

THE CRINOIDS OF THE BUITENZORG MUSEUM.

By

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The director of the Buitenzorg Museum has recently been so very kind as to submit to me for study the collection of comatulids belonging to that institution and to the Laboratory for Marine investigations at Batavia.

Nearly all the specimens included in the collection are from the waters about Sumatra, Java and southern Borneo, a particularly interesting region on which we have as yet relatively little information.

The collection includes representatives of 24 species. Although none of these species are new, several of the locality records and a number of the individual specimens are of very considerable interest.

Crossometra helius was previously known only from the five specimens collected by the „Siboga” in the Kei Islands. *Dichrometra tenuicirra* was heretofore only known from the twenty-six individuals dredged by the „Siboga” between Borneo and eastern Java. *Capillaster macrobrachius* was previously only known from the type specimen from the China Sea and another dredged by the „Siboga” on the Borneo Bank.

The large specimen of *Capillaster multiradiata* from St. Nicolaas Bay with only ten arms is worthy of note. The collection includes no less than fifty-five specimens of *Craspedometra acuticirra* of which previously only eleven have been recorded, nine of which I have personally examined.

The additional records for *Asterometra mirifica* and *Pterometra pulcherrima* are of much interest.

The specimen of *Comatula pectinata* from off Flat Hook, Borneo, with 18 arms has the largest number of arms of any individual of this species yet found, and is the only one possessing a IIBr series. One example with 17 arms has been recorded from Singapore, and another with 17 arms is known from the Java Sea north of western Java. All three of these specimens are undergoing adolescent autotomy.

Two of the eleven specimens of *Amphimetra molleri* in the collection have 11 arms, a single IIBr 2 series being present in each case. Heretofore the genus *Amphimetra* was supposed to include exclusively 10-armed forms. It is a somewhat anomalous type, and the occurrence in individuals with more than 10 arms of IIBr 2 series instead of IIBr 4 (3 + 4) series as would be expected in a genus of the family *Himerometridæ* emphasizes its peculiarities.

The genus *Pontiometra* is herein placed in the family *Colobometridæ* on the basis of the paired dorsal spines on the earlier cirrus segments. The family *Colobometridæ* includes a rather heterogeneous assemblage of genera which share in common only the lateral broadening of the dorsal processes of the earlier, or all, the cirrus segments, which form transverse ridges or paired or tripled spines. Since this feature is especially characteristic of the genus *Pontiometra* there is no reason for not including it in this family.

Of the 24 species represented in the present collection all but three — *Craspedometra acuticirra*, *Heterometra pulchra* and *Amphimetra molleri* — were included in the extensive collections made by the „Siboga”, and their synonymy will be found in the author’s report on the unstalked crinoids of the „Siboga” Expedition (Livr. LXXXIII, March 1918), in which the synonymy of *Amphimetra molleri* also is included. *Heterometra pulchra* was described in the author’s memoir on the crinoids of the Indian Ocean (Echinoderma of the Indian Museum, Part VII, Crinoidea, Calcutta, November 22, 1912), p. 317, and the synonymy of *Craspedometra acuticirra* will be found on p. 117 of the same memoir.

Detailed accounts of all the known species of *Comasteridæ*, to which family half of the species included in the present collection belong, are given in the author’s recent monograph of that group (Bulletin 82, United States National Museum, vol. 1, Part 3, pp. i-vii, 1 - 816; 82 plates; Washington, D. C., March 21, 1931). In this memoir are included keys to all the sub-families and higher groups of comatulids, as well as to all the genera and species of *Comasteridæ*.

Superfamily **Comasterida.**

Family COMASTERIDA.

Subfamily Capillasterinae.

Comatella nigra (P. H. CARPENTER).

Locality. — Near Cape Dato, Madura (off the eastern end of Java) (lat. 7° 33' S., long. 113° 37' E.); November 7, 1908 (Gier 13, Exp. 3). One specimen.

Comatella stelligera (P. H. CARPENTER).

Locality. — Dobo, northern side of the islet of Wamma, Aru Islands (lat. 5° 45' S., long. 134° 20' E.); February, 1908. One specimen.

Notes. — The specimen has 47 arms; the cirri have 18 - 21 segments.

Capillaster macrobrachius (HARTLAUB).

Locality. — Java Sea, northnortheast of Indramayu Point, Java (lat.

4° 55' S., long. 108° 56' E.); October 23, 1907 (Gier 3, Exp. 20). One specimen.

Notes. — There are 28 + arms. Of the seven IIBr series present five are 4 (3 + 4) and two are 2. Of the ten IIIBr series present eight are 3 (2 + 3), one is 4 (1 + 2, 3 + 4), and one is 2. There is a single IVBr 3 (2 + 3) series.

Capillaster multiradiata (LINNÉ).

Localities. — Great Kei, Kei Islands; March 4, 1928 (van Ledelhoff, No. 53). One specimen.

Northwest of Rembang, Java (lat. 5° 39' S., long. 111° 19' E.); October 19, 1908 (Gier 12, Exp. 14). One specimen.

North of central Java (lat. 5° 41' S., long. 109° 21' E.); November 21, 1907 (Gier 4, Exp. 10). Two specimens.

Nassi Besar, northern end of Sumatra; 9 meters; otter trawl; June 3, 1908 (Gier 9). One specimen.

St. Nicolaas Bay, western end of Bali; September 7, 1909 (Gier 24, Exp. 6). One specimen.

Sabang Bay, northern end of Sumatra; May 1908 (Gier 9). Two specimens.

Notes. — The specimen from Great Kei has 11 arms which are about 110 mm. long.

The example from northwest of Rembang has 21 arms. The cirri have 27-29 segments and are 23 mm. long.

Of the two specimens from north of central Java one is rather large with 30 arms and the other is a small 10-armed example.

The specimen from Nassi Besar is typical.

The example from St. Nicolaas Bay has only 10 arms.

Of the two specimens from Sabang Bay one has 20 arms, with ten IIBr 4 (3 + 4) series, and the other has 17 arms, with seven IIBr 4 (3 + 4) series.

Subfamily Comactiniinae.

Comatula micraster A. H. CLARK.

Locality. — Off Cape Jabung, northern coast of southern Sumatra (lat. 1° 03' S., long. 104° 35' E.); July 3, 1908 (Gier 9, Exp. 19). One specimen.

Notes. — Three cirri 8 mm. long with 12 segments are attached to two of the sides of the pentagonal centrodorsal, of which the other three sides are depressed to the level of the radial pentagon.

Comatula pectinata (LINNÉ).

Localities. — Off Flat Hook, southern Borneo (lat. 3° 46' S., long. 111° 50' E.); 15-18 meters (Gier 12, Exp. 6). One specimen.

East road of Indramayu (115 miles east of Batavia), Java (Gier 16, Exp. 3). Four specimens.

Off Cape Selatan, southern Borneo (lat. $4^{\circ} 25' S.$, long. $114^{\circ} 31' E.$); October 4, 1908 (Gier 12, Exp. 3). Two specimens.

North of western Java (lat. $5^{\circ} 22' S.$, long. $107^{\circ} 42' E.$); 23 meters; November 15, 1907 (Gier 4, Exp. 2). Four specimens.

North of western Java (lat. $5^{\circ} 16' S.$, long. $106^{\circ} 24' E.$); June 6, 1909 (Gier). Two specimens.

Off Cape Jabung, northern coast of southern Sumatra (lat. $1^{\circ} 03' S.$, long. $104^{\circ} 35' E.$); July 3, 1908 (Gier 9, Exp. 19). Three specimens.

Notes. — The specimen from off Flat Hook, Borneo, has 18 arms. There are seven IIBr series and one external IIIBr series present. All the division series are 2 (1 + 2). One post-radial series is undergoing adolescent autotomy, bearing on the first brachial two IIBr series, one of which carries a IIIBr series externally.

The four specimens from Indramayu are rather large and slender.

The two examples from off Cape Selatan, Borneo, are rather large, and are of the stout armed type.

The four specimens from lat. $5^{\circ} 22' S.$, long. $107^{\circ} 42' E.$ are large and slender armed with 10, 11, 12 and 13 arms. In those with 11 and 13 arms the cirri are entirely confined to the interradial angles of the centrodorsal, there being five pairs of cirri in the 13-armed specimen and one pair and four single cirri in the 11-armed specimen. These two specimens should undoubtedly be referred to *Comatula pectinata* var. *purpurea*.

The two examples from lat. $5^{\circ} 16' S.$, long. $106^{\circ} 24' E.$ are rather large and are of the stout armed type.

The three specimens from off Cape Jabung, Sumatra, are rather large. One has 11 and the other two have 10 arms.

Subfamily Comasterinae.

Comaster multibrachiata (P. H. CARPENTER).

Locality. — South of the eastern end of Java (lat. $8^{\circ} 47' S.$, long. $114^{\circ} 38' E.$); 30-36 meters; November 10, 1908 (Gier 13, Exp. 7). One specimen.

Comaster distincta (P. H. CARPENTER).

Locality. — St. Nicolaas Bay, on the western end of Bali; September 7, 1909 (Gier 24, Exp. 6). One specimen.

Comanthina schlegelii (P. H. CARPENTER).

Localities. — South of the eastern end of Java (lat. $8^{\circ} 47' S.$, long.

114° 38' E.); 30 - 36 meters; November 11, 1908 (Gier 13, Exp. 7). One specimen.

Nassi Besar; 15 meters; June 16, 1908 (Gier 9).

Notes. — The specimen from south of the eastern end of Java is large and typical.

Comantheria briareus (BELL).

Locality. — Sabang Bay, northern end of Sumatra; May 1900 (Gier 9). One specimen.

Comanthus (Cenolia) bennetti (J. MÜLLER).

Locality. — Near Ajer Melit; P. Weh, May 9, 1908 (Gier 9).

Notes. — This is a fine example of the species.

Comanthus (Comanthus) parvicirra (J. MÜLLER).

Locality. — Sebesi Island; H. BOSCHMA, April 1921. One specimen.

Superfamily **Mariametrida**.

Family **ZYGOMETRIDAE**.

Zygometra comata A. H. CLARK.

Locality. — Java Sea, northnortheast of Indramayu Point, Java (lat. 4° 56' S., long. 108° 56' E.); October 23, 1907 (Gier 3, Exp. 20). One specimen.

Notes. — This example has 18 arms.

Family **HIMEROMETRIDAE**.

Himerometra magnipinna A. H. CLARK.

Locality. — Nassi Besar; 9 meters; otter trawl; June 4, 1908 (Gier 9). One specimen.

Craspedometra acuticirra (P. H. CARPENTER).

Localities. — Off Cape Jabung, northern coast of southern Sumatra (lat. 1° 03' S., long. 104° 35' E.); July 3, 1908 (Gier 9, Exp. 19). Three specimens.

Near Deli, northern Sumatra (lat. $3^{\circ} 40' N.$, long. $99^{\circ} 10' E.$); 16 - 18 meters; June 25, 1908 (Gier 9, Exp. 14). Forty-eight specimens.

Malacca Strait, near the mouth of the Deli River, N.E. Sumatra (lat. $3^{\circ} 53' N.$, long. $98^{\circ} 46' E.$) 10 meters; June 22, 1908 (Gier 9, Exp. 12). Four specimens.

Notes. — One of the specimens from off Cape Jabung has 28 arms and another has 22 arms.

Nine of the specimens from lat. $3^{\circ} 40' N.$, long. $99^{\circ} 10' E.$ have 22 (one), 23 (two), 24 (three), 26 (one), 28 (one) and 29 (one) arms. In the specimen with 28 arms the arms are about 140 mm. long.

In one of the specimens from lat. $3^{\circ} 53' N.$, long. $98^{\circ} 46' E.$ there are 35 arms; all of the IIBr series are 2.

Heterometra crenulata (P. H. CARPENTER).

Localities. — Off southeastern Borneo (lat. $3^{\circ} 12' S.$, long. $116^{\circ} 38' E.$); 14 - 19 meters (Gier 14, Exp. 4). One specimen.

North of central Java (lat. $5^{\circ} 41' S.$, long. $109^{\circ} 21' E.$); November 21, 1907 (Gier 4, Exp. 10). Four specimens.

North of western Java (lat. $5^{\circ} 22' S.$, long. $107^{\circ} 42' E.$); 23 meters; November 15, 1907 (Gier 4, Exp. 2). Two specimens.

Off Cape Jabung, northern coast of southern Sumatra (lat. $1^{\circ} 03' S.$, long. $104^{\circ} 35' E.$); July 3, 1908 (Gier 9; Exp. 19) Two specimens.

Notes. — The four specimens from north of central Java are all small.

One of the specimens from north of western Java has 10 and the other has 11 arms. The lateral processes on the segments of the proximal pinnules are strongly developed, but slender.

One of the specimens from off Cape Jabung, Sumatra, has 22 arms. Of the ten IIBr series nine are 4 (3 + 4) and one is 2. There is one IIBr 4 (3 + 4) series following a IIBr 2 series, and one IIBr 2 series following a IIBr 4 (3 + 4) series. Both of the IIBr series are internally developed.

Heterometra quinduplicava (P. H. CARPENTER).

Locality. — North of central Java (lat. $5^{\circ} 41' S.$, long. $109^{\circ} 21' E.$); November 21, 1907 (Gier 4, Exp. 10). One specimen.

Notes. — The specimen is small with 16 arms, and is undergoing adolescent autotomy.

Heterometra pulchra A. H. CLARK.

Locality. — Near Deli, northern Sumatra (lat. $3^{\circ} 40' N.$, long. $99^{\circ} 10' E.$); 16 - 18 meters; June 25, 1908 (Gier 9, Exp. 14). Two specimens.

Amphimetra molleri (A. H. CLARK).

Localities. — North of central Java (lat. 5° 41' S., long. 109° 21' E.); November 21, 1907 (Gier 4, Exp. 10). One specimen.

Off Cape Jabung, northern coast of southern Sumatra (lat. 1° 03' S., long. 104° 35' E.); July 3, 1908 (Gier 9, Exp. 19). Four specimens.

Near Deli, northern Sumatra (lat. 3° 40' N., long. 99° 10' E.); 16 - 18 meters; June 25, 1908 (Gier 9, Exp. 14). Five specimens.

Near Olehleh, at the northwestern end of Sumatra (Gier 9, Exp. 4). One specimen.

Notes. — One of the specimens from off Cape Jabung has 11 arms, one IIBr 2 series being present.

One of the specimens from near Deli has one IIBr 2 series and 11 arms.

Family MARIAMETRIDAE.

Dichrometra tenuicirra A. H. CLARK.

Localities. — North of central Java (lat. 5° 41' S., long. 109° 21' E.); November 21, 1907 (Gier 4, Exp. 10). Five specimens.

Java Sea, northnortheast of Indramayu Point, Java (lat. 4° 55' S., long. 108° 56' E.); October 23, 1907 (Gier 3, Exp. 20). Two specimens.

Notes. — The largest specimen from north of central Java has 26 arms.

Family COLOBOMETRIDAE.

Pontiometra andersoni (P. H. CARPENTER).

Localities. — Northwest of Rembang, Java (lat. 5° 39' S., long. 111° 19' E.); October 19, 1908 (Gier 12, Exp. 14). Three specimens.

Java Sea, northnortheast of Indramayu Point, Java (lat. 4° 55' S. long. 108° 56' E.); October 23, 1907 (Gier 3, Exp. 20). One specimen.

Superfamily Tropiometrida.

Family THALASSOMETRIDAE.

Subfamily Ptilometrinae.

Asterometra mirifica A. H. CLARK.

Locality. — St. Nicolaas Bay, western end of Bali; September 7, 1909 (Gier 24, Exp. 6). Four specimens.

Notes. — One of the specimens has 11 arms 100 mm. long, one IIBr 2

series being present; the longest cirri have 93 segments. Another specimen has 10 arms 100 mm. long; the longest cirri have 95 segments. The two other specimens are small; each has 10 arms.

Pterometra pulcherrima (A. H. CLARK).

Locality. — South of the eastern end of Java (lat. $8^{\circ} 47' S.$, long. $114^{\circ} 38' E.$); 30-36 meters; November 10, 1908 (Gier 13, Exp. 7). One specimen.

Notes. — This is a fine typical example of the species. There are 18 arms 80-90 mm. long. The cirri are composed of 88-92 segments and are 60-75 mm. long. On one of the cirri the terminal claw has at the base on the dorsal side a process exactly resembling an opposing spine that rises to a height equal to about half the width of the base of the terminal claw.

Family CHARITOMETRIDAE.

Crossometra helius (A. H. CLARK).

Locality. — Bali Sea (lat. $7^{\circ} 35' S.$, long. $114^{\circ} 42' E.$); about 200 meters; Dr. Th. MORTENSEN'S South Africa — Java Expedition, 1929-'30; April 10, 1929. One specimen.

Notes. — This specimen has 26 arms about 150 mm. long. The cirri are 30-38 mm. long and are composed of 20-22 segments.