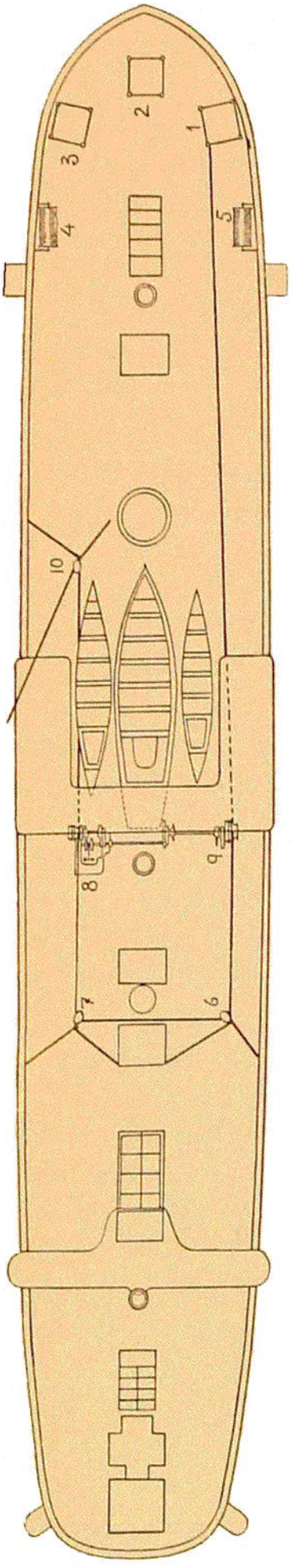

FIG. 1.—DECK ARRANGEMENT ON BOARD THE "CHALLENGER."

to haul in some thousands of fathoms of line within reasonable time would be quite out of the question without a steam-winch, and it is precisely because the use of steam first made it possible to examine properly the vast marine areas of the world that oceanic research is such a comparatively new science. The cruise of the "Challenger," the first great expedition specially fitted out to investigate the ocean, took place during the years 1872–76. Since then oceanography has made giant strides, and we have now many appliances at our disposal that were unknown to the pioneers of those days.

It is interesting to compare our modern methods with those of the "Challenger" Expedition, for we can then see what great advances have been made, and realise to what extent we have availed ourselves of the scientific inventions of our times. A critical examination of the mode of working adopted by the "Michael Sars" will be of use in this connection.

The "Challenger" Expedition.

The "Challenger" was a spar-deck corvette of 2306 tons displacement, with an auxiliary engine of 1234 indicated horse-power. The length of her deck was 226 feet, and her greatest breadth was 36 feet.

Almost amidships on her main deck, and just before the main mast, was a big steam-winch of 18 horse-power, with a long axle that extended right across the ship and carried large end-drums (see Fig. 1, 8). Hemp lines were used, which were hauled in by being passed round the end-drums.

Methods employed on board.

The sounding-line was operated by two large reels on the forecastle, 5 feet long and $2\frac{1}{2}$ feet in diameter (4 and 5), 3000 fathoms of line, one inch in circumference, to each reel. The breaking strain was about 700 kilos (14 cwt.), and the weight