

That the chambers of the pelagic Foraminifera are more or less filled with sarcode when they reach the bottom is, I believe, generally admitted, indeed it seems impossible to gainsay the direct evidence of the fact obtained by a succession of competent observers. The question that remains therefore is simply whether the animal continues in a vitally active condition, or is only so much dead protoplasm awaiting decomposition. If it be the latter its preservation from rapid decay requires explanation, which may possibly be found, as suggested by Sir Wyville Thomson, in the low temperature of the sea-bottom.

It may be that no uniform rule applies in all cases. Of *Hastigerina* for example, though in some localities as plentiful at the surface as *Globigerina*, a bottom-specimen even approximately complete is rarely met with, and one that could be mistaken for the living organism never; whilst of *Candeina*, with a test equally thin and fragile, the bottom-specimens are for the most part not only perfect but larger and more fully developed than any hitherto collected at the surface. The fragmentary condition of the bottom-specimens of *Hastigerina* may, it is true, be owing to the spinous exterior of the shell, which renders it additionally liable to fracture; and the completeness of those of *Candeina*, on the other hand, to the extreme smoothness of the surface; but it appears to me to require more collateral evidence than we are yet in possession of to make such a theory quite feasible. Again, when we find specimens of allied forms like *Pulvinulina elegans* and *Pulvinulina menardii* side by side in the same bottom-ooze, the shells and shell-contents, so far as can be told, in exactly similar condition and with every appearance of life about them, it is hard to believe that those of the one species were all living when taken, and those of the other all dead.

In the case of the pelagic Foraminifera, the material placed in my hands for examination was only a small fraction of that actually collected by the naturalists of the Expedition; and some of the difficulties which have been dwelt upon did not present themselves in the same way to those who were in the habit of examining the freshly obtained organisms on shipboard. Mr. Murray, for example, attributes a wider distribution, a greater abundance and frequency of occurrence, and a greater variety in size and thickness of shell, to several pelagic species than I have been able to state from my own observations. The Challenger naturalists had also the opportunity which I have not had of comparing the various layers of bottom-mud obtained by means of the Baillie sounding-tube, and in many other ways had advantages which I have not enjoyed. For these reasons, therefore, I desire to avoid the expression of any very positive opinion on the subject. Questions relating to the geographical and bathymetrical distribution of the shells of pelagic Foraminifera are referred to in Prof. Dittmar's Report on the Composition of Ocean Water (Phys. Chem. Chall. Exped., pt. i. p. 221), and their further treatment may well be left for the forthcoming Narrative volumes and for Messrs. Murray and Renard's Report on Deep-Sea Deposits.