

Vertical
distribution
of animals.

to try at the same time some vertical hauls with our *closing nets*. Accordingly, at Station 63 we made two series of hauls, one with a silk net 1 metre in diameter, and the other with the large 3-metre silk net (Fig. 89).

These experiments merely resulted in our capturing the species which occur most commonly,—a fresh proof that it is difficult to become acquainted with the fauna when only vertical hauls are made. A great many of the forms are too scarce to be caught by such means, and can only be taken by long-continued horizontal towing. In the case of the commonest species, however, these vertical hauls do give an indication of the vertical distribution as well as of the quantitative occurrence at different depths. It is advisable, therefore, to supply a few particulars of our experiments with the large net:—

Only 10 fishes were taken in a haul from 4500 metres up to 1500 metres, where we closed the net. All of them belonged to the species *Cyclothone microdon*.

In a haul from 1350 metres up to 450 metres we got 44 fishes; 27 specimens of *Cyclothone microdon*, 3 of *C. signata*, and 14 young fish (stomiatids and others).

In a haul from 500 metres up to 200 metres some small specimens of *Cyclothone signata* and a number of young fish were caught. From 200 metres to the surface there were only young fish.

This agrees with what we found when making horizontal hauls. The black *Cyclothone microdon* is only to be met with in deep water, where the light-coloured *C. signata* is absent, and *C. signata* occurs nearer the surface—from about 500 metres up to 200 metres—but has not been taken in depths less than 200 metres.

It is important to note how much fewer the individuals are in the deepest hauls. Though we drew the net through 3000 metres (from 4500 up to 1500 metres), we only caught 10 fishes, while in the 900 metres of water from 1350 metres up to 450 metres we got 44 individuals, 27 of them belonging to the same species as the 10 fishes from greater depths.

Similar conditions appear to prevail in the case of the red prawns, for in our deepest haul we caught only 11 large red prawns, but in the haul immediately above it there were 35 individuals. This seems to indicate that the deepest water-layers cannot at all compare in abundance of organisms with the intermediate layers.

At this station we also recorded a very large series of hydrographical observations, namely, twenty water-samples and