than others, and it is a remarkable fact that the spores of certain cryptogamous plants are of this kind, as we see in the inflammable character of the dry spores of Lycopodium; and we know that the slow putrefaction of such material underground effects chemical changes by which bituminous matter can be produced. There is, therefore, nothing unreasonable in the supposition advanced by Prof. Orton, that the spores so abundantly contained in the Ohio black shales are important or principal sources of the bituminous matter which they contain. Microscopic sections of this shale show that much of its material consists of the rich bituminous matter of these spores (Fig. 16). At the same time, while we may trace the bitumen of these shales, and of some beds of coal, to this cause, we must bear in mind that there are other kinds of bituminous rocks which show no such structures, and may have derived their combustible material from other kinds of vegetable matter, whether of marine or of land plants. We shall better understand this when we have considered the origin of coal.

The macrospores above referred to may have belonged to humble aquatic plants mantling the surfaces of water or growing up from the bottom, and presenting little aërial vegetation. But there are other Erian plants, as already mentioned, which, while of higher structure, may be of Rhizocarpean affinities.

One of these is the beautiful plant with whorls of wedge-shaped leaves, to which the name *Sphenophyllum* (see Fig. 20) has been given. Plants referred to this genus have been described by Lesquereux from the upper part of the Siluro-Cambrian,* and a beautiful little species occurs in the Erian shales of St. John, New Brunswick.† The genus is also continued, and is still more

* "American Journal of Science."

† Dawson, "Report on Devonian Plants," 1870.