SOME OF THE SHOWY MUSHROOMS IN NATURE.

THE BOLETUS FAMILY.

BY WILLIAM HOSEA BALLOU.

THE nomenclature of the Boletus family, or tube-bearing fungi, has just had a thorough revision at the New York Botanical Garden, by Dr. William Alphonso Murrill, Assistant Director. This fact enabled me to prosecute the photography of forms growing in life in New York city and vicinity, with the certainty of absolute identification of species and correct labels for negatives. Every species has innumerable variations in external appearances, due, I conclude, to different food supplies drawn from different soils. These variations make differences in colors and shapes. But whatever the variations, the spore of each species usually remains the same, and when placed under the microscope, reveals the correct name. Herein we have the great confusion of names caused by collections in museums, more or less imperfectly dried or distorted by insects. Imperfectly dried specimens can seldom present correct features for identification, particularly in cases of wide variation from the normal. All of the specimens I photographed growing in life were immediately placed living in the hands of Dr. Murrill, so that there could be no doubt as to their identity. The specimens were then scientifically dried and filed in the museum, adding to those already in stock there, and aiding to show the entire correct range of variations.

The variations in color and shape of the members

ROSTKOVITES GRANULATUS.

of the Boleti family are responsible for many errors by botanists in the past. The most extraordinary mistakes were those by botanists unable to distinguish Boleti features and placing them in some of the other families, mostly the Agarics, but some of them even in the Polyporaceæ. In revising nomenclature, modern methods are now applied in every department of natural science as pioneered, I believe, by the late Prof. Edward Drinker Cope. Cope first noted that the characteristics of the skull determined accurately most species of mammal and bird life, and the reproductive organs in reptile life. In revising nomenclature, a specialist seeks to borrow from museums and collectors all of the specimens referred to a given family. Having these before him, he exhaustively examines all of the literature ever printed on the family in question. He then separates the specimens into each genus to which they belong, and these into each species. He then takes all the specimens of a given species and makes a list of all the various scientific names that have been given it. From the literature in hand, he awards to each species the name given to it first, crediting the specialist who first named it. That is why, when you see a description of a species, it is preceded by a list of all the scientific names given to it, the name of the scientist giving each one, the name of the publication it was in, page and date. Often he finds all of his predecessors mistaken in their observations of characteristics and, in view of the errors they have made, is forced to give the species a new and cor-

CERIOMYCES MINIATO OLIVACEOUS.

rected description and a new and more appropriate Latin or Greek name.

Certain Boleti are still coming up at the date of this writing, October 20th, and will continue to do so until very cold weather. In fact, this is the season when the most showy forms of many fungi are likely to be found in gorgeous array. So far, I have photographed 22 species of the Boleti, out of perhaps 150

species known to America, of which one was new to science. Of these, the showy species will be figured herein as I saw them in the field. The variations were often most puzzling to me, causing me, in at least one instance, to pass by the most gorgeous and largest specimen of a species (*Gyroporus castaneus*), of

CERIOMYCES PALLIDUS.

which I had photographed only smaller specimens. However, I have the date and locality and next year will try to find a duplicate. Worse than that, on the same day and on the same forest roadway, in a space of 300 feet, I picked up without photographing, and placed in the collecting basket, seven species of boleti, which, because of their small size, and without examination, I considered merely young forms of specimens already in stock. Among them was the species new to science and which had just been discovered and named *Ceriomyces Morrisii*, by Peck. The smaller species would necessarily form a separate article. Following are some of the showy forms photographed in nature, with their new names, after Murrill, as recorded in his memoir on the Boletaceæ, published recently in the new magazine, *Mycologia*, and his new monograph on the family just issuing from the press.

YELLOW TUBE MUSHROOM (*Ceriomyces bicolor*).—Edible. Not many have collected this species. I found it in a cow pasture containing one small oak under which it grew. It has a purplish red cap, or top. The base, or hymenium, is bright yellow and smooth, like ointment packed in a tin box. The stem is yellowish, but usually with red streaks. In drying, the base turns brownish, and but for the red streaks on the stem, might be taken for another species. I found many brown-based specimens elsewhere, showing that

CERIOMYCES RETIPES.

they were passing into old age, which captures most fleshy fungi within a week from birth. A single woodland presents a constant panorama of passing species of fleshy fungi. Unless thoroughly examined every week from earliest spring to latest autumn, hundreds of species may escape observation. Many species come up to-day and are gone within the week, not to be seen again for a year. Every woodland, also, seems to present a different set of species at a given time, seldom duplicating each other. A single collector, therefore, would necessarily be omnipresent over the entire world to gather all the species appearing simultaneously. Again, there are innumerable species coming up during the entire nine months at all times, some of them on precisely the same spot. A rare puff ball, *Bovistella Ohioensis*, has been fruiting since the earliest spring on a small patch of the border of the New York Botanical Garden.

BITTER TUBE MUSHROOM (*Tylopilus felleus*).—Poisonous. Cap smooth and light brown, pink sheen on base when turned back and forth, making certain identification. I photographed the first specimen June 17th, pendent from an overturned root, west of Allenhurst, N. J. Thereafter I found specimens everywhere in Monmouth County woods. The largest specimens measuring up to 7 inches in diameter I found in the great Allaire woods growing along an entire hillside. September 21st was the last date any were observed this year. Murrill records it as growing over a foot in diameter.

SLIMY TUBE MUSHROOM (*Rostkovites granulatus*).—

Edible. The cap is convex, the base flat. The whole boletus is yellow in youth; every young specimen I have seen, usually growing in large groups, had yellow caps, hymeniums and stems. As they age, the cap turns reddish brown. In meadows the stems are short, in forests they are more lengthy. In meadows the caps are broad and rather thin, in forests often chunked. In one group, I counted many shapes, but all golden yellow. They may be found from summer to late autumn.

GREEN TUBE MUSHROOM (*Suillellus luridus*).—Poison. Cap brownish, base red or reddish, changing to brown when dead. The tubes are yellowish with red mouths. If cut, the entire surface of the boletus turns blue or salmon colored. The stem is yellowish. Usually upon its decay it is attacked by a slime mold, as are many species of the boleti. If found at the right age this is one of the most showy and most gorgeous of species, with its rich red hymenium. One can forgive it being poison, it is so beautiful, and to me the beauty of the fungi generally appeals far more than all of their edible, destructive or other characteristics. The largest group of *luridus* I found was growing closely bunched under an oak tree on the lawn of the Botanical Garden. It looked like a collection of kaffir huts with the roofs overlapping. The adjoining oak tree was entirely monopolized by the black and white spe-

TYLOPILUS FELLEUS.

cies *Tylopilus alboater*, the only specimens that have been found in this section. I found one specimen of *luridus*, growing on a large vine of poison ivy, two feet above the base of the tree entwined, demonstrating that one poisonous plant can exist on another poisonous plant, the poisons neutralizing each other.

BRIGHT YELLOW TUBE MUSHROOM (*Ceriomyces miniato olivaceus*).—Poison. This is a generally yellowish species, with large stems. The yellow of the base, however, is very bright and looks like ointment packed in a box. It also quickly changes to blue when cut or bruised. Under an oak on the lawn, not far from the last two species, this type came up at intervals all last summer. I have not yet seen it growing elsewhere, although its range is from New England to West Virginia.

RETICULATED MUSHROOM (*Ceriomyces retipes*).—Edible. All golden yellow, so far as I have seen, but its cap is said to vary to brown, perhaps from aging. The only group I met of this species was in the big Allaire, N. J., forest, owned by Mr. Arthur Brisbane, editor of the New York Evening Journal, under a thinned-out clump of pine trees. None appeared again after collecting those visible in the latter part of August. The stems were large and long, finely reticulated (having a network), the whole boletus firm with caps varying up to 5 inches wide. The specimens were readily visible some distance away, and of exceeding beauty.

ROUGH STEMMED TUBE MUSHROOM (*Ceriomyces sca-*

SUILLELLUS LURIDUS.

ber).—Edible. Various hues above, roseate, lavender, dark and light, but all white below. A very firm species with diameters up to 8 inches and weights up to 4 pounds. I have found it common in the piny woods everywhere, although not confined to them, from early spring to latest autumn. The caps are very round, convex, and thick. Enough of them go to waste to feed a large population. It is easily distinguished

by its scabrous stem and white hymenium, although its many colored caps often deceived me for some time until I grew familiar with its vagaries.

LARGE-TUBE MUSHROOM (*Ceratomyces edulis*).—Edible. All yellow or shades of it, up to 8 inches in diameter, the skin of cap often cracking. In age it usually dries out as if tanned. The first forms I met were snowy white from an attacking parasitical mold. Thereafter I found many normal specimens under

CERIOMYCES EDULIS.

spruce and pine trees. The first group had been attacked by a mold as soon as they commenced growing, because the mycelium was imbedded in a rotten stump where the parasite was entrenched. Two specimens I found growing in a large group of the deadly *Amanita muscaria*, both species all the same color, under a spruce tree.

TULIP-SHAPED BOLETUS (*Boletinus meruloides*).—Cap brown, base yellow with a network of little squares. I first came across a large group, or series of groups of this mushroom, under a huge, spreading ash tree in the Shetland pony pasture at Allaire, N. J. At first sight it seemed as if one had entered a field of dark brown tulips, as every specimen was curled up tulip shaped. Some children, playing near by, asked me what kind of flowers they were and refused indignantly my explanation that they were fruit and not flowers. The next group discovered was in a dark, narrow, covered flume, not far away, where none of them was tulip shaped, but flat on top. The flume was made to confine a small creek, emptying into Manasquan River. By removing a plank overhead I got light enough to photograph the specimen, the largest and most gorgeously colored I have seen. The species identifies itself by its network of little squares on the yellow hymenium.

ALL-RED BOLETUS (*Suillellus frostii*).—All red, with smooth red cap, red base, and red stem, named for the lamented C. C. Frost, a pioneer specialist on the Boleti, who forgot to name any of his discoveries, new to science, after himself. I first saw a group of blood-red specimens shining in a brush and log heap in a clearing of the Allaire, N. J., forest. There was no way to clear the ground and photograph the group, so I awaited discovery of more kindly-inclined specimens, which came later at Allenhurst, N. J. On a high hill, also in the Allaire forest, I saw an entire moss bed dotted with small specimens, their smooth red caps shining in the brown moss. This species also identifies itself by the characters mentioned. It is common enough in New Jersey, but only grows large where it has plenty of sunlight. I saw no specimen, however, over 3 inches in diameter.

THE ORANGE BOLETUS (*Boletus subsanguineus*).—One form has an orange cap, whitish orange base and stem. Another form is all brown, dark brown cap, light brown hymenium and stem. The third form is a blending of orange and brown. I photographed all three forms growing in moss beds in a grove at Deal Beach, N. J. The caps averaged 1 to 2½ inches in diameter, but at Allaire I got a snap at a cluster of specimens out in the open, the largest of which was 5½ inches across. My first glimpse at the clusters in the Deal grove led me to pass along, as I thought some picnickers had thrown a lot of orange peels in

CERIOMYCES BICOLOR.

the moss beds. Strangely enough, there is almost an odor of oranges about them, certainly an acetic acid aroma. The specimens growing in the sunlight differ in color, having light orange caps, white hymeniums and stems, and might be mistaken for *scaber*, except that the stem is not scabrous.

PALLID MUSHROOM (*Ceratomyces pallidus*).—Buff cap and greenish base. This is a common variety, grow-

ing very large at times, especially in the finely pulverized soil of a burnt and blackened forest. In the Deal Lake woods, New Jersey, specimens grew 6 inches across in such soil and conditions. Its pallid cap, usually spotted as if rain drops had marred it, identifies it at once. Some specimens, however, have quite brown caps with dark brown rims around the edge and do not look at all so sickly and dissipated as the generality of the type.

The Boletus family is a lover of oak trees, and in summer one is pretty sure to find a species of some kind under the afternoon shady side of any oak, anywhere, in field or forest.

FORKS AND CLEANLINESS.

DOMENICO SILVIO, doge of Venice from 1054 to 1096, is less known to fame than his wife, a Greek princess, whose peculiar habits made her an object of scandal and fear. The unfortunate woman had brought with her a small two-pronged gold fork which she used to convey food from her plate to her mouth. This innovation seemed so unnecessary and absurd a refinement that a general cry of indignation and horror arose, and the priests publicly invoked the chastisement of heaven upon the unnatural creature who refused to eat with her fingers. She soon died of a mysterious disease and all Venice regarded her taking off as a punishment for her sins. This awful example of Divine wrath

BOLETINELLUS MERULIOIDES.

formed the theme of sermons during three centuries, and more than four centuries elapsed before a fork again appeared on a Venetian table. About the year 1500 a few sybarites ventured to introduce the accursed implement and the Venetians gradually became accustomed to it. An English traveler, Thomas Coryate, endeavored to introduce the use of the fork into England, but he was lampooned and nicknamed "furcifer" (fork bearer), and London society continued to eat with the fingers.

In France, the fork was first introduced by the *mignons*, or favorite courtiers of Henri III. (1574-1589). The innovation met with much ridicule and little success, for the management of the new toy proved too difficult for most experimenters, who pricked their lips and tongues and scattered more food over their clothes and the table cloth than they put into their mouths. The use of the fork was only a passing fashion. As late as 1680 it had not been adopted in high society, although the king, Louis XIV., ate with a gold fork.

CERIOMYCES SCABER.

The date at which the use of forks became general is very difficult to fix, but it appears certain that in the latter part of the eighteenth century all of the *bourgeois* and many of the aristocrats continued to extract portions from the common dish with their fingers and that, even in the most sumptuously appointed houses, forks were given only to those guests who asked for them. Some guests brought, or sent in ad-

vance, their own forks and knives. This custom is not entirely obsolete in some parts of France, and it is still in vogue in a few districts in Germany, Switzerland, and Tyrol. In some of the French provinces, not many years ago, the host at a formal dinner would honor one of his fair guests by requesting her to mix the salad with her hands.

Dr. Cabanés, in a recent work, which contains these and many other details of old-time manners, asserts

BOLETUS SUBSANGUINEUS.

that the cult of the fork has exerted a deleterious influence on the cleanliness of the hands. The custom of putting the fingers into the common dish necessitated frequent ablutions. The hands were washed before eating and, during the meal, they were often wiped with the table cloth, which was undoubtedly invented for that very purpose. A manual of deportment, published in 1766, contains the following excellent advice:

"Always wipe your spoon after using it and before putting it again into the dish, for some persons are too fastidious to eat of a dish into which you have dipped your spoon after putting it to your mouth. If you have the misfortune to burn your mouth lift your plate to your lips, cover your mouth with your other hand and spew its contents on the plate. Take care never to throw anything, except liquids, on the floor. Never dip your bread or meat into the dish or the salt cellar. Do not offer to another person anything which you have tasted. Observe the general rule that nothing which has been on your plate should be returned to the dish."

A guest at a court dinner is counseled "to wash your hands, even if they do not need washing, in the presence of the other guests, before sitting at table, so that those who put their hands into the dish with yours cannot doubt that your hands are clean." This advice was not superfluous. When Queen Christina of Sweden visited France her hands were described by Mme. de Notteville as being "so dirty that it was impossible to see any beauty in them." The Chancellor Séguier "ate with the dirtiest hands that could be seen anywhere," and the Duc de Vendôme was so unclean that nobody was willing to sit beside him at table.

If we go back to the end of the sixteenth century we find the etiquette of the table still less rigid. It was correct to dip one's meat in the gravy of the dish. "If others dip their bread in the dish, you may dip yours with propriety. If there is a spoon in the dish, the soup or porridge may be tested with it, but it must be wiped and returned." Here we see the origin of the custom, still observed by some hostesses, of placing intimate friends together. Dabbling in the common dish and licking the common spoon were made more tolerable by this arrangement. When these communistic customs prevailed, however, it was deemed necessary to keep the fingers clean, but this was regarded as a superfluous refinement and the formal washing of the hands was discontinued when the use of the fork became general.

These fine gentlemen of the Renaissance, furthermore, were covered, though not so thickly as their pages and lackeys, with vermin, which, according to Dr. Cabanés,

SUILLELLUS FROSTII.

were employed in medicine, in the form of potions and plasters, cooked, raw, and even alive. The finest mansions, even the royal palaces, swarmed with vermin. The Carthusian monasteries alone were free from them. This exemption has been attributed to the vegetarian diet of the monks but it was more probably due to the fact that the cloisters were kept reasonably clean.—Le Monde Illustré.