

from the mountains to the plains, and where sand and finer matter are swept down by a vast current to the sea, together with the wreck of countless forests and the bones of animals which perish in the inundations. When these materials reach the Gulf, they do not render the waters unfit for aquatic animals ; but, on the contrary, the ocean here swarms with life, as it generally does where the influx of a great river furnishes a copious supply of organic and mineral matter. Yet many geologists, when they behold the spoils of the land heaped in successive strata, and blended confusedly with the remains of fishes, or interspersed with broken shells and corals, when they see portions of erect trunks of trees with their roots still retaining their natural position, and one tier of these preserved in a fossil state, above another, imagine that they are viewing the signs of a turbulent instead of a tranquil and settled state of the planet. They read in such phenomena the proof of chaotic disorder, and reiterated catastrophes, instead of indications of a surface as habitable as the most delicious and fertile districts now tenanted by man.

CHAPTER XVI.

TRANSPORTATION OF SOLID MATTER BY ICE.

Carrying power of river-ice—Rocks annually conveyed into the St. Lawrence by its tributaries—Ground-ice ; its origin and transporting power—Glaciers—Theory of their downward movement—Smoothed and grooved rocks—The moraine unstratified—Icebergs covered with mud and stones—Limits of glaciers and icebergs—Their effects on the bottom when they run aground.—Packing of coast-ice—Boulders drifted by ice on coast of Labrador—Blocks moved by ice in the Baltic—Ground-ice and coast-ice in the Baltic.

THE power of running water to carry sand, gravel, and fragments of rock to considerable distances is greatly augmented in those regions where, during some part of the year, the frost is of sufficient intensity to convert the water, either at the surface or bottom of rivers, into ice.

This subject may be considered under three different heads :—first, the effect of surface-ice and ground-ice in enabling streams to remove gravel and stones to a distance ; secondly, the action of glaciers in the transport of boulders, and in the polishing and scratching of rocks ; thirdly, the floating off of glaciers charged with solid matter into the sea, and the drifting of icebergs and coast-ice.

River-ice.—Pebbles and small pieces of rock may be seen entangled in ice, and floating annually down the Tay in Scotland, as far as the mouth of that river. Similar observations might doubtless be made respecting almost all the larger rivers of England and Scotland ; but there seems reason to suspect that the principal transfer from place to place of pebbles and stones adhering to ice goes on unseen by us under water. For although the specific gravity of the