

Family PENTACRINIDÆ, d'Orbigny, 1852.

Calyx small relatively to the stem and arms, composed of five basals and five radials, with under-basals in one genus. The rays divide from one to eight or ten times. The stem bears verticils of cirri at intervals. Two joints are united by syzygy at each node, to the upper one of which the cirri are articulated. The internodes are traversed by five ligamentous bundles which are interradially disposed and give rise to a more or less petaloid figure on the joint-faces. No root nor radicular cirri.

Remarks.—Although definitions of this family have already been given by d'Orbigny, de Loriol, and Zittel, they have been based almost entirely upon palæontological knowledge, and have not therefore given sufficient prominence to the syzygies between certain of the stem-joints, and to the ligamentous structures which produce the well known petaloid markings on their faces. The regular verticillate arrangement of the cirri along the whole length of the stem is especially characteristic of the Pentacrinidæ among the Neocrinoids, though there are a few Palæocrinoids, e.g., *Belemnocrinus florifer*, in which this peculiarity presents itself. But it does not necessarily follow that the nodal joints in the stems of these older forms are the epizygals of syzygies, as is the case in the Pentacrinidæ.

The same may be said of the so-called *Enerinus beyrichi*, in which Picard has described a verticillate arrangement of the cirri on the stem, without mentioning the presence of any syzygies at the nodes.¹

In *Apiocrinus* and *Bourgueticrinus* the upper part or even the whole of the stem is entirely free from cirri; and even when they do occur in verticils, it is only by two at a time instead of by fives, as in all the recent Pentacrinidæ except the one species *Pentacrinus alternicirrus* (Pl. XXV.; Pl. XXVII. figs. 1–3). Further, there is nothing like a syzygy between the two joints forming a node in a *Bourgueticrinus*-stem, which are articulated to one another in the usual way.

It is in fact the characters of the stem, much more than those of the calyx, which constitute the special distinctive mark of the Pentacrinidæ. For although *Extracrinus* is known by its under-basals, the composition of the calyx is identical in *Millericrinus* and *Pentacrinus*, and also in *Metacrinus*, if we follow strict morphology and consider the second radials as really arm-joints.

The calyx of *Balanocrinus* is unfortunately not yet known. The genus was founded by Agassiz for a fragment in the Basle Museum, which he supposed to be a peculiar form of calyx. But de Loriol² has shown that “ce prétendu calice n'est qu'un fragment de tige attaqué et déformé par un parasite.” Agassiz had, however, referred the stems associated with it to *Pentacrinus subteres*; and de Loriol, finding that the stem-joints of

¹ Ueber eine neue Crinoiden-Art aus dem Muschelkalk der Hainleite bei Sondershausen, *Zeitschr. d. deutsch. geol. Gesellsch.*, Jahrg. 1883, p. 201.

² Swiss Crinoids, p. 163.