

improbable that it was a prominent source, since the same process which will convert vegetable tissues into coal or mineral oil (page 124), will produce a like result from animal oils.

*Equivalent coal-beds in the series.* — Since the coal marsh area of Pennsylvania, eastern Ohio, Kentucky, and West Virginia was in all probability essentially continuous, it is reasonable to look for the beds over the areas that are of equivalent age. It has been found difficult, however, to make out even the relations between those of eastern and western Pennsylvania; that is, of the Anthracite and Pittsburg regions. The related West Pennsylvania and Ohio beds are more easily correlated. But any parallelism between the beds of Pennsylvania and those of Illinois and other states of the Mississippi valley, unless in the Lower Coal-measures, is improbable.

*Coal-measures.* — Full details with regard to the Bituminous Coal-measures of western Pennsylvania, West Virginia, and partly of Ohio, will be found in a Report by I. C. White, constituting Bulletin 65 of the U. S. Geological Survey. The following are facts from eastern Pennsylvania: —

In the Panther Creek basin at Tamaqua, where the total thickness is 2168', the lowest coal-bed is the *Lykens Valley coal*, 6' thick, within the Pottsville conglomerate. 240' above is the *A coal-bed*, 16'; 115' higher, the *B coal-bed*, 9'; 235' higher the *C coal-bed*, 8' (with a thin bed between); and then, 122' above the last, the *Mammoth bed*, including beds *D*, 12', and *E*, 24', and another between of 5', together with 45' and 48' of intervening rock. 211' higher comes the *F*, or *Lower Red Ash coal-bed*, 10'; 55' higher, the *Bony coal-bed*, 4'; 46' higher, the *G*, or *Upper Red Ash coal-bed*, 6'; 84' higher, the *Washington coal-bed*, 3'; 92' higher, the *Jock coal-bed*, 7'; and then 4 coal-beds of 2' each in the next 150'; 158' higher, the *First Upper Red Ash coal-bed*, 4'; 106' higher, the *Second Upper Red Ash coal-bed*, 3'; 63' higher, the *Third Upper Red Ash coal-bed*, 1'. From the Mammoth to the Lykens valley coal-bed the coals are of the White Ash group; the remainder are divided into the Upper and Lower Red Ash groups, along a plane below the third coal-bed from the top.

In the Pottsville basin, between the Mammoth and Lykens Valley coal-beds, there are 7 coal-beds; and one, 660' above the Lykens, called the *Buck Mountain coal-bed*, is 8' thick. The Wilkesbarre section gives widely different results. In western Pennsylvania the Coal-measures have their greatest thickness at the West Virginia line, midway in Greene County, Pa.; and from this point there is a thinning westward to about one third. Passing into Ohio, the interval between the Pittsburg and Uniontown coal decreases northward from 200' to 60' or less (Stevenson).

The Pottsville conglomerate in Mercer County, Pa., afforded I. C. White (*Pa. Rep. Q*, 3, 1880) the following section: —

Homewood sandstone 50', shales 5', iron ore 2', limestone 2½'	59½'
<i>Coal, Upper Mercer</i> .....	2½'
Shales 25', iron ore 2', Lower limestone 2½', shales 10'	39½'
<i>Coal, Lower Mercer</i> .....	2½'
Shale 10', iron ore 1', shales with Upper Connoquenessing sandstone..	66'
<i>Coal, Quakertown</i> .....	2'
Shales, Lower Connoquenessing sandstone 30', Sharon shales 30'.....	100'
<i>Coal, Sharon</i> .....	4'
Fire clay and shale 5', Sharon conglomerate 20'.....	25'

The thickness of the Coal-measures in Ohio is about 1250': the Lower Productive 250', with 7 coal-beds; the Lower Barren, having the Mahoning sandstone at its base, 500';