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AN ENDOPHYTE (*STICHUS MERMISOIDES*) OCCUR-
RING IN THE TEST OF A CRETACEOUS BIVALVE.

By R. ETHERIDGE, Junr., Curator.

(Plates xxx. and xxxi.)

In a very unlooked for host, another Endophyte has appeared, and quite a different type to any of the previously described Australian forms. Microscopic sections of the shell of *Fissiumula clarkii*, Moore, sp.¹ were prepared for the purpose of examining its structure, when it became at once apparent, even with a good pocket lens, that the test was permeated by some foreign body.

A section taken parallel to the growth layers of the shell, under a one inch objective, revealed the presence of innumerable black specks and small masses of irregular outline, and variable diameter. A few of these little objects are cut obliquely, when hair-like black lines are observed to pass from them into the deeper recesses of the shell test. The diameter of these specks varies between .002 and .004 mm.

It is, however, in a section taken transversely to the growth, and under a two inch objective that the explanation of these remarkable small objects becomes apparent, as long, inequidistant, and generally parallel chains of black spheres or monillæ penetrating the shell substance at right angles to its plane of growth; the straight and direct course, curving neither to the right nor left is very marked. The continuity of the monillæ is at times broken for short distances, but at these points the line is maintained as a faint transparent tube or sheath, to be again shortly occupied in a similar manner. If these breaks, in the continuity of the chain, are carried to any extent, as they are in some instances, the latter appears broken up into a series of disconnected black spheres, but still following one another at intervals in the same straight linear series. In other portions of the section the tubes or sheaths may be seen empty, without any infilling of monillæ or pigment matter, pursuing the same straight and parallel course as the chains do.

The monillæ in a given chain are of variable size, from .002 to .006 mm. diameter, but this irregularity is here and there

¹ Etheridge, Junr.—Mem. Geol. Surv. N.S. Wales, Pal. No. 11, 1902, pp. 31 and 36.

interrupted either by the interpolation of much larger spheres, small patches of black amorphous pigment matter, or small clusters of the ordinary monillæ. When out of focus in the further thickness of the shell the chains of monillæ look like so many parallel hairs, but taking a section of this nature as a whole, when viewed through a low power, I cannot do better than compare the parallel lines to a series of black stalactites dropping from the roof of a cave.

As before said the moniliform chains are straight and parallel, without inosculation or bifurcation, not returning on themselves, nor is there any dipping-out-of and coming-into the focus of the microscope of a given chain. At times the parallel lines are widely separated, at others close together, but there is no intermingling. The monillæ are wholly of one colour—black, and there are no refractive centres. The larger round spheres, already mentioned, similar to the heterocysts in *Palæopede whiteleggei*,² are usually single, or seldom more than two together, are perfectly opaque, and have a diameter of from $\cdot 01$ to $\cdot 015$ mm. They may or may not occur at the commencement and termination of a chain, as well as appearing in its course. No terminal locus has been observed on any chain, nor any trace of pulverulent matter issuing from the monillæ, but here and there a few of the latter are distributed free in the shell substance.

The small amorphous masses of black pigment matter seen in the courses of some of the chains are probably agglomerated monillæ, in a few instances they are certainly so, as traces of the moniliform outline of the component spheres can be distinguished. At the same time there is another feature present not hitherto observed, so far as I remember, in any of the previously described Australian penetrating organisms. It is visible more particularly in the transverse section, and is a stellate condition of the pigment masses, or, the latter with a few protruding acicular points; these have a diameter of from $\cdot 01$ to $\cdot 02$ mm. inclusive of the rays. In some of these irregular stars there is a marked resemblance to the skeletal-spicules of some Heteractinellid Sponges. The monillæ are sometimes so closely packed in serial order along a chain that their individual outline is in a measure lost, and the chain assumes a rope-like appearance.

Of the described Endophytes this form seems to approach nearest to *Palæopede whiteleggei*, but is distinguished by sufficiently obvious characters. The tubes or sheaths, when empty, bear some resemblance to those (mycelium) of *Peronosporites minutus*, Loomis.³

² Etheridge, Junr.—Rec. Aust Mus., iii., 5, 1899, p. 121, pl. xxiii.

³ Loomis—Bull. N. Y. State Mus., viii., 39, 1900, p. 225, pl. xvi., f. 5 and 6.

Referring to his three species of *Peronosporites*, Mr. F. B. Loomis says:—"Such fungi as those above described are common through Mesozoic and Cenozoic time, but have been found at least once in Siluric beds." In Australia we now know these Endophytic Fungi from Devonian (or possibly Silurian), Permo-Carboniferous, and Cretaceous rocks.

The penetrating body now described I purpose calling *Stichus mermisoides*.⁴

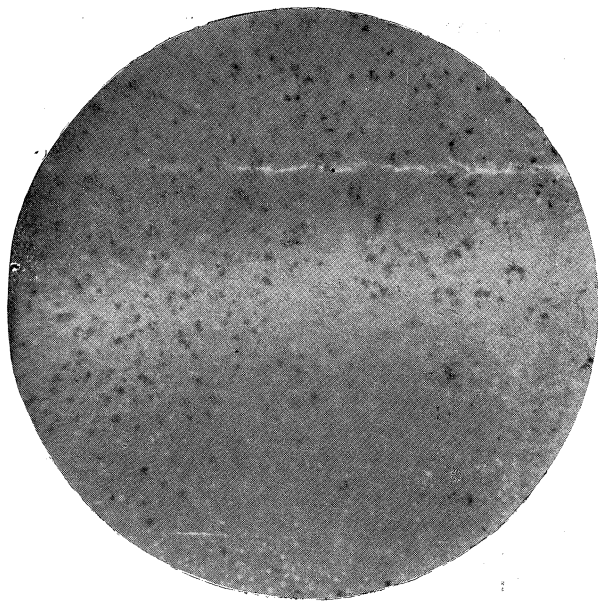
I am indebted for the excellent microphotographs represented in Pls. xxx.-xxxi., to my colleague Mr. T. Whitelegge, and for the two enlargements on Pl. xxxi. to Mr. Allan R. McCulloch.

⁴στίχος, a row; μέρμις, ἴθος, a rope, and οἶδες, signifying resemblance.

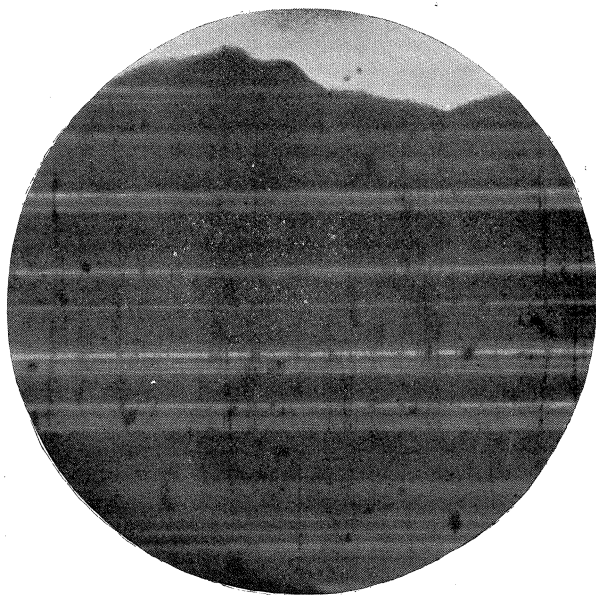
EXPLANATION OF PLATE XXX.

STICHUS MERMISOIDES, *Eth. fl.*

- Fig. 1. Section taken parallel to the growth layer of the shell of *Fissulinula clarkei*, Moore, viewed under a quarter inch objective.
„ 2. Section taken at right angles to the growth layers.



1

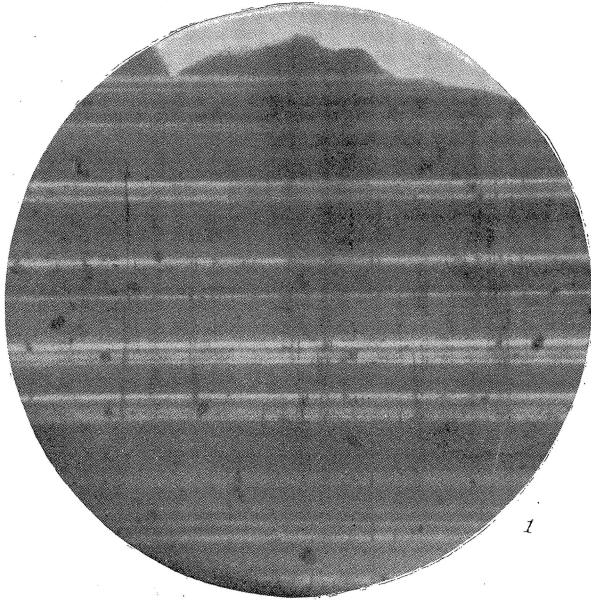


2

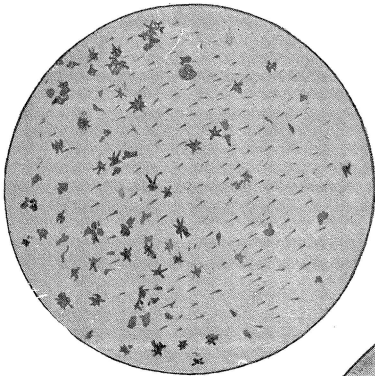
EXPLANATION OF PLATE XXXI.

TICHUS MERMISOIDES, *Eth. fl.*

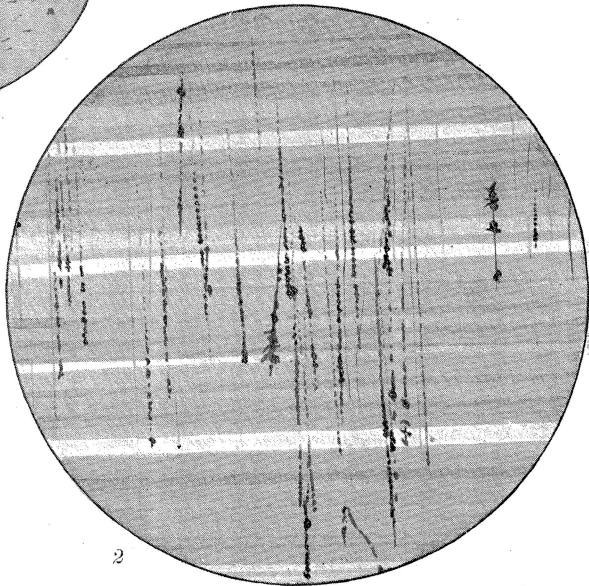
- Fig. 1. Section taken at right angles to the growth layers of the shell of *Fissilunula clarkei*, Moore, viewed under a quarter inch objective.
- „ 2. Portion of a similar section highly enlarged to show details.
- „ 3. Portion of a section taken parallel to the growth layers, highly enlarged to show details.



1



3



2