

## NOTES.

CLAY NODULES. In the account of the September excursion to Green's Creek, which appeared in the October issue, a mention was made of the interesting clay nodules, which occur there in such numbers. Since, the Editor has received from Dr. Percy E. Raymond, of the Geological Survey, some notes on these nodules, which will undoubtedly be of interest to our readers.

"Toward the end of the 'Great Ice Age' there was a lowering of the northeastern portion of the North American Continent with respect to the sea level, and, as a result, the great river valleys became, for a time, arms of the sea. One of these arms extended up the St. Lawrence as far as the upper end of Lake Ontario, with a side bay which occupied the Ottawa Valley for at least 200 miles west of Montreal. Another covered the region occupied by Lake Champlain, whence the name 'Champlain epoch,' often applied to this time. At that time, as now, the rivers, descending from the low highlands to the north and west, brought down sand and fine mud which was deposited over the sea bottom. With the mud came quantities of leaves from the northern forests, and occasionally, insects, feathers of birds, and bones or bodies of animals. In the sea itself lived such a fauna as is found off our northeastern coasts; whales, seals, various fish, barnacles and bivalves. As the animals died, their bodies or shells were buried in the constantly accumulating mud, and, being protected from rapid decay by the exclusion of the air, the harder portions have been preserved as fossils such as are found in the nodules at Green's Creek and Besserer's Grove.

"The exact method of formation of these nodules, or any nodules, is hardly known, but it seems probable that the acids which are the product of the decay of the organic matter had something to do with the formation of the cement which has hardened the clay for from one-half an inch to one inch in all directions from the fossil which forms the nucleus. It is, indeed, remarkable how closely the outline of one of the nodules follows the specimen within it.

"These nodules have furnished quite a fauna and flora, thanks to the persistent collecting of Dr. Ami and the members of the Field-Naturalists' Club. Nearly all the forms belong to species living at the present time, though a few, notably the insects, are now extinct. The fauna and flora are interesting as showing an instance in which organisms representing the life of both sea and land are preserved in the same bed, and as showing the great physical and climatic changes which may take place in a (geologically) short time. Sir William Dawson said of this flora that it 'represented the greatest refrigeration of