

striation which occurs in the valleys of the Connecticut and Lake Champlain, and elsewhere in New England. What were the determining conditions of these two courses, and were they contemporaneous or distinct in time? The first point to be settled in answering these questions, is the direction of the force which caused the striæ. Now, I have no hesitation in asserting, from my own observations as well as from those of others, that for the southwest striation the direction was *from the ocean toward the interior, against the slope of the St. Lawrence valley*. The erag-and-tail forms of all our isolated hills, and the direction of transport of boulders carried from them, show that throughout Canada the movement was from northeast to southwest.* This at once disposes of the glacier-theory for the prevailing set of striæ; for we cannot suppose a glacier moving from the Atlantic up into the interior. On the other hand, it is eminently favorable to the idea of ocean drift. A subsidence of America, such as would at present convert all the plains of Canada and New York and New England into sea, would determine the course of the Arctic current over this submerged land from northeast to southwest; and as the current would move *up a slope*, the ice which it bore would tend to ground, and to grind the bottom as it passed into shallower water; for it must be observed that the character of slope which enables a glacier to grind the surface, may prevent ice borne by a current from doing so, and *vice versa*.

Now we know that in the Post-pliocene period eastern America was submerged, and consequently the striation at once comes into harmony with other geological facts. We have of course to suppose that the striation took place during submergence, and that the process was slow and gradual, beginning near the sea and at the lower levels, and carried upwards to the higher grounds in successive centuries, while the portions previously striated were covered with deposits swept down from the sinking land or dropped from melting ice. It would be easy to show that this view corresponds with many of the minor facts.

Farther, the facts thus ascertained account for the excavation of the deep and land-locked basins of our great American lakes. Ocean currents, if cold, and clinging to the bottom, must cut out pot-holes, just as rivers do, though geologists are too apt to limit their function to the throwing up of banks. The course

* The few exceptional cases appear to belong mostly to the later period of the stratified sands.