

of crinoids were imagined to have been uniserial. However, in times preceding the advent of the actually known paleozoic crinoids, adjacent uniserial arms were supposed to have united laterally in pairs in such a manner as to give rise, first, to biserial arms, and, later, to pseudo-uniserial ones. According to this theory, the pinnules of the theoretical uniserial arms might be arranged in a single series along one side of the arm, while the pinnules of the pseudo-uniserial arms should occur in two series, successive pinnules being attached alternately to opposite sides of the series of arm ossicles. If the food-groove along the ventral surface of the crinoid arms be regarded as originating along the line of junction of the two imaginary primitive uniserial arms, this food-groove might be retained in pseudo-uniserial arms originating from biserial forms, but need not be present in the imaginary primitive uniserial arms.

The views favored by Clark, and the various possible deductions from them, are interesting. They would be more interesting if they found support in the probable phylogeny of fossil species. It must be conceded, however, that in the earliest known representatives of the crinoids, the primary radials and primibrachs of Clark already were united laterally so as to present an initial series of five, instead of ten arms, as demanded by Clark's theory, and all the arms bear food-grooves. Moreover, even the earliest known biserial arms are more or less uniserial at the base.

2. Uniserial arms and pinnules in *Comarocystites*.

In the absence of anything corresponding to the supposed primitive arm structure of crinoids, among known Crinoidea, it may be interesting to note that, among the Cystidea, the free arms of *Comarocystites* are uniserial (Plate III), do not bear a food-groove along the ventral side, and support pinnules arranged in a single row along the right side of the arm (the ventral surface being directed away from the observer, and the distal end of the arm being directed upward); moreover, the pinnules consist of a uniserial row of ossicles. In a similar manner the uniserial row of plates supporting the recumbent food-grooves of *Amygdalocystites* (Canadian Organic Remains, III, 1858, plate VI), also might be regarded as uniserial arms, bearing a single row of uniserial pinnules along the right side of each arm. It is probable that *Canadocystis* (Bulletin 80, N. Y. State Museum, 1905, pp. 273, 274), had an arm structure similar to that of *Amygdalocystites*. It must be admitted, however, that these forms are not normal cystids. The possession of uniserial pinnules in *Comarocystites* and *Amygdalocystites* is sufficient to indicate this. *Canadocystis* probably also had uniserial pinnules. However, none of these genera could have