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Loomis, Frederick Brewster

Siluric fungi from western
New York

University of the State of New York

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SILURIC FUNGI FROM WESTERN NEW YORK

BY FREDERIC B. LOOMIS (Amherst Mass.)

Plate 16

At about the middle of the Clinton group as it is developed at Rochester N. Y., occurs a band of hemate containing numerous fossils, which give evidence of having been deposited in a moderate depth of water. In thin sections many of these fossils are found to be more or less perforated by fine tubules entering from their surfaces. The borings are of interest as additional testimony of the presence of plants during Clinton time, a period when plants were very sparsely represented.¹ The borings, as will be seen from the figures, enter from the surface and are believed to represent plants which grew on the shells and sent only a part of their filaments into the shell. The tubules penetrate a little way into or occasionally riddle the whole shell. The borings are uniform in size, there being no tendency to irregular swellings in places where the host material was softer. At the ends of certain tubules are spherical swellings, in most cases of uniform shape and size. These swellings may represent sporangia, though I have no conclusive evidence to that effect. The borings doubtless represent the work of the mycelium of a fungus, probably some member of the *Phycomyces*. I regard them as due to fungi rather than to algae for the following reasons: the tubules are quite uniform in size and shape; while those of algae, under the same conditions, are more or less irregular; there is also in these fossils no evidence of septa, in which respect they are more like fungi than algae. The tubules are very small, $\frac{1}{400}$ to $\frac{1}{500}$ mm in diameter, which is smaller than is usual for algae, but quite normal for the mycelia of fungi. The spherical inflations at the ends of some filaments are very like sporangia, or other fungous swellings; but not at all like

¹ *Bythotrephix*, which is common in the rocks of this age and has usually been looked on as algaous, is regarded by Rothpletz and others as a sponge.

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swellings of algae, which are usually quite irregular in size and shape. Such spherical swellings as I have figured on the ends of various hyphae have been frequently described¹ on hyphae which had penetrated into the wood or leaves of fossil plants. Indeed, the appearance of the large number of filaments, entering from the surface and penetrating a short distance into the calcareous shells, is very like that produced by the mycelium of a lichen in penetrating a limestone or other rock on which it grows.

It is difficult to refer these marine fungi to modern families, as such recent fungi have not been extensively studied except so far as they affect food fish, etc. The mycelia from the Clinton group may be safely called *Phycomyetes*, and are probably to be placed near the genus *Saprolegnia*. Duncan² has described similar borings under the name *Palaeachlya perforans*, referring them also as "unicellular algae" to the family *Saprolegniae*.³ These were obtained from Lower Silurian foraminifera, the Upper Silurian coral, *Goniophyllum pyramidale*, the Devonian coral, *Calceola sandalina*, and a Miocene *Thamnastraea*. This author did not distinguish species, referring to one species mycelia both coarse and fine from Silurian to Tertiary. In the material under present consideration I find three forms distinguishable both by the character of the mycelium and the spherical swellings. So far as the mycelium is concerned, the Clinton fungi resemble Duncan's *Palaeachlya*; but the spherical swellings closely resemble those described by K lliker⁴, found in both recent and fossil corals and shells, which fungi K lliker described but left unnamed. They are also very like the Carbonic genus, *Peronosporites*,⁵ whose hyphae, however, enter plant tissue and would therefore seem to be either fresh-water or aerial fungi. *Peronosporites* has just such swellings as the Clinton fungi at the ends of small hyphae, both hyphae and swellings being unmodi-

¹See Seward. Fossil plants. 1898. p. 217.

²Quart. jour. geol. soc. Lond. 1876, p. 205.

³At the time Duncan wrote *Saprolegniae* were considered algae, but are now classed with fungi.

⁴Zeitsch. Wiss. Zool. 1859. 10: 215.

⁵See Seward. Fossil plants. 1898. p. 217.

fied as to shape or size whether in the cell walls or open cell spaces. In spite of the difference of host, for the present I prefer to assign these Clinton fungi to the genus *Peronosporites* rather than to propose a new generic name on a very inadequate botanical basis. The following three species are based on variations of the mycelium and hyphal swellings. The drawings are made with a camera lucida.

***Peronosporites ramosus* sp. nov.**

Plate 16, fig. 1-3

This species is characterized by a mycelium about $\frac{1}{420}$ mm in diameter, which gives off branches freely. All parts of the mycelium are uniform in size. Some hyphae are swollen at their ends into a globular sac. These sacs vary in size from $\frac{1}{75}$ to $\frac{1}{30}$ mm in diameter, and are globular in form, though they may be more or less ovate or even asymmetrical. Rarely a hypha, after enlarging into a sac, continues farther; though in one case a hypha has expanded into a second sac. These more or less irregular swellings probably do not represent sporangia or resting spores, which would be more regular in size and shape.

***Peronosporites globosus* sp. nov.**

Plate 16, fig. 4

The mycelium is $\frac{1}{600}$ mm in diameter, enters from the outer surface and branches but very seldom. At the ends of certain short hyphae are spherical swellings about $\frac{1}{35}$ mm in diameter, quite uniform in size and shape. Being uniformly on short hyphae, the swellings are near the surface of the host, and may represent sporangia though no spores are present. This is a common species.

***Peronosporites minutus* sp. nov.**

Plate 16, fig. 5, 6

The mycelium, about $\frac{1}{500}$ mm in diameter, entering from the surface, penetrates straight downward into the shell without giving off branches. Frequently on the ends of long hyphae are spherical swellings $\frac{1}{100}$ mm in diameter. These are very regular,

and have the smallest swelling belonging to any species, though the mycelium has a diameter about the same as the foregoing species.

All of the above are found on sectioning the firmer parts of the Clinton hematite layer, which is an aggregation of rolled bits of bryozoa, corals, brachiopod shells and crustacea, each fragment being coated by concentric layers of hematite, making an oolitic structure. If one accepts the theory that all oolites are formed by concentric coatings precipitated by algae, then these oolites must indicate the presence of other plants in the Clinton sea. This oolitic formation is described by C. H. Smyth jr.,¹ who carefully describes the process of concentric precipitations, but does not assign algae as a cause. This author describes the conditions prevailing at the time the hematite layer was deposited as a swampy shore of an inland sea.

Such fungi as those above described are common through Mesozoic and Cenozoic time, and have been found at least once before in Siluric beds.²

¹Zeitsch. f. Praktische geologie. August 1894. See also Amer. jour. sci. (3) 43, p. 487.

²Kölliker (*loc. cit.*) says he found his *Palaeachlya* in an Upper Siluric *Cyathophyllum* and a Lower Siluric foraminifer from Europe, but he does not figure either.

EXPLANATION OF PLATE

Peronosporites ramosus sp. nov.

Fig.

- 1 A transverse section of a punctate brachiopod shell inhabited by *P. ramosus*. *a*=shell punctae. x150
- 2 Branch *b* of fig. 1. x625
- 3 A shell cut parallel to the surface, showing an advanced stage of disintegration caused by *P. ramosus*

Peronosporites globosus sp. nov.

- 4 An impunctate brachiopod shell inhabited by *P. globosus*. x250

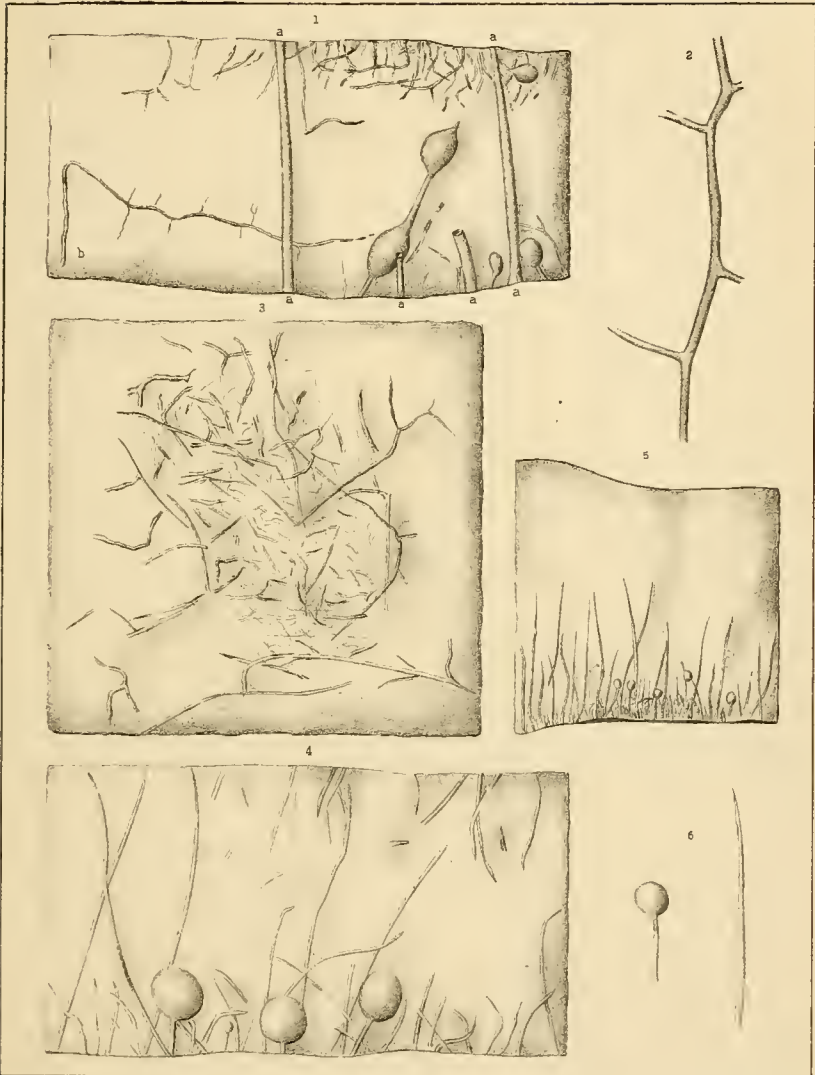
Peronosporites minutus sp. nov.

- 5 An impunctate brachiopod shell penetrated on one side only by *P. minutus*. x125
- ƒ *a*, a spherical swelling on a hypha, x500; *b*, a hypha. x500

FOSSIL FUNGI.

Bull. 37 N Y State Museum

Plate 16



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