a lily of the Lilium Martagon type, in which each petal is curved upon itself, the pinnules of the arms spreading laterally more and more as the crown is more fully open. . . . When disturbed, the pinnules of the arms first contract, the arms straighten themselves out, and the whole gradually and slowly closes up."[1]

Taking all these facts into consideration, I cannot but feel that a homology is of no real value when it is based upon the physiological condition of the arm-grooves in the dead animal, and still more in the fossil forms, closed up as they are in every possible way, especially when this condition is one which the living animal only assumes when disturbed, and cannot long maintain without the risk of being both starved and suffocated. The whole point of Wachsmuth and Springer's argument, however, is based upon this closure of the arm-grooves by pinnules and covering plates respectively; and they attempt to support the proposed homology by certain morphological considerations, which must now be discussed.

On each side of the brachial ambulacra of *Cyathocrinus iowensis* there are, according to Wachsmuth,[2] two rows of minute alternating plates, six to each arm-joint. A similar structure is shown in one of Angelin's figures of an arm-fragment of *Gissocrinus punctuosus*,[3] though in another figure only one row of plates is visible at the side of the ambulacrum instead of two, while the explanation of the figures simply says, "Digiti cum pinnulis magnitudine aucta." A somewhat different structure appears in *Cyathocrinus longimanus* figured on the preceding plate.[4] In this species, according to Wachsmuth and Springer,[5] "there are in place of only two, a series of five successive plates from each side, alternately arranged. The plates of each side taper toward the end and enfold over the furrow, covering it as perfectly and in the same manner as in the two former cases (*i.e.*, *Cyathocrinus iowensis* and *Gissocrinus punctuosus*). Angelin gives no description, but in his table of contents he calls the successive plates 'pinnulæ.'" Although, however, Angelin may have used the word "pinnulæ" for these lateral plates, I doubt how far he meant to imply any correspondence with the true pinnules of *Actinocrinus* and *Platycrinus* and other types in which they occur. For in his definition of *Crotalocrinus* he gives the same name to the lateral processes of the arms by which they are united into the well-known complex network; and he then continues, "Perisoma ventrale totum assulis variantibus tectum; assulæ ambulacrales minutæ, biseriatæ ab imis brachiis usque ad extremos digitos radiatim exeunt, quarumque numerus prout digitorum numerus magis magisque per repetitam dichotomiam increscit."[6] The magnificent figure which he gives of the ventral surface of an expanded *Crotalocrinus pulcher*[7] shows that the minute ambulacral plates on the arms are identical with the covering

[1] Quoted by Pourtalès, On a New Species of *Rhizocrinus* from Barbadoes, *Mem. Mus. Comp. Zoöl.*, vol. iv., No. 8, p. 29.

[2] *Amer. Journ. Sci.*, vol. xiv. p. 121.

[3] Iconographia Crinoideorum, Tab. xxvii. fig. 1*f*.

[4] *Ibid.*, Tab. xxvi. figs. 4, 5.

[5] Revision, part i. pp. 24, 25.

[6] Iconographia Crinoideorum, p. 26.

[7] *Ibid.* Tab. viii. fig. 6; see also Tab. xxv. figs. 15, 17.