

and still more fully in that on *Sigillaria* and its allies in 1870\*, several distinct types of Sigillarioid trees; though whether we can, as suggested in those papers, separate those with the *Clathraria* and *Favularia* styles of markings from the other *Sigillariae*, is still doubtful. The French authors above cited regard their *S. degans* and *S. spinulosa*, which are of the *Favularia* type, as true *Sigillariae*, and hold that their woody cylinder, with its fibres in radial series and with medullary rays and radiating bundles proceeding from the inner cylinder, allies these trees with the gymnospermous exogens. Williamson regards his *Sigillariae* of the *Diploaxylon* type of structure as probably cryptogamous and allied to *Lepidodendron*, though maintaining that the structure of these stems is truly exogenous. There can scarcely be any doubt that the higher type of *Sigillaria*, which I described in 1870, and which, I think, represents the ordinary coarsely-ribbed species of the type of my *S. Brownii*, are allied to gymnosperms. Prof. Newberry and the writer have adduced strong circumstantial evidence to show that *Sigillariae* produced the fruits known as *Trigonocarpa*, found so constantly with their remains. Goldenberg, on the other hand, has figured a sort of strobile as attached to *Sigillaria*. Williamson has figured fruit-scars, which he regards as attachments of cones. I have figured† well-preserved fruit-scars of two species which cannot have borne strobiles, but may very probably have borne *Trigonocarpa* or racemes of such fruits. These facts, I think, taken along with those of structure, tend to show that there may be included in the genus *Sigillaria*, as originally founded on the markings of the surface, species widely differing in organization, and of both gymnospermous and acrogenous rank. This conclusion is further confirmed by the fact, which I have long ago amply demonstrated in my papers on the structures and mode of accumulation of coal, that in the great coal-beds tissues of gymnospermous character, but distinct from those of Conifers, exist to an enormous amount, while no other trees are found in connexion with these beds to which such tissues can be referred except the *Sigillariae*.

Should this view be finally established, these trees will present an interesting link of connexion between the gymnosperms and the higher cryptogams. They connect the *Lepidodendra* with the Cycads and Conifers in the gradations of exogenous structure seen in their wood and bark, and also in the remarkable transitions which they exhibit between woody tissues of the discigerous type and those scalariform tissues which, though resembling scalariform vessels properly so called, yet in these plants are evidently arranged in the manner of woody fibres, and take the place of these in the construction of the stem.

The tendency of investigation of late has been to convey the impression that the Sigillarioid and Lepidodendroid trees of the coal-formation were of one somewhat uniform and monotonous type. On the other hand, the great number of species of these trees indicated

\* Quart. Journ. Geol. Soc. vol. xxvii. (1871) p. 147.

† Quart. Journ. Geol. Soc. vol. xxii. Report on Fossil Plants of the Lower Carboniferous: 1873.