

of the coal-measures, and consequently come up to the surface all round the margin of the basin. As the dip is usually at a considerable angle, vertical shafts, from 400 to 800 feet deep, are required to reach the great seam, at the distance of a few hundred yards inside the edge of the basin. It is only, therefore, along a narrow band of country that the coal can crop out naturally, and even here it is rarely exposed, and only where a river or valley has cut through the superficial drift, often thirty or forty feet thick. The principal coal-seam occurs in greatest force at Blackheath and the adjoining parts of Chesterfield county, where the coal is for the most part very pure, and actually attains the unusual thickness of between thirty or forty feet. I was not a little surprised, when I descended, with Mr. Gifford, a shaft 800 feet deep, to find myself in a chamber more than forty feet high, caused by the removal of the coal. Timber props of great strength are required to support the roof, and although the use of wood is lavish here, as in most parts of the United States, the strong props are seen to bend under the incumbent weight. This great seam is sometimes parted from the fundamental granite by an inch or two of shale, which seems to have constituted the soil on which the plants grew. At some points where the granite floor touches the coal, the contact may have been occasioned by subsequent disturbances, for the rocks are fractured and shifted in many places. This more modern coal, as well as that of Newcastle, and other kinds of more ancient date, exhibits under the microscope distinct evidence of vegetable structure, consisting in this case principally of parallel fibers or tubes, whose walls are pierced with circular or elongated holes. See fig. 5. B. and F.

By analysis it is found that so far as relates to the proportions of carbon and hydrogen, the composition of this coal is identical with that of ordinary specimens of the most ancient coal of America and Europe, although the latter has been derived from an assemblage of plants of very distinct species. The bituminous coal, for example, of the Ohio coal-field, and that of Alabama, yields the same elements.

For many years the cities of New York and Philadelphia have been supplied with gas for lighting their streets and houses, from