

AUSTRALASIAN ANTARCTIC EXPEDITION

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UNDER THE LEADERSHIP OF SIR DOUGLAS MAWSON, O.B.E., B.E., D.Sc., F.R.S.

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CRINOIDEA

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CRINOIDEA.

By AUSTIN H. CLARK, United States National Museum.

I.—INTRODUCTION.

In spite of all the work that has been done upon the Crinoidea of the Antarctic region, unexpected new forms still appear in every extensive collection from that area.

Because of their dependence upon a definite and narrowly delimited range of conditions, the Crinoidea are very locally distributed in all seas, and although they may be exceedingly abundant in a given region they will not be found unless one happens to hit upon one of the often very circumscribed areas in which they occur.

So we may expect that for some time to come new crinoid types will continue to be found in the Antarctic seas, especially in the deeper waters.

II.—THE ANTARCTIC CRINOID FAUNA.

The following crinoids are found in the Antarctic faunal area—that is, along the shores of the Antarctic continent and about Kerguelen, Heard Island and the South Orkneys—in water of less than 600 fathoms in depth.

ORDER COMATULIDA.

Sub-order MACROPHREATA.

Family ANTEDONIDAE.

Sub-family ZENOMETRINAE.

Eumorphometra concinna A. H. Clark.

Sub-family HELIOMETRINAE.

Promachocrinus kerguelensis P. H. Carpenter.

Solanometra antarctica (P. H. Carpenter).

Florometra mawsoni, sp. nov.

Anthometra adriani (Bell).

Sub-family BATHYMETRINAE.

Isometra vivipara Mortensen.

Thaumatometra nutrix Mortensen.

Family NOTOCRINIDAE.*Notocrinus virilis* Mortensen.

ORDER INADUNATA.

Family PLICATOCRINIDAE.*Ptilocrinus antarcticus* Bather.

The genera *Promachocrinus*, *Solanometra*, *Anthometra* and *Notocrinus* are confined to this region. *Eumorphometra* is represented by another species (*hirsuta*) at Marion Island. *Isometra* is represented by another species off the coast of South America as far north as Montevideo. *Ptilocrinus* is represented by a second, much larger, species (*brucei*) in deep water (2,485 fathoms) in the Antarctic regions, and by a third (*pinnatus*) in deep water (1,588 fathoms) off British Columbia. *Florometra* includes numerous species which range northward from Cape Horn along the western coast of South and North America to Alaska and the Aleutian Islands, and thence southward to southern Japan. The genus *Thaumatometra* is very widely distributed in deep water, although it does not occur in the Arctic or in the eastern Pacific; but there is some doubt whether the species described as *Thaumatometra nutrix* really belongs to this genus.

The genus *Ptilocrinus* is the only genus of stalked crinoids known from the Antarctic in shallow water.

In sharp contrast to the richness of the Antarctic, the Arctic fauna is very poor in crinoids, including only two species. These with their ranges, are:—

Helimetra glacialis (Leach): Arctic seas and southward to the eastern shore of Hudson Bay, Georges Bank, off Cape Cod, Massachusetts, Iceland, the Faeroe Islands, northern Norway (West and East Finmark), and eastward along the Russian coast to the New Siberian (Liakhof) Islands; also (var. *maxima*) from Cape Patience (Terpenia), Sakhalin Island, and the Gulf of Tartary southward along the Asiatic coast to the Korean Straits.

Poliometra proluxa (Sladen): Arctic regions; westward to Grinnell Land, southward to the vicinity of Godhaab, west Greenland, Cape Brewster, east Greenland, the vicinity of Jan Mayen, the cold deeps west, north and east of Iceland, the Faeroe Channel and Finmark, and eastward to Kara Bay and just east of Wilczek Land.

Helimetra glacialis belongs to the Helimetrinae and is closely related to the various species of this sub-family occurring in the Antarctic regions and in the east and north Pacific. *Poliometra proluxa* belongs to the Zenometrinae, and is related, though not very closely, to *Psathyrometra antarctica* which is found on the borders of the Antarctic continent at a depth of 1,430 fathoms.

Among the stalked crinoids the genus *Ilycrinus* (family Bourgueticrinidae) is found, in very deep water, only in the extreme north and south—from Enderby Land to the Crozet Islands (*australis* A. H. Clark), in the cold deeps north of Iceland and the Faeroe Islands (*carpenterii* Danielssen and Koren), and in the north Pacific from south-eastern Alaska to the Commander Islands (*complanatus* A. H. Clark).

The unstalked crinoids or comatulids which occur in the Antarctic in less than 600 fathoms may be differentiated by means of the following key.

III.—KEY TO THE UNSTALKED CRINOIDS (COMATULIDS) OF THE ANTARCTIC.

- a*¹ Ten rays and 20 arms (small specimens may have less than 10 rays, but never less than 6 rays, with twelve arms) *Promachocrinus kerguelensis*.
- a*² Five rays and 10 arms—
- b*¹ First pinnule (*P*₁) composed of very short segments, few or none of which are longer than broad.
- c*¹ Proximal pinnules shorter than those following, and *P*₁ shorter than *P*₂; dorsal perisome between the arm bases heavily and completely plated; ventral surface of the disk with very numerous plates, especially in the anal area; colour in life crimson, red-brown or brown when preserved *Notocrinus virilis*.
- c*² Proximal pinnules longer than those immediately following; *P*₁ longer than *P*₂, or *P*₁ and *P*₂ of the same length and longer than *P*₃; dorsal perisome between the arm bases and ventral surface of the disk wholly without plates; colour in life yellow, of flesh colour with the pinnules pink, never crimson.
- d*¹ Elements of the division series and brachials with a conspicuous and usually high narrow median keel; segments of *P*₁ from the base to the tip with high carinate processes on the outer side; *P*₂ much shorter than *P*₁ and composed of segments most of which are much longer than broad; in life flesh coloured with the pinnules pink *Anthometra adriani*.
- d*² Elements of the division series and brachials without high and narrow median keels; *P*₂ of about the same length as *P*₁; in life bright yellow.
- e*¹ Large and robust, the arms about 125 mm. long; *P*₁ with about 60 segments; cirri with about 40 segments, most of which are not longer than broad; brachials beyond the third syzygy short, much broader than the length of the longer side; dorsal surface of the brachials before the third syzygy smooth *Solanometra antarctica*.
- e*² Smaller and more slender, the arms not more than 85 mm. long; *P*₁ with not more than 36 segments; cirri with not more than 30 segments, those in the proximal two-thirds (except the basal) much longer

than broad; brachials beyond the third syzygy nearly or quite as long on the longer side as broad; brachials before the third syzygy with an abruptly elevated spinous patch in the distal portion of the dorsal surface, or with the distal edge everted and much produced ...

Florometra mawsoni, sp. n.

*b*² First pinnule (*P*₁) composed of segments which, except for the basal, are much elongated.

*c*¹ Genital pinnules with the second and third segments greatly expanded, forming a broad chamber (♀), or with the second-sixth segments broadened, most so on the second-fourth and less so on the fifth and sixth (♂); arms about 65 or 70 mm. long; cirri with 28-35 segments, few or none of which are appreciably longer than broad

Isometra vivipara.

*c*² No expansion of the segments of the genital pinnules.

*d*¹ Cirrus segments without dorsal processes, except for the opposing spine; about XLV cirri, which are closely set on a low rounded conical centrodorsal; elements of the division series and brachials smooth

Thaumatometra nutrix.

*d*² Shorter segments in the outer half or two-thirds of the cirri sharply carinate dorsally with prominent dorsal spines; about XXX cirri, which are arranged in ten crowded columns, two beneath each radial, on a long sharply conical centro dorsal; elements of the division series and lower brachials with very spiny edges and numerous fine spines on the dorsal surface; arms 30 mm. long; cirri with 20-23 segments, 7 mm. long

Eumorphometra concinna.

IV.—DESCRIPTION OF MATERIAL SUBMITTED FOR REPORT.

Family ANTEDONIDAE *Norman* (emend. A. H. Clark).

Sub-family HELIOMETRINAE *A. H. Clark*.

Genus PROMACHOCRINUS *P. H. Carpenter*.

PROMACHOCRINUS KERGUELENSIS *P. H. Carpenter*.

Localities.—Station 1, 354 fathoms, December 22, 1913 (thirty-six); Station 2, 318 fathoms, December 28, 1913 (seven); Station 3, 157 fathoms, December 31, 1913 (three); Station 8, 120 fathoms, January 27, 1914 (two); Station 9, 240 fathoms, January 28, 1914 (five); Station 10, 325 fathoms, January 29, 1914 (three); Station 12, 110 fathoms, January 31, 1914 (eight).

Distribution.—Shores of the Antarctic continent, and also Heard Island, Kerguelen, and South Georgia. The bathymetric range is from 10 to 354 fathoms.

This is the commonest and most widely distributed, and also the largest, of the Antarctic crinoids.

Colour in life.—Arms white, pinnules, and occasionally the cirri also, light heliotrope or violet, the ventral surface yellow or yellowish (Station 2). Sometimes the arms are narrowly banded with violet at the syzygies (Station 10).

Notes.—Of the sixty-four specimens in the collection, fifty-three have the usual 10 rays and 20 arms. One example has 10 rays and 22 arms (Station 12), one of the IBr axillaries bearing two IBr series, resembling the IBr series, each with two arms. Four specimens have 9 rays and 18 arms (Stations 1, 2 [2], and 3). Three specimens have 8 rays and 16 arms (Stations 2, 8, and 12). Three specimens have 6 rays and 12 arms (Stations 1 [2], and 8). Except for the 9-rayed examples, these are all much less than full size. The 8-rayed specimen from Station 8 is about two-thirds grown, and that from Station 12 is very small. The 6-rayed specimens are half the normal size or smaller.

In the specimen with two IBr series and 22 arms (Station 1) one of the IBr series is normally developed. The second is situated on the left distal face of the IBr axillary and is turned so that its dorsoventral axis makes an angle of 90° with the dorsoventral axis of the other, and of the IBr series which bears them. The axillary of this IBr series therefore has one of its lateral angles (the right) extending directly outward while the other (the left) is directed inward. Of the two arms arising from this axillary, one (which normally would be the right) extends outward from the general circle of arms with its dorsal surface to the left, while the other (normally the left) extends inward within the circle of arms and is not visible in external view.

In some of the specimens (Station 9) the middle two-thirds of the outer half of the fourth and following brachials is abruptly elevated and densely covered with very small erect spines; or (Stations 2, 10) on the sixth and following brachials a triangular area with the base occupying the entire dorsal portion of the distal edge and the apex in about the middle of the middorsal line is abruptly elevated and finely spinous. This elevation of a portion of the dorsal surface of the brachials disappears at about the thirtieth brachial, after which point the brachials have slightly produced and strongly serrate distal ends and sometimes a roughened dorsal surface.

Some individuals (Station 1) show no elevation at the synarthrial lines, while in others (Station 1) there are rather prominent small conical synarthrial tubercles.

The longest complete cirri (Stations 1, 10) are 70–80 mm. long and consist of 36–40 segments. The terminal claw is long, sharp, and very slender, gently curved in the proximal third but becoming straight in the outer two-thirds.

In the largest specimen with well preserved arms these are about 150 mm. in length; but in some of the specimens the arms must have been nearly or quite 200 mm. long.

Genus SOLANOMETRA A. H. Clark.

SOLANOMETRA ANTARCTICA (P. H. Carpenter).

Localities.—Station 1, 354 fathoms, December 22, 1913 (one); Station 3, 157 fathoms, December 31, 1913 (five); no locality (three).

Distribution.—Known only from Heard Island, the "Discovery" stations at Winter Quarters and near Mts. Erebus and Terror, and the "Aurora" stations listed above. The bathymetric range is from 75 to 354 fathoms.

Colour in life.—Yellow.

Remarks.—This species is easily distinguished from its relatives by the short cirri with not more than 40 segments of which the longest are about twice as long as broad, and the majority, in large cirri, are broader than long. The segments have rather flaring ends which give them a very characteristic appearance. The brachials beyond the oblong proximal are short, twice as broad as their greater (exterior) length. The axillaries are very broad, broader than long. P_3 is more like P_4 than it is like P_2 , and the segments of the outer pinnules are strikingly short.

In general appearance this species is extraordinarily like the Arctic *Helionetra glacialis*.

The six-rayed specimen of this species recorded (as *Antedon antarctica*) from the "Terra Nova" collections by Professor F. Jeffrey Bell in 1917 is undoubtedly an example of *Promachocrinus kerguelensis*.

Genus FLOROMETRA A. H. Clark.

FLOROMETRA MAWSONI, *sp. nov.*

? *Antedon antarctica* (part) Bell, National Antarctic Exped., Nat. Hist., 4, Echinod., 1908, p. 4 ("Discovery"; Winter Quarters).

? *Solanometra antarctica* (part) A. H. Clark, Smithsonian Miscellaneous Collections, 61, No. 15, 1913, p. 61, No. 3 ("Discovery"; Winter Quarters).

Promachocrinus (Promachocrinus) kerguelensis (part) A. H. Clark, Die Crinoiden der Antarktis, 1915, p. 130 [bottom of page]; pl. 4, figs. 1a, 1b (vicinity of Gaussberg, 222 fathoms).

Description.—The centrodorsal is moderate in size, flattened hemispherical, with numerous (from 60 to 80) cirrus sockets which are closely crowded and irregularly arranged, though on the apical half showing a tendency to become aligned in columns. Beneath each radial there are between four and five sockets, irregularly alternating higher and lower, one or more being smaller than the others.

The cirri are XL-L, 27-29, the longest 20-25 mm. in length. The first segment is very short, the second is from half again to twice as broad as long, the third is half again as long as its median width, and the fifth-seventh are about three times as long as their median width; those following very slowly decrease in length so that the outermost fourteen or fifteen are about as long as the distal width, except that the penultimate, which is narrower than those preceding, is from half again to twice as long

as broad, and the antepenultimate may be somewhat elongated. The third and following segments are constricted centrally with the dorsal and ventral (and also lateral) profiles markedly and evenly concave and the flaring distal ends overlapping the bases of the succeeding segments all round, though somewhat more strongly dorsally than elsewhere. As the segments decrease in length distally the dorsal and dorsolateral portions of their distal borders become more strongly produced and at the same time finely spinous, with a prominent tooth in the middorsal line. On the short outermost segments the dorsal surface becomes sharply carinate. As a result of the production of the dorsal surface of the segments the dorsal profile of the outer half of the cirri is very strongly and conspicuously serrate. The opposing spine is very small, low, conical, and subterminal in position, rarely somewhat elongated. The terminal claw is as long as, or longer than, the penultimate segment, and is very slender and only moderately curved.

The distal edges of the radials are even with the rim of the centrodorsal in the midradial line, but curve strongly upward in the interradian angles where they are considerably produced outwardly, the general surface of the interradian triangle formed by the anterolateral portions of two adjacent radials being deeply sunken. The edges of the radials are very finely spinous.

The IBr_1 are exceedingly short and band-like, between six and eight times as broad as the median length, broadly chevron-shaped, with the lateral borders convergent distally. The lateral portions of the distal edge are more or less strongly armed with fine spines. The IBr_2 (axillaries) are rhombic, somewhat broader than long, with all the sides rather strongly and almost equally concave. Their lateral angles project for some distance beyond the obtuse anterolateral angles of the IBr_1 . The anterior (distal) edges are finely spinous.

The 10 arms are about 85 mm. long. The first brachials are five or six times as long exteriorly as interiorly. From the inner side their distal border runs parallel to the proximal border to beneath the posterior projection of the second brachial, then turns distally and runs at an angle of about 45° with the proximal border to the outer distal angle. The distal edge is roughened with numerous very small spines, the roughening being broadest in the middle. The second brachials are very much larger than the first and are irregularly quadrate. Their outer border is about as long as the outer border of the first. A small area, roughly a right-angled triangle with the hypotenuse coinciding with the distal border and the opposite angle proximal and median, is roughened with fine short spines. The first syzygial pair (composed of brachials 3 + 4) is almost oblong, but slightly longer interiorly than exteriorly, with the proximal and distal borders slightly concave. The central half of the distal border is somewhat produced and is armed with short spines, this production being broadest in the median line. The next four brachials are wedge-shaped with strongly concave ends, twice as broad as the median length, with the longer side about half again as long as the shorter. The distal border is abruptly everted, and the central half is strongly produced at right

angles to the axis of the arm, forming (as viewed along the arm) a high rounded triangular coarsely spinous process. Shortly after the second syzygy the brachials become very obliquely wedge-shaped with strongly concave ends, not quite so long as broad, with the distal border rather strongly but evenly produced and coarsely spinous. Distally the brachials become gradually less and less obliquely wedge-shaped, and toward the end of the arms somewhat longer than broad and slightly constricted basally. The coarsely spinous production of the distal edge is conspicuous to the arm tips.

Syzygies occur between brachials 3 + 4, 9 + 10 and 14 + 15, and distally at intervals of 3 muscular articulations.

P_1 is 10 mm. long, very slender, flexible and flagellate, and is composed of 36 segments of which the first is between two and three times as broad as long, those succeeding gradually increasing in length and becoming about as long as broad on the eighth and very slightly longer than broad on the thirteenth-fifteenth, the remainder being about as long as broad. The third-fifth segments have the outer edge (the edge toward the arm tip) somewhat swollen and produced into a roundedly angular blunt-edged process, which on the next two segments is truncated and lower. The last eighteen segments have the side toward the arm tip with a prominent rounded process which is minutely spinous on the crest, the distal profile of this portion of the pinnule being prominently scalloped as in *Anthometra adriani*. On the six or eight segments preceding these, going toward the base of the pinnule, the swelling of the edge of the segments becomes more and more restricted to the distal end, and also progressively lower, finally disappearing altogether.

P_2 is of about the same length as P_1 , but it is considerably stouter basally, somewhat less flexible, and is composed of only 30 segments. The first segment is twice as broad as long, trapezoidal, the second is longer with the proximal angles broadly truncated, the third is about as long as broad, and the ninth and following are about twice as long as the width of their proximal ends. Distally the segments become shorter again, the last four or five being about as long as their greatest width. On the tenth segment the median portion of the distal border of the side toward the arm tip becomes swollen and minutely spinous. On the segments succeeding this swelling rises in height and extends basally so that the end of each segment on the side toward the arm tip projects some distance beyond the base of the following segment, the dorsal profile running in a straight line from the apex of this production to the base of the segment. Gradually the maximum height of this projection moves basally, and on the last four or five segments is about in the middle, so that the segments are seen to be provided, on the side toward the arm tip, with a conspicuous evenly rounded finely spinous blunt-edged crest.

P_3 is 8 mm. long with 16 segments, somewhat stouter basally than P_2 , less flexible, and tapering evenly from the base to the tip. The first segment is about three times as broad as long, the second is broader than long with the proximal angles broadly truncated, the third is nearly or quite half again as long as broad, the fifth is twice as

long as broad, and those following slowly increase in length, becoming about three times as long as broad distally. The side of the segments toward the arm tip bears a rather broad roughened line of fine spines and a slight and inconspicuous tuft of longer spines at the distal end, while the distal ends of the outer segments are slightly produced and finely spinous.

P_4 is 7 mm. long with 16 segments, and resemble P_3 .

The distal pinnules are about 15 mm. long with 25 segments which have a broad roughened or minutely spinular line along the side toward the arm tip.

Localities.—Station 2, 318 fathoms, December 28, 1913 (two); Station 8, 120 fathoms, January 27, 1914 (six); Station 9, 240 fathoms, January 28, 1914 (two); Station 10, 325 fathoms, January 29, 1914 (four); Station 12, 110 fathoms, January 31, 1914 (eleven); no data (two).

Distribution.—Known only between Lat. $64^{\circ} 32'$ and $66^{\circ} 55'$ S., from Long. $94^{\circ} 17'$ to $145^{\circ} 21'$ E. The bathymetric range is from 110 to 325 fathoms.

Notes.—This species is described from one of the two specimens from Station 2; the other is similar to the one described.

Other specimens show that the centrodorsal varies from low flattened hemispherical or broadly truncated conical in the larger examples to conical with slightly swollen sides, about twice as broad at the base as high, in the smaller. The arms in fully grown individuals vary from about 70 to 85 mm. in length. P_1 has from 26 to 36 (usually about 30) segments. The longest cirri are 25 mm. long with 26–29 segments.

The proximal brachials either have the middle portion of the distal edge greatly produced into a thin rounded triangular deeply serrate fin-like process at right angles to the axis of the arm, or there may be on the dorsal surface an abruptly elevated triangular area thickly studded with minute spines with the base occupying about the middle half of the distal edge and the more or less rounded apex on, or very near, the proximal edge. In a lateral view of the arms these elevated spinous areas appear as high rounded processes which are about their own width apart; but they may become much narrowed and restricted to the distal half or less of the brachials, in which case they appear as short and broadly rounded carinate processes.

The entire absence of any median carination on the elements of the division series and first two brachials at once distinguishes this species from similarly small specimens of *Anthometra adriani*.

In the British Museum there are several small comatulids collected by the "Discovery" at Winter Quarters of which I wrote in 1913 that they "are probably *antarctica*, but their small size renders accurate determination difficult." It is quite likely that these will prove to represent the present species.

In 1915 I recorded and figured what I considered at the time to be a half grown individual of *Promachocrinus kerguelensis* with 5 rays and 10 arms which had been dredged by the "Gauss" in 222 fathoms (400 metres) in the vicinity of Gaussberg. In this specimen the cirri were said to be 52 mm. long with 33-37 segments. The centrodorsal is conical, 4 mm. broad at the base and 4 mm. high, and shows no resorption at the dorsal pole. The dorsal surface of the earlier brachials is thickly beset with fine spines.

This specimen was figured natural size (fig. 1a) and also twice natural size (fig. 1b). The original photographs were not very clear, and the background was blocked out by myself. While the larger figure does not show the scalloped profile so characteristic of the arm bases of this species, this is indicated in the smaller figure on the left side, so that it may have been inadvertently obliterated in the larger figure in the blocking out process.

I am now inclined to believe that this so-called 5-rayed individual of *Promachocrinus kerguelensis* is in reality a specimen of *Florometra mawsoni*, and that the cirri described (52 mm. in length with 33-37 segments) may have come from a different individual.

Remarks.—There seems to be no doubt that this species is properly referable to the genus *Florometra*, from the other species of which it differs only in the much smaller size and in the greater development of the modification of the dorsal surface and distal edges of the earlier brachials.

The genus *Florometra* ranges from Cape Horn northward along the western coasts of South and North America to the Bering Sea, westward along the Aleutian Islands, and southward along the Pacific coast of Japan to Sagami Bay in southern Japan. It has not previously been found in the Antarctic seas.

Genus ANTHOMETRA *A. H. Clark.*

ANTHOMETRA ADRIANI (*Bell*).

Localities.—Station 1, 354 fathoms, December 22, 1913 (twenty-three); Station 2, 318 fathoms, December 28, 1913 (four); Station 3, 157 fathoms, December 31, 1913 (three); Station 8, 120 fathoms, January 27, 1914 (one); Station 9, 246 fathoms, January 28, 1914 (two); Station 12, 110 fathoms, January 31, 1914 (fifteen).

Distribution.—Confined to the shores of the Antarctic continent where it is generally distributed and common, being, except for *Promachocrinus kerguelensis*, the most abundant crinoid. The bathymetric range is from 110 to 354 (? 500) fathoms.

Colour in life.—Arms flesh colour, the pinnules pink.

Notes.—The longest cirri (Station 12) are 90 mm. long with 81 segments. The first segment is about four times as broad as long, the next three are about three times as broad as long, the fifth is slightly over twice as broad as long, the sixth is nearly as long as broad, the seventh is one third again as long as broad, and the ninth-twelfth are nearly twice as long as broad. The segments following very slowly decrease in length

so that the last eight are scarcely longer than broad. After about the twelfth the median portion of the distal dorsal border becomes very slightly prominent. In dorsal view the middle third of the distal edge is seen to be slightly bowed outward and serrate. Later this becomes slightly elevated and more strongly serrate, appearing in lateral view as a slight terminal spine directed obliquely forward. Distally this projection slowly narrows, on about the tenth segment from the end the dorsal surface of the segments becoming broadly and roundedly subcarinate: the median elevation gradually becoming still narrower and more easily evident, and the last two segments before the penultimate are distinctly carinate dorsally. The opposing spine is a longitudinally elongate tubercle occupying the distal half of the penultimate segment. The terminal claw is somewhat longer than the penultimate segment, moderately stout and evenly curved. In the outer half the cirri taper very slowly and gradually to a slender tip.

The proximal pinnules may be described as follows (large specimen from Station 12):—

P_1 is 20 mm. long with 50 segments. The first 4 or 5 segments are about twice as broad as long, and the remainder are all broader than long. The third and following segments have a prominent carinate crest on the side toward the arm tips. On the third the crest is broad and gently convex, on the fourth and fifth the process is roundedly pointed, and on the segments following the crest long and high, rising to a height of half the width of the segment or more, with the outer edge straight and parallel to the longitudinal axis of the segment. These prominent crests on the segments present in general the same effect as the combs on the proximal pinnules of the comasterids, but the outer edge is straight so that they are in shape oblong with the corners rounded, and they are situated on the side of the segments toward the arm tip instead of on the opposite edges as in the comasterids. The pinnule is slender, evenly tapering, flagellate, and flexible.

P_2 is 12 mm. long with 18 segments of which the first three are twice as broad as long, the seventh is about as long as broad, and those following gradually increase in length, the distal being twice as long as broad. The pinnule is slightly stouter basally than P_1 , tapers more gradually, and is less flexible. It tapers gradually to a point, and there is no modification of the segments.

P_3 is 10 mm. long with 20 segments and resembles P_2 ; P_4 is 12 mm. long with 19 segments; P_5 is 12 mm. long with 18 segments, very slightly stouter basally than P_4 . The pinnule increases slowly in width to the fifth and sixth segments, the seventh tapers strongly distally; and the terminating segments are slender. Viewed dorsally, the first two segments are very short, the fourth is about as long as broad, the seventh is about twice as long as the central width, and those following soon become about four times as long as broad. The fourth-seventh segments have their ventrolateral edges produced and broadly rounded, these flanges serving as a protection for the gonad. In lateral view the fourth-seventh segments are seen to be broadened, this broadening being greatest on the fifth. The seventh and eighth taper distally, and the ninth and following are slender.

P_6 is 22 mm. long with 36 segments. Viewed laterally it increases in width to the fifth and sixth segments, tapers on the seventh-ninth, and is slender with increasingly elongate segments from that point onward. The fourth-sixth segments have a slight flange-like production of the ventral edges. The following pinnules are similar, about 20 mm. long, with the third-seventh segments somewhat expanded and with their ventrolateral edges produced into a thin narrow flange. The genital pinnules have much the same appearance as those of the species of *Perissometra*. The ventral surface of the pinnules is completely enclosed by large covering plates imbricating distally, each of which bears a more or less elongate finger-like process extending over the median line, the finger-like processes of the plates on the two sides of the median line exactly dovetailing over the median line.

In the largest specimens (Station 12) the arms are about 160 mm. long, or somewhat less than twice as long as the longest cirri.

There is very considerable variation in the height of the middorsal carinate processes on the brachials, particularly on the more or less oblong brachials before the third syzygy. In occasional specimens (Station 1) the processes on these proximal brachials are almost wholly obsolete, being represented only by low obscure and broadly rounded tubercles, while in others (Station 1) they are very high with the crest forked.

Family NOTOCRINIDAE *Mortensen*.

Genus NOTOCRINUS *Mortensen*.

NOTOCRINUS VIRILIS *Mortensen*.

Localities.—Station 1, 354 fathoms, December 22, 1913 (three); Station 3, 157 fathoms, December 31, 1913 (four).

Distribution.—Previously recorded only from the Swedish South Polar Expedition, 1901–1903, Station 5, in Lat. $64^{\circ} 20' S.$, Long. $56^{\circ} 37' W.$, at a depth of 82 fathoms (150 metres); and from “Terra Nova” Station 341, off Cape Bird Peninsula, McMurdo Sound, at a depth of 44 fathoms (80 metres).

It is probably to be found everywhere along the shores of the Antarctic continent, though more locally distributed than the other Antarctic species of large size. The bathymetric range is from 44 to 354 fathoms.

Colour in Life.—Crimson.

Remarks.—This species is much less fragile than the other comatulids found in the Antarctic regions.

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