

Smoothering and striation of rocks are undoubtedly important effects both of land-glaciers and heavy sea-borne ice, but the levelling and filling agency of these is much greater than the erosive. As a matter of fact, as Newberry, Hunt, Belt, Spencer and others have shown, the glacial age has dammed up vast numbers of old channels which it has been left for modern streams partially to excavate.

The till or boulder clay has been called a "ground moraine," but there are really no Alpine moraines at all corresponding to it. On the other hand, it is more or less stratified, often rests on soft materials which glaciers would have swept away, sometimes contains marine shells, or passes into marine clays in its horizontal extension, and invariably in its embedded boulders and its paste, shows an unoxidized condition, which could not have existed if it had been a subaërial deposit. When the Canadian till is excavated and exposed to the air, it assumes a brown color, owing to oxidation of its iron, and many of its stones and boulders break up and disintegrate under the action of air and frost. These are unequivocal signs of a subaqueous deposit. Here and there we find associated with it, and especially near the bottom and at the top, indications of powerful water action, as if of land torrents acting at particular elevations of the land, or heavy surf and ice action on coasts, and the attempts to explain these by glacial streams have been far from successful. A singular objection sometimes raised against the subaqueous origin of the till is its general want of marine remains; but this is by no means universal, and it is well known that coarse conglomerates of all ages are generally destitute of fossils, except in their pebbles, and it is further to be observed that the conditions of an ice-laden sea are not those most favorable for the extension of marine life, and that the period of time covered by the glacial age must have been short compared with that represented by some of the older formations.

This last consideration suggests a question which might afford scope for another address of an hour's duration,—the question how long time has elapsed since the close of the glacial period. Recently the opinion has been gaining ground that the close of the ice-age is very recent. Such reasons as the following lead to this conclusion. The amount of atmospheric decay of rocks and of denudation in general which have occurred since the close of the glacial period are scarcely appreciable. Little erosion of river valleys or of coast terraces has occurred. The calculated recess-