

the abactinal system the primaries decrease in size and number, leaving the abactinal portion of the test covered by secondaries and miliaries for one-third the distance from the abactinal system to the ambitus. The arrangement of the tubercles is similar in the ambulacral system, the tubercles being, however, somewhat smaller. The primary spines are cylindrical, hollow, of uniform length (Pl. XI. fig. 1); those of the actinal system are capped with a gigantic, white, truncated conical hoof (Pl. XI. fig. 2). The spines of the secondary tubercles and of the miliaries are sharp, shorter, more slender, pointed, and tapering. The actinal system (Pl. XI. fig. 2) is thickly covered with short stouter spines, carried by the secondaries, and granules covering the plates of the actinal membrane (Pl. XII. fig. 4). The abactinal system is less well covered with spines (Pl. XI. fig. 3), the granulation of the anal system is quite uniform in size (Pl. XI. fig. 4), and the anal system is towards its outer edge covered by large irregularly-shaped plates, with slightly raised edges separating the plates of the genital ring; these plates carry no tubercles, only an indistinct granulation. The genital and ocular plates are fringed by an irregular row of miliaries (Pl. XI. fig. 4.)

In *Phormosoma*, viewed from the outside, and counting from the actinostome, the whole upper edge of the plates of the ambulacra pass under the lower edge of the succeeding plates, while in the interambulacral areas it is the lower edge which passes under the upper edge of the preceding plate (Pl. XII.^a figs. 11, 12).

Seen from the actinal side, the poriferous zone cannot well be traced through the mass of spines, and when denuded, is seen to extend very irregularly towards the actinostome (Pl. XII. fig. 4; Pl. XII.^a fig. 10).

As in *Phormosoma bursarium*, *Phormosoma placenta*, and other allied species, the depressed areolas of the large primary tubercles of the actinal surface form distinct projecting rings on the interior of the test (Pl. XII.^a fig. 11).

In alcohol the colour of the specimens of this species is dark violet, almost black both for the test and spines, and this formed a marked contrast to the white tips of the spines on the actinal surface.

The existence of primary spines tipped with hoofs as in the Arbaciadæ is an interesting structural feature connecting groups which thus far seemed somewhat isolated in their relationship to other Echinids. Thomson in the *Voyage of the Challenger* (vol. i.) figured these remarkable spines of the actinal surface of *Phormosoma hoplacantha* on p. 148, fig. 35, where he speaks of the wear of the base of the cones as if they had been in use for "vigorous locomotion" over the ground, as we know to be the case in one of the species of *Arbacia* of the eastern North American coast. In the Echinothuridæ the conical tip does not extend along the sides of the extremity of the spine, forming, as in the Arbaciadæ, a kind of cap; it is merely attached by a nearly horizontal base to the more flattened end of the spine. In consequence of this mode of attachment the tip is frequently lost.