

stances would grate powerfully upon the bottom of the sea, smoothing and striating the rocks, and especially projecting ledges, upon their northern sides, producing effects which could be distinguished afterwards only with difficulty from those of glaciers, except in the vast extent of country acted upon.

The most reasonable theory of the transport of materials from lower to higher levels is, that as the land sunk, the stranded ice would be lifted higher and higher along the shores, and finally be urged upon and over hills and mountains, carrying detritus along with it. Much of the work of smoothing and scouring down the ledges and accumulating the coarse drift was performed while the continents were sinking.

When the land had sunk 5,000 feet, all the mountains east of the Rocky mountains were submerged, except Mt. Washington, and a few peaks in North Carolina. The glaciers now would be covered up, and the icebergs be the only agency at work. Scarcely any form of life could exist among these icebergs, and only the hardier species when a greater extent of land had risen above the waters.

The land at length began slowly to emerge, and it seems to have been raised as a whole; that is, the whole mass was lifted together, so as not to disturb the relative levels of the surface, just as we know the continent of South America has been raised some 1,400 feet, without disturbing the strata horizontally, or producing the smallest fault or curvature.

As the land rose the water would, to some extent, and in particular places, sort and deposit the detritus worn off. And hence we can account for that mixture of mere mechanical accumulations and aqueous deposits, of which the drift is composed. Especially does it explain why, as we approach the outer (mostly southern) limits of the drift, we find the deposit more and more stratified, and the evidence of glacial action gradually disappearing.

By this submergence and emergence, every foot of surface must have been exposed to the long-continued action of waves, tides, and currents laden with ice; and, consequently, a great amount of detritus must have been broken off.

When the continent was partially submerged, at both the periods of its rise and fall, it is conceivable that large valleys deviating from the usual direction of the currents might incidentally become filled up with ice; and though only a part of the whole force could have acted upon those bergs, according to the laws of the resolution of forces, yet it would be sufficient to produce all the effects of ordinary drift in an unusual direction. In this case the drift