushels after the corn has been cut. One gathering this mushroom for food ought to know positively *Amanita verna*, *A. virosa* and *A. phalloides* so as not to gather any specimens of these by mistake. The presence of the volva at the base of the stem of an Amanita is the most obvious character to look for in avoiding these Amanitas. If one does not care to take away with him the base of each *L. naucina* gathered, he should nevertheless be sure that no volva is present on the part of the stem not taken.

## PLATE 12

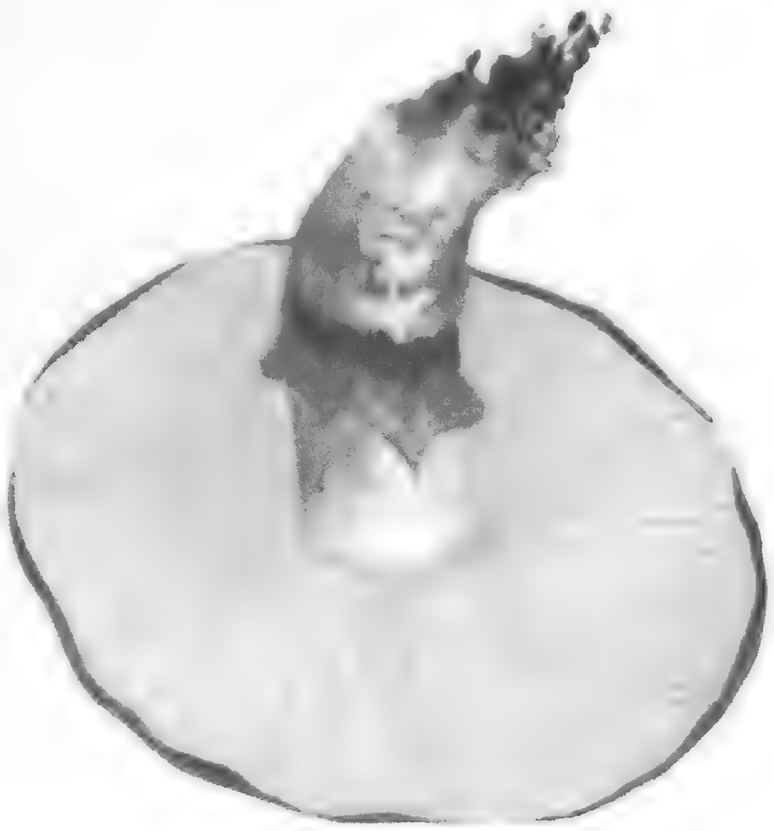
**Armillaria robusta** [Alb. & Schw.] Fries, Syst. Myc. 1: 26. 1821.

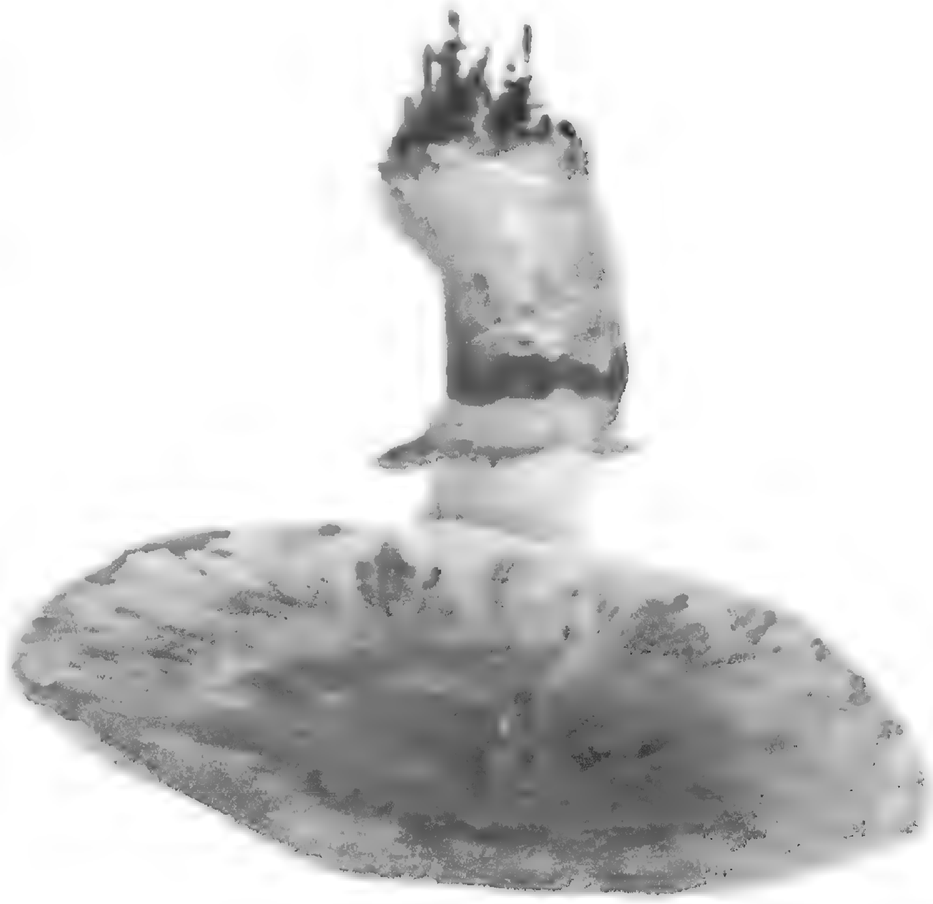
Illustrations: Barla, Champ. Alp. Marit. *pl.* 17. *f.* 5–7; Boudier, Icones *pl.* 22; Bresadola, Icones Myc. *pl.* 44.

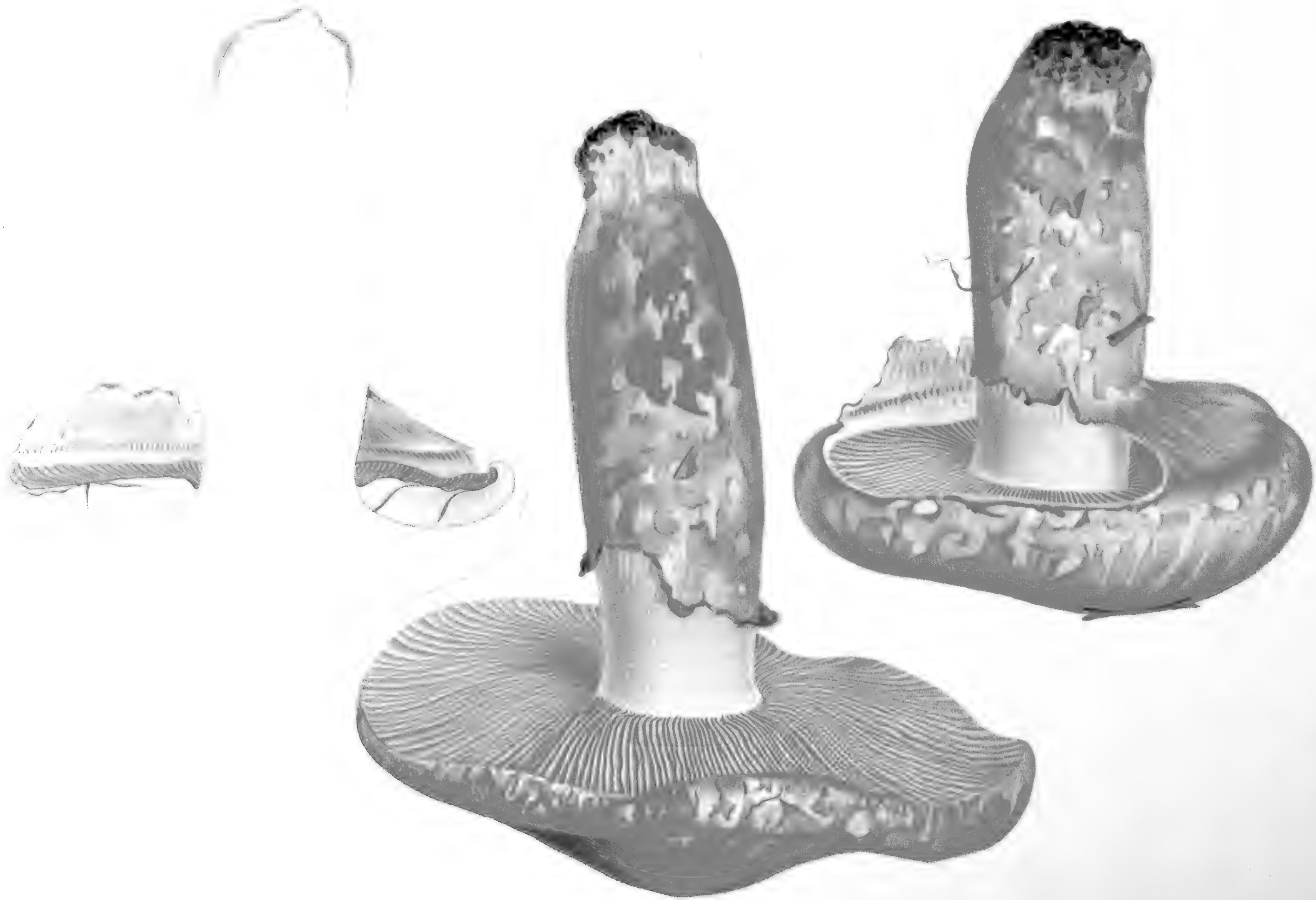
*Edible*

Fructifications 5–8 cm. high, with pileus 5–10 cm. broad, firm, convex, becoming expanded and somewhat depressed, cinnamon rufous to mahogany red, darker at the center, fibrillose, squamulose at the center, the margin at first incurved and having remnants of the veil attached; flesh white, firm, rather bitter, with no odor; gills white, sinuate-adnate, finally with a slight decurrent tooth, crowded, broad; spores white, even, 7–8½ × 4–5½ $\mu$; stem 4–6 cm. long, 1½–2½ cm. thick, cylindric or tapering downward, solid, white and with small floccose scales above the annulus, below the annulus colored like the pileus and with appressed brownish scales; annulus membranaceous, persistent, erect and flaring.

Usually solitary. On the ground in mixed woods. Milton, Massachusetts, and also at Shelburne, New Hampshire. October. Rare.







# PLATE 13

**Armillaria ponderosa** Peck, Buffalo Soc. Nat. Sc. Bul. **1**: 42. 1873; N. Y. State Mus. Rept. **26**: 50. 1874; **43**: 41. 1890.

Fructification very large, 10–15 cm. high, with pileus 10–15 cm. broad, thick, compact, convex, sometimes broadly umbonate, white or pinkish buff, glabrous, shining when dry, the naked margin inrolled under the slightly viscid, persistent veil; flesh white, with no disagreeable taste, no odor; gills somewhat emarginate, crowded, 8 mm. broad, white inclining to cream color; spores white, even, 6–7 × 4–5 $\mu$; stem 10–15 cm. long, 2½–4 cm. thick, cylindric, firm, solid, coated by the veil, colored like the pileus, white and furfuraceous above the membranaceous annulus.

Solitary or scattered. On the ground under spruce trees. St. Stephens, New Brunswick, Grand View Mt., Vermont, and in New York. September and October. Rare.

Peck published the spores as globose, 4 $\mu$ in diameter, but they are more elongated, as given above, in the Vermont specimens, determination of which was confirmed by Peck, and also in the New Brunswick gathering illustrated by the plate.

# PLATE 14

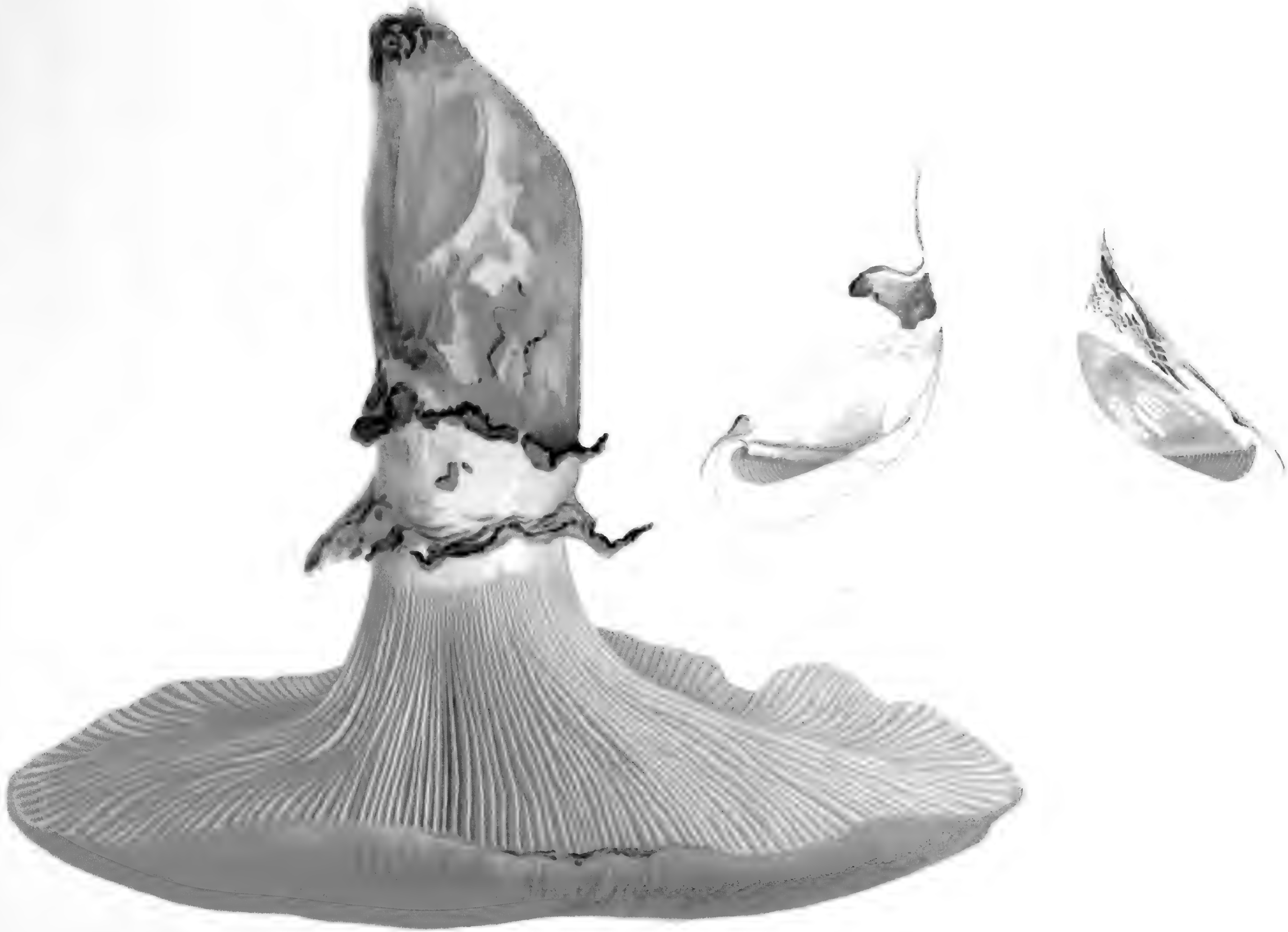
**Armillaria imperialis** Fries in Lund, Consp. Hym. Holm. 5. 1845; Hym. Eur. 43. 1874.

*Armillaria nobilis* Murrill, N. Am. Flora **10**: 38. 1914.

Illustrations: Fries, Icones Hym. *pl.* 17; Barla, Champ. Alp. Marit. *pl.* 20. *f.* 1–3; Bresadola, Icon. Myc. *pl.* 51; Gillet, Champ. Fr. Hym. *pl.* 55 (35).

Fructifications very large, 10–15 cm. high, with pileus 10–20 cm. broad, convex, becoming expanded, obtuse, glabrous, slightly viscid at first, smoke gray, streaked with innate fibrils towards the margin, the cuticle sometimes cracked on the disk, the margin turned down, inrolled at first; flesh thick, white, odorless, taste a little strong; gills long decurrent, white, becoming a little yellowish white; spores white, even, $11-14 \times 4\ \mu$; stem 5–10 cm. long, 12–20 mm. thick, solid, cylindric, contracted at the base, rather yellower than the pileus, streaked and floccose or even a little scaly; annulus double, the outer membranaceous, concolorous with the pileus, the inner filamentous-membranaceous, nearly white and rather evanescent.

Solitary. On the ground. St. Stephen, New Brunswick, and Castine and Georgetown, Maine. August and September. Rare.



# PLATE 15

**Tricholoma rutilans** [Schaeff.] Fries, Syst. Myc. 1: 41. 1821.

Illustrations: Schaeffer, Fung. Bavar. *pl.* 219 (120); Bresadola, Icon. Myc. *pl.* 69; Cooke, Illus. *pl.* 89 (74); Richon & Roze, Atlas Champ. *pl.* 27. *f.* 9–12; Ricken, Blätterpilze *pl.* 91. *f.* 1.

Fructifications 4–10 cm. high, with pileus 4–10 cm. broad, fleshy, campanulate, then flattened, dry, at first covered with a Morocco red to burnt sienna tomentum, then somewhat squamulose on the yellow surface beneath, the margin thin, at first involute; flesh yellow; gills crowded, rounded adnate or sinuate, yellow, with the edge flocculose; spores white, even, $6–7 \times 4–5\ \mu$; stem 4–10 cm. long, 6–14 mm. thick, curved, equal, stuffed, becoming hollow, pale yellow, variegated with reddish squamules.

Solitary or caespitose. On decaying, coniferous wood. Newton, Massachusetts and throughout New England and westward. July to October. Widely distributed but infrequent.

*T. rutilans* is listed as inedible by Richon & Roze, but edible by Bresadola.

# PLATE 16

**Tricholoma oliveum** Farlow & Burt, n. sp.

Type: in Farlow Herb.

Fructifications 6–9 cm. high, with pileus 8–14 cm. broad, convex, with margin turned inward but not inrolled, not viscid, with the disk Saccardo's olive and slightly floccose spotted, olive buff towards the margin and innately floccose under a lens, the margin even; flesh white, with strong, pungent and disagreeable taste and strong, slightly radish-like odor; gills broad, subdistant, emarginate, with a slight decurrent tooth, pale sea foam yellow, the edge entire; spores white, even, $6\frac{1}{2}-7 \times 4\ \mu$, tapering to the base; stem 4–8 cm. long, 1½–2 cm. thick at the upper end, bulbous below and 2½–3½ cm. in diameter, concolorous with margin of pileus, more or less silky streaked, solid, white within.

Solitary. On the ground under fir trees by wood roads. Campobello, New Brunswick. July. Only the type collection known.

*T. oliveum* is a species related to *T. saponaceum* and *T. pallidum* but with much larger fructifications than either of these, with bulbous stem, and with flesh not noted as becoming reddish; it grew under fir trees.

# PLATE 17

**Tricholoma decorosum** Peck, N. Y. State Mus. Rept. 25: 73. *pl.* 1. *f.* 1–4. 1873; 44: 157. 1891.

Fructifications 5–10 cm. high, with pileus 2½–5 cm. broad, firm, at first hemispherical, then convex or nearly plane, coated with numerous brownish subsquarrose tomentose scales, dull ochraceous or tawny; gills close, rounded and slightly emarginate behind, the edge subcrenulate; spores broadly ellipsoidal, even, white, $5–7 \times 3\frac{1}{2}–4\ \mu$; no cystidia; stem 5–10 cm. long, 3–8 mm. thick, equal or slightly tapering upward, solid, white and smooth at the top, elsewhere tomentose-squamulose and colored like the pileus.

Often caespitose. On fallen trunks in woods. Shelburne, New Hampshire, and Catskill Mts. and Allegany Co., New York. September and October. Rare.

Determination of the specimens was confirmed for Dr. Farlow by Peck.

# PLATE 18

**Tricholoma brevipes** [Bull.] Fries, Syst. Myc. 1: 53. 1821.

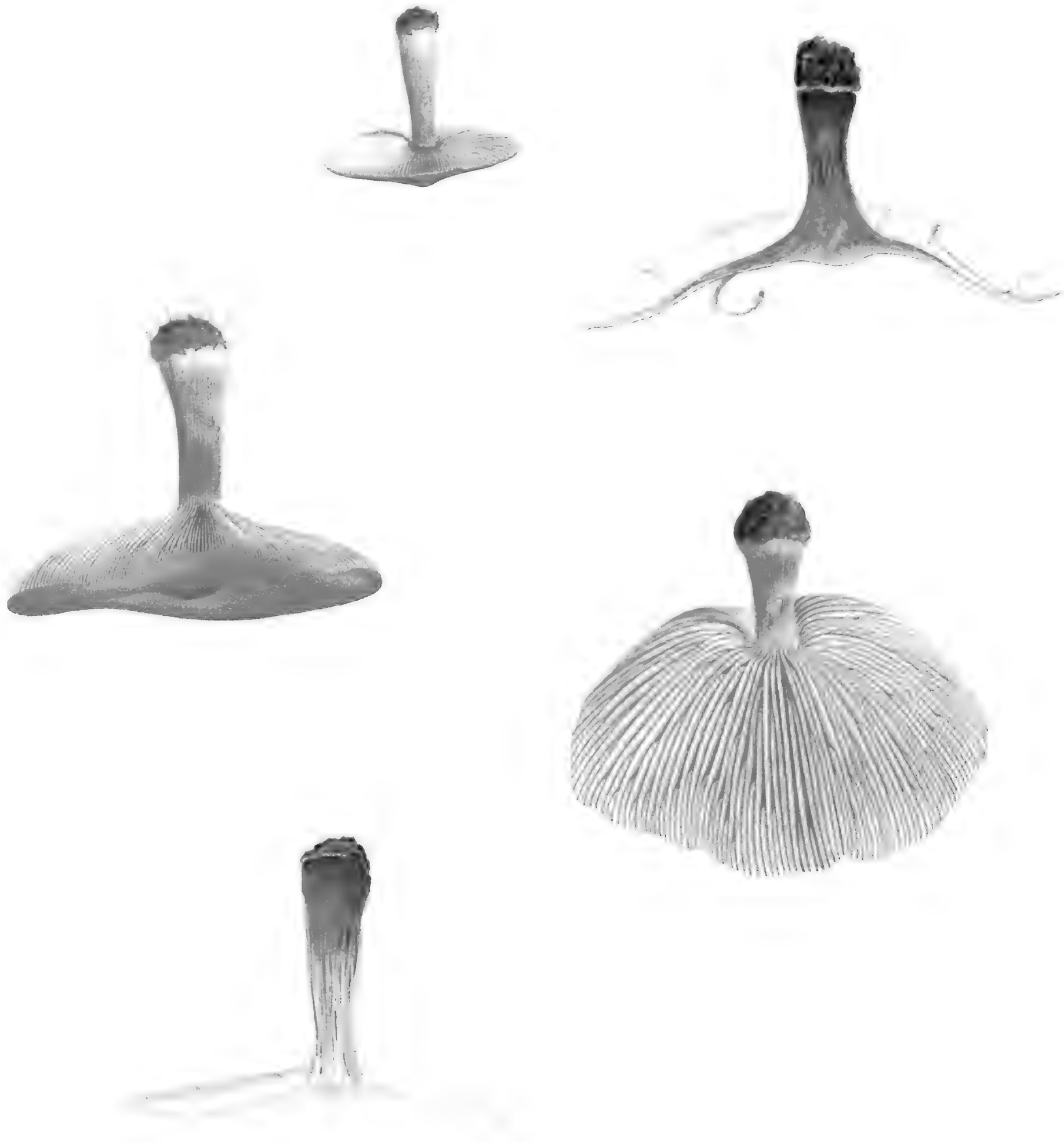
Illustrations: Bulliard, Champ. Fr. *pl.* 521. *f.* 2; Cooke, Illus. *pl.* 68 (120); Ricken, Blätterpilze *pl.* 96. *f.* 4.

*Edible*

Fructifications 2½–4 cm. high, with pileus 3–10 cm. broad, fleshy, convex, then plane, moist, shining, drab or gray brown, the flesh dirty white or yellow-white, thin; gills emarginate, crowded, slightly ventricose, dirty white, becoming yellow-brown towards the edge; spores white, punctate, 7–8 × 5–5½ μ; stem 2½–3 cm. long, 4–7 mm. thick at the upper end, gradually enlarging downward to a diameter of 12 mm. at the base, colored like the pileus, fibrillose, solid, within reddish brown or snuff brown towards the base and paler above.

Gregarious, rarely with two fructifications coherent. On rubbish heaps, Cambridge, Massachusetts. In fields and gardens, Albany, New York. October and November. Rare.

*T. brevipes* is characterized by its very short and thick, solid stem, colored nearly fuscous within, and by colored flesh and punctate spores.



# PLATE 19

## Top

**Clitocybe morbifera** Peck, Torrey Bot. Club Bull. **25**: 321. 1893; Kauffman, Agar. Mich. 745. *pl.* 159. 1918.

*Poisonous*

Fructifications 2–5 cm. high, with pileus 2–5 cm. broad, thin, convex, becoming plane or centrally depressed, glabrous, slightly hygrophanous, drab gray when moist, whitish or cinereous when dry, sometimes slightly umbonate; flesh white, with a persistent, disagreeable taste; gills adnate or slightly decurrent, narrow, close, whitish or pallid; spores white, even, broadly ellipsoidal, 4 $\mu$ long, almost as broad; stem about 2½ cm. long, 4–6 mm. thick, equal, hollow, colored like the pileus or a little paler.

Gregarious or caespitose. On the ground in lawns. Ottawa, Canada; the type collection was made at Washington, D. C. October and November.

*C. morbifera* closely resembles in aspect the edible *C. dealbata* but is drab gray when moist while the latter is white. The occurrence on lawns renders it more likely to be gathered for eating. Dr. Kauffman records that several families in various parts of the country have been made ill through eating this species. Nausea was caused in these cases, not death.

## Bottom

**Tricholoma sordidum** Fries, Syst. Myc. **1**: 51. 1821; Hym. Eur. 77. 1874.

*Clitopilus tardus* Peck, N. Y. State Mus. Rept. **54**: 167. 1901; Torrey Bot. Club Bull. **24**: 140. 1897 (as *Clitocybe*).

Illustrations: Fries, Icones *pl.* 45. *f.* 1; Cooke, Illus. *pl.* 100 (125); Hard, Mushrooms *text f.* 44; Peck, N. Y. State Mus. Bull. **131**. *pl.* 115; Quelet, Champ. Jura **1**. *pl.* 3. *f.* 1; Ricken, Blätterpilze *pl.* 95. *f.* 5.

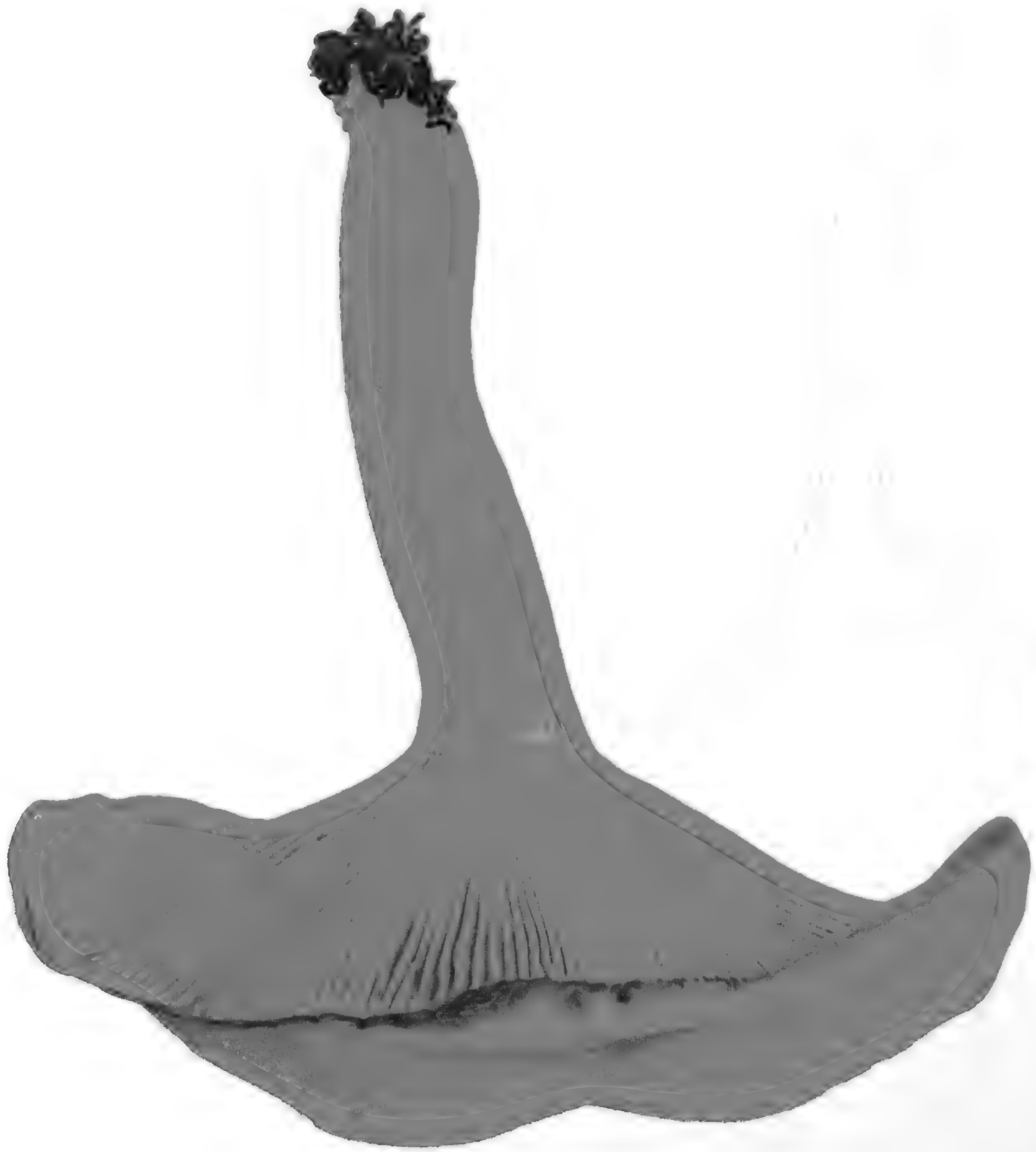
*Edible*

Fructifications 2½–5 cm. high, with pileus 2–5 cm. broad, convex, becoming expanded and depressed, slightly umbonate, glabrous, hygrophanous, when moist drab to ecru-drab with a slight violaceous tinge, becoming paler and avellaneous on parting with moisture; flesh of pileus and stem pallid vinaceous drab, no especial taste; gills adnate to sinuate-decurrent, rather close, pallid vina-

ceous drab; spores pale ochraceous or pale salmon, slightly uneven, 5–7 × 3–4 $\mu$; stem 2½–4 cm. long, 2–5 mm. thick, equal, solid, rarely with a narrow cavity, fibrillose, colored like the pileus.

Solitary or caespitose. On the ground in greenhouses and on lawns and near buildings. Massachusetts, Vermont and westward. September to February. Infrequent.

These figures are confidently referred to *C. tardus* because of agreement with specimens from the type locality received from the collector of the type of the species.



# PLATE 20

**Clitocybe illudens** Schweinitz, Syn. Car. 81. 1822.

Illustrations: Atkinson, Mushrooms *pl.* 29. *f.* 91; Hard, Mushrooms *pl.* 10; Peck, N. Y. State Mus. Mem. 3. *pl.* 68; McIlvane, Am. Fungi *pl.* 29; White, Hym. Conn., Conn. Nat. Hist. Surv. Bull. 3. *pl.* 18.

*Poisonous*

Fructifications large, 7–20 cm. high, with pileus 5–15 cm. broad, convex to expanded, plane or depressed, often umbonate, glabrous, bright orange, the margin elevated with age, often decurved; flesh white or yellowish, with disagreeable odor and taste; gills close, decurrent, bright orange; spores white, globose, 4–5 $\mu$ in diameter; stem 6–20 cm. long, 1–1½ cm. thick, firm, solid, glabrous, equal, flexuous, often curved or twisted.

Caespitose, sometimes in large clusters with as many as 50 fructifications to the clump. On and around stumps or buried wood. August to October. Widely distributed throughout eastern United States.

*C. illudens* is so conspicuous and attractive a fungus that it has been eaten by many people. It causes severe nausea and vomiting until finally thrown up.

# PLATE 21

**Clitocybe multiceps** Peck, N. Y. State Mus. Rept. **43**: 65. 1890.

Illustrations: Peck, N. Y. State Mus. Bull. **139**. *pl.* 117. *f.* 7–9; Atkinson, Mushrooms *pl.* 30; Hard, Mushrooms *text f.* 68; Kauffman, Agar. Mich. *pl.* 157.

*Edible*

Clusters up to 10 cm. high, with pilei 3–10 cm. broad, fleshy, firm, convex, glabrous, moist, whitish to pinkish buff, sometimes somewhat irregular by crowding together, the flesh white, mild to taste usually but sometimes somewhat disagreeable; gills close, adnate or slightly decurrent or with a few somewhat sinuate, whitish; spores white, even, globose, 6–7 $\mu$ in diameter; stems 4–10 cm. long, 6–15 mm. thick, equal or slightly thickened at base, solid, glabrous or slightly pruinose at apex, white or whitish.

Constantly caespitose in clumps of 2 or 3 to many individuals. On the ground in shaded lawns, pastures, by roadsides and in groves of frondose trees. Of wide range from Massachusetts westward. June to October. Frequent.

*C. multiceps* is edible but is not regarded by most people as of the best quality.

# PLATE 22

**Pleurotus petaloides** [Bull.] Fries, Syst. Myc. 1: 183. 1821.

Not *Pleurotus petaloides* as understood by Peck and by Kauffman.

Illustrations: Bulliard, Champ. Fr. *pl.* 226; Cooke, Illus. *pl.* 258 (284). *f. A;* Nees, Syst. *pl.* 22. *f.* 178; Persoon, Obs. Myc. 1: *pl.* 4. *f.* 1.

*Edible*

Cluster of fructifications 2½–10 cm. high, with pilei 2½–10 cm. broad, dimidiate, somewhat spathulate, tapering below into the stem, glabrous, light mouse gray to tawny olive, the margin involute; flesh of the pileus with a gelatinous layer under the cuticle; gills decurrent, crowded, narrow, white or yellowish; cystidia abundant in the hymenium, 45–87 × 12–15 $\mu$, very sharp pointed at both ends; spores white, even, 5–7 × 3½–4 $\mu$; stem 1–3 cm. long, ½–1 cm. thick, compressed, channelled, solid, downy, colored like the pileus or a little darker.

Caespitose. On ground and tan bark at Peabody, Massachusetts, and on the ground on golf links, Forest Park, St. Louis, Missouri. October. Rare.

The St. Louis specimens have dimensions only about half as large as those of the Massachusetts gathering which was used for the illustration and agree in this respect better with European specimens. The ellipsoidal spores are a distinguishing character of the species. It is probable that *P. petaloides* as understood by Peck should be compared with *Panus angustatus* Berk.

## PLATES 23, 48 (*Middle Figs.*)

**Pleurotus serotinus** [Schrad.] Fries, Syst. Myc. **1**: 187. 1821.

Illustrations: Cooke, Illus. *pl.* 258 (284). *f. B;* Hard, Mushrooms *text f.* 124; Patouillard, Tab. Anal. *f.* 629; Ricken, Blätterpilze *pl.* 112. *f.* 3.

*Edible*

Pilei sometimes solitary or usually caespitose and imbricated, dimidiate-reniform or somewhat orbicular, 3–10 cm. broad, up to 1 cm. thick, convex, fleshy, firm, viscid when young and moist, citrine drab to dark olive buff, somewhat tomentose towards the base; flesh white, thick, firm; gills close, thin, whitish yellow to somewhat ochraceous; spores white, allantoid, $5–6 \times 1$ $\mu$; cystidia fusiform, $25–30 \times 11$ $\mu$, more abundant on edges of the gills; stem very short, lateral, hardly visible when seen from above but defined on the under side by termination of the gills and tomentose with tawny tomentum, solid.

On decaying logs and fallen trunks of beech, maple and other frondose species. In mountain woods of New England, New York, and westward. September to November. Very common.

# PLATE 24

## Top

**Omphalia umbellifera** [L.] Fries, Elenchus Fung. **1**: 22. 1828.

Illustrations: Boudier, Icones *pl.* 69; Cooke, Illus. *pl.* 271 (260); Holmskiold, Beata Ruris Otia Fung. Dan. *pl.* 34; Patouillard, Tab. Anal. Fung. *f.* 222; Ricken, Blätterpilze *pl.* 105. *f.* 16.

Fructification 2–3½ cm. high, with pileus 1–2½ cm. broad, becoming broadly concave, hygrophanous, pale ochraceous buff to vinaceous buff, paler on parting with moisture, with innate flocci, the margin lobed and crisped; flesh yellowish; gills adnate, few, distant, dichotomous, connected by veins, wax yellow; spores white, even, 8–12 × 4–5 $\mu$; stem 1–2 cm. long, 2 mm. thick, cylindric, hollow, colored like the pileus, with the base villose or flocculent.

In a small cluster on mossy logs. King's Ravine, New Hampshire. September. Rare.

## Middle

**Cantharellus minor** Peck, N. Y. State Cab. Rept. **23**: 122. 1873; N. Y. State Mus. Bull. **1**:[2] 40. 1887; **131**: 41. *pl.* 116. *f.* 12–17. 1909.

*Edible*

Fructifications 2½–4 cm. high, with pileus 1½–2½ cm. broad, fleshy, thin, convex, then expanded, often umbilicate or centrally depressed, glabrous, orange buff, the flesh pale yellow; gills decurrent, narrow, distant, branched, orange buff; spores white, even, 8–9 × 4–4½ $\mu$; stem 1–3 cm. long, 2–4 mm. thick, somewhat flexuous, nearly equal or somewhat tapering downward, smooth, stuffed or hollow, concolorous with the pileus, with a whitish mycelium at the base.

Gregarious or somewhat caespitose. On the ground in thin woods and open places. Widely distributed in eastern United States from Massachusetts to South Carolina. June and July. Infrequent.

*C. minor* is of the same color as the chanterelle, *C. cibarius*, and is probably often collected for the latter but is much smaller, with longer and slenderer, stuffed or hollow stem, with thinner pileus, and with slightly smaller spores.

## Bottom

**Omphalia campanella** [Batsch] Fries, Syst. Myc. **1**: 166. 1821.

Illustrations: Atkinson, Mushrooms *pl.* 33; Cooke, Illus. *pl.* 273 (263). *f. A;* Hard,

Mushrooms *pl.* 17; Kauffman, Agar. Mich. *pl.* 172; Nees, Syst. *pl.* 23. *f.* 191; Schaeffer, Fung. Bav. *pl.* 230 (131); White, Hym. Conn., Conn. Nat. Hist. Surv. Bull. 3. *pl.* 16.

Fructifications small, 1½–3 cm. high, with pileus 1–2 cm. broad, thin, convex, umbilicate, glabrous, hygrophanous, striatulate, ochraceous orange to ochraceous buff, the flesh very thin, yellow; gills deeply decurrent, crowded, prominently connected by veins, yellow; spores white, even, 6–7 × 2½–3 $\mu$; stem 1–3 cm. long, 1 mm. thick, equal, curved, firm, horny, minutely hollow, date-brown below, colored like the pileus above, somewhat hairy at the base.

Gregarious and in gregarious clusters. On humus of coniferous logs and stumps in woods. June to November. Very common where coniferous substratum is available, rare where it can occur only on frondose humus, as about St. Louis.

**Omphalia Gerardiana** Peck. See Plate 2.

# PLATE 25

**Cantharellus cibarius** Fries, Syst. Myc. **1**: 318. 1821.

Illustrations: Fries, Sverig. Svamp. *pl.* 7; Atkinson, Mushrooms *text f.* 126; Cooke, Illus. *pl.* 1103 (1055); Dufour, Atlas *pl.* 20. *f.* 46; Farlow, Yearb. U. S. Agr. 1897. *pl.* 27. *f.* 1; Hard, Mushrooms *pl.* 22; Kauffman, Agar. Mich. *pl.* 3; Peck, N. Y. State Mus. Rept. **48**. *pl.* 32; Ricken, Blätterpilze *pl.* 1. *f.* 2; White, Hym. Conn., Conn. Nat. Hist. Surv. Bull. **3**. *pl.* 14.

*Edible*

Fructifications 3–10 cm. high, with pileus 3–10 cm. broad, convex, then expanded, soon depressed and concave by elevation of the margin which is often lobed, orange buff or egg yellow, glabrous; flesh compact, white within, with fragrant odor and agreeable taste; gills rather distant, decurrent, thick, more or less branched or anastomosing, egg yellow; spores white, even, $8–12 \times 4–5\,\mu$; stem 2–5 cm. long, 5–12 mm. thick, solid, equal or slightly tapering downward, glabrous.

Gregarious. On the ground in woods and open places. June to October. Common.

This is the highly regarded Chanterelle of mushroom lovers.

# PLATE 26

**Cantharellus floccosus** Schweinitz, Am. Phil. Soc. Trans. N. S. 4: 153. 1832.

Illustrations: Hard, Mushrooms *pl.* 23; Peck, N. Y. State Mus. Mem. 3.[4] *pl.* 55. *f.* 9–13; White, Hym. Conn., Conn. Nat. Hist. Surv. Bull. 15. *pl.* 19.

*Edible*

Fructifications large, 5–15 cm. high, with pileus 5–12 cm. broad, at first slender trumpet shaped, then deeply funnel form, fleshy, firm, floccose scaly, ochraceous buff, the flesh rather thick, white, with mild taste and pleasant odor; gills narrow, close, long decurrent, dichotomous, abundantly anastomosing, ochraceous buff; spores slightly ochraceous, 12–15 × 6½–9 $\mu$; stem very short, 1–3 cm. long, 1–2 cm. thick, solid, sometimes with a flexuous, root-like prolongation.

Solitary and gregarious. On the ground in moist coniferous forests and their borders, especially in mountains. New England and Pennsylvania to Michigan. June to September. Common.

This species is conspicuous by its large size, orange color, and deeply trumpet shaped pileus which is scaly on the upper surface.

# PLATE 27

## Top

**Hygrophorus Cantharellus** Schweinitz, Naturf. Gesell. Leipzig Schrift. **1**: 88. 1822; Fries, Epicr. Fung. 329. 1838.

Illustrations: Hard, Mushrooms *text f.* 165; Peck, N. Y. State Mus. Rept. **54**. *pl.* 76. *f.* 8–20.

*Edible*

Fructifications small, 2½–6 cm. high, with pileus 1–2½ cm. broad, thin, convex, sometimes umbilicate, glabrous or minutely squamulose, usually coral red or peach red, sometimes orange or yellow, not viscid; gills waxy, rather broad, distant, arcuate, decurrent, ivory yellow to cream color; spores white, even, 7–8½ × 4–4½ $\mu$; stem 2–6 cm. long, 2–3 mm. thick, nearly cylindric, solid at first, becoming hollow, brittle, shining, colored like the pileus or more yellow.

Gregarious. On humus of pine logs and stumps and on the ground among mosses in swampy woods. New Hampshire to New York and in North Carolina. July and August. Infrequent.

## Bottom

**Cantharellus cinnabarinus** Schweinitz, Naturf. Gessell. Leipzig Schrift. **1**: 83. 1822 (Syn. Car.); Am. Phil. Soc. Trans. N. S. **4**: 153. 1832.

Illustrations: Hard, Mushrooms *text f.* 161; Kauffman, Agar. Mich. *pl.* 2; Murrill, Mycologia **5**: *pl.* 92. *f.* 3; Peck, N. Y. State Mus. Mem. **3**:[4] *pl.* 56. *f.* 1–8.

*Edible*

Fructifications 2½–6 cm. high, with pileus 1½–5 cm. broad, fleshy, rather thin, firm, convex, then somewhat depressed, glabrous, coral red to peach red, fading on drying, the margin inflexed; flesh white, reddish tinged at the surface, with taste slightly peppery after a time; gills somewhat distant, decurrent, narrow, forked, venosely connected, colored like the pileus or more yellowish, spores white or nearly so, even, 8–9 × 4–5 $\mu$; stem 2–4 cm. long, 4–7 mm. thick, equal, solid, glabrous, concolorous with the pileus or more yellowish below.

Gregarious. On the ground in thin frondose woods and groves. Widely distributed in the United States. July to September. Frequent.

The cinnabar red color and slightly peppery taste aid in distinguishing this Chanterelle from *C. cibarius* and *C. minor*.

# PLATE 28

**Hygrophorus speciosus** Peck, N. Y. State Mus. Rept. **29**: 43. *pl.* 2. *f.* 1–5. 1878.

An *Hygrophorus aureus* Arrhenius in Fries, Mon. Hym. **2**: 127. 1863?

Illustrations: Peck, N. Y. State Mus. Mem. **3**.[4] *pl.* 51. *f.* 21–28; Hard, Mushrooms *text f.* 168; Kauffman, Agar. Mich. *pl.* 24.—Compare Fries, Icones *pl.* 166. *f.* 2; Bresadola, Fungi Trid. *pl.* 9; Cooke, Illus. *pl.* 896 (879). *f. B;* Kalchbrenner, Hym. Hung. *pl.* 26. *f.* 2.

*Edible*

Fructification 4–10 cm. high, with pileus 2–5 cm. broad, convex, becoming nearly plane, often with a small umbo, very viscid or glutinous, bright red or red orange when young or red on the center and yellow on the margin, fading and more largely yellow with age; flesh white, red or yellow under the separable pellicle, of mild odor and taste; gills distant, decurrent, white or becoming pale yellow; spores white, even, 8–10 × 4½–5 $\mu$; stem 4–8 cm. long, 4–10 mm. thick, nearly equal, solid, spongy within, viscid, sometimes slightly fibrillose, whitish or yellowish streaked.

Solitary or gregarious. On swampy ground, usually under or near tamarack trees. Maine, Massachusetts, New York and Michigan. September and October. Local.

# PLATE 29

**Hygrophorus fuligineus** Frost in Peck, N. Y. State Mus. Rept. **35**: 134. 1884.

Illustrations: Peck, N. Y. State Mus. Rept. **49**. *pl.* 45. *f.* 8–14; N. Y. State Mus. Mem. **3**.[4] *pl.* 50. *f.* 7–12; Atkinson, Mushrooms *text f.* 117; Hard, Mushrooms *text f.* 169.

*Edible*

Fructification 5–10 cm. high, with pileus 3–10 cm. broad, convex, becoming expanded and nearly plane or depressed, glabrous, very viscid or glutinous, light brownish olive to brownish olive of Ridgway, darker at the center; flesh white, soft, with no especial odor nor taste; gills somewhat distant, somewhat decurrent, thin, waxy, white; spores white, even, 8–10 × 4–5 $\mu$; stem 2½–8 cm. long, 1–2 cm. thick, equal or somewhat tapering downward, solid, viscid, white or whitish.

On the ground in pine woods. Massachusetts, Vermont and New York. September to November. Infrequent.

*H. fuligineus* is related to *H. olivaceo-albus* of Europe but is larger and has smaller spores.

# PLATE 30

## Top

**Lactarius sordidus** Peck, N. Y. State Cab. Rept. **23**: 119. *pl.* 2. *f.* 10–12; N. Y. State Mus. Rept. **38**: 120. 1885.

An *Lactarius atroviridis* Peck, N. Y. State Mus. Rept. **42**: 117. 1889?

Fructifications 3–6 cm. high, with pileus 4–12 cm. broad, fleshy, firm, convex and centrally depressed, viscid, soon dry, sometimes Saccardo's olive, sometimes dusky olive green, scabrous on the margin; flesh whitish, thick and compact; gills narrow, close, white or yellowish, slightly decurrent; milk white, unchangeable, acrid; spores white, echinulate, $7–8 \times 5–6\ \mu$; cystidia $55–90 \times 8–9\ \mu$; stem short, 2–3 cm. long, 1½–2½ cm. thick, equal, hollow, colored like the pileus, spotted.

On the ground in mixed woods. New Brunswick to Pennsylvania and westward. July to September. Frequent.

The drawing for this plate was approved by Peck as *L. sordidus*. Specimens in the herbarium of the writer seem to show that if *L. atroviridis* differs from *L. sordidus* as finally understood by Peck, it is by the complete lack of viscidity at all times.

## Bottom

**Clavaria vernalis** Schweinitz, Naturf. Gesell. Leipzig Schrift. **1**: 112. 1822.

Illustrations: Burt, Mo. Bot. Gard. Ann. **9**. *pl.* 9. *f.* 88; Coker, Clavarias *pl.* 82. *f.* 1, *pl.* 92. *f.* 3–7; Peck, N. Y. State Mus. Rept. **25**. *pl.* 1. *f.* 9 (as *C. clavata*).

Clubs very small, 1–1½ cm. high, 1–1½ mm. thick, simple, clavate, obtuse, glabrous, pinkish cinnamon, white at the base; flesh without noteworthy taste or odor; spores white, even, $7–9 \times 2½–3½\ \mu$.

Gregarious in numerous troops on moist earth and springing from a gelatinous, dark green stratum composed of aggregated green spherical cells like those which form the gonidia of many lichens. Massachusetts, New York, New Jersey, North Carolina and South Carolina. Late May and early June in the north, March in North Carolina. Infrequent.

The clubs are usually clavate and simple but individuals have been found forked near the tip or with one or more lateral prongs.

# PLATE 31

**Lactarius turpis** Fries, Epicr. 335. 1838.

Illustrations: Fries, Sverig. Svamp. *pl.* 60; Cooke, Illus. *pl.* 987 (925); Dufour, Atlas *pl.* 26. *f.* 59a; Krombholz, Abbild. *pl.* 69. *f.* 1–6; Ricken, Blätterpilze *pl.* 9. *f.* 4.

*Edible*

Fructifications very large, 6–12 cm. high, with pileus 6–30 cm. broad, convex and umbilicate, then expanded and depressed, raw umber color, somewhat glutinous when moist, somewhat roughish floccose, the margin inrolled at first, with an olivaceous-yellow villosity; flesh dirty white, thick; gills very numerous, close, adnate or a little decurrent in large specimens, yellowish white, dark spotted where wounded; milk white, not changing color, acrid; spores echinulate, $7–8 \times 6–7\ \mu$ and cystidia $60–75 \times 6–8\ \mu$ according to Ricken; stem 4–5 cm. long, 1½–4 cm. thick, firm, equal or attenuated downward, glabrous, colored like the pileus or paler, sometimes olivaceous, sometimes spotted, stuffed or hollow.

Solitary. On the ground in mountain woods. Chocorua, New Hampshire. August. Rare.

# PLATE 32

**Lactarius deliciosus** [L.] Fries, Syst. Myc. **1**: 67. 1821.

Illustrations: Fries, Sverig. Svamp. *pl.* 6; Atkinson, Mushrooms *pl.* 39. *f.* 1; Cooke, Illus. *pl.* 982 (947); Dufour, Atlas *pl.* 24. *f.* 56; Kauffman, Agar. Mich. *pl.* 11; Krombholz, Abbild. *pl.* 11; Peck, N. Y. State Mus. Rept. **48**. *pl.* 29.

*Edible*

Fructification 5–8 cm. high, with pileus 5–10 cm. broad, convex, then expanded and depressed, glabrous, slightly viscid when moist, ochraceous orange, fading in age, concentrically zonate; flesh whitish, tinged with orange but more especially along line of attachment with the gills, slightly acrid to the taste; gills somewhat decurrent, crowded, ochraceous orange, becoming somewhat greenish with age or where bruised; milk orange colored, mild; spores yellowish, echinulate, $8–10 \times 7–8\ \mu$; cystidia not found; stem 3–8 cm. long, 1–2 cm. thick, equal, glabrous, often orange spotted and finally greenish stained, stuffed and finally hollow.

Gregarious. On the ground in woods and damp mossy places under or near conifers. Throughout New England and westward. July to October. Common.

This is one of the most highly regarded and safest of mushrooms. It is readily recognized in our region by the bright orange color of pileus, gills and stem of young specimens and the orange milk which exudes copiously where wounded.

# PLATE 33

**Lactarius Chelidonium** Peck, N. Y. State Mus. Rept. **24**: 74. 1872; **38**: 116. 1885.

Illustrations: Peck, N. Y. State Mus. Mem. **3**.[4] *pl.* 53. *f.* 1–6; Atkinson, Mushrooms *pl.* 39. *f.* 2.

*Edible*

Fructification 4–8 cm. high, with pileus 4–8 cm. broad, fleshy, at first convex, then nearly plane and umbilicate or centrally depressed, dark olive buff to citrine, often with some narrow zones, slimy when moist; flesh dingy white, changing finally to grayish blue green under the somewhat separable pellicle, odorless, taste a little acrid; gills narrow, close together, sometimes forked, colored like the pileus, somewhat decurrent; spores yellowish in the mass, rough or minutely echinulate and with reticulated and pitted surface, 8–10 × 7–7½ $\mu$; milk scanty, saffron (like juice of Celandine), mild; stem 2½–6 cm. long, 1–1½ cm. thick, nearly equal, hollow, colored like the pileus.

Solitary. On sandy soil under or near pines. New Hampshire to New York and North Carolina. July to October. Occasional.

In Dr. Farlow's notes on the specimens illustrated he states, "Section of gills gives off a scanty fluid of watery consistency tinged with dirty orange brown." It is probable that specimens of *L. Chelidonium* are sometimes mistaken for old greenish ones of *L. deliciosus*.

# PLATE 34

**Lactarius indigo** Schweinitz, Naturf. Gesell. Leipzig. Schrift. 1: 87. 1822.

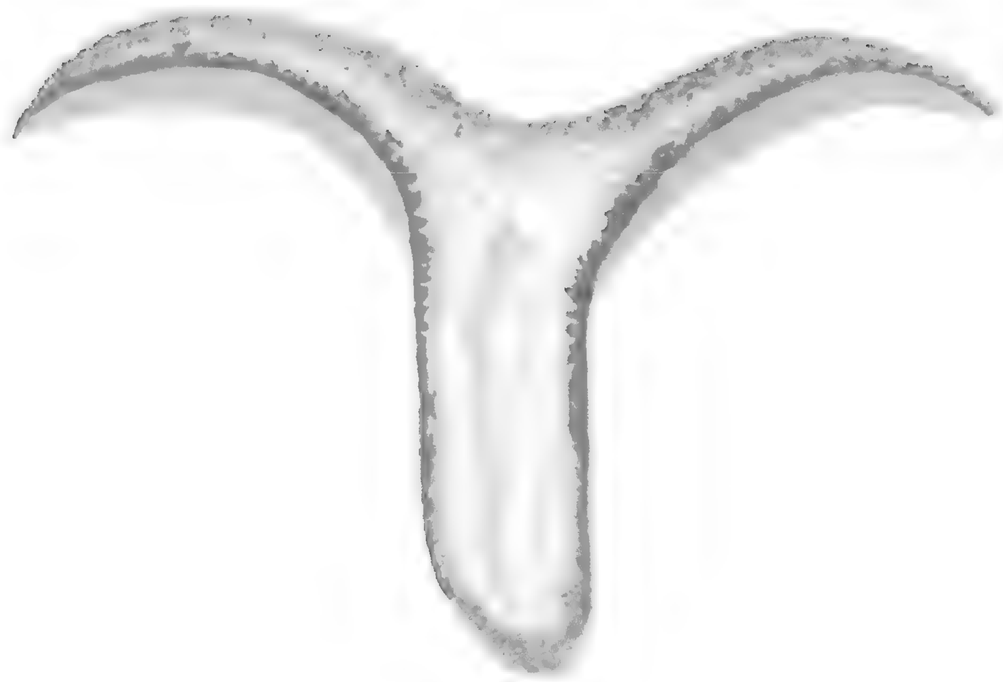
Illustrations: Atkinson, Mushrooms *pl.* 39. *f.* 3; McIlvane, Fungi *pl.* 41. *f.* 2.

*Edible*

Fructification 4–8 cm. high, with pileus 5–12 cm. broad, convex and somewhat umbilicate with margin inrolled, then expanded and depressed or somewhat infundibuliform, indigo blue to pale glaucous green of Ridgway, zonate, glabrous; flesh blue, with somewhat acrid taste; gills adnate-decurrent, close, colored like the pileus; milk dark blue, mild; spores yellowish, rough, with reticulate and pitted surface, $8–10 \times 7–8\ \mu$; stem 3–5 cm. long, 1–2 cm. thick, equal, hollow, colored like the pileus, sometimes spotted.

Gregarious. On the ground under or near pine trees. New England to North Carolina and westward. Widely distributed. July to September. Common.

*L. indigo* is conspicuous when growing by its blue color which is often as intense as that of the flesh in these figures. This color and the blue milk render the species easily recognized.



# PLATE 35

## Top

**Lactarius fuliginosus** Fries, Syst. Myc. 1: 73. 1821.

Illustrations: Bulliard, Champ. Fr. *pl.* 567. *f.* 3; Cooke, Illus. *pl.* 996 (959); Krombholz, Abbild. *pl.* 14. *f.* 10–12; Patouillard, Tab. Anal. *f.* 322; Ricken, Blätterpilze *pl.* 12. *f.* 5; Atkinson, Mushrooms *text f.* 120.

Fructification 3–10 cm. high, with pileus 4–10 cm. broad, convex, then expanded and somewhat depressed, dry, even, smoke gray to drab, sometimes snuff brown, finely velvety or pruinose, somewhat rugulose, the margin crenate wavy; flesh whitish, becoming pinkish or salmon when broken; gills subdistant, adnate or subdecurrent, whitish, then chamois, stained pinkish or salmon where wounded; milk white, or white changing slowly to saffron, slowly acrid; spores yellowish, globose, echinulate, 8–9 $\mu$ in diameter; stem 2–8 cm. long, 4–8 mm. thick, equal, stuffed then hollow, minutely velvety or glabrous, colored like the pileus.

Gregarious. On the ground in mixed woods. New England and westward. August to October. Infrequent.

## Bottom

**Lactarius lignyotus** Fries, Mon. Hym. 2: 177. 1863.

Illustrations: Fries, Icones *pl.* 171. *f.* 1; Atkinson, Mushrooms *text f.* 119; Hard, Mushrooms *pl.* 21; Peck, N. Y. State Mus. Bull. **150.** *pl.* 123.

Fructifications 4–8 cm. high, with pileus 3–12 cm. broad, convex, then plane, umbonate or slightly depressed, dry, generally rugose-wrinkled, fuscous to deep mouse gray, pruinose velvety; flesh white, slowly becoming pinkish or salmon when broken; gills somewhat distant, adnate or subdecurrent, white at first, then chamois, slowly changing to pinkish or salmon where wounded; milk white, slowly changing to reddish where in contact with flesh, mild or slightly acrid; spores yellowish, echinulate, globose, 8–10 $\mu$ in diameter; stem 3–7 cm. long, 4–12 mm. thick, colored like the pileus and with similar surface, paler at the base, equal, sometimes plicate at the apex, stuffed.

Gregarious. On wet or mossy ground in woods and swamps. New England to North Carolina and westward. August and September. Occasional.

*L. lignyotus* is closely related to *L. fuliginosus* but is darker and more sooty colored, with pileus more strongly rugose-wrinkled and often umbonate, with thicker, stouter stem and more likely to be found in swampy woods.

# PLATE 36

## Top

**Crepidotus dorsalis** Peck, N. Y. State Mus. Rept. **24**: 69. 1873.

Pileus sessile, dimidiate or somewhat reniform, 1–3 cm. broad, convex, fleshy, cream color to cream buff, nearly covered with honey yellow or tawny, small, fibrillose scales which are closer at the scarcely striate, decurved margin, the flesh white, thin, pliant; gills close, rather broad, rounded behind, yellow at first, becoming tawny olive, radiating from the white, villose place of attachment of the pileus; spores clay color or tawny olive in the mass, even, globose, 6–7 $\mu$ in diameter.

On frondose logs in open woods. New England and westward. July to September. Infrequent.

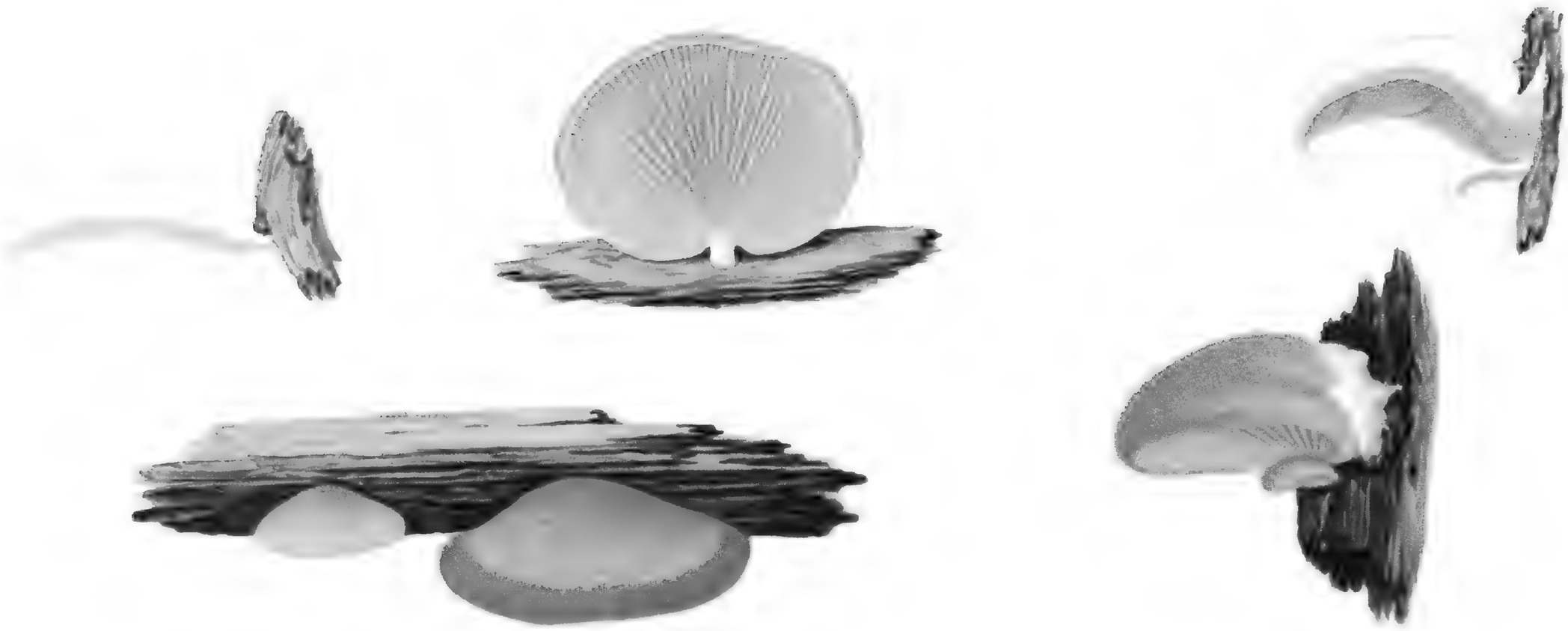
## Bottom

**Lactarius griseus** Peck, N. Y. State Cab. Rept. **23**: 120. 1873.

Illustrations: Burlingham, Torr. Bot. Club Mem. **14**. *f.* 14; Hard, Mushrooms *text f.* 138.

Fructifications small, 2–4 cm. high, with pileus 1–4 cm. broad, convex, soon depressed to infundibuliform, sometimes with a papilla at the center, dry, minutely tomentose, rarely tomentose-scaly, pale olive buff; flesh white, thin; gills narrow, close, adnate-decurrent, white, then yellowish; milk white, unchangeable, slightly acrid; spores pale cream colored, echinulate, 8–9 × 6–8 $\mu$; stem 2–4 cm. long, 2–5 mm. thick, equal or tapering upward, dry, glabrous, hollow, whitish or grayish, villose at the base.

Gregarious. On rotten wood, sometimes on the ground, in wet woods. Throughout New England and westward. July to September. Common.



# PLATE 37

**Russula chloroides** [Krombh.] Bresadola, Fungi Trid. 2: 89. *pl.* 202. 1900.

Illustrations: Krombholz, Abbild. *pl.* 56. *f.* 8, 9; Cooke, Illus. *pl.* 981 (946) as *Lactarius exsuccus.*

Fructifications rise but little above the ground; pileus 6–13 cm. broad, convex and umbilicate, with margin inrolled, becoming centrally depressed and somewhat infundibuliform, slightly pubescent, white, often spotted with yellowish or rusty stains; flesh white, mild to taste or tardily acrid; gills rather close, adnate or somewhat decurrent, whitish with tinge of pale pea green or water green which is more noticeable when viewed obliquely by reflected light, with a more distinct green ring around the stem where gills are attached; spores white, echinulate, 9–11 × 8 $\mu$; cystidia fusiform, 70–80 × 8–9 $\mu$; stem 2–4 cm. long, 1–3 cm. thick, equal, solid, white, glabrous.

Solitary or gregarious. On the ground in mixed woods and by roadsides in woods. Massachusetts and Vermont. July to September. Infrequent.

*R. delica* and *R. brevipes*, if the latter is a distinct species, are more frequently found than *R. chloroides* in the same region and same season and are doubtfully distinguishable from *R. chloroides* except by absence of the greenish color of the gills. The writer has not watched specimens of *R. chloroides* throughout their whole existence to make sure that the greenish color is always present.

# PLATE 38

**Russula atropurpurea** [Krombh.] Mairé, Soc. Myc. Fr. Bull. 26: 167. 1910.
*Russula rubra* as understood by Peck.

Illustrations: Krombholz, Abbild. *pl.* 64. *f.* 5, 6; Cooke, Illus. *pl.* 1025 (996), 1087 (997) as *R. rubra*.

Fructifications large, 5–12 cm. high, with pileus usually 5–10 or rarely up to 14 cm. broad, convex, becoming expanded and plane, then depressed, rather firm, viscid, deep blood red (dragon's blood red) and rather darker at the center, slightly tubercular striate and the cuticle separable at the margin in old specimens only; flesh reddish under the cuticle, white elsewhere, acrid to taste; gills forked near the stem and somewhat close there, white at first, then slightly yellowish, interspaces venose; spores white, echinulate, $9–10 \times 7–8\ \mu$; cystidia numerous, $40–70 \times 9–11\ \mu$; stem 5–12 cm. long, 1–4 cm. thick, stout, firm, equal or somewhat swollen below, white, sometimes rosy at the middle, solid or somewhat spongy within.

Solitary or gregarious. On the ground under pine trees in woods. Massachusetts and westward. July to October. Infrequent.

# PLATE 39

**Russula compacta** Frost in Peck, N. Y. State Mus. Rept. **32**: 32. 1879; N. Y. State Mus. Bull. **116**: 42, 71. *pl.* 109. 1907.

*Edible*

Fructifications 5–10 cm. high, with pileus 5–12 cm. broad, fleshy, firm, broadly convex, then depressed to somewhat infundibuliform by elevation of the margin, even, dry, unpolished, ochraceous buff to cinnamon buff, darker at the center; flesh firm, white, reddening or discoloring slightly upon exposure to the air, of mild taste, drying with a disagreeable odor; gills close, adnate, forked near the base, with some short ones present, white, discoloring to brownish where handled; spores white, globose, minutely echinulate, 8–9 $\mu$ in diameter; stem short, 3–6 cm. long, 1½–3½ cm. thick, equal, firm, solid, white, becoming brownish where bruised.

Gregarious. On the ground in coniferous and mixed woods. New Hampshire, Vermont, New York, Michigan. July to September. Frequent.

*R. compacta* retains well the rusty ochraceous color of the pileus in drying but the gills become distinctly smoke gray to light grayish olive when dried and the herbarium specimens have a permanent disagreeable odor suggestive of dried salt fish—all good characters for recognition of the species.

# PLATE 40

**Marasmius oreades** [Bolt.] Fries, Syst. Myc. **1**: 127. 1821.

Illustrations: Bolton, Hist. Fung. *pl.* 151; Berkeley, Outl. *pl.* 14. *f.* 5; Cooke, Illus. *pl.* 1118 (1072); Dufour, Atlas *pl.* 31. *f.* 71; Fries, Sverig. Svamp. *pl.* 31; Patouillard, Tab. Anal. *f.* 328; Atkinson, Mushrooms *text f.* 129; Farlow, Yearb. U. S. Dept. Agr. **1897**. *pl.* 27. *f.* 2; Hard. Mushrooms *text f.* 101, 102; Peck, N. Y. State Mus. Rept. **48**. *pl.* 14. *f.* 12–21.

*Edible*

Fructifications 3–7 cm. high, with pileus 2–5 cm. broad, fleshy, pliant, convex or nearly plane, often umbonate, glabrous, hygrophanous, dull brick red or tawny red when young and moist, becoming paler—pinkish buff—upon drying or when old, the margin even or somewhat striate when moist; flesh pale buff, with pleasant taste and odor; gills rounded behind or free, rather distant, interspaces venose, whitish or yellowish; spores white, even, $7–8 \times 5\ \mu$, with an oblique basal apiculus; stem 3–7 mm. long, 2–3 mm. thick, equal, solid, tough, whitish, clothed with a fine, dense, interwoven villosity.

In groups in fairy rings and not quickly putrescent. On the ground in grass on lawns, pastures and roadsides during a wet season. May to October.

Widely distributed and sometimes abundant. This is the Fairy Ring Mushroom, one of the best known and most highly regarded of the edible species. The arrangement of the fructifications in arcs or rings is due to the radial growth of the perennial mycelium outward in the lawn from year to year.

**Marasmius siccus** Schw. See Plate 92, bottom.

# PLATE 41

**Lentinus lepideus** Fries, Syst. Myc. **1**: 176. 1821.

Illustrations: Cooke, Illus. *pl.* 1140 (1091), 1141 (1092); Kauffman, Agar. Mich. *pl.* 6; Peck, N. Y. State Mus. Rept. **41**: 91. *text f.* 1; Schaeffer, Fung. Bav. *pl.* 29, 30.

*Edible*

Fructifications 4–10 cm. high, with pileus 5–10 cm. broad—rarely larger, compact, firm, convex, then plane or somewhat depressed, whitish to ochraceous buff, more or less covered with appressed scales which become tawny or rufescent; flesh white, pliant, taste not marked; gills decurrent by a tooth, irregularly serrate, transversely striate, covered when young with a membranous veil; spores white, even, $10–12 \times 4\ \mu$; stem 2–6 cm. long, 1–2 cm. thick, usually eccentric, solid, hard, scaly, sometimes with a dark, prolonged, radicated base where issuing from a cavity.

Solitary or caespitose. On pine railway ties, timbers and other wood in contact with the ground, and on stumps. Occurs on other conifers also and on oak, etc., more rarely. Widely distributed. May to October. Common.

The pilei are edible when young. *L. lepideus* is a species of great economic importance because of the decay it produces in pine cross ties and other timber in contact with the ground. *L. tigrinus*, a related species, occurs on coniferous timber also but has pilei under 5 cm. in diameter and spores only $6–8 \times 3\ \mu$.

# PLATE 42

**Panus rudis** Fries, Epicr. 398. 1838.

Illustrations: Hard, Mushrooms *text f.* 179; Kauffman, Agar. Mich. *pl.* 5; Patouillard, Tab. Anal. *f.* 637; Quelet, Champ. Jura 1. *pl.* 14. *f.* 1; Ricken, Blätterpilze *pl.* 26. *f.* 4; Romell, Hym. Aus. Am. 1. *pl.* 1. *f.* 10.

*Edible*

Fructifications 2–5 cm. high, with pileus 2–6 cm. broad, somewhat lateral at first, soon margined behind and excentric, depressed, coriaceous, tawny olive to cinnamon brown, strigose-hirsute; gills crowded, decurrent, entire, narrow, yellowish or colored like the pileus, the edge minutely setulose under a lens with cystidia and adhering hairs; such marginal cystidia 40–50 × 12 $\mu$, not found elsewhere; spores white, even, 5–6 × 2–3 $\mu$; stem short, excentric, sometimes almost lacking, ½–2 cm. long, 2–10 mm. thick, solid, strigose-hirsute, concolorous with the pileus.

Caespitose. On logs, stumps and fallen branches of *Fagus*, *Salix* and other frondose species. Very abundant throughout North America and rare in Europe, Africa and South America. June to December, and in March in the southern states.

The edible value of this species is chiefly as a flavoring for gravies. It dries easily to afford a supply for such use. It is very common in herbaria under the name *Lentinus Lecomtei* and has been distributed under this name in exsiccati. Objection to such reference is that the edges of the lamellae are not serrate as required by the original description, unless the earlier mycologists saw with their magnifying glasses little marginal groups of cystidia and adhering hairs and regarded them as teeth. *Lentinus strigosus* Schw. is a still earlier, probable name for this species, but the writer failed to find in the Schweinitz Herbarium specimens of either of these types for proof. Fries stated in *Elenchus Fungorum* that he had seen original specimens of both *Lentinus strigosus* and *L. Lecomtei* (*Agaricus crinitus* Schw.) and it is hoped that these specimens from Schweinitz may yet be found.

# PLATE 43

**Panus levis** Berkeley & Curtis, Ann. & Mag. Nat. Hist. II. 12: 427. 1853.

Fructifications 10 cm. high, with pileus 10–25 cm. broad, eccentric, sometimes lateral, marginate behind, coriaceous, convex, then plane and depressed, villose, white, becoming somewhat Marguerite yellow, the flesh yellowish; gills decurrent, distant, broad, entire, white, clothed below on the edge with the same coat as the top of the stem; spores white, even, 9–10 × 4–4½ $\mu$; stem 5–8 cm. long, 1½–3 cm. thick, generally eccentric, sometimes lateral, not rooting, solid, strigose below, closely villose above like the margin of the pileus and this coating continued a short distance upward between the decurrent gills, concolorous with the pileus.

Solitary. On logs and trunks of *Salix* and other frondose species. Widely distributed as far south as Alabama and westward to Missouri. September and October. Infrequent.

# PLATE 44

**Pluteus umbrosus** [Pers.] Fries, Syst. Myc. 1: 200. 1821.

Illustrations: Persoon, Icones et Descr. *pl.* 2. *f.* 5, 6; Boudier, Icones *pl.* 88; Bresadola, Fungi Trid. *pl.* 116; Cooke, Illus. *pl.* 304 (306). *f.* A; Ricken, Blätterpilze *pl.* 70. *f.* 4.

Fructifications 5–10 cm. high, with pileus 5–10 cm. broad, fleshy, convex to expanded, sometimes umbonate, more or less rugose, burnt umber color, floccose scaly on the disk, even and fibrillose on the margin; flesh white, with slightly disagreeable odor and taste; gills free, close, broad, white at first, then flesh color, with the edge fimbriate and blackish brown from colored cystidia which are clavate, 35–50 × 15–22 $\mu$, with yellowish brown contents; cystidia of the hymenium fusiform, hyaline, 66 × 22 $\mu$, with horns at apex; spores flesh color, even, 7–8 × 5–5½ $\mu$; stem 4–10 cm. long, 4–12 mm. thick, equal, solid, firm, pale or brownish, fibrillose or villose-squamulose.

Solitary. On decaying pine wood in forests. From Maine westward. August to October. Rare.

*Pluteus umbrosus* has some resemblance in aspect to the common *P. cervinus* but occurs on coniferous logs and stumps, has an umber colored pileus and distinctly dark edged lamellae which show well under the microscope the clavate organs with yellowish brown contents to which the colored edge is due.

# PLATE 45

## Top

**Pholiota limonella** Peck, N. Y. State Mus. Rept. **31**: 33. 1879.

Fructifications 5–7 cm. high, with pileus 2½–5 cm. broad, thin, convex or expanded, somewhat umbonate, viscid, rough with scattered erect reddish brown scales, amber yellow, the margin even; flesh yellowish, thin; gills sinuate, close, becoming ferruginous with the spores; spores cinnamon, even, 8–10 × 5 $\mu$; stem 2–6 cm. long, 4–5 mm. thick, equal, squamose with recurved scales, colored like or a little paler than the pileus.

Lynn Woods, Massachusetts. October.

*P. limonella* was described by Peck as growing on beech logs and having a solid stem. The specimens upon which this illustration was based have the stem slightly hollow and show no fragments of wood at base of stem. The dark brown mass about the base of each of the three specimens of the gathering is composed of small mosses densely crowded together and of such humus as supports a moss cushion in a dry location. Descriptive notes did not accompany these specimens.

## Bottom

**Pluteus leoninus** [Schaeff.] Fries, Syst. Myc. **1**: 199. 1821.

Illustrations: Schaeffer, Fung. Bav. *pl.* 48; Berkeley, Outl. *pl.* 7. *f.* 4; Patouillard, Tab. Anal. *f.* 639; Persoon, Icones et Descr. *pl.* 7. *f.* 3, 4.

Fructifications 4–7 cm. high, with pileus 2–5 cm. broad, campanulate, then convex or expanded, somewhat umbonate, even, glabrous, moist, amber yellow, striate on the margin; gills free, rather broad, becoming buff pink; spores buff pink, even, subglobose, 6–8 × 5–6 $\mu$; cystidia fusiform, 73 × 8 $\mu$, not abundant, without prongs; stem 4–7 cm. long, 2–4 mm. thick, equal or somewhat tapering upward, slightly striate, usually solid, white or yellowish.

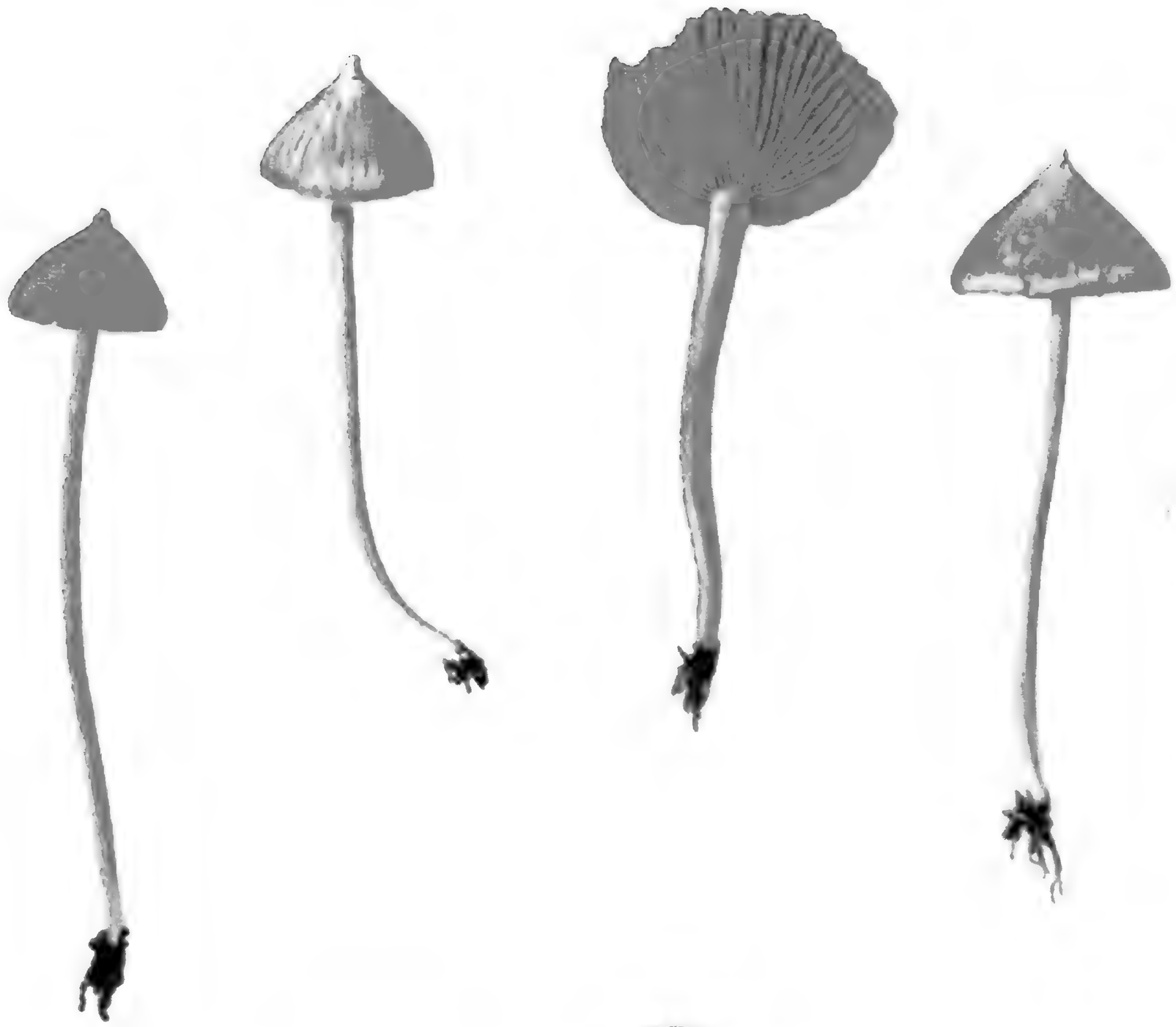
Solitary. On decaying wood in forests. From New England westward. July and August. Infrequent.

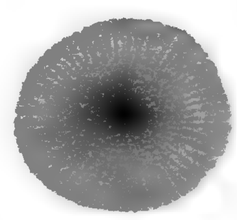
# PLATE 46

**Entoloma cuspidatum** Peck, N. Y. State Mus. Rept. **24**: 64. *pl.* 2. *f.* 14–18. 1872.
Illustrations: Kauffman, Agar. Mich. *pl.* 110.

Fructifications 5–12 cm. high, with pileus 2–4 cm. broad, conical or campanulate, usually with a papilla at the apex, moist, shining, glabrous, amber yellow, drying walnut brown to burnt umber in the herbarium; gills broad, somewhat distant, narrowly adnate with a small tooth, colored like the pileus at first, becoming salmon color with the spores, the edge denticulate or crenate; spores buff pink (flesh color), cubical with edge slightly rounded, about 8 $\mu$ square; stem 5–12 cm. long, 2–3, rarely 4, mm. thick, equal, hollow, glabrous, concolorous with the pileus, sometimes compressed or twisted.

Gregarious. In swamps and on sphagnum in peat bogs. Northern New England and New York. August. Infrequent.





# PLATE 47

## Top

**Leptonia placida** Fries, Syst. Myc. 1: 202.

Illustrations: Fries, Icones *pl.* 97. *f.* 1; Cooke, Illus. *pl.* 330 (352); Kauffman, Agar. Mich. *pl.* 114.

Fructifications 5–8 cm. high, with pileus 3–5 cm. broad, campanulate, then convex, obtuse, benzo-brown with a purplish tinge, shining between the blackish fibrils which are more abundant on the disk, not striate, the flesh white; gills whitish, broad behind but abruptly narrowed and adnexed; spores angular, 11 × 7–8 μ, with oblique apiculus at the base; no cystidia; stem 7 cm. long, 4 mm. thick, cartilaginous, hollow, nearly equal, shining, more bluish than the pileus, clothed with fibrils nearly to the apex.

Solitary. On very rotten wood and stumps. St. Hubert's Inn, Adirondack Mts., New York. September. Rare.

This was determined for Dr. Farlow as *L. placida* by Dr. Robert Fries. The figures differ from the description of European specimens of *L. placida* by the more purple color of pileus and stem, white instead of brownish flesh and more umbonate pileus. When found again, specimens should perhaps be compared with *Entoloma jubatum*, noting also whether the stem is cartilaginous.

## Bottom

**Leptonia asprella** Fries, Syst. Myc. 1: 208. 1821 (in *Eccilia*).

Illustrations: Atkinson, Mushrooms *text f.* 142; Quelet, Champ. Jura 1. *pl.* 6. *f.* 4.

Fructifications 3–5 cm. high, with pileus 2–4 cm. broad, convex, then expanded and umbilicate, rarely mammillate, somewhat membranaceous, drab, hygrophanous, striatulate when moist, the umbilicus villose and at length squamulose; gills adnate, separating free, somewhat distant, flesh color with the spores, edge of the same color; spores flesh color, angular, 11–12 × 8 μ; no cystidia; stem 3–5 cm. long, 1–2 mm. thick, equal, cartilaginous, fragile, becoming hollow, green or blue or colored like the pileus, with white mycelium at the base.

Solitary or gregarious. On the ground in woods, swamps and sphagnum bogs. Widely distributed but infrequent. July to September.

# PLATE 48

## Top and Bottom

**Claudopus nidulans** [Pers.] Peck, N. Y. State Mus. Rept. 39: 67. 1886.

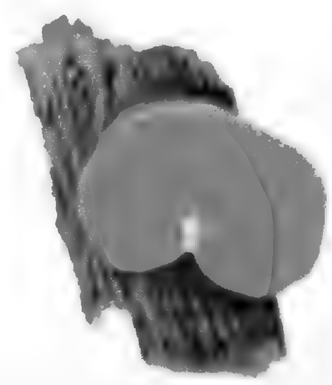
Illustrations: Persoon, Icones et Descr. *pl.* 6. *f.* 4; Atkinson, Mushrooms *pl.* 45; Fries, Icones *pl.* 86. *f.* 3; Hard, Mushrooms *text f.* 208; Kauffman, Agar. Mich. *pl.* 115.

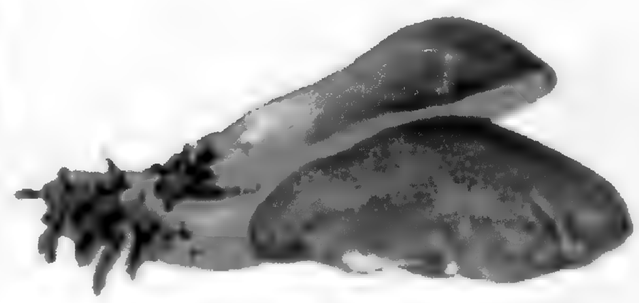
Pileus 1–9 cm. broad, sessile, often narrowed behind, sometimes imbricated, at times somewhat orbicular, dimidiate or reniform, tomentose, light orange yellow, drying paler; flesh whitish or yellowish, rather mild; gills adnate, moderately close, colored like the pileus; spores faint rose or salmon in the mass, even, $6–7 \times 2\frac{1}{2}–3\frac{1}{2}$ $\mu$.

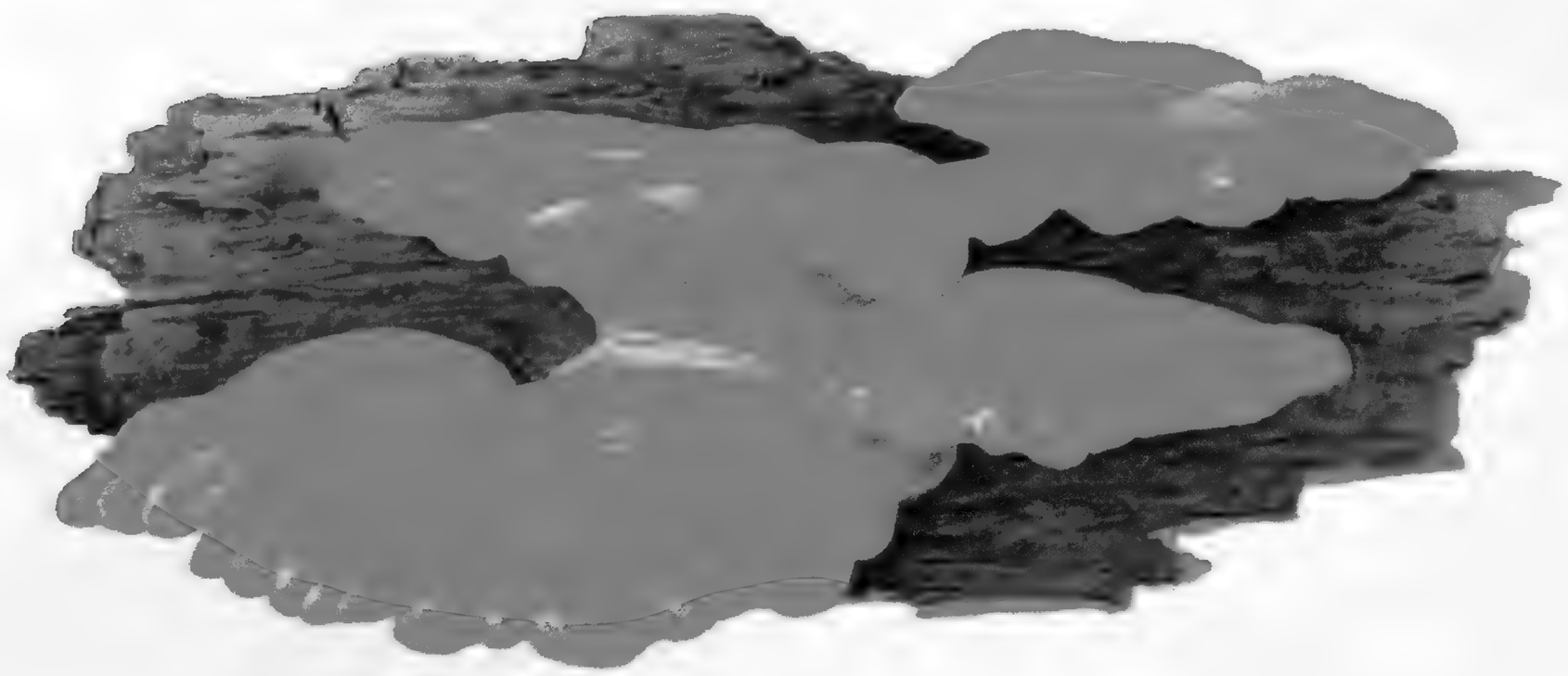
Gregarious or imbricate. On decaying logs of beech, poplar and other frondose species and also on pine. In New England and elsewhere, widely distributed. July to December. Infrequent.

## Middle

**Pleurotus serotinus** [Schrad.] Fries. Description with Plate 23.







# PLATE 49

**Pholiota caperata** [Pers.] Fries, Syst. Myc. **1**: 241. 1821.

Illustrations: Dufour, Atlas *pl.* 35. *f.* 80; Hard, Mushrooms *pl.* 31; Harper, Wis. Acad. Sc. Trans. **17**.[1] *pl.* 24; Krombholz, Abbild. *pl.* 73. *f.* 10-12; Peck, N. Y. State Mus. Rept. **54**. *pl.* 73. *f.* 1-5.

*Edible*

Fructification 6–12 cm. high, with pileus 5–10 cm. broad, campanulate or expanded, obtuse, glabrous, dry, chamois color to buff yellow, sometimes with whitish flocci at the center, generally more or less radially wrinkled; flesh white, with pleasant taste and odor; gills moderately close, adnate, then emarginate, whitish becoming somewhat ochraceous or clay color, often uneven on the edge; spores ferruginous (cinnamon brown), rough, inequilateral, $12-14 \times 8-9\ \mu$; stem 5–12 cm. long, 1–2 cm. thick, cylindric, firm, solid, glabrous, white, with a persistent, reflexed annulus rather distant from the pileus towards the middle of stem.

Solitary or gregarious. On the ground in mixed or coniferous woods. New England and westward. August to October. Frequent.

**Pholiota angustipes** Peck. See Plate 69, bottom, with description.

**Pholiota limonella** Peck. See Plate 45, top, with description.

# PLATE 50

**Pholiota erebia** Fries, Syst. Myc. 1: 246. 1821.

Illustrations: Cooke, Illus. *pl.* 358 (377); Harper, Wis. Acad. Sc. 17.[1] *pl.* 30; Patouillard, Tab. Anal. *f.* 644; Ricken, Blätterpilze *pl.* 56. *f.* 1.

Fructifications 4–8 cm. high, with pileus 2–5 cm. broad, convex, viscid, hygrophanous, fuscous black at first, cinnamon brown when mature and dry, rather uneven with irregular depressions, the margin irregularly grooved; flesh pale brownish, with strong and disagreeable taste, odorless; gills somewhat distant, adnate, often with a small decurrent tooth, dirty brownish white at first, becoming cinnamon; spores pale ferruginous, even, 14–15 × 7–7½ $\mu$; stem 4–8 cm. long, 6–12 mm. thick, equal or slightly tapering upward, becoming hollow, often cohering at the base, brownish, fibrillose, striate, with a superior, persistent, membranaceous annulus which becomes reflexed.

Solitary and caespitose. In grass and lawns on sandy ground. Cambridge, Massachusetts. September and October. Local and infrequent.

## PLATE 51

**Pholiota spectabilis** Fries, Elenchus Fung. **1**: 28. 1828.

Illustrations: Fries, Icones *pl.* 102; Cooke, Illus. *pl.* 352 (394); Harper, Wis. Acad. Sc. Trans. **17**.[1] *pl.* 44; Kauffman, Agar. Mich. *pl.* 61.

Fructification 6–10 cm. high, with pileus 4–12 cm. broad, fleshy, compact, convex, expanded, deep chrome, the surface finally broken into minute, appressed, fibrillose scales; flesh pale yellow (Marguerite yellow), with bitter taste; gills adnate, with a small decurrent tooth, crowded, yellow becoming ferruginous; spores yellow ocher under the microscope, rough, $8–9 \times 5–6\ \mu$; stem 5–10 cm. long, 6–20 mm. thick, slightly thickened downward and more or less ventricose, normally solid, peronate; annulus near apex of stem, membranaceous, persistent, yellow.

Solitary or caespitose. On stumps and decaying wood. Waltham, Massachusetts, and westward. September and October. Widely distributed but rare.

Distinguishing characters are the rough spores and bitter taste.

# PLATE 52

## Top

**Inocybe asterospora** Quelet, Soc. Bot. Fr. Bull. 1879: 50. 1879.

Illustrations: Cooke, Illus. *pl.* 385 (430); Patouillard, Tab. Anal. *f.* 546; Ricken, Blätterpilze *pl.* 29. *f.* 1.

Fructification 4–8 cm. high, with pileus 2–5 cm. broad, convex, then expanded and umbonate, cinnamon rufous, fibrillose, becoming rimose, the flesh white; gills close, narrowly adnate, emarginate, ventricose, dull cinnamon; cystidia abundant on sides and edges of lamellae, 40–50 × 13 $\mu$, ventricose, apex crystallate; spores ochraceous brown, nearly spherical, stellately nodulose, 8–10 × 7–8 $\mu$; stem 4–8 cm. long, 3–7 mm. thick, reddish, equal, usually somewhat bulbous, solid, streaked with brown fibrils.

Gregarious. On sandy ground in woods. New England and westward. July to September. Rare.

## Middle Row at Left

**Inocybe nodulospora** Peck, N. Y. State Mus. Rept. 32: 28. 1879.

*Inocybe leptophylla* Atkinson, Am. Jour. Bot. 5: 212. 1918.—Not *Inocybe lanuginosa* [Bull.] Karst.

Fructification 2–4 cm. high, with pileus 1–3 cm. broad, thin, convex, expanded, obtuse, tawny to hazel, dry, floccosely squamose, with the scales of the disk more erect; gills close, broad, ventricose, rounded at the stem, becoming ferruginous-cinnamon, the edge white-crenulate; cystidia (sterile cells) on edge of lamellae 40–55 × 15 $\mu$, not present elsewhere; spores ferruginous brown, somewhat rectangular, nodulose with scattered tubercules, 9–11 × 7–8 $\mu$; stem 2–4 cm. long, 2–4 mm. thick, equal, solid, floccose-fibrillose to tomentose-squamulose, colored like the pileus.

On the ground under spruce trees and on wood humus—especially about sphagnum marshes. New England and westward. July and August. Infrequent.

The squamulose pileus, white-crenulate edge of gills, absence of cystida except on edge of gills, and small, nodulose spores not exceeding the dimensions given, are distinguishing characters of *I. nodulospora*.

## Middle Row at Right

**Inocybe amarescens** Farlow & Burt, n. sp.

Type: in Burt Herbarium.

Fructifications 2–3 cm. high, with pileus 1½–3 cm. broad, convex, sometimes somewhat depressed, umbonate, rimosely floccose-scaly with the scales adpressed, Saccardo's umber with the disk somewhat the more intensely colored; flesh thin, pale straw colored, after a time becoming very bitter to the taste; gills crowded, somewhat adnate, rather broad, yellowish at first, finally Saccardo's umber, the edge whitish and slightly denticulate; cystidia abundant on sides of gills, lanceolate, obtuse, 28–40 × 12–14 $\mu$, not different on edge of gills; spores tawny olive, even, 7–9 × 4½–5 $\mu$; stem 2–3 cm. long, about 2 mm. thick, equal, solid, minutely velvety under a lens, paler than the pileus, drying to fuscous in the herbarium.

Gregarious. On bare ground in a hickory grove, Middlebury, Vermont. July. Probably rare.

*I. amarescens* is related to *I. dulcamara* and *I. carpta* by its bitter taste but is distinct from the former by its smaller and abundant cystidia, which are not confined to the edge of the gills, and by the solid, velvety stem and from *I. carpta* by the smaller cystidia and even spores.

**Inocybe calamistrata** Fries. See Plate 54, top.

## Bottom

**Inocybe radiata** Peck, Torr. Bot. Club Bull. **22**: 488. 1895.

Fructification 3–7 cm. high, with pileus 2–5 cm. broad, campanulate, becoming expanded, umbonate, fibrillose with brown fibrils, becoming rimose; flesh white, thickish on the disk; gills adnate or sinuate with a small tooth, broad, ventricose, becoming ochraceous cinnamon, the edge whitish; cystidia scattered on sides and edges of gills, 40–60 × 15 $\mu$, ventricose, with apex somewhat crystallate; spores angular or with some nodules, 10–12 × 7–8 $\mu$; stem 3–7 cm. long, 2–4 mm. thick, equal, solid or stuffed, fibrillose, colored somewhat like the pileus but paler.

Gregarious. On poor soils by roadsides under trees. Massachusetts and New Hampshire and westward. June to October.

The stem is solid, as published in the original description, in specimens referred to this species by the writer, collected on Middlebury College Campus, Vermont.

# PLATE 53

**Naucoria Christinae** Fries, Epicr. 192. 1836–1838.

Illustrations: Fries, Icones *pl.* 121. *f.* 2.

Fructification 2–6 cm. high, with pileus 2–4 cm. broad, conical, acute, becoming expanded, sharply umbonate, viscid, glabrous, light ochraceous salmon to salmon color when moist, liver brown with a tinge of brick red in drying, the flesh slightly reddish ; gills free or adnexed, or varying adnate, crowded, ventricose, becoming clay color to tawny olive ; spores cinnamon in the mass, slightly rough, 9–11 × 4–4½ $\mu$ in American specimens, 4–8 × 3–4½ $\mu$ in Swedish ; stem 6–15 cm. long, 3–6 mm. thick, with the long rooting portion up to 10 cm. long or about two thirds the whole length of the stem, hollow, colored like the pileus above, with the radicated portion darker red and blackening, cartilaginous, fragile when fresh, drying tough.

Gregarious. On sandy hillsides under oak trees. Lynn, Melrose and Worcester, Massachusetts. October. Abundant locally.

This species has the aspect of *Hygrophorus conicus* and the specimens blacken more or less also in drying. The very long rooting portion of the stem is noteworthy.

# PLATE 54

## Top

**Inocybe calamistrata** Fries, Syst. Myc. 1: 256. 1821.

Illustrations: Fries, Icones *pl.* 106. *f.* 2; Cooke, Illus. *pl.* 369 (407); Gillet, Champ. Fr. Hym. *pl.* 343 (358).

Fructification 4–10 cm. high, with pileus 2–6 cm. broad, fleshy, thin, campanulate or convex, obtuse, covered with squarrose scales, cinnamon brown to sudan brown; flesh whitish, reddish where wounded; gills adnexed, crowded, broad, whitish, soon cinnamon-ferruginous, the edge whitish; no cystidia on sides of gills; spores ferruginous brown, even, ellipsoidal, 10–12 × 5–6 $\mu$; stem 4–10 cm. long, 2–5 mm. thick, firm, equal, solid, clothed with recurved fibrillose scales, colored like the pileus, often somewhat dark blue at the base.

On the ground in the shade in damp places. East Providence, Rhode Island, and westward. July to September. Infrequent.

## Bottom

**Cortinarius (Inoloma) squamulosus** Peck, N. Y. State Cab. Rept. **23**: 108. *pl.* 3. *f.* 1–3. 1873.

Fructification large, 10–15 cm. high, with pileus 5–10 cm. broad, thick, fleshy, convex, somewhat broadly umbonate, densely fibrillose scaly, chestnut to chocolate brown; flesh pale avellaneous with a slight pinkish or violet tinge, with no especial taste; gills adnate then deeply emarginate, broad, not crowded, pale pinkish brown at first, then colored like the pileus; spores russet to auburn in the mass, rough, 7–9 × 6–7 $\mu$; no cystidia; stem 6–15 cm. long, 12–20 mm. in diameter near pileus, swollen at the base into a large ventricose or somewhat fusiform bulb 3–6 cm. thick, solid, shreddy, somewhat squamulose, colored like the pileus, annulate above by a definite band-like collar; cortina pallid to brownish, closely woven.

Gregarious. On the ground in mixed frondose woods. Vermont and westward. August and September. Infrequent.

# PLATE 55

**Cortinarius (Inoloma) pholideus** Fries, Syst. Myc. 1: 219. 1821.

Illustrations: Albertini & Schweinitz, Consp. Fung. *pl.* 12. *f.* 1, as *Agaricus lepidomyces;* Cooke, Illus. *pl.* 761 (760); Phillips, Grevillea 7. *pl.* 117. *f.* 1; Ricken, Blätterpilze *pl.* 46. *f.* 4; Peck, N. Y. State Mus. Rept. 24. *pl.* 1. *f.* 1–3, as *Cortinarius asper.*

Fructification 4–8 cm. high, with pileus usually about 3–5 cm. broad, fleshy, firm, somewhat ochraceous tawny, finally more cinnamon, hemispherical-campanulate, then expanded, umbonate, rough with erect, brown, hairy scales; flesh dirty white usually, slightly violaceous at first; gills somewhat emarginate, crowded, violaceous, then pale cinnamon, the edge entire; spores tawny in the mass, rough, 7–8 × 5–6 $\mu$; no cystidia; stem 4–7½ cm. long, 6–10 mm. thick, nearly equal, solid, slightly narrowed upward, fibrillose scaly and colored like the pileus below but violaceous and even above the cortinate arachnoid ring; cortina sparse, fibrillose.

Gregarious or caespitose. On very rotten logs and on ground in moist coniferous or, more rarely, mixed woods. Northern New England and westward. September and October. Not uncommon.

In confirming for the writer a Vermont collection of this species, Peck wrote, "My *C. asper*, in my opinion, is not sufficiently distinct from *Cortinarius pholideus.*"

# PLATE 56

**Cortinarius (Telamonia) armillatus** [Alb. & Schw.] Fries, Syst. Myc. **1**: 214. 1821.

Illustrations: Fries, Icones *pl.* 158. *f.* 1; Cooke, Illus. *pl.* 802 (800); Hard, Mushrooms *text f.* 243; Kauffman, Agar. Mich. *pl.* 85, 86; Ricken, Blätterpilze *pl.* 48. *f.* 5.

*Edible*

Fructification 6–12 cm. high, with pileus 4–15 cm. broad, campanulate, then expanded, fleshy, not viscid, tawny to hazel, innately scaly or fibrillose; flesh dingy pallid or slightly brownish, with mild taste; gills adnate, sometimes with a decurrent tooth, broad, distant, pale cinnamon at first, becoming Brussels brown; spores cinnamon, rough, 10–12 × 5–6 $\mu$; stem 6–12 cm. long, 10–15 mm. thick above, bulbous below and 2–4 cm. thick there, solid, marked above the bulb with prominent, floccose, cinnabar red or English red zones or bands formed from the red universal veil; cortina whitish at first, fibrillose.

Solitary or gregarious. On leaf humus in mountain forests. Vermont and westward. August and September. Frequent.

The bright red bands about the stem are a conspicuous and distinctive character.

# PLATE 57

**Cortinarius (Myxacium) mucifluus** Fries, Epicr. 274. 1836–1838.

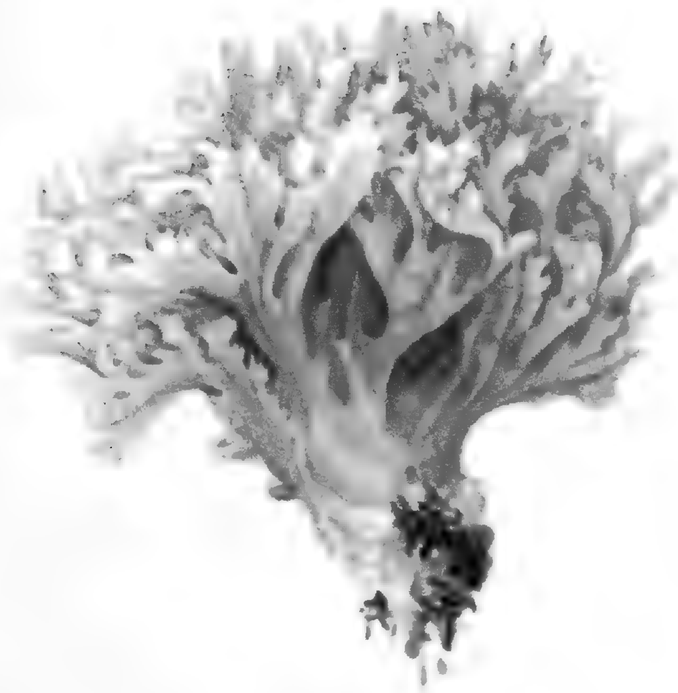
Illustrations: Fries, Icones *pl.* 148. *f.* 1; Cooke, Illus. *pl.* 740 (735); Kauffman, Agar. Mich. *pl.* 63; Peck, N. Y. State Mus. Rept. 48. *pl.* 13. *f.* 1–6 (as *C. collinitus*); Ricken, Blätterpilze *pl.* 34. *f.* 1 (as *C. collinitus*).

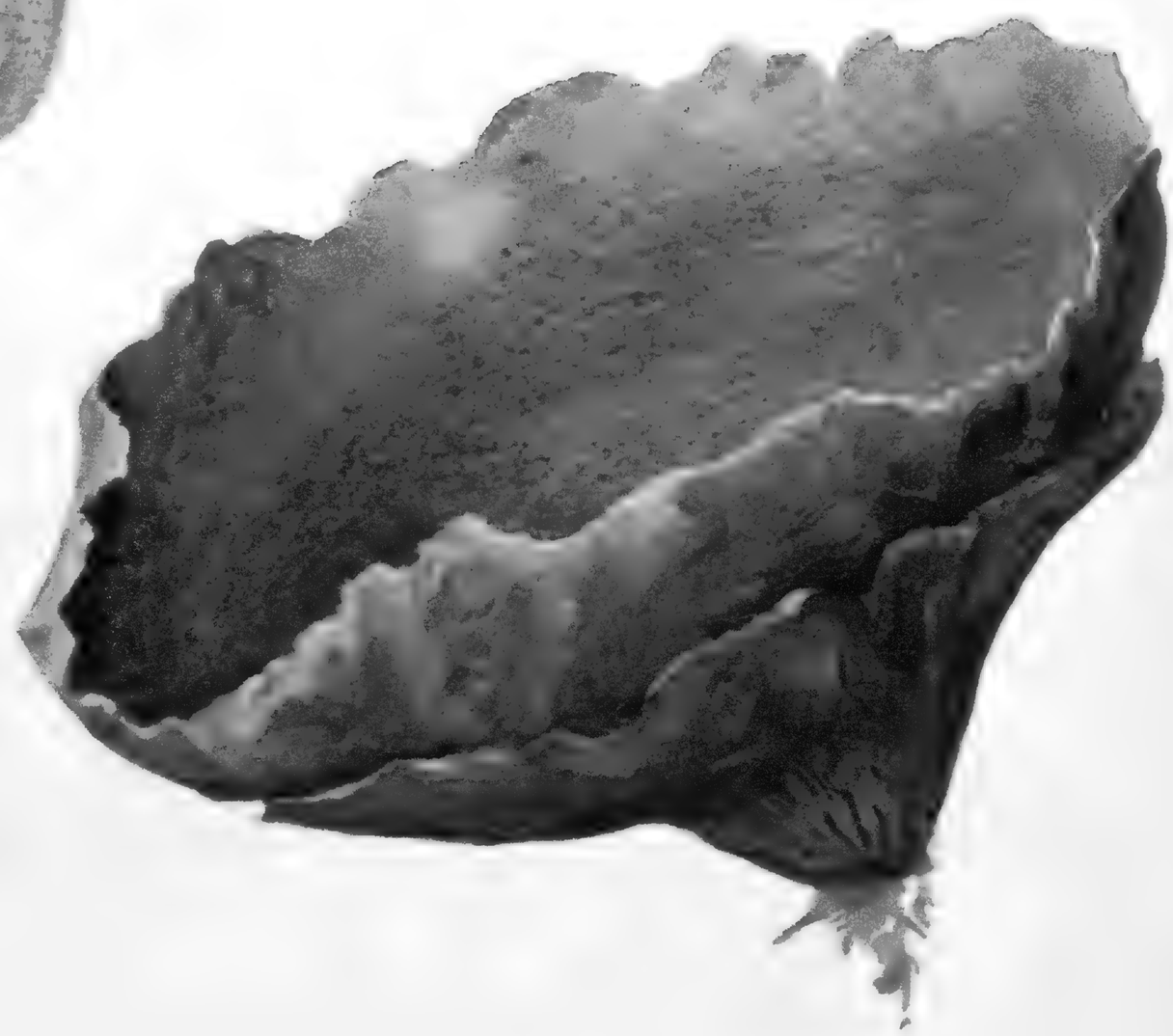
*Edible*

Fructification 6–15 cm. high, with pileus 4–8 cm. broad, campanulate-convex, then expanded and margin incurved, obtuse, glutinous when moist, shining when dry, varying from chamois to ochraceous tawny and tawny; flesh yellowish, with no noteworthy taste; gills grayish white at first, then deep olive buff to clay color, adnate to somewhat emarginate, rather broad, close; spores cinnamon, minutely tuberculate, 10–12½ × 6–7 $\mu$; no cystidia; stem 6–15 cm. long, 6–20 mm. thick, cylindric, solid, viscid or glutinous when moist, with the glutinous covering (universal veil) cracking transversely in drying and forming thick, scaly bands of the dried gluten, usually paler than the pileus.

Gregarious. Under coniferous trees in mixed woods. Vermont and westward. August and September. Frequent.

The writer has followed Kauffman in regarding this species as *C. mucifluus* rather than *C. collinitus* Fr.





# PLATE 58

## Top Row at Right

**Cortinarius (Inoloma) violaceus** [Linn.] Fries, Syst. Myc. **1**: 217. 1821.

Illustrations: Fries, Sverig. Svamp. *pl.* 58; Bulliard, Champ. Fr. *pl.* 250 (649); Hard, Mushrooms *text f.* 238; Patouillard, Tab. Anal. *f.* 127; Peck, N. Y. State Mus. Rept. 48. *pl.* 12; Richon & Roze, Atlas *pl.* 34. *f.* 19–21; Ricken, Blätterpilze *pl.* 44. *f.* 4.

*Edible*

Fructification 6–12 cm. high, with pileus 5–10 cm. broad, convex, obtuse, becoming nearly plane, dry, dark violet (dark vinaceous gray), floccose scaly; flesh more or less tinged with violet, of mild taste; gills adnate, notched near the stem and sometimes with a small decurrent tooth, thick, broad, somewhat distant, dark violet, becoming ashy cinnamon with the spores; spores cinnamon brown, minutely verrucose, 11–16 × 7–10 $\mu$; in preparations potassium hydrate becomes vinaceous with a pigment dissolved from the lamella; stem 6–12 cm. long, 7–12 mm. thick near the pileus, 1½–2½ cm. thick through the clavate, bulbous base, solid, colored like the pileus, fibrillose; universal veil lacking or obsolete.

Solitary or scattered. On leaf humus in mountain forests. Vermont and westward. August and September. Frequent in Vermont.

## Top Row at Left

**Clavaria cinerea** Bulliard, Champ. Fr. *pl.* 354 (204). 1787.

Illustrations: Bulliard, *loc. cit.*; Burt, Mo. Bot. Gard. Ann. 9. *pl.* 8. *f.* 60 (after Bulliard); Dufour, Atlas *pl.* 68. *f.* 149; Greville, Scot. Crypt. Fl. *pl.* 64; Patouillard. Tab. Anal. *f.* 154.

*Edible*

Fructification 3–5 cm. high, branched, very variable in habit, grayish or with a faint tinge of purple, rather brittle; branching irregular, repeated, uneven, axils usually acute; branches thick or slender, cylindric or compressed, short, stuffed, erect, wrinkled, apices often toothed; flesh white, no odor, taste mild; stem more or less distinct, thick, short; basidia with 2 sterigmata; spores copious, hyaline, even, 7–10 × 6–8 $\mu$.

Solitary or gregarious. On ground in woods. South Hingham, Massachusetts. August. Rare.

**Lycoperdon cyathiforme** Bosc, Mag. Naturf. Freunde Berlin 5: 87. *pl.* 6. *f.* 11. 1811.

*Bovista lilacina* Berk. & Mont., Hooker's London Jour. Bot. 4: 66. 1845.

Illustrations: Bosc, *loc. cit.*; Atkinson, Mushrooms *pl.* 81; Farlow, U. S. Agr. Yearb. 1897. *pl.* 30; Hollos, Gastero. Hung. *pl.* 13; Lloyd, Myc. Notes 1. *pl.* 35; Murrill, Mycologia 1. *pl.* 15. *f.* 1; Peck, N. Y. State Mus. Rept. 48. *pl.* 2.

*Edible*

Fructification 7–15 cm. in diameter, globose or depressed, glabrous or minutely floccose or scaly, whitish to pinkish buff, soon becoming marked and cracking into tessellated or polygonal areas in the upper part, contracted below, commonly with a short stem-like base; interior of fructification white and fleshy when young and edible, maturing the capillitium and spores and becoming purple drab to vinaceous drab, falling away or blowing away together with upper part of the fructification and leaving a vinaceous, cup-shaped base such as shown in lowest figure on the right; spores vinaceous drab, spherical, echinulate, 7 $\mu$ in diameter.

Solitary. On the ground in pastures and cultivated fields. Widely distributed. August and September. Frequent.

Select for food, specimens of this puff ball which are so immature that the interior is still white.

# PLATE 59

**Paxillus atrotomentosus** [Batsch] Fries, Syst. Myc. 1: 272. 1821.

Illustrations: Batsch, Elenchus *pl.* 8 *f.* 32; Cooke, Illus. *pl.* 876 (869); Dufour, Atlas *pl.* 42. *f.* 100; Hard, Mushrooms *text f.* 233; Quélet, Champ. Jura 1. *pl.* 10. *f.* 1; Richon & Roze, Atlas *pl.* 45. *f.* 13–16; Ricken, Blätterpilze *pl.* 28. *f.* 4.

*Edible*

Fructification up to 10 cm. high, with pileus 5–15 cm. broad, firm, fleshy, excentric, convex, then plane or somewhat infundibuliform sometimes more or less lateral and ascending, dry, sometimes slightly tomentose, cinnamon or ochraceous tawny, the margin thin, involute; flesh whitish; gills easily separable from the pileus, somewhat decurrent, yellow, close, branching at the base; spores clay color to buckthorn brown in the mass, even, $5–6 \times 3\frac{1}{2}–4\ \mu$; no cystidia; stem 3–10 cm. long, 1–3 cm. thick, solid, tough, straight or curved, often excentric or lateral, rooting, covered with dense, soft, cinnamon brown or blackish brown tomentum.

Solitary or caespitose. On pine stumps and decaying pine wood. August and September. From New England westward. Rather frequent in mountain forests.

This species is distinguished by the ready peeling away of the gills from the pileus, by ochraceous spores and by dense, tomentose covering of the stem.

# PLATE 60

**Agaricus arvensis** Schaeffer, Fung. Bav. *pl.* 310 (172), 311 (173). 1774.

Illustrations: Fries, Sverig. Svamp. *pl.* 4; Berkeley, Outl. *pl.* 10. *f.* 4; Cooke, Illus. *pl.* 523 (540); Dufour, Atlas *pl.* 42 *f.* 101; Farlow, U. S. Agr. Yearb. **1897**. *pl.* 24; Hard, Mushrooms *text f.* 252, 253; Kauffman, Agar. Mich. *pl.* 46; Peck, N. Y. State Mus. Rept. **48**. *pl.* 8.

*Edible*

Fructification 6–13 cm. high, with pileus 5–15 cm. broad, somewhat hemispherical at first, then convex and expanded, obtuse, firm, even, glabrous or with appressed, floccose scales, dry, white or yellowish; flesh thick, white, at length somewhat yellowish; taste mild; gills free, crowded, broad, whitish at first, soon dull pink, finally army brown or Rood's brown, the edge entire; spores purplish brown to seal brown or fuscous in the mass, even, 7–8 × 4–5 $\mu$; stem 5–12 cm. long, 1½–2½ cm. thick, somewhat thickened or bulbous at the base, white, becoming slightly yellow, stuffed, finally hollow; annulus thick, superior, double—that is, a double membrane as of two layers more or less grown together, the upper layer white, the lower layer more or less stellately split and often yellowish.

Solitary, gregarious, sometimes two in a cluster. On the ground in cultivated fields, lawns, pastures and borders of groves. Widely distributed. July to October. Frequent.

The so-called double ring is distinctive of this species, which is commonly called the field mushroom or horse mushroom. In the upper figures of the plate the two layers of the ring are grown together rather closely although the figure on the left shows the lower layer split stellately and the upper layer showing still unbroken through fissures of the lower. These upper figures were made from specimens collected on a lawn in Cambridge, Massachusetts. The lower figures show the double annulus very distinctly; these figures were from specimens grown at Columbia, Missouri, by Dr. B. M. Duggar in his work on the production of mushroom spawn by tissue cultures. The large, common mushrooms of the market are very likely to be *A. arvensis*.

# PLATE 61

**Agaricus abruptibulbus** Peck, N. Y. State Mus. Bull. **94**: 36. 1904.

*Agaricus abruptus* Peck, N. Y. State Mus. Mem. **3**:[4] 163. *pl.* 59. *f.* 8–14. 1900. — *A. arvensis* var. *abruptus* Peck, N. Y. State Mus. Rept. **48**: 141. 1896. — Compare upper figures with *Pratella flavescens* Gillet, Champ. Fr. Hym. 564. *pl.* 384 (574) and lower figures with *Agaricus flavescens* of Richon & Roze, Atlas *pl.* 17. *f.* 17–21.

Illustrations: Peck, *loc. cit.*; Atkinson, Mushrooms *text f.* 19–20; Hard, Mushrooms *text f.* 254; Kauffman, Agar. Mich. *pl.* 47.

*Edible*

Fructification 8–12 cm. high, with pileus 8–12 cm. broad, convex, then expanded and becoming plane, rather thin, fragile, dry, glabrous or innately floccose or sometimes obscurely appressed scaly, white or creamy white, usually tinged with yellow in drying—especially at the center; flesh white, usually turning yellowish where cut or bruised; gills free, remote, crowded, narrow, soon pinkish, becoming deep brownish drab or fuscous; spores purple brown, even, $7–8 \times 4–5\ \mu$; stem 7–12 cm. long, 8–13 mm. thick, hollow, equal or slightly tapering upward, bulbous at the base, the bulb small, usually abruptly bulbous and flattened or becoming so in drying; annulus large, pendant, usually double, even above, cracking on the under side and sometimes separating into flakes or radiating yellowish patches.

Scattered or somewhat caespitose. In mixed woods and more frequently near pine trees. New England to Missouri. July to October. Frequent.

The name *Agaricus flavescens* has priority over *A. abruptibulbus* if it refers to the same species. This the writer regards as very doubtful, for none of the European figures of *A. flavescens* have base of the stem abruptly bulbous, and furthermore the type figures of Gillet do not have a double ring, and in the description the flesh is stated as white and the stem stuffed. The upper figures of the present plate are based on specimens collected at Lake Dunmore, Vermont, which in drying brought out well the distinctive abruptly bulbous base of the stem.

# PLATE 62

**Agaricus brunnescens** Peck, Torrey Bot. Club. Bull. 27: 16. 1900.

*Edible*

Fructification 4–10 cm. high, with pileus 5–10 cm. broad, thick, firm, hemispherical, becoming convex or nearly plane, fibrillose, sometimes slightly squamose, somewhat silvery white when very young, becoming avellaneous to somewhat russet and bay brown, the margin extending beyond the gills and appendiculate by a narrow membranaceous fragment of the veil; flesh whitish or grayish, unchanging, with agreeable taste; gills close, rounded behind, free but reaching the stem, at first whitish; then reddish pink, finally Rood's brown to Van Dyke brown; spores subglobose, $6–8 \times 5–6\ \mu$; stem 2½–9 cm. long, 1–2½ cm. thick, at first solid or stuffed, becoming hollow, silky, concolorous with the pileus; annulus single, ample, thick, persistent, often striated on the upper surface by impressions of the edges of the gills.

Solitary. On dump ground, on manure and street scrapings and in a blacksmith shop. East Cambridge and Charlestown, Massachusetts. June to October. Local and probably rare.

This species is likely to be confused with the more common *A. Rodmani* but differs from the latter by browner color, longer and hollow stem, single ring and more globose spores. The drawing was made eight years before the publication of the description of *A. brunnescens*.

# PLATE 63

**Agaricus campestris** Linnæus, Fl. Suec. no. 1205. 1755.

Illustrations: Fries, Sverig. Svamp. *pl.* 5; Atkinson, Mushrooms *text f.* 1–8; Cooke, Illus. *pl.* 526 (544); Dufour, Atlas *pl.* 43 *f.* 103; Farlow. U. S. Agr. Yearb. 1897. *pl.* 21; Hard, Mushrooms *text f.* 248, 249; Peck, N. Y. State Mus. Rept. 48. *pl.* 6; Ricken, Blätterpilze *pl.* 61. *f.* 6; and many others.

*Edible*

Fructification 3–7 cm. high, with pileus 4–7 cm. broad—occasionally larger when cultivated, convex, then expanded and nearly plane, firm, even, dirty white or yellow white, occasionally glabrous but usually covered with flat, brownish, floccose scales, the margin extending beyond the gills and the edge often fringed when young with portions of the veil; flesh thick, white, not changing color when bruised, of pleasant taste and odor; gills free, not remote, crowded, ventricose, at first a delicate pink, finally burnt umber to blackish brown, the edge entire; spores blackish brown in the mass, even, $8 \times 4$–$4\frac{1}{2}$ $\mu$; stem $2\frac{1}{2}$–7 cm. long, 8–10 mm. thick or up to 15 mm. thick when cultivated, nearly equal, almost solid or stuffed, firm, white or whitish, glabrous; annulus single, white, membranaceous, midway up the stem or above, the edge torn, sometimes very narrow as in Plate 63, often more ample.

Scattered or caespitose. On the ground in lawns, pastures, manured grounds and mushroom beds. July to October, rest of the year in mushroom cellars. Widely distributed but uncommon except locally.

Plate 63 illustrates the wild or common mushroom of pastures; there is also a whiter form. Plate 64 shows the common form under cultivation through spawn in mushroom beds; there is under cultivation a browner, more scaly form also.

The common mushroom is characterized by the dark brown or seal brown color of the gills when mature and by the absence of a volva at or near the base of the stem. *Lepiota naucina*, illustrated in Plate 11, has white spores and gills which are white at first and become merely pink or brownish. This Lepiota is a very valuable edible species which is so abundant that one who knows the common mushroom can hardly fail to find and recognize the Lepiota. In gathering mushrooms in the young or button stage, great care must be taken to be sure that no specimen has a volva, in order to avoid the deadly *Amanita verna* shown in Plate 3.

# PLATE 64

**Agaricus campestris** Linnæus, cultivated form. For description see page 69.

# PLATE 65

**Stropharia rugosa-annulata** Farlow, n. sp.

Type: in Farlow Herb.

Fructification large, 10–15 cm. high, with pileus 6–15 cm. broad, somewhat conical at first, soon expanded and convex, obtuse, firm, not viscid, even, pecan brown to chestnut, streaked with innate fibrils or glabrous, barely squamulose at the apex when old, the margin inrolled; flesh about 1 cm. thick, white; gills adnate, separating from the stem, crowded, at first pale olive, then deep quaker drab, drying fuscous in the herbarium, the edge uneven; spores snuff brown under the microscope, even, slightly truncate at one end, $11-13 \times 8-9\ \mu$; no cystidia; stem 9–14 cm. long, 10–16 mm. thick, slightly tapering upward, solid but soft within and slightly yellowish, olive buff and striate below the ring, more deeply striate above it and bearing floccose masses; annulus superior, thick, composed of two layers—the lower layer greatly thickened, split radially and extending beyond and outside the margin of the pileus in about 12 horns or claws which curve about and clasp the pileus, upper layer or upper side of annulus rugosely or reticulately grooved, floccose membranaceous, and breaking away from margin of pileus so as to leave some fragments attached to the latter.

Gregarious. On cultivated ground in a cornfield. Waban, Massachusetts. September. Rare.

This species is noteworthy by its chestnut pileus, snuff brown, slightly truncate, large spores, and unique annulus with horns extending from the under side outward and upward so as to clasp the pileus like the settings of a jewel, as shown by the young fructification at the left. No still younger stage was available to show an earlier stage of the curious ring. The reference to Stropharia is due to Mr. Krieger's note that the gills are adnate. The highly developed double ring is comparable with that of *Agaricus arvensis* and *A. Rodmani.*

# PLATE 66

**Stropharia subcaperata** Farlow & Burt, n. sp.

Types: in Farlow Herb. and Burt Herb.

Fructification 8–12 cm. high, with pileus 5–12 cm. broad, convex, becoming expanded, broadly umbonate, fleshy, firm, viscid when moist, even, glabrous, cream buff to cream color, the margin decurved; flesh thin at the margin but rather thick at the disk, white, firm, with no especial taste nor odor; gills close, adnate with a decurrent tooth, 10–13 mm. broad, ventricose, grayish at first, soon clouded brownish purple and purple black with the spores; spores fuscous in the mass, even, truncate at one end, $10–13 \times 7\ \mu$; no cystidia; stem 7–10 cm. long, 12–18 mm. thick, cylindric, stuffed, colored like the pileus, squamulose with slightly darker floccose scales; annulus superior, membranaceous, colored like the stem on the under side but purple black with the spores on the upper side so as to resemble a narrow black purple band around the stem.

Solitary or two together. On leaf humus under beech trees in mountain forests usually. Cabot Mt., Chocorua and Shelburne, New Hampshire, near Lost Pleiad Pond, Breadloaf, Vermont, and Purgatory Swamp, Dedham, Massachusetts. September and October. Rare.

*S. subcaperata* may be recognized by its resemblance in stature and color to the more common *Pholiota caperata*, from which it differs by purple black gills and spores, and scaly stem. Boudier and De Seynes, who saw the plate, did not recognize this species as European; Peck regarded it as new.

# PLATE 67

**Hypholoma appendiculatum** Bulliard, Champ. Fr. *pl.* 392 (442). 1788; Fries, Syst. Myc. **1**: 227. 1821.

*Hypholoma Candolleanum* Fries, Syst. Myc. **1**: 226. 1821.—*H. incertum* Peck, N. Y. State Mus. Rept. **29**: 40. 1878.

Illustrations: Bulliard, *loc. cit.*; Berkeley, Outl. *pl.* 11. *f.* 4; Cooke, Illus. *pl.* 546 (586), 547 (587); Atkinson, Mushrooms *text f.* 26, 27; Harper, Wis. Acad. Sc. Trans. **17**: *pl.* 80, 83. *f. C*; Kauffman, Agar. Mich. *pl.* 54; Murrill, Mycologia **4**. *pl.* 56. *f.* 1, 2; Peck, N. Y. State Mus. Mem. **3**.[4] *pl.* 60. *f.* 1–9.

*Edible*

Fructification 3–7 cm. high, with pileus 3–7 cm. broad, thin, fragile, at first somewhat campanulate and obtuse, then expanded, splitting radially, hygrophanous, pale yellowish or buff when young and moist, then whitish as it expands and becomes drier except on the disk, finally tinged with purplish or vinaceous near the margin as though stained by the mature gills, even, at length glabrous, the margin sometimes appendiculate with loose fragments of the fugacious veil which soon disappear; flesh thin, white, of pleasant taste and odor; gills adnate, soon separating, very numerous, very narrow, at first white, soon with a faint flesh color or lilac tinge, finally purplish brown and Hay's brown, the edge minutely white fimbriate; spores purple brown or Hay's brown in the mass, even, $8 \times 4$–$4\frac{1}{2}$ $\mu$; cystidia in the form of sterile, inflated, cylindric, or more usually pyriform, cells $25$–$40 \times 8$–$11$ $\mu$, obtuse at the outer end, rarely constricted in the middle and fusiform below; stem $2\frac{1}{2}$–7 cm. long, 3–5 mm. thick, usually slender, equal, hollow, white, even, fragile and easily splitting, pruinose above.

Solitary, densely gregarious or caespitose, often in large clusters. On lawns and roadsides and in garden borders—especially in the vicinity of decaying, buried wood. June to September. Very common.

*H. appendiculatum* was excellently illustrated by the type plate of Bulliard with which the present plate agrees well. The illustration by Ricken represents something different and has apparently misled Kauffman. *H. Candolleanum* was segregated from *H. appendiculatum* on the trivial character that its gills from at first white become slightly lilaceous—not flesh color—before assuming the final purplish brown color. This is a nice color distinction to make and the writer is convinced by his own observation of specimens in large clusters and groups that it is not a constant character. Specimens in his herbarium had the gills as rosy for a short time as those of *Pluteus cervinus* but differed in no other respect from others of the same group referable to *H. Candolleanum* by gills for a time slightly violaceous. The name *H. appendiculatum* is based on an excellent plate and has priority. This mushroom is one of our most delicious edible species and nothing poisonous is likely to be mistaken for it.

# PLATE 68

**Bolbitius vitellinus** [Pers.] Fries, Syst. Myc. 1: 303. 1821.

Illustrations: Cooke, Illus. *pl.* 928 (678). *f. A*; Gillet, Champ. Fr. Hym. *pl.* (47); Kalchbrenner, Icones Hung. *pl.* 19. *f.* 2; Ricken, Blätterpilze *pl.* 23 *f.* 9.

Fructification 6–12 cm. high, with pileus 2–8 cm. broad, somewhat membranaceous, oval at first, obtuse, campanulate, then expanded and convex, at first pale egg yellow or olive, then becoming somewhat pale olive gray or pale smoke gray near the margin, viscid, glabrous, soon striate-furrowed and splitting from margin to the disk; gills narrowly adnate, becoming free, attenuated at both ends, thin, crowded, pale ochraceous or lemon yellow when young, becoming ochraceous tawny, crisped, scarcely deliquescing in wet weather; spores tawny or cinnamon-rufous, even, slightly truncated at one end, $11–13 \times 6\frac{1}{2}–8\ \mu$; stem 6–12 cm. long, 3–5 mm. thick, slender, fragile, equal or tapering upward, hollow, yellowish, more or less pruinose-scaly.

On manure pile. Cambridge, Massachusetts. June. Widely distributed. Infrequent.

# PLATE 69

## Top

**Coprinus soboliferus** Fries, Epicr. 243. 1836–1838.

Illustrations: Cooke, Illus. *pl.* 848 (649); Gillet, Champ. Fr. Hym. *pl.* (186) *suppl.*; Krombholz, Abbild. *pl.* 4. *f.* 1, 2.

*Probably edible*

Fructification 7–13 cm. high, with pileus 5–7 cm. long and about 7 cm. broad when expanded, ovate, becoming campanulate, then expanded, truncate, firm, silvery drab or avellaneous, with numerous brown scales, somewhat lobed and plicate, the flesh thin, white; gills free, crowded, broad, ventricose, at first white, then grayish, becoming brownish black and finally black; spores blackish brown or seal brown in the mass, truncate at one end, $9–10 \times 6–7\ \mu$; gills not available for examination as to cystidia; stem 6½–12½ cm. long, 1½–2 cm. thick and shouldered at the ring, tapering from there towards both base and apex, furrowed and white and silky striate above the ring, below colored like the pileus, striate and flocculent; ring very evanescent; stems hollow, joined together at the base into a common, tuberous, soboliferous, underground portion.

Caespitose. At bases of stumps and in vicinity of buried, decaying wood. Inman Street, Cambridge, Massachusetts. October. Rare.

*C. soboliferus* differs from *C. atramentarius* in the truncate, more squamulose pileus tending to brownish color and in stems arising from a common tuberous base. Rea regards it as a variety of *C. atramentarius*.

## Bottom

**Pholiota angustipes** Peck, N. Y. State Mus. Rept. **30**: 40. 1878.

Fructification 4–7 cm. high, with pileus 2½–6 cm. broad, fleshy, hemispherical, becoming convex or nearly plane, broadly umbonate, slightly viscid when moist, squamulose with minute, dot-like, appressed scales, clay color, becoming grayish Isabella color; flesh whitish, taste unpleasant; gills thin, close, at first broadly adnate, becoming sinuate, narrow, whitish or creamy yellow, becoming tawny brown; spores fusco-ferruginous, naviculoid, $7½ \times 4–5\ \mu$; (Peck); stem 3–6 cm. long, 5–9 mm. thick, equal or tapering downward, flexuous, stuffed or hollow, squamulose above, colored somewhat like the pileus but paler.

Caespitose. In pastures, usually near or around stumps. New England and New York. July to October. Rare.

# PLATE 70

**Gomphidius viscidus** [Linn.] var. **testaceus** Fries, Epicr. 319. 1836–1838.

Illustrations: Sowerby, Col. Fig. *pl.* 105.

Fructification 6–8 cm. high, with pileus 2–5 cm. broad, fleshy, flattened convex, becoming slightly depressed, umbonate, viscid, Hay's russet to brick red, shining when dry; flesh reddish, of mild taste; gills decurrent, distant, often branched, yellow-brown at first, then Hay's brown and fuscous; spores snuff brown in the mass, even, $16–22 \times 6–7\ \mu$; cystidia cylindric, brownish at or near apex, $130 \times 15–18\ \mu$; protruding $55–70\ \mu$; stem 3–6 cm. long, 4–7 mm. thick, paler brick color than the pileus, with base of same color, solid, equal or slightly attenuated below, fibrillose scaly.

Solitary. On the ground under pines. Shelburne, New Hampshire, and Cambridge, Massachusetts. September and October. Rare.

*G. viscidus*, as collected in Vermont, differs from the variety described above in having the upper surface of the pileus more conical, rather than flat, not as deep a red, and the stem yellow towards the base both externally and within.

## PLATE 71

**Boletus subluteus** Peck, N. Y. State Mus. Bull. 1:[2] 62. 1887.

Illustrations: Peck, N. Y. State Mus. Rept. 48: *pl.* 33. *f.* 1–6; Farlow, U. S. Agr. Yearb. 1897. *pl.* 28; Hard, Mushrooms *text f.* 297.

*Edible*

Fructification 5–8 cm. high, with pileus 4–8 cm. broad, convex or nearly plane, viscid or glutinous when moist, dingy yellowish to Sudan brown and hazel, sometimes obscurely virgate spotted or streaked with innate flocci; flesh yellowish; tubes plane or convex, adnate, small, subrotund, about 1½–1 to a mm. in dried specimens, yellow, becoming yellow ocher; spores tawny olive in the mass, even, 9–10 × 4–4½ μ; stem 4–6½ cm. long, 8–12 mm. thick, slender, equal, annulate, solid, yellowish, conspicuously dotted above and below the ring with reddish or brownish glandular dots; annulus somewhat membranaceous, glutinous, collapsing to a narrow band, persistent.

Solitary or caespitose. On sandy soil in thin pine woods and by roadsides shaded by pines. From New England westward. August to October. Frequent.

*B. subluteus* is distinguished by glutinous dark pileus, and by annulate stem dark glandular dotted both above and below the ring.

# PLATE 72

**Boletus elegans** Schum. Saell. 2: 374. 1803.

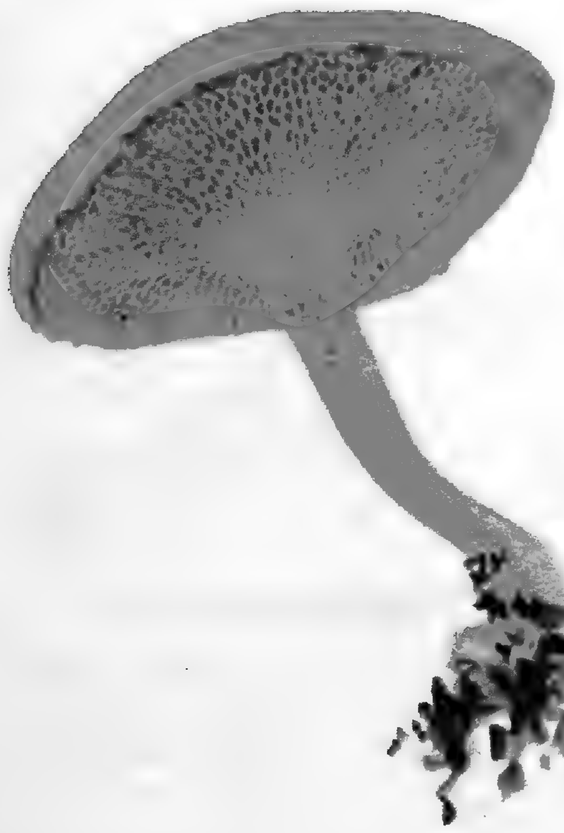
Illustrations: Bulliard, Champ. Fr. *pl.* 332 (316); Dufour, Atlas *pl.* 53. *f.* 123; Fries, Sverig. Svamp. *pl.* 76.

*Edible*

Fructification 7–11 cm. high, with pileus 5–11 cm. broad, convex, becoming plane, very viscid, empire yellow to primuline yellow, the margin thin, acute; flesh greenish yellow, becoming madder pink where bruised; tubes decurrent, pale lemon or citron yellow, becoming somewhat brownish yellow with age, somewhat madder pink where bruised, subangular, 2–2½ to a mm. in dried specimen; spores between pinkish buff and avellaneous in the mass, even, 8½–10 × 3½–4½ $\mu$; stem 5–8 cm. long, about 1½ cm. thick, cylindric, firm, often reticulate above the ring with lines prolonged from the decurrent tubes, colored somewhat like the pileus but darker and coarsely mottled below the ring, solid; ring above middle of stem, large, membranaceous, entire, erect, lemon yellow, collapsing around the stem with age.

Solitary. In a garden under *Betula alba* and near a larch tree. Newton, Massachusetts. September. Rare.

The decurrent tubes and slightly smaller spores separate *B. elegans* from the common *B. Clintonianus* of northeastern United States. The ring of European *B. elegans* is described as torn and often fugacious and there is no record of its flesh and tubes changing to madder pink where bruised. Slight differences such as these constantly embarrass one in comparing American specimens of presumably European species with their descriptions. In the case of this species a specimen collected by the writer in woods of the Earl of Lounsbury, near Selby, England, agreed in all respects with the European description and had only a part of the ring still attached and showed no change in color of gills and flesh where wounded.



# PLATE 73

**Boletus americanus** Peck, N. Y. State Mus. Bull. 1:[2] 62. 1887.

Illustrations: Atkinson, Mushrooms *text f.* 171; Hard, Mushrooms *text f.* 304; White, Conn. Nat. Hist. Surv. Bull. 3. *pl.* 29.

*Edible*

Fructification 5–10 cm. high, with pileus 3–7 cm. broad, thin, convex or nearly plane, soft, very viscid or glutinous when moist, wax yellow or empire yellow, sometimes somewhat dotted or streaked with bright red, the margin often more or less membranous fringed when young; flesh pale yellow, often pinkish after exposure to the air, somewhat acrid; tubes adnate, plane or convex, angular, rather large, about 1 to a mm. in dried specimen, pale yellow, becoming somewhat ochraceous; spores cinnamon in the mass, even, $10–11 \times 4–4\frac{1}{2}\ \mu$; stem 4–9 cm. long; 4–7 mm. thick, equal or slightly tapering upward, not bearing a ring, colored like the pileus, yellow within, glandular dotted from base to apex, with numerous brown or reddish glandular excretions.

Gregarious. On sandy ground in pine woods and by roadsides under pines. From New England westward. August and September. Common.

# PLATE 74

**Boletus punctipes** Peck, N. Y. State Mus. Rept. 32: 32. 1879.

Illustrations: Atkinson, Mushrooms *text f.* 172.

Fructification 5–12 cm. high, with pileus 5–11 cm. broad, convex or nearly plane, glutinous when moist, cinnamon buff, somewhat deeper colored at the center or nearly tawny, the thin margin becoming recurved with age; flesh yellowish not changing; tubes adnate, small, about 2 to a mm. in dried specimen, nearly cylindric, short, usually nearly plane, at first brownish, then cinnamon brown to antique brown; spores clay color in the mass, even, $9–10 \times 4\ \mu$; stem 4–11 cm. long, 6–12 mm. thick near apex, tapering upward, glandular dotted, rhubarb yellow (yellow ocher surface with cinnamon brown glandular masses), curved, solid, not having a ring.

Solitary or gregarious. On the ground in mixed woods. New England to North Carolina and westward. July to September. Infrequent.

# PLATE 75

**Boletus granulatus** Linn. Fl. Suec. No. 1249. 1755.

Illustrations: Dufour, Atlas *pl.* 64. *f.* 139; Fries, Sverig. Svamp. *pl.* 23; Hard, Mushrooms *text f.* 283; Krombholz, Abbild. *pl.* 34 *f.* 11–14; Patouillard, Tab. Anal. *f.* 355; Peck, N. Y. State Mus. Rept. **48**. *pl.* 34. *f.* 1–5.

*Edible*

Fructification 3½–7 cm. high, with pileus 4–7 cm. broad, thick, convex, viscid or glutinous when moist, varying from nearly white to kaiser-brown, often light yellow-brown; flesh white, with taste faintly sweet, pleasant, no odor; tubes short, adnate, pale yellow, becoming greenish yellow, small, about 2 to a mm. in a dried specimen, granular dotted; spores ochraceous tawny in the mass, even, 8–9½ × 3–4 $\mu$; stem 2½–6 cm. long, 8–12 mm. thick, nearly equal, solid, not annulate, whitish yellow, paler than the pileus, dotted with blackish brown or reddish brown granulations.

Solitary or caespitose. By roadsides and in thickets and mixed woods. Widely distributed. July to October. Common.

*Boletus granulatus* is highly regarded as an edible species; it occurs in abundance in gray birch thickets and groves throughout the summer if there is a favorable rainfall. Specimens of this species collected by the writer in company with Dr. Robert Fries near Upsala, Sweden, agreed closely with collections from Middlebury, Vermont. In contrast with *B. elegans*, *B. granulatus* is a species whose American specimens agree well with those of Europe and their European descriptions.

# PLATE 76

**Boletus badius** Fries, Elenchus Fung. 1: 126. 1828.

An *Boletus dichrous* Ellis, Torrey Bot. Club Bull. 6: 109. 1876?

Illustrations: Fries, Sverig. Svamp. *pl.* 50: Krombholz, Abbild. *pl.* 36. *f.* 12–18; Rostkovius in Sturm, Deutsch. Fl. 3.[5] *pl.* 5. (70).

Fructification, 5–8 cm. high, with pileus 4–6 cm. broad, convex, russet or hazel, viscid, then somewhat finely tomentose, often shining when dry; flesh white, a little brownish pink under the separable pellicle; tubes adnate or sinuate-depressed, convex, equalling or longer than thickness of pileus, angular, rather large, pale greenish-yellow, becoming greener where wounded; spores honey yellow in the mass, even, 13–15 × 5–6 $\mu$; stem 4–7 cm. long, 7–12 mm. thick at apex, nearly equal or attenuated upward, colored like the pileus except for a small yellow band at the apex, solid, more or less streaked with red or brown and covered with minute reddish brown granules but not glandular dotted.

Solitary. In moss at King's Ravine, New Hampshire. September. Rare.

This was regarded by Dr. Farlow as a small form of the species. European *B. badius* has large fructifications with stem more nearly equal than the figure on the left and with tubes and flesh becoming bluish where wounded. Perhaps this plate illustrates *B. dichrous* Ellis, a smaller and somewhat distinct species, closely related to *B. badius*, of which the writer has not seen authentic specimens. Its description follows as originally published.

**Boletus dichrous** Ellis, Torrey Bot. Club Bull. 6: 109. 1876.

*Boletus squamulosus* Ellis, Torr. Bot. Club Bull. 6: 77. 1876, but not of Fries, Epicr.

Pileus convex, 2′–3′ across, covered with a dull red, separable, viscose pellicle—flesh soft, dull yellowish-white when freshly broken, soon turning greenish-blue and finally drying to a permanent yellow—tubes of unequal size, not large, somewhat depressed around the stem, straw color, turning greenish-blue when bruised, but, like the flesh of the pileus, becoming at length permanent yellow. Stem solid, 3′ long, ½′ thick, rather enlarged below, yellow within and at the very summit, surface covered, except the yellow summit, with a red squamulose coat. Resembles *B. Frostii* Rus. but is distinguished by the color of the tubes and the different covering of the stem. Spores elliptic, about .0007′ long, one end a little bent.

In dry oak and pine woods, July, August. (Found at Newfield, New Jersey, by J. B. Ellis.)

# PLATE 77

## Top

**Boletus auriporus** Peck, N. Y. State Cab. Rept. **23**: 133. 1879.

Fructification 5–10 cm. high, with pileus 2½–7 cm. broad, convex or becoming plane, glabrous or pruinose, varying from light grayish vinaceous to chestnut; flesh white, unchangeable, slightly red next to the upper surface, with slightly astringent taste but not marked; tubes adnate, slightly depressed around the stem, bright golden yellow (empire yellow), retaining their color when dried, angular, 2–3 to a mm. or sometimes 1 to a mm. when decompound; spores honey yellow in the mass, even 11–12 × 4–5 $\mu$; stem 3–8 cm. long, 4–12 mm. thick, equal or somewhat thickened at the base, viscid or glutinous when moist, colored like the pileus at base or deeper to Morocco red, yellowish streaked with red at apex, solid.

Solitary or sometimes two together. On ground in mixed woods of chestnut, beech, etc. New England and westward. August. Infrequent.

*B. auriporus* is distinguished by the bright golden yellow tubes which retain this color in drying, and slimy stem and rather large spores.

## Lower Left Figs.

**Boletus rubinellus** Peck, N. Y. State Mus. Rept. **32**: 33. 1879.

Illustrations: Peck, N. Y. State Mus. Bull. **1**.[2] *pl.* 2. *f.* 20–22; Beardslee in Lloyd, Myc. Writ. **4**, Myc. Notes 40. *text f.* 745.

Fructification 4–7 cm. high, with pileus 2½–5 cm. broad, broadly conical or convex, viscid when moist, somewhat tomentose or slightly pubescent when dry, Etruscan red fading to yellowish on the margin; flesh whitish or yellowish, of mild taste; tubes adnate or slightly depressed around the stem, dingy reddish, becoming somewhat ferruginous; spores ferruginous-brown, 12–15 × 4 $\mu$; stem 2½–5 cm. long, 4–7 mm. thick, slender, equal, even, colored like the tubes, yellow within, sometimes yellow at the base.

Solitary. In mixed woods or under or near coniferous trees in open places. New England to North Carolina and westward. Rare.

## Lower Right Figs.

**Boletus piperatus** Bulliard, Champ. Fr. *pl.* 451 (318). *f.* 2.

Bulliard, *loc. cit.*; Dufour, Atlas *pl.* 60. *f.* 132; Fries, Sverig. Svamp. *pl.* 67; Krombholz, Abbild. *pl.* 37. *f.* 16–20; Nees, Syst. *pl.* 26. *f.* 207; Patouillard, Tab. Anal. *f.* 673; Rostkovius in Sturm. Deutsch. Fl. 3.[3] *pl.* 60 (47); White, Conn. Nat. Hist. Bull. 3. *pl.* 33.

Fructification 4–7 cm. high, with pileus 2½–7 cm. broad, convex or nearly plane, slightly viscid when moist, glabrous, vinaceous tawny to ferruginous; flesh whitish or yellow, with very peppery taste; tubes adnate, often with a decurrent tooth, rather long, angular, 1½–2 to a mm. in dried specimen, ferruginous; spores cinnamon brown in the mass, even, 9–11 × 4 $\mu$; stem 3–6 cm. long, 4–7 mm. thick, slender, equal, tawny yellow, solid.

Solitary or gregarious. In thin woods and by roadsides near white pine trees. Widely distributed from New England westward. June to September. Common.

The peppery taste is a distinctive character for recognition of *B. piperatus*.

# PLATE 78

**Boletus Ravenelii** Berkeley & Curtis, Ann. & Mag. Nat. Hist. II. **12**: 429. 1853; Grevillea **1**: 35. 1872.

Fructification 5–10 cm. high, with pileus 2½–7 cm. broad, convex, at length nearly plane, slightly viscid when young or moist, at first covered with a sulphur-yellow pulverulent tomentum (the remains of the universal veil), then becoming dull red or brownish red on the disk upon disappearence of the pulverulence; flesh whitish or somewhat yellow, changing faintly blue where wounded, of slightly acid taste; tubes adnate, depressed around the stem, pale yellow, becoming wood brown and finally umber, angular, 1–2 to a mm. in the dried specimen; spores pale ochraceous brown in the mass, even, 11–12 × 5–6 $\mu$; stem 3–8 cm. long, 6–12 mm. thick, nearly equal, clothed and colored like the pileus, with a slight, evanescent, webby or tomentose ring near the apex, solid, yellow within.

Solitary or sometimes two together. On the ground in upland and mountain forests of mixed species. Maine to North Carolina. July to September. Of wide range but rare.

*B. Ravenelii* is conspicuous and easily recognized by its sulphur yellow and pulverulent pileus and stem and presence of a ring.

# PLATE 79

**Boletus subtomentosus** Linn. Fl. Suec. No. 1251. 1755.

Illustrations: Bulliard, Champ. Fr. *pl.* 393 (328). *f.* *A*; Dufour, Atlas *pl.* 62. *f.* 136; Hard, Mushrooms *text f.* 284; Nees, Syst. *pl.* 26. *f* 206; Patouillard, Tab. Anal. *f.* 670; Richon & Roze, Atlas *pl.* 59. *f.* 7-9.

*Edible*

Fructification 5–12 cm. high, with pileus 3–10 cm. broad, convex, then pulvinate expanded, dry, villose-tomentose, tawny olive to brown olivaceous and tawny red, yellow in the chinks where cracked, often cracked; flesh white or yellowish, not changing color, with no especial taste; tubes adnate, depressed around the stem, becoming convex, wax yellow, not changing color where wounded, angular, large, about 1 to a mm. in the dried specimen; spores snuff brown in the mass, even, 12–14 × 4½–5 $\mu$; stem 3–9 cm. long, 6–18 mm. thick, equal or somewhat attenuated downward, somewhat sulcately ribbed with ribs rarely anastomosing, solid, a little paler than the pileus, scurfy with minute dots.

Solitary or gregarious. On the ground or on humus of stumps in mixed woods. Widely distributed. July to September. Common.

*B. subtomentosus* is distinguished by its somewhat tomentose pileus of tawny olivaceous color usually, often cracked and showing yellow in the fissures, and by the large, angular, wax yellow, adnate tubes. The closely related *B. chrysenteron* is red under the cuticle and has its tubes turn blue where wounded.

# PLATE 80

**Boletus Russelli** Frost, Buffalo Soc. Nat. Sc. **2**: 104. 1874.

Illustrations: Hard, Mushrooms *text f.* 306; Murrill, Torrey Bot. Club Bull. **35**. *pl.* 40.

Fructification large, 7–15 cm. high, with pileus 5–10 cm. broad, convex, thick, dry, drab gray, slightly tomentose-squamulose all over or fasciculately red pilose, yellowish beneath the tomentum, becoming areolately cracked; flesh yellowish, unchangeable, with no especial taste nor odor; tubes somewhat adnate, often depressed around the stem, greenish yellow (citron green), becoming darker and browner, angular, about 1 to a mm. in the dried specimen; spores between snuff brown and Saccardo's umber in the mass, longitudinally ribbed and furrowed, $15–20 \times 8–10\ \mu$; stem 5–12 cm. long, enlarged at base and 2–3 cm. thick, tapering upward to 1–1½ cm. thick at apex, orange vinaceous to Etruscan red, solid, yellowish white within, the surface roughened by lacerated edges of large, longitudinal, anastomosing ridges.

Solitary. On rocky ground in mixed woods. From Maine to North Carolina and westward. July and August. Rare.

In older specimens the pileus becomes more squamulose than shown in the figures. Distinguishing characters of *B. Russelli* are the dry, squamulose pileus, red, lacerated, coarsely reticulated stem, and large, longitudinally ribbed and furrowed spores which are as unique as the stem.

# PLATE 81

**Boletus speciosus** Frost, Buffalo Soc. Nat. Sc. Bull. 2: 101. 1874.

Illustrations: Hard, Mushrooms *text f.* 287.

*Edible*

Fructification large, 8–18 cm. high, with pileus 7–20 cm. broad, very thick, subglobose and compact, then convex and softer, glabrous or nearly so, red (vinaceous tawny to dahlia carmine); flesh pale yellow, changing to blue where wounded, no especial taste nor odor; tubes adnate, plane or depressed around the stem, stuffed when young, subrotund, small, about 3 to a mm. in dried specimen, pale lemon yellow or citron yellow, changing to greenish and then to blue where wounded; spores light buff to cream color in the mass, even, $10–13 \times 3\frac{1}{2}–4\ \mu$; stem stout, 5–15 cm. long, 2–5 cm. thick, nearly equal or somewhat bulbous, reticulated, wax yellow for its whole length or more or less carmine red from the base upward, yellow within.

Solitary. On the ground in rich woods. From New Brunswick throughout New England and westward. July to September. Infrequent.

This handsome Boletus is easily recognized by its red pileus and lemon yellow tubes and stem, or with the stem some shade of carmine from the base upward, and by its beautifully reticulated stem and yellow flesh and tubes changing to blue where wounded. *B. regius* of Europe is in size, aspect and color similar to red stemmed *B. speciosus* but differs by somewhat larger spores, by flesh and tubes not changing to blue where wounded, and also by not occurring with the stem wholly yellow.

PLATE 82

**Boletus speciosus** Frost. For description see page 88.

# PLATE 83

**Boletus ornatipes** Peck, N. Y. State Mus. Rept. **29**: 67. 1878.

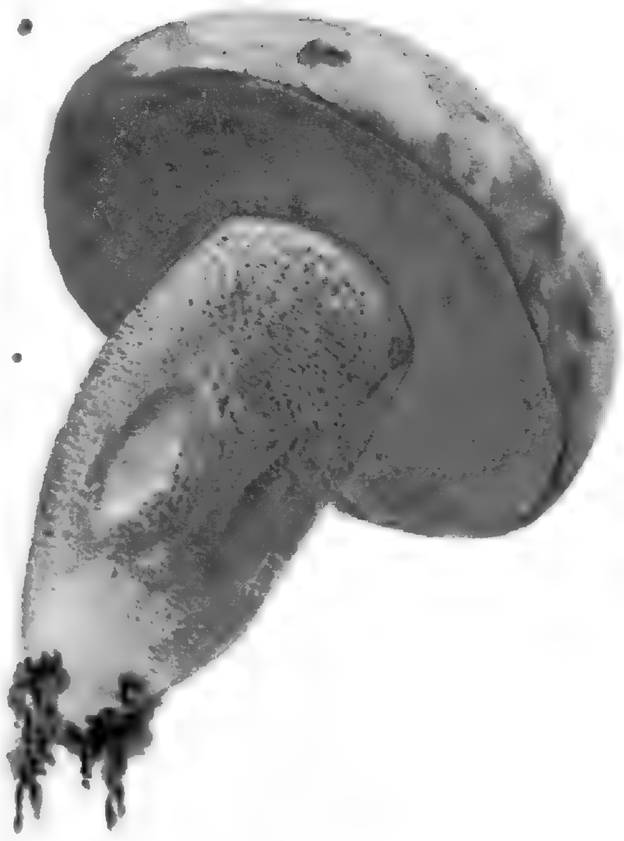
Illustrations: Peck, N. Y. State Mus. Bull. **54**. *pl.* 80. *f.* 1–5.

*Edible*

Fructification 6–14 cm. high, with pileus 5–12 cm. broad, firm, convex, dry, glabrous or very minutely tomentose, drab or Isabella color; flesh yellow, unchangeable, with no especial taste; tubes adnate, plane or nearly so, sometimes slightly depressed around the stem, aniline yellow, not changing to blue where wounded, about 2 to a mm. in dried specimen; spores snuff brown in the mass, even, 11–14×4–5½ $\mu$; stem 5–12 cm. long, 8–15 mm. thick, equal or nearly so, distinctly and beautifully reticulate throughout, yellow, solid, yellow within.

Solitary. On the ground in chestnut and beech woods. New England and westward.

This species is characterized by solitary mode of growth, beautifully reticulated clear yellow stem, which is colored like the small tubes, and by rather large spores.



# PLATE 84

**Boletus eximius** Peck, Jour. Myc. 3: 54. 1887.

*Boletus robustus* Frost, Buffalo Soc. Nat. Sc. Bull. 2: 104. 1874, but not of Fries.

Illustrations: Peck, N. Y. State Mus. Bull. 54. *pl.* 80. *f.* 6–12; Hard, Mushrooms *text f.* 292.

*Edible*

Fructification large, 7–12 cm. high, with pileus 6–20 cm. broad, at first hemispherical, becoming convex, dry, glabrous or somewhat pruinose, dark vinaceous drab to vinaceous brown with a tinge of lilac, retaining color well in drying; flesh thick, grayish or reddish white, varied with chocolate colored dots, no especial taste; tubes adnate, nearly plane, stuffed, colored like the pileus, cylindric, about 3 to a mm.; spores cinnamon brown in the mass, even, $13–17 \times 4–5\ \mu$; stem 5–10 cm. high, 1½–2½ cm. thick, nearly equal, sometimes slightly tapering upward, minutely furfuraceous, colored like the pileus, solid.

Solitary. On the ground in thin frondose woods. Throughout New England and westward. July to September. Infrequent.

*B. eximius* may be recognized by its large size, uniform vinaceous drab color of pileus, stem, tubes and flesh with usually a little more lilac tinge than shown in the plate, by tubes stuffed when young, and by rather large spores. The color is retained so well in drying that the dried specimens are readily recognizable by color.

# PLATE 85

**Boletus luridus** Schaeffer var. **erythropus** [Pers.] Fries, Syst. Myc. 1: 391. 1821.

Illustrations: Fries, Sverig. Svamp. *pl.* 12; Richon & Roze, Atlas *pl.* 60. *f.* 14-60.

*Poisonous*

Fructification large, 7–15 cm. high, with pileus 5–12 cm. broad, convex, minutely pubescent, brown, between pecan brown and burnt umber; flesh yellow, changing to blue where wounded, no especial taste nor odor; tubes free, yellow, becoming greenish, about 2 to a mm. in dried specimen, the mouths closed at first and Indian red; spores wood brown to buffy brown in the mass, even, $15–18 \times 5–7\ \mu$; stem 5–12 cm. long, 1–2½ cm. thick, nearly equal or slightly tapering upward, yellow tomentose at base, granulated and streaked with blood red above and dotted with red squamules, solid, within yellow changing to blue in upper part of stem, blood red below and at the base.

Solitary. On the ground in thin woods and groves, more frequent near conifers. New Brunswick and New England and westward. July to September. Widely distributed but infrequent.

This variety is characterized by free, yellow tubes with red mouths, yellow flesh changing to blue where wounded, and by red stem not reticulated but clothed with minute red squamules. Typical *B. luridus* has the stem reticulate with blood red veins.

# PLATE 86

**Boletus Frostii** Russell in Frost, Buffalo Soc. Nat. Sc. Bull. **2**: 102. 1874.

Illustrations: Hard, Mushrooms *text f.* 308; Peck, N. Y. State Mus. Bull. **116**. *pl.* 108.

*Edible*

Fructification 6–12 cm. high, with pileus 6–10 cm. broad, convex, firm when young, becoming softer with age, glabrous, viscid, ox-blood red; flesh nearly white, tinged with yellow next the tubes, scarcely turning blue where wounded, slightly acrid; tubes nearly free, greenish yellow with mouths blood red or cinnabar, tubes becoming yellowish brown in age, changing to blue where wounded; spores snuff brown in the mass, even, $15–16 \times 4–5\ \mu$; stem 5–10 cm. long, 1–2½ cm. thick, equal or swollen at the base and attenuated upward, solid, strongly reticulate, colored like the pileus, yellow within, often mottled with red towards the base.

Solitary. On light sandy or gravelly soils in groves of both deciduous and evergreen trees. Throughout New England and westward. July and August. Infrequent.

This beautiful Boletus may be recognized by its viscidity, dark blood-red color of pileus, tube mouths and reticulate stem, the large spores, and nearly white flesh scarcely changing to blue where wounded. The red color is usually lost in drying.

# PLATE 87

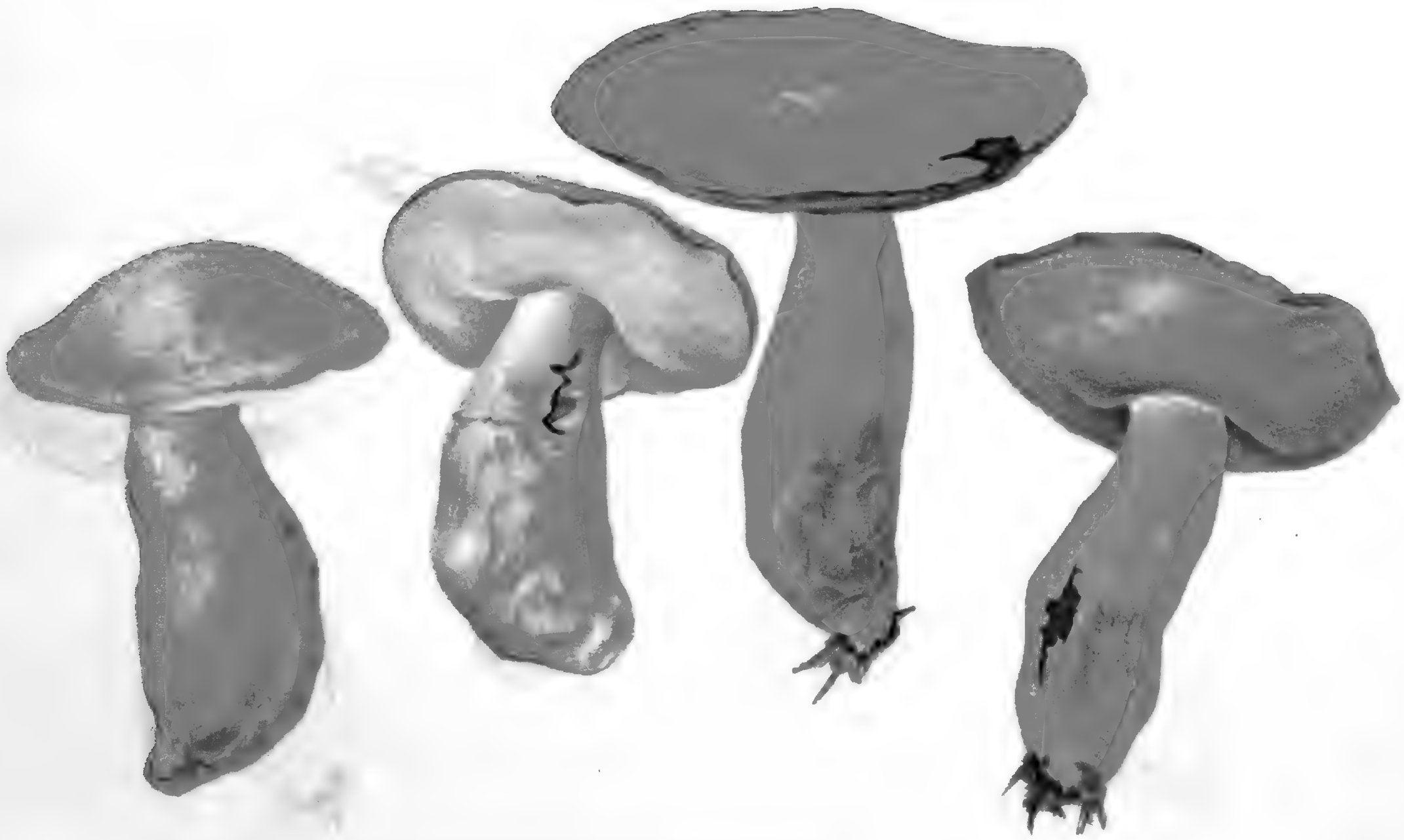
**Boletus chromapes** Frost, Buffalo Soc. Nat. Sc. Bull. 2: 105. 1874.

Illustrations: Atkinson, Mushrooms *pl.* 59; White, Conn. Nat. Hist. Bull. 3. *pl.* 31.

Fructification 6–11 cm. high, with pileus 5–10 cm. broad, convex, soon plane, slightly and sometimes fasciculately tomentose, between rose pink and rhodonite pink; flesh white, not changing, with no especial taste; tubes somewhat adnate, depressed around the stem, convex, white at first, becoming brown, about 2 to a mm. in dried specimen; spores chamois color in the mass, even, $11-13 \times 4-5\ \mu$; stem 5–10 cm. long, 8–15 mm. thick, equal or slightly attenuated upward and sometimes at the base, solid, scabrous punctate, chrome yellow (aniline yellow) at the base without and within, sometimes paler or whitish towards the apex, rarely reddish at the apex.

Solitary. On the ground in frondose woods. From New Hampshire to North Carolina. July to September. Frequent.

The yellow base of stem, the pink pileus, and the tubes white at first, are characters which render *B. chromapes* easy to recognize.



# PLATE 88

**Boletus cyanescens** Bulliard Champ. Fr. *pl.* 369 (329). 1787.

Illustrations: Bulliard, *loc. cit.*; Fries, Sverig. Svamp. *pl.* 80; Hard, Mushrooms *text f.* 288; Krombholz, Abbild. *pl.* 35. *f.* 7–9; Richon & Roze, Atlas *pl.* 59. *f.* 10–14; Rostkovius in Sturm, Deutsch. Fl. 3.[5] *pl.* 44 (79).

Fructification 5–10 cm. high, with pileus 5–10 cm. broad, convex, or nearly plane, covered with an appressed tomentum or with brownish flocculent scales, deep olive buff to clay color or somewhat brown, drying Isabella color in the herbarium; flesh white or dirty white, quickly changing to blue where wounded, with no especial taste; tubes free, depressed around the stem, convex, white, becoming yellowish, changing to blue where wounded, 2–3 to a mm. in the dried specimen; spores pale, even, variable in size, 9–11 × 5–7 $\mu$; stem 5–9 cm. long, 1½–3½ cm. thick, ventricose, villose-pruinose, stuffed, becoming cavernous and with diaphragms inside, contracted and even at the top, colored like the pileus.

Solitary. On rocky soil in frondose woods. Widely distributed from New Brunswick south and west. August and September. Frequent.

McIlvane reports this species as edible and excellent, but Richon & Roze, as suspected or poisonous. *B. cyanescens* of Europe is described with spores 8–9 × 4–5 $\mu$ and as yielding an azure blue juice when compressed.

# PLATE 89

**Boletus castaneus** Bulliard, Champ. Fr. *pl.* 328 (324). 1786.

Illustrations: Bulliard, *loc. cit.*; Hard, Mushrooms *text f.* 310, 311; Krombholz, Abbild. *pl.* 4. *f.* 28–30; Patouillard, Tab. Anal. *f.* 356; Peck, N. Y. State Mus. Rept. 48. *pl.* 36. *f.* 1–7; Richon & Roze, Atlas *pl.* 56. *f.* 11–13.

*Edible*

Fructification usually small, 4–8 cm. high, with pileus 4–10 cm. broad, convex, becoming nearly plane or depressed, firm, even, dry, minutely velvety-tomentose, cinnamon or vinaceous tawny; flesh white, not changing, pleasant to taste; tubes free, short, white, becoming pale greenish yellow, small, about 3 to a mm. in dried specimen; spores olive buff in the mass, even, $8–9 \times 5–6\ \mu$; stem 3-7 cm. long, 6–15 mm. thick, equal or tapering upward slightly, stuffed, then hollow, clothed and colored like the pileus.

Solitary. On ground in thin woods and groves. From New England westward. Widely distributed. July to October. Rather common.

*B. castaneus* may be recognized by its small fructifications with pileus and stem of chestnut or cinnamon color and minutely velvety-tomentose, by hollow stem and white, unchangeable flesh of pleasant, nutty taste.

# PLATE 90

**Boletinus pictus** Peck, N. Y. State Cab. Rept. **23**: 128. 1873.

Illustrations: Peck, N. Y. State Mus. Mem. **3**.[4] *pl.* 61. *f.* 1–5; Atkinson, Mushrooms *text f.* 175; Hard, Mushrooms *text f.* 313.

*Edible*

Fructification 5–10 cm. high with pileus 5–10 cm. broad, campanulate, then convex or nearly plane, dry, at first covered with a dense red to ox-blood red tomentum which covers the whole fructification as a veil but soon divides on the pileus into floccose scales revealing the yellow color of the pileus beneath and between the scales; flesh firm, thick, yellow, sometimes slowly changing to reddish where wounded; tubes not readily separable from the flesh above, decurrent, angular, arranged radially as though formed of broader radiating gills connected by numerous narrower, anastomosing partitions, at first pale yellow, becoming browner when old; spores clay color to tawny olive in the mass, even, $9\frac{1}{2}$–$11 \times 4\ \mu$; stem central, 3–8 cm. long, 6–12 mm. thick, equal or nearly so, colored and clothed like the pileus below the ring, which soon collapses, yellowish above the ring, solid.

Solitary or gregarious. On the ground in pine woods and borders of sphagnum swamps. From New England to North Carolina and westward. July to September. Common.

*B. pictus* may be recognized by the veil of red tomentum which covers the whole fructification in the young stage, soon separates into scales and is torn across between pileus and stem so that some portions are appendiculate to the margin of the pileus while another portion forms a somewhat evanescent ring near the apex of the stem. The tubes do not peel away clean from the pileus, as in Boletus, and they have a radial arrangement with the radial walls the thicker, best shown near the stem.

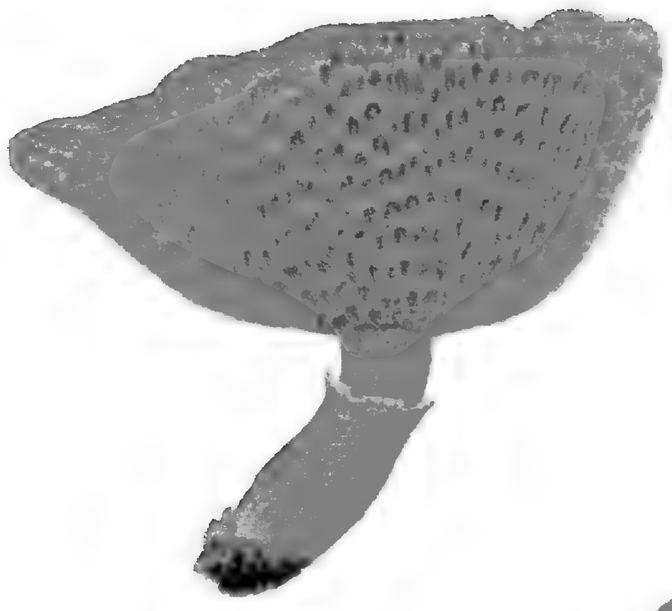
# PLATE 91

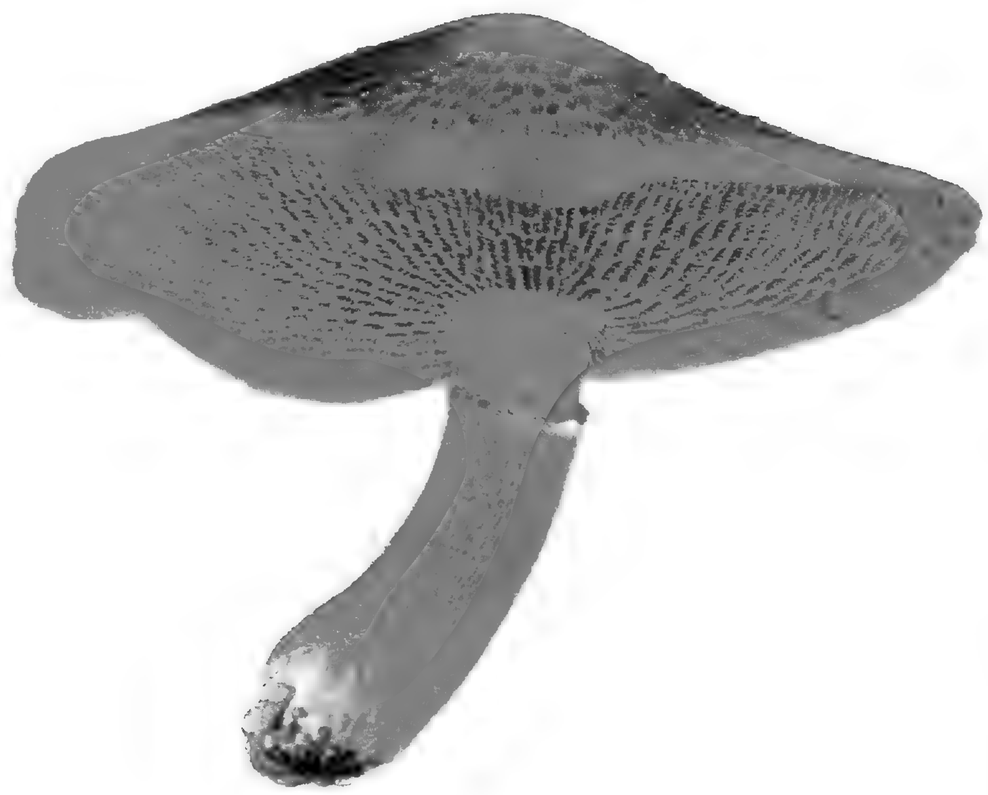
**Boletinus porosus** (Berk.) Peck, N. Y. State Mus. Bull. 8: 79. 1889.
*Paxillus porosus* Berkeley, Hooker's London Jour. Bot. 6: 314. 1847.
Illustrations: White, Conn. Nat. Hist. Surv. Bull. 3. *pl.* 28.

Fructification lateral-stemmed, with pileus 5–12 cm. broad, 1–2 cm. thick, viscid when moist, shining, bister or chestnut brown, the margin thin and even; flesh yellowish; tubes not readily separable from the flesh above, decurrent, resembling numerous broad radiating gills, branching and connected by numerous irregular veins of less prominence and forming large angular pores more or less decompound, about 1 to a mm. for the ultimate divisions in the dried specimen, yellow; spores ochraceous, even, $8–9 \times 6–7\ \mu$; stem lateral, 2–3 cm. long, 8–12 mm. thick, reticulated above by the decurrent walls of the tubes, colored like the pileus, solid.

Solitary. On the ground in moist woods and groves. From New England to Louisiana and westward. July to September. Infrequent.

The variety *opacus* Peck differs from the typical form as originally described from a gathering at Waynesville, Ohio, in not being viscid nor shining but having pileus dry and glabrous or somewhat tomentose.





# PLATE 92

## Top

**Boletinus cavipes** (Klotzsch) Kalchbrenner, Bot. Zeitung **25**: 181–182. 1867; Magyar Tudomanyos Akad. Math. Termesz. Közl. **5**: 287. *pl.* 3, *f.* 1. 1868 [A szepesi Gombak Jegyzeke **2**]

*Boletus cavipes* Klotzsch in Fries, Boleti fung. gen. illus. 7. 1835.

Illustrations: Kalchbrenner, Icones Hung. *pl.* 31; Gillet, Champ. Fr. Hym. *pl.* 448; Hard, Mushrooms *text f.* 314.

Fructification 5–8 cm. high, with pileus 4–10 cm. broad, convex, sometimes broadly umbonate, fibrillose scaly, ochraceous tawny, sometimes tinged with reddish; flesh pale yellow, slightly red under the cuticle; tubes not readily separable from flesh above, decurrent, at first pale yellow, then darker and tinged with green, finally becoming olive or olive brown, radially arranged, about ½–1 to a mm. in the dried specimen; spores pale honey yellow in the mass, even, about $9 \times 4\ \mu$; stem 4–7 cm. long, 6–12 mm. thick, hollow, equal or slightly tapering upward, bearing a slight ring near the top, reticulate above the ring with dissepiments of the tubes, floccose scaly below the ring, a little more vinaceous than the pileus; veil whitish, floccose, partly adhering to the margin of the pileus, soon disappearing.

Solitary. In sphagnum swamps under or near tamarack trees. From New Brunswick westward. September and October. Rare. This species resembles *B. pictus* in being annulate but is not as red, has a hollow stem and somewhat smaller spores.

## Bottom

**Marasmius siccus** (Schw.) Fries, Epicr. 382. 1836–1838.

*Marasmius campanulatus* Peck, N. Y. State Cab. Rept. **23**: 126. 1873; N. Y. State Mus. Bull. **105**: 34. 1906.

Illustrations: Hard, Mushrooms *pl.* 17, *text f.* 111.

Fructification tough, shrivelling in dry weather, reviving again in wet weather, 4–8 cm. high, with pileus 1–2 cm. broad, membranaceous, campanulate, dry, glabrous, distantly radiate-sulcate to the disk, ochraceous tawny to burnt sienna with a tinge of rose, the disk a little darker; flesh membranaceous; gills free or slightly attached, ventricose, distant, whitish or tinged by color of pileus; spores white, even, broader at one end, $11–15 \times 4–4\frac{1}{2}\ \mu$; stem 4–8 cm. long, about 1 mm. thick, horny, glabrous, shining, blackish brown, hollow.

Gregarious. On fallen leaves, etc., in woods. From New Brunswick south and westward. July to September. Widely distributed and common.

# PLATE 93

**Fistulina hepatica** [Huds.] Fries, Syst. Myc. **1**: 396. 1821.

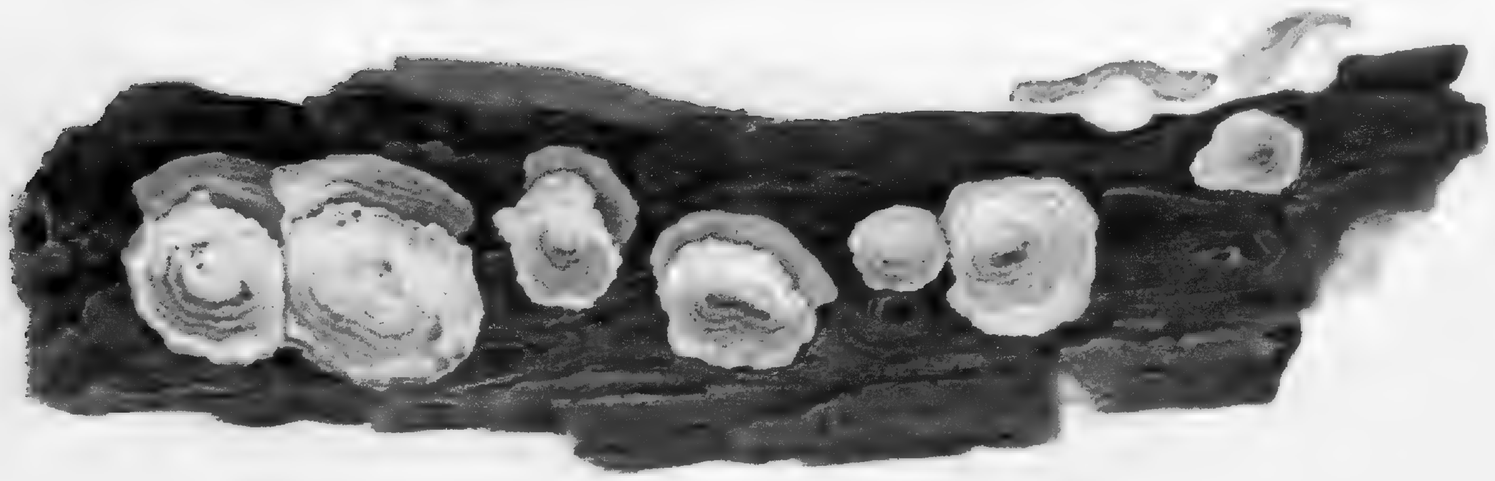
Illustrations: Fries, Sverig. Svamp. *pl.* 25; Atkinson, Mushrooms *pl.* 65. *f.* 1; Berkeley, Outl. *pl.* 17. *f.* 1; Boudier, Icones *pl.* 164; Bulliard, Champ. Fr. *pl.* 74, 464, 497, (314); Cooke, Brit. Ed. Fungi *pl.* 11. *f.* 38; Dufour, Atlas *pl.* 64. *f.* 140; Hard, Mushrooms *pl.* 43; Peck, N. Y. State Mus. Rept. **48**. *pl.* 37. *f.* 5–9.

*Edible*

Fructification 5–15 cm. and more broad, 2–3 cm. thick, usually with a short lateral stem but sometimes sessile, fleshy, firm, juicy, dark red to liver color, roundish, dimidiate or somewhat spathulate, rough, viscid; flesh red, variegated with reddish streaks, juice reddish, of pleasant, acid flavor; stem when present, lateral, 3–5 cm. long, 1–2 cm. thick, colored like the pileus, punctate; tubes yellowish or slightly tinged with pink, becoming dingy, not grown together; spores slightly colored, even, $4 \times 3\ \mu$, only a few found.

Solitary. On stumps and dead branches of oak and chestnut trees in woods in wet weather. July and August. Widely distributed but not abundant.

*Fistulina hepatica*, often called the beefsteak fungus on account of the dark red flesh as shown in the figure on the left, is one of the best of our edible species. It imparts a characteristic appetizing flavor to the other ingredients with which it is cooked. Chopped up into small pieces and cooked with a little bacon in scrambled eggs, it is a treat for camping parties.



# PLATE 94

## Top

**Fomes pinicola** [Swartz] Cooke, Grevillea **14**: 17. 1885.

*Polyporus pinicola* [Swartz] Fries, Syst. Myc. **1**: 372. 1821.—*Boletus ungulatus* Schaeffer, Fung. Bav. **4**: 89. *pl.* 137 (212). 1774.

Illustrations: Schaeffer, *loc. cit.*; Gillet, Champ. Fr. Hym. *pl.* (290); Overholts, Washington Univ. Studies **3**.[1] *pl.* 5. *f.* 27; Schrenk, U. S. Dept. Ag., Div. Veg. Phys. & Path. Bull. **25**. *pl.* 3–5, 9. *f.* 4–8, 10. *f.* 1, 4–5.

Fructification perennial, sessile, with pileus 4–10 cm. long, 6–15 cm. wide, 3–10 cm. thick, plane to convex, sometimes ungulate, dimidiate, woody and rigid, at first with a reddish resinous crust which blackens or becomes somewhat gray with age or in later years, glabrous, more or less concentrically sulcate; substance pallid or wood colored, corky to woody; tubes stratose, 3–5 mm. long, with circular mouths, 3–5 to a mm.; spores slightly colored, $6 \times 4\ \mu$.

Solitary. On pine logs. Widely distributed. Common.

This bracket fungus may be recognized by its occurrence on pine logs and stumps, pale substance with stratose tubes of the same color, and reddish resinous crust on the upper surface of the young portion of the pileus.

## Bottom

**Polystictus conchifer** Schweinitz, Naturf. Ges. Leipzig. Schrift. **1**: 98. 1822 (under *Boletus*).

*Boletus virgineus* Schweinitz, *loc. cit.* and *pl.* 2. *f.* 4–5.

Illustrations: Lloyd, Myc. Writ. **3**. Myc. Notes Polyporoid Issue **3**: 41. *text f.* 365, 366; Moffatt, Chicago Acad. Sc. Bull. **7**.[1] *pl.* 16. *f.* 2; Overholts, Washington Univ. Studies IV. **3**.[1] *pl.* 3. *f.* 10 a–e.

Fructifications of this species occur at first in the form of sterile cups which are shown magnified 2–3 diameters in Plate 94 at the bottom. From such a cup-shaped base there grows out a polyporoid pileus, not illustrated in the plate, described as follows:—

Fructifications sometimes centrally attached but usually grown out laterally from whitish sterile cups 3–7 mm. in diameter which often persist at the base of the mature fructification and are concentrically zoned with 2 to several narrow dark zones; pileus 1½–2½ cm. long, 2–5 cm. wide,

1–2 mm. thick, coriaceous, dimidiate to flabelliform, conchate, white or whitish, glabrous, azonate or with pale zones; tubes short, about 1 mm. long, thin walled, white, the mouths irregular but usually angular, about 3 to a mm., often becoming lacerate; spores hyaline, even, $6–7 \times 2\frac{1}{2}–3\ \mu$.

On dead or fallen branches of *Ulmus* by roadsides and on *Salix* in swamps. July to November. Common in eastern United States.

# PLATE 95

**Cyclomyces Greeneii** Berkeley, Hooker's London Jour. Bot. 4: 306. *pl.* 11. 1845.

Illustrations: Berkeley, *loc. cit.*: Hard, Mushrooms *text f.* 360, 361; Lloyd, Myc. Writ. 3. Myc. Notes *f.* 360.

Fructification central stemmed, 2½–8 cm. high, with pileus 2½–15 cm. broad, orbicular, spongy corky, drying rigid, more or less lobed, usually somewhat depressed, tobacco colored, ferruginous cinnamon, clothed with a short, velvety down which vanishes in parts towards the margin, where it is radiately arranged in little linear grooves and raised lines, the margin acute; substance soft, colored like the pileus; tubes 5–8 mm. long, soon breaking up to form concentric lamellae brownish but paler than the pileus; basidia with 2 sterigmata; spores brownish clay-color, even, 10–12 × 6–8 $\mu$; stem central, 2–7 cm. long, 1–2½ cm. thick, expanding above and sulcate there, colored like the pileus, velvety, spongy-solid.

Solitary. On the ground in woods. Widely distributed in eastern United States and Canada but rare.

The concentric lamellae are the remarkable and distinguishing character of this species. The type locality is Massachusetts.

# PLATE 96

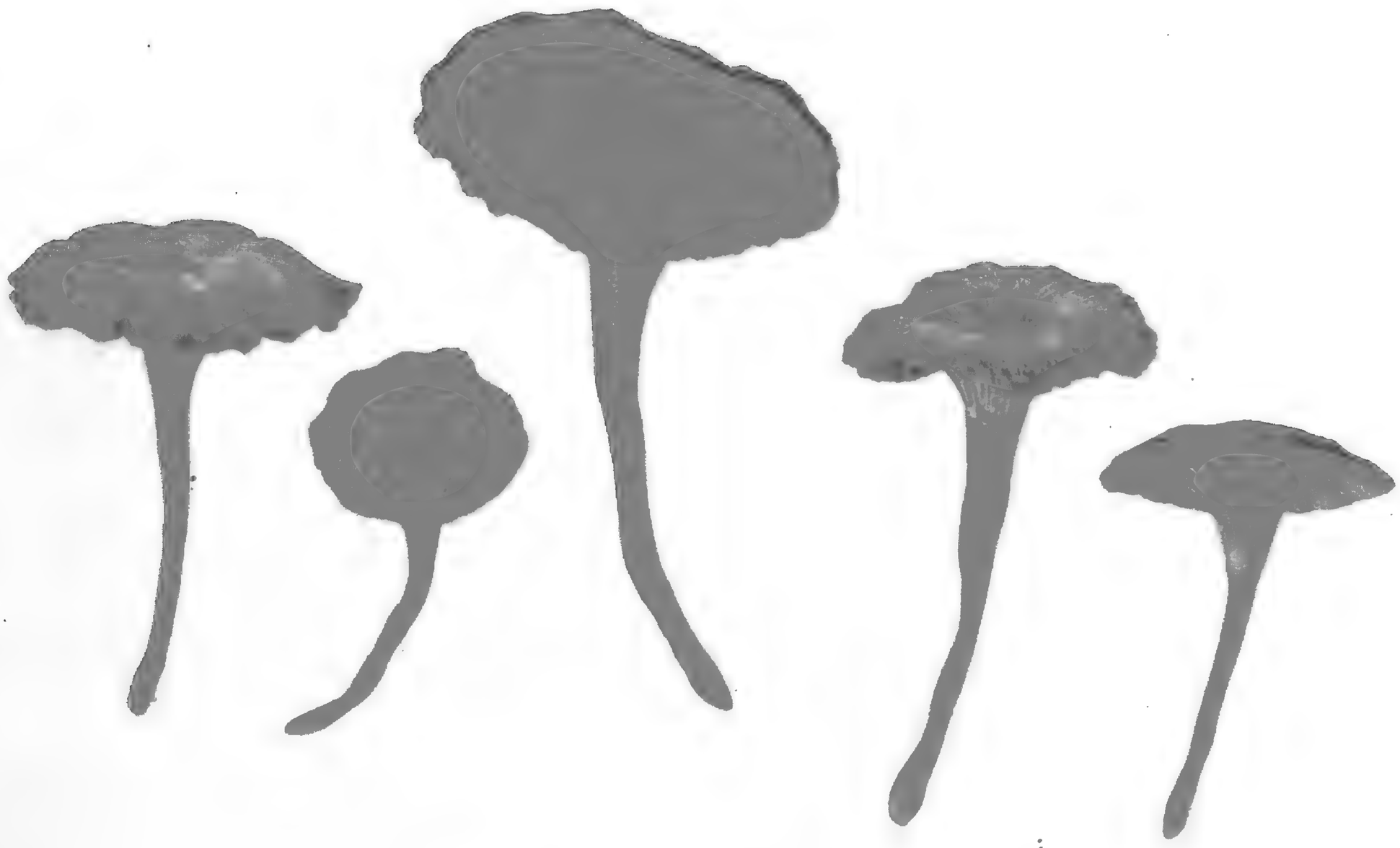
**Hydnum auriscalpium** [Linn.] Fries, Syst. Myc. 1: 406. 1821.

Illustrations: Bulliard, Champ. Fr. *pl.* 481 (303). *f.* 3; Dufour, Atlas *pl.* 67. *f.* 146; Krombholz, Abbild. *pl.* 50. *f.* 15–17; Nees, Syst. *pl.* 32. *f.* 243; Patouillard, Tab. Anal. *f.* 146; Schaeffer, Fung. Bav. *pl.* 143 (231).

Fructification 3–8 cm. high, lateral stemmed, with pileus 1–2 cm. in diameter, thin, dimidiate, reniform, coriaceous, hirsute, paler at first, then date brown and blackening, the margin sometimes lobed; teeth 1–3 mm. long, about 3 to a mm., colored like the pileus, becoming cinereous with the spores; spores white, becoming minutely echinulate, subglobose, 4 $\mu$ in diameter; stem 3–8 cm. long, 1–3 mm. thick, lateral, usually inserted in the sinus of the pileus, rarely central, swollen at the base and rooting, colored like the pileus, clothed throughout with stiff hairs like those of the pileus.

On fallen cones of *Pinus resinosus* and other conifers from Maine to Minnesota and on cones of fir in Oregon. Common in Europe but rather rare in North America.

This fungus is readily recognized by its dark, hairy, reniform or somewhat cordate pileus attached by the sinus at right angles to the slender, erect stem.



# PLATE 97

**Craterellus lutescens** [Pers.] Fries, Epicr. 532. 1838; Hym. Eur. 630. 1874.

*Cantharellus lutescens* (Pers.) Fries, Syst. Myc. **1**: 320. 1821.

Illustrations: Persoon, Myc. Eur. **2.** *pl.* 13. *f.* **1**; Bolton, Hist. Fung. *pl.* 105. *f.* **2**; Burt, Mo. Bot. Gard. Ann. **1**: *pl.* 17. *f.* 20; Peck, N. Y. State Mus. Mem. **3.**[4] *pl.* 56. *f.* 1–8; Schaeffer, Fung. Bav. *pl.* 157 (249).

*Edible*

Fructification 2½–8 cm. high, with pileus 2–6 cm. broad, thin, varying from convex and umbilicate to tubiform or funnel-shaped, often pervius, ochraceous salmon like the hymenium and stem or sometimes darker and drying smoke gray, drab or pale fuscous, the margin undulate, sometimes lobed or irregular; when fresh with the lamellae narrow, distant, forked or branched, decurrent, ochraceous salmon, drying with hymenium greatly contracted, remotely ribbed, rugosely wrinkled or nearly even between the ribs, cadmium yellow to ochraceous buff; spores even, $10–12 \times 6–8\ \mu$; stem 1½–6 cm. long, 2–5 mm. thick, flexuous, cylindric, hollow, ochraceous salmon, drying ochraceous buff.

Solitary or rarely in small clusters. On moist ground, among mosses, and about stumps in woods and shaded places. Newfoundland to North Carolina and westward to Michigan. August to October. Frequent.

*C. lutescens* is a connecting species between the genera *Cantharellus* and *Craterellus* and is included in the former genus by some authors and in the latter by others. Fries transferred it to *Craterellus* in his latest works. Fresh specimens such as were drawn in this plate are likely to be referred to *Cantharellus* because of the gills but such great changes occur through contraction of the hymenium when these specimens dry that they are likely to ultimately find place in herbaria in *Craterellus* or be sent to a specialist on the Thelephoraceæ for identification. The upper surface of the pileus is often ochraceous orange like the hymenium and stem in American specimens, as in this plate, but we have gatherings also with the upper surface fuscous or nearly so and quite comparable with European specimens.

# PLATE 98

**Clavaria pistillaris** Linn. Fl. Suec. 456. No. 1266. 1755; Fries, Syst. Myc. 1: 477. 1821.

Illustrations: Atkinson, Mushrooms *text f.* 203; Bulliard, Champ. Fr. *pl.* 244 (211); Batsch, Elenchus Fung. *pl.* 11 *f.* 46; Coker, Clavarias *pl.* 22, 23; Dufour, Atlas. *pl.* 70. *f.* 156; Hard, Mushrooms *text f.* 396; Peck, N. Y. State Mus. Bull. 94. *pl.* 93. *f.* 1–4, and Mem. 4.[3] *pl.* 66. *f.* 15–17.

*Edible*

Fructifications 5–15 cm. high, 1–5 cm. thick in the upper part, clavate or obovate, obtuse, whitish, then dingy ochraceous buff to orange cinnamon, even or nearly so, solid or somewhat spongy within, frequently cracked at the apex in large specimens revealing the white flesh ; spores white or slightly yellowish, even, 9–12 × 4½–6½ μ.

Solitary or in tufts of two or three. On the ground in frondose woods and in mountain forests. Widely distributed in the northern states. August and September. Infrequent.

**Clavaria cinerea.** *See* PLATE 58.

**Clavaria vernalis.** *See* PLATE 30.

# PLATE 99

## Top

**Clavaria fusiformis** Sowerby, British Fungi *pl.* 234, 235. 1797; Fries, Syst. Myc. 1: 480. 1821.

Illustrations: Sowerby, *loc. cit.*; Bolton, Hist. Fung. *pl.* 110; Burt. Mo. Bot. Gard. Ann. 9. *pl.* 8. *f.* 66; Coker, Clavarias *pl.* 11, 12, 82. *f.* 14; Cotton, Brit. Myc. Soc. Trans. 3. *pl.* 11. *f. A*; Hussey, Ill. Brit. Myc. 1. *pl.* 18; Patouillard, Tab. Anal. *f.* 565.

Fructifications 5–10 cm. high, simple, densely fascicled, connate at the base, amber yellow or clear canary yellow, of bitter taste when fresh; clubs elongated, acute, hollow, sometimes compressed, the tips often becoming watersoaked and brownish; basidia with 4 sterigmata; spores globose, even, minutely apiculate, 5–8 $\mu$ in diameter, at first yellow, then colorless.

Fasciculate-connate. On ground in woods. Widely distributed. August. Frequent.

This species is distinguished by the densely tufted habit, canary yellow color and bitter taste. Species of somewhat similar aspect have been described under the names *C. aurantio-cinnabarina*, *C. compressa*, and *C. platyclada* but without complete and exact record of their distinctive characters when fresh.

## Bottom

**Clavaria pulchra** Peck, N. Y. State Mus. Rept. 28: 53. *pl.* 1. *f.* 10. 1876.

An *C. persimilis* Cotton, Brit. Myc. Soc. Trans. 3: 182. 1909?

Illustrations: Peck, *loc. cit.*; Burt. Mo. Bot. Gard. Ann. 9. *pl.* 10. *f.* 93; Coker, Clavarias, *pl.* 1. *f.* 6, 7. *pl.* 13, 82. *f.* 16–18.

Fructifications simple, small, 2–6 cm. high, primuline yellow to orange, becoming darker on drying, the clubs elongate-clavate, obtuse or sometimes acute, 1½–6 mm. thick near the top, sometimes compressed and grooved, becoming hollow, tapering downward gradually into the paler or whitish stem-like base; taste sweetish; spores hyaline, even, subglobose to oblong ovoid, slightly flattened on one side, 5–8 × 4–6 $\mu$, with a lateral, oblique apiculus.

Gregarious or in small clusters. On ground or on humus of wood in mixed woods. Maine to North Carolina and in Ohio. August and September. Common.

Fine large specimens of *C. pulchra*, such as those shown by this plate, are likely to be confused with *C. inaequalis* unless the spores are examined. *C. inaequalis* has echinulate spores, while those of *C. pulchra* are even and of very characteristic form with oblique, lateral apiculus as accurately shown by Coker, *loc. cit.*, *pl.* 82, *f.* 16–18.

# PLATE 100

## Upper Fig. at Left

**Calocera viscosa** (Pers.) Fries, Syst. Myc. 1: 486. 1821.

Illustrations: Persoon, Comment. Clav. *pl.* 1. *f.* 5; Dufour, Atlas *pl.* 75. *f.* 174; Gillet, Champ. Fr. Hym. *pl.* 500 (85); Quelet, Champ. Jura 1. *pl.* 21. *f.* 5; Schaeffer, Fungi Bav. *pl.* 174 (284).

Fructifications 3–10 cm. high, branched, tough and not easily cut, gelatinous-coriaceous, viscid, ochraceous orange, even, linear; branches cylindric or compressed, concolorous, straight, repeatedly dichotomous, solid, the apex usually forked; flesh yellow, gelatinous at first; basidia forked, 2-spored; spores ochraceous, even, 8–10 × 4 $\mu$, simple, becoming septate in germination.

On coniferous wood decaying on the ground and on the ground in coniferous woods. Widely distributed in the United States. July to September. Infrequent.

This Calocera is distinguished from species of Clavaria by bifurcate basidia of Dacryomyces type and more gelatinous fructifications, which are repeatedly branched in *C. viscosa* but caespitose in the more common *C. cornea*.

## Upper Fig. at Right

**Dacryomyces deliquescens** (Bull.) Duby, Bot. Gall. 2: 729. 1829.

Illustrations: Bulliard, Champ. Fr. *pl.* 455 (218). *f.* 3.

Fructification 1–5 mm. long, 1–3 mm. broad, usually small, gregarious, pulvinate, gelatinous, somewhat wrinkled, avellaneo-ochraceous, tawny or antique brown, becoming resin colored and more flattened in drying; basidia 2-spored; spores hyaline, even, curved, simple at first, becoming 1–3-septate, 12–18 × 3½–5 $\mu$.

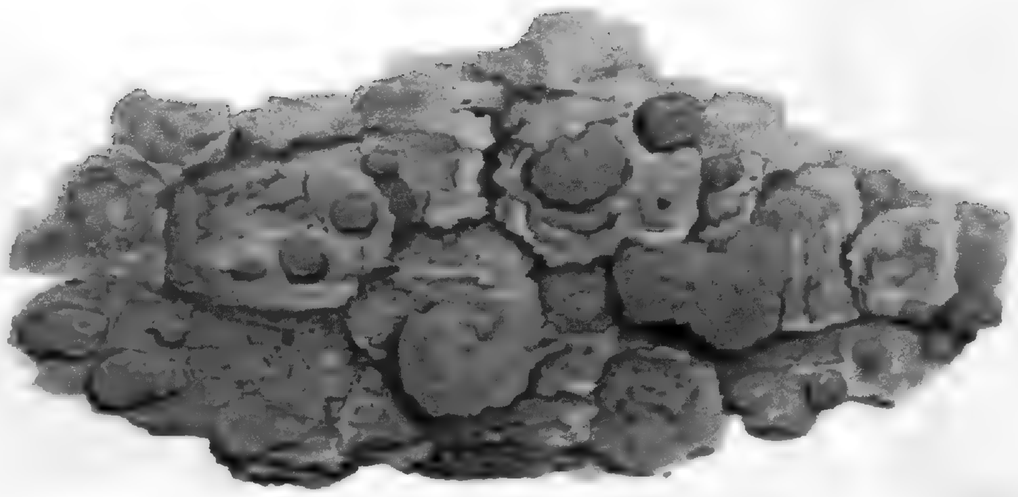
Usually on decorticated, partially decayed pine or other coniferous wood but sometimes on wood of frondose species. Vermont to Alabama, westward to Missouri, and in Alaska. March to November. Common.

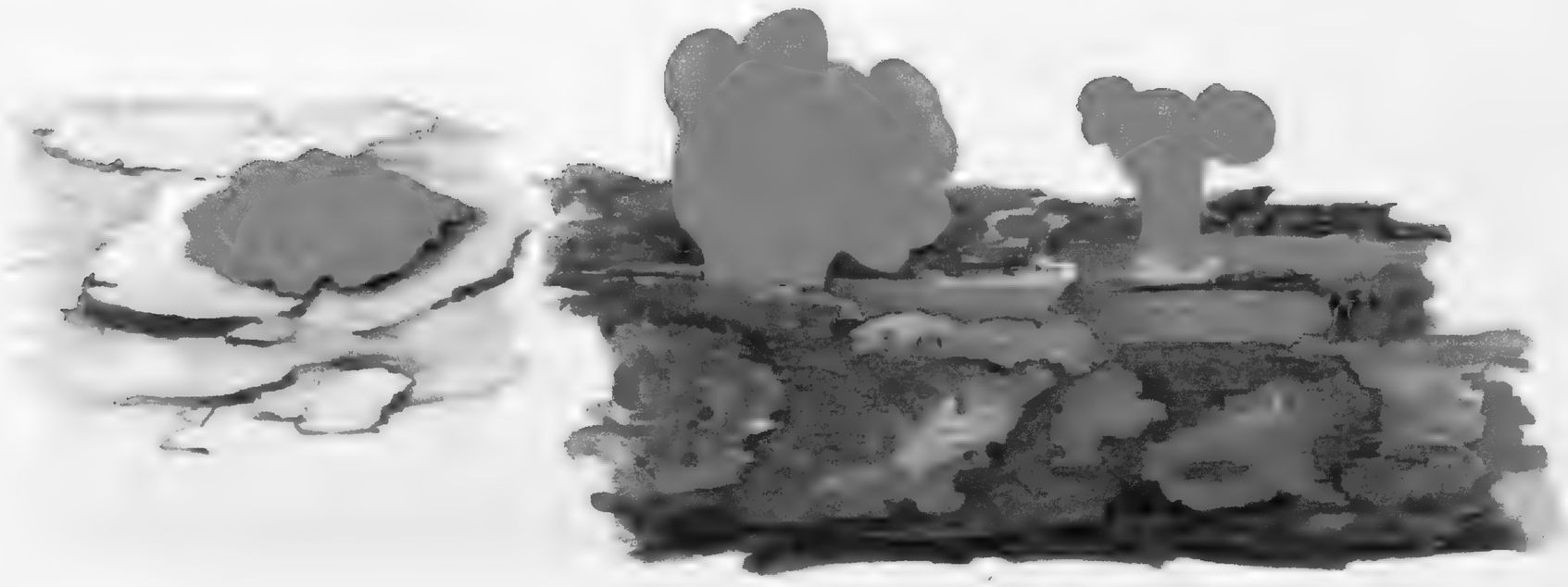
*D. deliquescens* is characterized by its small, tremelloid, smoky, ochraceous or pale greenish fructifications with somewhat wrinkled surface and spores about 15 $\mu$ long and not more than 3-septate.

## Bottom

**Dacryomyces palmatus** (Schw.) Burt, Mo. Bot. Gard. Ann. 8: 379. *pl.* 3. *f.* 2. 1921.

*Dacryomyces chrysosperma* Berkeley & Curtis, Grevillea 2: 20. 1873.





Illustrations: Burt, *loc. cit.*; Coker, Elisha Mitchell Sci. Soc. Jour. **35**. *pl.* 23. *f.* 10; *pl.* 48; *pl.* 63. *f.* 6, 7; Lloyd, Myc. Writ. **6**. Myc. Notes 64: 989. *pl.* 159. *f.* 1762; Gilbert, Wis. Acad. Trans. **16**. *pl.* 83. *f.* 25, 26.

Fructifications up to 3 cm. high, 1–2 cm. broad, and 1–5 cm. long, gregarious or caespitose and forming erect, gelatinous, rounded, brain-like, complicated masses with surface lobed and folded, slimy when wet, cadmium yellow to ochraceous orange and drying the same color, penetrating the bark by a whitish radicated base; basidia forked, 2-spored; spores colored like the fructification, curved, becoming 5–7-septate, $18–28 \times 6–7\ \mu$.

On coniferous logs, stumps and brushpiles—collected once on *Betula lutea*. Canada to Louisiana and westward to British Columbia and Washington. July to March. Common in New England.

*Dacryomyces palmatus* is distinguished by its large size, bright orange-yellow color, and large 8-celled spores. Comparison with a specimen of this species in Curtis Herb., bearing the name *Tremella aurantia*, led Dr. Farlow to list the species for New England under the name *Dacryomyces aurantius* in Appalachia **3**: 248. 1883.

# PLATE 101

**Dictyophora duplicata** (Bosc) Ed. Fisch. in Sacc. Syll. Fung. 7: 6. 1888; Burt, Bot. Gaz. 22: 387. 1896.

*Phallus duplicatus* Bosc, Gesellsch. Naturf. Freunde zu Berlin Mag. 5: 86. *pl.* 6. *f.* 7. 1811.

Illustrations: Atkinson, Mushrooms *pl.* 83; Bosc, *loc. cit.*; Hard, Mushrooms *pl.* 55; Lloyd, Myc. Writ. 2. *pl.* 118, 119.

*Poisonous*

Fructification 15–24 cm. high, with pileus 4–5 cm. broad, 4–5 cm. high, campanulate, with upper surface a dark green hymenial spore mass of fetid odor termed the gleba, and with the surface beneath the gleba sculptured with strong reticulated ridges and crests, at the apex joined with apex of stem into a white somewhat recurved portion perforate into the cavity of the stem; veil white, attached to the stem near its apex, pendant from underneath the pileus, variable in length but usually about half the length of the stem, reticulate, with the perforations smaller towards the lower border and the bars wider so as to become nearly membranaceous there; stem 10–20 cm. long, 2–3 cm. in diameter, cylindric, contracted into the truncate apical collar, fleshy, white, hollow, with the wall 4–10 mm. thick, pseudoparenchymatous, composed of several layers of small chambers; volva attached to the stem at the base, with wall up to 5 mm. thick which consists mostly of a thick gelatinous middle layer, irregularly ruptured at maturity by elongation and emergence of the stem and pileus, white or earth stained.

Solitary. On the ground about buildings, in shrubbery and about stumps in fields and thickets in wet weather. June to November. Frequent in eastern United States and the Mississippi Valley.

This phalloid or stinkhorn is distinguished from other species by its conspicuous membranaceous, perforate veil and reticulately sculptured surface of the pileus after loss of the gleba. In the developmental stages the gleba is composed of an intricately folded hymenium whose hyphal tissue and basidia deliquesce at maturity of the spores into a sirupy mass which is greedily eaten by flies. The offensive odor is usually enough to prevent all thought of human edibility of stinkhorns; they are regarded as poisonous.

## PLATE 102

### Upper Left Figs.

**Helvella infula** Schaeffer, Fung. Bav. *pl.* 159 (251). 1762–1774; Fries, Syst. Myc. **2**: 17. 1823.

Illustrations: Boudier, Icones *pl.* 223; Cooke, Mycographia *f.* 334; Fries, Sverig. Svamp. *pl.* 83; Kauffman, Michigan Acad. Sc. **1**. *pl.* 31; Krombholz, Abbild. *pl.* 21. *f.* 13–17; Schaeffer, *loc. cit.*

*Edible*

Fructification 7–18 cm. high, with pileus lobate, deflexed, even, somewhat wrinkled at the center, amber brown or reddish cinnamon, the margin adhering closely to the stem; spores hyaline, even, biguttulate, 18–22 × 7–8 $\mu$; stem 4–12 cm. long, 1–3 cm. in diameter, equal or sometimes enlarged near the base or apex, whitish or pallid, slightly villose, stuffed, then hollow.

Scattered and usually solitary. On rotting pine logs and on ground in wood roads in coniferous woods on mountains throughout the United States. August. Rare.

### Upper Right Figs.

**Morchella esculenta** (Linn.) Persoon, Syn. Fung. 618. 1801; Fries, Syst. Myc. **2**: 6. 1823.

Illustrations: Atkinson, Mushrooms *pl.* 85; Berkeley, Outl. *pl.* 21. *f.* 5; Bulliard, Champ. Fr. *pl.* 218 (274); Cooke, Mycographia *f.* 312; Dufour, Atlas *pl.* 78. *f.* 183; Farlow, U. S. Agr. Yearb. **1897**. *pl.* 29. *f.* 2; Fries, Sverig. Svamp. *pl.* 54; Hard, Mushrooms *text f.* 409; Peck, N. Y. State Mus. Rept. **48**. *pl.* 3. *f.* 1–3.

*Edible*

Fructification 6–12 cm. high, with pileus 3–4½ cm. broad, inflated, globose or sometimes narrowed towards the apex, with base adnate to the stem, surface honeycombed with firm anastomosing ribs bounding broad pits which are irregularly arranged, not in longitudinal rows, and with diameters of the same pit nearly equal in all directions; asci cylindric, 8-spored; spores even, 20–24 × 12–15 $\mu$; paraphyses filiform, slightly thickened above; stem 3–5 cm. long, about 1–1½ cm. thick, cylindric, white, fleshy.

Solitary or two together. On the ground under trees in spring and early summer—often in orchards

and where ground has been burnt over. Widely distributed in United States. April and May. Common locally.

Species of Morchella, the morels, are ascomycetous fungi which differ from kinds illustrated in all the preceding plates by having their spores contained in sack-like asci which are arranged side by side, or with alternating paraphyses, in the hymenium lining the pits of the pileus. Other common and equally edible morels related to *M. esculenta* are *M. deliciosa* of form very like the small figure on the right and *M. conica* which has a conical pileus with the pits arranged in longitudinal rows. The form of pileus and arrangement of pits is often rather variable among specimens of the same gathering and presumably of but one species.

## Middle of Bottom Row

**Helvella albipes** Fuckel, Symbolae 334. *pl.* 5. *f.* 2. 1869.

Illustrations: Fuckel, *loc. cit.*; Boudier, Icones *pl.* 234 as *Leptopodia albella*; Cooke, Mycographia *f.* 336; Gillet, Champ. Fr. Discom. *f.* 80 (72); Kauffman, Michigan Acad. Sc. **1.** *pl.* 30; Quelet, Champ. Jura Suppl. **20.** *pl.* 6. *f.* 16. as *Elvella albella*.

Fructification 2½–5 cm. high, with pileus 2 cm. broad, lobed, with lobes deflexed, even, hair brown to fuscous, emarginate, the under side whitish or pallid gray; spores hyaline, even, 18–22 × 11–12 μ, uniguttulate, borne 8 to an ascus; stem 2–3 cm. long, 2–3 mm. thick, cylindric, white, somewhat puberulent.

Solitary. On moss and under alders and conifers. Williamstown, Massachusetts, and Tolland, Colorado. September. Local.

Specimens from the Massachusetts gathering were referred by Boudier to *H. albella* and they agree well with Boudier's plate of that species, but they agree closely also with an authentic specimen of *H. albipes* in Farlow Herbarium. *H. albipes* has priority. The American specimens have the pileus bilobed but it is not always 2-lobed in Europe.

## Bottom Row extreme Left and Right Figs.

**Gyromitra esculenta** (Pers.) Fries, Summa Veg. Scand. 346. 1849.

Illustrations: Persoon, Champ. Com. *pl.* 4; Fries, Sverig. Svamp. *pl.* 82; Boudier, Icones *pl.* 224; Burt, Rhodora **1.** *pl.* 4. *f.* 2; Cooke, Mycographia *f.* 328; Dufour, Atlas *pl.* 78. *f.* 185; Kauffman, Michigan Acad. Sc. **1.** *pl.* 32; Peck, N. Y. State Mus. Rept. **48.** *pl.* 5. *f.* 1–3.

*Edible*

Fructification 4–8 cm. high, with pileus inflated, rounded, lobed, gyrose-convolute, bay brown or hazel, glabrous, supported on the stem by attachment here and there of the margin; spores hyaline, even, obtuse at the ends, ellipsoidal, $20–26 \times 10–12\ \mu$, borne 8 to an ascus; stem 3–4 cm. long, stout, sometimes swollen and furrowed towards the base and sometimes towards the apex, whitish, stuffed or hollow.

Solitary or in clusters of two to four. On sandy ground during wet weather and in wet ravines near pines. Widely distributed. May and June. Infrequent.

*Gyromitra esculenta* may be recognized by the brain-like convolutions of its hazel or bay brown pileus and by the ellipsoidal spores. Old specimens and those kept rather a long time have been reported poisonous; freshly gathered specimens which are not too old may be eaten in moderation.

# PLATE 103

## Top

**Microglossum rufum.** (Schw.) Underwood, Minnesota Bot. Studies **1**: 496. 1896; Durand, Ann. Myc. 6; 406. *pl.* 5. *f.* 9–14. 1908.

Form *Geoglossum luteum* Peck, N. Y. State Mus. Rept. **24**: 94. *pl.* 3. *f.* 20–24. 1872.

Illustrations: Peck, *loc. cit.*; Burt, Rhodora **1**. *pl.* 4. *f.* 10; Cooke, Mycographia *f.* 12; Hard, Mushrooms *text f.* 423.

Fructification 3–5 cm. high, clavate, rather slender, with ascigerous portion 1½–2½ cm. long, 3–6 mm. thick, stipitate, mustard yellow, sometimes more dingy, usually somewhat compressed or longitudinally furrowed, obtuse, glabrous; spores hyaline, even, slightly curved, at first multiguttulate, finally 5-septate, 26–35 × 5 $\mu$, 8 to an ascus, biseriate; stem 2–2½ cm. long, 1½–2 mm. thick, nearly cylindric, paler than the ascigerous part, squamulose.

Solitary, gregarious or subcaespitose. On mossy banks and on humus of wood in woods. July to September. Frequent in eastern United States.

This species has the aspect of a small yellow Clavaria but is distinct by showing its spores contained in asci if a portion of the hymenium is examined with the compound microscope.

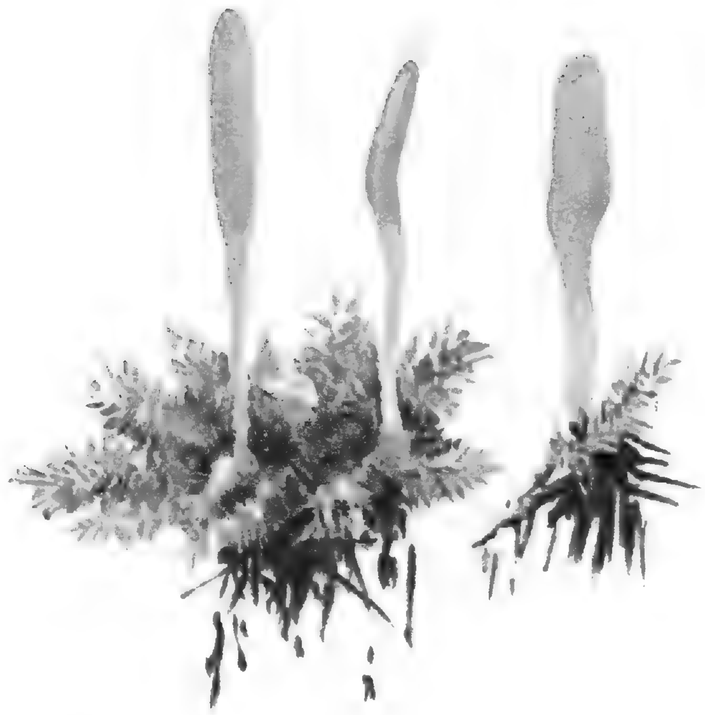
## Figs. at Left in Middle Row

**Leotia lubrica** (Scop.) Persoon, Römer's N. Mag. Bot. **1**: 97. 1794.

Illustrations: Atkinson, Mushrooms *text f.* 221; Berkeley, Outl. *pl.* 22. *f.* 1; Bulliard, Champ. Fr. *pl.* 473 (296). *f.* 2; Burt, Rhodora **1**. *pl.* 4. *f.* 12; Cooke, Mycographia *f.* 171; Dufour, Atlas *pl.* 80. *f.* 188; Durand, Ann. Myc. 6. *pl.* 11. *f.* 106, *pl.* 20. *f.* 213; Hard, Mushrooms *text f.* 425.

*Edible*

Fructifications 2–6 cm. high, stipitate, tremelloid, more or less viscid, cream color, often with a greenish or olive tinge; the ascigerous portion pileate, 1–1½ cm. broad, convex, with the surface often irregularly furrowed, the margin recurved, often slightly lobed, supported on the apex of the stem; spores hyaline, even, finally 5–7-septate, straight or curved, 20–24 × 5–6 $\mu$, borne 8 to an ascus; paraphyses branched, filiform, with the tips enlarged and agglutinated by amorphous matter; stem 1½–5 cm. long, 5–10 mm. thick, cylindric or somewhat compressed, often slightly tapering upward, hollow.



Usually densely caespitose. On damp ground in woods or on wood humus. Canada and eastern United States and westward to Missouri. July to September. Very common.

This fungus is regarded as edible but not choice.

## Figs. at Right in Middle Row

**Mitrula vitellina** Bres. var. **irregularis** Peck, N. Y. State Mus. Rept. **48**: 130. *pl.* 5, *f.* 8–14. 1896.

*Geoglossum irregulare* Peck, N. Y. State Mus. Rept. **32**: 45. 1879.

Illustrations: Peck, *loc. cit.* and N. Y. State Mus. Bull. **1**.[2] *pl.* 1. *f.* 5–7; Durand, Ann. Myc. **6**. *pl.* 5. *f.* 7, 8; Massee, Ann. Bot. **11**. *pl.* 12. *f.* 23–24a.

*Edible*

Fructification 2–5 cm. high, with the ascigerous portion clavate, of irregular form, twisted or contorted, compressed, sometimes lobed, obtuse, cadmium yellow or egg yellow, tapering below into the short, rather distinct, yellowish or whitish stem ; spores hyaline, even, simple, 8–10 × 4–5 $\mu$, 8 to an ascus, uniseriate.

Caespitose or solitary. On bare soil, mossy damp places, and in paths in woods—most frequently in pine woods. New Brunswick and Ontario to District of Columbia and in Colorado. September to November. Infrequent, sometimes abundant locally.

## Bottom

**Cudonia lutea** (Peck) Saccardo, Atti Real. Ist. Venet. VI. **3**: 725. 188

*Vibrissea lutea* Peck, Buffalo Soc. Nat. Sc. Bull. **1**: 70. 1873; N. Y. State Mus. Rept. **25**: 97. *pl.* 1. *f.* 19–23. 1873.

Illustrations: Burt, Rhodora **1**. *pl.* 1. *f.* 8, 8a; Durand, Ann. Myc. **6**. *pl.* 11. *f.* 105, *pl.* 21. *f.* 216–219; Massee, Ann. Bot. **11**. *pl.* 12. *f.* 5–7.

Fructification 1½–3 cm. high, yellow, drying vinaceous buff, coriaceous-fleshy, with the pileus 5–15 mm. broad, convex, covered when young by a membrane which cracks and falls away later leaving remnants attached to the reflexed margin, the under side of the pileus somewhat ridged or striate with the ridges running down the stem ; spores hyaline, even, multiseptate, 50–72 × 2 $\mu$, borne 8 to an ascus in a fascicle in the upper part of the ascus ; stem 1–2½ cm. long, 2–5 mm. thick, cylindric or somewhat tapering upward, sometimes slightly compressed, solid.

Gregarious or rarely clustered. On ground and rotting leaves in pine and beech woods. Ontario, New England, New York and Tennessee. August and September. Common.

This American species is distinguished by its large spores, yellow color and the veil-like covering of the young pileus.

# Indices

# Indices

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