

dual figured by Sars<sup>1</sup> they occur on the lowest thirty-three joints of a stem with fifty-nine joints altogether. In another case five out of eighteen joints are cirriferous; while the individual represented in Pl. IX. fig. 1 has only nine cirriferous joints in a stem of over forty. A similar variation occurs in *Rhizocrinus rawsoni*. Every joint in the lowest part of the stem may bear cirri at one or both ends of the long axis of its upper face. But I have in no case found more than fifteen joints in this condition, and they are sometimes not consecutive, a cirrus-less joint being occasionally interposed between two others which bear cirri (Pl. X. fig. 15). On the other hand, in the only individual with a complete stem which was obtained by the Challenger, and also in the young specimens dredged by the "Porcupine," there are no radicular cirri at all, but only a spreading root formed by subdivision of the main axis of the stem (Pl. LIII. fig. 7); and this appears to be a constant condition in *Bathycrinus* (Pl. VII. figs. 1, 9; Pl. VIIIa. fig. 3).

Below the last of the regular and dice-box shaped joints, which may or may not bear cirri, there come one or more others of irregular shape and variable size. Spreading rootlets proceed outwards from these, as a rule more abundantly in *Rhizocrinus* than in *Bathycrinus*. In *Rhizocrinus lofotensis* this inferior joint usually bears several slender root filaments disposed around a central one; while one or two stronger and branching rootlets sometimes come off between it and the regular stem-joints. This is more especially the case in *Rhizocrinus rawsoni*; but in *Bathycrinus* the inferior joint, or "root-joint" as it has been called, is quite short, and gives off two or rarely three chief roots, which themselves subdivide into smaller ones (Pl. VII. figs. 1, 9; Pl. VIIIa. fig. 3).

Both these rootlets of the stem-axis itself and the radicular cirri are composed of a series of gradually diminishing joints closely united by ligaments. They attach themselves to foreign bodies by calcareous expansions round their ends or beneath the sides on which they happen to rest (Pl. IX. fig. 1; Pl. X. fig. 15). Anything serves for this purpose which may improve the anchorage of the Crinoid in the soft mud, which is nearly universal at great depths, *e.g.*, fragments of shell, grains of sand, sponge-spicules, foraminiferal tests, &c. Hence, whatever be the case in the Pentacrinidæ, *Rhizocrinus* and *Bathycrinus* must remain permanently fixed in one place throughout life.

In a specimen of *Rhizocrinus rawsoni* which was dredged by the "Travailleur," and was described as a new genus *Democrinus* by Perrier,<sup>2</sup> the diameter of the stem is lessened at the origin of two groups of rootlets, and regains its former size lower down. Perrier suggests the question "si la partie qui se prolonge au delà des racines n'est pas destinée à devenir un second pédoncule surmonté d'un second calice. Si cette induction se vérifie, les *Democrinus* constitueront le premier exemple actuel d'Échinodermes vivant en

<sup>1</sup> *Op. cit.*, tab. i. fig. 1.

<sup>2</sup> Sur un nouveau Crinoïde fixé, le *Democrinus* Parfaiti, provenant des dragages du "Travailleur," *Comptes rendus*, t. xcvi., No. 7, pp. 450, 451: