Chapter 10

THE MARINE INVASION

It has long been well known that as the Wisconsin ice sheet disappeared from the margin of its gathering grounds in Ungava, the sea at once covered large tracts about the shores of Hudson Bay, throughout the St Lawrence valley, along the coast of New Brunswick, Maine and New Hampshire, and probably also a narrow strip of the coast of Massachusetts north of Boston. The main geologic problem awaiting solution in these fields is that of determining the upper marine limit. The literature of the field presents the greatest variety of opinion on this subject, the vertical and horizontal range of the marine waters being limited by each writer according to very different criteria. While the earlier writers as a rule were inclined to regard the submergence as of great depth and wide extent, recent investigators exercising a closer and more cautious discrimination between the effects of glacial waters, lake waters and those of the sea have tended to restrict the submergence to narrower limits. As will be observed I have come to an essential agreement with Baldwin[1] whose paper on the Champlain district has the merit of including a diagnosis of the marine limit on the Vermont side of the valley.

THE UPPER MARINE LIMIT

The criteria appealed to by different geologic writers in the establishment of the upper marine limit in this part of North America indicates a wide diversity of opinion as to the effects of marine action and consequently as to the extent of the postglacial submergence in this district. All are agreed that the upper limit of marine fossils is a trustworthy though probably a minimum measure of the vertical extent of the submergence. Most geologists would probably also accede to the zoologic postulate that the marine limit does not lie higher above the shell line than the depth of water indicated by the fossils as necessary for their growth. Such is the present vertical range of most of the species found in the Champlain valley—100 to 300 feet—that they do not furnish a criterion for discriminating between marine beaches and glacial

[1] Baldwin, S. P. 1894. *See* bibliography, 1.