As regards the systematic arrangement of the class Verrill's[1] labours are to be specially noted. He has carefully distributed the numerous genera into well-defined and natural families, which he collects into the three suborders of Alcyonacea, Gorgonacea, and Pennatulacea. More recently von Koch[2] has published a classification of the Alcyonaria based on certain anatomical details, dividing them into nine families, by which he endeavours to show forth their natural affinities. Hickson[3] likewise with great ingenuity has based a system of classification on the presence or absence of a ciliated groove (siphonoglyphe) in the œsophagus of the polyps.

A natural classification of a group should no doubt be the record of its evolution, and should exhibit at a glance the stages through which the varied forms passed on their way to the attainment of their present positions. A very thorough knowledge of the life history of existing forms, and of the measure of their variableness, would be necessary ere the outlines of such a classification could be attempted, and for the filling in of the details one would require also a knowledge of extinct forms. Unfortunately for the perfection of such a scheme among the Alcyonaria there is no appeal to palæontology, the phenomena which are of most importance,—such as the structure and relations of the canal system, the structure and development of the individual polyp forms,—can never in fossil forms be known, owing to their being incapable of preservation in tables of stone.

We do not overlook the fact that in some cases the skeletal remains of forms such as those of the Favositidæ are to be met with, and that these, according to the convincing researches of Moseley, appear to be nearly related to the still living forms of the Helioporidæ, nor that the Syringopora are related to the Tubiporidæ, but these are but instances rather of extreme differentiation of type, branch endings that afford no clue to the peculiarities of the stem or root forms, presupposing generations of predecessors, whose nature will probably remain for ever unknown.

It follows therefore that there remains no other alternative but to trace out, as best can be done on the existing available material, the probable evolution of the types, but until much more is known as to the history of existing forms this cannot be done in an effective manner. Our first idea was to work out with this object in view the material collected by the Challenger, but it soon became apparent that some of it was not sufficiently well preserved for minute anatomical investigation, and that many important types living in shallow seas, as well as those from the Indian Ocean and the north-west coasts of America, were absent from this collection, so that we were forced to the conclusion that it would be premature to do more than present such an orderly arrangement of the group, as would for the present assist the student to a comprehension of the new forms described in our Report.

[1] A. E. Verrill, *Proc. Essex Inst.*, vol. iv. p. 145.
[2] G. v. Koch, *Mitth. Zool. Stat. Neapel*, Bd. iii. p. 537.
[3] S. J. Hickson, *Phil. Trans.*, vol. clxxiv. p. 603.