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Bulletin No. 29: Common Mushrooms of New England

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COMMON MUSHROOMS OF NEW ENGLAND



THE CONNECTICUT ARBORETUM
CONNECTICUT COLLEGE

BULLETIN NO. 29
NEW LONDON, CONNECTICUT

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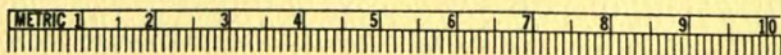
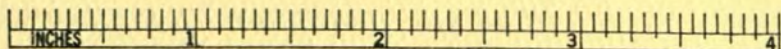
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Front Cover: Honey Mushroom (*Armillariella mellea*)

Back Cover: Turkey Tails (*Polyporus versicolor*)



COMMON MUSHROOMS OF NEW ENGLAND

JOHN C. COOKE

University of Connecticut
at
Avery Point

Illustrations by
CHRISTINE W. AMEELE

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THE CONNECTICUT ARBORETUM

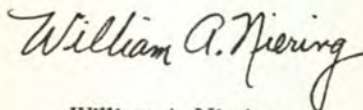
FOREWORD

It was during an Arboretum mushroom collecting trip by the local mycological society that the idea for this bulletin evolved. I was truly amazed at the diversity of mushrooms found and the excitement created among the participants. Therefore, the aim of this publication is to share this exciting facet of the natural world with a broader audience.

For thousands of years men have been attracted by mushrooms. In Guatemala mushroom stones, some 3000 years old, were presumably associated with mushroom cults by which they were used in religious rituals. The Mazatex Indians in present-day Mexico have night-long ceremonies between shaman and patient, the former using the potential "power" of the mushroom to interact with supernatural forces.

The mushrooms, representing some 38,000 species, are merely one group of the fungi which number over 100,000 kinds. They are among the antibiotics of modern medicine. They also account for many of our plant diseases. Ecologically, they are recognized as Nature's decomposers. In the upper eight inches of the soil it is estimated that there are nearly five metric tons of fungi and bacteria per hectare. These, along with the mushrooms, represent the silent recyclers which gain their energy from dead leaves and logs and thereby significantly contribute to soil formation. Currently, man is mimicking this basic ecological process by attempting to recycle resources as much as possible.

I wish to acknowledge the dedication of Dr. John Cooke for his painstaking effort in writing the text and guiding Chris Ameenle whose artistic talent greatly enhances this work. The editorship of Dr. Randall Ameenle and Mr. Glenn Dreyer in presenting a most meaningful format is greatly appreciated. We also wish to acknowledge Tami Trask, our typesetter, and Mike Shinault, our printer, for their meticulous high quality workmanship.



William A. Niering,
Director

INTRODUCTION

Fungi are a vital group of organisms in the woodland habitat. Their interaction with other organisms along with their unique structure and method of growth has given them recognition as a separate kingdom of organisms. The types of fungi familiar to even the most casual observer includes mushrooms, boletes, bracket (shelf) fungi and puffballs. Large numbers of other types of fungi are frequently not observed because they are short-lived and because their small size requires the use of a hand lens or a microscope to be seen.

Structure and Ecological Role of Fungi

Fungi are saprotrophic or parasitic organisms that reproduce by microscopic spores. Most produce a cellular type of growth that is best described as fine, branching, thread-like filaments. These microscopic threads, called hyphae, develop from the spores. All of the hyphae of the fungus are collectively referred to as the mycelium. Hyphae often group together into larger visible strands, so that the mycelium is seen as a network of stringy filaments under decaying leaves, logs, beneath bark, or wherever the fungus might be growing. A mushroom is composed of a mass of mycelium. When opposite mating types of hyphae come in contact, a sexual reproductive mycelium is formed that can produce spore-forming structures under proper temperature and moisture conditions. These are the familiar fungus-type structures mentioned above. Each forms its spores on or in specific parts of the structure such as the gills of the typical mushroom or in the pore tubes of the boletes and bracket fungi. When the spores are released, they are carried by air currents or in some cases by water or insects. If they land on a suitable substrate, the spores give rise to new hyphae and mycelium, thus beginning a new cycle of growth.

The fungi play an important role in the forest ecosystem. There is no question of their function in the decomposition of dead plant and animal litter. The growing hyphae and mycelium secrete digestive enzymes that result in the breakdown of decaying matter such as the cellulose and lignin of woody plants. The soluble products of this digestion are absorbed and respired by the fungi. In this manner, the fungi gain substance and energy for growth while liberating carbon dioxide bound up in the dead organic matter. The carbon dioxide is used again by green plants as an essential substrate for the process of photosynthesis. Also, during this breakdown process, minerals are released into the soil and taken up by plants. Thus, it can be seen that fungi are important in the recycling of carbon and minerals in nature.

Important fungal tree pathogens and wood decay fungi occur in our area. The destructive nature of several diseases such as Dutch elm disease, American chestnut blight, target canker of yellow birch, and black knot of cherry may be observed frequently. Wood decay of living and dead trees may involve fungi that produce spores on mushrooms such as *Armillariella mellea* often associated with oaks or on bracket fungi such as *Polyporus betulinus* on gray birch. In some cases it is not clear whether a specific fungus associated with wood decay causes the death of a living tree or if it follows the death of the tree. In either case, specific species of fungi are associated with certain types of wood decay in particular species of trees.

Fungi also play an important role in the forest by forming symbiotic relationships with the roots of trees and other plants. This relationship, which is called a mycorrhizal association, is most often mutually beneficial to both the host and the fungus. The hyphal strands form an intimate association with the growing roots of the host plant, extending from the roots throughout the soil and increasing the area of absorption of water and minerals that move into the roots of the host. The fungus in return receives organic compounds directly from the roots.

If eaten, some mushrooms are deadly poisonous, some cause intestinal upset, and some may cause allergic reactions in sensitive individuals. The importance of correct identification of wild mushrooms cannot be overemphasized if they are to be used as food. Proper methods of collecting wild mushrooms for eating are described in several mushroom field guides (see Suggested Readings). The emphasis of this booklet is not on mushrooms as food but rather to serve as a primer for the identification of common mushroom species in the Connecticut College Arboretum and surrounding woodlands.

Names of Fungi

Since common names of mushrooms are very variable, it is helpful to become familiar with their Latin names. Each mushroom species is given two Latin names — a genus name and a species name. These names are always underlined or written in italics. For example, the common store-bought mushroom has the genus name *Agaricus* and the species name *campestris*. It is referred to as *Agaricus campestris*. In most field guides, as in this text, when the name of a fungus is used several times on a page, the genus name is abbreviated by the first letter, e.g., the above becomes *A. campestris*.

It is not uncommon to find a mushroom described under more than one genus name if you compare several mushroom field guides on identification. This leads to much confusion for the person first learning common mushrooms, who may have trouble learning just a single Latin name. It is probably best for the beginner to place initial emphasis on the key features of the freshly collected mushroom and to use the name given in the field guide or key being used to identify the specimen collected. Other names that are used for the same mushroom can be learned later as one becomes familiar with the identification of mushrooms. Name changes have occurred in the past and will probably occur in the future for some species, due in part to ongoing scientific study of specimens. Such studies may reveal microscopic and chemical features that indicate that a specimen previously thought to be a certain species, is actually a different species, although the two may appear to be identical in the field. Name changes also have occurred when the rules of nomenclature have not been followed in naming a specimen. These rules are taken from the International Code of Botanical Nomenclature. In some instances, adoption of new names that conform to the rules of the Code has occurred for species that had not been previously named according to the rules. More detailed discussion of the reasons why name changes have occurred among the mushrooms is presented in *An Index of the Common Fungi of North America* (Miller and Far, 1975) and in *One Thousand American Fungi* (McIlvaine and Macadam, 1973). In the species descriptions used in the following pages, alternate names are provided for certain species. This allows the reader to compare the descriptions

and illustrations used herein with those in other field guides that may list the species under a different name.

Spore Color Determination

Since spores are formed on the gills and pore tube surfaces of many fungi, it is often assumed that one need only look at the color of the spore-forming surface of a specimen to determine the spore color. However, the most accurate method of arriving at spore color as described in most field guides is to make a spore print. This is done by cutting off the stem of a specimen (if present) directly below the cap and placing the specimen with its spore-forming surface on white paper. The specimen is usually covered with a glass for an hour or more, or in some cases overnight. The spores are deposited in mass on the paper. The spore color given for the genera described is based on the color observed in such mass deposits. For some mushrooms, spore deposits may occur on the stem surface, on leaf litter in the area immediately around the mushroom or on the cap surface of another mushroom if the mushrooms grow in overlapping clusters. Such deposits often do not suggest the true shade seen on white paper but they can be useful in some cases. In a few species, spores are so numerous on the gill surface that they do color the gill. Knowing when to use gill color as a guide to spore color comes only with experience.



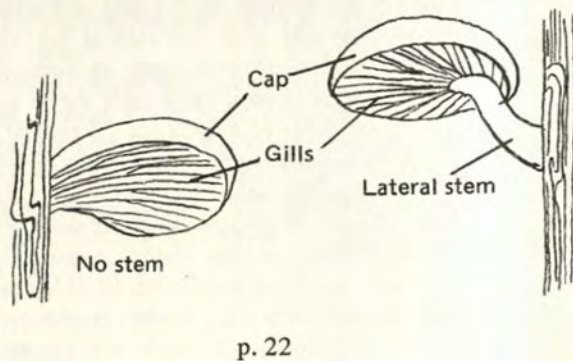
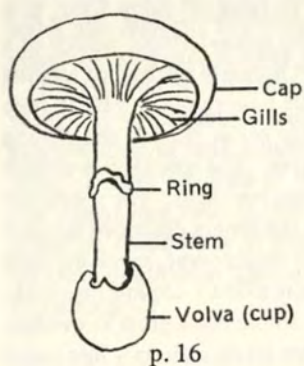
PICTORIAL GUIDE TO MAJOR GROUPS OF FUNGI

Members of the kingdom Fungi considered in this text are macroscopic terrestrial forms that are common in southeastern Connecticut. They belong to a major subdivision of fungi known as the Basidiomycotina (Basidiomycetes). The genera chosen for illustration are particularly common in the Arboretum and surrounding woodlands. However, many are not restricted to this area and may be found throughout other parts of Connecticut and the northeastern United States.

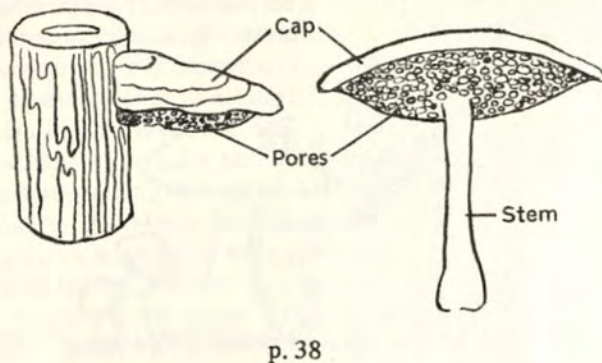
The following simple illustrations are provided to familiarize the reader with some of the basic macroscopic features that are useful in identifying the major groups of Basidiomycetes. The characteristics shown are used in the various keys throughout the booklet.

MAJOR GROUPS OF FUNGI

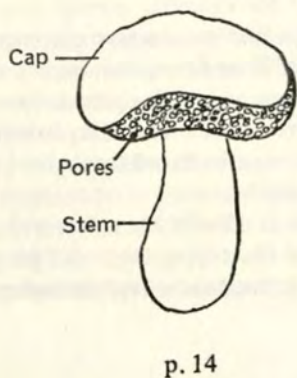
GILLED MUSHROOMS



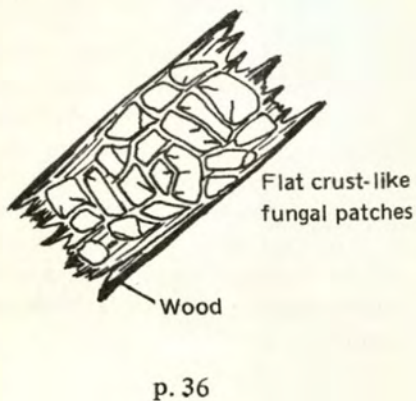
BRACKET FUNGI AND PORED-LEATHERY MUSHROOMS



PORED-FLESHY MUSHROOMS



SMOOTH-SURFACED FUNGI



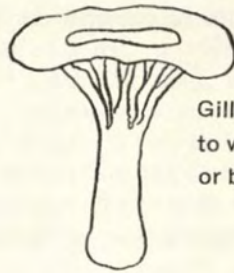
MAJOR GROUPS OF FUNGI

CORAL FUNGI



p. 30

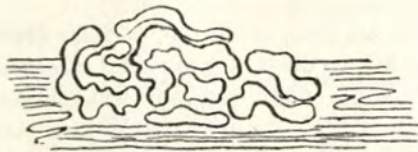
CHANTERELLE FUNGI



Gills reduced to wrinkles or blunt ridges

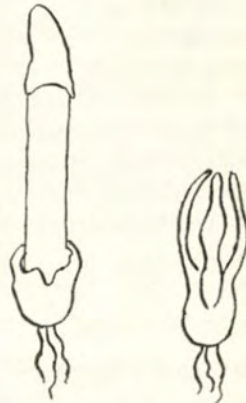
p. 28

JELLY FUNGI



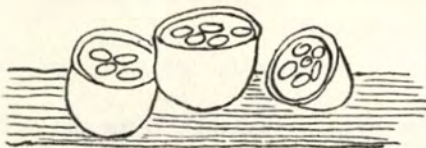
p. 36

STINKHORNS



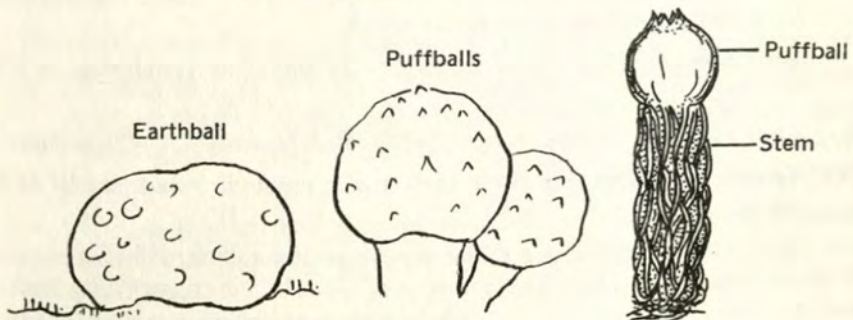
p. 32

BIRD'S NEST FUNGI



p. 32

PUFFBALL AND STALKED PUFFBALL FUNGI



p. 34

p. 32

KEYS TO FUNGI OF THE CONNECTICUT ARBORETUM

On the basis of the preceding illustrations you may be able to place a specimen in one of the proper major groups. If not, an unknown specimen may be placed in a group using the following key, entitled "Key to Major Groups." Species that have certain features in common are placed together into groups called families, while groups of families are placed in more inclusive categories called orders. These groupings suggest a close relationship between the included species. After observing the features of an unknown specimen, choose between the paired alternate characteristics given by the letters to the left in the key. For example, if the fungus has fleshy gills, choose A; if it is not fleshy or lacks gills, then choose AA. The latter indicates one should move onto the B alternatives. If you continue this procedure of choosing between alternatives given in the key, you will eventually reach the name of a major fungus group. From there you can turn to the pages indicated to see if your specimen can be matched with one of the given illustrations and descriptions. Supplementary keys to the gilled fungi (page 10), the pored and bracket fungi (page 12), and to species of the genus *Polyporus* (page 13) are presented because these are large groups with many common representatives. These keys are used in the same way as the Key to Major Groups.

If your specimen does not match up with one given in a key or with the descriptions given, do not be too surprised. There are hundreds of species that occur in any area and no single key or book can cover them all. Additional books and field guides are listed in the reference section (page 44). These contain many additional genera and species of fungi. Several contain colored illustrations and thus are particularly useful to the beginning student. However, beware; many species can only be identified with certainty by looking at microscopic characteristics.

Key to Major Groups

- A. Spore-forming region characterized by distinctly radiating, fleshy gills on the lower surface of a mushroom cap or shelf-like fungus Gilled Mushrooms (Agaricales) See Key p. 10
- AA. Spores not formed on fleshy gills B
 - B. Spores formed in pores on the lower surface of a cap or shelf or on teeth-like projections from crusts on sticks C
 - BB. Spore-forming region smooth, wrinkled, slimy (gelatinous) or not exposed E
- C. Crust with teeth-like projections, light to dark brown. *Hydnochaete* p. 36
- CC. Spores formed on the lower surface of a cap from round, angular or fusing pores. D
 - D. Fruiting structure a fleshy mushroom structure with distinct pores on the undersurface of the cap Pored-Fleshy Mushrooms (Boletaceae & Strobilomycetaceae) See Key p. 12

- DD. Fruiting structure tough, leathery, corky or woody with the lower surface of the cap bearing minute round or angular pores (may require a hand lens to be seen), or with the pores fusing to form a labyrinth or irregular gilled appearance, or the pores giving way with age and forming minute teeth or spines. Bracket Fungi & Pored-Leathery Mushrooms (Polyporaceae) See Key p. 12
- E. Fruiting structure having an exposed spore surface that is smooth to wrinkled; the texture is leathery or fleshy F
- EE. Fruiting structure if entirely gelatinous will have an exposed smooth spore surface, but if partially gelatinous (associated with a young egg stage of development), then forming its spores with age on a slimy head region of a simple or branched stem; or, the fruiting structure not gelatinous and the spores not borne on an exposed surface H
- F. Fruiting structure when found on wood is flattened against the surface of the wood with a disk shape, or is raised from the wood and forms overlapping bracket-like structures; when found on the ground or on buried wood, it is erect, with a stem and a depressed cap, sometimes having a cup shape; texture leathery for all forms Smooth-Surfaced Fungi (Stereaceae) p. 36
- FF. Fruiting structure found on the ground, erect; texture fleshy to brittle (never gelatinous) G
- G. Fruiting structure an erect, simple club-shaped structure or a much-branched coral-shaped structure; the clubs and branches are rounded and smooth. . . Coral Fungi (Clavariaceae) p. 30
- GG. Fruiting structure a funnel-shaped mushroom with the outer, lower surface smooth to wrinkled; the cap is often deeply depressed Chanterelle Fungi (Cantharellaceae; a family in the gilled mushrooms) p. 28
- H. Fruiting structure smooth, with a texture that is gelatinous, cartilage-like, or rubbery, and dries to a tough rubbery or crust-like state; reviving to its original texture when moistened. Jelly Fungi (Auriculariaceae, Dacrymycetaceae, & Tremellaceae) p. 36
- HH. Not with the above characteristics I
- I. Possessing a slimy, dark-colored, stalked, spore-forming region that has a strong fetid odor J
- II. Not having a slimy region or fetid odor K
- J. Fruiting structure with a stem that is branched near the apex, a slimy spore mass covering the inner surface of the branches; the branches may come together near the top and in some are fused together at the tips. . Stinkhorn Fungi (Clathraceae) p. 32
- JJ. Fruiting structure having an unbranched stem with a tapered or cap-like apex, the latter being smooth or with a network of ridges; a slimy spore mass occurs on the outer part of the upper stem or covers the cap-like region Stinkhorn Fungi (Phallaceae) p. 32

- K. Fruiting structure shaped like a small bird's nest (usually less than 1-2 cm high) and containing small egg-shaped structures in which the spores occur; may be found on wood or soil Bird's Nest Fungi (Nidulariaceae) p. 32
- KK. Not with the above characteristics L
- L. Fruiting structure is round to pear-shaped, without a stem, and varies in size from 2-3 cm to 50 cm broad; spores borne internally; the covering tissues of the fruiting structure are thin to very thick; in some, the spores (usually violet, brown to black in color) are released as a dry dust powder from an opening that forms in the covering tissues near the apex . Puffball Fungi (Lycoperdaceae) p. 34
- LL. Fruiting structure usually with a bright orange to red round spore case on a stalk, covered with a clear gelatinous material; an opening at the apex through which spores escape is often surrounded by a distinct ridged area Stalked Puffball Fungi (Calostomataceae) p. 32

Key to Gilled Fungi

- Spore print black, gills turn into a black inky liquid *Coprinus* p. 24
- Spore print pink, gills pinkish *Pluteus* p. 16
- Spore print purplish, chocolate or blackish brown (A)
- Spore print rusty to cinnamon brown (B)
- Spore print white or near-white (D)
- A. No ring on stem *Naematoloma* p. 20
- AA. Ring present on stem *Agaricus* p. 16
- B. Cottony web of hyphae covering the gills of young specimens *Cortinarius* p. 24
- BB. Not as above. (C)
- C. Convex to cone-shaped cap, on wood or in moss *Galerina* p. 20
- CC. Convex cap usually with scales on surface; on wood . . *Pholiota* p. 20
- D. Bracket fungus with gills or a mushroom with gills reduced to folds (E)
- DD. Mushrooms with gills (K)
- E. Mushrooms funnel-shaped with gills reduced to wrinkles or folds (F)
- EE. Bracket fungi with gills present, may be reduced to folds, with or without a lateral stem (G)
- F. Mushrooms brown to black *Craterellus* p. 28

- FF. Mushrooms yellow, orange or red; gills running down stem are forked or reduced to ridges *Cantharellus* p. 28
- G. Bracket fungi usually without a lateral stem (H)
- GG. Bracket with a lateral stem (often reduced) (J)
- H. Bracket with concentric zones of color on upper cap; 'gills' with radiating ridge-like appearance *Plicaturopsis* p. 40
- HH. Gills not ridge-like (I)
- I. Gills notched along the edges like the blade of a saw . *Lentinellus* p. 22
- II. Bracket, hairy, grayish white; gills split along the edges and curled back *Schizophyllum* p. 40
- J. Convex cap is depressed at the stem or the region of attachment *Pleurotus* p. 22
- JJ. Cap convex to flat, not depressed at region of attachment to wood *Panellus* p. 22
- K. Gills free from the stem (L)
- KK. Gills attached to the stem (M)
- L. Lacking a true stem cup (volva) at the base of the stem; forming scales on the cap that develop from the cap tissue and thus do not peel off *Lepiota* p. 18
- LL. Forming a well-developed stem cup at the base of the stem; cap with warts or patches of tissue not formed from the cap tissue and thus may be rubbed off *Amanita* p. 18
- M. Gills waxy (N)
- MM. Gills not waxy (O)
- N. Mushrooms usually bright yellow, orange or red . *Hygrophorus* p. 24
- NN. Mushrooms not bright-colored, gills usually pink . . *Laccaria* p. 26
- O. Mushroom funnel-shaped, gills extending down the stem . *Clitocybe* p. 28
- OO. Not as above. (P)
- P. Mushrooms small with narrow stems (Q)
- PP. Mushrooms large with stems wider than 1 cm . . . (R)
- Q. Stem fleshy, mushrooms not reviving when placed in water after drying *Mycena* p. 26
- QQ. Stem tough to horny, mushrooms reviving in water after drying *Marasmius* p. 26
- R. Cap and gills secreting drops of fluid (latex) when cut *Lactarius* p. 16
- RR. Not as above. (S)
- S. Occurring on wood (T)
- SS. Not on wood (U)

- T. Mushrooms in clusters at the base of trees and old stumps *Armillariella* p. 18
- TT. Mushrooms occurring singly on rotting stumps and logs or on buried wood *Tricholomopsis* p. 30
- U. Stem brittle, breaking like a piece of chalk; upper membranous tissue of the cap easily and cleanly peeled from the cap tissue *Russula* p. 16
- UU. Stem pulpy to fibrous, may be brittle; upper membranous tissue of the cap not easily and cleanly peeled away . . *Tricholoma* p. 30

Key to Genera of Pored-Fleshy Mushrooms, Bracket Fungi and Pored-Leathery Mushrooms

- A. Fleshy mushrooms with caps having pores in place of gills. B
- AA. Woody, leathery brackets or non-fleshy mushrooms with a pore surface E
- B. Cap covered with gray-brown to blackish coarse scales *Strobilomyces* p. 14
- BB. Cap smooth C
- C. Spore print pink, rose or purple brown *Tylophilus* p. 14
- CC. Spore print olive-brown, yellow-brown to brown D
- D. Cap often slimy and sticky; pores radiating in rows from stem to margin of cap *Suillus* p. 14
- DD. Cap dry; pores not in radiating rows *Boletus* p. 14
- E. Brackets perennial (with more than one layer of pore tubes seen when the specimen is cut through the center F
- EE. Brackets or mushrooms annual (with a single layer of pore tubes). G
- F. Upper surface of bracket red or gray, smooth, with a varnished appearance; pore surface becomes discolored when bruised *Ganoderma* p. 42
- FF. Upper surface not shiny; pore surface does not become discolored when bruised *Fomes* p. 42
- G. Brackets with elongate pores or in some specimens forming irregular leathery gill-like structures *Daedalea* p. 42
- GG. Brackets or mushroom structures with distinct pores . . . *Polyporus*
See Key p. 13

Key to Species of Polyporus

- A. Tough to leathery mushroom structure occurring on wood *P. brumalis* p. 38
- AA. Bracket or funnel-shaped structures B
 - B. Bracket occurring on living or dead birch trees . *P. betulinus* p. 38
 - BB. Bracket occurring on logs or stumps other than birch. C
- C. Funnel-shaped structure occurring at the base of conifers *P. schweinitzii* p. 38
- CC. Not as above. D
 - D. Bracket with a lateral stem or branching stem system. E
 - DD. Bracket lacking a stem F
- E. Bracket attached to wood by a single short lateral stem . *P. squamosus* p. 40
- EE. Developing a central stem with numerous branches, each a small bracket *P. frondosus* p. 38
 - F. Large (25 cm wide) overlapping, yellow to orange brackets. *P. sulphureus*
 - FF. Small (less than 12 cm wide) overlapping brackets G
- G. Brackets bright orange on upper and lower surface and throughout the inner tissue *P. cinnabarinus* p. 38
- GG. Not as above. H
 - H. Brackets white, soft and watery when fresh *P. albellus* p. 38
 - HH. Not as above. I
- I. Pore surface pale violet with a pore-free area along the thin undermargin *P. pargamenus* p. 38
- II. Not as above. J
 - J. Overlapping leathery brackets with the upper surface possessing distinct, concentric colored zones. . . . *P. versicolor* p. 40
 - JJ. Overlapping leathery brackets with upper surface not zonate; pore surface forming teeth in older specimens *P. pubescens* p. 40

PORED-FLESHY MUSHROOMS

STROBILOMYCES (spore print dark brown). These mushrooms have convex caps and stems covered with *gray-brown to blackish coarse scales*. The spore-bearing surface has large *angular pores*. When the cap flesh is cut, the cap *turns reddish and then black*. Specimens occur singly or in small groups on the ground in wooded areas.

Pine Cone Mushroom (*Strobilomyces floccopus*) is a common species with pine cone-like scales on the cap. Frequently found scattered in oak woods. Cap: 15 cm wide. Stem: 12 cm x 25 mm. A second species, generally considered rare, *S. confusus*, is somewhat smaller and is best separated from *S. floccopus* on the basis of microscopic spore features.

TYLOPILUS (spore print pink, rose or sometimes brown or purple-brown). These mushrooms have a convex cap and a *pore surface in place of gills*. The stem is usually *ornamented with elongate dots* or a network of ridges.

Bitter Bolete (*Tylopilus felleus*) forms a *large, convex, tan to brown cap*. The *pink pore surface* gives rise to a rose or pink spore print. The flesh of the *cap changes from white to pale-pink when bruised*. The base of the stem is slightly swollen and the upper part usually has a network of ridges. This species is found on the ground usually associated with *rotten stumps of conifers*. Also called *Boletus felleus*. Cap: 30 cm wide. Stem: 12 cm x 25 mm.

SUILLUS (olive-brown spore print). Forms mushrooms with caps and stems that may be hairy and sticky. The spores are borne in tubes and are released through loose, radially arranged rows of pores on the underside of the cap. A ring may be present in some species.

Painted Suillus (*Suillus pictus*) forms a somewhat yellowish, convex cap that may be tacky when fresh and that is covered with tufts of brick red hairs. The tubes and stem are yellow and may turn reddish if bruised. This species is found growing on the ground under eastern white pine. Cap: up to 12 cm wide. Stem: up to 12 cm long and 25 mm wide.

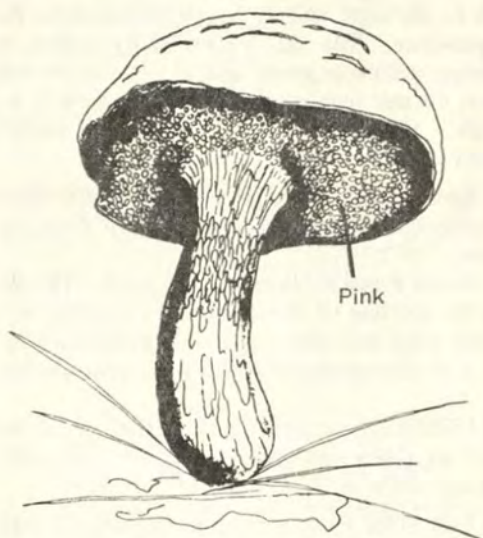
BOLETUS (spore print olive-brown). Boletes have dry convex caps with a *pored undersurface*. The stem is either smooth or has a network of ridges. Most species are found on the ground under hardwoods and conifers.

Red Bolete (*Boletus frostii*) is a beautiful specimen having a *dark red cap, stem and pore surface*. Bright yellow drops of fluid are exuded from the pores when the specimens are young. The cap, stem and *pores turn blue when bruised*. The stem has a prominent *network of yellow ridges*. Specimens are usually found under oak trees. Cap: 15 cm wide. Stem: 10 cm x 20-30 mm.

PORED-FLESHY MUSHROOMS



Pine Cone Mushroom
Strobilomyces floccopus



Bitter Bolete
Tylopilus felleus



Painted Suillus
Suillus pictus



Red Bolete
Boletus frostii

GILLED MUSHROOMS

RUSSULA (spore print white or in some species pale yellow). Mushrooms with convex to *flat caps* and thick, cylindrical stems that give most specimens a *short compact appearance*. The cap is covered by a thin, membranous tissue that is *purple, red, orange, yellow or green* and which may be easily peeled away from the cap. Cap and stem do not separate easily. They have a *brittle texture* and break like a piece of chalk. The gills are usually white and are attached to the stem. Occurring on the ground.

Red Russula (*Russula emetica*) easily distinguished by *red color of the cap* and fragile white stem. White spore print. Cap: 10 cm wide. Stem: 8 cm long and 15 mm wide.

Green Russula (*Russula virescens*). The greenish cap has a *patchy appearance* due to the splitting of the cap's outer membrane, exposing the white tissue beneath. The spore print and gills are white and the stem is white to pale-green. Not Illustrated.

A similar species of *Russula*, *R. xerampelina*, has a purplish-red cap.

PLUTEUS (spore print pink). These mushrooms have convex caps and central stems that are fleshy and *easily separated*. The *gills are free from the stem*. Species occur on logs and stumps or on buried wood.

Pink-gilled Pluteus (*Pluteus cervinus*) forms a brown to pale tan, convex to cone-shaped cap. The center of the cap is usually darker and bears flattened hairs. The *gills become pink* as the spores mature. Often found growing on buried wood. Cap: 10 cm wide. Stem: 12 cm x 15 mm.

LACTARIUS (spore print white or pale yellow). Mushrooms with *depressed caps* that are white, yellow, orange, pale blue or yellowish brown and with short, thick, brittle stems. *Clear, white or colored latex* fluid exudes from the gills when broken. The white to cream *gills are attached to the stem* and *frequently extend down the stem*. Occurs on the ground.

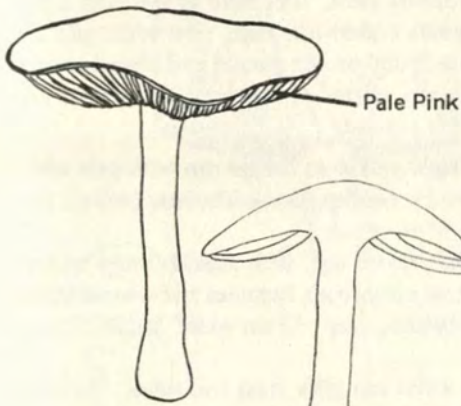
Peppery Milk Cap (*Lactarius piperatus*) is a common whitish mushroom with tannish areas. When broken the *white latex* dries pale yellow. Distinguished by a depressed cap and gills extending down stem. Cap: 12 cm wide. Stem: 6 cm x 2 cm.

Two similar, common, white species are *L. deceptivus* and *L. subvellereus*. The gills of *L. deceptivus* are not close together and the cap is inrolled with a cottony margin while *L. subvellereus* has a velvet-like cap surface and a very pale greenish blue region where the gills meet the stem. Not Illustrated.

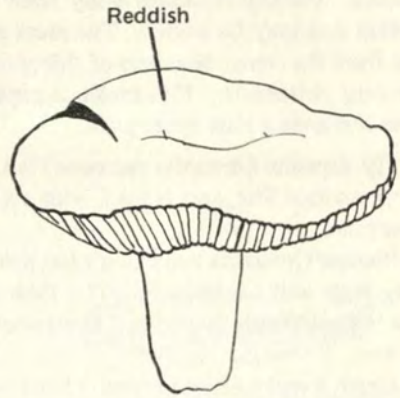
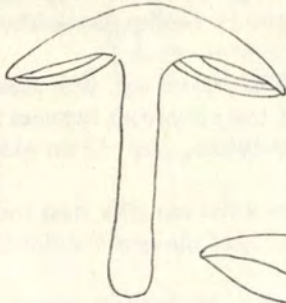
AGARICUS (spore print purple-brown to chocolate or blackish brown). The caps are convex to flat, white to brown, often with flattened scales, and are moist to dry but not sticky. The flesh may stain yellow or red when bruised. The *cap is easily separated from the stem*. The stem bears a *ring* (annulus). The *gills are free from the stem*, pink to gray when young, but dark brown when the spores mature. The species are found in humus-rich areas.

Meadow Mushroom (*Agaricus campestris*) occurs in pastures. The cap becomes off-white to light brown with age, and may bear hairs that form flattened scales. The stem is tapered at the base and bears a *ring* in fresh specimens. Varieties of this species are cultivated commercially. Cap: 10 cm wide. Stem: 6 cm x 18 mm.

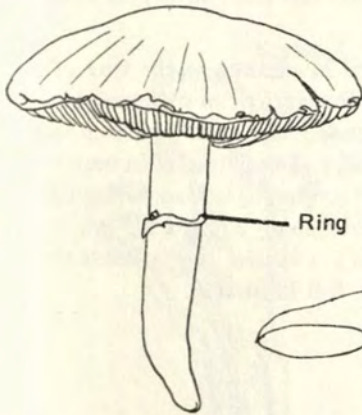
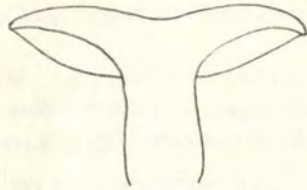
GILLED MUSHROOMS



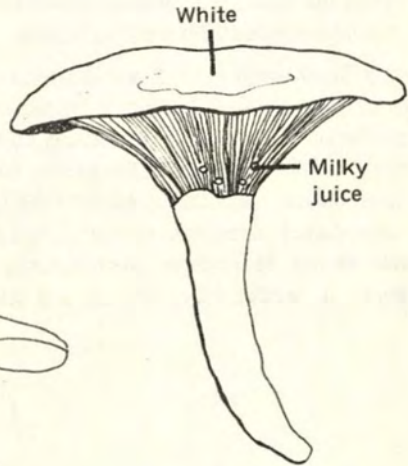
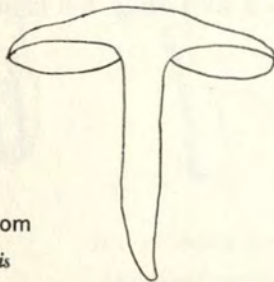
Pink-gilled Pluteus
Pluteus cervinus



Red Russula
Russula emetica



Meadow Mushroom
Agaricus campestris



Peppery Milk Cap
Lactarius piperatus

GILLED MUSHROOMS

AMANITA (spore print white). These mushrooms have convex caps with scale-like patches. The cap separates easily from the fleshy stem. The stem grows from a *cup* (volva) that may be buried. The stem possesses a *skirt-like ring*. The white gills are free from the stem. Members of this genus are found on the ground and several species are very poisonous. *Volvariella*, a genus closely related to *Amanita*, has similar features but gives a pink spore print.

Fly Amanita (*Amanita muscaria*) has a *bright yellow to orange cap* with pale *white warts* on top. The stem is thick with a ring and a *swollen pouch-like base* (volva). Not Illustrated.

Blusher (*Amanita rubescens*) has a reddish-brown cap, with pinkish warts on top. *Ring* large and conspicuous. The flesh of this mushroom becomes *red when bruised*. The volva is knob-shaped and somewhat indistinct. Cap: 12 cm wide. Stem: 12 cm x 20 mm.

Death Angel (*Amanita virosa*) has a pure white cap, gills, stem and volva. The volva is a loose cup and there are white warts on top of the cap. Not Illustrated.

LEPIOTA (spore print white or off-white). Mushrooms possess convex *caps with scales*. The cap is easily separated from a hollow or solid stem. The stem bears a distinct ring and has a bulb-shaped base. The gills are white and free from the stem.

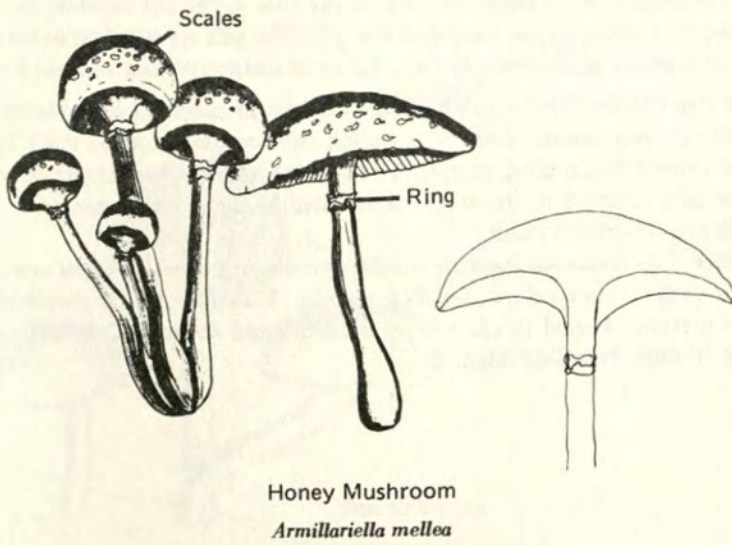
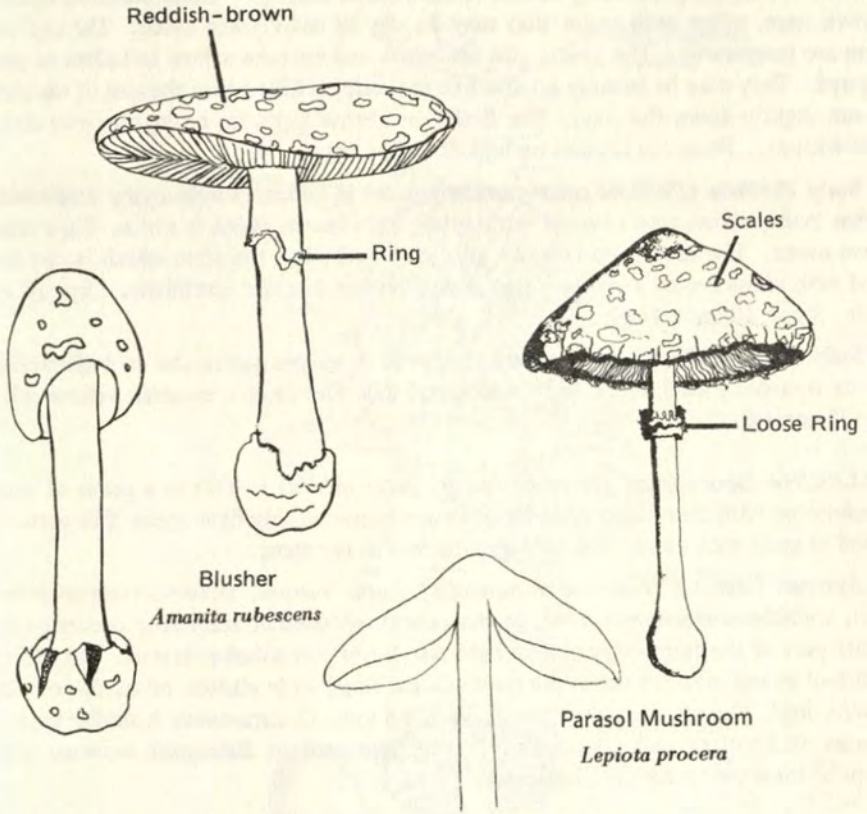
Parasol Mushroom (*Lepiota procera*) can easily be recognized by its long narrow stem with a *loose ring* that can be moved along the stem. The light brown, scaly cap is bell-shaped to convex and develops a knob at the center. Cap: 15-20 cm. Stem: 40 cm x 15 mm.

ARMILLARIELLA (spore print white). These mushrooms form convex to flat caps on a stem having a *ring* that is present in young specimens. The cap does not separate easily from the stem. The gills are attached to the stem and may run slightly down the stem. Occur on wood that may be buried.

Honey Mushroom (*Armillariella mellea*) is found in *clusters* at the base of tree stumps or dead trees. It has a pale brown convex to flat, sticky cap with *surface scales* that are darker brown than the tissues of the cap itself. Caps with a knob in center. The cream-colored gills often have rusty brown patches. The fibrous stem bears a cottony ring. Black root-like bundles of mycelium (rhizomorphs) extend outward at the base. Also called *Armillaria mellea*. Cap: 15 cm wide. Stem: 20 cm x 2.5 cm.

Little Honey Mushroom (*Armillariella tabescens*), a species that exhibits similar features to *A. mellea*, has a dry cap and lacks a ring. Not Illustrated.

GILLED MUSHROOMS



GILLED MUSHROOMS

PHOLIOTA (spore print rusty brown to dark earth brown). These mushrooms have convex caps, often with scales that may be dry or slimy when moist. The cap and stem are inseparable. The young gills are white and become yellow to brown or rust-colored. They may be broadly attached to the stem, notched near the end of the stem or run slightly down the stem. The fleshy to fibrous stem has a ring that may disappear with age. Found in clusters on logs or buried wood.

Scaly Pholiota (*Pholiota squarrosoides*) grows in clusters on decaying hardwoods. It has *pale yellow* caps covered with small, pale-brown pointed scales. Caps slimy when moist. The mature rust-brown gills are attached to the stem which is also covered with scales below a cottony ring that is absent in older specimens. Cap: 10 cm wide. Stem: 10 cm x 1 cm.

Scaly Pholiota (*Pholiota squarrosa*), similar to *P. squarrosoides*, can be distinguished by its non-slimy cap, dense large scales, and gills that show a greenish yellow color. Not Illustrated.

GALERINA (spore print yellow-brown to rusty brown). This is a genus of *small mushrooms* with convex to cone-shaped caps borne on thin little stems that occur on wood or areas with moss. The *gills are attached to the stem*.

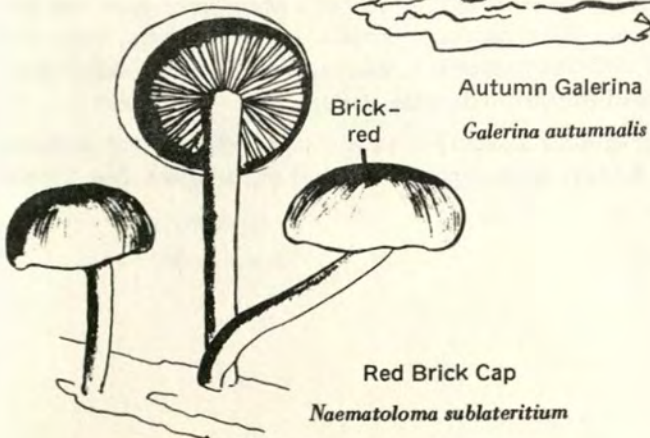
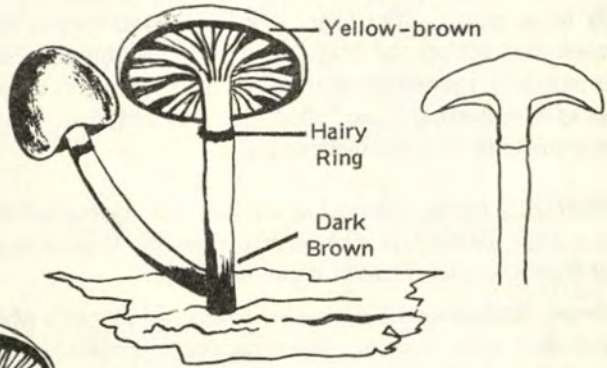
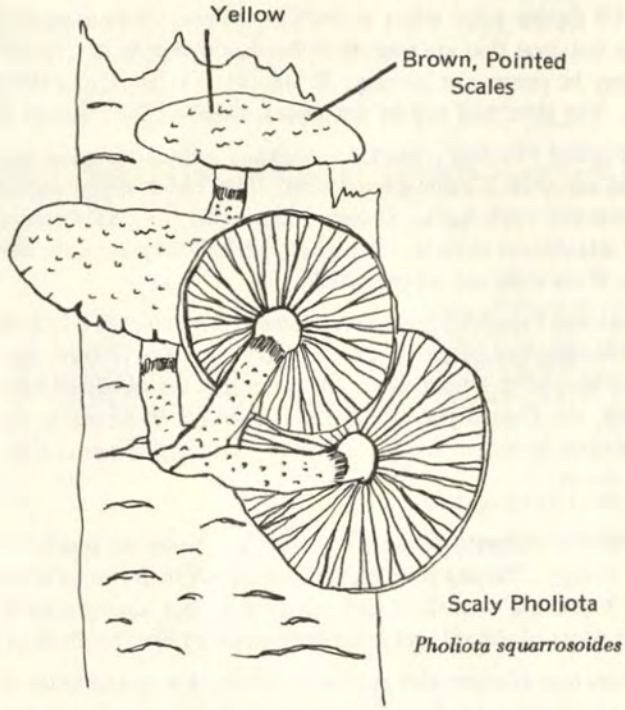
Autumn Galerina (*Galerina autumnalis*) forms *convex, yellow-brown to brown* caps, sometimes showing a knob in the center. A distinct *hairy ring* occurs on the upper part of the stem. Upper stem light tan, lower part a darker brown. The gills are attached to and may run down the stem. Occur singly or in clusters on hardwoods and conifer logs. Cap: 5 cm wide. Stem: 6 cm x 6 mm. *G. autumnalis* is similar to some species of *Pholiota* and microscopic features are used to distinguish between specimens of these two genera in most cases.

NAEMATOLOMA (spore print cinnamon brown to purple brown). These mushrooms have convex, *brightly colored caps*. No ring on the stem as the cap expands, but fragments of tissue may occur on the margin of the cap. The gills are attached to the stem which does not separate easily from the cap. Occur in clusters on logs and wood chips.

Red Brick Cap (*Naematoloma sublateralitium*) occurs *in clusters* on hardwood logs, stumps and the ground around them. Caps brick red towards the center and a lighter tan to yellow toward the inrolled margin. The purplish brown spores are produced on grayish purple gills attached to the stem. Also listed in the genus *Hypholoma*. Cap: 8 cm wide. Stem: 10 cm x 15 mm.

Yellow Brick Cap (*Naematoloma capnoides*) produces a convex, *bright orange to yellowish cap* with a paler yellow, inrolled margin. The gills become purple-brown as the spores mature. Found *in clusters* on conifer wood stumps. Cap: 5 cm wide. Stem: 8 cm x 10 mm. Not Illustrated.

GILLED MUSHROOMS



GILLED MUSHROOMS

PANELLUS (spore print white to buff). These wood-inhabiting mushrooms have convex to flat caps that are smooth to hairy and may be dry, moist to sticky or slimy. A stem may be present or lacking. If present, it is lateral and the gills are attached to the stem. The stem and cap do not separate easily. The edges of the gills are smooth.

Orange-gilled *Panellus* (*Panellus serotinus*) possesses a green and yellowish-orange, fan-shaped cap with a *short lateral stem*. The *cap is sticky and slimy* when wet and may be covered with hairs. *Orange-yellow gills*, well separated and radiating from region of attachment to stem. These bracket-like fungi occur in overlapping groups on logs. Cap: 8 cm wide and 10 mm thick.

Luminescent *Panellus* (*Panellus stipticus*) forms clusters of *overlapping small mushrooms* with *short lateral stems* on decaying logs. The convex, *tan, densely hairy caps* are kidney-shaped to shell-shaped. The tan gills are extended slightly down the stem. When fresh, this fungus produces a faint green luminescence in the dark. It may take several minutes in a dark room to observe this phenomenon. Cap: 3 cm wide. Stem: 10 mm x 6 mm.

LENTINELLUS (spore print white to buff). These are *bracket-like* fungi that grow attached to logs. The cap is tough and will shrink in dry weather and revive when wet. If a stem is present, it is short and lateral and does not separate from the cap easily. The lower edges of the gills are irregularly notched like the blade of a saw.

Bear *Lentinus* (*Lentinellus vulpinus*) grows as a *semi-circular bracket fungus* from the sides of decaying hardwood logs, attached laterally by a tapered stem-like region, singly or in groups. The lower side bears white to pale tan gills with small pointed *sawteeth* that radiate out from the point of attachment. The *tan cap* bears radial furrows especially toward the enrolled margins. The surface of the cap is *hairy near the point of attachment*. Also called *Lentinus vulpinus*. Cap: 10 cm wide, extending 5 cm from point of attachment to log.

PLEUROTUS (spore print white or in a few species pale lilac). These mushrooms form convex, *fleshy caps with enrolled margins*. Caps *depressed at the point of attachment* to wood. *Stems lateral* if present.

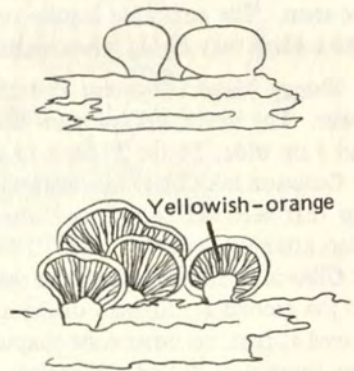
Oyster Mushroom (*Pleurotus ostreatus*) produces a white spore print that looks grayish-lilac when it dries. This mushroom forms a depressed-convex, white to tan cap. It is *shell-shaped with wavy margins*. Attached *laterally* with reduced stem to hardwood logs or trunks of trees in overlapping clusters. Cap: 12 cm wide.

Oyster Mushroom (*Pleurotus sapidus*) is similar to *P. ostreatus* but produces a pale lilac spore print. A heavy spore deposit is required to distinguish these 2 species. Not Illustrated.

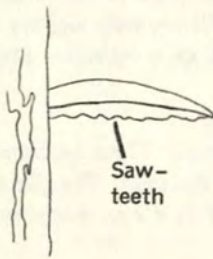
GILLED MUSHROOMS



Luminescent Panellus
Panellus stipticus



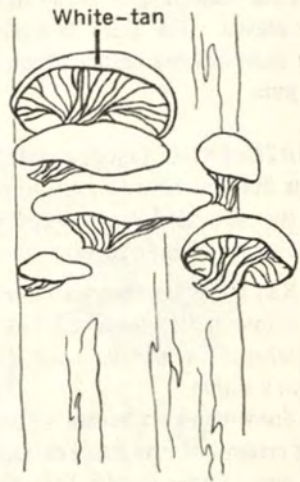
Orange-gilled Panellus
Panellus serotinus



Hairy, Tan



Bear Lentinus
Lentinellus vulpinus



Oyster Mushroom
Pleurotus ostreatus

GILLED MUSHROOMS

COPRINUS (spore print black). The *conical* mushroom caps bear *fine ridges or scales* on the surface. They look like closed umbrellas when young. The stem is thin and uniform. The light gray gills become black at maturity and are free or notched near the stem. The noticeable feature of this mushroom is the 'melting' of the cap and gills into a *black inky liquid* when mature, often within a few hours.

Shaggy Mane (*Coprinus comatus*) has an *off-white, cylindrical cap with fluffy scales*. The white, hollow stem has a *ring* that disappears with age. Cap: 15 cm tall and 5 cm wide. Stem: 20 cm x 15 mm.

Common Ink Cap (*Coprinus atramentarius*) has a *smooth, gray brown, cone-shaped cap* that becomes *bell-shaped* when mature. The white stem bears a *ring* that disappears after a short time. Cap: 10 cm tall and 8 cm wide. Stem: 12 cm x 15 mm.

Glistening Ink Cap (*Coprinus micaceus*) is a small mushroom found in dense clumps on the ground at the base of living trees or decaying stumps. The *reddish brown cap* is oval at first, becomes cone-shaped and finally *bell-shaped*. It has distinct *ridges* and tiny shiny particles on the surface when young. The white stem is hollow and brittle. Cap: 6 mm wide. Stem: 10 cm x 8 mm. Not Illustrated.

HYGROPHORUS (spore print white). These are *small* mushrooms that grow on the ground and have *brightly colored caps* that range from bright yellow, orange, or red to shades of gray or brown. The *cap* is usually cone-shaped and the stem is often hollow. The *thick, waxy gills may extend down the stem*. *Camarophyllus* and *Hygrocybe* are 2 genera that share the same macroscopic characteristics.

Cone Cap (*Hygrophorus conicus*) has bright *yellow-orange to red conical caps* that are *sticky*. The *stem is hollow and twisted*. The gills are only slightly attached to the stem and are thinner than in most other species. Cap: 6 cm wide. Stem: 10 cm x 10 mm.

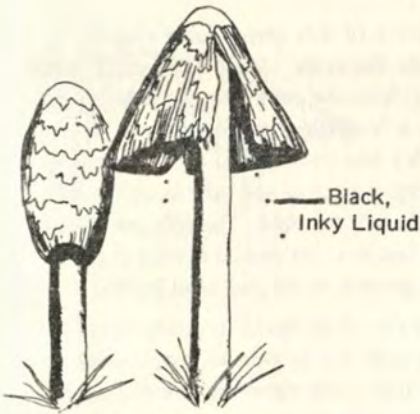
CORTINARIUS (spore print rusty to cinnamon brown). These mushrooms possess caps that are *convex* and *do not separate easily from the stem*. The gills are attached to the stem and are covered by a *cottony inner veil* in young specimens. In older specimens a faint ring may appear on the stem.

Red-gilled Cortinarius (*Cortinarius semisanguineus*) can be readily distinguished by its *bright red to brownish-red gills*. The dry cap and stem are yellow to light brown in color. The annulus soon disappears in mature specimens. Cap: 5 cm wide. Stem: 6 cm x 6 mm.

Snow-cap Cortinarius (*Cortinarius heliotropicus*) has a *dark violet cap with radiating cream-colored patches* that occur on the surface. Cap: 6 cm wide. Stem: 7 cm x 15 mm. Other species (not illustrated) are *Cortinarius iodes* and *C. iodeoides*, which have *sticky violet caps* and stems and lack the radiating patches seen in *C. heliotropicus*. The size of these 3 species is similar.

Silver-violet Cortinarius (*Cortinarius alboviolaceus*) has a *pale violet, dry cap and stem*. Cap: 6 cm wide. Stem: 8 cm x 18 mm. Not Illustrated.

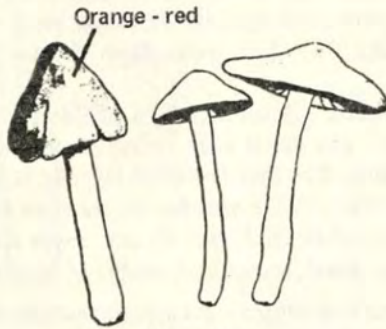
GILLED MUSHROOMS



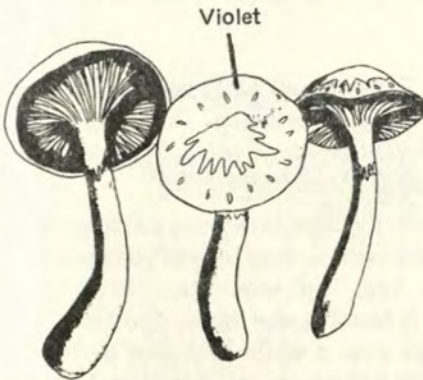
Shaggy Mane
Coprinus comatus



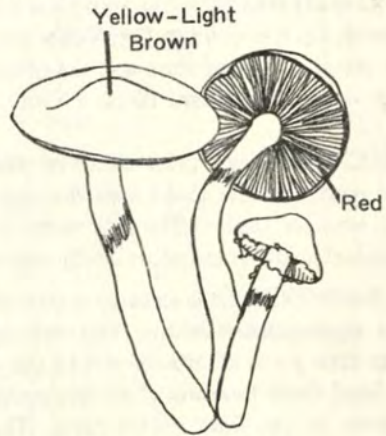
Common Ink Cap
Coprinus atramentarius



Cone Cap
Hygrophorus conicus



Snow-cap Cortinarius
Cortinarius heliotropicus



Red-gilled Cortinarius
Cortinarius semisanguineus

GILLED MUSHROOMS

MARASMIUS (spore print white). Mushrooms of this genus form convex or bell-shaped caps that do not separate easily from the stem. Most have small white or reddish-brown caps with *radial lines running from the center to the edge of the cap surface*. They are generally very small with a tough texture that allows the fruiting structure to shrivel up when conditions are dry and to revive to near original appearance when moistened. The thin stems are tough to horny and vary in color from light shades near the cap to dark brown to black towards the base. The gills are attached to the stem but in some species the gills are notched near the stem and may appear nearly free. Members of this genus are found on the ground, wood and dead leaves.

Fairy Ring Mushroom (*Marasmius oreades*) is often found in grassy areas growing in wide circles called fairy rings. They have light tan to pale brown, convex to bell-shaped caps that flatten with a knob. The tough solid stem bears fine hairs near the base. The gills are white or pale tan, attached to the stem and notched. Cap: 2-6 cm wide. Stem: 8 cm x 5 mm.

Pinwheel Marasmius (*Marasmius rotula*) and **Orange Pinwheel Marasmius** (*Marasmius siccus*) are two common small species. *M. rotula* has a white cap and *M. siccus* has a tan to rose-colored cap. Cap: 2 cm wide. Stem: 8 cm x 1 mm.

MYCENA (spore print white). Most members of this mushroom genus are small with a delicate appearance. The cap is cone or bell-shaped with straight margins (not incurved) in young specimens. The thin, brittle to flexible, hollow stem does not separate easily from the cap. The gills are attached to the stem and may be notched near the stem. They are fleshy when fresh and do not revive after drying. They occur singly or grouped in humus, wood, leaves, and needles of conifers.

Yellow Mycena (*Mycena epipterygia*) has a bright yellow to yellow-brown sticky, bell-shaped cap that is easily seen against the decaying wood and humus. Cap: 2 cm wide. Stem: 8 cm x 2 mm.

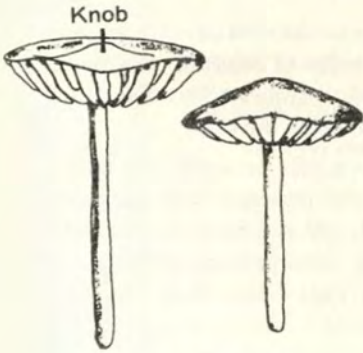
Rose Mycena (*Mycena pura*) has a pale violet to rose-colored cap and stem. The smooth cap is convex to flat. Veins occur between adjacent lilac-colored gills. The gills are attached to the stem and are often notched. This species occurs on the ground. Cap: 4 cm wide. Stem: 10 cm x 8 mm.

LACCARIA (spore print white or pink). These ground-inhabiting mushrooms possess convex to flat moist caps that appear faded pink on drying. The cap and stem do not separate easily. The pale violet to pink gills are waxy, widely separated and are attached to the stem, occasionally running slightly down the stem.

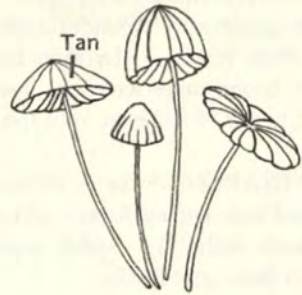
Deceiver (*Laccaria laccata*) produces a convex reddish-brown to pinkish-brown cap. The spore print is white. The well-separated pink to flesh-colored gills are notched near their point of attachment to the stem. Cap: 7 cm wide. Stem: 10 cm x 8 mm.

Sand Dune Laccaria (*Laccaria trullisata*) is found in sand dunes. The species forms convex to flat, light brown caps. The spore print is white. The pink to violet gills are attached to the stem, much of which may be buried in the sand. Cap: 6 cm wide. Stem: 10 cm x 20 mm. Not Illustrated.

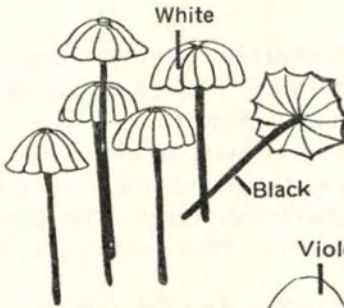
GILLED MUSHROOMS



Fairy Ring Mushroom
Marasmius oreades



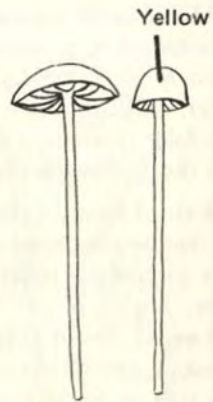
Orange Pinwheel Marasmius
Marasmius siccus



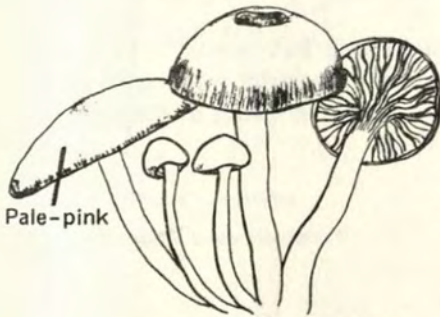
Pinwheel Marasmius
Marasmius rotula



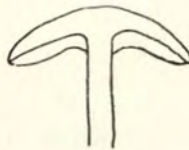
Rose Mycena
Mycena pura



Yellow Mycena
Mycena epipterygia



Deceiver
Laccaria laccata



GILLED MUSHROOMS

CLITOCYBE (white or off-white spore print). These mushrooms have *fleshy, funnel-shaped caps* and are found on the ground, wood or needles of conifers. The margin of the *cap is incurved* when young. Stem and cap do not separate readily. The cap bears white gills that are broadly attached to the stem or run down the stem.

Club-stemmed Clitocybe (*Clitocybe clavipes*) has a pale brownish cap that is at first convex with a central knob. Center of *cap* becomes *depressed* with age giving the older specimens a distinct funnel shape. The off-white *gills extend down the stem* and are often forked. The stem has a bulb-shaped base. This pleasant-smelling species, often found under conifers, does not decay readily. Cap: 10 cm wide. Stem: 6 cm long; width 15-30 mm from top to base.

CANTHARELLUS (spore print white to buff). Mushrooms in this genus form funnel-shaped caps having *forked gills that extend down the stem*. The stem and cap do not separate easily. The widely separated gills are thick and may appear more like folded ridges than typical gills.

Red Chanterelle (*Cantharellus cinnabarinus*) has a *reddish-orange* funnel-shaped cap. Well-separated gills extend down the stem. This species is often found on the ground under hardwood trees. Cap: 4 cm wide. Stem: 4 cm x 10 mm.

Golden Chanterelle (*Cantharellus cibarius*) forms yellow, smooth, convex then funnel-shaped caps with uneven margins that curve downward. The gills extend well down the tapered stem. Often having a *fruity odor*. Found on the ground under both conifers and hardwood trees. Cap: 10 cm wide. Stem: 6 cm x 2 cm. Not Illustrated.

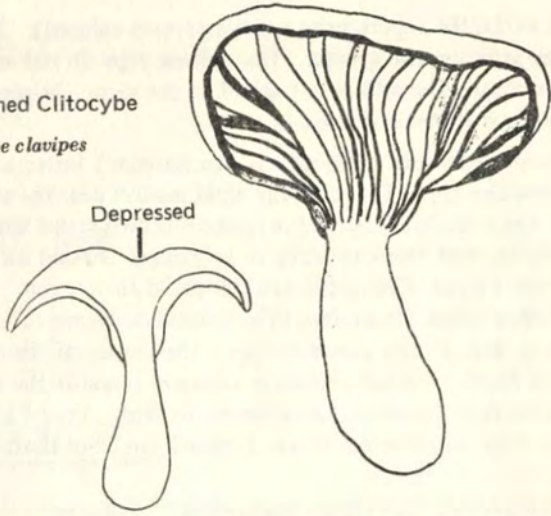
CRATERELLUS (spore print white to buff or brownish yellow). This genus is characterized as a *non-gilled funnel-shaped* mushroom that is usually dark colored, *brown to black*. Borne on a short stem, the general appearance is that of a horn of plenty. The spores are formed on the outer surface which can be smooth or wrinkled with folds (extremely blunt 'gills') and is a light shade of gray or brown compared with the darker inner surface. These fungi occur on the ground or on buried wood.

Horn of Plenty (*Craterellus cornucopioides*) produces white to buff spore prints. The fruiting structures are grayish-black on the inner surface and an ashy gray on the outer surface and reach a height of 10 cm. The margin is curved back and is usually entire.

Horn of Plenty (*Craterellus fallax*), a species with features similar to *C. cornucopioides*, can be distinguished by its pinkish-buff to brownish-yellow spore print. It may take up to 24 hours to obtain a good spore print in species of this genus. Not Illustrated.

GILLED MUSHROOMS

Club-stemmed Clitocybe
Clitocybe clavipes



Red Chanterelle
Cantharellus cinnabarinus



Horn of Plenty
Craterellus cornucopiodes

GILLED MUSHROOMS

TRICHOLOMA (spore print white to cream-colored). These fairly large fleshy mushrooms grow on the ground. The convex caps do not separate easily from the fleshy brittle stem. The gills are attached to the stem. In general appearance, some species resemble specimens of *Russula*.

Soap Mushroom (*Tricholoma saponaceum*) forms a *sticky, moist, grayish yellow to brownish* cap. The gills may stain reddish near the margin of the cap. The whitish stem has a reddish base and may show brown stains with age. There is a *soapy odor* associated with the cap when it is broken. Found on ground in mixed conifer and hardwood areas. Cap: 8 cm wide. Stem: 8 cm x 2 cm.

Yellow-gilled Tricholoma (*Tricholoma flavovirens*) forms a bright yellow convex to flat cap with a faint greenish tinge. The center of the cap is darker due to masses of *brown hyphae strands radiating outward* towards the margins. Pale yellow gills are notched near the area of attachment to stem. Found in mixed conifer and hardwood areas. Cap: 10 cm wide. Stem: 8 cm x 2 cm. Not Illustrated.

TRICHOLOMOPSIS (spore print white). These relatively *large mushrooms* have convex caps (up to 20 cm wide) attached to fleshy stems (up to 15 cm long) and are found on *rotting logs and stumps*. The cap and stem do not separate easily. The gills are attached to the stem.

Broad-gilled Tricholomopsis (*Tricholomopsis platyphylla*) has a dry, convex, grayish brown, fibrous cap. Margin of *enrolled cap* may be *split along its edges*. The *white gills are broad, widely separated* and attached to or notched at the stem. Also called *Collybia platyphylla*. Cap: 15 cm wide. Stem: 14 cm x 3 cm.

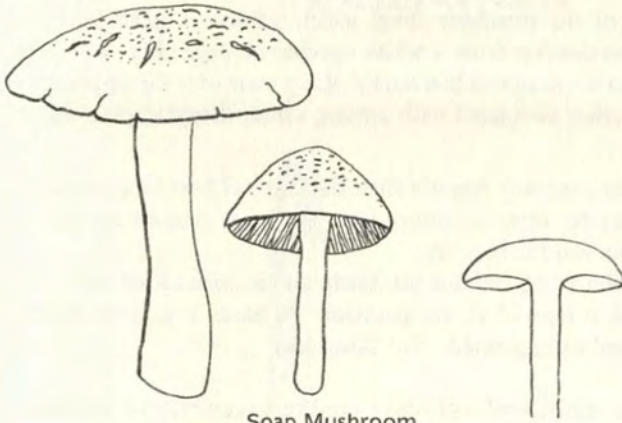
CORAL FUNGI

CLAVARIA (spore print white to cream). This upright fungus forms finger-like or club-shaped stalks that may be slightly or profusely branched. The stalks are soft, brittle, or tough. The spore-bearing portion of this fungus is on the upper parts of the stalks. Specimens in this genus are found on the ground. *Clavaria* is one of several genera belonging to the coral fungi. Identification of most species of coral fungi requires both macroscopic and microscopic features. Spore prints of these fungi may be obtained by laying a specimen on its side on white paper and covering it with a glass to prevent it from drying out.

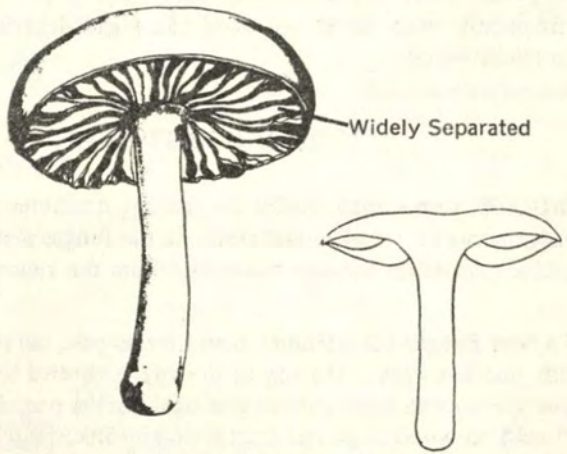
Yellow Coral (*Clavaria fusiformis*) forms simple, *bright lemon yellow* stalks. The *tips of the stalks are narrow and pointed*. Specimens are often found growing in close association or in clusters. Stalk: 12 cm wide x 5 mm wide. Also known as *Clavulinopsis fusiformis*.

Violet Coral (*Clavaria amethystina*) forms numerous fine-branched, soft, brittle stalks that are *white to pale violet*, growing on soil in mixed woods. Also called *Clavulina amethystina*. Stalk: 8 cm tall. Not Illustrated.

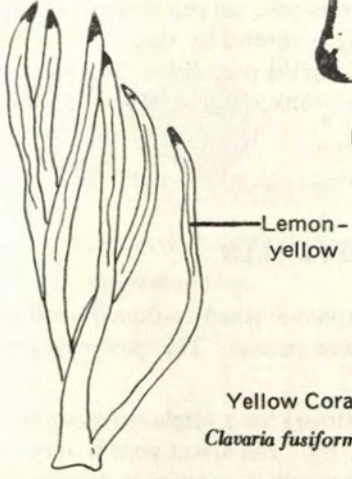
GILLED MUSHROOMS
CORAL FUNGI



Soap Mushroom
Tricholoma saponaceum



Broad-gilled Tricholomopsis
Tricholomopsis platyphylla



Yellow Coral
Clavaria fusiformis

STINKHORNS

MUTINUS is a member of the stinkhorn fungi which produce a fetid odor when mature. Fruiting structures develop from a white egg-shaped stage (Fig. A). A stem develops from this egg that bears spores in a sticky, slimy mass over the upper surface (Fig. B). Specimens are often associated with rotting wood, decaying plant litter or rich soil.

Dog Stinkhorn (*Mutinus caninus*) forms a stem that is 10-12 cm long and tapered at the apex. The stem may be white to orange-red. The spore mass covers the upper 3 cm of the stem surface but not the very tip.

Mutinus elegans is similar to *M. caninus* but forms a long, pink to red stem, 10 cm long and 10 mm wide that is tapered at the apex and the base. It is often associated with decaying oak leaves and rotting wood. Not Illustrated.

PSUEDOCOLUS resemble small, oval, off-white egg-like structures, 3-4 cm long and 3 cm wide (Fig. C). A white stalk, 5 cm tall, is produced from the egg-like structure that separates into 3 orange arms which are fused at the tip (Fig. D). The inner surface of the arms is covered with a dark green to black, sticky, odoriferous slime, containing the spores.

Squid Stinkhorn (*Pseudocolus schellenbergiae*) is the basis for this description. It has frequently been found on wood chips and decaying leaf litter along paths.

BIRD'S NEST FUNGI

CRUCIBULUM forms small, distinctive fruiting structures that resemble *bird's nests* and usually occur on woody substrates. As the fungus matures, spore-bearing structures (called peridioles) become apparent within the structure. These resemble tiny eggs.

Bird's Nest Fungus (*Crucibulum laeve*) forms pale, tan cup-shaped structures, covered with *fine tan hairs*. The top of the cup is covered by tissue *that breaks down* to expose the smooth inner surface that contains the peridioles. This species is commonly found on wood chips and rotten wood. Size: 10 mm high; 8 mm wide. Also known as *C. levis* and *C. vulgare*.

STALKED PUFFBALLS

CALOSTOMA produces a spore-containing structure raised up from the soil on a stalk consisting of pale brown interwoven gelatinous strands. The spore case opens by a pore at the tip.

Slimy Stalked Puffball (*Calostoma cinnabarina*) has a *bright red spore sac* covered with a *jelly-like material* when young (Fig. E). The apical pore is surrounded by elevated ridges. The gelatinous nature of the stalk is apparent in mature specimens (Fig. F). Specimens may occur singly or in small groups in moist soil.

STINKHORNS
 BIRD'S NEST FUNGI
 STALKED PUFFBALLS

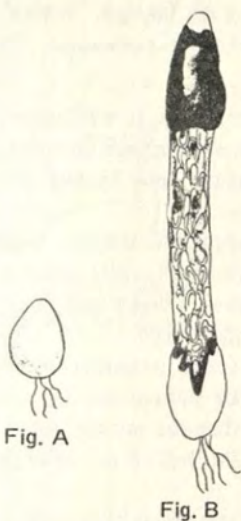


Fig. A

Fig. B

Dog Stinkhorn
Mutinus caninus

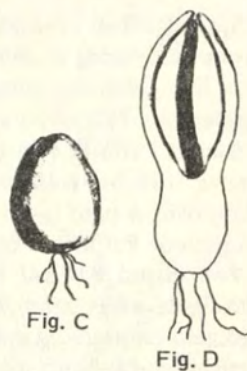


Fig. C

Fig. D

Squid Stinkhorn
Pseudocolus schellenbergiae



Bird's Nest Fungus
Crucibulum laeve



Fig. E

Fig. F

Slimy Stalked Puffball
Calostoma cinnabarina

PUFFBALLS

LYCOPERDON produces round to pear-shaped structures on a short stem-like base. They are up to 7 cm in diameter with the spore-forming region enclosed by a double covering. The outer covering may have *spines, warts or granular material*. The inner covering is smooth. The interior of the puffball is pure white when young, turns yellow and then dark brown to black as the spores are formed. A small pore-type opening may develop at the apex through which the spores can escape. Puffballs usually occur on the ground or decaying wood.

Spiny Puffball (*Lycoperdon candidum*) develops round to oval-shaped puffballs. The outer covering is white with distinct, *pyramidal white spines* that flake off, sometimes in patches, exposing the inner brownish covering. Also known as *Lycoperdon marginatum*. Puffball: 5 cm wide; height 3 cm.

Round Puffball (*Lycoperdon perlatum*) produces pear-shaped, *white puffballs covered with* brownish cone-shaped *spines* that leave dull white circular spots after falling off. A pore forms at the apex for spore release. Occurs singly or in groups on the ground. Puffball: 6 cm wide; height 8 cm. Not Illustrated.

Pear-shaped Puffball (*Lycoperdon pyriforme*) forms pear-shaped, *tan puffballs with thick, white string-like strands at the base*. The surface may be smooth or covered with persistent granules that are darker brown than the surface tissue. Specimens occur in clusters on rotting logs or wood humus. Puffball: 5 cm wide; height 7 cm.

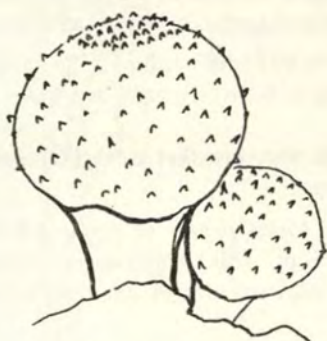
SCLERODERMA forms spherical to oval fruiting structures that lack a stem. The inner tissue is dark purple in young specimens and becomes black when the spores mature. The wall of this structure is thick and leathery and spore release occurs through irregular breaks in the wall.

Earthball (*Scleroderma aurantium*) is round to oval with a light tan wall covering that becomes yellow-brown with age. The wall is covered with raised warts formed by fine cracks in the wall. Specimens often occur in clusters on the ground attached to the soil by dense tufts of mycelium. Also known as *S. citrinum* or *S. vulgare*. Earthball: up to 12 cm in diameter.

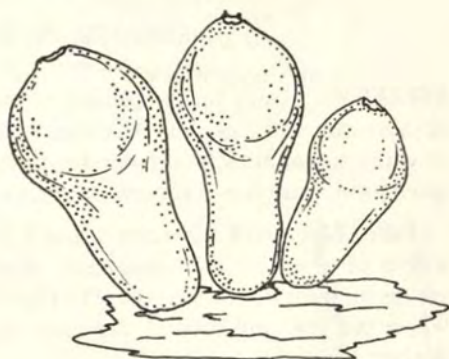
GEASTRUM forms a round spore-bearing structure which at first resembles a typical puffball with 2 distinct walls. The outer wall splits along several lines and curves back to form a star-like pattern. The intact inner wall may have an apical opening through which dark spores escape. In some species the inner sac is raised on a short stalk.

Earthstar (*Geastrum campestre*). The illustration for this genus is based on the general appearance of this species. Other northeastern species are difficult to identify.

PUFFBALLS



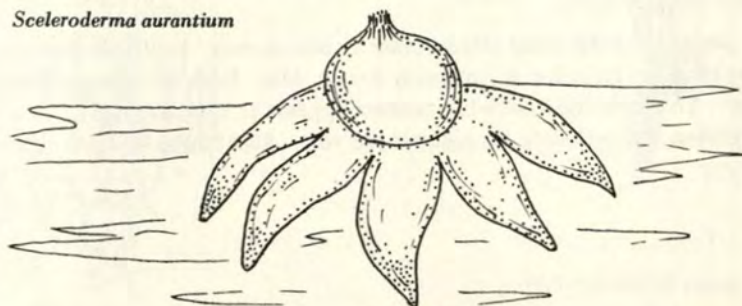
Spiny Puffball
Lycoperdon candidum



Pear-shaped Puffball
Lycoperdon pyriforme



Earthball
Sceleroderma aurantium



Earthstar
Geastrum campestre

JELLY FUNGI

TREMELLA. Produces irregularly raised masses of *gelatinous tissue* on twigs, logs and stumps in most weather. These jelly structures are yellow, orange, red, pale brown or clear in consistency. On drying they form a hard horny crust on the substrate.

Yellow Witches' Butter (*Tremella mesenterica*) forms hemispherical or irregularly lobed jelly masses that are *bright yellow* and up to 8 cm long and 3 cm wide.

EXIDIA. Forms pale gray to black gelatinous structures that are flat to raised irregular lobes on the surface of twigs, logs and stumps.

Black Witches' Butter (*Exidia glandulosa*) forms groups of gray-black to *black, convoluted gelatinous masses* up to 15 cm long with numerous, small warts over the surface (Fig. A). When dry, this species becomes a *black crust* on the substrate (Fig. B). It is usually found on hardwoods.

SMOOTH-SURFACED FUNGI

STEREUM. Forms tough, leathery or hard spore-bearing structures on the branches of dead trees and logs. The structures are flat against the substrate surface, partly flat, or partly turned back at the margins to form a cap, bracket or shelf-like fungus. The *spore-forming surface is smooth* or slightly wrinkled.

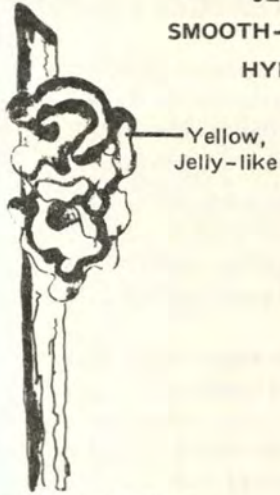
False Turkey-tail (*Stereum ostrea*) forms overlapping groups of thin, leathery shelves on wood of deciduous trees. It resembles *Polyporus versicolor*. The shelves are semicircular or fan-shaped. The upper surface has distinct zones of pale green, off white, tan, gray and brown. The lower spore-bearing surface is pale tan and smooth. Shelves: 6 cm wide.

Parched Stereum (*Stereum frustulosum*) forms small, smooth, gray, flat, cushion-shaped, hard bodies, 1-2 mm thick. The round or polygonal structures are 2-5 mm wide and occur in clusters. This species occurs most frequently on fallen oak logs and stumps. Also known as *Xylobolus frustulatus*.

HYDNOCHAETE. This fungus does not fall into any of the major categories of fungi described in this bulletin, due to its unusual structure. It grows as a *flat, dry mat* over the surface of bark and wood, forming *shallow tubes* with irregular pores that develop into flattened teeth.

Brown-toothed Crust (*Hydnochaete cinnamomea*) occurs on sticks and branches of hardwoods. Its color is *cinnamon brown* when fresh but becomes *dark brown* with age. The brownish tooth-like texture appears as fine stiff hairs. This fungus is very common and persistent throughout the year. Also known as *Irpex cinnamomeus*.

JELLY FUNGI
SMOOTH-SURFACED FUNGI
HYDNOCHAETE



Yellow Witches' Butter
Tremella mesenterica

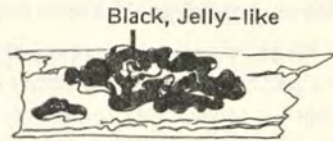


Fig. A



Fig. B

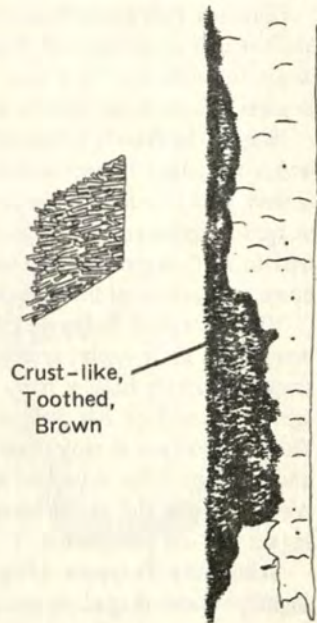
Black Witches' Butter
Exidia glandulosa



False Turkey Tail
Stereum ostrea



Parched Stereum
Stereum frustulosum



Brown-toothed Crust
Hydnochaete cinnamomea

BRACKET FUNGI AND PORED-LEATHERY MUSHROOMS

POLYPORUS (spore print white). Produces mushroom, bracket or shelf-like structures or lies flat against a branch or log. The texture of the spore-forming structure is woody, tough, corky, leathery or infrequently fleshy. The spores are formed in tubes with pore openings. The stem may be central, lateral or absent.

White Polypore (*Polyporus albellus*) is white when fresh. It grows on hardwoods as a partly flat to partly shelving fungus, singly or in *sparsely overlapping groups*. This fungus is usually soft and watery when fresh and becomes *yellowish and brittle when dry*. Brackets: 2-10 cm wide, 5 cm thick and projecting up to 7 cm from the wood. Not Illustrated.

Birch Conk (*Polyporus betulinus*) forms a thick, tough, bracket attached by a restricted area or a short lateral stem to logs and branches of living or dead birch trees. The whitish-brown, convex caps have a minute pore surface that is white at first and becomes tan. The margin of the cap extends downward beyond the level of the pore surface. The pore surface becomes finely toothed with age. Bracket: 15 cm wide, 3 cm thick and projecting up to 15 cm from the host.

Winter Polypore (*Polyporus brumalis*) forms a tough mushroom-shaped fruiting structure on deciduous logs and stumps. The *dark brown, velvety, circular cap* with a *depressed center and incurved margin* is supported by a brown to black central stem. The pore surface is white and the pores are angular and sometimes radially elongate. Bracket: 7 cm wide. Stem: 7 cm long. Not Illustrated.

Cinnabar Polypore (*Polyporus cinnabarinus*) forms a bright orange, tough, leathery bracket that is *orange-red* throughout the entire structure. The pores are angular and larger towards the base than the margin. Also listed as *Pycnoporus cinnabarinus*. Bracket: 10 cm wide, 20 mm thick and project up to 6 cm from logs.

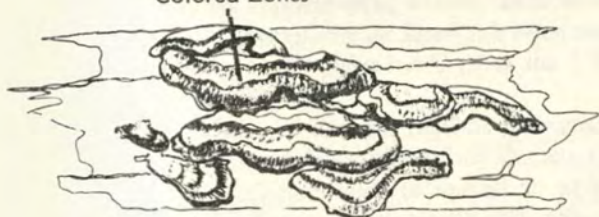
Hen-of-the-Woods (*Polyporus frondosus*) forms a near-central stem structure from which abundant branches develop. The branches produce *overlapping, laterally attached, fleshy to tough gray-brown caps* with white pore surfaces and irregularly lobed margins. Specimens may grow larger than 60 cm in width. The individual caps are oval to shell-shaped and up to 8 cm wide and 7 mm thick. Angular pores may extend down the surface of the branching stems. Also listed in the genus *Grifola* or *Polypilus*.

Violet-toothed Polypore (*Polyporus pargamenus*) forms thin, leathery, overlapping brackets in an irregular arrangement or in rows on wood of deciduous trees. The fan-shaped brackets have a hairy upper surface when young that becomes smooth with age. This surface has *yellow and brown-colored zones* that become pale with age. The pore surface is violet and becomes white. A pore-free area occurs along the thin undermargin. The round to angular pores form a toothed surface in older specimens. Also placed in the genus *Hirschioporus*. Bracket: 7 cm wide, 6 mm thick and projecting up to 4 cm from wood.

Schweinitz Polypore (*Polyporus schweinitzii*) is yellowish to dark rusty brown, slightly funnel-shaped to circular cap with or without stem. Stem, if present, may be central or lateral. Cap may possess concentric ridges and dense hairs. Spore surface yellowish or greenish yellow at first, darkening on drying. Usually found growing near base of coniferous trees. Also called *Phaeolus schweinitzii*. Bracket: 25 cm wide; 4 cm thick. Not Illustrated.

BRACKET FUNGI AND PORED-LEATHERY MUSHROOMS

Colored Zones



Violet-toothed Polypore
Polyporus pargamenus



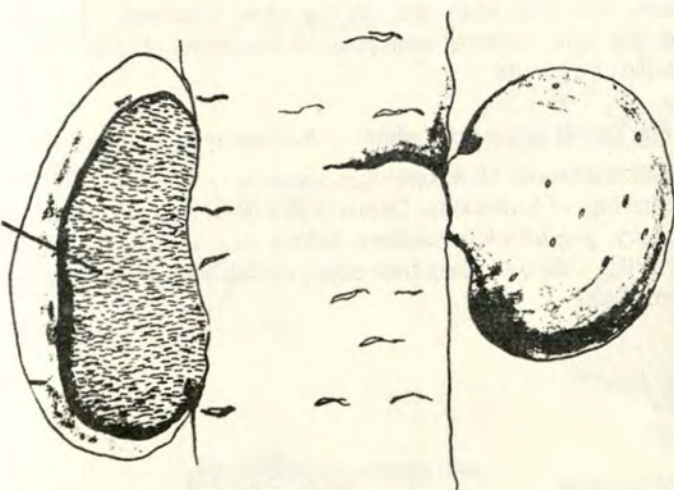
Orange-red



Cinnabar Polypore
Polyporus cinnabarinus

Hen-of-the-Woods
Polyporus frondosus

Undersurface



Birch Conk
Polyporus betulinus

BRACKET FUNGI AND PORED-LEATHERY MUSHROOMS

Hairy Polypore (*Polyporus pubescens*) forms overlapping, leathery to tough clusters of brackets on branches of deciduous trees. Grayish hairy brackets white throughout, with white pore surface and angular pores that break up into teeth in older specimens. Also listed as *Coriolus*. Bracket: 5 cm wide, 7 mm thick, projecting to 6 cm from wood. Not Illustrated.

Scaly Polypore (*Polyporus squamosus*) circular, shallow, funnel-shaped, light tan to brown cap with short lateral stem. Occurs singly or in overlapping clusters on wounded areas of deciduous trees or on stumps or logs. Cap fleshy to *tough and watery* when fresh and rigid when dry, with conspicuous *brownish scales* on the surface that often overlap. Pores run down the stem; are 1-2 mm wide and angular. Stem *black* at base. Bracket: 30 cm wide, 4 cm thick. Stem: 5 cm long.

Sulphur Mushroom or Chicken-of-the-Woods (*Polyporus sulphureus*) forms clusters of overlapping orange to sulphur yellow stemless brackets. Bracket margins relatively soft and fleshy; central and attached regions tough. With age, color fades to pale yellow or off-white. Occurs on living trees or dead hardwoods. Also listed as *Lae-tiporus*. Bracket: 30 cm wide, projecting up to 25 cm from substrate.

Turkey Tails (*Polyporus versicolor*) forms clusters of thin, leathery, *overlapping shelves* that are *hairy* with distinct, concentric *colored bands of yellow, orange, brown, gray and white*. Occurs on decaying hardwood. Pore surface and inner tissues white. Also listed as *Coriolus*.

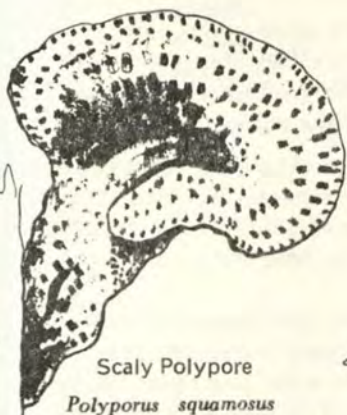
PLICATUROPSIS (spore print white). *Small shelf-like mushrooms* growing in clusters on branches and logs of deciduous trees.

Ridged Gill (*Plicaturopsis crispa*) convex to flat, *fine hairy bracket* with lobed, incurved margins and *concentric zones of color* that vary from pale tan to brown, with lighter colors toward the margins (Fig. A). Brackets tough, attached directly to hardwood stems, shrivelling when dry, reviving when moistened. Spore surface is white with ridge-like 'gills' radiating from point of attachment (Fig. B). Also listed as *Plicatura*. Bracket: 3 cm wide.

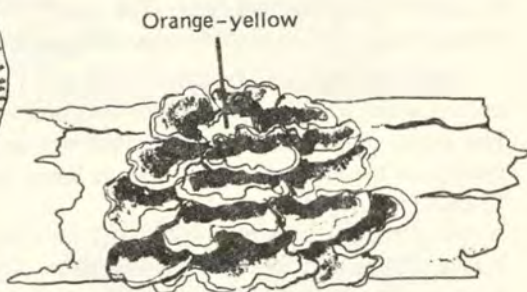
SCHIZOPHYLLUM (spore print white). Only one species in the genus.

Split Gill Mushroom (*Schizophyllum commune*) found throughout year growing on sticks and logs of hardwoods. Occurs in clumps as tough, leathery, circular or semi-circular, *hairy, grayish-white brackets*, lacking stem and attached to wood at central region (Fig. C). *Gills split* along their edges, curling back on drying (Fig. D). Bracket: up to 30 mm wide.

BRACKET FUNGI AND PORED-LEATHERY MUSHROOMS

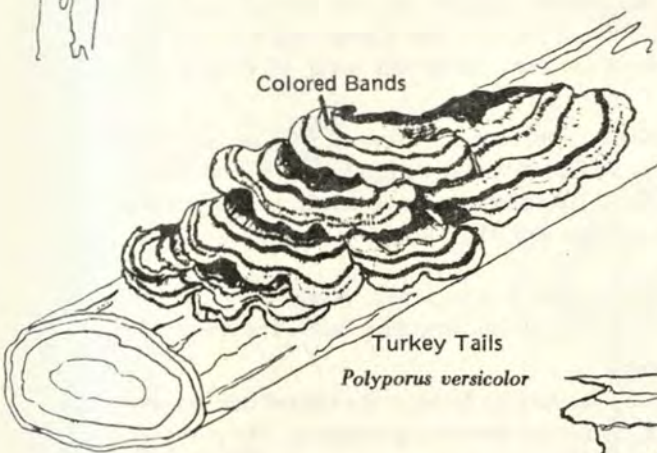


Scaly Polypore
Polyporus squamosus



Orange-yellow

Sulphur Mushroom
Polyporus sulphureus

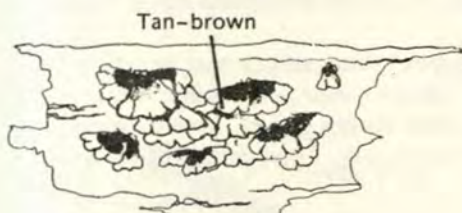


Colored Bands

Turkey Tails
Polyporus versicolor



Fig. C



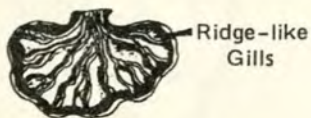
Tan-brown

Fig. A



Fig. D

Ridged Gill
Plicaturopsis crispa



Ridge-like
Gills

Fig. B

Split Gill Mushroom
Schizophyllum commune

BRACKET FUNGI AND PORED-LEATHERY MUSHROOMS

DAEDALEA produces annual brackets that are tough, corky, or woody and without stems. They are attached to logs, stumps and branches of dead or living trees, mainly by areas that are flat and wide. The lower spore-bearing surface produces *irregularly arranged pores* that at times become elongated, fuse and appear *gill-like*.

Currycomb Fungus (*Daedalea confragosa*) produces flattened to slightly convex, smooth white to ash gray caps with *concentric brownish bands* on the upper surface. The brown pore surface forms radially elongated *gill-like pores* that extend to the margins of the bracket. This fungus is found on living or dead hardwoods. Brackets: 15 cm wide and 1.5 cm thick.

Oak Daedalea (*Daedalea quercina*) produces hoof-shaped to wide, light brown brackets. The pale tan pore surface slants upward towards the outer margin of the bracket. The *large, irregular gill-like pores* have walls 1 mm thick. Specimens usually occur on dead or living hardwoods. Brackets: 15 cm wide, 8 cm thick, and 5 cm long.

FOMES produces perennial brackets that are hard and woody. Each year a new surface layer of pores forms over the previous year's pores to give an *outward extension of growth* on the bottom of the cap. Specimens occur on fallen logs, stumps and trunks of living trees.

Horsehoof Fungus (*Fomes fomentarius*) forms a *hoof-shaped*, grayish brown bracket with a grayish pore surface that may darken slightly when bruised. The inner tissues are dark rusty brown. Specimens occur on trunks and logs of dead or living hardwoods. Brackets: 15 cm wide and 20 cm long.

GANODERMA produces perennial brackets with a gray-brown, flattened surface that may appear *crust-like* or with a dull *varnished* look. The lower side has a pore surface.

Varnished Conk (*Ganoderma tsugae*) forms a fan-shaped bracket with an upper surface that has a *smooth, orange-red varnished appearance*. The pore surface is white to pale brown. If a stem is present, it is short and lateral. This fungus is tough to woody when dry. It is found primarily on or near stumps and logs of conifers. Brackets: 25 cm wide.

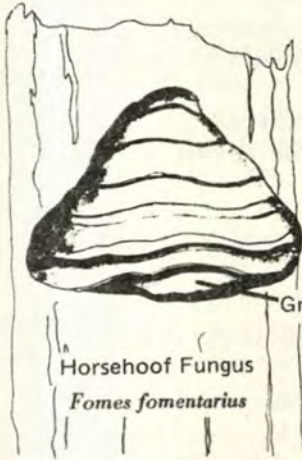
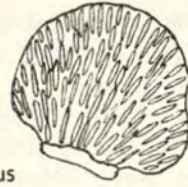
Artist's Conk (*Ganoderma applanatum*) forms semicircular, woody brackets with *smooth, gray* upper surfaces. The *smooth white pore* surface turns *brown when bruised* or scratched allowing one to draw on this surface. One to several specimens may be found on stumps and logs of hardwoods. These are among the largest bracket fungi reaching over 60 cm across.

BRACKET FUNGI AND PORED-LEATHERY MUSHROOMS



Elongate
Pores

Currycomb Fungus
Daedalea confragosa



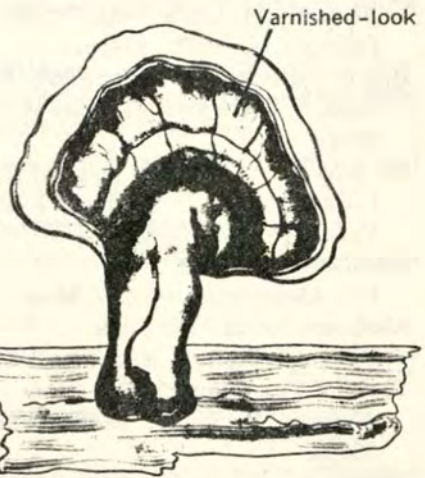
Horsehoof Fungus
Fomes fomentarius

Gray-brown



Elongate
Pores

Oak Daedalea
Daedalea quercina



Varnished-look

Varnished Conk
Ganoderma tsugae



Smooth, Gray

Artist's Conk
Ganoderma applanatum



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GLOSSARY

- ANNUAL — growing only during a single year.
- ANNULUS — the skirt or collar-like remains of the inner veil tissue that occurs around the upper stem of some mushrooms.
- CAP — the top part of a mushroom that bears the gill, pores, or teeth.
- CONCAVE — referring to mushroom caps that are rounded and incurved downwards.
- CONIFER — a cone-bearing tree, usually with needle-like foliage.
- CONVEX — referring to mushroom caps that are irregularly rounded and curved upwards towards the margin.
- CUP — the remains of the universal membranous tissue around the base of the stem of some mushrooms.
- ECOSYSTEM — a natural habitat that includes all the organisms and environmental factors affecting them.
- EVERGREEN — referring here to coniferous trees.
- FUNGUS — an organism consisting of hyphae that exists as a saprotroph or parasite.
- GELATINOUS — having a jelly-like consistency.
- GILLS — the radiating plates of the lower mushroom cap on which the spores form.
- HARDWOOD — a flowering, broad-leafed tree as distinguished from a cone-bearing tree.
- HOST — the term used for any plant (or other organism) from which a parasitic fungus obtains its nourishment.
- HYPHAE — the basic thread-like growths of a fungus.
- INNER VEIL — the fungal cap tissue that covers the developing gills in some mushrooms. It becomes the annulus on the stem of a mature mushroom.
- LABYRINTH — a maze of interconnecting tissues as in the gill-like region of *Daedalea* species.
- MYCELIUM — collective term for all the hyphae forming a mushroom.
- PARASITE — a fungus that obtains part or all of its nourishment from a living plant or from another living organism.
- PERENNIAL — growing from one year to another.
- PILEUS — see *cap*.
- RING — see *annulus*.
- SAPROTROPH — a fungus that obtains its nourishment from dead organic matter.
- SLIMY — having a wet, mucilaginous texture.
- SPECIES — a group of individuals sharing common characteristics that produce other individuals with the same features and that are designated by the same name.
- SPORE — the reproductive unit of a fungus, analogous to a seed of a plant.
- STEM — the supporting structure of a mushroom cap.
- STIPE — see *stem*.
- TERRESTRIAL — growing in soil on the ground.
- UNIVERSAL VEIL — a fungal tissue that surrounds the young developing mushrooms in certain species. In a mature mushroom, the lower part of this veil becomes the cup and the upper part may form patches of tissue on the cap.
- VOLVA — see *cup*.

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