

of *Sphæroidina* retained the form of the pseudopodial tubulation of the shell as minute cylindrical projections from the surface. So far as the general fact of the presence of the animal sarcode in bottom-specimens of pelagic forms is concerned, these observations possess no novelty, but are simply confirmatory of the results set forth by many previous writers; indeed, the sarcode-contents of the shells of bottom-*Globigerinæ* were fully and accurately described by Wallich more than twenty years ago.

The distribution of the little northern species, *Globigerina pachyderma*, presents some features of interest bearing upon the matter in hand. This is a strongly marked form, and easily recognised. It is common in the Arctic Seas, generally occurring in company with small specimens of the typical *Globigerina bulloides*. In the Farøe Channel, as is well known, there exist, side by side, two sharply defined areas, of which the bottom temperature differs to the extent of 16° or 17° Fahr., though there is no material difference as to depth, and the temperature of the surface-water is practically uniform over the whole. On the cruise of the "Knight Errant" bottom-specimens of *Globigerina pachyderma* were dredged abundantly in the "cold area," and, more sparingly, at one Station in the "warm area." In the tow-net gatherings *Globigerina bulloides* was equally plentiful over the "cold" and "warm" areas; but neither there, nor hitherto in any other region, has *Globigerina pachyderma* been met with at the surface. It is also worth mentioning that occasional specimens of the latter species have been found in the Red Clay of the abyssal depths of the North Pacific and elsewhere.

In alluding to the comparative thickness of the shells of surface- and bottom-specimens, some reservation was made with respect to the *Orbulinæ*. As commonly taken in the tow-net, the calcareous investment of *Orbulina* is a globe of extreme tenuity and transparency, the exterior of which is usually provided with delicate spines, sometimes of great length, but more often relatively short. This outer test encloses a small, internal, polythalamous, *Globigerina*-like shell, which as a rule is also more or less spinous. Compared with these, bottom-specimens are stoutly built, and very variable amongst themselves in shell-texture and other particulars. Perhaps the most noteworthy structural feature of the latter is the way in which the shell is formed of a number of distinct layers, sometimes four or five separate shelly envelopes, one enclosed within the other, yet without any apparent adhesion of their walls. The majority of bottom-specimens, especially those of large size, contain no internal "Globigerine" shell.¹

To revert to the pelagic specimens. In a gathering taken with the tow-net sunk to 200 fathoms an *Orbulina* was met with, the shell of which measured nearly $\frac{1}{50}$ th inch (.046 mm.) in thickness; this was so exceptional that it attracted instant attention. I have

¹ Since these introductory paragraphs have been in type, I have received from my friend M. Schlumberger a copy of a note "Sur l'Orbulina universa, d'Orb." (dated 21st April 1884), in which the occurrence of specimens with and without the internal *Globigerina*-like shell is brought forward as an example of "dimorphism" (see p. viii.), the single-chambered shell being the homologue of the large initial segment of other Foraminifera. Is it possible that of the "pair," in this instance, one form normally inhabits the surface-water the other the bottom-ooze?