

MYCOLOGICAL NOTES.

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232—THE TYLOSTOMEAE.

This tribe is distinguished by having a long stipe which is distinct from the peridium. The only other tribe of truly stalked puff-balls (Podaxineae), has the stipe continuous to the apex of the peridium, forming an axis. We have representatives of five genera.

KEY TO THE GENERA.

- Peridium opening by circumscissile dehiscence Battarrea.
 - Peridium not dehiscing circumscissile.
 - Stipe inserted in a "socket" in base of peridium.
 - Small plants, mouth apical. Tylostoma.
 - Large plants dehiscing irregularly Queletia.
 - Peridium seated on the broad apex of the stipe.
 - Peridium opening by an apical mouth. Chlamydopus.
 - Peridium opening irregularly. Dictyocephalos.

233—BATTARREA.

A curious genus with a long stipe, and a peridium that dehisces circularly, the top part coming off like a lid. We have two species in our collection from the Western States, but are not sure about them, and therefore will not publish the species until we can further satisfy ourselves.

234—TYLOSTOMA.

This genus is represented by a number of species in this country, and I have thus far been able to do very little with them by means of the literature on the subject. They are all little stalked plants, as shown in figure 67. The peridium has at the base a kind of "socket" into which the stipe is inserted. We expect at some future day to present a paper by which our species may be recognized. It is impossible to do it



Fig. 66.

Under view of peridium, showing "socket." (Enlarged.)



Fig. 67

Tylostoma.
(Natural Size.)

235—CHLAMYDOPUS.

We have in our Western States a single representative of this family. The genus is close to *Tylostoma*, and it is still considered by some authors (Hollos, Fischer), as a synonym for *Tylostoma*. Spe-gazzini, who proposed the genus, distinguished it from *Tylostoma* by the persistent volva at the base of the stipe, and by the broad attachment of the stem to the peridium. The first distinction is of little value, as several *Tylostomas* have volvas more or less persistent as cups at the base of the plants. The second, however, we consider of sufficient importance for generic distinction.

In *Chlamydopus* the peridium is seated on the broad top of the stipe. In *Tylostoma* the slender stipe is inserted into a kind of "socket" in the base of the peridium. In addition, as Miss White notes, the general appearance of the two genera are different. In *Chlamydopus* the plant is smooth, no portion of the volva remaining attached to the plant save the cup at the base. In *Tylostoma* the volva is of the nature of an exoperidium, partially persistent at the base of endoperidium. Prof. Patouillard, (to whom we had the pleasure of sending specimens), notes there is a marked difference in the basidia of the genera.

236—CHLAMYDOPUS MEYENIANUS.

(Plate 10.)

Entire plant smooth, light color. Peridium globose, smooth, 1½-2 cm. in diameter, dehiscing by a torn mouth, borne on the broad concave apex of the stipe. Columella none. Spores rust color, sub-globose, verrucose, about 6 mic. in diameter. Capillitium light yellow, almost hyaline under the microscope, much branched and interlaced, sparingly septate. Stipe long, thick and concave at the apex, tapering down, smooth, sulcate, with almost woody texture. Volva persisting (normally) as a cup at base of plant, covered with adhering dirt. (The volva is usually absent from herbarium specimens).

Prof. C. V. Piper, who has kindly sent us the specimens, furnished the following interesting notes to the habits of the plant, and it is the first published account of them:

"The plant is by no means rare in the drifting heaps of sand in the vicinity of Pasco. As it usually grows, nothing but the peridium is exposed all the remaining part being subterranean. This point, however, varies with the looseness of the sand, in some cases the wind exposing nearly the entire plant. Where, however, the sand is fairly firm, the whole stipe is underground. The length seems to vary wholly with the amount of loose sand through which it must grow to reach the surface."

Chlamydopus Meyenianus was originally collected in Peru and sent to Klotzsch, who described and figured it as *Tylostoma Meyenianum*. The plants and figures had no volva at the base, but were otherwise quite characteristic. (*)

(*) Dr. Hollos has kindly forwarded to me a drawing of Meyen's specimens preserved in the Museum at Berlin. There is no question as to its identity with our American plant.

The American plant seems heretofore to have been collected only in New Mexico. (*) There is a specimen in Ellis's collection from E. A. Wooten, New Mexico.

SYNONYMS.

Spegazzini, a South American botanist, has beautifully figured the plant and called it a new genus and a new species, *Chlamydopus clavatus*. He was the first to show the volva at the base of the plant. We think the genus is valid, but there is no reason for the new specific name, save lack of knowledge of Klotzsch's plant. Miss White adopts Spegazzini's name, illustrating the weakness of the attempted use of "priority rules" without knowing the facts.

Morgan illustrates as "*Tylostoma Meyenianum*" a plant that cannot be Klotzsch's species, and is probably *Tylostoma obesum*, and does not belong to the genus *Chlamydopus*.

Specimens in our Collection.

Washington, C. V. Piper.

237—QUELETIA.

This genus consists of a single known species described by Fries (1871), from specimens sent from France and named for Dr. Quelet, a French writer of mycology. It may be likened to a huge *Tylostoma*, having the same rust-colored gleba and the stipe inserted into a "socket" at base of peridium. The peridium does not have a definite mouth, but breaks irregularly after the manner of a *Calvatia*. Were it not for this character, it would be difficult to say how it differs from *Tylostoma* save in its size.

238—QUELETIA MIRABILIS.

(Plate 10.)

Plants from 3 to 7 cm. in diameter, stems 8 to 15 cm. long. Cortex apparently a thin white coat that breaks up into granular particles and mostly disappears, very much the same as that of *Bovista plumbea*. Endoperidium firm, hard, brown, cracking open irregularly when mature. Stem long, (†), ragged and shreddy externally. It is inserted into a socket at the base of the peridium, like the stems of the little *Tylostomas*. Spore mass, dark rusty brown. Capillitium light colored, under a microscope almost transparent, tubular (‡), branched, thick, usually with blunt ends and rarely at all tapering. Spores globose, coarsely warted, 5–6 mic.

Our good friend, Dr. Wm. Herbst, of Trexlertown, Pa., is fortunate in being the only collector to have ever found the plant in this country, and its occurrence with him was most mysterious. On a pile of spent tanbark at an abandoned tannery, a short distance from

(*) I presume the specimen sent Berkeley by Wright from New Mexico was correctly determined, as it is evident from Berkeley's remarks under *Tylostoma angolense* that he was familiar with Klotzsch's plant.

(†) None of Dr. Herbst's specimens that we have seen have a thick, obese stem, as originally illustrated by Fries, and copied by Engler & Prantl, and Miss White.

(‡) That it actually consists of little tubes can be demonstrated by shaking in alcohol and watching under a microscope as the alcohol dries out. Little bubbles of alcohol can be seen running through the tubes.

Dr. Herbst's house, in August, 1892, this plant grew in great abundance. Not a single specimen ever grew on that pile before or since, and has not been found elsewhere in the United States. (*) Dr. Herbst's specimen is identical in every respect with specimens received from France.

Specimens in our Collection.

Pennsylvania, Dr. Wm. C. Herbst. *France*, N. Patouillard.

239—DICTYOCEPHALOS CURVATUS.

(Plate 11).

One of the strangest plants that has been brought to the notice of mycologists in the last few years is the above, described by Prof. Underwood in 1901. It grows in the arid, alkaline regions of the West, and is a very rare plant. The only collection now known is in the herbarium of New York Botanical Garden.

The plant has a thick woody volva, which remains as a cup at the base as shown in our plate, portions being also adherent to the peridium. The stem is long (the specimen photographed measuring 35 cm.) hard woody, solid, tapering to the base. It is very firm, hard texture, and reminds one more of a portion of a ligneous plant than what would be expected in a *Gastromyces*. At the top is a kind of false collar, the adherent portion of the peridium. The peridium is thick, rough, hard, flattened pyramidal in shape, (our illustration shows the broad side) "rupturing irregularly" (according to Underwood), but we saw no specimen where the peridium had dehisced, simply where they had been broken off from the stem. Capillitium septate, branched. Spores sub-globose, warted. 5-6 mic.

This curious plant was found by Mr. E. Bethel in 1897, and sent to Prof. Ellis with the following notes:

"These plants are very odd looking in their native haunts; they grow on a soft alkaline adobe soil. Some of them had lifted themselves entirely out of the ground, while others had the stalk standing in about one inch of soil. They presented a very fantastic appearance, as there was little or no other vegetation about.

Some of the specimens were very much bent, approximating a semi-circle, others were twisted like a corkscrew, with the portions of the stalk split and bent back. I think the chief factor in lifting the plant out of the ground is this twisting and bending back of the portions of the stem during dessication."

SYNONYMS.

While we have no positive information, we feel very sure it is the same plant that was imperfectly described by Prof. Peck in 1895 as *Battarrea attenuata*. In the light of Prof. Underwood's excellent description and illustration, we do not believe that anyone can read over Prof. Peck's description without reaching the conclusion that it is the same plant. However, regardless of what the future may develop in this connection, we shall always advocate and use the name Prof. Underwood gave, on the merits of the case.

(*) Miss White states that Prof. Peck thinks the spores were introduced with imported tannery bark. That is not possible, for there was never a pound of any but local Chestnut bark used in that tannery. The hides were imported from South America, and if the plant grows there might be a solution of the mystery. The plant is only known from France, and is not recorded by Spegazzini, who has published the fungi of several South American countries.

240—THE PODAXINEAE.

This tribe is characterized by having a stalk continuous to the apex of the peridium forming an axis. Some of the plants are short stalked, some long stalked. The tribe forms a natural connecting link between the Gastromycetes and Agarics. Thus Podaxon is a true Gastromycetes with capillitia mixed with spores. Cauloglossum is close to Hymenogasters, with its permanent gleba chambers. Secotium is only a step from Cauloglossum the tramal plates not forming such firm cells. Gyrophragmium is Secotium with the plates more sinuate-lamellate, and Montagnites, which is usually placed with the Agarics, is only a Gyrophragmium with the plates truly lamellate.

KEY TO THE GENERA.

- Gleba with irregular, persistent chambers.
 - Peridium, elongated club-shaped. Cauloglossum.
 - Peridium, round or conical, (*) Secotium.
- Gleba with sinuate-lamellate plates. Gyrophragmium.
- Walls of gleba chambers not persistent Podaxon.

241—CAULOGLOSSUM TRANSVERSARIUM.

(Plate 12.)

The genus *Cauloglossum* is represented by a single known species. The other species bearing the name in the early botanical works belong to *Podaxon*, a very different genus. The only species grows in our Southern States, and was little known until last year (1902), when a very full and excellent account was written by J. R. Johnston (†). The genus with its prominent columella and permanent gleba cells seems to me to stand next to *Secotium*, from which it differs in its texture and in the thin, irregularly ruptured peridium.

Cauloglossum transversarium grows only in moist situations in our Southern States (‡). The plants are club-shape or broadly oblong, and have a short stalk which is prolonged as a broad columella to the apex of the plant. Externally they are smooth, dark brown, internally "gamboge yellow when young, becoming dirty olive brown," (Thaxter).

The peridium is simple, thin, smooth, and "ruptures irregularly and indefinitely exposing the chambers of the glebe underneath. In some mature specimens is even more or less evanescent, the exposure of the gleba chambers giving a honeycombed appearance to the entire surface," (Johnston). The gleba of an olive color is composed of small, permanent chambers, similar to those of *Rhizopogon*. The spores are elliptical, smooth, 3×8 mic., light brown color, almost transparent under high power.

(*) This distinction between *Cauloglossum* and *Secotium* is not satisfactory. The difference between the genera, to my mind, is one of texture hard to express in words. *Cauloglossum* is close to *Rhizopogon* as to texture of gleba, *Secotium* more closely related to *Gyrophragmium*. Besides, the thin, friable peridium of *Cauloglossum* is different from the persistent peridium of *Secotium*.

(†) Proc. Am. Acad. Arts and Sciences, July, 1902.

(‡) Prof. Thaxter (1897), found it "abundantly growing out of the bases of living or dead trees, or upon rotten stumps or fallen logs, or among rubbish on the ground close by." Thos. F. Wood (1880), sent a number of specimens to Prof. Ellis, and wrote: "It grows along the moist margin of a mill pond near Wilmington, N. C., in a loamy soil under the undergrowth. They are quite common. I found the remains of many of them in a semi-liquid state."

SYNONYMS.

This plant has been fortunate in having only one name, *Cauloglossum transversarium*, applied to it in most books, and it is well established. It was first called *Lycoperdon transversarium* (by Bosc, 1811). Recently a "juggled" name, *Rhapalogaster transversarium*, has been proposed for it. (*)

Specimens in our Collection.

Florida, an alcoholic specimen kindly sent us by Prof. Thaxter.

North Carolina, a dried specimen from the Ellis collection kindly given us by Prof. Britton.

We hope our Southern friends will watch out for this plant, and supply us more abundantly.

242—SECOTIUM.

This genus, the name of which means a cell, has always been of interest, as it has always been known as a step towards the agarics, and the only frequent plant we have with this character. *Secotium acuminatum* is the most frequent species both in this country and Europe. The genus can be divided into smooth and rough spored species. We have in our collection only one belonging to each section that we will describe. (†)

243—SECOTIUM ACUMINATUM.

(Plate 13.)

So extremely variable is this plant as to shape and markings, that it is hard to describe it, and we believe a reference to our plate (No. 13), will give a better idea of it than we can put into words. (‡) One might well say that several species are depicted there, but it is not practicable to separate them, as widely diverging plants (Plate 13, figs. 6 and 7) grow side by side, and are evidently the same species. The stalk is usually short, but distinct, and is prolonged to the apex of the peridium forming an axis for the gleba.

The peridium is light colored, of a soft texture, not brittle; it tardily dehisces by breaking away at the base, as shown in figs. 1 and 10. The surface is smooth, or spotted with scales, as shown in our figures. The shape is usually acute-ovate, sometimes obtuse, globose or depressed globose. I think it is never truly acuminate, and the name, strictly speaking is a misnomer.

The gleba is composed of semi-persistent, elongated, irregular cells plainly seen under a glass of low power, or even to the eye (see fig. 9). Capillitium none. Spores, globose or ovate globose, *smooth*, often apiculate, 5-6 mic.

(*) The author labors at great length for an excuse to change the name, and devotes more than half of his article to the subject. His conclusions appear to us in brief to be that as this is the only plant that can bear the name of *Cauloglossum*, all other plants so called belonging to other genera, therefore this cannot bear it and must have a new name to which the author can add his own. He does not use the name himself, however, simply proposes it for others use who may be willing to employ an unfamiliar name (if they will add this author's name to the "new combination"). For himself he prefers to use the old, familiar name, and the title of his paper is "*On Cauloglossum transversarium* Fries (Bosc)."

(†) We have from W. H. Long, Jr., another smooth spored species from Texas that is a novelty as to this country. As Mr. Long is working on a paper on the subject, we do not wish to anticipate him, and will pass further consideration of the plant for the present.

(‡) "I have collected in Hungary more than a thousand specimens of this fungus, and they were of such a variety of color and form that it would certainly be possible to manufacture several dozen species therefrom."

HOLLOS.

DISTRIBUTION.

The plant reaches us from almost all sections of the United States except the Eastern States, and is widely distributed, but does not seem to be abundant in any particular locality. It is also widely distributed in Europe, Asia and Africa.

SYNONYMS.

Hollos states that half of the species in Saccardo belong to this one species. He calls it *S. agaricoides*, which I consider a "juggled" name. It was described from this country first as a *Lycoperdon*, (to which genus it has no resemblance), as *Lycoperdon Warnei*, afterwards changed to *Secotium Warnei*, and under this name usually appears in our literature. I do not think there is the slightest basis for separating our plant from the European plant.

Specimens in our Collection.

Washington, C. V. Piper; Colorado, E. B. Sterling, Rollin H. Stevens; Nebraska, Rev. J. M. Bates; Iowa, L. H. Pammel, T. H. Macbride, L. R. Waldron; Kansas, E. Bartholomew; Missouri, C. H. Demetrio; Minnesota, Mary S. Whetstone, E. P. Ely, Minn. Bot. Survey; Michigan, L. E. Weld, C. G. Lloyd; Illinois, L. H. Watson; Ohio, A. P. Morgan, W. L. Aiken, Dr. H. L. True, C. G. Lloyd; Kentucky, H. Garman; Alabama, C. E. Baker; Texas, W. H. Long, Jr.; Canada, J. Macoun; Hungary, Dr. L. Hollos.

We think the plant does not occur in the Eastern States.

244—SECOTIUM MACROSPORUM.

(Plate 13.)

Peridium subglobose, smooth, $1\frac{1}{2}$ –3 cm. Stem very short, or none. Spore mass dark brown. Columella slender. Spores *large*, globose. apiculate, *rough*, 10–12 mic.

This little species is described from specimens sent by E. P. Ely from Dallas, Texas. It widely differs from our common species by its *large, rough* spores (*). It grew, I judge, on the ground. No one else has ever sent me the plant, and W. H. Long, Jr., who has made extensive collections of Gastromycetes in Texas, has never found it.

Specimens in our Collection.

Texas, (Dallas), E. P. Ely.

245—SECOTIUM RUBIGENUM.

Our knowledge of *Secotium rubigenum* (†) is confined to an examination of specimen in Ellis's collection. Dr. Hollós claims "it is



Fig. 68.

Secotium rubigenum. (Natural size.)

only a young" *Secotium acuminatum*. It impressed us as being quite different. It is of a firmer texture and is dark *red*, both within and without. We have many specimens of *S. acuminatum*, and have

(*) Prof. Patouillard advises me that he knows but two other species with rough spores *Secotium olbium*, a curious little species that grows on fallen oak leaves in Southern Europe, and *Secotium Mattirolianus*, with a long stalk, from Italy. Neither of these plants has any resemblance (save the rough spores). to our little species, as will be noted by referring to the cuts reproduced in Engler and Prantl.

(†) Not *Secotium nubigenum*, as Hollos and others have copied typographical error in Saccardo.

never noted the least indication to turn reddish (*). Besides, *S. rubigenum* grew "on logs of *Pinus contortus*, summit of Sierra Nevada." Our *S. acuminatum* always grows in the ground.

246—HYPOBLEMA.

The specimen on which the genus *Hypoblema* is based is in the New York Botanical Gardens labeled *Lycoperdon lepidophorum*. The genus differs from *Calvatia* in having a distinct thin membrane lining the peridium. We believe the plant has three peridia. The exoperidium similar to the cortex of *Calvatia*, remains of which are seen as warts on the specimens. (Plate 14, fig. 1); a thick endoperidium like that of *Mycenastrum*; and a thin, membranaceous, third peridium covering the gleba. This third peridium is very evident in the specimen, and can be plainly seen in our photograph. If we are mistaken as to these warty remains representing a cortex, we still think the genus is distinct from *Calvatia*, for then the exoperidium is thick and hard and the endoperidium a thin, distinct membrane, lining the exoperidium, just the reverse of the peridium structures of *Calvatia*.

247—HYPOBLEMA LEPIDOPHORUM.

(Plate 14.)

Plants depressed globose, from 10 to 20 cm. in diameter. Peridium 1 mm. thick, hard, breaking into irregular fragments like a *Calvatia*, marked with darker, wart-like, raised blotches, the remains (I think), of a cortex. Lining membrane, soft, paper-like, a dark, thin membranaceous layer, not adherent to the peridium, and entirely covering the spore mass (in all the specimens I saw). While it is more persistent than the thick peridium, it undoubtedly finally breaks up into fragments that fall away. The plants have no sterile base (†). Spore mass, dark olive. Capillitium colored, consisting of slender interwoven branched threads, of a nearly uniform (5 mic.) diameter. Spores globose, echinulate, 5–6 mic.

This plant in its internal structure is the same as the little-known genus *Lanopila*, if I understand that genus. It differs from all other genera in the nature of its peridium layers as previously described.

SYNONYMS.

The plant was described by Ellis as *Lycoperdon lepidophorum*, (‡) and compiled into Saccardo as *Bovista lepidophorum*. It was well described by Morgan as *Calvatia pachyderma*, but Morgan was mistaken in referring to Peck's *Lycoperdon pachyderma*, Ellis's *Lycoperdon lepidophorum*. The two plants are very different in their peridia, their spores and their capillitia. The plant is figured in Gast. Genera as *Hypoblema pachyderma*.

(*) Hollos states "when the fresh specimen (*S. acuminatum*), is touched with the finger it acquires rose-red, sometimes blood-red spots." Our American plant does *not*.

(†) So Morgan and Ellis state, we have never seen a specimen cut open.

(‡) The specimens were collected at Huron, Dakota, by Nellie E. Crouch, and are preserved in the Ellis collection. They are labeled *Lycoperdon lepidophorum*, and there is a note by Ellis, "Morgan probably correct in considering this only *L. pachyderma* Pk." In reading over Peck's description, I noted several discrepancies and wrote to Prof. Peck, who kindly sent me type material of his *Lycoperdon pachyderma*. It is a *Calvatia*, but has neither the spores, capillitia nor peridia of Ellis's plant.

248—DIPLOCYSTIS WRIGHTII.

(Plate 15.)

There are two genera of "puff-balls" (if they are not the same), that widely differ from all others in having the individuals grow densely on a common matrix. We were greatly pleased to receive from L. J. K. Brace, Bahamas, a fine specimen of one of these curious genera. Previously we had seen it, but only fragments.

Diplocystis Wrightii was described by Berkeley from Cuban material in 1865. It is found in several of the West Indies. The individual plants are about $\frac{1}{2}$ cm. in diameter. They are densely seated on a common matrix (*). The exoperidium of each specimen seems to be confluent with the matrix. The top breaks off in a circumscissile manner, and falls away, leaving the base as a cup containing the little "puff-ball." The endoperidium is rather firm, smooth, lighter color than exoperidium. It opens by small apertures at the top (†). Spore mass dark, fuliginous, with no sterile base. The capillitium is very interesting (‡). It appears as shreds (of a membrane) of various diameters, from 3 to 30 mic., branched and interwoven. The thin shreds are almost hyaline smooth, and not widely different from the hyaline capillitium of other gastromycetes. The thick shreds are light yellow colored, and under a high power marked with a dense reticulation. Spores globose, 4–5 mic. smooth or minutely punctate, many short-apiculate.

Berkeley described the curious genus *Broomeia* from South Africa (§) in 1844. Twenty-five years later he described these plants from Cuba. Although the two genera are evidently close. (and I have seen it stated that they are the same), Berkeley does not indicate how they differ, and does not mention *Broomeia* in his account of *Diplocystis*. One would have trouble to conclude from the figures and description in Engler and Prantl what the difference is. I judge from Murray's account of *Broomeia* (Jour. Linn. Soc.) that the distinction is this. *Broomeia* has a common exoperidium covering *all* the puff-balls in each cluster. *Diplocystis* has an individual exoperidium for each endoperidium.

Fischer in Saccardo compiles *Discisceda* as a synonym for *Diplocystis*. Dr. Hollós has proven that *Discisceda* is the same as *Catastoma*.

249—ARACHNION.

The genus *Arachnion* can be briefly described as being puff-balls within puff-balls. The entire interior of a ripe specimen is filled, not with dust, (spores and capillitium) as most puff-balls, but with a granular substance that feels "gritty" when rubbed between the fingers. These granules are peridioles; they are little sacks containing spores. They are small, but can be seen under a hand-glass, and even with the naked eye. They are the color, and appear as if the puff-ball was filled with ashes. The name *Arachnion* refers "to a spider sac filled with eggs."

(*) The figure in Engler and Prantl shows them somewhat remote from each other. In all specimens we have seen they are almost contiguous.

(†) It is not a definite, protruding mouth, as shown in figure in Engler & Prantl.

(‡) Berkeley simply states capillitium "lax."

(§) It does not grow at Albany, *New York*, as erroneously stated in Saccardo.

250—ARACHNION ALBUM.

(Plate 16.)

But one species is really known of this genus, *Arachnion album*, and that was described by Schweinitz (*). It is a very small plant, rarely being over 1 cm. in diameter, and usually half that size.

The peridium is smooth, very thin fragile, and easily breaks into fragments (†). The peridioles, irregular in shape and size from 150 to 250 mic., and under a microscope have a ragged appearance, the membrane being composed of loosely woven hyphæ (‡). Mixed with the ripe peridioles are fragments of hyphæ threads, thick, often septate, but these, I think, are not true capillitium, but rather loose threads from the peridioles. The little peridioles are filled with spores (§), smooth, globose, often apiculate, small. 3–4 mic.

Specimens in our Collection

Texas, W. H. Long, Jr. *Ohio*, A. P. Morgan, C. G. Lloyd. *Massachusetts*, Geo. B. Fessenden.

We think this plant is not so rare as its scanty representation in our collection would indicate, but that is generally overlooked on account of its small size. Spegazzini states it is common in South America, and Patouillard has told me that he has received specimens from the West Indies.

In addition to specimens listed above, we have specimens from F. J. Braendle, Washington, D. C., and Mrs. E. B. Blackford, Boston, that appear to us to be different, being yellow inside when immature, and having thick capillitium threads mixed with the peridioles. At the time we received them we thought they were only a condition of *Arachnion album*, but now are disposed to think otherwise. They will be further considered in the future.

251—NOTES ON THE GEASTERS.

An author goes to work and fixes up the characters of the various species from material at hand, and thinks he has the subject all straightened out. The trouble is that plants are perverse, and will not confine themselves to the characters authors think they should. You get the distinction between two "species" clear in your mind, and along comes a lot of specimens exactly intermediate, and you do not know to which to refer them. Dr. Hollós has a very simple method of solving all such problems. In genera like *Mycenastrum* and *Polysaccum* when the "species" grade into each other, he throws them all without distinction into one species (||). This is an easy way of disposing of a very troublesome subject. If we should consolidate all the Geasters of which intermediate forms reach us from time to time, we will eventually have but one species of Geaster.

The less a man knows about these things, the more he thinks he knows. The more scanty the material from which he works the clearer the species are (to him). These thoughts are strongly impressed on us from studying a lot of Geasters received from W. H. Long, Jr., Texas. It is a section from which we had previously very little material, and many of the forms Mr. Long sends are puzzles to us.

(*) *Arachnion Bovista* and *Arachnion Drummondii* are little more than *nominæ nudæ*, and *Arachnion aurantiacum* is simply a guess based on Rafinesque's vaporings, and is far more probably *Scleroderma flavidum*.

(†) Owing to its fragile nature, it is difficult to preserve perfect specimens unless they are very carefully handled.

(‡) Very different from the smooth, firm peridioles of *Nidulariaceæ*.

(§) Easily seen by crushing the peridiole with a cover glass on a slide.

(||) In a letter just received, he writes me he has reduced all species of *Battarreia* to a single species.

252—GEASTER FLORIFORMIS.

From material sent by Mr. Long and from other sources abundantly since our Geaster pamphlet was issued (cfr. *The Geastrae*, p. 11 and 43), we are thoroughly convinced that Dr. Hollós is right, that Morgan's *delicatus* was described from imperfect material, and that the plant does have normally a protruding mouth and often an elongated form.

As Vittadini has therefore more accurately described and figured the plant, we have no further reason to retain Morgan's name. Nor is the plant the "little" species we supposed. In a collection of a hundred or more received from C. H. Baker, Florida, not one of them was as large as a pea, and yet we have in our collection now all grades of size up to $1\frac{1}{2}$ cm. in diameter. As the plant reaches the size of *G. mammosus*, and as that species is only distinguished by its definite mouth, an unstable character (see *The Geastrae*, p. 4), we would not be surprised to receive any day specimens that we would not know whether to refer to *G. floriformis* or *G. mammosus*.

Among Mr. Long's specimens were a few not so strongly hygroscopic as called for in the description; in fact, had they been sent separately we should have referred them to *G. arenarius*. This raises the question if *G. arenarius* is not, in fact, a slightly hygroscopic form of *G. floriformis*. The plants from Jupiter, Florida, from which the species was described, however, have smaller spores.

OTHER SPECIES.

Among a lot of typically asperate specimens of *G. asper* were a few evidently the same, but smooth. Is the supposed asperate character of *G. asper* of any value? One lot of plants were intermediate between *G. pectinatus* and *G. Schmidelii*. We have labeled them *G. Schmidelii*, but it is a question whether they are large, long-pedicellate *G. Schmidelii*, or small, short-pedicellate *G. pectinatus*.

As different as our illustrations of *G. triplex* and *G. saccatus* var. *major* may appear, we have specimens not only from Mr. Long, but from others that we do not know whether to consider as a large form of *G. saccatus* or a small form of *G. triplex*. As distinct as the extreme forms appear to be, intermediate specimens occur that seem to connect them.

253—A CORRECTION.

In the foot note on page 125, we state that "Corda (1842), pointed out the spore distinction between *Mitremyces lutescens* and *cinnabarinus*, but put them in two genera." This we erroneously inferred from what Burnap states (our copy of Corda being loaned). We find on return of the book that Corda "put them in two genera," but he did not "point out the spore distinction," and apparently did not know the plants. He copied the genera from Desveaux and Nees von Esenbeck, and evidently had no suspicion that they were the same.

254—GEASTER RUFESCENS IN WASTE PLACES.

"I found a large patch, probably twenty or twenty-five feet in area, of *Geaster rufescens* at the corner of Main and Elm streets, Grofton, N. Y. At the corner of the streets named had been a building of the Grofton Bridge Co. This spot apparently had been at some time a dumping place for cinders and shop sweepings, and among which were evidences of iron turnings. Thus the soil was largely impregnated with oxide of iron. *Geaster rufescens* grew very profusely over the entire area named. I could hardly thrust the point of my cane between them. It was a sight worthy the attention of the most careless observer, but scores of people passed the spot daily without even seeing the plant."—Extract from private letter from Frank R. Rathburn, Auburn, N. Y.

255—THE CLEAVAGE OF *SCLERODERMA* GEASTER.

"I have found a fine example of the peculiar cleavage of the peridium of *Scleroderma Geaster* that you have illustrated in *Mycolical Notes*, page 81. It is caused in this case, I think, by immature plants being killed by the cold weather. The spore mass in drying sticks to the inner side of the peridium, and in weathering does not dry as readily as the outer layer of the peridium, which gradually peels off, as shown in your photograph. I have several stages of this interesting process. The plants named were killed about Nov. 23rd, 1902, being the second crop of this species to develop this fall; the first developed in October, the continued rains and warm weather starting a second lot. but as I have stated, cold weather killed them before they matured. In none of the first crop was this cleavage observed, although I collected many specimens, while numbers of the present crop show evidence of this cleavage."—Extract from letter from W. H. Long, Jr., of Denton, Texas.

We do not doubt that Mr. Long has presented a correct solution of this problem, and we are glad to be able to publish the information. Such facts as these ought to be recorded by all means. As Mr. Long states, "I find it much more interesting to study plants than the literature of plants."

256—*LEPIOTA* MORGANI in EUROPE.

Prof. Bresadola, to whom we sent specimens of *Lepiota Morgani*, advises us that in his opinion the plant is the same as Krombholz has described and illustrated under the name of *Agaricus gracilentus*. It has always been supposed in this country that *Lepiota Morgani*, with its greenish gills, was something unique, the fact having been overlooked that Krombholz described and illustrated *Agaricus gracilentus* with gills "Blassgrünlich werdenden," and that his figure 14 shows the gills decidedly greenish. The top of the pileus as shown in figure 13, does not have the same scales that our plant has, but Krombholz's figure 16 of his species *Agaricus subtomentosus* is a perfect illustration of our plant. Although he described the gills as white, we would not be surprised if it turned out that *Agaricus subtomentosus*

was based on the same plant, because it is well known that the gills of *Lepiota Morgani* are white until the spores ripen. Certain it is that the figure of *Agaricus subtomentosus* is a perfect representation of the plant much better than any that have appeared in this country. We presume in view of these facts that priorists will have to call our American plant "*Lepiota gracilentia*," and we would consider it very unfortunate if we felt obliged to do the same. We do not undervalue the historical importance of the information Prof. Bresadola has kindly given, although we feel it would be a misnomer to call a plant "slender," when in reality it is the largest and most obese of our species.

257—*COPRINUS RADIANUS*.

Several years ago while at Boston I found some of our Mycological friends puzzling over a little species of *Coprinus* which had been found in a tuft of *Ozonium*. They were surprised when I told them it was the most common species that we have in our woods around Cincinnati, and that it usually grows in this *Ozonium*. It has been a question to me for many years what the connection is between this *Coprinus* and the *Ozonium*.

If it were only occasionally that we find the two associated, we might think that in these cases the *Ozonium* was merely an accidental host. In certain seasons of the year *Coprinus radians* grows very common in the woods around Cincinnati. We have noted it hundreds of times, and in almost every instance it grows from a patch either small or large of brown *Ozonium*.

It is particularly partial to Elm, and an elm tree that has fallen only a year or two and still retains its bark is a favorite habitat for the plant. We have counted over a hundred specimens growing from cracks in the bark of a fallen elm.

Ozonium auricomum, as named by Link, is very common on fallen branches of elm, forming a dense cushion of coarse brown fibers. It looks not unlike coarse brown wool. You find it in Engler and Prantl (p. 517), under "Sterile Mycelium of doubtful belongings," and described with "fructification unknown." It was considered by Fries as a sterile mycelium. Rarely do we find it in the proper season in this locality that a number of specimens of *Coprinus radians* do not grow from it. The question that I have tried to solve is, "Is it the mycelium of this species of *Coprinus*?" The constant association of the two, and the fact that no other species of *Agaric* grows in the *Ozonium* in our locality, strongly tend to this conclusion. I am not expert enough with the use of the microscope to trace the connection between the two, but Prof. Bresadola writes me "Dr. Penzig has a study in 1880 of *Ozonium* and *Coprinus*, and has reached the conclusion that the *Ozonium* is the mycelium of the *Coprinus*. I have examined your specimen and find nothing to confirm the opinion of Penzig. I find only points of contact, but I have not been able to trace the hyphae of *Ozonium* into the hyphae of *Coprinus*. However, I have reserved your specimen to study anew and compare it with the work of Penzig, which at this moment I do not have."

The article of Dr. Penzig (to which Bresadola refers), is found in *Nouvo Giornali Botanico Italiano* 1880, p. 132. It is in Italian, therefore unreadable (to us), but the conclusions evidently are that the *Ozonium* is the mycelium of *Coprinus*. I do not understand, however, exactly what the connection is. The radiating mycelium at the base of the plant (fig. 69), is white. *Ozonium* is always reddish brown. Rarely do we find specimens with the white mycelium so strongly developed as in the plant selected for illustration.

In regard to the identity of the species of *Coprinus*, we do not know under what name it appears in American literature. Such a common plant must have been noticed, and probably masquerades as a new species somewhere.

Dr. Penzig (loc. cited), describes it as a new species, *Coprinus intermedius*, and his description and figure is exactly the plant we have at Cincinnati, thus confirming the position that the *Ozonium* is the mycelium of this particular plant. Prof. Patouillard, to whom we sent specimens, determines it as *Coprinus radians*.

It has but little resemblance to Cooke's figure, and still less to Massee's. In addition, *Coprinus radians* in English books seems to be a species that only occurs on plastered walls.

The only reference I have found to the color of the spores, (save Penzig, loc. cited where they are correctly described as brown-black), is Massee "violet-black," ascribed to *radians*. The spores of our plant in mass when fresh and moist are *brown*, as brown as the spores of any *Psalliota* that ever grew (*). But in drying they turn darker, almost black. I have found in all books I have consulted that the spores of *Coprinus* are described as black, and no allowance is made for the inclusion of any brown-spored species.

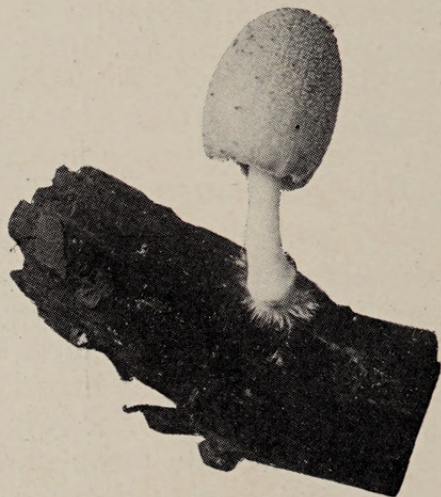


Fig. 69.
Coprinus radians.

258—DISTRIBUTION OF MITREMYCES.

We hope that everyone who meets specimens of *Mitremyces* growing will favor us with at least a few specimens of each species that we may study their distribution. There is something very mysterious about it. *Mitremyces cinnabarinus* is a common plant that we have found growing in the Alleghenies. There seems to be some sections, however, (as at Washington, D. C., and at Rugby, Tenn.), where the two other species grow, and *Mitremyces cinnabarinus* is not found. H. M. Caldwell, of Rugby, Tenn., has just sent us a fine lot of *Mitremyces Ravenelii* and *lutescens*, but does not find *cinnabarinus*.

In connection with the *Mitremyces* subject, we have received a letter from Mrs. M. S. Percival, of Rugby, Tenn., stating that she

(*) Those who work with *Coprinus* in this country know that we have two common species with *brown* spores. The plant under consideration and *Coprinus pulcherifolius*. But it is only when the spores are fresh and moist. They turn almost black when dry, hence it is not practicable to take them out of the genus *Coprinus*.

has noted specimens where the spore-sac protrudes through the mouth slits, thus confirming Masee's statement. We have never seen specimens.

We have received another consignment of *Mitremyces Ravenelii*, var. minor, from F. J. Tyler, and they are exactly as the previous lot—no connecting forms between them and the ordinary form of *Mitremyces Ravenelii*. We feel that in time this "variety" will be entitled to a specific rank.

259—TREMELLODON GELATINOSUM.

There are certain characters that in the Friesian system are associated with certain tribes or alliances of plants. Thus spines with the *Hydnei*; gills with *Agarics*; pores with the *Polyporei*; gelatinous texture with the *Tremellae*, etc. (*) Occasionally we find a plant combining two of these characters, and then, of course, there is a diversity of opinion as to its classification. Such a plant is the one named above. With the gelatinous texture of the *Tremellae* it has the spines of the *Hydnei*. Fries, Stevenson and others class it as a *Hydnei*; the modern writers, on account of its basidia, with the *Tremellae*.

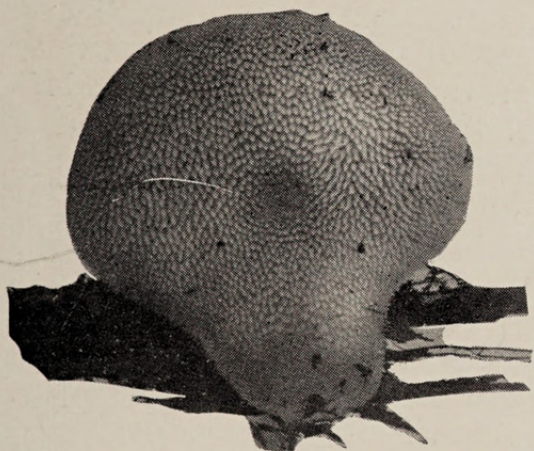


Fig. 70.
Tremellodon gelatinosum.

The plant seems to be common in Europe, and has been illustrated a number of times. In this country it seems to be rarer. It is not mentioned in Atkinson's work, and we do not find it in the index of the first 27 reports of Peck. We are

under the impression, however, that Peck has recorded it somewhere. We gathered it last summer on logs in Northern Michigan. There is no necessity of a detailed description of it here. With our illustration and the fact that it has the soft tremulose structure of a *Tremellae* and the spines of a *Hydnum* no one can mistake it. Our plant does not have the long stipe shown in illustration of Engler and Prantl.

260—NOMENCLATURE.

"I see you stand up firmly against the criticisms in reference to omission of authors' names. The evils you deplore for much of the egotistical practice I fully appreciate, and I can indorse all you say on that point. In spite of this, I am bound to say that my experience from day to day convinces me more thoroughly that endless confusion must result by the summary sacrifice of author citation. In the group

(*) In the new system that is being gradually evolved, based primarily on basidia structure, the prominent characters of configuration are only secondary in importance. It may be more scientific, but I am partial to the Friesian system. The simpler we make classification the more persons we will interest in the study, and the more facts and information will be published about the plants.

Minute anatomical studies are of interest, but only a comparative few have the patience or the skill to follow them out, and to make a knowledge of them the first requisite of classification debars a great number of workers.

that you study, comparatively limited in the number of forms, I can see no great inconvenience arising from the practice. I think, however, that the experience of others will be more in a line with that of my own. I merely say this word in passing, from which you may know that the matter is one of interest to me; most advantageous practice will doubtless result from the experience of many specialists. Your form must be desirable, and yet it looks to me as though it is a case of out of the frying pan into the fire."—Extract from letter from Prof. W. A. Kellerman.

Our views on the nomenclature subject have been published so frequently it is not necessary to here repeat them. We believe, briefly, that personality in botanical science is the greatest weight attached to this study. More "new species" are published, more juggling of the names of old species are due directly to this cause than to any other. If the present plan is eternally followed, viz., that of describing plants in such an indefinite way that workers cannot tell from the *description* what the plants are, endless confusion must ever result. But if every botanical writer will make it his first duty to so describe and ILLUSTRATE his plants that others may know them, the matter will soon probably be rationally cleared up, the names of the plants then conveying the descriptive ideas they should. As things are now, chains of men are wasting time, either willingly or by protest, affixing their own names and personalities where the voice of science only has a right.

261—"CHARLEY'S" VIEWS OF NOMENCLATURE.

We have on our list of acquaintances a celebrated "bug hunter." We know him quite well, well enough, in fact, to call him "Charley." Many a friendly discussion have we had with him on the subject of affixing personal names to the name of bugs and plants. Charley is a firm believer in it, but Charley is a candid fellow. He does not beat the devil around the bush and argue about the "confusion that would result" if we called things what they are, nor does he cite that great bugaboo, "how are you going to tell what is meant when two men have called different objects the same name." He puts it on the only ground that is rationally at the bottom of the whole scheme, a personal ground. Authors like to see their names in print. He says: "When I hunt up a new beetle and describe it, my name is put after it. *That is my reward.* If you take this away from me, what other returns do I get for all the trouble and labor I have gone to in the matter?" If all our critics were as candid as "Charley," we think we could soon show that the pursuit of science is its own reward, that it is not necessary to introduce a scheme of personal advertisements in order to study nature. While "Charley" and I do not agree on this point, there is one in which we are in close accord. It does my heart good to hear "Charley" cuss, (and Charley knows how to "cuss" with force) the men who have attempted to change all the names of butterflies. It seems strange to me that "Charley" does not see that this same personal incentive is the basis of all these name-changers, and that it is only a question of time when they will brush his name from all the bugs he has discovered.



Fig. 1.

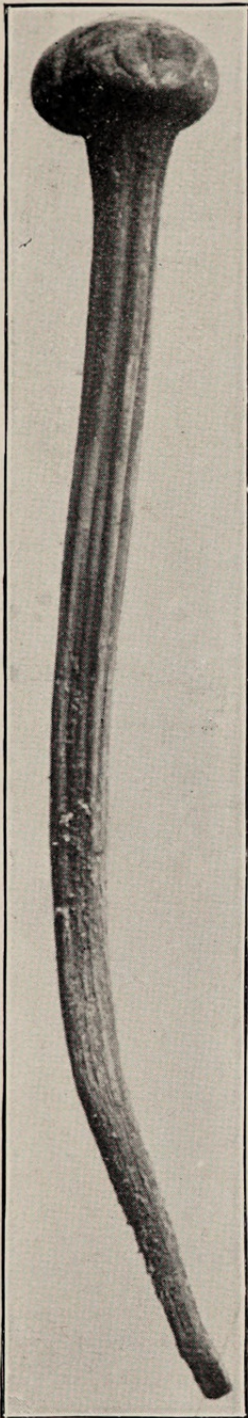


Fig. 2.

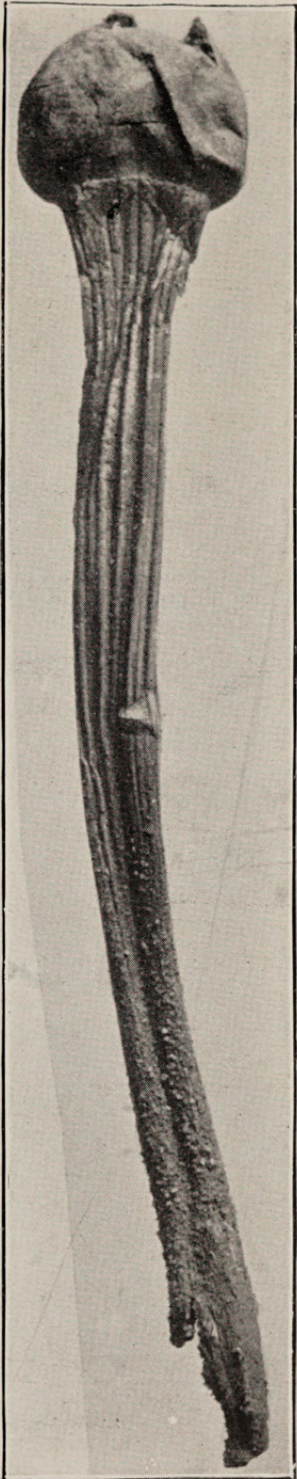


Fig. 3.

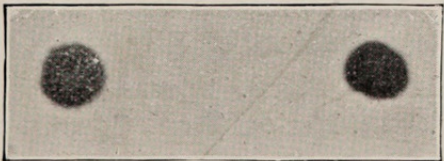


Fig. 4.

Explanation of Figures.

Fig. 1. Plant with volva. Figs. 2 and 3. Plant without volva. Fig. 4. Spores (x 1000.) All from C. V. Piper, Washington.

CHLAMYDOPUS MEYENIANUS.

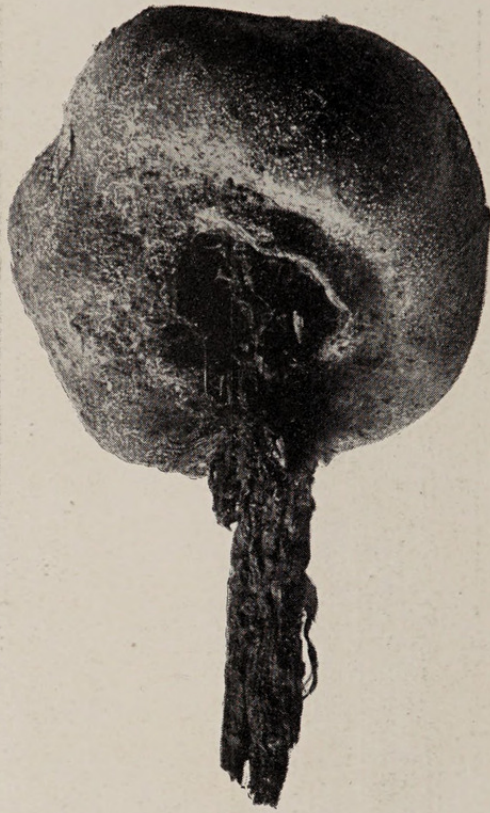


Fig. 5.

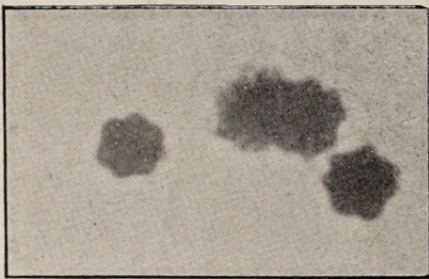


Fig. 6.

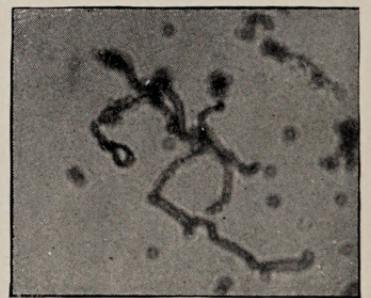


Fig. 7.

Explanation of Figures.

Fig. 5. Plant, natural size. Fig. 6. Spores (x 1000.) Fig. 7. Capillitium (x 55,) Specimens from Dr. Wm. Herbst, Trexlertown, Pa.

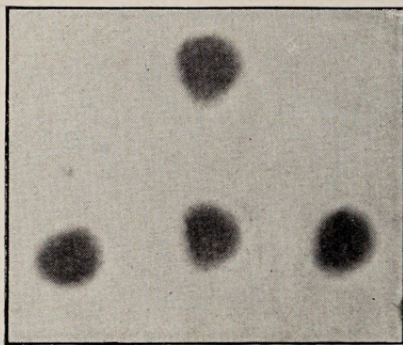
QUELETIA MIRABILIS.



Fig. 1.

DICTYOCEPHALOS CURVATUS.

(Explanation of figures, see over.)



(Fig. 2.)

Explanation of Figures.

Fig. 1. Plant (reduced one-third), in Ellis's collection, from E. Bethel, Colorado. Fig. 2. Spores ($\times 1000$.)

DICTYOCEPHALOS CURVATUS.



Fig. 1.

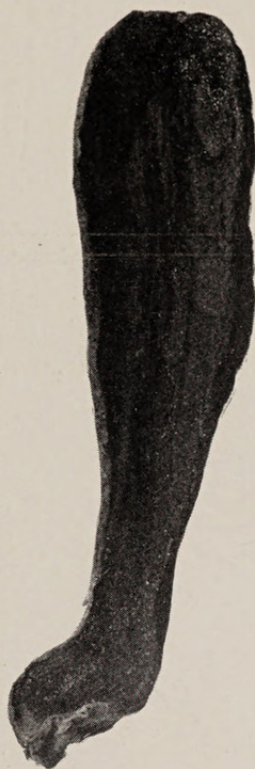


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

(Explanation of figures, see over.)

CAULOGLOSSUM TRANSVERSARIUM.



Fig. 6.

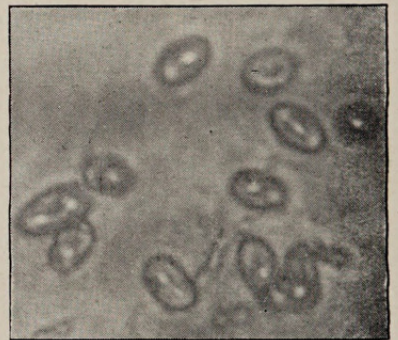


Fig. 7.

Explanation of Figures.

Figs. 1, 2, 3, 4, 5. Plants and sections, natural size. Fig. 6. Section (x five.)
 Fig. 7. Spores (x 1000.) Figs. 1, 3 and 6. Specimens from Florida from Roland
 Thaxter. Figs. 2, 4 and 5. Specimens from North Carolina in the Ellis collection.

CAULOGLOSSUM TRANSVERSARIUM.

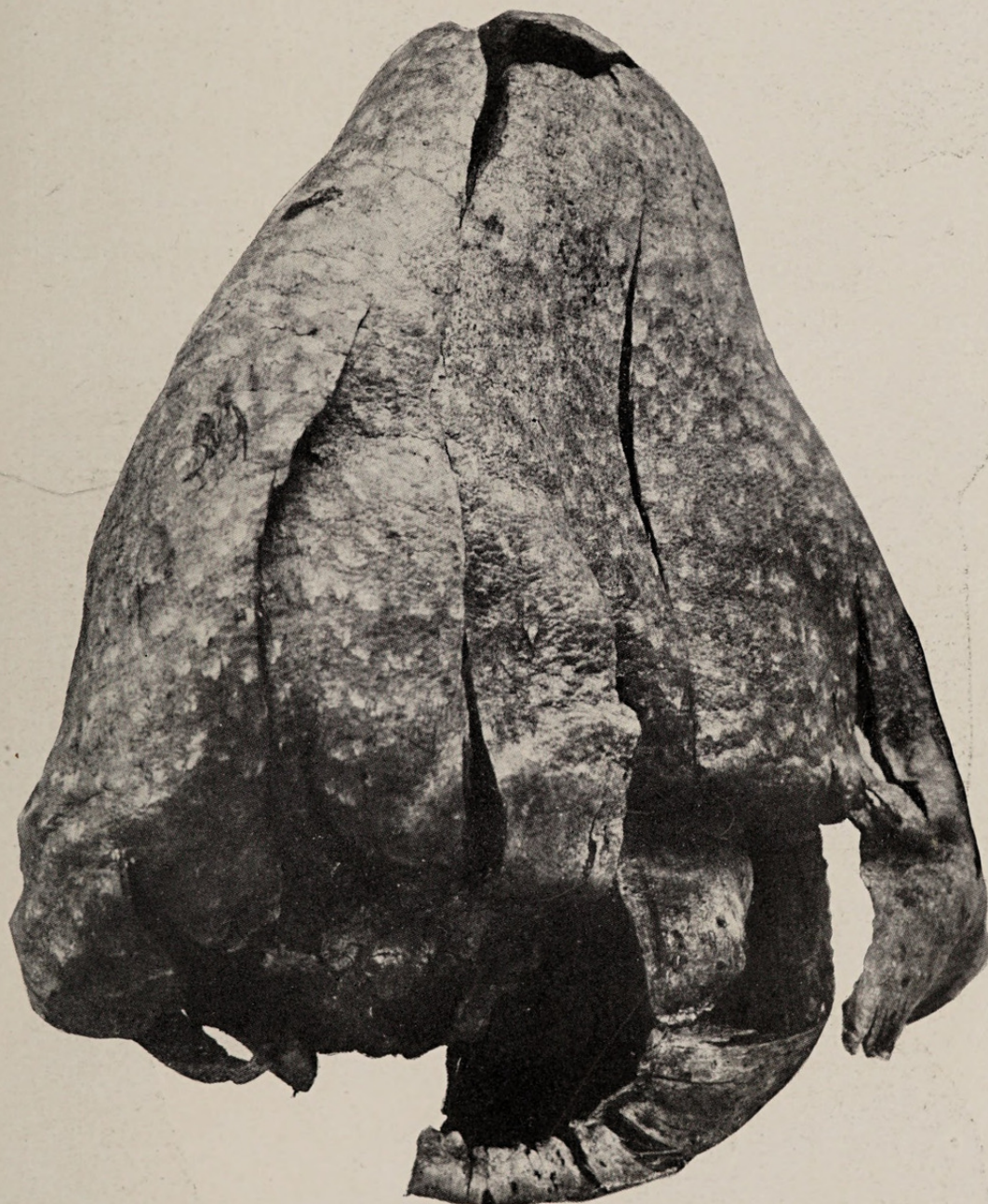


Fig. 1.

(Explanation of figures, see over.)

SECOTIUM ACUMINATUM.

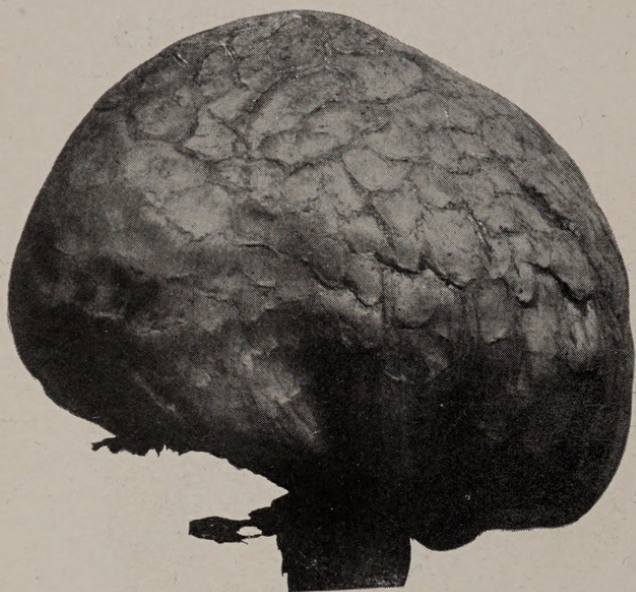


Fig. 2.

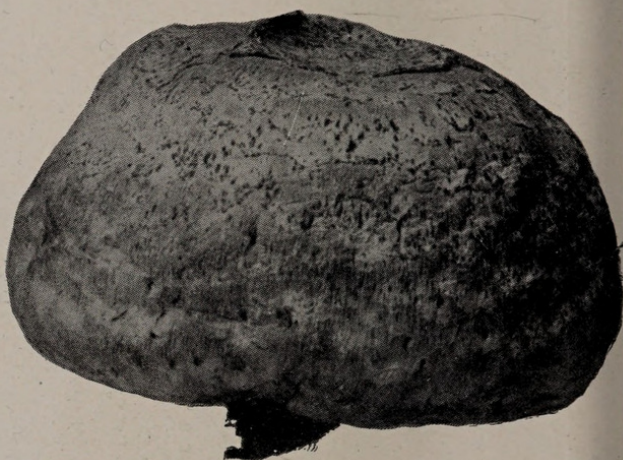


Fig. 3.



Fig. 4.



Fig. 5.

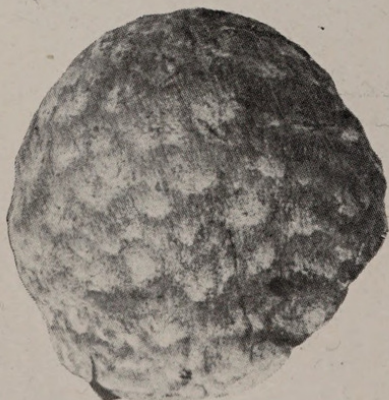


Fig. 6.



Fig. 7.

SECOTIUM ACUMINATUM.
(Explanation of figures, see over.)

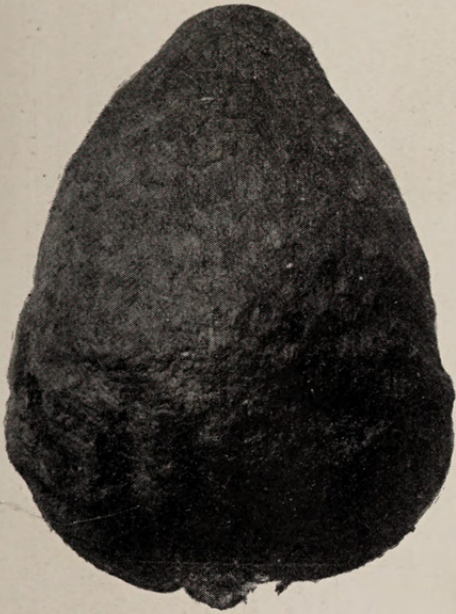


Fig. 8.



Fig. 9.



Fig. 10.

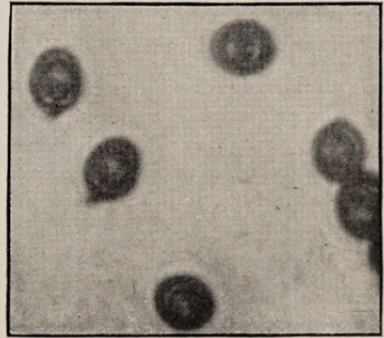


Fig. 11.

Explanation of Figures.

Figs. 1 to 10. Plants, natural size. Fig. 1. Unusually large specimen in Ellis's collection. Figs. 2 and 3. From C. V. Piper, Washington. Figs. 4 and 5. From Dr. H. L. True, Ohio. Figs. 6 and 7. Of the same collection from Kansas in the Ellis Herbarium. Fig. 8. From Dr. L. Hollos, Hungary. Fig. 9. Section of plant. Fig. 10. Plant from A. P. Morgan, Ohio. Fig. 11. Spores ($\times 1000$.)

SECOTIUM ACUMINATUM.



Fig. 12.

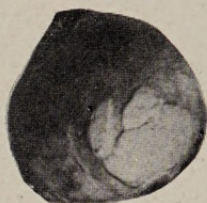


Fig. 13.



Fig. 14.

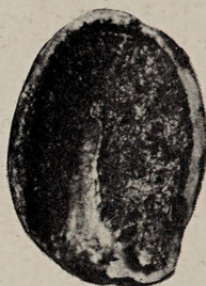


Fig. 15.

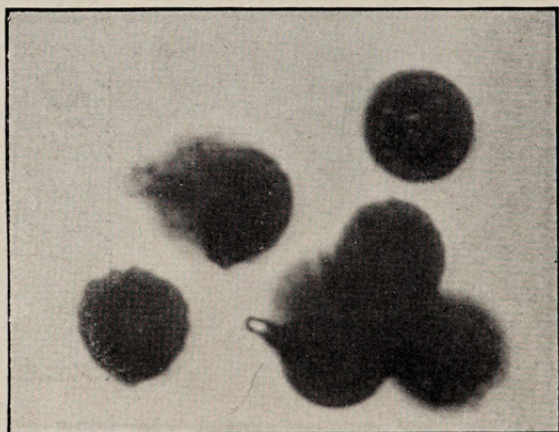


Fig. 16.

Explanation of Figures.

Figs. 12, 13 and 14. Plants, natural size. Fig. 15, Section. Fig. 16. Spores (x 1000.) All from E. P. Ely, Dallas, Texas. The bottom of figure 12 is cut off by limitation of plate.

SECOTIUM MACROSPORUM.

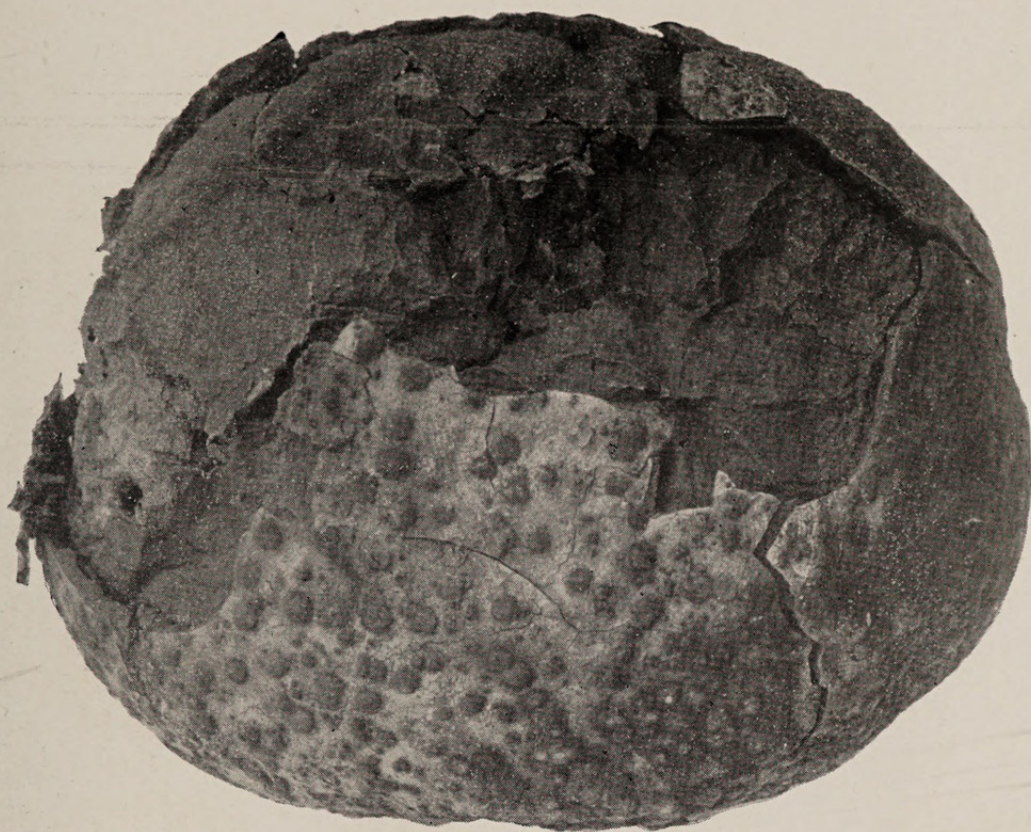


Fig. 1.

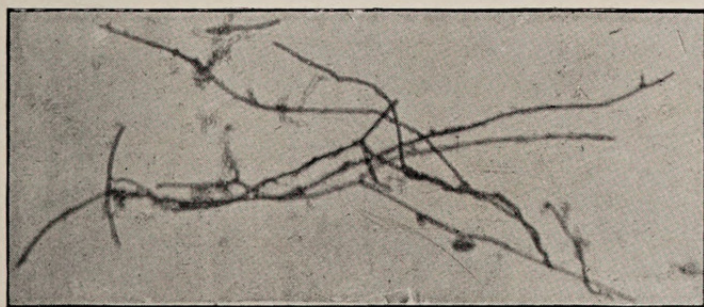


Fig. 2.

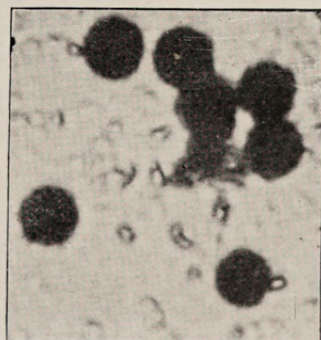


Fig. 3.

Explanation of Figures.

Fig. 1. Plant, natural size. Fig. 2. Capillitium ($\times 55$.) Fig. 3. Spores ($\times 1000$.) From specimen in the Ellis collection.

HYPOBLEMA LEPIDOPHORUM.

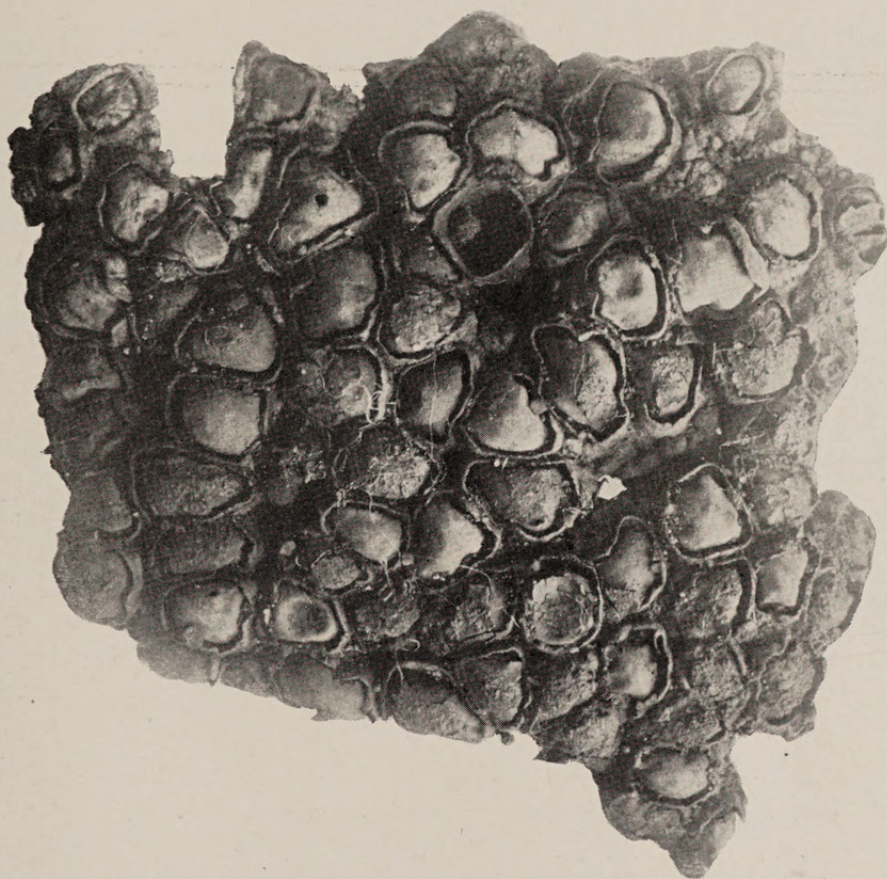


Fig. 1.



Fig. 2.

(Explanation of figures, see over.)

DIPLOCYSTIS WRIGHTII.

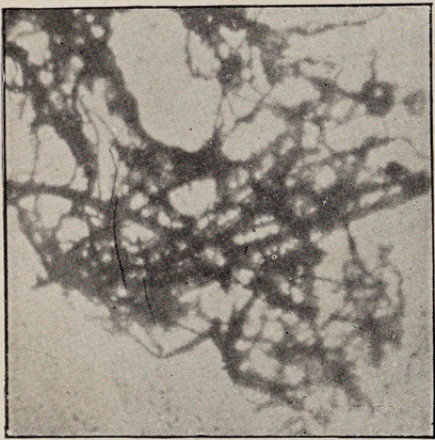


Fig. 3.

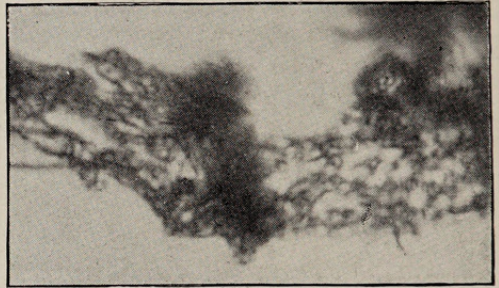
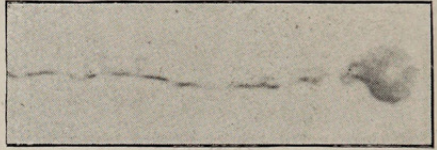


Fig. 4.

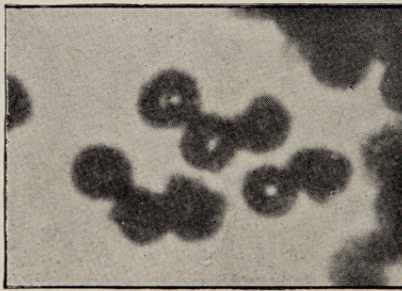


Fig. 5.

Explanation of Figures.

Fig. 1. A cluster of plants, natural size. Fig. 2. Section. Fig. 3. Capillitium (x 55.) Fig. 4. Capillitium shreds (x 1000.) Fig. 5. Spores (x 1000.) Specimens from L. J. K. Brace, Bahamas.

DIPLOCYSTIS WRIGHTII.



Fig. 1.



Fig. 2.



Fig. 3.

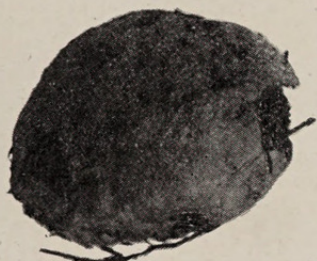


Fig. 4.



Fig. 5.

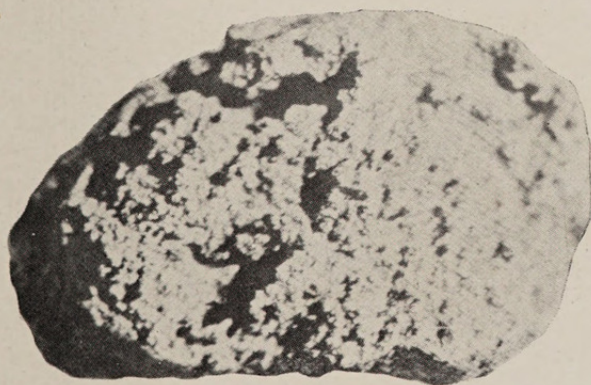


Fig. 6.



Fig. 7.

Explanation of Figures.

Figs. 1 to 4. Natural size. Fig. 2. Young. Figs. 1 and 4, Ripe. Fig. 3. Section. Fig. 5. Spores (x 1000.) Fig. 6. Section (x five.) Fig. 7. Peridioles (x 55.)



Lloyd, C. G. 1903. "Mycological Notes, No. 14 (232-261)." *Mycological writings of C. G. Lloyd* 1, 133–148.

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