

This would give the maximum number of arms as forty; but although the ten distichal axillaries may all be present, the palmar axillaries are frequently only developed on the two outermost of every set of four secondary arms, as in the unique specimen of *Pentacrinus maclearanus* (Pl. XVI.), and the individual of *Pentacrinus alternicirrus* shown in Pl. XXV. This would give six arms on each ray, making thirty in all. Sometimes, however, there are no palmars at all, or only one or two series of them (Pl. XVIII. fig. 2; Pl. XIX. figs. 1, 6, 7), so that the number of arms varies between twenty and thirty.

The ray-divisions of *Pentacrinus decorus* present almost as much variation as the basals do. Some young specimens have only one or two distichal series (Pl. XXXV.); while one individual has but ten arms like *Pentacrinus naresianus*. In others, again, the arms are more numerous, though palmars are rare (Pl. XXXVI. fig. 1). I am inclined to suspect, from an examination of several young specimens, that the many-armed condition is to some extent a secondary one. Thus if none of the arms were broken and subsequently repaired, the original of Pl. XXXV. fig. 1 would have grown up with no more than eleven arms. When, however, an arm is broken off at a syzygy, and a new one developed in its place, an axillary is nearly always formed in this new one sooner or later, whether there were one present on the original arm or not. An instance of this kind is shown in Pl. XXXVI. fig. 2; and it is not uncommon to meet with individuals of ten-armed species of *Comatula* which have replaced some of their arms after fracture and have developed axillaries in the reparation, so that the number of arms may reach eleven or twelve. This increase in the number of arms after reparation seems to take place largely in *Pentacrinus decorus*; for it is rare to meet with a specimen which does not show these signs of reparation, certain axillaries and the arms which they bear being distinctly smaller than their fellows.

In *Pentacrinus asterius* and *Pentacrinus mülleri* there are always twenty arms or more, all the primary arms ending in distichal axillaries. Most of the secondary arms bear palmar axillaries, and there are sometimes even one or two more beyond these, so that the rays may divide five times in all. There is no special regularity of division in *Pentacrinus asterius*, though the number of arms is large, exceeding one hundred, according to Sir Wyville Thomson.<sup>1</sup> But in *Pentacrinus mülleri* there are usually not more than four ray-divisions, the (palmar) axillaries being limited to the outer arms as in *Pentacrinus maclearanus* and *Pentacrinus alternicirrus*; while the fourth and fifth axillaries, if present, occupy a similar position, so that there are six, eight, or ten arms to the ray, as 2, 1; 1, 2—2, 1, 1; 1, 1, 2—or 2, 1, 1, 1; 1, 1, 1, 2.

The arms of *Metacrinus* branch as a rule more freely than those of *Pentacrinus*, except *Pentacrinus asterius*, all of the species having two, and most of them four axillaries beyond the radials; but there is no special regularity about the grouping of the arm-divisions.

<sup>1</sup> Sea Lilies, *The Intellectual Observer*, August 1864, p. 5.