

ing for the ashes being carried such enormous distances through the air ; these difficulties were solved by Murray in another direction during the Challenger Expedition by the discovery of floating pumice¹ stones in all parts of the ocean. By treating the deposits with acid, Bailey showed that there is always a small quantity of mineral particles in organic calcareous sediments, though veiled by the preponderance of the calcareous element, and that the calcareous organisms increase in abundance as the Gulf Stream is approached. He found only imperfect casts of Foraminifera in the deposits off the northern coasts, the green casts being generally met with in the more southerly soundings.

Maury represents the bathymetry of the Atlantic on a chart,² indicating by four shades of colour the depths within 1000, 2000, 3000, and 4000 fathoms. He says that the mineral particles found in the deep sea are not rolled, any more than the small shells associated with them, and concludes that the dynamic action of the sea is not felt at great depths, where the currents are too slow to move anything. This was an argument in favour of the cherished plan of binding the new and old worlds together by means of a telegraph cable, to which he often refers. He was of opinion that the mechanical actions which modify continental surfaces : the various effects of temperature, rain, wind, running water, and force of gravity, produce no effect on the bed of the sea. "We have," he says, "in imagination been disposed to regard the waters of the sea as a great cushion placed between the air and the bottom of the ocean to defend and protect it from the abrading agencies of the atmosphere." The deeps and shallows of the ocean would remain unchanged were it not for the microscopic organisms incessantly drawing from the sea-water the elements in solution to construct their solid envelopes, and these being showered upon the bottom and accumulating there. He estimated the part taken by calcareous and siliceous microscopic organisms in pelagic deposits, based upon Bailey's observations. He agrees with Bailey that the animalculæ, whose remains are found at the bottom of the sea, lived in the surface waters ; but he carries the idea too far when he asserts that the absence of light, low temperature, and pressure, preclude the possibility of life in very deep water. Ehrenberg held the opposite opinion regarding the habitat of these microscopic organisms, pointing out the presence of organic substances in the shells dredged from the bottom of the sea, and that some forms in the deposits were to be found nowhere else. Murray's tow-net observations have since proved that the most abundant of these shells from the bottom live in the surface waters.

In 1857 Captain Dayman sounded across the North Atlantic in H.M.S. "Cyclops," along the great circle between Valentia and Trinity Bay, Newfoundland, a little to the

MAURY'S BATHY-
METRICAL CHART.

DO MICROSCOPIC
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OR AT THE
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OCEAN ?

DAYMAN'S SOUND-
INGS ON THE
TELEGRAPH
PLATEAU.

¹ See Murray, *Proc. Roy. Soc. Edin.*, vol. ix. p. 247, 1877 ; Murray and Renard, *Deep-Sea Deposits Chall. Exp.*, pp. 294 *et seq.*, 1891.

² Maury, *op. cit.*, pl. xi.