

skeletons must, after the death of the organisms, form siliceous deposits of considerable extent around all coasts bordered with ice, at depths between 80 and 400 fathoms. Opposite Victoria Barrier the bottom was covered with a white or greenish mud, consisting principally of Diatom frustules. In very deep water, opposite Victoria and Graham's Land, the mud was very pure and fine grained, but in shallow water, near the coast, it was mixed with sandy and gravelly particles. Hooker considered that these microscopic plants were intended to maintain in the south Polar regions the balance between the animal and vegetable kingdom, and also to purify the vitiated atmosphere, performing in Antarctic latitudes the part of vegetation in other regions. He states that Diatoms exist in every latitude from Spitzbergen to Victoria Land, Iceland, Great Britain, the Mediterranean, North and South America, and the islands of the South Sea, and that the frustules of species living in the Antarctic have contributed to the formation of various strata during geological periods. He estimates that the deposit formed principally of Diatom frustules extends continuously for more than 400 miles off Victoria Land, at depths of about 300 fathoms. The existence of remains of Diatoms, including a few Antarctic species, in volcanic ashes, pumice, and scoriæ, led him to suppose that organic substances covering the bases of active volcanoes, like Mount Erebus and Vesuvius, might be ejected from the craters along with volcanic products.

In 1840 Edward Forbes joined, as naturalist, the surveying ship "Beacon" while in the Mediterranean, and for eighteen months he studied the Ægean Sea and its shores, taking more than one hundred dredgings at different depths down to 130 fathoms. Before Forbes' time the bathymetrical distribution of marine animals had been investigated to a certain extent, but the works of Audouin and Milne-Edwards (1830), Sars (1835), and Oersted (1844), applied only to the more superficial waters of the sea. Forbes studied the question with regard to animals inhabiting deep water, and in 1844 published his memoir, "On the Light thrown on Geology by Submarine Researches."¹ He maintains that the dredgings show the existence of distinct regions at successive depths, having each a special association of species. He remarks that the species found at the greatest depths are also found on the coasts of England, and he concludes, therefore, that such species have a wider geographical distribution. Forbes divided the area occupied by marine animals into eight zones of depth, in which animal life gradually diminished with increase of depth, until a zero was reached at about 300 fathoms. He shows that in Cretaceous and Tertiary layers similar zones may be distinguished, and that depth must have been in former times, as it is now, one of the factors in the distribution of marine organisms. He found fewer species in the deep zones than in the shallow ones, and supposes that plants, like animals, disappeared at a certain depth, the zero of vegetable life being at a less depth than that of animal life. Forbes concluded that, as nearly all marine basins are over 300 fathoms in depth, most of the sedimentary beds must be void

¹ *Edinburgh New Phil. Journ.*, vol. xxxvi. p. 318.