

possible to diagram these brachioles so as to suggest a uniserial origin, and this is true also of the so-called pinnules of *Caryocrinites*, the ossicle in contact with the lower brachial being regarded the first.

The pinnulars of *Caryocrinites* are long and narrow in a direction parallel to the length of the pinnule, and are arranged in alternating series, as already indicated. The covering plates are long and narrow in a direction transverse to the length of the pinnule, about three or four occurring in the length of one pinnular.

The arms of *Caryocrinites* apparently varied in length. In an individual having a theca 30 millimeters in height, the arm nearest the left side of the anal opening has a length of 55 millimeters, while the second arm anterior to the latter, but on the same side, evidently was considerably longer since the part remaining, lacking the tip, is 75 millimeters in length. Possibly the posterior arms were shorter than the anterior arms also in other specimens.

The number of arms attached to the same theca varies in number in different individuals. In the youngest specimens, of which two occur in the Springer collection, the facets for 3 arms are distinctly developed. In one of the largest specimens, 14 arms are present. These are arranged in three groups, the anterior and left posterior groups including 5 arms, while the right posterior group includes only 4 arms. This varies in different individuals.

The question arises how and where the additional arms arise. It is noticed that in addition to the facets supporting the arms, the theca presents also smaller depressions, apparently for the attachment of appendages.* Some of these depressions are traversed by a single median ridge placed in a radial direction, suggesting former articulation with some appendages. While no appendage actually ever has been found attached to these depressions it has been noticed that the order of appearance of these depressions is also the order of appearance of the additional arms, when a comparative study is made of the larger and smaller specimens of the same species. From this it is evident that these depressions are the points of emission of the additional arms.

Since similar depressions are present even in the largest specimens, and the position of these, of course, is never occupied by arms, it is possible that some of the later appendages were never strongly articulated with the theca, probably always remained comparatively small, and were specialized for the purpose of bearing the genital glands. Jaekel (*Thecoidea und Cystoidea*, 1899, p. 302, fig. 70) figures the relative position of the arm bases and of the smaller openings. Wachsmuth and Springer, (1881, *Revision of the Palaeocrinoidea*, Proc. Philadelphia Acad. Nat. Sci., vol. II, p. 51), long ago called attention to similar small depressions or pores at the sides of the arm facets of *Batocrinus*, and suggested respiratory purposes.

The area of attachment at the base of the column of *Caryocrinites*