

Cliff recession is indeed accelerated by coastal subsidence; but it takes place on any fully matured shore-line, as a part of the normal sequence of changes, and even on young shore-lines where the initial slope is steep.

That rapid cliff recession does not *necessarily* indicate that subsidence is in progress is seen in the case of the west shore of Lake Michigan, between Milwaukee and Chicago. According to Dr. Edmund Andrews,¹ the average rate of recession of this cliffed coast, prior to 1870, was over five feet a year. In other words, although the cliffs along the west shore of Lake Michigan are higher than those on the northeast coast of New Brunswick, their average rate of retreat is faster. Locally, cliff recession as fast as thirty or forty feet has been observed on the Wisconsin shore.² This destruction of cliffs by the waves of Lake Michigan cannot be attributed to a rise in level of the water on the shore; for the surveys cover a long period of years, during which the changes of level of the lakes have been slight, and as often downward as upward.³

Drowned Valleys.—In a letter in *Science*,⁴ discussing the question of modern stability of the Atlantic coast, Mr. T. L. Casey points to the well-known estuarine coast of Maryland as “positive evidence of progressive subsidence . . . in recent times.” If the drowned valleys of Chesapeake bay can thus be appealed to as evidence that the coast of Maryland is now sinking, the same argument could be applied to the equally typical dendritic estuaries of Gloucester, Cumberland, and Kent counties, in New Brunswick. It seems necessary, therefore, to anticipate the use—or, more accurately, the misuse—of such evidence, by pointing out the fallacy in it. Drowned valleys simply indicate that the land once stood higher than now; they do not indicate the date of the drowning, and do not prove that

¹Edmund Andrews: The North American Lakes considered as Chronometers of Post-glacial time. Transactions of the Chicago Academy of Sciences, vol. 2, 1870, pp. 1-23.

²J. W. Goldthwait: Abandoned shore-lines of eastern Wisconsin. Wisconsin Geological and Natural History Survey, Bull. No. 17, 1907, pp. 58-59.

³For similar testimony from the shore of Lake Huron, and information as to the fluctuations in level of the Great Lakes, see A. C. Lane: Geological report on Huron County, Michigan. Geol. Survey of Michigan, vol. 7, 1900, pp. 78-85, and Plate 5.

⁴T. L. Casey: Subsidence of the Atlantic shore-line. *Science*, vol. 34, 1911, pp. 80-81.