

of nutriment derived from the shore? These questions must be left to future research.

In Chapter VI. Gran has described the vertical distribution of pelagic plants. In the open Atlantic he found that the great majority of the plants occur in depths between 10 and 50 metres; at 75 metres the numbers decrease to about one-half, and at 100 metres to one-tenth, of the numbers found in the upper layers. The whole of the animal life in the oceans, 5000 or 6000 metres deep, thus mainly depends on the pelagic plants suspended in the uppermost 100 metres of water. The animals frequenting this upper layer feed partly on plants, partly on other animals, while in deeper water only animal food is available, besides the dead plants and animals sinking from the surface. Nutrition in the upper "plant"-region must therefore be different from that in the deeper layers.

Many animals of the plant-region are typical plant-eaters, and their bodies are organised for this purpose. This is especially the case as regards appendicularians and salpæ, the foremost part of their digestive tract, the so-called branchial sac, being provided with a grating of the finest and most delicate structure, retaining even the most minute plants (the coccolithophoridæ). Many of these minute plant-forms were indeed first discovered by examining the stomach-contents of salpæ (Stein, Sir John Murray, Lohmann), and during the Atlantic cruise of the "Michael Sars" Gran also collected salpæ in order to secure material for comparison with our tow-net captures of minute plants. The cœlenterates (medusæ, ctenophores, siphonophores) are well adapted to capture minute plants by the aid of their tentacles, and so are the unicellular animals (foraminifera and radiolaria) by the aid of their long thin plasm threads (pseudopodia). The most important of all plant-eaters are, however, the small crustaceans, particularly copepoda, which seem specially adapted for feeding on the microplankton of the ocean. Gran has examined the excrements of copepoda, which sink through the water in the shape of minute sausage-like lumps, and are very often taken in considerable quantities in the silk nets. All the soft parts have been digested, but the shells of the plants eaten, the calcareous shells of the coccolithophoridæ, the armour of peridineæ and the silicious shells of diatoms, can be identified. In the Norwegian Sea Gran observed that the copepoda were present in enormous numbers just below the layers containing a wealth of diatom plant-life, but nevertheless the excrements of these copepoda consisted of the frustules of the diatoms. The