

would make all the barrier needed. The pitch of the land about Nelson River is now eastward, and the rate about two feet a mile.

Upham sets aside the idea of this change of level, and makes the lake and the southward discharge the result of a damming by the ice-sheet along the northeast border of the lake. For details of his observations and his view of the events of the period, the reader is referred to his elaborate report already mentioned. On the slopes leading down to James Bay, the southern extremity of Hudson Bay, marine deposits occur up to a height of 450 feet above the level of Hudson Bay, indicating that the Hudson Bay region finally lost all its elevation, and became, further, much depressed. This is part of the evidence presented by Upham to prove that the ice-dam was required. But there is doubt whether the retreating ice would have long remained a barrier under the warm climate of the Champlain period.

5. *The region of the Great Lakes.* — Lake Ontario, now 247 feet above the sea, was in Champlain time at sea level, at the head of the long St. Lawrence Bay, as already explained. But the northern and southern shore-lines are widely different in height, owing to the warping of the surface in the later reëlevation. North of the middle of the lake, the height above the water surface of the prominent shore-line or beach (called the Iroquois beach by Spencer, who mapped its position) is 355 feet, while south it is 189 feet, whence the increase in height northward is 166 feet in a distance of 60 miles. At the east end of the lake depression, the corresponding heights are 483 feet at Watertown and 194 near Rome, an increase northward of 289 feet in 60 miles. The depth of the lake at the time was nearly 1000 feet — equal to the present depth, 740 feet, *plus* the mean height of the opposite shore-lines. (The positions of these upper shore-lines are given on the map.)

Westward along the lake, the height of the upper shore-line decreases, and at the west end, 200 miles distant from the east, it is only 116 feet — a diminution from Watertown of 367 feet in 200 miles.

Lake Erie is now 326 feet above Lake Ontario, or 573 feet above sea level. The height of its upper shore-line south of the lake, at Cleveland, is 213 feet; and that of the upper, north of it (the Ridgeway beach of Spencer), is 273 to 351 feet. The heights increase eastward. The upper at the west end, near Fort Wayne, is 207 feet, and toward the east end, 261 feet. The mean height of the upper line south of the lake is about 200 feet, and the same is true as regards the southern shore-line of Lake Ontario. The fact suggests the inference that the heights of the two lakes may have had the same difference then as now. Through the subsidence the lake lost its outlet to the Ohio — the Wabash River, which had served this purpose, becoming a tributary to the lake.

Lake Superior is now 602 feet above sea level, and Michigan and Huron, 582 feet. The latter lakes are but nine feet above Lake Erie.

On Lake Superior, the upper shore-line of the north side has a height above the lake at Josephine Mountain — 50 miles west of Thunder Bay — according to A. C. Lawson, of 509 to 607 feet; at Duluth, the west end, of 534