

## THALASSOCRINUS, A NEW GENUS OF STALKED CRINOIDS FROM THE EAST INDIES.

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By AUSTIN HOBART CLARK,

*Assistant Curator, Division of Marine Invertebrates, U. S. National Museum.*

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During the course of her investigations among the East Indian islands, the United States Bureau of Fisheries steamer *Albatross* dredged a small stalked crinoid which in certain important respects is different from any hitherto known. It is evidently nearly related both to *Hyocrinus* and to *Gephyrocrinus*, and, with them, falls into the family Hyocrinidæ as redescribed by Kœhler and Bather. The affinities appear to be closer to *Gephyrocrinus* than to *Hyocrinus*, and I was at first inclined to consider it a new species of that genus. There is the same curious elevation of the disk ambulacra from which that genus derives its name, but the sides of this wall or bridge are completely covered with perisomic plates. The basals are proportionately considerably smaller than those of *Gephyrocrinus*, and their lower third is cylindrical as in *Hyocrinus*, but they are not so elongated as in that genus. They are three in number, the smaller being anterior and the two larger lateral. Each bears at its base two tubercles, which mark the angles of the stem; this latter is hexagonal proximally, becoming slowly cylindrical; the upper columnars bear six tubercles, marking the angles; on the lower cylindrical segments these tubercles persist as short, small spines, resembling the condition seen in certain species of *Millericrinus*. The arm bases do not occupy much more than one-third of the distal edge of the radial, this form being therefore intermediate between *Hyocrinus* and *Gephyrocrinus* in this feature. In *Hyocrinus* the first pinnule is on the sixth brachial (the epizygal of the third syzygial pair); in *Gephyrocrinus* the first pinnule is on the fourth brachial (usually the epizygal of the second syzygial pair); in this new form it is on the fifth brachial, the epizygal of the second syzygial pair, but the two first syzygial pairs are separated by a single brachial. The orals and interambulacral plates are pierced by about seventy water pores, which are not found, however, in the interambulacral plates of the anal area. The orals are very large, much larger than in either *Hyocrinus* or *Gephyrocrinus* and consist of a broad triangular apex and a posterior portion, concave laterally and posteriorly, which runs backward for some distance over the inter-

ambulacral areas. Beyond the third the brachials are united in syzygial pairs as in *Gephyrocrinus*, and the first two brachials are similarly united.

This new type may be known as

THALASSOCRINUS, new genus.

The characters of this genus are included in the description of the type-species.

*Genotype*.—*Thalassocrinus pontifer*, new species.

THALASSOCRINUS PONTIFER, new species.

*Stem*.—The stem is 151 mm. in length and is composed of 169 columnars; those immediately beneath the basals are discoidal, about 0.3 mm. in length and about 2.2 mm. in diameter, the diameter gradually decreasing, after the proximal eight or ten being about 1.8 mm.; after the sixth traces of intercalated columnars may be found between each two columnars, and after the fourteenth these intercalated columnars entirely separate those on either side; after the twenty-eighth there is no difference between the intercalated and the original columnars; both have increased so that they are now 0.7 mm. in height, remaining 1.7 mm. in diameter; at the fortieth they are about 0.8 mm. in height with the same diameter, but now they increase rather more rapidly in length, so that at the fifty-third they are 1.2 mm. long; after the proximal half of the stem they very gradually decrease in height, being distally about 0.8 mm. In the last 50 mm. of the stem there is an almost imperceptible increase in the diameter, which becomes rather more noticeable in the last 10 mm.; the diameter of the lowest columnar, the stem having been broken off at or near the root, is 2.3 mm.

At the top of the stem the columnars are hexagonal in outline, the angles of the hexagon being occupied by rather prominent tubercles, and these tubercles are practically alike on the succeeding columnars; after the eighth these tubercles become more prominent, for the reason that the original columnars are separated by intercalated columnars of lesser height, whose tubercles are only slightly developed; the tubercles on the second, fourth, eighth, fifteenth, and twenty-third columnars are slightly larger than those on the remainder; after the twenty-seventh segment these tubercles somewhat abruptly become much smaller and the columnars become nearly circular in outline, each bearing about its middle six minute moderately sharp tubercles which rise abruptly from the general surface; after the proximal third of the stem these show a tendency to become obsolete on alternate segments, and in the terminal third of the stem they have entirely disappeared, so that the columnars are perfectly smooth; after the proximal third of the stem the columnars appear to be quite circular in outline.

The joint faces in the upper middle portion of the stem (which is in two pieces) are marked with radial crenellæ, but there is a plane area about the central canal, equal in average width to half the diameter of the canal, which is produced into six angles whose apices reach halfway to the periphery of the joint face, or even somewhat farther.

One of the six angles of the stem is exactly in radius D.

On the topmost three or four columnars supplementary tubercles are formed between those occurring from radius A to radius C.

*Basals.*—The basals are three in number, but so closely united that the sutures are almost obsolete; one of the basals supports the anterior radial; the division between the two others coincides with the suture between the radials on either side of the anal interradius.

The basal cone is approximately 2 mm. high (radially), 3.5 mm. in distal and 2.5 in proximal diameter; in its proximal third its sides are parallel with the dorso-ventral axis, and bear six prominent though well-rounded tubercles, two to each basal; in the distal two-thirds the sides diverge at an angle of about  $68^\circ$ , and there are five shallow interrarial depressions.

*Radials.*—The radials are roughly pentagonal in shape; the sutures between them may be easily seen, though the union is very close; each radial is about 2.2 mm. wide at the base, 4 mm. wide distally, 3.7 mm. high interradially, and 3.5 mm. high to the base of the first brachial; the socket serving for the attachment of the first brachial is only about 1.7 mm. broad, so that not much more than one-third of the distal margin of the radial is occupied by the articulation; the free interrarial borders are turned upward and then slightly inward; in profile the sides of the radial circlet are seen to make an angle of about  $68^\circ$  with each other; the middle line of the radials is occupied by three nearly obsolete tubercles, a pair proximally (one on either side of the midradial line) and a single one just proximal to the articular socket. The border of the radials (and basals also) along the interrarial and basirarial sutures is usually narrowly depressed, so that these sutures appear in depressed bands.

*Tegmen.*—The tegmen is a rather high five-sided pyramid, the apex (the apices of the orals) being 5 mm. above the interrarial margin of the radials, or about as high as the base of the sixth brachial; each ambulacrum is raised high above the general surface of the tegmen upon a narrow wall, the crest of which at first runs outward horizontally from the base of the orals and then curves upward, merging into the ambulacrum of the arms at about the sixth brachial.

The orals are very large, reaching nearly two-thirds of the distance from the tip of the oral pyramid to the interrarial border of the radials; in their inner half they resemble the orals of *Hyocrinus*,

except that when the animal is viewed laterally their outline is more nearly triangular; the sides beyond this triangular inner half curve inward (around the bridge supporting the ambulacra) and then gradually outward again, so that their outermost diameter is slightly greater than that of the base of the triangular tip; the outermost border is more or less strongly concave (much more so than in *Hyocrinus*), so that the outer margin is rather strongly bilobate; there is a short spine in the center of each oral, and in the outer half there are, irregularly disposed, two or three low flattened tubercles, most of which are pierced by water pores.

The anal tube, which is small and conical, rises just beyond the bilobate outer margin of the oral; the whole anal area is covered with perisomic plates, smaller on the anal tube and between it and the oral than elsewhere, none of which are pierced by water pores. The remaining interradiial areas are completely covered by about a dozen perisomic plates, of which four or five are usually much larger than the others, irregular in shape and position, and bearing, collectively, from a dozen to nineteen irregularly placed tubercles, each pierced with a water pore. The sides of the wall or bridge which supports the disk ambulacra are entirely covered by numerous small subequal perisomic plates, entirely devoid of water pores.

*Arms.*—None of the arms are complete; their normal length appears to be between 55 mm. and 60 mm.; the brachials are united in syzygial pairs except the third, which has a muscular articulation at either end; the sides of the brachials are rather strongly concave, so that the articulations and the syzygial sutures are prominent.

The first pinnule (always on the fifth brachial) is 23 mm. long and is composed of thirty segments, which, in a lateral view, are about one-third longer than broad; the covering plates are large and rounded-triangular, resting upon a calcareous band which is not regularly differentiated into side plates, though in some cases the oblong side plates may be fairly well indicated; the pinnule is much compressed laterally, so that its lateral diameter is about half its dorso-ventral diameter; it is large and practically uniform throughout; in its middle part its diameter is about equal to that of the brachials at the same height; the following pinnules are similar, but apparently first increase and then decrease gradually in size; the second pinnule is 28 mm. long; the third pinnule is 26 mm. long, with thirty segments; the fourth is 25 mm., and the eighth is 23 mm. long, with twenty-three segments; the fifth pinnule on the right posterior ray is replaced by an arm.

*Color* (in life).—Pale sulphur yellow, the lower end of the stem becoming brownish (F. M. Chamberlain).

*Type.*—Cat. No. 27483, U.S.N.M., from *Albatross* station 5636.