distinction between the strand and the substance of the walls is that it often yields a dark violet colouration with liquor Iodi followed by sulphuric acid, while the walls do not. It stains readily with haematoxylin (especially the granular parts) and with methyl- or aniline-blue.

It seemed possible that this cellulose-like substance might be a reserve-material to be used up in the rapid production of the filamentous branches which occurs in this *Alga* during the summer. To test this point I obtained some specimens after the summer growth had taken place. For this material I am indebted to Mr. C. Green, who gathered it for me on Clare Island, last July. In it not only the branches of the coenocyte forming the compact thallus, but also those which are prolonged into the filamentous out-growths, frequently exhibit the axial strand.

It may also be interesting to note, that in this material, which was fixed in methylated spirit, one stage, at least, of nuclear division could be observed. In several instances the chromatin of the minute nuclei could be seen divided into two dome-shaped masses, the convexities being directed towards the poles of division. The surfaces of the chromatin-masses, which lay towards the equator, appeared fimbriated. The fimbriations possibly represent the ends of the chromosomes in diaster. A strand of more densely stained protoplasm connects the two masses. Except for this, I have seen no indications of a spindle. However, as only a few stains were tried, and no special care was taken in the fixing of the material, it is hardly to be expected that these details, which would be very minute in *Codium*, could be seen.

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**ON SPENCERITES, A NEW GENUS OF LYCOPODI-
ACEOUS CONES FROM THE COAL-MEASURES**¹. By D. H. Scott, M.A., Ph.D., F.R.S.—The fossils which form the subject of the present paper are Cryptogamic strobili, showing evident Lycopodiaceous affinities, but differing in important points from other fructifications of that family, so that it appears necessary to establish a new genus for their reception.

Two species are described, one of which (*Spencerites insignis*) is already known to us from the investigations of Williamson, who named

¹ Abstract of a paper read before the Royal Society, Nov. 18, 1897.

it first *Lepidostrobus insignis*, and afterwards *Lepidodendron Spenceri*¹, while the other (*Spencerites majusculus*) is new.

In one of his latest publications, Williamson pointed out that it might ultimately be necessary to make his *Lepidodendron Spenceri* the type of a new genus². The separation thus suggested is now carried out, on the basis of a renewed investigation of the structure of this fossil.

Spencerites insignis is a pedunculate strobilus; the vegetative organs are not as yet identified. The specimens are calcified, and their structure admirably preserved.

The anatomy of the axis is of a simple Lycopodiaceous type, but differs in details (such as the course of the leaf-trace bundles) from that of the axis of *Lepidostrobus*. The peduncle bears sterile bracts, similar to the sporophylls of the cone itself; the latter are arranged spirally, or in some cases in alternating verticils.

The individual sporophylls are of peltate form, consisting of a short cylindrical pedicel, expanding into a relatively large lamina. The sporangia are approximately spherical bodies; unlike those of *Lepidostrobus*, they are quite free from the pedicel, and are attached by a narrow base to the upper surface of the lamina, where it begins to expand.

The details of the sporangial wall are quite different from those of *Lepidostrobus*, and the spores are also characteristic. In size they are intermediate between the microspores and macrospores of *Lepidostrobus*. They are of tetrahedral form, becoming spheroidal when mature, and each spore has a hollow, annular wing running round its equator. The wing is no doubt formed by a dilation of the cuticle³, and not, as Williamson supposed, from the abortive sister-cells.

Spencerites majusculus, the new species, is much larger than the former, the axis of the cone being twice as thick. The anatomy is similar, but the sporophylls, and consequently the leaf-traces, are more numerous. The sporophylls, which are arranged in alternating verticils, are relatively short, and of peculiar form; the lamina is very thick, and of great tangential width. The sporangia are like

¹ Williamson, Organization of the Fossil Plants of the Coal-measures, Parts IX, X, XVI, and XIX, Phil. Trans., 1878, 1880, 1889, and 1893.

² General Index, Part II, 1893, p. 24.

³ Cf. Solms-Laubach, Fossil Botany, p. 239.

those of the former species, and similarly inserted, but the spores are quite different. They are smaller than those of *S. insignis*, and have the form of quadrants of a sphere, with narrow wings along their three angles.

The genus is separated from *Lepidostrobus*, mainly on account of the very different mode of insertion of the sporangia, a character which is accompanied by differences in the form of the sporophylls and sporangia, the structure of the sporangial wall and of the spores, and the whole habit of the strobilus.

Spencerites, and especially *S. insignis*, bears a considerable resemblance to the *Sigillariostrobus Crepini* of Zeiller, but cannot be united with the genus *Sigillariostrobus*, for the insertion of the sporangia in the latter, as shown in the *Sigillariostrobus ciliatus* of Kidston, is totally different. The author is much indebted both to M. Zeiller and Mr. Kidston, for the loan of their specimens for examination.

The generic and specific characters may provisionally run as follows:—

Spencerites, gen. nov.

Cone consisting of a cylindrical axis, bearing numerous simple sporophylls, arranged spirally, or in crowded alternating verticils.

Sporophylls short, formed of a sub-cylindrical pedicel, expanding into a large peltate lamina.

Sporangia solitary on each sporophyll, inserted, by a narrow base, on the upper surface of the lamina, but free from the pedicel.

Sporangial wall consisting of a single layer of prosenchymatous cells. Spores winged.

1. *Spencerites insignis* (Will.).

Lepidostrobus insignis, Will. Organization of the Fossil Plants of the Coal-measures, Part X, Phil. Trans. 1880, p. 502.

Lepidodendron Spenceri, Will. Loc. cit. Part XVI, Phil. Trans., 1889, p. 199.

Cone pedunculate; peduncle bractigerous. Whole cone 8–10 mm. in diameter. Axis 3.5–5 mm. in diameter. Sporophylls 2–2.5 mm. long; lamina distinctly peltate, vertically elongated.

Sporangia approximately spherical. Spores tetrahedral, becoming spheroidal when free, with a hollow equatorial wing. Maximum

diameter of spore, without wing, about 0.14 mm.; with wing, about 0.28 mm. Wood of axis without prominent angles, with or without pith.

Outer cortex containing distinct bands of sclerenchyma.

Locality, near Halifax and Huddersfield.

Horizon, Lower Coal-measures.

2. *Spencerites majusculus*, sp. nov.

Whole cone about 15 mm. in diameter, axis about 9 mm. in diameter. Sporophylls about 3 mm. long; lamina obscurely peltate, as seen in radial section, but greatly elongated tangentially, attaining a breadth of 3 mm.

Sporangia approximately spherical. Spores having the form of quadrants of a sphere, with three narrow wings. Maximum diameter of spore, without wings, about 0.11 mm.; with wings, about 0.15 mm.

Wood of axis with about 30, somewhat prominent, angles; without pith.

Outer cortex uniformly sclerotic.

Locality, near Halifax.

Horizon, Lower Coal-measures.

Scott, Dukinfield Henry. 1897. "On Spencerites, a new genus of Lycopodiaceous cones from the coal-measures." *Annals of botany* 11, 590–593.
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