

occurrence of certain species is subject to great variation in different regions. We shall, therefore, dispense with the many Latin and Greek terms employed to define such groups of pelagic organisms, and simply use the term "bathypelagic" to denote those animals that live deep in the intermediate layers. Hensen proposed the term "plankton" to denote every kind of organism floating or drifting in the water, either shallow or deep, "dead or living," and Haeckel applied it so as to include all pelagic animal and plant life as a whole, in contrast to bottom-life as a whole, which he terms "benthos."

In this chapter I propose to consider only the different species or communities of pelagic animals, not the pelagic life as a whole. Pelagic forms occur in all classes of the animal kingdom from the unicellular Protozoa to the fishes; to mention them all would be to write a text-book on zoology. The chief aim of this book is however to give some of the general and special results of the cruises of the "Michael Sars." A discussion of the results relating to pelagic animals (as with the bottom-fish) calls for some information about the principal forms, so I commence with a short review of pelagic animals.<sup>1</sup> In the absence of descriptions of the animals, the illustrations will give the reader an idea of some of the forms referred to. Their geographical distribution, as known from previous expeditions, is briefly indicated, and in a later section I shall deal with the distribution of the most important animals in their communities in the different areas of the North Atlantic and the Norwegian Sea.

## I. SHORT REVIEW OF PELAGIC ANIMALS

Among unicellular animals the Foraminifera and the Radiolaria may be given prominence. Being exceedingly rich in species, as well as individuals, they play an enormous part in the economy of the ocean, and their shells constitute an essential portion of the deposits on the ocean-floor.

The pelagic foraminifera have shells of carbonate of lime, usually divided into several chambers communicating with each other, allowing the protoplasm to penetrate the whole shell, which is perforated by innumerable small apertures (foramina), through which the finest threads of the protoplasm (the pseudopodia) may pass. In Chapter IV. p. 172, a list is given of all the species known to be pelagic, and certain important forms are figured. The list embraces eight genera and twenty-six species, fourteen of which belong to the genus *Globigerina*, also represented by an enormous number of individuals. During the

Foraminifera.

<sup>1</sup> A very useful review of the results of modern (especially German) investigations is given in Steuer's *Planktonkunde* (Leipzig and Berlin, 1910), with extensive lists of literature.