

show an increasing knowledge of marine zoology. Up to the end of last century the little that was known about the inhabitants of the lower zones of the sea seems to have been derived from a few specimens collected on the shore after tempests, or to captures made by chance on sounding or fishing lines, or brought up by dredges and nets while fishing for oysters and mussels. In 1799, Otto Friedrich Müller introduced the naturalist's dredge, a modification of that used by Marsili and Donati in 1750,¹ for investigating the fauna of the bottom of the sea.²

SIR JOHN ROSS.

Sir John Ross, in his voyage to Baffin's Bay³ in 1817-1818, mentions four deep-sea soundings which may be considered historical. The first sounding was made 2 miles from the coast to a depth of 2700 feet, and brought up gravel and two small living Crustaceans (*Gammarus*); the second, in 3900 feet of water and 18 miles from the coast, brought up pebbles and brown clay with *Serpula*, Corallines, and Crustaceans; the third, in 6000 feet and 6 miles from the coast, brought up black mud with a few worms; and in the fourth sounding, in 6300 feet, he obtained a starfish attached to the line below the depth of 2400 feet. Not only are these results worthy of attention, but also the method employed in obtaining them. Ross used an apparatus of his own invention, manufactured by the blacksmith on board his vessel, which he called a "deep-sea clamm."⁴ By means of this ingenious instrument he succeeded not only in taking deep soundings, but he brought up a much larger quantity of the deposit from the bottom of the sea than he could have done with the sounding lead; thus in Baffin's Bay, lat. 72° 23' N., long. 73° 07' W., he brought up from a depth of 1050 fathoms several pounds of greenish mud.⁵

These observations of Ross opened a new era in submarine soundings, and proved for the first time that organisms existed at great depths. The truth was not recognised at once, and the observations of the celebrated navigator had not at that time sufficient influence to overcome the opinion generally current that the sea was uninhabited at depths approaching 1000 fathoms; this was the first example of animals brought up from such depths. Dr. Carpenter has given the most precise details on this point, received from General Sir Edward Sabine, who was a member of Sir John Ross' expedition:—"The ship sounded in 1000 fathoms, mud, between 1 and 2 miles off shore (lat. 73° 37' N., long. 75° 25' W.); a magnificent *Asterias caput-medusæ* was entangled by the line and brought up with very little damage. The mud was soft and greenish, and contained specimens of *Lumbricus tubicola*. So far my written journal, but I can add, from a very distinct recollection, that the heavy deep-sea weight had sunk, drawing the line with it, several feet into the very soft greenish mud, which still adhered to the line when brought

¹ See *ante*, page 68.

² See Narr. Chall. Exp., vol. i. p. xxxv.; and Thomson, *Depths of the Sea*, p. 237, London, 1874.

³ Ross, *A Voyage of Discovery for the Purpose of Exploring Baffin's Bay*, vol. i. p. 178, and App., p. lxxxv., London, 1819.

⁴ *Voyage of Discovery in His Majesty's Ships "Isabella" and "Alexander,"* App. p. cxxxv., London, 1819.

⁵ See Wallich, *North Atlantic Sea-bed*, pp. 78, 79, London, 1862.