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On the Structure and Affinities of Fossil Plants from the Palaeozoic Rocks. II. On *Spencerites*, a new Genus of Lycopodiaceous Cones from the Coal-measures, founded on the *Lepidodendron Spenceri* of Williamson.

By

D. H. Scott.

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 it first *Lepidostrobus insignis* and afterwards *Lepidodendron Spenceri**), 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 genus.**) 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 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 cuticle,***) and not, as Williamson supposed, from the abortive sistercells.

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 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 sporo-

*) Williamson, „Organisations of the Fossil Plants of the Coal-measures“. Parts IX, X, XV I, and XIX. (Phil. Trans. 1878, 1880, 1889 and 1893.)

**) General Index, Part II, 1893, p. 24.

***) Cf. Solms-Laubach, Fossil Botany, p. 239.

phylls 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 sp. Will. "Organisation of the Fossil Plants of the Coal-measures", Part 9, Phil. Trans., 1878, p. 340, figs. 39 to 47 and 51 to 57.

Lepidostrobus insignis, Will. l. c. Part. 10, Phil. Trans., 1880, p. 502, figs. 11 and 12.

Lepidodendron Spenceri, Will. l. c. Part 16, Phil. Trans., 1889, p. 199, figs. 19 to 22; Part 19, Phil. Trans., 1893, p. 24, figs. 41 to 50.

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.

Instrumente, Präparations- und Conservations- Methoden etc.

De Meulemeester, J., La machine à glace et son application en fermentation haute, conférence. (Annales de la Société des brasseurs pour l'enseignement professionnel. 1897. No. 3.)

Rheinberg, Ueber ein neues Verfahren, auf optischem Wege Farbencontraste zwischen einem Object und dessen Untergrund oder zwischen bestimmten Theilen des Objects selbst hervorzurufen. (Archiv für mikroskopische Anatomie und Entwicklungsgeschichte. Vol. L. 1897. Fasc. III.)

Sammlungen.

Harmaud, J., Lichenes Lotharingiae. Fasc. XII. 1897.

Der vorliegende diesjährige Fascikel dieses Exsiccatenwerkes (vergl. Bot. Centralbl. Bd. LXIX. 1897. p. 320) enthält die folgenden Nummern:

198. *Cladonia coccifera* (L.) f. *squamosa* Harm. — 257. *Evernia prunastri* (L.) f. *retusa* Harm. — 316. *Parmelia physodes* (L.) f. *tubulosa* Schaer. — 379. *Physcia leptalea* Ach. — 386. *Physcia lithotea* f. *sciastra* (Ach.). — 392. *Physcia tribacella* Nyl. — 404. *Gyrophora hirsuta* Ach. — 458 bis. *Lecanora lobulata* Smfrit. — 512. *Lecanora calva* ad rufescentem transiens. — 526. *Lecanora vitellina* f. *arcuata* Hofim. — 545. *Lecanora milvina* (Wahlbg.) — 552. *Lecanora atrocinerea* Nyl. — 568. *Lecanora subfusca* (L.) f. — 570. *Lecanora campestris* Schaer. — 586. *Lecanora angulosa* (Schreb.). — 586 bis. *Lecanora angulosa* var. *coerulata* Ach. — 592 bis. *Lecanora glaucolutescens* Nyl. — 593. *Lecanora Hageni* Ach. apotheciis gregariis. — 593 bis. *Lecanora Hageni* Ach. f. *saxicola*. — 589 bis. *Lecanora conferta* (Dub.) Nyl. — 613. *Lecanora symmictera* Nyl. — 613. *Lecanora symmictera* var. *saepincola* Ach. — 615. *Lecanora symmictera* Ach. — 617. *Lecanora piniperda* Körb. — 617 bis. *Lecanora glauccella* Fltw. — 621 bis. *Lecanora subintricata* (Nyl.) Th. Fr. — 627. *Lecanora polytropa* Schaer. var. *ecrustacea* Schaer. — 648 bis. *Lecanora Nylanderiana* Mass. — 652. *Lecanora atra* var. *grumosa* (Pers.) Ach. — 654 bis. *Lecanora picea* (Dicks.) Nyl. — 661 bis. *Lecanora vicaria* Th. Fr. — 678. *Lecanora lusca* Nyl. — 688. *Lecanora complanata* Körb. — 712 bis. *Lecanora discreta* (Ach.) — 731. *Pertusaria multipuncta* Nyl. — 727. *Pertusaria areolata* (Clem.) Nyl. — 745. *Pertusaria Wulfenii* var. *rupicola* Schaer. — 747. *Pertusaria leioplaca* (Act.) Schaer. var. *octospora* Nyl. und var. *pseudopustulata* Harm. — 757 bis. *Pert. coronata* (Ach.) Nyl. — 759. *Phlyctis argena* Körb. — 793. *Lecidea coarctata* f. *elachista* (Ach.). — 1103. *Lecidea canescens* Ach. — 1123. *Lecidea badia* (Fltw.). — 1126. *Lecidea myriocarpa* var. *chloropolia* (Th. Fr.). — 1187 bis. *Mycoporum elabens* Fltw. — 1291. *Normandina pulchella* Borr. — 1297. *Endocarpon leptophyllum* Ach. — 1298. *Endocarpon hepaticum* Ach.

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