which they now possess. There are no true pinnules in *Cyathocrinus* proper, but only repeatedly branching arms, which must therefore have contained the genital glands; and each of the branches borne by one of the lower axillaries may fork again several times, so that they cannot be compared to the long, undivided pinnules of *Hyocrinus* (Pl. VI. figs. 1, 2). In *Poteriocrinus*, on the other hand, the successive arm-joints bear pinnules which are not specially different from those of Neocrinoids; while the mode of branching of the arms resembles that characteristic of *Pentacrinus mülleri*, and more especially of *Extracrinus*, the axillaries being generally limited to the outer arms of the ray, and having unequal distal faces.[1]

It is in the curious genus *Barycrinus*, which was separated from *Cyathocrinus* by Mr. Wachsmuth, that we find the nearest approach to the pinnule-arrangement of *Hyocrinus*. According to Wachsmuth and Springer[2] "all the main arms, instead of bifurcating, give off at regular intervals, alternately on opposite sides, and from the inner margins of the plates, short, rounded, simple armlets, which in most species throw off secondary branches as in *Botryocrinus*, and these armlets here as there, probably performed the office of pinnulæ." *Barycrinus hoveyi*, var *herculeus*, M. and W., is one of the exceptional species in which the armlets are simple and without secondary branches. The excellent figure of it which is given by Meek and Worthen[3] shows these armlets to come off alternately on opposite sides just as in *Hyocrinus*, but from every second joint, instead of from every third (Pl. VI. figs. 1, 2). They have unfortunately never been found in a perfect condition; and we cannot tell therefore whether they reached to the level of the top of the arms proper as in *Hyocrinus*, though Meek and Worthen's description seems to indicate that such is the case.

The difference between these armlets of *Barycrinus herculeus* and those of *Extracrinus* is that the former seem to bear no pinnules as the latter do, and must therefore have contained the genital glands; while they come off alternately from opposite sides of the main arm-trunk, and not from its inner one only as in *Extracrinus*.

We have seen that the pinnule of a Neocrinoid is practically a reduced copy of an arm, but modified by the great development of the fertile portion of the genital gland which it contains, that part of the gland which is confined to the arm being usually sterile and known as the "genital cord" or "rachis" (Pl. Vc. fig. 1; Pl. VIIIa. figs. 4, 5; Pl. LX. fig. 6—*gc*.).

Although it would seem improbable that the pinnules of Palæocrinoids are essentially different in nature from those of the Neocrinoids, Messrs. Wachsmuth and Springer have attempted to show that the small alternating plates covering the brachial ambulacra of *Cyathocrinus* are homologous with the pinnules of the Actinocrinidæ and Platycrinidæ. These are long, comparatively slender, and closely arranged side by side

[1] See p. 277.

[2] Revision, part i. p. 101.

[3] Palæontology of Illinois, vol. v. pl. xiii. fig. 2.