

the relatively great proportion of length to width, whatever may be the shape of the full-grown joint. In some Comatulæ this condition is permanently retained, but in others and in the Pentacrinidæ the arm-joints of mature individuals are usually much wider than long. In accordance with this, we find that even in young individuals of *Pentacrinus decorus* with quite high radials and arms only 12 mm. long, consisting of about a dozen properly formed joints, the great relative width of the latter is already very distinctly indicated (Pl. XXXV.); while the last few joints are much smaller than their predecessors, and have rather the appearance of a pinnule than of the continuation of the arm, the preceding joint of which looks like an axillary bearing two small arm-stumps.

This mode of development is less marked in a somewhat older individual of *Pentacrinus decorus* with about forty arm-joints, the later ones of which gradually decrease in size instead of becoming abruptly smaller; and the imperfect state of development of the later pinnules which is so characteristic of the Pentacrinidæ is very well shown. This would seem to indicate that the mode of growth of the arm-bases proceeds on a different plan from that of their middle and outer portions. In still larger individuals, as in the youngest specimens of *Pentacrinus wyville-thomsoni* (Pl. XVIII. fig. 3), *Pentacrinus naresianus*¹ (Pl. XXXa. fig. 1), and *Metacrinus nodosus* (Pl. LI. fig. 1), the terminal arm-joints are distinctly longer than wide, although the lower ones have almost assumed their adult form; and in all of them, but especially in *Metacrinus nodosus*, there is the characteristic reduction in the size of the later pinnules. Nothing is to be learnt regarding the order of the pinnule-succession in the Pentacrinidæ from any of these young individuals; for the smallest of them are larger than some young Comatulæ already detached from the stem, but without pinnules on the arm-bases, and they all have their proper complement of pinnules. The stem-joints of the immature Pentacrinidæ, like the later joints of growing arms, are relatively high in proportion to their width. This is exactly the reverse condition to that of the young joints formed immediately beneath the calyx (Pl. XXXIV. fig. 9). The same distinction appears in the very different type of stem characteristic of the *Comatula*-larva and of the Bourgueticrinidæ (Pl. VII. fig. 11; Pl. VIIIa. fig. 1; Pl. LIII. figs. 7, 8). The young joints are at first discoidal, then lengthen out, and finally the width increases relatively to the length so as sometimes even to exceed it considerably. The two types of stem are so very different that it is perhaps a little rash to reason about the one on the basis of the other. The intercalation of new joints, which is so characteristic of the Pentacrinidæ, seems never to occur in the Bourgueticrinidæ, new joints being only formed beneath the calyx. In this last respect, however, the mode of growth in the youngest Pentacrinidæ with very slender stems appears to be very much what it is in the equally slender *Rhizocrinus* and *Bathycrinus*. But as the diameter of the stem increases to 3 or 4 millimetres the

¹ The arm-joints of this species are more like those of the Comatulæ than is the case in any other *Pentacrinus*. Instead of being nearly oblong, they have somewhat oblique ends, especially in the lower parts of the arms (Pls. XXVIII.-XXX.).