

zone. The teeth are grooved as in the *Cidaridæ*. The face of the pyramid of the jaw is like that of the recent *Echinothuridæ*, remarkable for the length of the teeth compared to the height of the pyramid which is much less than is the case in the *Echinidæ*. The upper foramen of the pyramid is very small, the cheeks of the pyramids are deeply cut by a triangular pit which forms a narrow edge, the outer side of the pyramid, and a well-marked dividing wall with parallel edges between these two deep triangular depressions, a modification of the structure of the pyramid, which as yet has not been seen in any of the recent *Echinidæ*. See also Müller's figure of the pyramid (*Neue Echinod. d. Eifeler Kalk.*, pl. iii. fig. 12). From the drawings of Trautschold of *Archæocidaris rossica* the jaws of the genus resemble most closely those of *Cidaris*.

In the *Cystocidaridæ* of Zittel (*Echinocystites* of Wy. Thomson and Hall) the jaws are apparently very different from those of the *Perischoechinidæ*, but they are not sufficiently well known to compare them to those of other Echinoderms, though they would appear from the drawings of Thomson to approach somewhat the mouthpieces of the Starfishes and Ophiurans. The anal system of this group of Echinids is also excentric and not placed at the apex of the test, where the other plates of the apical system are placed,—a structural feature which was supposed to be characteristic only of the higher Echinoidea, the *Spatangoids* and *Clypeastroids*.

But by far the most embryonic of all Echinoidea, and the most interesting of the Palæozoic Sea-urchins, is the remarkable genus *Bothriocidaris*, in which, if the figures of Schmidt¹ are correct, there is absolutely nothing to distinguish the plates of the actinal or abactinal systems from those of the coronal plates proper in the ambulacral and interambulacral areas. The ambulacra extend unbroken to the very plates which constitute the edge of the actinal opening, and the interambulacral areas, which consist only of a single row of plates, to the last row of plates surrounding the actinostome; and at the abactinal pole the plates pass similarly without any change into the minute plates which must have made up the anal system. As in all young Echinids the test also is made up of a small number of coronal plates very uniform in size on both the ambulacral and interambulacral zones, and diminishing only slightly in size towards the actinal and abactinal systems.

It seems quite evident from the above, and from the examination of the species of *Phormosoma* and *Asthenosoma* collected by the Challenger, that the Palæechinidæ are far more closely allied to the recent Echinids than is usually supposed, and that we have in the recent *Echinothuridæ* structural features combining the characteristics of the normal *Desmosticha* and of the Palæechinidæ to such an extent that we are hardly justified in regarding the Palæechinidæ as a subdivision of the Echinoidea equivalent to that of the *Clypeastroids* or *Spatangoids*.

In the *Echinothuridæ* the pedicellariæ in their general character are allied to those of the *Diadematiidæ*, more specially to those of *Astropyga*. The long-headed long-stemmed

¹ Fr. Schmidt, *Neue Balt. Sil. Petref.*, Mem. Acad. St Petersburg., vii^e. Série, xxi., pl. iii.