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On the STRUCTURE and AFFINITIES of SIGILLARIA, CALAMITES and CALAMODENDRON. By J. W. DAWSON, LL.D., F.R.S., F.G.S., Principal of M<sup>e</sup>Gill University.

(Read May 11, 1870\*.)

## [Plates VII.-X.]

1. SIGILLARIA.

The difficulty of arriving at a correct knowledge of the structure of these eurious trees is caused principally by the unequal durability of the different parts of the stem. It arises from this that some portions have usually perished, while others were in process of mineralization, and the portions which remain have in a great degree lost their original form and arrangement. The outer bark, while extremely durable, was too impenetrable to be preserved in any other way than as compact coal. The fibres of the bark and of the woody axis are often mineralized or imperfectly preserved as mineral charcoal. - The cellular portions of the bark and of the axis have usually entirely disappeared. Still, imperfectly preserved stems can be obtained in great abundance in any coal-field by those who are content to work on such unpromising material.

Probably the finest specimen of a Sigillaria hitherto described is that of S. elegans, so admirably figured by Brongniart, and which has long served to give to the student of palæobotany his ideas of the structure of the genus. Unfortunately, however, Brongniart's specimen represents a small or young stem belonging to the somewhat aberrant subgenus Favularia; so that it fails to give an adequate idea of the structure of the typical fossil Sigillaria, which are much more common and important, at least in the coal-fields of Nova Scotia. The structure of these last, as observed in specimens obtained at the South Joggins, was, I believe, first described by mo in my paper on the Vegetable Structures in Coal, published in the 'Journal' of this Society in 1859. The specimens subsequently figured in the 'Journal' of this Society, and in the 'Transactions' of the Royal Society, by Mr. Binney, under the name of S. vascularis, belong, in part at least, to types of structure quite distinct from that of the true Sigillaria+.

My own results as to the typical *Sigillariæ* are thus shortly summed up in my paper on the "Conditions of Deposition of Coal"<sup>+</sup>;..."In the restricted genus *Sigillaria* the ribs are strongly developed, except at the base of the stem; they are usually much

\* For the discussion on this paper see Quart. Journ. Geol. Soc. vol. xxvi. p. 490.

<sup>+</sup> It would seem that the specimens figured by Mr. Binney as Sigillaria vascularis (Philos. Trans. vol. clv.) belong in part to the axis of a remarkable Sigillarioid tree, of which specimens have been kindly shown to me by Prof. Williamson, and in part (especially pl. xxxv. figs. 5 & 6) to the whole stem of a Lepidodendron. The latter plant has been described by Mr. Curruthers as Lepidodendron setaginoides.

1 Quart. Journ. Geol. Soc. vol. xxii. p. 129.