

thickness, and the Parma sandstone similarly salt-bearing."\*

The dish-shaped conformation of the strata of the lower peninsula of Michigan, has prevented the escape to the sea of such soluble substances as were originally embraced in the marine deposits from which the rocks were formed. The subterranean basins of Michigan furnish three great salt lakes. The first is in the subcarboniferous rocks, being on a parallel with the gypsiferous formation of Nova Scotia (Dr. Winchell); the second in the Parma sandstone; and the third, the only one which occurs in Canada, is the lowest or Onondaga salt group; but, unfortunately, instead of the group occupying a basin, it is distributed in Canada more in the form of a hill, sloping to Lake Erie and to Lake Huron, with a central highest axis between the two lakes. The transverse trough or depression passing through Enniskillen, connects the basins of Lake Michigan with those of Pennsylvania.

Although rich brines may not be found by boring in Enniskillen, yet petroleum still offers an encouraging prospect. It is important to bear in mind the peculiar character of the jointed structure of the rocks of the Hamilton group, and the vast area of rock surface those joints may connect into one narrow reservoir, or many independent narrow reservoirs. The underlying Corniferous limestone is also extensively intersected by divisional plains in Michigan, and thus presents an open character. It is even supposed by many in that State, that owing to the open joints in this rock, a subterranean communication exists between Lake Michigan and Lake Huron, in the southern part of the peninsula. The petroleum wells in Enniskillen are governed in their flow by the same laws which regulate the flow of brine springs and ordinary springs of fresh water; and these, we know, are in many instances of an intermittent character, dependent upon atmospheric and other changes. The fact that the brackish water should also have ceased to flow from some of the wells, affords a good ground for the expectation that many of the oil wells partake of this intermittent character; and owing to the complex ramifications of the joints in the rock, which form the narrow reservoirs from which they spring, many of them will probably yet gladden the hopes of their proprietors by a renewed but intermittent flow.

The conclusion at which we arrive with regard to the results which may be expected to be obtained by the "Test well" in Enniskillen, as far as brines are concerned are the following: If petroleum is not found at a less depth than 400 feet in the rock, it will

not be found in deeper borings. As soon as the Onondaga salt group or the junction between the Onondaga and Corniferous group are reached, brine will probably be found, but not sufficiently rich for profitable working; and that deeper borings in the Onondaga salt group will fail to reach salines which can compete with the more abundant distribution of salt in the detached basin of Michigan, where all the conditions for the accumulation of this important product appear to have been fulfilled.

#### GOLD IN INDIANA.

In a report of a geological reconnaissance of Indiana, made under the direction of the late David Dale Owen, M.D., by Richard Owen, M.D. mention is made of the new gold region in Indiana at Hamlin's Fork of Salt Creek. Dr. Owen expresses the opinion that the gold is invariably associated with drifted quarternary material derived from a matrix at least from four to six hundred miles distant in a northerly direction. If this should prove true, the greater distance may bring the source of the gold within British territory on the north shore of Lake Huron. If the source should be west of north, the rocks of the south shore of Lake Superior will be its matrix; and as the formations there developed are of considerable extent in Canada, gold may yet be found in situations not far from the shores of those lakes in British territory.

It is important to bear in mind that the source of a great part of the gold as yet found in the world is the veins which were formed in rocks of Palæozoic age. The rocks which, in the neighborhood of Lakes Superior and Huron, were erupted during this period may, possibly, be the source of the gold found in the drift of Illinois. A range of volcanic or trap rocks extends from the extremity of Keeweenaw Point to Montreal River in the northern peninsula of Michigan, from two to eight miles wide, and running nearly parallel to the lake coast. Twelve miles from Montreal River and east of it the range widens to fifteen miles, sending off spurs to the southern extremity of Agogebic Lake and the Porcupine Mountains. These rocks were erupted during the period of the Potsdam Sandstone. They occur on Isle Royal and in Canada south-east and north of Black Bay, Lake Superior, and on numerous islands, such as St. Ignace and the islands of Neepigon Bay and other portions of the north shore. Intrusive rocks also occur west of Lake Superior as far as Rainy Lake. But their age is not so well established as those on the south shore. The supposition of Dr. Owen will doubtless direct attention to the erupted rocks of Palæozoic age in the Lake Superior district, and veins of this age should be sought for

\* From a paper in *Hunt's Merchants' Magazine* for September, 1862.