

anambulacral plates of recent Crinoids (Pl. XVII. fig. 6 ; Pl. LV.). They pass downwards into the interradians at the sides of the calyx, just as in the recent species and in the Liassic *Extracrinus*.

Wachsmuth stated in 1877<sup>1</sup> that although he had not found the summit of any Ichthyocrinoid perfectly preserved, he felt convinced from what he had observed "that it did not consist of a soft skin." Subsequently, however, he described the ventral disk of the Ichthyocrinidæ<sup>2</sup> as "rarely preserved; composed of a more or less soft or scaly integument, yielding to motion in the body and arms. . . . The interradian areas are sometimes found depressed and in other cases distended, showing that there had been some expansion or contraction of the body-walls due to the mobility of the radial parts, and indicating likewise flexibility in the vault."

Under these circumstances I find it difficult to believe that the ventral disk of the Ichthyocrinidæ did not correspond to the similarly named structure in recent Crinoids, but represents the solid vault of *Actinocrinus*. Were this the case, there must have been another flexible skin inside the "pliant scaly integument," with the food-grooves passing over its upper surface as they do over that of an internal cast of *Actinocrinus*. It is of course impossible that a proof of the existence of such a structure can ever be obtained. But why should its existence be postulated at all, simply because *Ichthyocrinus* is a Palæocrinoid?

According to Wachsmuth and Springer "this family might very appropriately be called the Articulates of the Palæozoic Crinoids, being especially distinguished in most of its species by what seems to be an articulate structure in the whole skeleton."<sup>3</sup> I cannot but believe that they present a similar approximation to Neocrinoids in the structure of their vault, ventral disk, or whatever else it be called.

Any Crinoid with a well-plated disk (Pl. XIII. fig. 1 ; Pl. XVII. fig. 6 ; Pl. XXVI. figs. 1, 2 ; Pl. L. figs. 1, 2 ; Pl. LV.) appears to me to be a recent *Onychocrinus*. If the summit of this genus was soft, pliant, and flexible, it must have consisted like the ventral disk of a *Pentacrinus* of a perisome formed of connective tissue, with the numerous irregular interradian plates imbedded in it ; and I cannot bring myself to believe that the flexible summit was really the "tegmen" overlying another disk, which itself represented the plated ventral perisome of *Pentacrinus*. It is admittedly a direct continuation of the "squamous integument" uniting the rays on the dorsal side. This is "composed of very minute irregular polygonal plates, or by distinct interradian and axillary plates, the former varying in number from one to thirty or more."<sup>4</sup>

Thus *Onychocrinus* has a large first interradian which rests between the first and second radials. "The succeeding ones are smaller, decrease rapidly in size and thickness, and pass gradually into the very minute irregular plates which form the interradian

<sup>1</sup> *Amer. Journ. Sci. and Arts*, vol. xiv. p. 185

<sup>3</sup> *Ibid.*, part i. p. 31.

<sup>2</sup> *Revision*, part i. p. 31.

<sup>4</sup> *Ibid.*, part i. p. 31.