

THE CRINOID GENUS *COMATULA* LAMARCK; WITH A
NOTE ON THE ENCRINUS PARRÆ OF GUERIN.

BY AUSTIN HOBART CLARK,

Assistant, Bureau of Fisheries.

In a previous paper^a I published a preliminary notice of a revision of the unstalked crinoids, paying particular attention to the group called collectively "*Antedon*" by Dr. P. H. Carpenter. I had not at the time been able to arrive at a satisfactory conclusion in regard to the genus *Comatula* (= *Actinometra* P. H. Carpenter), but I have since taken up the question again and, after reexamining my old material, and studying a very considerable amount of new, have succeeded in resolving *Comatula* into two apparently homogeneous component types. My study was based, so far as possible, upon ten-armed specimens, and I have paid particular attention to the young whenever I have been able to get them.

The authorities of the U. S. National Museum have, as in the past, most generously placed at my disposal their entire collection of recent crinoids, and it is on this collection that my studies have been mainly based.

I wish further to express my deep appreciation of the kindness and generosity of Mr. Alexander Agassiz, who has permitted me to make use of his magnificent collection of recent crinoids, which contains many species which otherwise would have been inaccessible to me, including a considerable number of undescribed forms. I am also greatly indebted to Prof. Hubert Lyman Clark, of Harvard University, and to Prof. A. E. Verrill, of Yale, for many courtesies received during my visits to those institutions. Professor Clark especially, through his minute and exhaustive knowledge of the other Echinoderm groups, has suggested to me many interesting points in the morphological as well as the anatomical and systematic relations of the species upon which to work in the future.

^a *Smiths. Misc. Coll.* (Quarterly Issue), L, pp. 343-364.

Doctor Carpenter, in his report on the "Comatula" of the *Challenger* expedition, divided *Comatula* (= *Actinometra*) as follows:

- SERIES I: the two outer radials and the first two brachials united by syzygy:
 Ten arms-----*Solaris* group.
 Two distichals united by syzygy-----*Paucicirra* group.
 Three distichals, the axillary a syzygy-----*Typica* group.
- SERIES II: the two outer radials articulated: Ten arms-----*Echinoptera* group.
- SERIES III: two articulated distichals:
 Palmars and post-palmars like distichals; but first two brachials united
 by syzygy-----*Stelligera* group.
 First arm-syzygy in the third brachial-----*Valida* group.
- SERIES IV: three distichals, the first two articulated, and the third axillary
 with a syzygy.
 First arm-syzygy in the second brachial-----*Fimbriata* group.
 First arm-syzygy in the third brachial-----*Parvicirra* group.

This arrangement of the species was merely intended as a convenient guide to their identification, and nothing more was claimed for it. Its artificial character may be judged from a single species, the *Alecto parvicirra* of Johannes Müller 1841 (= *Actinometra parvicirra* of Carpenter), the type species of Carpenter's last group. This species is not infrequently ten-armed, therefore falling in the "*Echinoptera* group;" again, it may have all the distichal series of two articulated segments, the first arm-syzygy falling in the "third brachial," in which case it belongs with the "*Valida* group" according to Carpenter's scheme; yet the species is made the type of a third group, the "*Parvicirra* group." The groups themselves, contrary to what was the case in the various "groups" and "series" of "*Antedon*," are, with a single curious exception, the "*Typica* group," fairly homogeneous. Carpenter gives four species as belonging to this group, *distincta*, *typica*, *novæ-guinææ*, and *multibrachiata*, and a fifth, *gracilis*, has since been described. In *distincta* and *multibrachiata*, the costals are united by syzygy; according to the descriptions of these species, the distichals are 4 (3+4), and the palmars 2 (1+2); but on Plate LV and Plate LV1 quite a different arrangement is found: while the palmars are 2 (1+2), the distichals are 4 (1+2; 3+4); in other words the distichals, instead of being "three, the axillary a syzygy" are *four, united in two syzygial pairs*. This simplifies matters considerably, as will be seen further on. Now, in *typica* and *gracilis*, and in *novæ-guinææ* as well as I can judge from the figure, the costals and first two distichals are *not* united by syzygy; while the union is very close, it is of the same type as that between the costals in such species as Carpenter's *Actinometra robustipinna* and Müller's *Alecto parvicirra* and *Alecto trichoptera*. We find, then, that three of the five species of the "*Typica* group," including *typica* itself, fall in "Series IV," while the other two do not belong in Carpenter's scheme at all.

The genus *Comatula* falls naturally into two divisions, species in which the costals are united by syzygy, and species in which the costals are articulated. Each of these divisions is a homogeneous unit, which can not, with our present knowledge of the species, be advantageously subdivided. For the first division the name *Comatula* (type *Comatula solaris* Lamarck) is available. Two generic names, *Comaster* L. Agassiz, 1836, and *Phanogenia* Lovén, 1866, have been based on species of the second group, of which *Comaster* (with the type, *Comatula multiradiata* Lamarck = *Asterias multiradiata* Linnaeus, not *Comatula multiradiata* Goldfuss [= *Alecto nova-guinea* Müller] as has been stated by various authors, following Müller), being the earlier, will have to be used.

COMATULA Lamarck, 1816.

A genus of Comatulidæ (= Actinometridæ) in which the costals are united by syzygy, the distichals are 2 (1+2) or 4 (1+2; 3+4), and the palmars 2 (1+2).

Type of the genus.—*Comatula solaris* Lamarck, 1816.

Distribution.—Australia northward, throughout the East Indies, to Japan. ? Madagascar. ? Society Islands.

The known species belonging to this genus as here restricted are:

<i>Comatula distincta</i> (P. H. Carpenter).	<i>Comatula paucicirra</i> (Bell).
<i>Comatula multibrachiata</i> (P. H. Carpenter).	<i>Comatula pectinata</i> (Linnaeus).
	<i>Comatula serrata</i> A. H. Clark.
<i>Comatula notata</i> (P. H. Carpenter).	<i>Comatula solaris</i> Lamarck.

COMASTER L. Agassiz, 1836.

A genus of Comatulidæ in which the costals are united by bifascial articulation, the distichals being 2 or 4 (3+4) or both, rarely irregular.

Type of the genus.—*Asterias multiradiata* Linnaeus, 1758, and of Retzius, 1783 (not *Asterias multiradiata* Gray, 1840 = type of the genus *Heliaster*).

Distribution.—Intertropical; north to the Bay of Biscay, South Carolina, southern Japan, and Korea, south to southern Brazil, Peru, Australia, and the Cape of Good Hope; the headquarters are in the East Indian region.

The described species of the genus are as follows. In addition to these I have examined a number of others, mainly from the West Indies:

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| <p>(1) <i>Comaster alata</i> (Pourtalès).
 <i>Comaster alternans</i> (P. H. Carpenter).
 <i>Comaster belli</i> (P. H. Carpenter).
 <i>Comaster bennetti</i> (J. Müller).
 <i>Comaster bornensis</i> (Grube).
 <i>Comaster briareus</i> (Bell).
 (2) <i>Comaster carpenteri</i> A. H. Clark.
 <i>Comaster coppingeri</i> (Bell).
 <i>Comaster discoides</i> (P. H. Carpenter).
 <i>Comaster divaricata</i> (P. H. Carpenter).
 <i>Comaster duplex</i> (P. H. Carpenter).
 <i>Comaster echinoptera</i> (J. Müller).
 <i>Comaster elongata</i> (P. H. Carpenter).
 <i>Comaster fimbriata</i> (Lamarek).
 <i>Comaster gracilis</i> (Hartlaub).
 <i>Comaster grandicalyx</i> (P. H. Carpenter).
 <i>Comaster iowensis</i> (Springer).
 <i>Comaster lineata</i> (P. H. Carpenter).
 <i>Comaster japonica</i> (J. Müller).
 <i>Comaster littoralis</i> (P. H. Carpenter).</p> | <p><i>Comaster macrobrachius</i> (Hartlaub).
 <i>Comaster maculata</i> (P. H. Carpenter).
 <i>Comaster magnifica</i> (P. H. Carpenter).
 <i>Comaster marii</i> (A. H. Clark).
 <i>Comaster meridionalis</i> (Agassiz and Agassiz).
 <i>Comaster multiradiata</i> (Linnæus).
 <i>Comaster nobilis</i> (P. H. Carpenter).
 <i>Comaster nova-guinæa</i> (J. Müller).
 <i>Comaster orientalis</i> (A. H. Clark).
 <i>Comaster parvicirra</i> (J. Müller).
 <i>Comaster peronii</i> (P. H. Carpenter).
 <i>Comaster quadrata</i> (P. H. Carpenter).
 <i>Comaster regalis</i> (P. H. Carpenter).
 <i>Comaster robustipinna</i> (P. H. Carpenter).
 <i>Comaster rotalaria</i> (Lamarek).
 <i>Comaster rubiginosa</i> (Pourtalès).
 <i>Comaster schlegelii</i> (P. H. Carpenter).
 <i>Comaster sentosa</i> (P. H. Carpenter).
 <i>Comaster solaster</i> (A. H. Clark).
 <i>Comaster stelligera</i> (P. H. Carpenter).
 <i>Comaster trichoptera</i> (J. Müller).
 <i>Comaster typica</i> (Lovén).
 <i>Comaster valida</i> (P. H. Carpenter).
 <i>Comaster variabilis</i> (Bell).</p> |
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1. COMASTER ALATA (Pourtalès).

"*Actinometra pulchella* (Pourtalès)" was invariably used by Doctor Carpenter for the species which had previously been named *alata* by Portalès, because he considered the name more appropriate, and subsequent authors have persisted in following him. Not only is *Antedon pulchella* of Portalès^a preceded by *Antedon alata* of the same author^b for the same species, but *Antedon pulchella* Portalès, 1878, is preoccupied by *Ganymeda* (= *Antedon*) *pulchella* Gray, 1834.^c

2. COMASTER CARPENTERI, new name.

Doctor Carpenter in 1888^d described a species of *Comaster* as *Actinometra multifida*, referring the name to Johannes Müller; but Müller, according to his own statement,^e proposed the name *multifida*

^a Bull. Mus. Comp. Zool., V, No. 9, p. 216.

^b Idem., p. 215.

^c Proc. Zool. Soc. London, 1834, Pt. 2, No. 14, p. 15.

^d Challenger Reports, XXVI, Zoology, p. 330.

^e Archiv für Naturgesch., 1841, I, p. 147.

merely as a substitute for Lamarek's *multiradiata*. His idea was that, two quite different species having been called *multiradiata*—one by Lamarek^a and one by Goldfuss,^b but Lamarek's description being quite worthless, whereas Goldfuss's is accompanied by an excellent figure—the name should hold for the form with the recognizable diagnosis, so he restricted it to Goldfuss's form. Subsequently he examined Lamarek's original types, and from them drew up his diagnosis of *multifida*. Now, thanks to Doctor Carpenter's investigations, we know what Lamarek's *multiradiata* really is, and (as it is the same as the Linnaean and Retzian *Asterias multiradiata*) of course the specific name *multiradiata* must be retained for it. Doctor Carpenter realized this, but he resurrected *multifida* for a specimen which was among Lamarek's types, and differed both from the *multiradiata* of Lamarek and the *multiradiata* of Goldfuss; but *multifida* is a pure synonym of *multiradiata* Lamarek and can not be used for any other species. The form may be renamed *Comaster carpenteri*.

ISOCRINUS PARRÆ (Guérin).

In his monograph on the recent stalked crinoids, Doctor Carpenter makes no mention of the species described as *Enerinus parra* by Guérin in 1835.^c Guérin, under the heading *Enerinus*, speaks of the "*Enerinus caput-medusæ*" described by Guettard and by Ellis (= *Isis asteria* Linnaeus), and then goes on to say that the "Palma animal" described and figured by Parra in 1787^d appears to represent another species. He describes this species in detail under the name of *Enerinus parra*, taking his description from Parra, and he also reproduces Parra's plate. Except for the fact that the animal is represented as growing on the seashore like a palm tree, the reproduction is very good. Doctor Carpenter mentions the reference to Parra in his account of *Isocrinus asteria*, but says he was unable to consult it. Besides Guérin, Oken in 1815 and again in 1835 copied Parra's figure, and Gervais refers to *Enerinus parra*, and it seems as if one of the four must have been accessible to Doctor Carpenter. A glance at Parra's figure shows that the species he had was the same one which was described by Örsted in 1856^e as *Pentacrinus mülleri*; the short internodes (four to six) and consequent crowding of the cirri, combined with the stout stem, preclude the possibility of its being any other West Indian species. There can, therefore, be but

^a Hist. Nat. des Animaux sans Vertèbres, II, 1816, p. 533.

^b Petrefacta Germaniæ, I, p. 202, pl. LXI, figs. 2a–8.

^c Dict. d'Hist. Nat., III, p. 49, pl. CXLVII, fig. 1.

^d Description de diferentes piezas de Historia Natural, Havana, 1787, p. 191, pl. LXXI.

^e Forhandl. Skand. Naturf. 7de Møde i Christiania, p. 202.

one course; the species now known as *Isocrinus mülleri* (Örsted, 1856) must in the future be known as *Isocrinus parra* (Guérin, 1835).

There is still another name based on a recent West Indian *Isocrinus* which is not mentioned by Carpenter, although in his bibliography he cites the paper in which it occurs. In 1828^a the Rev. Lansdown Guilding described under the name of *Encrinus milleri* an *Isocrinus* brought up from the deep water off St. Vincent, where he then lived. The species is, however, quite unrecognizable, so that the name can never become available; besides, it is preoccupied by the fossil *Encrinites milleri* of von Schlotheim, 1822.

^a Zoological Journal, IV, p. 175.