

other. It seems to me that Lovén's attempt to fix the axis of the Echinoidea by means of the position of the plates round the actinostome must of necessity fail. It is at the actinostome that all the accumulated disturbances during the whole growth of the Sea-urchin concentrate. It is there that constant resorption and crowding is taking place, and while acknowledging the infinite skill with which Lovén has attacked the subject, many of his conclusions are not of as general application as would at first sight appear. If we examine in the simplest Echinids (the Cidaridæ and Salenidæ) the plates as they make their appearance around the apical system, we shall find no such general formula as has been so ingeniously framed for the actinostome. Taking, for instance, the pores at the actinostome according to Lovén's formula in a species of *Porocidaris* we get the usual formula I.a, II.a, III.b, IV.a, V.b, and we have for the interambulacral system a regular alternation of large and small plates, while at the abactinal system where the plates appear first we get—

1a, 2b, 3b, 4a, 5a, for the small plates ; and  
1b, 2a, 3a, 4b, 5b, ,, large ,,

In a younger specimen, on the other hand, the interambulacral plates alternate regularly, and we get—

1b, 2b, 3b, 4b, 5b, for the small plates,  
1a, 2a, 3a, 4a, 5a, ,, large ,,

Their order and formula depending upon the rate of growth of the smaller interambulacral plates, which is evidently a rate quite independent in the different interambulacra, and the formula will of course depend upon the particular stage of growth at which the urchin is examined. In two species of *Salenia* we find the same difficulty, Lovén's formula holding good for the actinostome ; as regards the ambulacra, we have the following formulæ different for the interambulacral plates when we take them as they appear round the apical system—

1b, 2b, 3a, 4a, 5b, for the small plates,  
1a, 2a, 3b, 4b, 5a, ,, large ,,

while in another stage of the same species we have the large and small plates regularly alternating—

1a, 2a, 3a, 4a, 5a, for the small plates; and  
1b, 2b, 3b, 4b, 5b, ,, large ,,

The same I found to be the case at the apex of *Salenia varispina*. It seems to me that those who have attempted to define the antero-posterior axis of the Echinids have failed from their not taking into account the embryological data. These, it is true, are scanty, yet they are sufficient to settle the question of the all importance of the madreporic body,