

## CHAPTER I.

### ON THE VARIOUS METHODS OF OBTAINING, EXAMINING, AND DESCRIBING DEEP-SEA DEPOSITS.

#### *α.* METHODS EMPLOYED ON BOARD SHIP.

THE various instruments employed on board ship for the purpose of obtaining information with reference to the deposits now forming on the floor of the ocean have been described in detail in the Narrative of the Cruise.<sup>1</sup> In this place it is, however, proposed to refer briefly to these instruments with the view of pointing out the quantity of these deposits procured by the different methods, under various conditions as to depth, locality, and nature of the bottom.

The ordinary deep-sea sounding lead, from 12 to 14 lbs.<sup>2</sup> in weight, armed with lard, often gives valuable and reliable information concerning the deposits in all depths under 100 fathoms.<sup>3</sup> This is especially the case where the bottom is hard, sandy, or rough, and if the lead be used frequently over a considerable area, and the particles be examined by the microscope after being freed from the grease by means of turpentine or naphtha.

*The Cup Lead* (Fig. 1) is a modification of the ordinary deep-sea lead (A), with an iron spike (C) driven into its lower end; at the bottom of this spike is an inverted hollow iron cone (B), and above the cone is a sliding iron disc (D) movable up and down the spike between the bottom of the lead and top of the cone, and just large enough to cover the opening of the cone when resting upon it. During the descent of the lead the disc is raised off the cone by the friction of the water, so that on reaching the bottom the cone is forced into the mud, and is filled with the mud or other loose material forming the deposit. On the lead being drawn up through the water, the friction of the water forces down the sliding disc (D) on the top of the cone (B), and thus prevents the contents from being washed out.

*The Valve Lead* (Fig. 2) is another modification of the deep-sea lead, fitted at its base with an iron cylinder (A) having a common butterfly valve (B) at the bottom. This form of lead was found in practice to be the best for all ordinary soundings in depths under 300 fathoms.<sup>4</sup> The cylinder being made to unscrew, the contents can be collected expeditiously, and usually without much loss. Even when the cylinder contained no specimen from the bottom, an examination of the lower edges would often

<sup>1</sup> Narr. Chall. Exp., vol. i. pp. 56 *et seq.*

<sup>2</sup> 5·5 to 6·4 kilogrammes.

<sup>3</sup> 183 metres.

<sup>4</sup> 549 metres.