two syzygies, and thus consists of three parts, and so do all the succeeding joints; and each joint gives off a pinnule from its distal end, the pinnules arising from either side of the arm alternately." In this type, therefore, two-thirds of the arm-joints lose their individuality altogether. They bear no pinnules and take no part in the movements of the arms. In *Rhizocrinus* half the brachials are in the same condition; while more than half are devoid of pinnules, as the lowest pinnule-bearing joint is the sixth or sometimes even the eighth primitive brachial (Pl. IX.).

It is worth notice that the modes of arrangement of the arm-joints which are characteristic of *Hyocrinus* and *Rhizocrinus* respectively, are precisely paralleled by the condition of certain species of the Palæozoic *Heterocrinus*. Thus in *Heterocrinus constrictus*, Hall, the pinnules are borne alternately on opposite sides of the arm by every third joint; and I have little doubt, from the figures of the arms which are given both by Hall[1] and by Meek,[2] that each group of three joints is intersected by two syzygies just as in *Hyocrinus* (Pl. VI. fig. 1).

On the other hand, the alternation of syzygies and muscular joints, which is so characteristic of *Rhizocrinus*, also occurs in *Heterocrinus simplex*; and Meek's figures[3] show that the opposed syzygial surfaces were striated as in *Apiocrinus* and *Comatula*, and not plain as in *Pentacrinus* and *Rhizocrinus*.

It has been pointed out already[4] that the supposed syzygies in the arms of *Bathycrinus* (Pl. VII. fig. 2; Pl. VIII. figs. 1, 2; Pl. VIIIa. fig. 1) are really articulations of a peculiar type, though the fossæ and vertical ridge are barely visible in the outer parts of the arms, and would probably have escaped notice altogether, but for the very marked differences from ordinary syzygial surfaces which are presented by the apposed faces of the two outer radials, or of two of the paired lower brachials (Pl. VIIa. figs. 16, 19, 20, 22). Nevertheless, the proximal joint of a pair so united resembles the hypozygal of a syzygy in the non-development of its pinnule; and it might therefore be urged that every pair so united should be properly considered as a single joint, just as in the case of a syzygial pair which only bears a pinnule on the epizygal. It must be remembered, however, that the syzygial union is an immovable one, which is far from being the case with any articulation, whether bifascial or trifascial; and the reasons given above for retaining the individuality of the two outer radials and of the first two joints beyond any axillary, even when they are united by syzygy, apply equally well in the case of *Bathycrinus*. For the hypozygal joints of syzygial pairs are not the only ones which never bear pinnules. The lower joint of every pair forming a bifascial articulation is distinguished in the same way, *e.g.*, the first joints of the various arm-divisions in most Comatulæ, and the first brachials of *Pentacrinus naresianus* (Pl. XXXa. fig. 12*b*). The same is also true in the many-armed Pentacrinidæ, when there are many joints in an arm-division and the axillary is

[1] Twenty-fourth Annual Report on the New York State Museum of Natural History, Albany, 1872, pl. v. figs. 13, 14.
[2] Palæontology of Ohio, vol. i. pl. i. fig. 10. [3] *Ibid.*, pl. i. fig. 7. [4] *Ante*, pp. 8, 9.