

are left at the bottom of the sea, while the tube containing a specimen of the deposit is

hauled to the surface and on board ship. During the first months of the cruise the diameter of the tube was not more than 1 inch,¹ but this was replaced by one having a diameter of 2½ inches,² and latterly the tube was made to project fully 18 inches³ below the weights. When there was reason to suppose that the bottom would be a tenacious clay, no butterfly valve was used at the lower end of the tube, as this valve is a great impediment to the entrance of the deposit into the tube. In these cases the tube sometimes sank 18 inches or 2 feet⁴ into the clay, and brought up a section to that depth and over a quart⁵ bottle full of the clay. It not being always possible to know beforehand the nature of the bottom, it was found by experience best to have the tube always fitted with the butterfly valve when sounding, for a Globigerina Ooze or other less tenacious deposit was not retained in the tube without the valve. To facilitate collecting the mud or other deposit brought up by the tube, the lower half was made to unscrew, and this was then taken into the laboratory, the butterfly valve removed, and the roll of mud or other deposit taken out at the upper end, or allowed to slip out by its own weight, on jerking or on striking it gently on the table. The arrangement, colour, and general appearance of the different layers, if any, were then carefully noted. Even when the whole of a more or less granular deposit appeared to have been wholly washed out of the tube on its way up through the water, still a small quantity of the deposit or a few shells or stones would usually be found inside behind the valves. The method of sounding with these machines is very satisfactory from the point of view of the study of Deep-Sea Deposits, for the largest specimens of the deposit are thus obtained; the method of sounding with wire, now chiefly employed, where the weights and tubes are very much less, is less satisfactory in this respect.

Buchanan's combined sounding tube and water-bottle, as used by Mr. Buchanan with success on board the telegraph ships, is represented in Figs. 7, 8, 9, and 10, and has the

advantage of utilising the weights in pushing the tube into the ground, with the

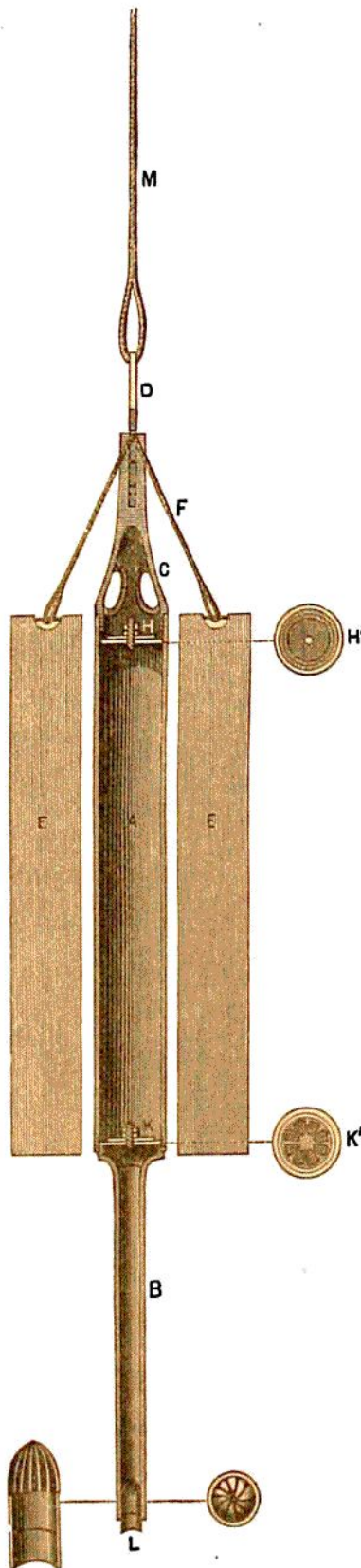


FIG. 7.—Buchanan's Combined Sounding Tube and Water-Bottle.

¹ 25·4 mm.

² 63·7 mm.

³ 45·7 centimetres.

⁴ 61 centimetres.

⁵ 1·1 litres.