

these circumstances the conclusion seems obvious that the shell of *Orbulina* in its typical condition has no general aperture, in the sense in which that term is ordinarily employed.¹

With reference to the existence of a distinct series of larger pores it is interesting to note the collateral fact, that in certain other genera of Foraminifera, where a final segment of abnormal size is formed, such, for example, as the balloon-shaped chamber of *Cymbalopora bulloides*, or the inflated terminal segment of *Pulvinulina lateralis*, the ordinary aperture is more or less replaced by a number of exceptionally large perforations scattered over the face of the outermost chamber.

Thick-shelled bottom specimens of *Orbulina* frequently exhibit a curious lamination of the walls of the test, affording clear evidence that the increase in thickness has taken place not as a continuous deposit but by the formation of successive layers of calcareous matter. An illustration of this phenomenon is shown in Pl. LXXXI. fig. 26, which represents a shell formed of at least four concentric laminae. This structure is best seen in old and worn specimens, and it is quite possible, though the layers are well-defined and the enclosed spheres loose and easily separated, that the entire wall may have been compact and to all appearance homogeneous during the life of the animal; in other words, that the visible separation into laminae may be the first stage in the disintegration of the shell. There are, however, rare instances of living surface-specimens with a double shell-wall, and in one case a threefold shell has been observed; but in all these the calcareous laminae are of extreme tenuity, and bear little actual resemblance to the coats of the bottom-specimens.

As has been already stated (p. 607), bottom-specimens have occasionally been found, which, like those from surface gatherings, contain a polythalamous nucleus. These, however, are comparatively rare and of somewhat local distribution. In dredged specimens, as a rule, the cavity of the test is undivided and seldom contains any trace of an internal skeleton; if, therefore, the *Globigerina*-like inner shell is an invariable feature of the early stages of growth, which is by no means proved, it is probably absorbed during the process of thickening of the outer walls.

In bottom-ooze, in which *Orbulinae* abound, two-chambered shells are not unfrequently met with. They consist of the normal spherical test with an adherent supplementary chamber. Sometimes the added segment is larger than the original test, as in two of the figured specimens, Pl. LXXXI. fig. 20, and Pl. LXXXII. fig. 2; in other cases it is of about the same size, as shown in Pl. LXXXI. fig. 21. Such forms constitute the *Globigerina bilobata* of d'Orbigny. More rarely shells with two supplementary chambers present themselves, of which Pl. LXXXII. fig. 3 is an example. In all these cases the chambers have the true Orbuline character, and the test has nothing resembling a *Globigerine* aperture, indeed it seldom possesses any aperture at all. From a morpho-

¹ Shacko's recent observations entirely confirm this view (*op. cit.*), p. 433. On the other hand it is right to state that Wallich entertains the contrary opinion (*Deep-sea Researches on the Biology of Globigerina*, p. 74).