primitively five or eight. Two instances in which *Pentacrinus* varies in the direction of *Metacrinus* have come under my notice. One is in *Pentacrinus müllcri* (Pl. XV. fig. 2). The second and third radials are articulated, but the latter is an axillary with a syzygy, so that there are primitively four radials. In the other case (*Pentacrinus decorus*) there are seven primitive joints in the ray. The first two above the primary radials are united by a bifascial articulation, while the axillary is a syzygy. I have elsewhere described two specimens of *Millericrinus pratti* in which there are four radials, in one case on two out of the five rays (Quart. Journ. Geol. Soc., vol. xxxviii. p. 35, pl. i. fig. 23). Similar variations occur among the Comatulæ. In one *Antedon* that I have examined, one of the rays consists of five joints, the axillary being a syzygy; while in individuals of two other species, the axillary rests directly upon its first radial, the second radial having remained undeveloped. When there are five radials in *Metacrinus*, as in *Metacrinus angulatus*, the third and fourth bear pinnules; but the second does not, for it is united by syzygy to the third, and has lost its individuality as a separate joint (Pl. XII. figs. 5–10; Pl. XXXIX. fig. 1). The radials of *Metacrinus angulatus*, therefore, are practically four in number, the second of which is a syzygy and bears a pinnule like the third.

In *Metacrinus nodosus*, on the other hand, there are primitively eight radials, but besides the syzygy between the second and third, there is another between the sixth and seventh; so that there are really only six joints, all of which except the first and last (axillary) bear pinnules, while the second and fourth have syzygies, and are as much single arm-joints as the third brachial or any other syzygial joint in the arm of *Antedon rosacea* (Pl. L. figs. 1, 6–16; Pl. LI. fig. 1).

In *Encrinus*, *Extracrinus*, and in most recent species of *Pentacrinus*, as also in a few Comatulæ (*Actinometra solaris*, *Actinometra typica*, &c.), the two outer radials and the first two joints beyond them are respectively united by syzygy. On the principle explained above, each pair would therefore be considered as forming a single joint, so that the true third brachial (itself a syzygial pair) would come to be the second. This would involve our describing these forms as having but two radials, the axillary with a syzygy, and syzygies both in the first and in the second brachials. I think, however, that this would be misleading, and make the difference between this type and that of *Antedon rosacea* and *Pentacrinus naresianus* appear much greater than it really is.

The presence of three radials is such an absolutely constant character in all the five-rayed Neocrinoids excepting *Metacrinus* and *Plicatocrinus*,[1] that the fact of the outer ones being united by syzygy and not articulated seems to me to be of minor importance; and I do not assign to it the same morphological value as the syzygial union of the third and fourth primitive brachials, in which the former loses its pinnule. No Crinoid with

[1] Zittel has described a six-rayed example of this genus, in which the first joint above the cup (called by him the first brachial) is axillary as in many Palæocrinoids (*Sitzungsb. d. II. Cl. k. baier. Akad. d. Wiss.*, 1882, Bd. i. p. 105).