the gills do not pass through cuts in the test so prominent in the Diadematidæ, but force their way through the membranous space between the coronal plates and the actinal membrane proper at the angle of the poriferous zone and interambulacral area.

The discovery of recent Echinothuridæ has naturally led to a renewed discussion of their affinities with the Palæechinidæ and other Palæozoic Echinids, and more particularly of the systematic relations of the Palæechinidæ to the Desmosticha. The relationship to the Cidaridæ and Echinothuridæ is certainly not very remote, as will be seen when we come to compare the apical and actinal systems of the Cidaridæ with those of the Palæechinidæ, and the structure of the primary tubercles of the actinal surface of the recent Echinothuridæ to the primary actinal plates of *Archæocidaris* and *Eocidaris*.

As far back as 1857 Müller[1] called attention to the imbricating plates of the test, not only of *Lepidocentrus* but also of *Archæocidaris*, and both Lovén[2] and myself called attention to the imbrication of the coronal plates of the Perischoechinidæ as a general character of the group. In 1874[3] I called attention to the fact that Müller's observation had escaped the attention of the American Palæontologists, to whom we owe the description of so many of the genera of this interesting group of Echinids. Later English writers[4] on the subject, who have, in consequence of the discovery of the recent genera *Asthenosoma* and *Phormosoma* with the imbricating coronal plates, taken up the question again, seem likewise to have completely overlooked what Müller had published on the subject.

There are in the collection of the Museum of Comparative Zoölogy a number of specimens of Palæechinidæ, which with the fine collection of Palæechinidæ from the Burlington limestone made by Mr Wachsmuth, which he has been kind enough to lend me for inspection, has enabled me to examine the greater number of the genera thus far described, and to satisfy myself, from personal examination, of the structure of the coronal plates of the Perischoechinidæ.

As has been pointed out by Etheridge[5] there are two very distinct types among the Palæechinidæ. Those in which, as in *Lepidesthes*, *Lepidechinus*, *Echinocystites*, *Lepidocentrus*, and the like, we have comparatively thin coronal plates imbricating like the tiles of a roof both towards the actinal and abactinal region as well as laterally, and those in which, as in *Oligoporus*, *Palæechinus*, and *Melonites*, the coronal plates are of great thickness and on which the plates abut by more or less bevelled edges, but still retain the same lateral and vertical (actinal or abactinal) direction. This division, of course, depends entirely upon the thickness of the plates of the test, and is not based upon important structural features, though the facies of such genera as *Oligoporus* and *Lepidesthes* would at the first

[1] J. Müller, Ueber neue Echinodermen des Eifeler Kalkes, Berlin, 1857; Abhand. d. Berlin Akad. für 1856.
[2] S. Lovén, Études sur les Echinoïdées.
[3] Revision of the Echini, part 4.
[4] J. Young, Geological Magazine, vol. x. p. 301, 1873; W. Keeping, Quar. Jour. Geol. Soc., vol. xxxii. p. 35, 1876.
[5] R. Etheridge, Jr., Quar. Jour. Geol. Soc., 1874, vol. xxx. p. 307.