

which petroleum and oils can be extracted, but scarcely yet with sufficient readiness and cheapness to warrant the utilizing of these shales for economic purposes.

The shales of the Utica are for the most part soft dark-brown or black, brittle, earthy and bituminous. From the exposures of this formation as far east as Murray Bay, Que., along the north shore of the St. Lawrence in the vicinity and under the waters of Lake St. Peter; at Montreal, Lacolle, Clarenceville; and again between Lake Ontario (Whitby) and Collingwood Bay, near Collingwood, as also along the capes and bays of the great Manitoulin and other islands in the northern portion of Lake Huron, the shaly strata of the Utica are very similar throughout and the characters very closely related.

In certain areas they are more or less calcareous, at times they are highly argillaceous. The presence of volcanic and intrusive masses about Montreal, and in the Eastern Townships of Quebec, has considerably altered and hardened the Utica of that region, which is, as a rule, highly calcareous.

*Chemical characters.*—In the "Geology of Canada," 1863, Sir William Logan has given a number of interesting chemical analyses of the Utica shales or "pyroschists," as they are called, which were made by Messrs. Chandler and Kimball for Prof. Whitney, and were published in the "Geol. of Wisconsin," Vol. I, p. 184.

The five analyses there given are here inserted, as they serve to show clearly the chemical composition of these shales or pyroschists from various localities. They are as follows:—

"I. is a blackish-brown, very fine-grained rock, from Cape Smith, Lake Huron. It has a somewhat conchoidal fracture, is not schistose in its structure, and contains no traces of fossils. II. is from an Island north of Maple Cape, and is blackish-brown, fine-grained, and earthy in texture, with a laminated structure, and contains no fossils. III. is from Ste. Anne, Montmorenci, and is dark-brown, shaly, and contains graptolites. IV. is from Gloucester, and is a