

continents have always been areas of gradual upheaval, with weak oscillations, while the oceans have always been areas of subsidence. Geologists, he says, have often had recourse to the hypothesis of marine currents to explain the presence of incoherent matters scattered over the sea-bottom, but he sought in vain in the trough of the Gulf Stream for traces of the characteristic mud thrown out by the Amazon, which discolours the sea for a long distance seaward. It has often been supposed that the absence of fossils denotes a deep sea, but, he remarks, we now know that organisms exist even at the greatest depths. Taken in its *ensemble*, the basin of the Gulf Stream, between Cuba and Florida and further north and east, with its very abrupt slopes, presents features of configuration differing widely from continental areas of like extent. Speaking of the formation of the rocks of the Keys, especially the oolitic rocks, he concludes that no rock of the Jurassic formation could have been built up of the materials found in the deepest parts of the Atlantic basin; the vast area occupied by the Keys, the reefs of Florida, and the inclined coralline plateau on the American edge of the Gulf Stream basin, may be compared with the Jurassic formations of the European and Asiatic continents, but their stratigraphic relations show that, during the geological middle ages, the Jurassic rocks were formed on the submarine border of a growing continent, just as the Pourtales Plateau forms to-day the southern border of North America. Returning to the idea of the permanence of continents and ocean basins, he concludes by saying: "If this view is correct, it naturally follows that the main outlines and circumscription of the continents and of the oceans must have been determined at the very beginning of the formation of inequalities upon the earth's surface, and remained essentially the same through all geological ages, varying only as to their relative height and depth, as well as to their respective extension."¹

DELESSE'S CHARTS
AND RESEARCHES
ON THE LITHOLOGY
OF THE BOTTOM OF
THE NORTH
ATLANTIC.

In 1871 Delesse published his work on the lithology of the bottom of the sea,² embodying the results of long, laborious, and methodical researches, dealing more especially with the coast sediments of the seas of France. He takes account of the agents assisting in the formation of these deposits, and indicates the samples collected up to that time by the hydrographic offices of various countries. His charts are founded upon the charts published by the maritime nations of Europe and America, and where the soundings are sufficiently numerous he represents the contours of the bottom by curves; he also represents the orography of the bottom corresponding to the orography of the neighbouring land, and indicates the limits of the hydrographic basins, the annual rainfall, and indeed all the data bearing directly on the formation of marine deposits, such as currents, tides, prevailing direction of the winds, &c. He divides recent deposits into sand, gravel, gravelly sand, boulders, ooze, clay or argillite, slimy sand, sandy mud, gravelly mud, calcareous ooze, and coralline ground. In addition to the deposits of the coasts of

¹ *Ibid.*, p. 377.

² M. Delesse, *Lithologie du fond des mers*, with folio atlas, Paris 1871.