

Goniocidaris tubaria (Pl. XL. figs. 1-25).*Cidarites tubaria*, Lamk., 1816, Anim. sans Vert.*Goniocidaris tubaria*,¹ Lützk., 1864, Bid. til Kund. om Ech.

A large number of specimens of all sizes were collected off Moncœur Island, Bass Straits. This has enabled me to examine the range of variation of the primary radioles of this species; the principal ones are figured on Plate XL. figs. 1-25.

From the sections of spines of *Cidaris* it is evident that the variations of the shape and of the size of the appendages is entirely due to the greater or less development of parts of the sheath of the radioles characteristic of the Cidaridæ. The differences in the shape of the radioles noticed on the same specimens of genera of *Cidaris*, of *Dorocidaris*, of *Porocidaris*, of *Phyllacanthus*, of *Goniocidaris*, &c., in fact, of all the recent genera of Cidaridæ, show the utter impossibility of distinguishing the species of this family by any differences in the shape of the primary radioles. The secondary ornamentation, such as the granules, their size and arrangement, is a far better guide, but the effect of this is apt to be greatly modified when we find it on a deeply fluted radiole, a flat fan-shaped or a highly serrated primary spine. The greatest caution must be exercised in using even this character, and the determination of species of *Cidaris* by palæontologists from fragments of radioles, or even from primary radioles, appears to be, judging from our knowledge of the recent types, of but little value. With the exception of the club-shaped radioles, such as *Cidaris dorsata* (Braun), *Cidaris ræmeri* (Wissm), from the Trias, *Cidaris glandifera* (Goldf.) and the like, from the Jura, and *Cidaris clavigera* (Kœn) from the Chalk, there are none of the many differently shaped radioles, probably belonging to Cidaridæ of the Jura or of the Chalk and Tertiary, which are not represented in species living in the seas of the present epoch. So that, as far as the Cidaridæ are concerned, we have, with the exceptions mentioned above which have disappeared, and with the exception of *Diplocidaris* and *Tetracidaris*, the same generic types now living which characterised first the Jurassic, then the Cretaceous, and finally the Tertiary seas.

From the fact that the Cidaridæ like other Echinids, in fact, like all Echinoderms, are gregarious, we ought to be exceedingly cautious in characterising a formation or a bed from the fossil Echinids of any special locality. No better instance of the negative character of such evidence could be given than the hauls made at different depths in regions not very remote geographically. The experience of all deep-sea dredging, and, in fact, of dredging even at moderate depths, seems conclusive. A few instances will suffice.

Thomson often brought up in the "Porcupine" immense numbers of *Echinus norvegicus*, *Cidaris papillata*, *Spatangus raschi*, and *Brissopsis lyrifera*.

¹ In the Revision of the Echini, I did not refer this to Lütken as I should have done, see Revis. Echini, pp. 77, 131, 213, 397.