

genera is so widely different, and partly so insignificant, that they may belong to very different groups.

Arenaceous shells of cylindrical or urceolate form, with a simple mouth-opening at the distal end, occur in very different classes of the animal kingdom, viz.:—1. Foraminifera (Perforata as well as Imperforata); 2. Physemaria (*Prophysema*, *Gastrophysema*); 3. Spongiæ (Ammoconidæ); 4. Hydroida (*Atractylis*, *Perigonymus*, &c.); 5. Anthozoa (*Cerianthus*, &c.); 6. Rotatoria (*Melicerta*); 7. Gephyrea; 8. Annelida (Oligochæta and Polychæta); 9. Insecta (larvæ of Phryganidæ, &c.). In all these cases the determination of the group is difficult, or even impossible, when only the shell is known, and not the animal producing it. Sometimes the recognition of the shell is possible by comparison, or by means of secondary circumstances. But in other cases it is quite impossible.

The majority of the gigantic deep-sea Foraminifera described by Brady and others are Imperforata, and possess a solid arenaceous shell; these are therefore not sponges. But a number of arenaceous genera are Perforata, and there may be true sponges among them. It is possible (or even probable) that many arenaceous tubes regarded hitherto as Rhabdamminidæ are indeed Ammoconidæ. Brady himself rightly calls many of his Astrorhizidæ doubtful organisms, of which it is difficult to determine the zoological origin and position. Indeed, his *Sagenella* is so similar to our *Ammoconia*, his *Rhizammina* to our *Ammosolenia*, and his *Rhabdammina* to our *Ammolynthus*, that they may be easily confounded. If we assume that, in the well-known calcareous Asconidæ (*Calcolynthus*, *Leucosolenia*, *Auloplegma*), the calcareous spicules are replaced by xenophya (or by foreign skeletal bodies taken from the sea-bottom), we should have the Ammoconidæ figured in Pl. VIII.—*Ammolynthus* (figs. 1, 2), *Ammosolenia* (fig. 3), *Ammoconia* (figs. 4, 5).

*Ammoconidæ and Physemaria (Ammolynthus and Haliphysema).*—A new light is thrown by the Ammoconidæ upon those interesting primitive Metazoa which I described in 1876 as Physemaria (*Haliphysema* and *Gastrophysema*). I had observed two of these organisms in the Mediterranean in the living condition, and bearing eggs (*Haliphysema primordiale* in Corsica, 1875, and *Gastrophysema dithalamium* in Smyrna, 1873). The structures which I found in the walls of these remarkable animals are essentially the same as in the Ammoconidæ collected by the Challenger. The only important difference is that the thin wall of the tubular body is apparently solid and imperforate in the Physemaria, porous and perforate in the Ammoconidæ.

This difference may be explained in two ways. The body-wall of the Physemaria may be indeed imperforate, and in this case they retain the primordial position on the lowermost step of the Metazoa, which I had assigned to them, as "Gastræadæ of the present time." On the other hand, it may be that the body-wall is perforated by numerous microscopical pores, and that these were closed temporarily and accidentally during the