

EROSION AT NIAGARA.

IT seems to have been a matter of common observation among the early colonists of America that the Niagara Falls had receded from the escarpment at Queenston to their present position six miles up the gorge. In spite of the view then frequently held that ravines were to be accounted for by violent rendings of the crust, those six miles, even in the eighteenth century, were appealed to as a natural time-scale. It was, moreover, felt that the rate of recession might give us a measure of the antiquity of the earth. James Hall in 1842 established a series of marks and monuments to which subsequent surveys might refer, and Mr. G. K. Gilbert¹ now draws conclusions from the work of his predecessors in 1842, 1875, 1886, and 1890, and from Mr. W. C. Hall's re-examination of the edge for the United States Geological Survey in 1905. He reproduces some of Captain Basil Hall's drawings, made with a camera lucida in 1827, and interesting photographs taken from 1855 onward. The former, which appear to be of great accuracy, throw doubt on certain de-



The Horseshoe, the true head of the Niagara Gorge, about 1886. The notch in the farther margin was not present in 1827.

tails of the map of 1842. Mr. Gilbert regards the survey of 1905 as of especial importance, since it is the last record of the Niagara River in a natural condition. "The Erie Canal is supplied with water from the Niagara River at Buffalo, the Welland Canal is supplied from Lake Erie, and the Chicago Drainage Canal draws water from Lake Michigan. All the water thus diverted is withdrawn from the cataract. So also is the water diverted from the river above the falls for factory purposes and for use in the generation of electricity" (p. 12).

The really active line of erosion is at the lip of the Horseshoe Fall. Very little recession occurred here at the head of the gorge between 1827 and 1842, but the rate between 1842 and 1875 was about 4 feet per annum, and from 1875 to 1905 nearly 6 feet per annum (p. 15). "The distance through"—Mr. Gilbert writes "thru"—"which the Horseshoe Fall has retreated since it parted from the American Fall is about 2500 feet. Allowing 5 feet per annum as the rate of recession, the parting took place about five hundred years ago." The present average rate

of recession of the American Fall is probably only 0.2 foot per annum.

Mr. Gilbert, in view of the importance of local and temporary conditions, such as the position of joints in the limestone shelf, wisely makes no estimate of the time that has elapsed since the falls occurred at Queenston. But his study will be welcome in the literature of geology and geography alike, since it deals with one of the most famous types of river-erosion in the world. G. A. J. C.

A YEAR'S WORK OF THE CARNEGIE INSTITUTION.¹

THE Carnegie Institution was founded, and endowed with 2,000,000., in order "to encourage, in the broadest and most liberal manner, investigation, research and discovery, and the application of knowledge to the improvement of mankind." The year-book for 1906 contains a general report on the work of the year, and short abstracts of the special investigations in progress. To the reader it affords abundant opportunity of "fine confused feeding"; to the reviewer a mass of projects and results of which it is hopeless to give any adequate account.

The trustees' plan of campaign has not yet been thoroughly worked out, and, indeed, in detail at least, must vary with the time. At the outset they had hosts of applications for assistance in research. The universities and colleges of the United States are now largely staffed by men brought up on research, who find themselves without the time or the appliances for the work they have prepared themselves to do. It was natural that they should appeal to the institution for assistance, and that the trustees should respond by making grants in aid to individual investigators on a somewhat extensive scale. But difficulties have made themselves manifest, especially in the supervision of miscellaneous investigations; and experience has convinced the trustees that there is a greater prospect of a valuable return from large projects carried on under the direct supervision of the institution than from minor projects entrusted to individuals. Accordingly, during 1906, while the larger projects have been increased, a smaller number of minor grants have been made than in former years.

There are at present forty-five of these minor projects in progress. They are for the most part researches in mathematical, physical, and natural science, and in history, literature, and philology; but they include also the preparation of such works as the "Index Medicus." The grants in aid of them range from 50l. to 2000l., and seem to be made for the provision of assistants, apparatus and materials, and for the publication of results. The total amount thus allotted during the year was about 19,000l.

The larger projects may be divided into four classes—astronomical, geophysical, biological, and economic and historical. Astronomy has always been

¹ "Rate of Recession of Niagara Falls." By G. K. Gilbert, accompanied by a Report on the Survey of the Crest, by W. Carvel Hall. Pp. 31+11 plates. (Bull. U.S. Geol. Survey, No. 506, 1907.)

¹ Carnegie Institution of Washington, Year-Book No. 5, 1906. Pp. viii+266. (Washington: Published by the Institution, 1907.)