older formations. It may be regarded as a stage in the alteration and mineralization of vegetable matter, intermediate between peat and true coal.

Coal—a compact, usually brittle, velvet-black to pitch-black, iron-black, or dull, sometimes brownish rock, with a grayish-black or brown streak, and in some varieties a distinctly cubical cleavage, in others a conchoidal fracture. It contains from 75 to 90 per cent of carbon, and a small percentage of sulphur, generally in the form of iron-disulphide. It has a specific gravity of 1·2–1·35, and burns with comparative readiness, giving a clear flame, a strong aromatic or bituminous smell, some varieties fusing and caking into cinder, others burning away to a mere white or red

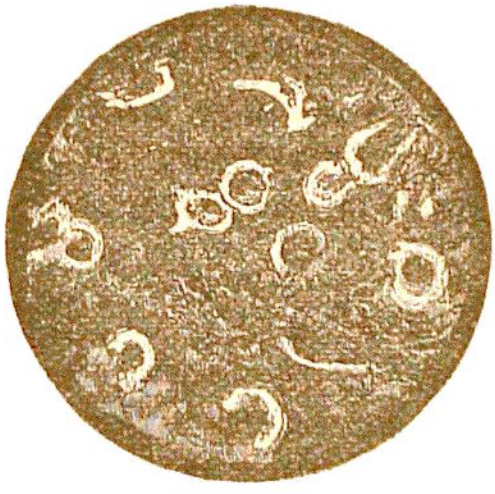

Fig. 25.—Microscopic Structure of Dalkeith Coal, showing Lycopodiaceous Sporangia (magnified 200 Diameters).

ash. Though it consists of compressed vegetation, no trace of organic structure is usually apparent.[143] An attentive examination, however, will often disclose portions of stems, leaves, etc., or at least of carbonized woody fibre. Some kinds are almost wholly made up of the spore-cases of lycopodiaceous plants (Fig. 25). There is reason to believe that different varieties of coal may have arisen from original diversities in the nature of the vegetation out of which they were formed. The accompanying table shows the chemical gradation between unaltered vegetation and the more highly mineralized forms of coal.

---

[143] On the influence of pressure on the formation of coal, see Frémy, Compt. rend. 20th May 1879. Spring, Bull. Acad. Roy. Bruxelles, 1880, p. 367.