

greater number of wedges. This outer ring is separated from the inner foramen by an inner ring in which the reticular tissue is very close, as in *Spatagocystis*, *Cystechinus*, and *Pourtalesia* (Pl. XXXIX. figs. 28, 37), or in which it even fills the whole interior of the shaft, as in *Cystechinus* and *Urechinus* (Pl. XXXIX, figs. 28, 30), or is in the normal Spatangoids separated from the central foramen by an inner ring of more or less distinct wedges, the continuation of the larger ring, as in *Lovenia*, *Cionobrissus*, and *Hemiaster*. In some of the genera we find the reticular structure reduced to a minimum, as in *Echinocrepis* (Pl. XXXIX. fig. 32), and in *Periaster* (Pl. XXXIX. fig. 38). From the examination of a number of genera of Clypeastroids and of Spatangoids, there seems to be far less diversity in the structure of the spines in the genera of these two groups than we find in the Desmosticha.

CHARACTER OF SYSTEMATIC AFFINITY OF ALLIED GROUPS OF ECHINOIDEA.

In endeavouring to trace the affinities of the comparatively small number of fossil and living Echinids, it may perhaps be as well to state numerically what we are trying to do, and to show once for all how futile it must be to carry on the attempts which have become so fashionable of tracing the genealogy of this or that group of animals. Very few are so well known from their comparatively unbroken palæontological history as the Echinoidea and none are at the same time limited to so comparatively small a number of species, both fossil and recent. In order to limit the problem still more, we will take it for granted that we may neglect within each genus specific differences as not affecting the case, and take alone the fossil and recent genera, which we will assume to be for the present not more than 225, represented by 2000 fossil, and less than 300 recent species.

The genera of the present epoch—say 107, with 300 species—represent the possible combinations of but a small number of Echinoidea, taking into consideration the number of terms which are variable, which are (in a general way only, of course):—the apical system, the actinal system, the genital plates, the ocular plates and the anal plates, the coronal plates, the ambulacral and interambulacral areas, the poriferous zone, the primary, secondary, and miliary tubercles and their corresponding spines, the modifications of the poriferous zone near the apical and actinal systems, and on the test; the fascioles, the jaws, the alimentary canal, the position of the apical system, of the anal system, of the actinostome, and the modifications of the same. We will say twenty variables which may be, of course, combined in all possible ways one with the other, and which are capable in their most restricted limits of at least 2^{19} combinations; and when we remember that in the 225 genera which we have thus far recognised, we may imagine any one or all the twenty variables affecting the relationship of each of the genera, it seems somewhat hazardous, to say the least, to attempt anything beyond the broadest