INTRODUCTION.

Methods of Examination.

Considering the peculiar organisation of the Deep-sea Keratosa, and the fact that some distinguished spongiologists had denied their sponge-nature, I was, of course, obliged to employ all possible methods of examination, in order to show their sponge-organisation as clearly as possible. A great number of microtomical sections through the different parts of the sponges were mounted, and stained with carmine, hæmatoxylin, methyl-green, and other colouring matters of modern histology. The sponges were besides examined in the dry and the wet state, in glycerine and Canada-balsam, treated with alkalies, mineral acids, &c. Employing these different methods, it has been possible to show conclusively the presence of a true sponge-skeleton in the majority of the Deep-sea Keratosa, as in the two families of the large-sized Stannomidæ and Spongelidæ (Pls. I.–VI.). The results of this examination were different in two other families, the Psamminidæ (Pl. VII.) and the Ammoconidæ (Pl. VIII.); these produce no sponge-skeleton, and are therefore, strictly speaking, not true Keratosa (in the proper sense of the term), but skeletonless Malthosa (or Myxospongiæ).

The most important part of the sponge-organism—as is well known—is the aquiferous canal-system with its characteristic dermal pores (Porifera). Special care, therefore, was taken to recognise its structure in the Deep-sea Keratosa as fully and exactly as possible. But, unfortunately, I was not able to accomplish this part of my task so satisfactorily as could be desired, for three reasons: first, the insufficient state of preservation; second, the enormous mass of xenophya or of foreign bodies, which makes up the greatest portion of all these sponges, covering and hiding the finer structures; third, the peculiar symbiosis with Hydroids, the reticular hydrorhiza of which traverses the whole body in the majority of the Deep-sea Keratosa.

The state of preservation, as well of the Deep-sea Keratosa themselves as of the symbiotic Hydroids connected with them, was in all the specimens of the Challenger collection very insufficient, though probably they were put in strong alcohol soon after capture. No doubt the principal cause of this is the sudden change of conditions (temperature, pressure, &c.) by which these delicate organisms are injured in the most