

tations. Some of these conditions it is impossible to ascertain without considerable general geological knowledge, and a minute acquaintance with the local geology of the region under consideration.

In determining upon the first condition, it is necessary to know what are the characteristics of a formation containing the materials for oil, and what particular formations in the chronological series have been proven to contain such materials. Experience has shown that comminuted vegetable matters disseminated through a matrix of fine argillaceous materials, and forming a black, or carbonaceous, or bituminous shale, are the chief source of supply in all the productive regions of the United States and Canada. The intimate mixture of vegetable and argillaceous particles seems to facilitate the chemical rearrangements involved in oil-genesis. Pure vegetable matters form beds of coal, in which the organic material is approximately fixed. The distinction between the "splintery" and "fatty" coals corresponds with their difference in purity. Cannel coals are highly carbonaceous shales. Like the "black shale" of the West, they afford copious supplies of liquid hydrocarbons.

The mother-rock of the oil in some of the most productive regions of the continent seems to be the "black shale" of the West, which is the Genesee shale of the New York geologists. This fact was first pointed out by my friend Professor Newberry, now of Columbia College. I have little doubt that this formation affords the oil obtained in Northwestern Pennsylvania; parts of Enniskillen and Bothwell, in Ontario; in Eastern and Central Eastern Ohio; in the Glasgow region of Southern Kentucky, and in Northern and Middle Tennessee. It is also probable that it supplies the oil in most of the wells of Southwestern Pennsylvania, West Virginia, Southeastern Ohio, and Northeastern