NOTE.

A NOTE ON THE STRUCTURE OF THE CORTEX OF SIGILLARIA MAMILLARIS, Brongn. In a paper¹ on the structure of *Sigillaria scutellata*, Brongn., published last year, we drew attention to some new points of interest in regard to the ribs, leaf-bases, and also the leaf-traces of the stem of this species. We have since had an opportunity of examining the anatomy of an excellent specimen of *Sigillaria mamillaris*, Brongn., recently acquired by the British Museum (Nat. Hist.)². The material was obtained originally by Mr. Lomax from Shore-Littleborough, Lancashire. Mr. Lomax was able to expose the external surface, which, in the case of one rib, proved to be extremely well preserved. Thus, as with our specimens of *Sigillaria scutellata*, there has been no difficulty in determining the species by its external characters.

The structure of the stele of another example, referable to the same species, has been already described by Dr. Kidston,³ in a preliminary note published some two years ago. No reference, however, was there made to the anatomy of the cortical tissues, or of the leaf-bases.

We do not propose to attempt a full account of the anatomy of the British Museum specimen, but rather to compare its structure on certain points with that of *Sigillaria scutellata*, especially in regard to the ribs and leaf-bases.

Sigillaria mamillaris, like *S. scutellata*, is an Eusigillarian stem of the Rhytidolepis type; that is to say the stems are ribbed, and the ribs are separated by straight furrows. While, however, in *S. scutellata* the bracket-shaped leaf-bases are long and distant from one another, in *S. mamillaris* they are shorter (about 13 mm. in length) and closely approximated. In the former species, the successive leaf-bases of the same rib are separated by small areas of primary cortex. In the latter, the leaf-bases are merely marked off, above and below, by small transverse grooves, partly filled by a growth of cork. These grooves are more or less oval in form at the surface, and are not as broad as the rib. Their breadth decreases as we pass inwards from the surface, and more internally they assume a triangular shape.

Thus the ribs of *S. mamillaris* are interesting as affording a transition stage between a *Sagillaria* with distant leaf-bases, such as *S. scutellata*, and a Favularian type such as *S. tessellata*, where the leaf-bases are very short but much broader, though equally approximate. The zigzag course of the grooves between the ribs in Favularian species appears to be due to the fact that the leaf-bases are more hexagonal

¹ Arber and Thomas: Phil. Trans. Roy. Soc., Ser. B, vol. cc, p. 133, 1908; Proc. Roy. Soc., Lond., B, vol. lxxx, p. 148, 1908.

² Nos. V. 11,403-11,418 in the General Collection of Sections in the Geological Department.

³ Kidston: Proc. Roy. Soc., Edinburgh, vol. xxvii, p. 203, 1907.

in form, and that their breadth is greater than that of the rib, and equal to, or greater than, their length.

No trace of the ligule has been found in the present specimen. This organ may or may not have occupied the groove between the successive leaf-bases. At present the evidence as to its exact position does not seem satisfactory.

As in *S. scutellata*, the ribs of the present specimen, which are about 9-10 mm. broad, consist largely of phelloderm, of 2-3 mm. in thickness, probably developed on the inner side of a meristematic zone, although no actual evidence of cambial activity can be seen. The prismatic fibres of the phelloderm appear to be rather shorter and smaller than in *S. scutellata*, and we have not noticed any evidence of their being chambered.

External to the phelloderm, a small zone of primary cortex is found in the longitudinal grooves, as in *S. scutellata*. The leaf-bases are likewise bracket-shaped structures, though, as has been already remarked, of a different shape. The external layers of the cortex appear to have been more highly suberized than in our previous specimens, three or four rows of cork-like cells being observed in some cases.

The leaf-trace bundle, when passing through the leaf-bases, also possesses a *double xylem strand*, as we found to be the case in *S. scutellata*. The leaf-traces are usually not preserved very clearly, as is frequently the case in petrifications of this genus, and it is only in a few instances that the xylem elements can be distinguished. There is some evidence, however, to indicate that the two xylem strands united as the leaf-trace passed inwards through the rib.

The form of the parichnos appears to agree with that of *S. scutellata*. The various stages can be followed, leading up to the state where the two arms unite below the bundle; but we have seen no example in which they are also united above, and completely surround the trace. It may be that the absence of tangential sections, cut deep through the ribs, will account for the lack of evidence of this stage.

In conclusion we find that *S. mamillaris* confirms several of the main conclusions of our previous paper on *S. scutellata*, as regards the structure and relation of the ribs and the leaf-bases. Although the leaf-bases are entirely different in form, the relationships remain unaltered. The discovery of a second case among the Eusigillariae in which the leaf-trace, when passing through the leaf-base, possesses a double xylem strand, closely similar to that found in the leaf *Sigillariopsis*, confirms Dr. Kidston's conclusion as to the leaves of this species, and would seem to imply that this peculiarity may be of frequent occurrence, if indeed it be not the rule, among members of this group of the Sigillarias.

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