



CHAPTER V

PHYSICAL OCEANOGRAPHY

IN the middle of last century the idea of "physical oceanography" did not exist, but in the course of a few decades it has become a widespread branch of knowledge, with a copious literature and bulky text-books. A few figures may serve to show how important is the study of the sea. The waters of the globe cover more than two-thirds of its surface, and their volume is about 1300 millions of cubic kilometres, or thirteen times that of all the land above sea-level. The mean height of the land is 700 metres, while the average depth of the sea is 3500 metres. Sea-water contains various salts in solution, the total weight of which is nine times that of the earth's atmosphere.

Difficulties
in making
oceanic
observations.

Mechanical
appliances
necessary.

The reason why the ocean, which plays such an important part in the economy of the earth, has not been investigated until recently is because of the special difficulties which are encountered in making investigations. One great difficulty is, as has been previously mentioned, that it is impossible to observe directly what is going on beneath the surface, and it is necessary to have a special set of apparatus that can be relied upon. The methods have developed with phenomenal rapidity, but the observations are still few in proportion to the extent of the ocean, and consequently it is often difficult to obtain a complete and true image of the actual conditions. Many of the results obtained are therefore merely preliminary, and further study may alter our views on various points; for the solution of