

even in the Florida Straits. Over a portion of the "Blake plateau," a region southeast of Georgia, between the lines of 100 and 600 fathoms, the bottom is "clean of mud and ooze, and almost so of living species"; and A. Agassiz has hence suggested that abrasion by current action may be going on over it. It is a question for investigation.

The bottom of the Atlantic Ocean, south of Newfoundland and thence southwestward, has received droppings of stones, gravel, and earth from icebergs, and the deposits of the Glacial period extend some distance south of the latitude of Cape Hatteras. They consist of sand, stones, and some large bowlders of granite and other rocks. The "Challenger" expedition dredged up a 500-pound bowlder of syenite in this region near latitude $41^{\circ} 14' W.$, from a depth of 1340 fathoms (Murray, 1885). The "Albatross," of the United States Fish Commission, obtained granite bowlders of 50 pounds near $71^{\circ}-72^{\circ} W.$ and $37^{\circ} 40' N.$ (Verrill, 1884). In the Glacial period, even New York Bay, and perhaps Delaware Bay, discharged icebergs for transport by the Labrador current to a melting region on the borders of the Gulf Stream. On the *east* margin of the Gulf Stream, in 2000 fathoms, the dredge has found, as Verrill states, only the usual Globigerina ooze, and farther south toward the West Indies, the bottom is no less free from continental debris. But the modern era has its new element, which has made exceptions possible over all the ocean.

Owing to the presence of Man in the world, whose life is on the waters as well as the land, the bottom deposits have been found in one case to afford a dredge-load of red bricks. It was brought up from a depth of 1537 fathoms (nearly 10,000 feet) in the Atlantic in latitude $39^{\circ} 3'$ and longitude $70^{\circ} 51'$; and Professor Verrill, the reporter (1884), remarks that the bricks were probably from the used-up furnace of a returning whaler, and were thrown overboard when nearing home after a whaling voyage.

We are led by the facts to the belief that in the cold, dark, still, abyssal depths, through which transportation is reduced to descent by gravity, ooze, sprinkled with volcanic ashes for concretion-making, is the substitute for sand, gravel, and mud; and where the means of biological progress are simply strife for food and mate and physiological response to living work, there is excessively slow and feeble geological change.

III. FREEZING AND FROZEN WATER: GLACIERS, ICEBERGS.

Water performs part of its geological work in the act of freezing, and another part when frozen, in the condition of snow and ice.

WATER FREEZING.

1. *Displacement and fracturing.* — Since water on becoming ice, at $32^{\circ} F.$, increases in volume about $\frac{1}{11}$, or lineally about $\frac{1}{35}$, and diminishes in density to 0.92, whenever freezing takes place in crevices, it opens and deepens them,