

eight hours after it was cast over, the dredge was safely hauled on deck, having in the interval accomplished a journey of upwards of eight statute miles.

This was the deepest haul which was attempted during the second cruise of the PORCUPINE, but the same routine proved equally successful on many occasions at depths almost equally great in subsequent cruises under the direction of my colleagues, Dr Carpenter and Dr Gwyn Jeffreys. The mode of working in the PORCUPINE was the simplest which could be contrived; we had started, no doubt, with greatly exaggerated ideas of the difficulty of such operations, and it was our constant aim to avoid all apparatus which might possibly go wrong; and, as these excursions usually lasted only for a short time, to use nothing but such gear as sailors are accustomed to, and require little training to handle. Some slight changes were made in the CHALLENGER, and with our additional experience, in the case of an expedition on so large a scale, the various methods might be elaborated in many ways with advantage, but I am inclined to think that the same general plans which were adopted in the PORCUPINE would still be the most suitable for a short trip in a vessel of moderate size, with a crew not specially trained. There can be no doubt that in any future expedition, on whatever scale, it would be an unjustifiable waste of time and space to neglect the use of wire for sounding, and wire rope for dredging and trawling, but it seems to me that even the use of these should be simplified and not made more complex. No one who has not had personal experience of the working of machines of any kind in a small vessel in bad weather can form an idea of the risk to the accuracy of the results, to the machines themselves, and to those who handle them.

THE SPECIAL ARRANGEMENTS AND METHODS USED ON BOARD THE CHALLENGER FOR PROCURING AND PRESERVING DEEP-SEA ANIMALS.

The arrangements on board the CHALLENGER were much the same as those on board the PORCUPINE, or any other vessel specially fitted for surveying and deep-sea investigation. The only great change which we made in our method was the gradual substitution, during the early part of the voyage, of the beam-trawl for the dredge. For the first few hauls in deep water off the coast of Portugal, the dredge came up full of the usual "globigerina ooze," very uniform throughout; and the work of hours in sifting gave but a small result. We were anxious to get some idea of the general character of the fauna, and particularly of the distribution of the higher animal groups; and, after various suggestions for modifying the dredge, it was proposed to try the ordinary trawl. We had a compact well-balanced trawl with a 15-foot beam on board, and we sent it down off Cape St Vincent to a depth of 600 fathoms. The experiment looked hazardous, but to our great satisfaction the trawl came up all right, and contained, along with many of the larger invertebrata, several fishes with what we became accustomed afterwards to recognize