

A CROSSOTHECA FROM NORTHERN ILLINOIS

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During a collecting trip to the famous nodule-producing strip mines south of Chicago, in April, 1947, a specimen of *Crossotheca* was obtained which displays both fertile and sterile portions of a frond in organic connection. From a comparison with the American and British fossils assigned to this genus our specimen appears to represent a new species.

A good deal of interest has been shown in *Crossotheca* and supposedly related fossils since it is felt that they are microsporangiate fructifications of certain Pteridosperms. The general problem of the affinities of these fructifications has been considered at length by a number of previous workers and need not be repeated in detail here. About a dozen species of *Crossotheca* have been described, and while certain of these are imperfectly known with reference to the structure of the synangia, the morphology of the sterile foliage, and the general organization of the frond, it is evident that it was a large and varied genus. Judging from the work of Lesquereux, Kidston, Crookall, and others it seems clearly established that in some species the sterile portion of the fronds was of the *Pecopteris* type and in others of the *Sphenopteris* type.

It is not possible to make satisfactory comparisons with all of the previously described species since in some instances spore measurements are not given or the sterile pinnules have not been found attached.

Crossotheca McLuckiei sp. nov.

The single specimen on which this description is based consists of the terminal portion of a fertile penultimate pinna with portions of three sterile pinnae at its base. It is not possible to say what fraction of the entire frond is represented but it is significant that the sterile and fertile portions are in organic connection.

The entire specimen is 6.5 cm. long (fig. 1), including the sterile portion at the base. It is terminated by a fertile pinnule, below which lie five or six lateral single pinnules, and below these are pinnae consisting of from three to five fertile pinnules each. The base of the specimen is terminated by three sterile ultimate pinnae, two of which are shown in fig. 2.

The fertile pinnules are about 3 mm. long and 1 mm. wide and apparently consist of a much-reduced "lamina" bearing up to 20 sporangia in the usual marginal fashion for *Crossotheca*. The sporangia are not well preserved, but when shown in side view appear to have not exceeded 1.5 mm. in length. The spores are mostly uniform in size, being spherical, 70 μ in diameter, with a distinct trilete commissure and a very faintly warted exine (fig. 5). A few spores have been observed that are appreciably smaller (fig. 6) than the others, these measuring 45 μ .

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Origin: Collected from an old "spoil" near the entrance of the miner's Recreation Area, north of Coal City; base of the Carbondale formation, middle Pennsylvanian.

Type specimen: No. 5005, preserved in the paleobotanical collections of the Henry Shaw School of Botany.

Discussion:

In 1902 Sellards described two species of *Crossotheca* from Mazon Creek, *C. trisecta* and *C. sagittata* (*Staphylopteris sagittatus* Lesquereux). The fertile pinnules, as a whole, as well as the sporangia, of *C. sagittata* are much larger than those of *C. McLuckiei*, and the fertile foliage appears to be more distinctly pecopterid in form. *C. trisecta* differs in that its spores are almost exactly half the size of those from our specimen, and the sterile foliage, according to Sellards, is similar to that of *C. sagittata*. There seems to be no question that the specimen described here is distinct from these two.

Of the *Crossothecas* considered by Kidston in his monographic review of the genus (1923) *C. communis* (Lesquereux) Kidston seems to be the most closely comparable to our specimen. According to Kidston this species is rare in Britain and was originally based on sterile *Sphenopteris* foliage from American material. The sterile pinnae of *C. communis* (see Kidston, pl. 89, fig. 9b) resemble our specimen but unfortunately measurements of the sporangia and spores are not given for *C. communis*.

Whether all of the fertile specimens that have been described as *Crossotheca* are naturally referable to a single genus may be questioned. Being compression species there are certain structural details about which we would like further knowledge. However, it seems likely that all are closely comparable in the general organization of the fertile pinnule. Although there is appreciable size difference in the spores, their spherical shape and the "minute warty thickenings" that characterize the wall are remarkably uniform in most species. On the other hand, the range in form of the sterile pinnules is equally striking. In *C. Schartzlarensis* the pinnules are very finely divided similar to those of *Rhodea*; in *C. communis*, *C. McLuckiei*, and *C. Hoeninghausi* they are of the *Sphenopteris* type; in *C. pinnatifida* they are closer to *Neuropteris*; and in *C. Boulayi* closer to *Pecopteris*.

The specimen is named for Mr. John L. McLuckie in recognition of his continued interest in the fossils of the Mazon Creek region and for his generous services as guide on numerous collecting trips.

Literature cited:

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