Researches relating to the Great Lakes.—Spencer. 115

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beaches in both places were found to record the evidences of gentle terrestrial movements. Following up his investigations, Prof. Gilbert connected the various fragments of a great beach upon the southern and eastern sides of lake Ontario, as far as Adams Centre, near Watertown, N. Y.,* and found that the old waterline was deformed to the extent of several hundred feet in proceeding northeastward. This was an admirable piece of work, which was invaluable to the writer, who extended the observations farther[†] and made use of them in measuring the amount of the long sought for terrestrial deformation at the outlet of lake Ontario, and found that these post-glacial movements were sufficient to account for the rocky barrier across the Laurentian valley, producing the basin which retains the waters of lake Ontario. The channels across this rocky barrier, however, were closed with drift deposits reaching to a depth of 240 feet. In thus establishing the ancient drainage of the Ontario basin, after years of observation, often representing but little progress, the phenomena of the basin were discovered without the glacial theory of erosion. Then the writer found that the drowned channels cross lake Huron, and passing through Georgian bay, continued beneath hundreds of feet of drift, eastward of the Niagara escarpment, and joined the Ontario valley a few miles east of Toronto. A similar channel (the Huronian) crossed the state of Michigan, passed through Saginaw bay, and over the sub-lacustrine escarpment, to the deeper channel of the Huron basin. The Erie (Erigan river) drainage had been found to pass into the head of the Ontario basin. Thus was discovered the course of the ancient Laurentian river and its tributaries of antiquity. These upper basins were also affected by the terrestrial tilting recorded in the beaches, as well as by the drift obstructing them.

Prof. Gilbert, who had, many years before, mapped beaches at the head of lake Eries afterwards measured the

*Report of the meeting of the Am. Assc. Adv. Sci., Science, Sept., 1885, p. 222.

[†]The Iroquois Beach: a Chapter in the Geological History of Lake Ontario, by J. W. Spencer. Trans. Roy. Soc. Can., 1889, pp. 121-134. (First read before Phil. Soc., Wash., March, 1888.)

[‡]Origin of the Basins of the Great Lakes. Q. J. G. S. (Lon.), vol. XLVI, 1890, pp. 523-533.

§ See Geology of Ohio, vol. II, 1874.