

the deepest part of the ocean.<sup>1</sup> Although the oceanic phenomena revealed at the surface of the sea were eagerly studied during, and immediately after, the time of the great discoveries to which we have just referred, the phenomena of the deep sea cannot be said to have engaged the attention of navigators and scientific men till after the lapse of several centuries.

In the first half of the seventeenth century Kircher reviews the doctrines as to the depth of the sea accepted in his time. He says:—"In the same manner as the highest mountains are grouped in the centre of the land, so also should the greatest depths be found in the middle of the largest oceans: near the coasts with but slight elevations the depth will gradually diminish towards the shore. I say coasts with but slight elevations, for if the shores are surrounded by high rocks, then greater depths are found. This is proved by experience on the shores of Norway, Iceland, and the Islands of Flanders."<sup>2</sup>

The first attempt to represent the bottom of the sea by isobathic curves is to be found in a map by Philippe Buache in 1737. These curves are intended to show that certain elevations of the sea-bottom correspond with the orography of the neighbouring land. In an essay on physical geography, published in 1752, he develops his ideas on this subject.<sup>3</sup>

Unsuccessful attempts were made by Captain Ellis in 1749, by Lord Mulgrave in 1773, and by Scoresby in 1817, to sound the ocean. Sir John Ross was more fortunate in 1818. During his first Arctic expedition he brought up 6 lbs. of mud from 1050 fathoms in Baffin's Bay. Soundings were correctly obtained in 1000 fathoms in Possession Bay, and worms and other animals were found in the mud procured. Sir James Clark Ross, during his Antarctic expedition,<sup>4</sup> after a number of unsuccessful attempts with the sounding lines in use, made a new line on board his ship, 3600 fathoms in length. With this a satisfactory sounding was obtained in 2425 fathoms in the South Atlantic, and another off the Cape of Good Hope in 2677 fathoms. On two occasions no bottom could be found with over 4000 fathoms of line. He also dredged successfully in depths of 400 fathoms. Some beautiful specimens of Corals, Corallines, *Flustra*, and a few Crustaceous animals were obtained.

A great impulse was given to deep-sea soundings when Lieut. Brooke, an officer in the United States Navy, invented his sounding machine in 1854, by which, applying Cusanus' idea of a detaching weight to the sounding line, the sinker was detached when the weight struck the bottom. This instrument was modified and improved by Commander Dayman, who employed it while sounding across the Atlantic in the region through which the Atlantic cable would require to pass. The introduction of steel wire

<sup>1</sup> Pigafetta, Premier voyage autour du Monde, p. 53, Paris, l'an ix.

<sup>2</sup> Kircher, Mundus Subterraneus, p. 97.

<sup>3</sup> Buache, "Essai de géographie physique," &c., Hist. de l'Acad. des Sciences, 1752, p. 399.

<sup>4</sup> From 1839 to 1843.