KUNGL. SVENSKA VETENSKAPSAKADEMIENS HANDLINGAR
TREDJE SERIEN. BAND 17. N:O 2.

CRINOIDS OF S. AFRICA

BY

TORSTEN GISLÉN

WITH 2 PLATES AND 26 FIGURES IN THE TEXT

COMMUNICATED APRIL 27TH 1938 BY O. CARLGREN AND N. v. HOFSTEN

STOCKHOLM
ALMQVIST & WIKSELLS BOKTRYCKERI-A.-B.

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Introduction.

Dr. TH. MORTENSEN during his Java—S. Africa Expedition in 1929—30 brought together a fine collection of Crinoids from S. Africa. I owe him my deepest thanks for placing this valuable material at my disposal.

The collection consists partly of specimens dredged during the cruises of the Cape Government vessel Pieter Faure, partly of specimens collected by Dr MORTENSEN himself. In the former case, unfortunately, it has in some cases turned out to be impossible to clear out the definite localities. I am indebted to Dr. K. H. BARNARD of the S. African Museum, Cape Town, for having deciphered some of the stations. The U. before the figure of the station-number according to him refers to specimens obtained in the Union of S. Africa waters, the P. refers to the operations of the Pieter Faure, carried out by Dr. Gilchrist (in ?1925) in Portugese East Africa around the neighbourhood of Delagoa Bay.

Among the records below I have also put in some finds of Prof. O. CARLGREN made during his trip to S. Africa in 1935.

* * *

Almost a century ago J. MÜLLER described the first comatulid from S. Africa. It was his *Alecto wahlbergii* collected by the Swedish scientist WAHLBERG and in the possession of the Swedish State Museum (1843 Wiegmanns Arch. Naturgesch. Vol. 1, p. 131). In modern nomenclature it is referred to the genus *Comanthus*. However, in spite of the time elapsed since then, it is a regrettable fact that our knowledge of S. African crinoids has developed very slowly and that it is still very deficient. It was 1908 before this single comatulid, described in the forties, got any companions. In the year mentioned JEFFREY BELL described four species from this area, three of which were new and the fourth identical with the *Comanthus* mentioned above (Mar. Invest. S. Afr. Vol. 4, p. 139 ff.)

A. H. CLARK in 1911 summed up our knowledge of the African crinoids (Proc. U. S. Nat. Mus. Vol. 40, p. 1 ff.). He knew then of 53 species from the coasts of Africa, and listed 22 species from the S.E. coast of the continent (op. cit., p. 8). Nevertheless, most of these 22 species were recorded from islands far off the coast or from tropical Africa; from South Africa proper were still only four species recorded. Even if also including the fauna as far north as to comprise Madagascar, we got only four or five species more. In

1915 A. H. Clark could add yet another species, *Cominia* (later called *Annametra*) *occidentalis* (Deutsche Süd-Polar Exped. 16, Zool. Bd. 8, p. 164).

However, thanks to the cruises of the Cape Governement vessel Pieter Faure, H. L. Clark in 1923, when working up the material collected, added four species to the S. African fauna, three of them being decidedly deep-water species (Ann. S. Afr. Mus. Vol. 13, p. 227 ff.).

Finally in 1936 A. H. Clark made a survey of the crinoids occurring on the west-coast of Africa (John Murray Exped. Vol. 4 No. 4, p. 98) and also, together with a list of the crinoid fauna of S. Africa, has given a discussion of its affinities (op. cit., p. 105).

Thus from Saldhana Bay in the west to Delagoa Bay in the east up till now the following species have been recorded:

Comanthus wahlbergii (J. Müll. 1843).

Dichrometra flagellata var. *afra* A. H. Clark 1912 (*Liparometra multicirra* H. L. Clark 1923).

Tropiometra carinata (Lam. 1816) (*Ant. capensis* of Bell 1908).

Crotalometra magnicirra (Bell 1908).

Pachylometra sclateri (Bell 1908).

Annametra occidentalis (A. H. Clark 1915).

Pentametrocrinus varians (P. H. Carp. 1882) (H. L. Clark 1923).

Democrinus chuni (Döderlein 1907) (H. L. Clark 1923).

Monachocrinus perrieri (Koehler & Vaney, 1910) (*M. coelus* H. L. Clark 1923).

Of these all except *Dichrometra*, *Pentametrocrinus*, and *Monachocrinus* are represented in Dr. Mortensen's collections from S. Africa. But — and this evidences very clearly our imperfect knowledge of the crinoid fauna in this part of the world — there are 6 more species all, except *Tropiometra clarki*, which is a new name for an old species, being representatives for new varietal, specific, or even generic deviations from the types hitherto known.

The species in Dr. Mortensen's collections are the following:

Comasteridæ	*Comatella africana* n. sp.
	Comissia serrata n. sp.
	Comanthus wahlbergii (J. Müll.).
	Comanthus wahlbergii var. *multibrachia* n. var.
Himerometridæ	*Heterometra africana* var. *delagoæ* n. var.
Colobometridæ	*Embryometra mortenseni* n. gen. n. sp.
Tropiometridæ	*Tropiometra carinata* (Lam.).
	Tropiometra clarki n. nom.
Thalassometridæ	*Crotalometra magnicirra* (Bell).
Charitometridæ	*Pachylometra sclateri* (Bell) (?).
Antedonidæ	*Annametra occidentalis* (A. H. Clark)
Bathycrinidæ	*Democrinus chuni* (Döderlein).

In his paper of 1936 quoted above Mr CLARK says (p. 105) that the Malayan fauna, when extending south-westward along the islands of the western Indian Ocean to south-eastern Africa, becomes considerably attenuated. »In this region all the large species are absent and many of the others have become modified in the decrease in size and stoutness, combined with greater slenderness of the proximal pinnules.» And further: »South Africa from Natal southward has its own special fauna, characterized by two littoral endemic species that are quite different from any Malayan forms.»

As regards the new species described in this paper, we find the following relationships and differences.

Comatella africana has more elongated cirrals and arm-joints than any *Comatella* hitherto described, in this respect it seems to take an intermediate position between *C. brachycirra* (the Bonin Isl.) and *Neocomatella europæa* (S.W. Europe and N.W. Africa), but has more arms than either.

Comissia serrata is a small form with its nearest relations in East Asia.

Comanthus wahlbergii var. *multibrachia* seems to come closest to *C. wahlbergii*, but also resembles *C. tasmaniæ* rather closely.

Heterometra africana var. *delagoæ* is a dwarfed, but more multirayed variation of a tropical East African species. It shows also some affinities to a Maldive and a S. Japanese species.

The new genus *Embryometra* shows remote similarities to *Decametra*, a genus extending from S. Japan and W. Australia to Arabia and S.E. Africa. It is, though, more slender and of a more youthful type than any of the Decametras.

The new forms thus strengthen the impression that the S. African crinoid fauna is a special fauna with many endemics. Its closest relationship is largely to be sought for, not, as might be supposed, in the north, off the E. coast of Africa, but in the Far East. A. H. CLARK's statement concerning the increasing slenderness and decreasing size holds good upon the whole, often it is combined with characteristics of youth. A tendency to an increasing number of arms can also be traced. In zoogeographical respects *Comatella africana* is especially of interest, as it seems to bridge over to the Atlantic forms.

One characteristic of the S. African fauna off Natal is that the deep-sea species occur there in tolerably shallow water (cf. *Crotalometra*, *Pachylometra*, and *Democrinus*).

Comasteridæ.

Comatella africana sp. nov.

Text-figs. 1—2. Pl. 2 fig. 5.

South Africa U. 1323, 29°41′ S., 31°31′ E. 1 sp.

Cd flat and low, diameter 2,5 mm. Cirri marginal XXIV 14—16; 9—12 mm., in a close, partly double whorl. The new small cirri tend to arrange

themselves just above the former mature cirri. First cirral L=$\frac{2}{3}$ br, 2nd L=2 br, slightly constricted centrally, 3rd L=4 br, distal part a little widened, 4th L=1$\frac{3}{4}$ br with a dorsal knob and a distal thickened rim, 5th L=br, the following ones similar or a little shorter still. From about the 9th—12th segment there are one, or generally two small, successive, lengthrunning cristæ on each cirral. Opposing spine small but distinct. Terminal claw curved, L=1$\frac{1}{2}$ the penultimate segment. The cirrus is recurved in the outer part.

RR protruding inconsiderably in the corners. I Br 1 forming a low and indistinct synarthrial tubercle with I Ax., h=$\frac{1}{6}$ br. I Ax pentagonal h=$\frac{1}{3}$ br, constricted proximally, its lateral borders with I Br 1 forming a straight angle. Dorsal surface indistinctly pitted. II Br 2 (1—2) with a close synarthrial articulation between the two ossicles, the synarthrial eminence is indistinct. III Br 2 (1—2) present on the outer sides only. The specimen is badly broken. The only ray that is not mutilated has 6 arms. In a complete specimen the arms were thus probably XXX (there are many loose arms with division-series); the length is 55 mm. The arm-bases are widely separated laterally.

Example of ramification:

$$\text{I } 1\text{—}2\begin{cases}\text{II } 1\text{—}2\begin{cases}\text{III } 1\text{—}2\begin{cases}\text{Br}\\ \text{Br}\end{cases}\\ \text{Br } \ 1+2\ (3+4)\ldots\end{cases}\\ \text{II } 1\text{—}2\begin{cases}\text{Br } \ 1+2\,3\,4\ldots\\ \text{III } 1\text{—}2\begin{cases}\text{Br } 1+2\,3\,4\ldots\\ \text{Br } 1\text{—}2\,3+4\ldots\end{cases}\end{cases}\end{cases}$$

First syzygy between Br 1+2 or 3+4, the first mentioned case usually occurring on the inner sides only. The 2nd syzygy may appear between Br 3+4, otherwise it comes at about Br 15. Distally there are syzygies with an interval of 3—4 muscular articulations. Br 5 and 6 (to 7) are rectangular, L=$\frac{3}{4}$ br, a little constricted centrally and everted distally, sculpture as on I Brr. From Br 8 the ossicles become longer on the pinnular side, more and more constricted centrally, the distal border being everted and a little spiny. L of distal Brr 1$\frac{1}{2}$ br. The br of the arms is about 0,6 mm. and there are 14—16 joints per cm.

P_1—P_3 with combs of 11—12 large and broad teeth. P_1 ±27, longer than P_2 and P_3. Longest segments L=1$\frac{1}{2}$ br. Distal pinnules ±17; 6 mm. Longest pinnulars L=3 br No disc preserved.

This curious new form, because of its remarkable cirri and long-jointed Brr and pinnulars, is at once distinguished from all the other species of the genus *Comatella*. It comes closest to *C. brachycirra*, but the longest cirrals, Brr, and pinnulars are longer than in this species. Being a long-jointed type it approaches *Palæocomatella* and *Neocomatella*. It is, however, distinguished from the former genus by more arms (III Brr occurring), fewer teeth on the proximal pinnules, smaller Cd, and by the presence of (small and indistinct) synarthrial tubercles. The synarthries of the division series are also distinct and easily visible.

Among the species of the genus *Neocomatella* it approaches close to *N. europæa,* but the new species has more arms, the Cd is larger(?), and the arm-bases seem to be different, knobby and well separated laterally. I Br 1 is also distinctly visible in dorsal view (In *N. europæa* the arm-bases are broad and smooth and only I Ax is visible in dorsal view) (cf. P. H. CARPENTER 1888, Challenger Exp. Pl. 52, fig. 1).

Already when finding *C. brachycirra*,, which is a form with long-jointed arms, there could be considerable doubt whether the difference between *Comatella* and *Neocomatella* was sufficient to keep the two genera separate. When now we get a new species from the Indian Ocean of *Neocomatella* type, but as to arm-joints close to a *Comatella* species, I can see no reason for retaining the former genus.

I have remarked earlier (T. GISLÉN Arkiv för zoologi Bd 19 A, No. 32, p. 2, Stockholm 1928) that in *Palæocomatella* the 2nd whorl of cirri is not arranged in columns with the 1st whorl. The only difference between *Comatella* (+*Neocomatella*) and *Palæocomatella* should then be the large Cd and the close connection between the division series in the genus last mentioned. But even in this respect there seem to be intergradations, as some species of *Comatella* have a large Cd (*C. africana* and the Neocomatellas) or a close synarthry between I Br 1—2 (*C. brachycirra*). Therefore, this genus also ought, most correctly, to be included in *Comatella.*

Commissia serrata n. sp.

Text-figs. 3—4. Pl. 1 fig. 1.

No locality. 2 spp. (According to Dr. MORTENSEN perhaps from Mocambique. As, however, I found two pinnules of *Crotalometra magnicirra* in the same glass-jar, and as spiritus-specimens of the species last mentioned only occur in this collection from St. U. 4068 and 6244, they may come from one of these localities.)

Sp. 1. Cd discoidal, diameter 2 mm. C. XXIII 13—15; 7—9 mm. in an almost simple marginal whorl; 3rd segment L=1½ br, 4th—5th cirral longest L=2—2½ br, constricted centrally, distal cirrals shorter again L=or ¾ br. Minute dorsal spines from about the 7th segment. Antepenultimate cirral L=½—¾ br. Opposing spine small, pointed. Terminal claw curved, L=1½ the penultimate cirral.

Arms X 30 mm. +(probably not over 40 mm. in the complete specimen). Brr 1 almost completely united inwardly. Brr after Br 5 longer on the pinnular side, distally everted and provided with a distal denticulated rim, thereby giving the arm a serrate profile. Second syzygy about Br 10, distally with an interval of 3—4 muscular articulations. Breadth of arms 0,6 mm. 18 Brr per cm. including the syzygies (otherwise 15). Distal Brr longest side =¾ br.

P_1—P_3 or P_4 with a comb, sometimes also a comb on P_5 or P_6, though then there are one or two preceding pinnules which lack any teeth. $P_1 \pm 32$;

about 9 mm. with 8 teeth, P_2 about 6 mm.; usually with the first genital gland. Proximal $\frac{2}{3}$ of following pinnules out to about P_8 greatly swollen by the gonads. Basal segments of the pinnules with distal thickening and spinosity.

Mouth central. Anal cone large and papillose at tip. Colour brownish. Cirri and articulations lighter.

Sp. 2. C. XX 13—15, 4th segment longest, L=3 br.

There are abnormally XI arms. The abnormal ray:

$$\text{I } 1\text{—}2\begin{cases}\text{Br } 1\text{—}\bar{2}\ 3+\underline{4}\ldots\ 11+12\ldots\ 15+16\ldots \\ \text{II } 1\text{—}\underline{2}\ 3+4_1\begin{cases}\text{Br}_1\ 1\text{—}\bar{2}\ 3+\underline{4}\ldots \\ \text{Br}_1\ 1\text{—}\underline{2}\ \bar{3}\ \underline{4}\ldots\ 10+\underline{11}\ldots\end{cases}\end{cases}$$

The antepenultimate cirral is shorter than in the East Asiatic *C. spinosissima* which this species approaches most closely. The cirrals are also more numerous than in the species mentioned, the cirri stouter, the combs occur on more proximal pinnules (in this respect it approaches *C. hispida* which, though, has much longer combs, and also longer arms). And finally the genital gland also often appears on P_2. This is thus still another pair of those African and East Asiatic *Comissias* of which we know earlier (*C. ignota* and *minuta*).

Comanthus wahlbergii (J. Müll.).

Text-fig. 7.

From St. 13313 1 dried sp. Nieca river NW. N $\frac{1}{4}$ N, distant 43 miles. 43 fath. Sand, shell, and coral (near East London).

False Bay 17 fath. Stone. 19 XII 1929 (Mort. Coll. St. 66) 9 spp.

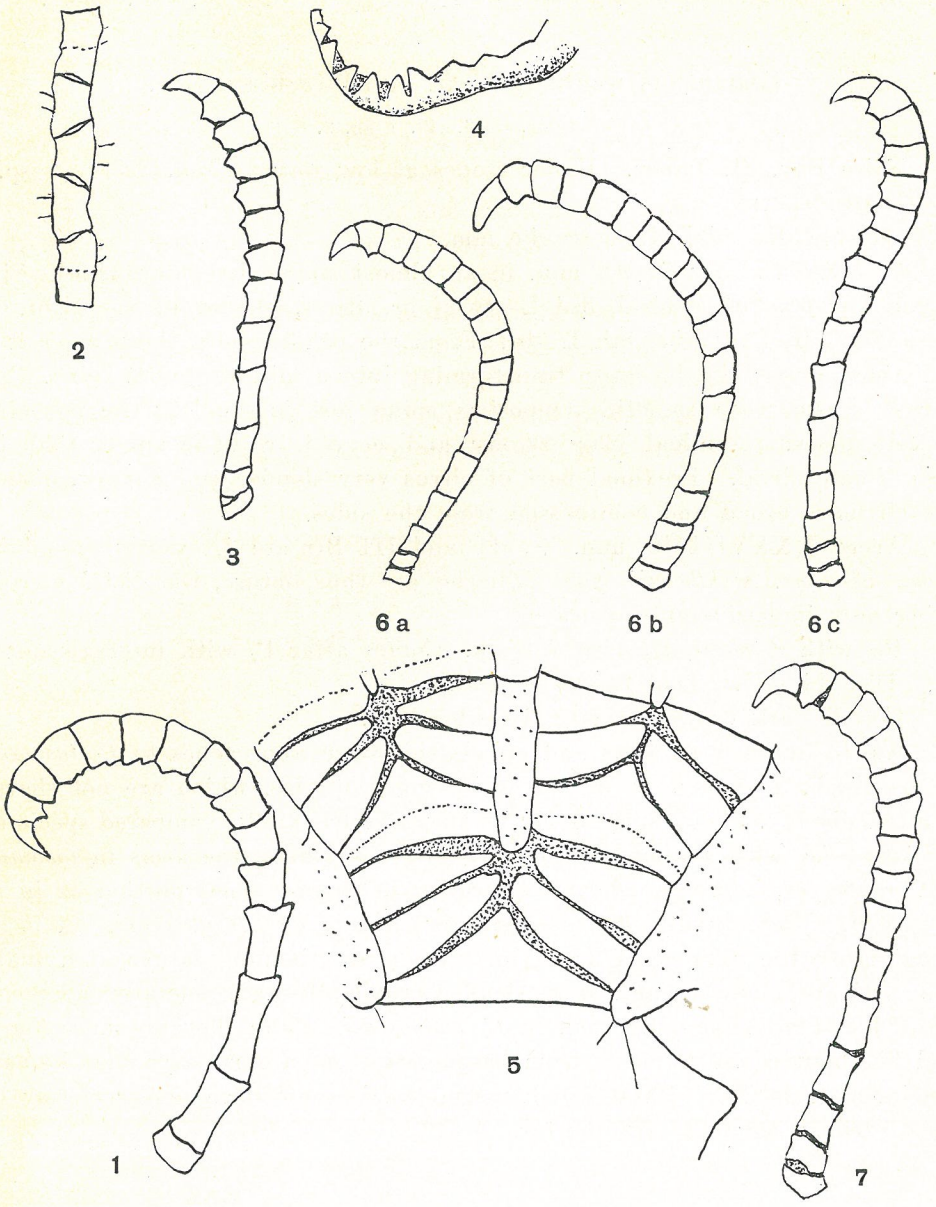
False Bay (Gordon Bay) 8—9 fath. Hard bottom. 19 XII 1929 (Mort. Coll. St. 67) 36 spp.

The specimen from St. 13313 is a young with XI arms only. The cirrals are 13.

From St. 66 the smallest specimen has X arms, 20 mm. The arms are otherwise generally XV—XX. II Brr in 2 specimens (one case each) are abnormally 2 (1—2). One specimen has a symbiontic amphipod partly hidden between the disc and the Cd.

In St. 67 the diameter of Cd is 2—3 mm., the number of arms is generally XVII—XX 55—70 mm. Specimens with XV—XVI arms rarely occur. Smallest specimen with an arm-length of 35 mm. II Brr are invariably 4 in about 30 spp. Two specimens have II Br 2 in one case each, two spp. have II Br 2 in 2 cases, in one of them there is a III Br 2 (1—2) after a II Br 2 Ax., XXI arms in all. One, abnormal, specimen has 8 II Br 2 and 1 II Br 4. In one there is an abnormal ray with one II Br 1 Ax.

P_{II} and P_1—P_5 or P_6, then often also P_8, and even P_{10} with a comb which proximally consists of 8 and in the distal pinnules of 6—7 teeth.



Figs. 1—7.

1—2 *Comatella africana* 1) Cirrus, 2) Distal arm-part;
3—4 *Comissia serrata* 3) Cirrus, 4) Tip of P_1;
5—6 *Comanthus wahlbergii* var. *multibrachia* 5) Proximal arm-part, 6) a—c three cirri, more or less compressed distally;
7 *C. wahlbergii* Cirrus (Figs. 1—3, 5—7 $^{9}/_{1}$, 4 $^{17}/_{1}$.)

During his stay in S. Africa Prof. O. CARLGREN collected several specimens of this species near Simonstown (Froggy Pond 2 M. Oct. 1935).

Comanthus wahlbergii var. **multibrachia** n. var.

Text-figs. 5—6. Pl. 1 fig. 2.

False Bay, St. James. Under stones at low water. Jan. 1930. 1 sp.

Description:

Cd thin discoidal, diameter 4,0 mm.

C. XXV 15—18; 7—9,5 mm. in an almost simple irregular whorl. First segment short, 2nd cubical, 3rd L=to $1\frac{1}{3}$ br, 4th L=$1\frac{2}{3}$ br, 5th L=$2\frac{1}{2}$ br, 6th L=$1\frac{2}{3}$ br, 7th L=$1\frac{1}{3}$ br, 8th L=br. From the 6th segment there appears an indistinct dorsal knob, later transforming into a minute dorsal spine. The cirrus is otherwise smooth. Opposing spine just as small as the preceding dorsal spines. Terminal claw strong and curved, a little longer than the penultimate cirral. Proximal part of cirrus very slender and narrow, distally the cirrus is broad and compressed from the sides.

Arms XXXVIII 45 mm. +, II and III Brr are 4, exactly resembling those of *Com. wahlbergii* (the axillaries are thus obtuse, the distal margins being only inconsiderably concave).

P_{II} with 8 teeth, P_2 with 7 teeth. Combs after P_4 with intervals out to P_9. Disc 14 mm. Anal funnel central.

Colour dark brown, arms a little brighter.

As to number of arms and cirrals this form approaches to *C. tasmaniæ* from which, however, it differs in having axillaries, which are not sharply pointed distally. According to Mr CLARK, who has kindly compared specimens of *tasmaniæ* with a photo of the form described here, the arms in *tasmaniæ* are, moreover, more slender, not swollen in the proximal portion as in my specimen. Undoubtedly it comes rather close to *C. wahlbergii*, but it has about twice the number of arms, the Cd is proportionately larger, and, finally, the cirri are smoother and more slender proximally and generally more compressed and broad distally than in *C. wahlbergii*, where they are more rugged and of about equal diameter from base to tip. Mr CLARK says that he has a specimen from Port Natal which resembles the new form rather closely but the proximal segments are shorter.

Himerometridæ.

Heterometra africana var. **delagoæ** n. var.

Text-figs. 8—11. Pl. 1 fig. 3.

South Africa P 1987, P 2001, P 2012, (P?) 2079 — Portugese East Africa, vicinity of Delagoa Bay: 8 spp. (spp. 1—8). 3 spp. (spp. 9—11). 2 spp. (spp. 12—13). 1 sp. (sp. 14).

Sp. 14. Cd flat, diameter 4,5 mm.

C. XXI 29—34; 18—22 mm. in a partly double whorl, the distal cirrals are provided with long and pointed dorsal spines, beginning abruptly about cirral 13 to 16. Longest proximal segments L=$\frac{2}{3}$ br. Length of distal segments =$\frac{1}{2}$ br.

Arms XIX; ± 85 mm. II Br 4 (4 cases), 2 (1—2) 1 case, 5 (3+4) 2 cases, III Brr 2 (2 cases, on the inner sides).

First syzygy between Br 3+4, 2nd sometimes between Br 5+6, otherwise at Br 9+10, then at about Br 15+16, distally with an interval of 7—10 muscular articulations.

Proximal pinnules rather smooth but angular, the proximal joints with a low double length-running carination which on the distal pinnulars is substituted by a single one. P_{II} 21; 7,5 mm., P_1 22; 9,5 mm., P_2 ± 24; 12 mm. P_3 of about the same length but with fewer pinnulars. P_4 shorter. From P_4—± P_{10} there is a high crest on pinnulars 2 to 4 or 6. The crest is broken off at the articulations.

Spp. 1—8.	Sp. 1	Rays:	6+4+6+4+4=XXIV	arms.
	» 2	»	6+5+4+6+4=XXV	»
	» 3	»	6+4+5+7+4=XXVI	»
	» 4	»	6+6+5+5+7=XXIX	»
	» 5	»	6+7+6+6+6=XXXI	»
	» 6	»	6+6+6+7+7=XXXII	± 75 mm. II Brr 4, III Brr 2 except in one case.
	» 7	»	8+7+6+5+6=XXXII	arms. II Brr 2 or 4.
	» 8	»	6+6+7+5(+)+8=XXXII+	»

Sp. 4 has C. XXV 28—32; 20—24 mm. Longest cirral L=$\frac{3}{4}$ br. P_2 23; 9 mm. P_3 22; ± 10 mm. Sp. 6 has C. 25—31; 13—18 mm. Longest cirral L=$\frac{3}{4}$ br.

In Sp. 3 the ray with 7 arms is abnormal as shown below.

$$1\ 1\text{—}2\begin{cases}\text{II } 1\text{—}\bar{2}\ 3+4\begin{cases}\text{III } 1\text{—}2\begin{cases}\text{Br } 1\text{—}\bar{2}\ 3+\underline{4}\ldots \\ \text{IV } 1\text{—}\underline{2}\ 3+\bar{4}\ \underline{5}\ \bar{6}\ 7\begin{cases}\text{Br } \bar{1}\ \underline{2}\ \bar{3}\ \underline{4}\ldots 14+15\ldots \\ \text{Br } \underline{1}\ 2+\bar{3}\ \underline{4}\ldots 14+15\ldots\end{cases}\end{cases} \\ \text{Br}\end{cases} \\ \text{II } 1\text{—}\underline{2}\ 3+4\begin{cases}\text{III } 1\text{—}2\begin{cases}\text{Br} \\ \text{Br}\end{cases} \\ \text{Br}\end{cases}\end{cases}$$

The right arm rising from IV Br 7 is a pinnule which has grown out to an arm; this is, though, directed ventrally just like a normal pinnule.

Sp. 9. C 25—27; 15—20 mm. Rays: 5+5+5+4+ one broken ray, thus probably at least XXIII arms. II Brr 4 in 7 cases out of 8. III Brr 4 in 2 cases of 3. P_3 20; ± 10 mm.

Sp. 10. Much broken, 2 loose rays with 4 and 6 arms.

Sp. 11. Rays: 6+5+5+6+5=XXVII arms.

Sp. 12. Arms XXIX; ± 75 mm. II Brr 4 (8 cases), 2 (2 cases), III Br 4 (5 cases, 4 of them after II Brr 2), 2 (4 cases).

Sp. 13. C XXXII, 29—33; 12—22 mm. Longest cirral ¾ br. Rays: 8+7 +7+8+9=XXXIX; 75 mm. II Brr 4 (7 cases), 2 (3 cases), III Brr 2 (12 cases), 4 (3 cases), 6 (3+4) 1 case, IV Brr 2 (2 cases), 4 (1 case).

The large dorsal cirral spines which begin abruptly place this form in the vicinity of *H. africana.* However, the cirrals are shorter, the arms more and also considerably shorter, the proximal pinnules having fewer segments. In the two characteristics last mentioned it approaches *H. schlegelii*, but differs from this species in having at least twice its number of arms. As to the short cirrals it comes near to *H. flora* which has, though, much longer but fewer arms.

Within this genus there are described many species — in fact, probably too many — and not to increase the number of doubtful and critical species I have only considered this form to be of a varietal nature.

Colobometridæ.

Embryometra mortenseni n. gen. n. sp.

Text-figs. 12—15. Pl. 2 fig. 6.

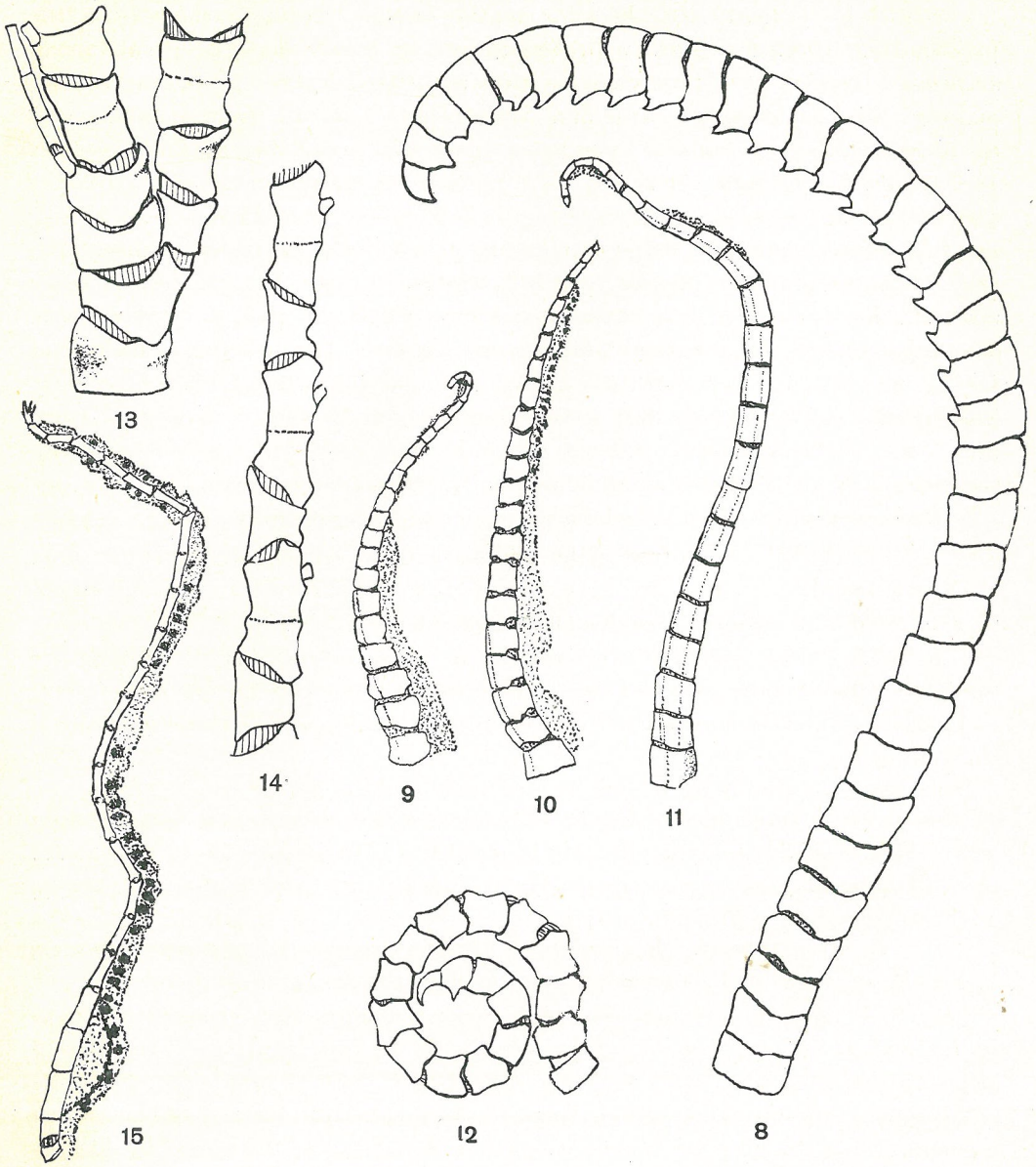
S. Africa 34° 17′ S. 17° 58′ E., 160 fath. Mud. 17 XII 1929 (Mortensen Coll. St. 56) 1 sp. Type (Sp. 1).

S. Africa 34° 21′ S, 17° 57′ E., 178 fath. Mud. 19 XII 1929 (Mortensen Coll. St. 57) 3 spp. (Spp. 2—4).

Sp. 1. Cd hemispherical, with a flattened dorsal pole, ventral diameter 1,7 mm., free dorsal pole about 0,7 mm.

C. XVI 16—18; ± 6 mm. strongly recurved, in a partly double whorl. First segment short, 2nd L=½—¾ br, 3rd L=to 1⅓ br, 4th L=1⅓ br, a little collar-shaped distally, the following similar or a little shorter, the collar becoming more and more obsolete. Antepenultimate segment L=1¼ br. Penultimate cirral with an opposing spine standing out at right angle from the distal part of the ossicle. Terminal claw curved, insignificantly longer than the preceding ossicle. There is no dorsal spine present. In profile one might suggest that there was an indistinct carination, but when the cirrus is viewed from the dorsal side no such carination can be detected. When observed from this side there seems to be a distal thickening with a very fine and obsolete spinosity (just as in the ends of comatulid Brr joints at high magnification).

Arms X; ± 65 mm. RR very narrow bands in the centre, protruding in the corners, where with its neighbour it forms an acute angle. I Br 1 almost quadrangular, distal corners obtuse, with I Ax forming a very moderate synarthrial tubercle. I Ax L=br, pentagonal, the lateral sides sloping proxi-



Figs. 8—15.

8—11 *Heterometra africana* var. *delagoæ*. 8) Cirrus, 9) P_{II}, 10) P_1, 11) P_2, all $^9/_1$;
12—15 *Embryometra mortenseni*, 12) Cirrus, 13) Basal arm-part, 14) Middle part of arm, 15) Distal pinnule, all $^{11}/_1$.

mally. Distal margins a little everted and curved, the distal tip therefore forming an acute angle.

Brr 1 h=$\frac{1}{2}$ br, a little broader on the outside, contiguous inside in the proximal $\frac{3}{4}$. Br 2 L=$\frac{3}{4}$ br. with the preceding ossicle forming a small synarthrial tubercle. All proximal ossicles a little constricted in the centre, making this part of the arm of a knobby appearance. In the middle and distal Brr this is less and less pronounced; the long side of these ossicles $1\frac{1}{2}$—2 × br. Syzygies 3+4, 9+10, 14+15, then with an interval of 2 muscular articulations.

P_1 10; 3,5 mm., P_2 12; ±5 mm., P_3 10; 3,5 mm., P_4 usually absent, P_5 and following pinnules present. P_a is absent in 8 cases, P_b, and in most cases also P_c, are present, P_d is often absent, the following pinnules are present. The segments of the proximal pinnules are smooth, 1st pinnular is short, 2nd L=$1\frac{1}{2}$ br, 3rd L=2 br, 4th L=$2\frac{1}{2}$ br, 5th and following L=3—4 br, very indistinctly thickened at the ends. Genital glands small, visible on distal pinnules. Distal pinnules ± 25; ± 11 mm. The 3rd—5th segments, roofing the gonads, a little flattened and broadened. Distal segments L= ± 4 br.

Disc extending to Br 6. Colour (in alchohol) light brownish.

Sp. 2. Dorsal cirrus-free pole of Cd a little arched, diameter 0,7 mm. C. XXII 18—19; ± 7 mm. strongly curved, fixing to part of a sponge, arranged in a close double whorl. Longest cirrals L about $1\frac{1}{3}$ br.

Arms X; ± 65 mm. RR well visible, h=$\frac{1}{4}$ br, laterally soldered together except in the distalmost $\frac{1}{4}$. I Br 1 h=$\frac{2}{3}$ br well separated from each other. I Ax L=br, almost hexagonal, with I Br 1 forming an obsolete synarthrial thickening.

Example of pinnulation and distribution of syzygies.

I 1—2 { Br 1—$\bar{2}$ 3+4 $\bar{5}$ $\underline{6}$ $\bar{7}$ $\underline{8}$ 9+10 11 12 $\underline{13}$ 14+$\overline{15}$ $\underline{16}$ 17+$\overline{18}$ $\underline{19}$ 20+$\overline{21}$ . . .
Br 1—$\underline{2}$ 3+4 $\underline{5}$ $\bar{6}$ $\underline{7}$ 8 9+10 11 $\underline{12}$ $\overline{13}$ 14+$\underline{15}$ $\overline{16}$ 17+$\underline{18}$ $\overline{19}$ 20+$\underline{21}$ . . .

P_1—P_3 are present. P_4 is almost always absent. P_a is absent 8 cases, P_b and P_c are present, P_d absent. P_7 and P_f bear the first genital glands.

P_1 9; 3 mm. smooth and curved in over the high disc. 1 segment L=to $1\frac{1}{3}$ br, 2nd L=$1\frac{1}{2}$ br, 3rd L=$2\frac{1}{2}$ br, 4th L=3 br, 5th L=$3\frac{1}{2}$ br. Distal segments a little longer still, tapering distally. P_2 ± 10; 4 mm. + (probably 4,5 mm. in all) stouter and stiffer than P_1, tips covering surface of disc. 3rd segment L=3 br, longest segments L=4 br. P_3 ± 8; 2,5 mm. P_6 11; 3,5 mm. P_7 11; 4,5 mm. From this pinnule onwards there are genital glands, well developed, from the 3rd to the 5th pinnulars. Distal pinnules 17; 6 mm. 1st segment L=$\frac{1}{2}$ br, 2nd L=$1\frac{1}{2}$ br, 3rd L=3 br. Longest pinnulars 4—5 br.

Disc extending to Br 6. Anal funnel long, distinctly visible between the arms, naked. Colour (in alcohol) whitish, perisome and soft parts of pinnules brown. Pinnules light brown.

Sp. 3. Cirri fixed to a hydroid XVI 17; 6,5 mm. Arms ± 50 mm. P_a absent in all cases; P_4, P_d, and sometimes P_5 absent.

Sp. 4. Cd a flattened hemisphere with some interradial pits. C. XII 14—18; to 6,5 mm. Arms 35 mm.+. No BB visible. Pinnulation as before but sometimes P_3 and P_c are also absent. Disc thrown off.

With its long Brr and rather bead-like proximal arm-parts, and with the few-jointed cirri lacking dorsal spine or carination, this new form has a very close resemblance to the *Antedoninæ*. As P_a is absent one might think of the subfamily *Perometrinæ*, but the forms included there are characterized by much longer cirri with more cirrals which, besides, are provided with spines. The other subfamily of *Antedonidæ* to be considered here is the *Antedoninæ*. Within this subfamily *Andrometra* is the only genus which approaches the new form by having the same proportion between the proximal pinnules. But in this genus the Cd is conical and the charactere of the proximal arm-parts very different. Besides, the defective pinnulation would be something unique within the *Antedoninæ*.

In spite of a very Antedonid appearance this new form is probably most correctly to be ranged within the *Colobometridæ*. The cirri, while as to appearance of the cirrals approaching the *Antedoninæ*, because of their distal collars resemble cirrals in e. g. some species of *Decametra*. Moreover, only very rarely in the *Antedonidæ* P_2 is the longest pinnule, while in the *Colobometridæ* this is a very usual feature.

The curious pinnulation may partly be an adolescent phenomenon, as in the largest specimen the distal pinnule-gap is filled up in some rays. Still, this being the case it is a phenomenon unparallelled that a comatulid does not fill up the pinnule-gap before the time when the pinnules get swollen genital glands.

However, even if full-grown specimens should turn out to have a complete pinnulation, the new genus is easily distinguished from every comatulid genus hitherto described by combining the following characteristics: Hemispheric Cd, short and few cirrals without spines but with indistinct distal collars, long-jointed and knobby arms and very long but smooth pinnulars, P_2 being the longest pinnule, and P_a being absent.

When in 1922 describing the new genus *Clarkometra* I placed it in the sub-fam. *Perometrinæ* of the *Antedonidæ*. (Nov. Act. Soc. Sci. Upsal. Ser. 4 Vol. 5 No. 6, p. 142). A. H. Clark, as it seems to me quite correctly, has later transferred it to the *Colobometridæ* (1936 Temminckia Vol. 1, p. 310). *Embryometra* is still one such very difficult intermediate link between the *Colobometridæ* and some types of the *Antedonidæ*. As to the diagnosis of the former family, *Embryometra* falls outside the *Colobometridæ*, but a careful investigation of its characteristics seem to place it as a near relative of this family. In 1924 I pointed out that the *Macrophreata* must be considered as a group of polyphyletic origin and that there are probably series within the *Antedonidæ* which have their ancestors near the *Colobometridæ*. The evolution within the comatulids proceeds towards an ideal type, more or less Antedonid in appearance, and therefore a decision about the systematic position may in some cases be rendered extremely difficult. The new form described above

seems to me to be one more proof for my opinion expressed on the occasion quoted (Zool. Bidr. Uppsala Bd. 9, p. 241).

Tropiometridæ.

Tropiometra carinata (Lam.).

S. Africa P. 2001 } Portugese { 2 spp. C 23; 20 mm. and 21; ± 12 mm. resp.
P. 2012 } East Africa { 1 sp.

Tropiometra clarki nov. nom.

Pl. 1 fig. 4.

S. Africa, False Bay, 17 fath. Stone, (Mortensen Coll. St. 66) 19 XII 1929. 1 sp.

Cd. discoidal, diameter 7,5 mm. Flat dorsal surface 6 mm.

C. XXI 28—32; 25—36 mm. in a partly double whorl. All segments short. Proximal ones L=$\frac{1}{3}$ br, distal ones =$\frac{1}{2}$—$\frac{2}{3}$ br, in profile a little constricted proximally, the profile thereby slightly serrated. No dorsal spines present. There are traces of a very indistinct opposing spine.

Arms X; 110 mm. +. RR visible as very narrow bands which are almost broken off in their centre. I Br 1 h=$\frac{1}{6}$ br. I Ax triangular (h=$\frac{1}{2}$ br., br=6,5 mm.) with the preceding ossicle forming a blunt synarthrial eminence. Br 1 twice as broad on the outer side, almost free from each other inside over the tip of I Ax. Br 2 broader on the outside too, in close apposition laterally with adjacent rays though not flattened against them. Brr rectangular till about Br 10, then wedge-shaped and a little thickened, especially in the mediodorsal line along the distal rim. This thickening by and by develops into a blunt dorsal spine which is distinctly visible in lateral view in the middle part of the arm. Distally it disappears again. Middle and distal Brr short and discoidal L=$\frac{1}{4}$—$\frac{1}{6}$ br.

Example of distribution of syzygies.

I 1—2 { Br 1—2 3+4 ... 7+8 ... 10+11 ... 18+19 ... 28+29 ...
Br 1—2 3+4 ... 7+8 ... 14+15 ... 23+24 ... 32+33 ...

Distally there are syzygies with an interval of 8—13 muscular articulations.

P_1 21; 15,5 mm. P_2 20; 13 mm. P_3 23; 14 mm, P_4 21; 13 mm. All proximal pinnules smooth, angular after the first few pinnulars. P_1 is slender, P_2 and following pinnules with a long genital gland. Distal pinnules ± 32; 11—12 mm.

Colour: Cd, cirri, and basal arm-parts purplish brown. Middle and distal arm parts and pinnules mottled white and dark purplish.

This species seems to be chiefly the same as some of the specimens which A. H. Clark has called *Tr. encrinus*. A. H. Clark in a letter to me (June

29th 1937) says that his earlier references to *Tr. encrinus* are very much mixed up. In the original description of this species (Proc. U. S. Nat. Mus. Vol. 40, p. 36) the number of cirrus-segments was taken from specimens of *indica* from Ceylon which at that time he did not distinguish from *encrinus*. The specimens from Ceylon described in Crin. Indian Ocean in 1912 are *indica*, not *encrinus*. At the time of the Siboga Report Mr CLARK says that he had not seen any of the large specimens from India which he later determined as *encrinus*.

The type-specimen of *encrinus* from »Eastern Asia», in the Berlin Museum, No. 5336 (cf. also Proc. U. S. Nat. Mus. Vol. 43, p. 402), is according to Mr CLARK probably identical with *Tr. carinata*. On the other hand, under the name of *Tr. encrinus*, specimens are described and figured in 1932 (Rec. Ind. Museum Vol. 34, p. 561 ff., Pls. 19, 20) which seem to be almost identical with my specimen described above. The only difference of any importance is that in my specimen there is a well-developed dorsal spine on the Brr of the middle arm-part.

Mr CLARK says that the confusion in regard to *Tr. encrinus* is most unfortunate, but he recommends giving a new name to the specimen from Mandapam described in detail on p. 561 (op. cit. 1932), which should then be the type. I do this, as it gives me the pleasure of dedicating the species to my old friend Mr A. H. CLARK.

The long and many-jointed cirri, together with the stout arm-bases and tolerably short arms, easily distinguish this species from those which are described earlier.

Thalassometridæ.

Crotalometra magnicirra (BELL).

N.W. $\frac{1}{2}$ W of Buffalo River (East London). 300 fath. Sand, broken shells, (Pieter Faure 12725) 1 sp. dried (Sp. 1)

20 miles N.W. $\frac{1}{2}$ N. of East London 400—450 fath. Sand, stones, (Pieter Faure 12792 A) 2 spp. dried (Spp. 2—3).

$7\frac{1}{2}$ miles N. W. × N. of Umhlangakulu River (Southern Natal Coast). 50 fath. Sand, gravel, sponge fragments, (Pieter Faure 12831). 1 sp. dried (Sp. 4).

29° 51′ S. 31° 28′ E. (Union S. Africa 3719—20) 1 sp. dried (Sp. 5).

U. 4068, 1 sp. (Sp. 6).

29° 34′ S. 31° 32′ E. (U. 6244) 2 spp. (Spp. 7—8).

Sp. 1. —

Sp. 2. A small specimen. Cd dorsally spinous. 39 cirrus-joints. I Br 1—2 with an indistinct length-running crest. These ossicles otherwise smooth. Arms X; ± 75 mm.

Sp. 3. Larger sp. 50 cirrus joints. Margins of I Br ossicles everted, the evertions being provided with a fine denticulation. Arms XVI. After II Ax Br 1+2 3+4.

Sp. 4. One cirrus retained 63; 70 mm. Arms XX; 80 mm.
Sp. 5. C. ± 50; 55 mm.
Sp. 6. C. in X rows ± 60; 65 mm. Arms XX; 110 mm. +.
Sp. 7. II Br 2 in 4 cases out of 10.
Sp. 8. II Br 4 probably in all cases. Arms badly broken.

Charitometridæ.

Pachylometra sclateri (Bell) (?)

Text-figs. 16—17. Pl. 2 fig. 7.

15 miles N. of East London, 310 fath. Mud. (Pieter Faure 12884). 3 spp. juv., dried. (cf. H. L. Clark 1923, p. 234) (Spp. 1—3).

From off Durban S. Africa. 225 fath. Sandy mud. 26 VIII 1929 (Mortensen Coll. St. 25) 1 sp. (Sp. 4).

Spp. 1—3. Cd flattened conical. C. in about XII columns, XVII 15—19; 6—7 mm. Longest cirrus-joints L=1⅓ br. Opposing spine present. Cirrus otherwise smooth.

All are X-armed young. Synarthrial articulations with a small, narrow, low, and indistinct tubercle. First syzygy Br 3+4, 2nd Br 9+10 usually. In one specimen the first syzygy is sometimes substituted by a synarthry, thus Br 1—2 3—4. Distal syzygies with an interval of 2 muscular articulations.

Sp. 4. Cd subhemispherical, diameter 1,7 mm.

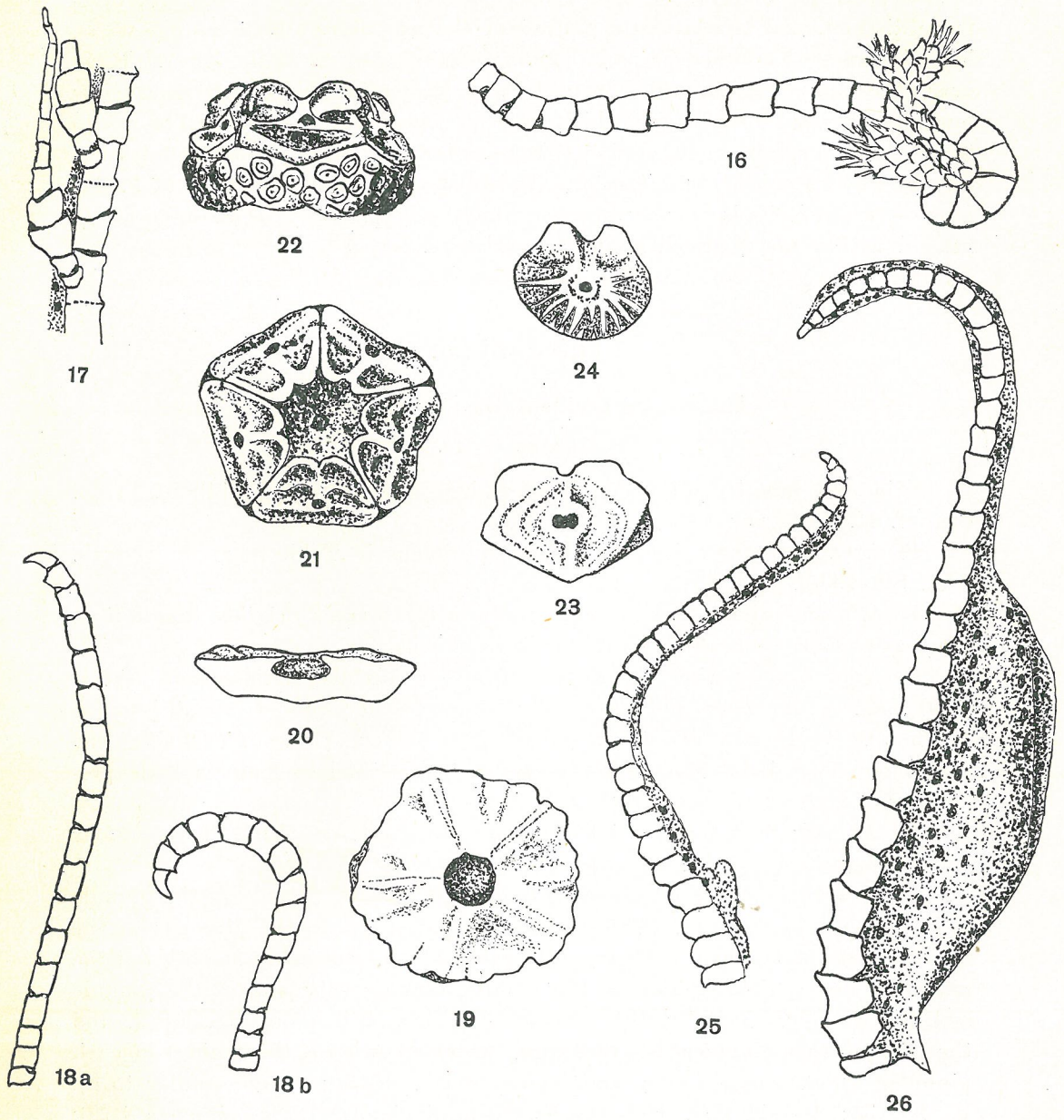
C. X 21; 9 mm. The cirrals after the second or third segments a little longer than broad, slightly widened distally, dorsal profile therefore serrated, the cirrals provided with a distinct keel, but no real dorsal spine. Opposing spine present. Terminal claw shorter than the preceding segment.

Arms X; 25 mm. +, broken. RR broad bands, h=¼ br, a little everted and thickened distally and laterally. I Br 1 h=½ br, thickened and everted laterally and inconspicuously everted distally. There is a similar evertion also in I Ax., which is pentagonal h=⅔ br, but then the arms become more and more smooth. In one abnormal ray there is an incomplete third I Br. Proximal arm-parts wall-sided out to Br 5. There is a small but distinct synarthrial tubercle. Proximal articulations usually 1—2 3+4 but sometimes 1 2+3 or 1—2 3+4 5+6. Distal syzygies with an interval of 2(—3) muscular articulations. The Brr after Br 10 begin to be wedge-shaped but they always remain smooth dorsally.

P_1 ± 9; ± 2,5 mm. stout, longest joints L=1½ br. Following pinnules mostly broken. Genital pinnules ± 12, with the 3rd and 4th segments very much expanded.

Colour in alcohol white, disc brown, studded with calcareous plates.

I am rather much in doubt whether the specimens described above are in reality referable to *Pachylometra sclateri*. The smaller specimens (Spp. 1—3)



Figs. 16—26.

16—17 *Pachylometra sclateri*(?) Sp. 4, 16) Cirrus; 17) Middle arm-part with genital pinnules; 18—26 *Annametra occidentalis*. 18 a and b 2 cirri; 19) Ventral view of a Cd; 20) Another Cd in cross section; 21) Radial pentagon ventral view; 22) Cd and radial ring lateral view; 23) I Br 1 dist.; 24) Br 3 dist.; 25) P_1; 26) P_3 with the first genital gland.
(Figs. 16, 17, 23—26 $^{11}/_{1}$, 18—22 $^{9}/_{1}$.)

are from one of the stations where H. L. CLARK got his young specimens. Sp. 4 is a little larger, the keel on the dorsal side of the cirrals somewhat more distinct, and the lateral sculpture of the arm-bases a little more obvious, but the general appearance and distance of the syzygies is the same. However, the specimen is still X-armed, and the ossicles of the division-series much longer (a characteristic which may of course be an indication of youth) than in the specimen figured by BELL. In fact, the genital pinnules are closely reminiscent of *Charitometra*. Provided that it is not a young of *Pachylometra sclateri*, it is a new species which may probably be most correctly ranged within the X-armed genus *Charitometra*.

Antedonidæ.

Annametra occidentalis (A. H. CLARK).

Text-figs. 18—26.

Saldhana Bay 10—14 fath. Sand and mussle beds (P. F. 14905). 1 sp. dry (cf. H. L. CLARK 1923, p. 231).

Prof. O. CARLGREN dredged several specimens in Table Bay, 10—15 fath. (Oct. 8th 1935).

I give here some complementary notices to CLARK's original description. They are taken from Prof. CARLGREN's specimens.

Syzygies usually with an interval of 4(—6) muscular articulations. Arms ± 50 mm. with short and proximally rather broad joints, L about ½ br (br 1,4 mm.). There are about 24 articulations per cm. (± 18 if excluding the syzygies). The distal rim of the proximal Brr is thickened and a little protruding.

P_1 32—35; 8—8,5 mm. All segments are short, the 5th—12th pinnular being longest, L = ± br, the distal shorter again. About the 3rd—8th pinnular has a knob on its dorsal side, thereby giving the profile of the pinnule a saw-shaped appearance. This feature continues out to the pinnules of the middle parts of the arm. The middle part of P_1 is tolerably smooth but the pinnulars are a little swollen in the middle, making this part of the pinnule a little knobby. Distally this feature becomes still more developed, and the tip of the pinnules is, therefore, provided with a thickening on each pinnular whick reminds of a rudimentary comb. P_2 35; 9 mm. similar to P_1. P_3 28—33; 10—11 mm. with the first genital gland. Distal pinnules ± 20; 5,5 mm, longest joints L = 1⅓—1½ br, 2 or 3 last joints with dorsal hooks. Microscopic single hooks also on a small number of more proximal pinnulars.

As mentioned earlier this species was originally described by A. H. CLARK as a *Cominia*, thus belonging to be *Comasteridæ*. Later on he corrected himself and, creating a new genus for the species, placed in in the *Antedonidæ*. Certainly this curious little species by its puzzling proximal pinnules has a strong resemblance to the family first mentioned. To solve the question

of its systematical affinities I sacrificed two specimens for an examination of the articular facets of the radials and of the Cd. The broad and rounded muscular fossæ of the RR prove beyond any doubt that CLARK was right in removing the form from the *Comasteridæ*. The presence of sacculi also shows that the form cannot be ranged in the family mentioned. There are no basal rods, as was erroneously stated by CLARK in 1915, and a typical rosette occurs.

As to its position within the *Antedonidæ* A. H. CLARK places it in the *Antedoninæ* (1929, Journ. Linn. Soc. Vol. 36, p. 659). At first when investigating the form I was fairly convinced that it was a dwarfed member of the *Heliometrinæ*. It has, namely, the same type of proximal pinnules with many short joints which are carinate proximally and provided with a rudimentary pseudo-comb distally. Moreover, P_2 is similar to P_1 (with the same short joints) and P_3 bears the first genital gland. With its short Brr it seemed to approach *Solanometra*, from which, though, it differed by longer cirrals and pinnulars of the distal pinnules. However, the appearance of the radial facet, which deviates markedly from the high and narrow muscular fossæ shown in e. g. *Heliometra* and *Florometra*, has convinced me that the similarities of the proximal pinnules are only convergences, and that it is most correctly placed in the *Antedoninæ*, where we often have the same broad and rounded radial facets.

Bathycrinidæ.

Democrinus chuni (DÖDERLEIN).

Pl. 2 fig. 8.

From off Durban, S. Africa 225 fath. Sandy mud. 26 VIII 1929 (Mortensen Coll. St. 25). 11 Spp.

Sp. 1. A complete specimen. Stalk 55 mm. with 43 joints in all. First segment short. 2nd cubical, 3rd L=1⅓ br, 4th L=2 br, 5th L=2½ br, 6th and following slowly increasing to L=3 br. From about the 30th segment there are knobby articulations. Rhizoids occur on the last 3 segments. Diameter of stem 0,4—0,5 mm.

BB circlet h 2,0 mm., largest br 1,5 mm. RR h=½ br, br of radial circlet 1,4 mm. Dorsal face of RR pentagonal, with the distal margin evenly concave. Br 1 narrower distally, h=1⅓ distal br. Arms + RR 4,5 mm. 1—2 3+4 5+6 7+$\overline{8}$ 9+$\underline{10}$ ... 15 or 16 joints preserved.

Sp. 2. Stalk 70 mm., with 47 joints. Radiculi from the 39th segment. Diameter of stem 0,5—0,6 mm., longest joints L=2½ br. Length of calyx (including the RR) 4,2 mm. H of BB 3,3 mm., br of basal ring 1,8 mm., br of radial ring 1,7 mm. Br 1 h=⅔ br.

Sp. 3. Stalk 45 mm. with 39 joints. The segments are knobby from the 28th and there are rootlets from the 38th. Stem diameter 0.3—0,4 mm. 2nd joint L=1⅓ br, 6th and following L=3—3½ br.

Length of calyx 2,7 mm., of BB 2,2 mm., diameter of basal ring 1,5 mm., of radial ring 1,4 mm. Br 1 h=br.

The other specimens vary between these extremes. The longest stem is 80 mm. and has 54 segments and there are rootlets on 14 distal joints. The longest stem-joints are L=$2\frac{1}{2}$—3 br, the diameter of the stem-joints varies between 0,4—0,6 mm. Br 2 is usually a little broader than long.

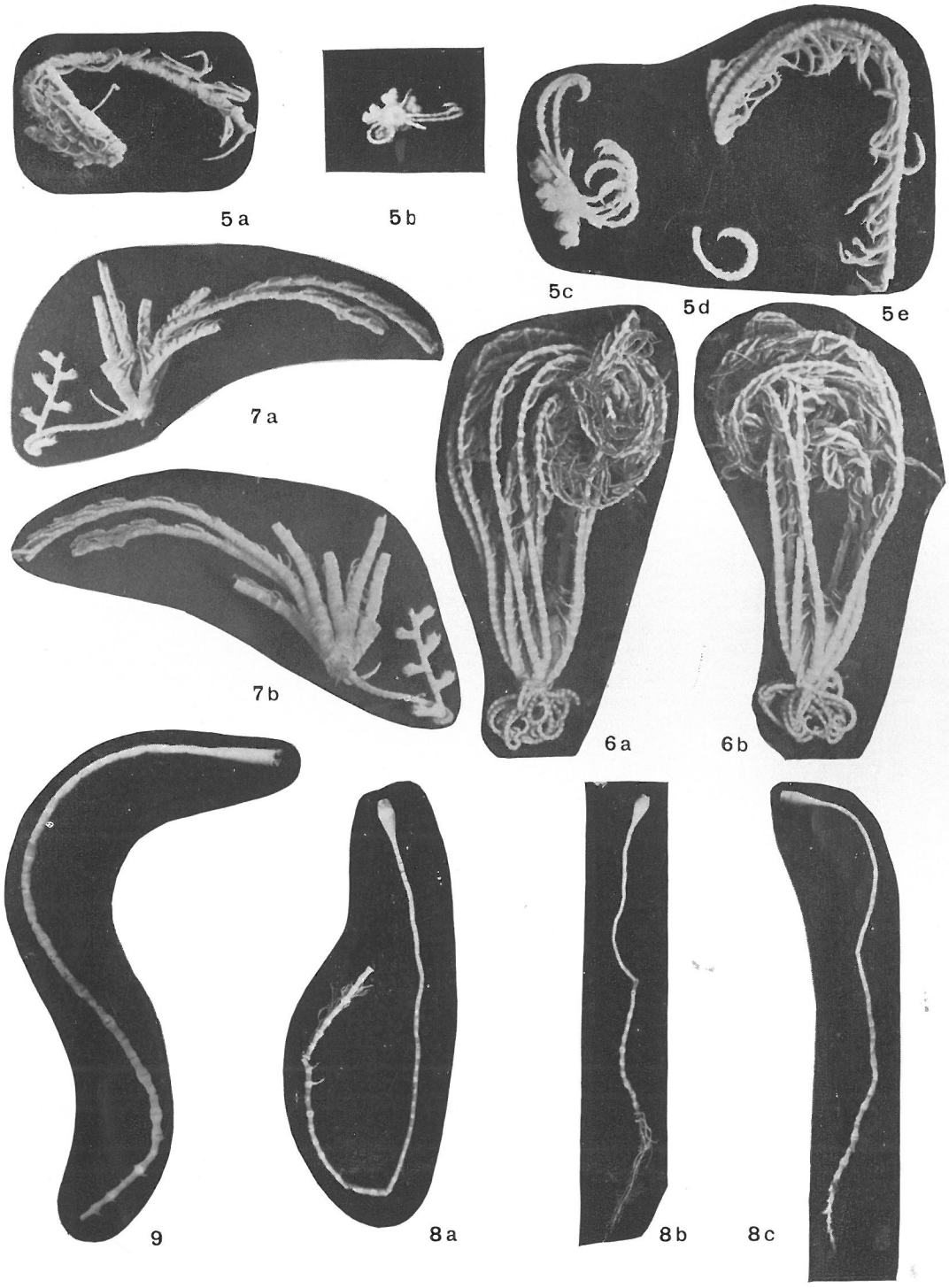
The smallest specimens are typical *chuni*, the largest more or less typical *braueri*. It is to be observed that DÖDERLEIN obtained his *braueri* in the same locality as also *chuni* was found. I think that *braueri* are only large specimens of *chuni*.

On the other hand, after having compared my *braueri* var. *japonicus* (GISLÉN 1927 Videnskabl. Meddel. København Bd. 83, p. 55 ff. figs. 47—80, 85—89) I am convinced that it is a representative for a distinct separate species which I then call *D. japonicus* (Pl. 2 fig. 9).

Tryckt den 3 oktober 1938.

Uppsala 1938. Almqvist & Wiksells Boktryckeri-A.-B.

Figs. 1—4. 1) *Comissia serrata*, × 1⁴/₅; 2) *Comanthus wahlbergii* var. *multibrachia*, × 1⁴/₅; 3) *Heterometra africana* var. *delagoæ*, ¹/₁; 4) *Tropiometra clarki*, × ⁴/₅ nat. size.



Figs. 5—9. 5a—e) *Comatella africana* one cirrus, Cd, and arm-bases in lateral and dorsal view and one ray in ventral and dorso-lateral view, 5b × 1¼, the other × 2; 6) *Embryometra mortenseni* Sp. 1 viewed from two different sides, ²/₁; 7) *Pachylometra sclateri* (?) Sp. 4 viewed from two different sides, × 2—2¼; 8) *Democrinus chuni*, a and b two specimens with typical *chuni*-calyces, c with the calyx approaching the *braueri* type, × 1¼; 9) *Democrinus japonicus*, × 1¼.

Uppsala 1938. Almqvist & Wiksells Boktryckeri-A.-B. 38348