

enlarged to receive the fertile portions of the genital glands, no part of these appearing in the arms (Pl. Vc. figs. 7, 8, 10, *t*; Pl. VI. fig. 1); while they have no appendages of their own as the armlets have in *Extracrinus*.

The peculiar pinnule arrangement of *Hyocrinus* helps us to understand why there are no pinnules upon the axillaries of multiradiate Crinoids. These may be considered as ordinary pinnule-bearing joints, so modified that the pinnule and the continuation of the arm which bears it are equal in size or nearly so. As mentioned above, this is in fact the mode of formation of the pinnules at the growing points of the arms, as is well shown in a very young individual of *Pentacrinus decorus* (Pl. XXXV. fig. 1). The joint which bears the last formed pinnule is an axillary with two nearly equal distal faces; and the pinnule can only be distinguished from the continuation of the arm by the greater length of its component joints. Furthermore, in the short posterior arms of *Actinometra*, the only ones in which the normal mode of termination has been observed,¹ the last joint is an axillary which bears two pinnules of the ordinary character.

In *Rhizocrinus* (Pl. IX. figs. 4, 5) as in *Hyocrinus* (Pl. VI. figs. 1, 2) the pinnule-bearing joints have very much the appearance of axillaries with unequal distal faces; and a similar inequality is shown by the axillaries of *Extracrinus*, each of which bears an "armlet" on one face and the continuation of the main arm-trunk on the other.

Numerous instances of reparation after injury also indicate the close similarity of arms and pinnules. A very common one, sometimes to be met with in *Antedon rosacea*, is as follows:—The epizygal of the third brachial is broken away, carrying with it all the outer part of the arm, as well as the pinnule which it bears. But it is replaced by an axillary with two distal faces, from each of which an arm eventually grows out, one or other of them perhaps dividing again, as in the specimen of *Pentacrinus decorus* shown on Pl. XXXVI. On the other hand, in an abnormal individual of *Metacrinus angulatus*, the eighth distichal is not an axillary, as is usually the case. But it is somewhat swollen and has a slightly larger pinnule than the preceding joint, so that it resembles an axillary with unequal faces. In the specimen of *Actinometra strota* which is represented on Pl. LV. fig. 2, one of the second brachials of the right posterior ray bears two fully developed pinnules instead of an arm and its own proper pinnule, so that it looks like an axillary. There is no disk-ambulacrum corresponding to this undeveloped arm.

Considering therefore the fundamental identity of arms and pinnules, one would scarcely expect that an axillary joint which gives rise to two arms (often unequal in size) should bear a pinnule as well (see pp. 347, 358).

The pinnule arrangement of *Hyocrinus* is totally unlike that of any other Neocrinoid, although, according to Sir Wyville Thomson,² we have something very close to it in some species of the Palæozoic genera *Poteriocrinus* and *Cyathocrinus*. These names were probably employed by Sir Wyville in the wide sense, and not with the restricted meaning

¹ *Actinometra*, *loc. cit.*, p. 40, pl. ii. fig. 6.

² *Journ. Linn. Soc. Lond. (Zool.)*, vol. xiii., 1876, p. 52.