

the Cretaceous and of the Tertiary forms, the following only:—*Stephanocidaris*, *Goniocidaris*, *Diadema*, *Centrostephanus*, *Echinothrix*, *Astropyga*, *Aspidodiadema*, *Micropyga*, *Colobocentrotus*, *Heterocentrotus*, *Parasalenia*, *Pseudoboletia*, *Echinostrephus*, *Pleurechinus*, *Microcyphus*, *Mespilia*, *Prionechinus*, *Evechinus*, *Peronella*, *Astriclypeus*, *Rotula*, *Neolampas*, *Anochanus*, *Palæotropus*, *Cionobrissus*, *Echinocrepis*, *Spatagocystis*, *Cystechinus*, *Argopatagus*, *Palæostoma*, *Tripylus*, *Faorina*.

From our study of the embryonic stages of the Echinidæ, the Clypeastridæ, and the Spatangidæ, and a comparison of these stages with the genera of the Desmosticha and Petalosticha which have either succeeded the genera above mentioned, or have lived with them during the Cretaceous period and have disappeared either during the Cretaceous or the Tertiary periods, we find no difficulty in tracing an unbroken systematic connection from the earliest Cretaceous beds to the present time. But this connection is so complicated, and ramifies in so many directions, that it must be hopeless, even with the small number of species of Echinids known, to attempt to do more than to indicate the lines of affinities, the delicate threads of which we can trace in characteristics of genera which at any special epoch seem to have little or no structural affinity. Let us take, for instance, the genera characteristic of the Chalk, and attempt to trace their connection both backwards and forwards in time.

Taking these genera in their most extended signification, and more especially those characteristic of the Lower Cretaceous formations, *Cidaris*, *Orthocidaris*, *Phyllacanthus*, *Tetracidaris*, *Goniopygus*, *Codiopsis*, *Magnosia*, *Cyphosoma*, *Pseudocidaris*, *Orthopsis*, *Pedinopsis*, *Codechinus*, *Stomechinus*, *Acrosalenia*, *Echinothuria*, *Pygaster*, *Discoidea*, *Holectypus*, *Pyrina*, *Clypeopygus*, *Pygurus*, *Metaporhinus*, *Holaster*, *Toxaster*, and comparing them in the first place with the genera of the Lias as far as they are known, we find that, with the exception of *Cidaris* and *Hypodiadema*, the forerunners of the Cidaridæ and Diadematiidæ, not a single form of the Echinidæ is represented.

To attempt to explain their relationship to the earlier types, we may say in a very general way that the Perischoechinidæ early show on the one side a tendency to limit the number of the rows of interambulacral plates; and on the other side a decided tendency to a splitting up of the ambulacral and interambulacral plates into numerous irregular rows; they are thus the only group leading directly to such types as *Cidaris* on the one side and to the Echinothuridæ on the other, the genera *Tetracidaris* and *Echinothuria* in the Chalk being the representatives of these two groups of Palæechinidæ; while the presence of such a type as *Hypodiadema* early in the Trias may, perhaps, represent the reduction of the number of coronal plates in some of the earlier Echinids, while retaining the uniform tuberculation so characteristic of the Palæechinidæ, and retaining at the same time the proportionally broader ambulacral areas of some of the types. From the time of the Trias the Cidaridæ have been a most persistent type, and the changes the members of the family have passed through are restricted to very narrow limits, with