

A PRELIMINARY REPORT ON POLYPORES OF EASTERN TENNESSEE

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From time to time, something has been said of the flora of Eastern Tennessee. The limited idea of a flora visualizes trees, flowers and other conspicuous vegetation. This restricted notion has apparently been inherited generally by the public as well as by some students of nature. As a matter of fact, it is both proper and profitable to consider all kinds of plant life in viewing the make-up of a flora.

The group of organisms known technically as polypores,—and popularly as brackets—are plants. They constitute an interesting and important component of our vast and varied flora. If it is true that the flora of Tennessee is unique, varied and rich, it is so because of its strong representation not only of trees, shrubs and flowers, but also of ferns, mosses and the more lowly types such as molds, mildews, rusts, smuts, mushrooms and polypores.

The polypores are members of a larger class of plants,—the fungi— which are degenerates, criminals, scavengers. They are degenerates in that they lead a dependent life. Lacking green foliage, the instrument of food-making, they have turned to other sources, such as living trees and vegetable debris, in order to subsist. Thereby, they may become a criminal menace by their disintegrating effect on otherwise sound trees of the lawn and forest; on the other hand, some perform a carrion duty in returning defunct vegetable organs to their original constituents. Thus, these plant-organisms occupy a prominent and useful post in the natural scheme.

WHERE TO FIND POLYPORES: THEIR SUBSTRATES, HABITATS

Just as higher plants prefer certain types of soil, so polypores show a certain choice of habitation. Although a majority seem to abound on dead and fallen branches of trees, a number attach themselves to the soil. Some species closely approximate a parasitic relationship with living trees; in such cases decay and disease result. Whether the substrate is living or dead, some forms of polypores confine their existence to deciduous trees and logs, others to coniferous plants. A few situations as regards substratum may be stated: *Polyporus fumidiceps* is found especially on dead wood of willow; *Polyporus radicans* grows attached to buried wood; *Polyporus Berkeleyi* seems to prefer oak stumps; *Polyporus fumosus* and *Polyporus conchifer* choose fallen elm branches. On pine and other coniferous woods we find *Polyporus abietinus*, *Polyporus guttulatus*, and *Polyporus Schweinitzii*. *Fomes pinicola* commonly, although not invariably, thrives on conifers. On soil, especially burned-over earth in woods, we find *Polyporus fomicola*;

usually near the ground but attached to the trunks of maple, we have collected *Fomes connatus*. Our common *Fomes fomentarius* has been found with great frequency on living, deciduous trees and is much in evidence as one climbs Mt. LeConte. On railroad ties, we have observed *Polyporus adustus*, *Polyporus gilvus* and others. A species called *Fomes rimosus*, with its dark, cracked, hoof-shaped fruit body can be had almost anywhere by examining a few locust trees, standing or fallen.

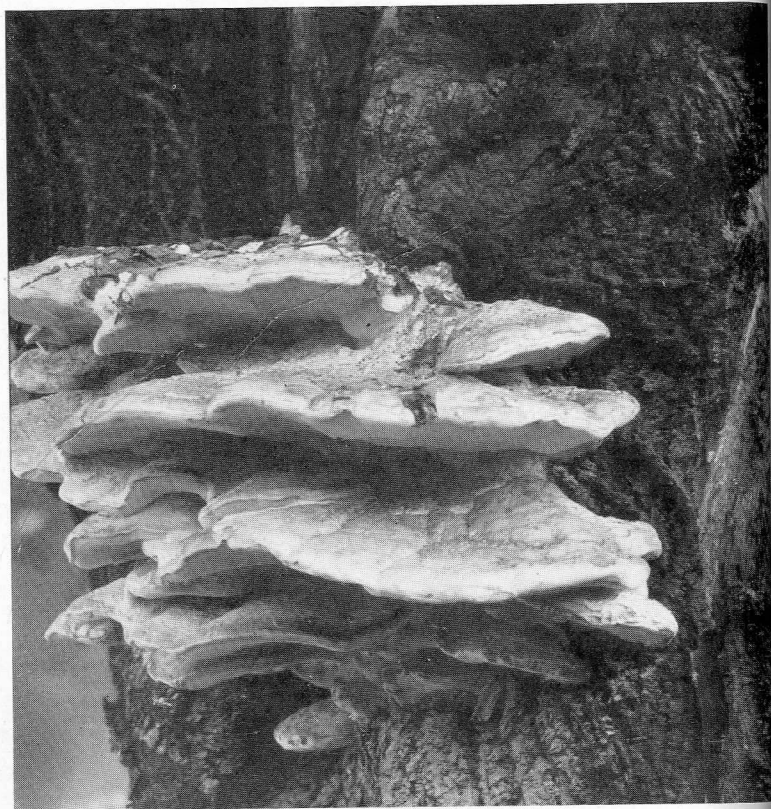


Fig. 1—A polypore on old tree trunk, showing the shelving habit.

On nearly all kinds of dead wood, twigs, limbs, trunks, and the like, one may at any time collect an abundant growth of *Polyporus parvigenus* and *Polyporus versicolor*. The enumeration need not go further. Enough has been said to indicate where polypores may be found with great ease to the collector.

GENERAL STRUCTURAL FEATURES OF POLYPORES

A brief excursion into the woods soon brings one upon a polypore. Especially in the late summer and fall of the year their fruiting bodies are conspicuous on fallen twigs, logs, stumps, and even on the trunks

of trees, where they usually take the form of shelves (Fig. 1). Such a shelf, or bracket, shows typically an upper and a lower surface. The upper surface may vary in color and marking, while the lower surface is distinguished by its tubes compactly arranged with their mouths downward. Looking at the broad under surface, then, one perceives these numerous pores,—whence the name polypores (Fig. 2). These openings

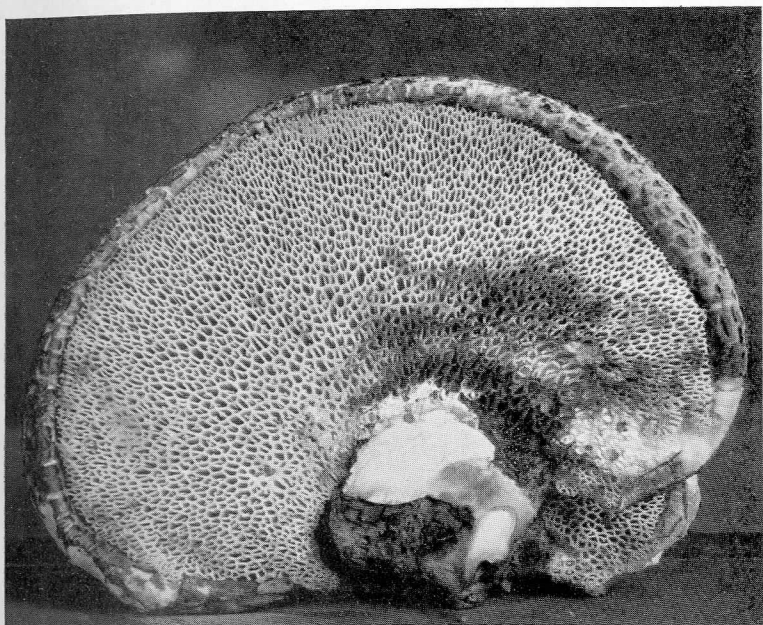


Fig. 2—The under surface of *Polyporus squamosus* showing pores.

are in most forms distinctly rounded or angular holes, while in others the pore-walls are sinuate or lacerated. In more extreme forms the pores are, on the one hand, so greatly elongated as to take on the aspect of gills, a feature which at once suggests a mushroom; on the other hand, the pores may be reduced to shallow pits separated by narrow ridges. Pore surfaces vary in color, white, smoky-gray, brown, red.

The shelf, or bracket, has been spoken of as the fruiting body (Figs. 1-4). It bears the reproductive structures or spores,—whence botanically referred to as a sporophore. The spores themselves are borne on club-shaped organs which stud the inner surface of the pore-wall. Although the spores individually are microscopic in size, they may, at times, be seen in mass as a powder deposited on debris, bark or other objects just beneath the pores. The color of this mass varies with the species,—white, bluish, or some shade of yellow or brown. The color of the pore surface is not necessarily an index to spore color. One familiar form has a brown pore surface while the spores are pale; in another species

the surface is red and its spores colorless; in a third, the surface is white and the spores brown. Pore arrangement is usually without order, although in a few forms the openings develop in radiating lines or rows.

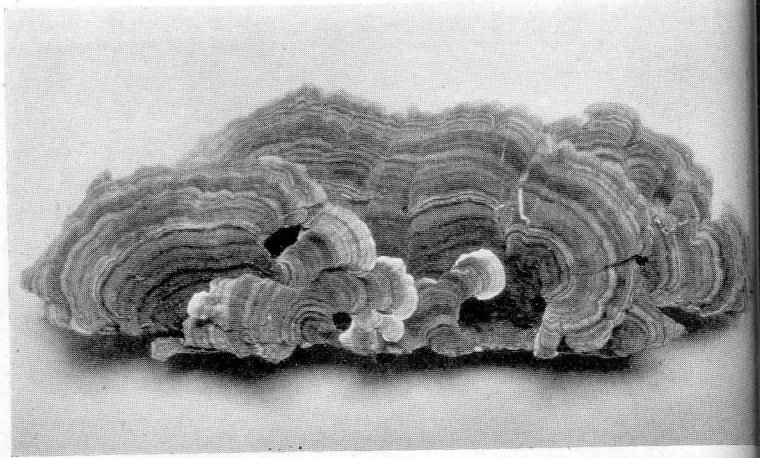


Fig. 3—The upper surface of *Polyporus versicolor* with its many-colored ring or zones characteristic of this common species.

Furthering the discussion of the general features of the upper surface of the fruiting body, we note considerable variety of marking and coloration (Figs. 3-4). This upper side may be smooth, velvety or hairy. It sometimes exhibits many multi-colored zones,—white, yellow, brown, reddish, greenish, dark to nearly black. In certain hard and woody forms the zones represent annual layers; in such cases the approximate age of the bracket can be determined by counting the zones (Fig. 4). One specimen brought in from Elkmont shows fourteen layers, indicating a probable age of as many years. This species, *Fomes pinicola*, may attain rather large proportions: one of our specimens is eighteen inches across. Another large form, collected on Mt. LeConte and in Cades Cove, while only an annual (*Polyporus Berkeleyi*), grows in clusters and each specimen may fill a large market basket.

The colors found in the upper surface of fruiting bodies are of wide variety. Some are whitish, others gray, brown, yellow, red. In one common and striking form the surface is chestnut-brown or mahogany-colored, and it appears as if varnished. Another less common species possesses a whitish to dingy yellow or brownish appearance clothed with closely appressed brown scales (*Polyporus squamosus*). The color of the upper surface may or may not match that of the lower side.

Interiorly, the substance of the bracket shows variety of color, the hue being constant for the species. In some groups, the context is

whitish, pallid or light yellow; in others red or reddish; in still others, brown or brownish.

Some of the simplest polypores, although difficult of classification, are devoid of any shelving characteristic. They simply spread out on



Fig. 4—The upper surface of *Fomes applanatus*. The distinctive rings, or layers, are indicative of years of growth. This specimen would appear to be about eight years of age.

the substratum exhibiting no bracket whatever. (Too little is known of these forms to permit inclusion in this paper; we refer to the genus *Poria*.) In wood inhabiting species the shelves may possess a lateral stalk, or a stalk may be lacking. Forms growing on the soil and on buried wood usually have a central stalk. In *Polyporus radicans* the stalk is central and velvety and extends some distance into the ground, suggesting a root,—whence the specific name. In others, e.g., *Polyporus folicola*, the stalk is not deep-rooting.

The general texture of polypores is woody, corky, leathery and semi-fleshy; in young forms or young parts the body is fleshy. The yellow polypore, *Polyporus sulphureus*, is rather fleshy in the younger, marginal portions; such parts are edible. This is true of some other polypores; if they are to be eaten they must be gathered while young. Few forms, however, besides the yellow bracket are edible. We have

eaten this species and prefer it to all mushrooms except the common commercial agaric, the meadow mushroom. Properly cooked, the flavor of the yellow polypore is suggestive of young chicken. The beef-steak fungus (also called oak-tongue, beef-tongue, and liver fungus) likewise edible, but its kind is not included in this discussion. Botanically the fleshy boleti and the beef-steak fungus are considered a little outside the family of the more tough, woody types.

THE SPAWN, OR MYCELIUM OF POLYPORES

While the fruiting body is a conspicuous and important organ of polypore, there is another essential, although less noticeable, structure. The bracket superficially appears to be attached to its substratum, but a more careful examination reveals its organic connection with a system of branched threads called mycelium. Portions of these threads may be used to propagate the species, much like cuttings, therefore the mycelium is at times referred to as spawn. These mycelial threads dissolve and absorb food materials as they pervade the substrate. One may see these threads under the bark of a decaying log or twig; or by disturbing old fallen leaves, one may readily find an abundance of white or bright-colored strands belonging to near relatives of polypores. Spores, discharged from the pore-walls, fall on a wounded tree-trunk or wood-debris and in moisture germinate to form sprouts which by continued growth develop into mycelium.

NUMBERS OF GENERA AND SPECIES

Among the fungi, no group, save the gill-forming mushrooms, is more conspicuous in eastern Tennessee than the polypores. In the wooded areas, especially in the mountains, but by no means confined to them, one can soon gather a large number of individuals and species and a fair representation of genera. We report herewith six genera and 76 species, as follows:

<i>Genus</i>	<i>Number of species listed herein</i>
Polyporus	56
Fomes	9
Daedalea	3
Lenzites	3
Favolus	1
Trametes	4

When it is considered that most of our collections have been made rather casually and within a radius of thirty miles of Knoxville, it can be imagined that as the survey is extended over the State the representation will be much greater.

AN ABBREVIATED KEY TO GENERA OF POLYPORES

- I. Fruiting body perennial, showing annual layers; woody..... *Fomes*
- II. Fruiting body not layered; variable texture; leathery, corky, or even fleshy when young.

- A. Pores in radial lines and longer in the radial direction;
angular or hexagonal *Favolus*
- B. Pores not in radial lines; rounded, broken up into teeth-like
openings, labyrinthiform or gill-like.
1. Pores labyrinthiform, elongated *Daedalea*
2. Pores more or less gill-like *Lenzites*
3. Pores rounded, or in a few species breaking up into teeth.
- (a) Tubes all sunken to an equal depth into the fruiting
body *Polyporus*
- (b) Tubes not in a distinct layer, but sunken to unequal
depths *Trametes*

LIST OF POLYPORES FOUND IN EAST TENNESSEE

Kauffman, in 1917, reports¹ the collection of fungi, including polypores, in the vicinity of Elkmont, Tennessee. He lists a few species which, to date, we have not collected. These forms we are including in our list with a note in each case indicating collection by Kauffman. Except these species, all the polypores listed below are deposited in the herbarium of The University of Tennessee. Determination of species has been made by Kauffman, Lloyd, Overholts and the writer; in some cases, my own determinations have been confirmed by Overholts.

- Polyporus abietinus* Dickson ex Fries. On pine wood.
- Polyporus adustus* Willdenow ex Fries. On railroad ties, silver bell, and
and other deciduous wood.
- Polyporus albellus* Peck. Collected by Kauffman.
- Polyporus arcularius* Batsch ex Fries. On dead wood.
- Polyporus Berkeleyi* Fries. On soil near oak trees.
- Polyporus borealis* Fries. On trunks of conifers.
- Polyporus brumalis* Persoon ex Fries. On dead wood.
- Polyporus Caesius* Fries. Collected by Kauffman.
- Polyporus chioneus* Fries. Collected by Kauffman.
- Polyporus cinnabarinus* Jacquin ex Fries. On dead wood.
- Polyporus cinnamomeus* Jacquin ex Fries. On soil.
- Polyporus circinatus* Fries. On pine log.
- Polyporus cochifer* Schweinitz. On dead branches of elm and oak.
- Polyporus confusus* A. & S. Collected by Kauffman.
- Polyporus cristatus* Persoon ex Fries. On soil.
- Polyporus croceus* Persoon ex Fries. Collected by Kauffman (reported
as *P. Pilotae*).
- Polyporus Curtisii* Berkeley. On soil.
- Polyporus delectans* Fries. On old logs.
- Polyporus dichrous* Fries. On dead wood.
- Polyporus distortus* Schweinitz ex Fries. On deciduous trees.
- Polyporus elegans* Bulliard ex Fries. On dead wood.
- Polyporus fissilis* B. & C. Collected by Kauffman.
- Polyporus floriformis* Quelet. Collected by Kauffman.
- Polyporus foveicola* Berkeley and Curtis. On burned-over earth in woods.
- Polyporus frondosus* Dickson ex Fries. On soil.
- Polyporus fumidiceps* Atkinson. On willow log.
- Polyporus fumosus* Persoon ex Fries. On elm.
- Polyporus galactinus* Berkeley. On decaying log.
- Polyporus giganteus* Fries. On ground around stumps.

¹Kauffman, C. H. 1917. Tennessee and Kentucky Fungi. *Mycologia* 9: 159-166.

- Polyporus gilvus* Schweinitz ex Fries. On railroad ties, and a variety of dead branches.
- Polyporus guttulatus* Peck. On coniferous wood.
- Polyporus haedinus* Berkeley. Collected by Kauffman.
- Polyporus hirsutellus* Schweinitz. Collected by Kauffman.
- Polyporus hirsutulus* Schweinitz. On dead branches of birch.
- Polyporus hirsutus* Wulfen ex Fries. On dead twigs.
- Polyporus lucidus* Leyssing ex Fries. On decaying log.
- Polyporus Montagnei* Fries. On ground "attached to buried pine branches."
- Polyporus pargamenus* Fries. On a variety of dead branches, stumps and logs.
- Polyporus Peckianus* Cooke. Collected by Kauffman.
- Polyporus perennis* Linnaeus ex Fries. On soil.
- Polyporus picipes* Fries. On stumps, logs, etc.
- Polyporus pinsitus* Fries. On Juniper.
- Polyporus pubescens* Schumacher ex Fries. On dead wood.
- Polyporus radiatus* Fries. On dead tree trunk.
- Polyporus radicans* Schweinitz. On soil.
- Polyporus resinosis* Schrader ex Fries. On logs and stumps of hemlock and deciduous trees.
- Polyporus robinophilus* Murrill ex Lloyd. Reported by Kauffman as *Trametes robinophila* Murrill.
- Polyporus sanguineus* Linnaeus ex Fries. On logs.
- Polyporus Schweinitzii* Fries. On oak and pine stumps.
- Polyporus semipileatus* Peck. Reported by Kauffman as *P. semisupinus* B. & C.
- Polyporus Spraguei* Berkeley and Curtis. On dead wood.
- Polyporus spumeus* Fries. Collected by Kauffman.
- Polyporus squamosus* Hudson ex Fries. On maple.
- Polyporus sulphureus* Bulliard ex Fries. On dead trees, logs and stumps.
- Polyporus tulipiferus* (Schw.) Overholts. On dead wood.
- Polyporus versicolor* Linnaeus ex Fries. On dead wood of all kinds.
- Fomes applanatus* Persoon ex Wallroth. On decaying logs and stumps.
- Fomes conchatus* Fr. Collected by Kauffman.
- Fomes connatus* Weinman ex Gillet. On trunks of maple "usually near the ground."
- Fomes fomentarius* Linnaeus ex Gillet. On beech and other living deciduous trees.
- Fomes lobatus* Schweinitz ex Cooke. On deciduous wood.
- Fomes pinicola* Swendener ex Cooke. On coniferous wood.
- Fomes marmoratus*. On deciduous trees.
- Fomes meliae* Underwood. On railroad ties.
- Fomes rimosus* Berkeley. On black locust.
- Daedalea ambigua* Berkeley. On logs.
- Daedalea confragosa* Bolton ex Fries. On dead twigs.
- Daedalea unicolor* Bulliard ex Fries. On dead wood.
- Lenzites betulina* Linnaeus ex Fries. On oak stump.
- Lenzites saepiaria* Fries. On coniferous dead wood.
- Lenzites vialis* Peck. On dead wood.
- Favolus candensis* Klotzsch. On dead branches.
- Trametes carnea* Nees ex Cooke. On dead pine.
- Trametes protracta* Fries. On dead coniferous wood.
- Trametes scutellatus* Schweinitz. On dead wood.
- Trametes sepium* Berkeley. On oak post.