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SYNOPSIS OF THE
BRITISH BASIDIOMYCETES

A DESCRIPTIVE CATALOGUE OF
THE DRAWINGS AND SPECIMENS
IN THE DEPARTMENT OF BOTANY
BRITISH MUSEUM

BY

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P R E F A C E

IN 1905 the Trustees acquired the manuscript descriptions drawn up by Mr. Worthington G. Smith, when preparing the fine series of coloured drawings of British Fungi which are exhibited in the Public Gallery of the Department of Botany. The descriptions were accompanied by line drawings illustrating the characters of each genus. In 1907 the Trustees gave permission for their publication in the form of the present Handbook, which it is hoped will prove a useful introduction to the study in the field of the larger British Fungi. Of the numerous introduced species all that have appeared in the open air are included; but those occurring in greenhouses and stoves are omitted, except those which continually reappear, and those which stray into gardens.

Mr. Smith himself and Mr. W. E. St. John Brooks, Assistant in the Department, have given valuable help in the preparation of the book for the press.

A. B. RENDLE.

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SYNOPSIS

OF

BRITISH BASIDIOMYCETES

INTRODUCTION

THE British Basidiomycetes include nearly all the larger British Fungi. They comprise all the Mushroom-like Fungi, practically all the larger woody corky and gelatinous fungi of trees stumps and fallen branches (*Hymenomyces*), the Phalli, Puff-balls and their allies, and a small number of Truffle-like subterranean species (*Gasteromyces*). The term Basidiomycetes is used in the sense in which

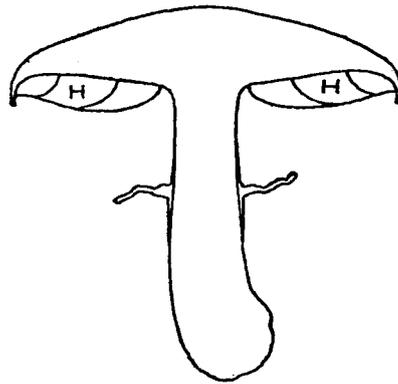


Fig. 1.—Section through Mushroom, showing exposed hymenium (H).
One-half natural size.

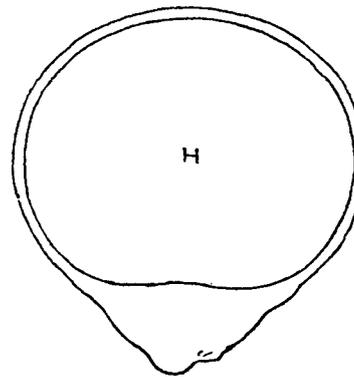


Fig. 2.—Section through Puff-ball, showing hymenium (H) closed in.
One-quarter natural size.

it was employed by De Bary, and not with the larger meaning assigned to it by Brefeld, which includes the Rust-fungi or *Uredineæ*.

In the *Hymenomyces* the spore-bearing surface or *hymenium* is exposed during development, as in the Mushroom (fig. 1); in the *Gasteromyces* the hymenium is closed or hidden within the substance of the fungus until maturity, as in the Puff-ball (fig. 2).

The larger Fungi not described in this work are a few of the Ascomycetes, including the Morel and its allies, the true ascus-bearing Truffles and a limited number of Cup-fungi.

The microscope is unnecessary for the determination of the greater number of the Basidiomycetes; nearly all are large and can be satisfactorily examined by the unaided eye or with the assistance of a hand-lens. A few forms found under Family IV *Thelephoraceæ*, as *Solenia* and *Cyphella*, superficially resemble certain of the Ascomycetes, as *Peziza*; but with a little experience even obscure forms

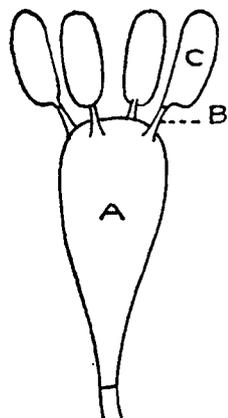


Fig. 3.—*Pleurotus ostreatus* Quél.
A, basidium; B, sterigma;
C, spore. $\times 750$.

may be easily determined with the aid of a simple lens. In some genera of the *Thelephoraceæ* a microscopic examination of the hymenium is sometimes desirable.

The Basidiomycetes are highly plastic and variable. No one species is constant in all its characters, and a single example seldom wholly accords with any other single example of the same species. Examples which appear to be intermediate between allied, and sometimes between not allied, species are frequently met with. About one species in ten is perhaps fairly well and distinctly marked, but all species will at times present aberrant characters. Any one character is liable to fail; in the determination of species, therefore, all the characters must be studied together.

The Basidiomycetes are so named on account of the spores being borne on more or less club-shaped cells named *basidia* (fig. 3). They are commonly borne in fours, on slender usually short threads or supports named *sterigmata*. In rare instances, however, the basidium bears two spores or perhaps only one; in these cases the normal number of four is sometimes reverted to in well-developed examples. In some species of the *Tremellinaceæ* the spores are septate, and in some *Gasteromycetes* six or even more spores are produced on a basidium.

The spores are usually smooth and simple or composed of one cell; they are sometimes echinulate or warted. The commonest form is oval or round; a few are multiangular. They are of microscopic size, varying from about 18μ to 3μ in length, and of various colours.

The character of the basidium with its four naked spores is one of great importance, as it separates the Basidiomycetes from the Ascomycetes. In the latter the spores are borne usually in a series of eight, within microscopic transparent elongated colourless sacs named *asci* (fig. 4); the asci when ripe open at the apex and the spores escape.

In an examination of the spore-bearing surface or hymenium of

the Basidiomycetes three kinds of cells are met with,—the ordinary barren cells of the hymenium, the basidia with the spores, and certain other large cells named *cystidia*. The last-named are sometimes very small or practically absent, as in *Clavaria*; in other genera they are very large, as in *Coprinus* (fig. 5), *Hymenochaete* (fig. 6) and *Peniophora*.

The more highly developed Basidiomycetes as a rule bear white or slightly tinted spores; the lower or dung-borne species usually produce black spores. In most instances the spore-colour is permanent, but in some species it vanishes and leaves the spores hyaline. The colour of the spores is often used as a generic or subgeneric character; the tint often, but not invariably, gives the distinctive hue to the mature hymenial surface. It is readily seen by placing examples with the hymenium downwards upon a piece of glass on which the spores will be deposited.

At maturity, the spores of the *Hymenomycetes* drop from the sterigmata and are free in the air, but in the *Gasteromycetes* the outer coats become naturally ruptured before the spores can escape. In the *Phalloidaceæ* the sporiferous surface is at first enclosed in a veil (*volva*), and even after the elongation of the stem, the cap (*pileus*) is covered by a very thin, almost invisible membrane; when the spores are ripe they are enveloped in mucus which runs down from the upper parts of the fungus to the lower, where there is a gelatinous stratum; the spores may possibly germinate in the decomposing gelatine. In the fetid species the odour attracts swarms of flies and sometimes small beetles to the sporiferous mucus, which they eagerly devour. On flying away the insects disseminate the spores, which have been seen to germinate after having passed through flies. In the *Lycoperdaceæ* the spores are at first enclosed in a peridium, and it is only when this is ruptured that they are set free. The *Hymenogastraceæ* are subterranean, or nearly so, and the spores must either germinate in the decaying substance of the mother plant or be carried away by larvæ, insects, etc.

In germination the spores open at one or both ends; a transparent germinal tube emerges (fig. 7) and forms strands, threads or hyphæ of cellular mycelium. The strands branch and coalesce



Fig. 4.—*Morchella esculenta* Pers.
A, ascus; B, spore; C, paraphysis.
 $\times 500$.

with other hyphæ belonging to other spores of the same species. In rare instances, as in the *Tremellinaceæ*, the spores germinate and

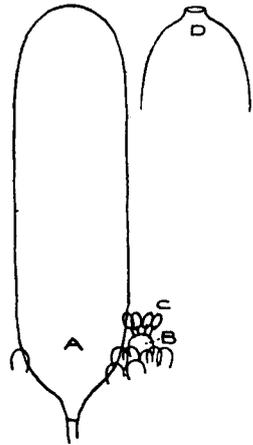


Fig. 5.—*Coprinus atramentarius* Fr.
A, cystidium, orifice open at D;
B, basidium; C, spores. X 200.

produce a rudimentary mycelium (*promycelium*) bearing spores, from which only is a true mycelium produced. The mycelium or finely matted growth produced by germinating spores is the "spawn" of gardeners; it is usually white in colour, but is sometimes tinted; in one or two instances it is blood-red. If the mycelium or spawn be placed upon a suitable matrix the fungus will, under favourable circumstances, be reproduced. The spores of some Basidiomycetes very speedily die after falling from the hymenium. No sexual organs are known in the Basidiomycetes.



Fig. 7.—*Psathyrella prona* Gill.
Spores germinating. X 350.

The season of growth is usually the autumn, but a considerable number appear in the spring and summer, and some continue to grow till late in the autumn or even early winter. Many species of *Marasmius* will, after being quite parched in dry weather, revive in rain, and several of the late-growing species of *Clitocybe* and *Collybia* revive after being frozen. There are two crops of some Basidiomycetes every year, one vernal and the other autumnal; this is the case with *Coprinus atramentarius*, of which the first crop appears after the rains of April and May, the second in September or October. If vernal examples are gathered and buried with decayed wood or beside decaying posts a crop of perfect fungi will appear in September or October. There are sometimes three crops of *Coprinus micaceus* in one year. If living plants of *Coprinus*

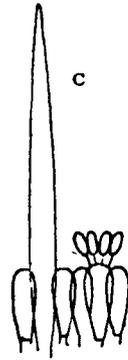


Fig. 6.—*Hymenochate nigrescens* Cooke.
Part of hymenium with long cystidium, C. X 300.

radiatus are placed upon manure heaps the spores will germinate at once and reproduce the plant in a day or two.

Some of the perennial *Polyporaceæ* continue to increase in size for many years. The years of growth can be counted in the annual flesh-strata, which are easily seen when sections are made. Mycelium will continue to live in wood or in the ground for an apparently unlimited time. I have known a "fairy-ring" of *Clitocybe geotropa* on Dunstable Downs for forty or more years, which under favourable conditions of light can be seen at a distance of more than a mile. The diameter has not altered much during the time I have known it, for sometimes it grows inwardly for several years and then again outwardly.

Most species are terrestrial and grow on or just below the ground; a large number grow on dead leaves and twigs; others on dead wood, bark, branches and trunks. It is unusual to see fungi on healthy trees; the majority of the larger fungi so commonly seen growing on tree-trunks in parks, woods and forests are "wound parasites," which germinate upon a damp injured place and grow parasitically upon the living host. Rootlets are often attacked by mycelium which at length develops as a perfect fungus at the tree's base, as in *Fomes annosus*, or in other cases travels further up the trunk as in *F. ignarius*, and other species. *Polyporus Schweinitzii* is well known to be highly destructive to conifers; *Pinus Strobus*, *P. sylvestris* and *Larix europæa* especially suffer. Many other species of *Polyporus* are more or less destructive. Amongst the *Agaricaceæ*, *Armillaria mellea* is one of the most destructive; it often grows upon living roots, not uncommonly under the shade of large trees, the growth of the fungus being limited to the extent of the root-growth of the trees. One form of its mycelium, named *Rhizomorpha*, lives perennially beneath the bark of trees. It destroys tree-roots, chiefly those of conifers, but sometimes attacks plum and other trees; it also appears on squared timber, when used for bridges, in mines, etc.

Certain species grow parasitically upon other Basidiomycetes. *Volvaria Loveiana* grows upon the pileus of *Clitocybe nebularis*; two species of *Nyctalis* grow upon the pileus or stem of species of *Russula* and *Lactarius*; and *Boletus parasiticus* grows from the base or side of *Scleroderma vulgare*. Some species are almost peculiar to human habitations: *Coprinus radians* grows upon plastered walls, *C. aphthosus* commonly appears in kitchens and cellars, *Merulius lacrymans* (Dry Rot), *Poria hybrida* and *Polyporus destructor* are almost entirely confined to the interior of houses and ships, and *Merulius corium* often grows in dwelling-houses. *Coprinus domesticus* is usually seen in or close to human dwellings; *C. comatus* and *Cortinarius urbicus* commonly grow close to houses or to places where human beings resort. Many species grow on burnt wood and earth, as *Clitocybe fumosa*, *Collybia atrata*, *C. ambusta*, *Flammula decipiens*, *F. sapinea*, *F. carbonaria*, *Lepiota Friesii*, *Cantharellus radicosus*, *Polystictus cinnamomeus*, and many others.