

quently gives place to the scarlet-vermilion, in the light of our present knowledge, can only be a matter of conjecture.

These two points, however, may be regarded as pretty well settled: (1) that the female does not have this brightly-colored crown, and (2) that some young autumnal males (very likely a large majority of them) do possess this ornament.

In regard to the use of this decoration, I strongly suspect it to be not merely an ornament induced by sexual selection for the delectation of the female, but of considerable service to the bird in his "entomophagical" pursuits. But as I have no evidence to offer upon the subject, it would be unprofitable to discuss it here.

A careful comparison of Eastern with Western Province specimens fails to reveal any tangible differences of plumage or structure.

NOTICE OF A COLLECTION OF STALKED CRINOIDS MADE BY THE STEAMER ALBATROSS IN THE GULF OF MEXICO AND CARIBBEAN SEA, 1884 AND 1885.

By RICHARD RATHBUN.

During the early part of 1884 and of 1885, the U. S. Fish Commission steamer Albatross, Lieut. Commander Z. L. Tanner, U. S. N., commanding, was engaged in exploration to the south and southeast of the United States. The former year, under the direction of the Hydrographic Bureau of the U. S. Navy, she was mainly employed in making sounding observations in the Caribbean Sea region; but a short stop for dredging purposes was made off Havana, Cuba, where the U. S. Coast Survey steamer Blake had already discovered a rich assemblage of stalked crinoids. In 1885 the Albatross remained about three months in the Gulf of Mexico, visiting the same locality off Havana, and adding very largely to the natural-history results of the previous year. Brief accounts of these two cruises have already been given in this volume of Proceedings (pp. 83 and 696).

Stalked crinoids were collected off Havana, Cuba, off Santiago de Cuba, and in the northeastern part of the Gulf of Mexico, off the coast of Florida. Only four species were obtained—*Rhizocrinus Rawsoni*, *Pentacrinus decorus*, *P. Mülleri*, and *P. asterius*. The first-mentioned species was taken at all of the above localities, *Pentacrinus decorus* and *P. asterius* off Havana only, and *P. Mülleri* off Havana and off Santiago de Cuba.

The collection made off Havana is an exceedingly fine one, containing over 600 specimens, a large proportion of which are in a very perfect state of preservation, due to the great care bestowed upon them by the naturalists on board. As regards this locality, Mr. James E. Benedict, the chief naturalist of the Albatross, states that all the specimens of sea-lilies were obtained to the eastward, and within sight, of

the harbor of Havana. The water deepens rapidly from the shore to a depth of several hundred fathoms, and the bottom is very rough. The tangles only could be used for collecting, and the exact depth at which all the specimens were taken could not be determined, as the depth generally increased during the progress of every haul, the tangles being usually dragged diagonally off shore from the places where they were lowered. The range of depth given in connection with each species is probably approximately correct, but *P. Mülleri* appears to be limited to more shallow water than *P. decorus*.

As the tangles were hauled on board, the "lilies" generally hung with the arms downward; they were cut as quickly as possible from the hemp swabs, and placed in large, deep dishes, about two-thirds full of alcohol, in which they gave off immediately a rich reddish-brown color. They were afterwards transferred to the large copper tanks and large jars. *P. Mülleri* retains more of its natural color in alcohol than *P. decorus*.

The writer has made a careful examination of all the specimens for the purpose of determining the species represented, but the collection merits more critical study, without which it would be impossible to enlarge upon the results already published by Dr. P. H. Carpenter in his recent Challenger volume,* in which he discusses the collection made in the same region by the Coast Survey steamer Blake. Of great interest are the more or less complete series of the young of three species, which are deserving of careful study.

Rhizocrinus Rawsoni Pourtales.

P. H. Carpenter, Report upon the Crinoidea collected by H. M. S. Challenger, 1873-'76, Part I, 1884, p. 262.

Many examples of this species were collected by the steamer Albatross in the Gulf of Mexico, in 1885, but in the cruise of the preceding winter but a single specimen was obtained, and that was taken at station 2129, south of Cuba. The greatest number were obtained south-east of Pensacola, Fla., in depths of 88 to 196 fathoms, over one hundred specimens having been dredged in a single haul at station 2401, 142 fathoms.

As usually happens with this species, but a very small proportion of the specimens retain their arms, the rough handling to which they are naturally subjected in the trawl-net, filled with materials of all kinds, tending to break off the more delicate and loosely jointed appendages. The series from station 2401 is an exceedingly interesting one, containing individuals of all sizes, from those measuring about 23^{mm} in length of stem to others with the stem fully 280^{mm}. in length, the latter being much larger than any yet recorded. Among the smaller

* The Voyage of H. M. S. Challenger. Zoology. Report upon the Crinoidea collected during the Voyage of H. M. S. Challenger, during the Years 1873-'76. By P. Herbert Carpenter, D. Sc., assistant master at Eton Collegè. Part I. General Morphology, with Descriptions of the Stalked Crinoids. 1884.

specimens there are several which appear to resemble *Rhizoerinus lofotensis* more or less closely as regards the joints of the stem, the shape of the calyx, and the structure of the arms; but this resemblance is probably superficial, for the most extreme forms in this direction are connected, by many specimens showing intermediate gradations, with specimens that are typical of *R. Rawsoni*. Unfortunately *R. lofotensis* is very poorly represented in the National Museum collections, thereby precluding careful comparisons with it.

The entire collection exhibits a considerable range of variation, but nothing beyond what has been already noticed by Dr. P. H. Carpenter, unless it may be in the instance above mentioned. In nearly all the specimens from the northern part of the Gulf of Mexico (stations 2399, 2401, 2402, 2403) the calyx is proportionally broad above, expanding rather rapidly from the stem upward, and with scarcely ever any noticeable restriction around the radials. The specimens from this region are all very much alike as to the shape of the calyx, and in this particular differ from those taken off Havana (stations 2321, 2326, 2327, 2337, 2345) and south of Cuba (station 2129), in which the calyx is proportionally longer and narrower with frequently a more pronounced radial constriction. The stem is almost always smallest at the calyx, being sometimes very small at that point; quite perfect dice-box shaped joints are not uncommon, especially low down on the stem; the longest joints scarcely ever exceed twice the diameter in length.

Following are given measurements of three of the larger specimens from station 2401. The arms are perfectly preserved only in No. 1.

Dimensions of three large specimens from station 2401.

	No. 1.	No. 2.	No. 3.
Length of stem millimeters	190	248	280
Number of joints in stem	74	96	106
Length of stem joints near middle millimeters	3	2.6	3
Diameter of same	1.5	1.5	1.9
Height of basal tube	4	3.8	3.5
Greatest diameter of same	2.8	2.8	2.5
Height of calyx	5	4.8	4.5
Greatest diameter of same	3	3	2.9
Length of arms	45		
Number of double joints in same	About 42		

RECORD OF SPECIMENS

Gulf of Mexico, southeast of Pensacola, Fla. :

Latitude 28° 44' N., longitude 86° 18' W., 196 fathoms, gy. M.; station 2399, two specimens (12348).*

Latitude 28° 38' 30" N., longitude 85° 52' 30" W., 142 fathoms, gn. M. brk. Sh.; station 2401, one hundred specimens (12354).

Latitude 28° 36' N., longitude 85° 33' 30" W., 111 fathoms, gy. M.; station 2402, three specimens (12352).

Latitude 28° 42' 30" N., longitude 85° 29' W., 88 fathoms, gy. M.; station 2403, one specimen (12349).

* The numbers in parentheses are catalogue numbers of the U. S. National Museum.

Off Havana, Cuba:

- Station 2321, 230 fathoms, fne. gy. S., one specimen (12353).
- Station 2326, 194 fathoms, Cr., one specimen (12346).
- Station 2327, 182 fathoms, fne. S., one specimen (12351).
- Station 2337, 199 fathoms, Cr., three specimens (12350).
- Station 2345, 184 fathoms, gy. wh. Cr., one specimen (12347).

South of Cuba:

- Latitude 19° 56' 04" N., longitude 75° 48' 55" W., 274 fathoms, bn. M. fne. S.; station 2129, one specimen (7109).

Pentacrinus decorus Wyville Thomson.

P. H. Carpenter, *loc. cit.*, p. 330.

The number of specimens of *Pentacrinus decorus* obtained was not far from 500, and all were taken off Havana, Cuba, in depths of 67 to 279 fathoms. The series is an exceedingly fine one, presenting all stages of growth from the smallest to the largest described by Dr. Carpenter, but very young specimens are comparatively rare. A hasty examination of the collection furnishes no important facts to add to Carpenter's very full description. From 28 to 30 arms were noticed in a number of specimens, and one specimen has 38 arms. In the last the branching is regular on some rays and irregular on others; the several rays bear from 5 to 10 arms each, as follows: 5, 10, 8, 8, 7. The ray bearing 10 arms is divided as follows: The 2 primaries have 2 distichals each. The primary on the right divides into two secondaries, the outer one with 3 palmars, terminating in 2 free arms, the inner with 4 palmars, followed by a free arm on the right, and a tertiary (if so we may call it) on the left, the latter having 6 joints and ending in 2 free arms. The inner secondary of the left primary has 5 palmars and 2 free arms; the outer secondary, 1 palmar, a free arm on the right, and a tertiary of 3 joints on the left, followed by 2 free arms. The height from the basals to the tips of the arms is about 100^{mm}, but, excepting for the greater fullness of the cluster of arms, the specimen appears to be perfectly normal.

The youngest specimen is of about the same relative size as the smallest described and figured by Dr. Carpenter (*loc. cit.*, p. 21, pl. xxxv, fig. 1).

RECORD OF SPECIMENS.

Off Havana, Cuba:

- Stations 2156 to 2169, 78 to 278 fathoms, 1884, 125 + specimens (12355).
- Stations 2319 to 2350, 67 to 279 fathoms, 1885, 300 + specimens (12356).

(Young specimens.)

Off Havana, Cuba:

- Stations 2156-2169 (12571); station 2161, 146 fathoms (12568); station 2167, 201 fathoms (12569); station 2169, 78 fathoms (12570); stations 2319-2350 (12567); station 2335, 204 fathoms (12361); station 2346, 200 fathoms (12359, 12566); station 2347, 216 fathoms (12362); station 2348, 211 fathoms (12360); station 2349, 182 fathoms (12565).

Pentacrinus Mülleri Oersted.

P. H. Carpenter, *loc. cit.*, p. 306.

About one hundred specimens in all of this species were collected on the two cruises, by far the greater number having been obtained in 1885. The greatest length of arm observed was 164^{mm}, with 134 joints, the calyx and arms being exceptionally perfect, but the stem short. Others nearly as large are contained in the collection. The longest stem measures slightly more than 350^{mm} in length, and includes 29 internodes, with 8 to 9 internodal joints; the diameter of the stem is 5.5^{mm}; the length of the longest arm 135^{mm}. The next longest stem measures 280^{mm} in length, 5.5^{mm} in diameter, and has 25 internodes with 9 internodal joints each. The shortest internodes observed occur in a stem 222^{mm} long; diameter of stem 5.8^{mm}; number of internodes, 28; length of internodes, 7^{mm}; number of internodal joints, 7. The usual number of joints to an internode is 7 to 11, but as few as 5 and 6 were noticed in some adult specimens.

The stem differs greatly in shape, being sometimes very rounded pentagonal, with but a slight longitudinal depression on each face, while again this depression may be very wide and pronounced and the edges quite angular. In the larger number of specimens the internodal joints are subequal in length, and in only a comparatively small number are they regularly alternating, as thin and thick. In some specimens this latter arrangement occurs irregularly on portions of the stem.

The color varies greatly in alcoholic specimens, the variation being probably due in part to the manner of preservation. Nearly half the specimens have a tinge of green, varying to bluish, this color being sometimes very light, at others dark. Many specimens are very light purplish, purplish white or yellowish white. Light shades of brown and gray also occur, and several varieties of coloring may be found on the same specimen. The lower arm joints and calyx are generally darker than the rest of the body, being often of a dark olive color.

Comparatively few young specimens of *Pentacrinus* were obtained, considering the large size of the entire collection made. From among the young specimens examined about eight appear to belong to this species, although where only short stems occur it is very difficult to distinguish this species from *P. decorus*. A sufficiently complete series, ranging from the largest to the smallest, has, however, been brought together, to render the identifications presumably accurate. The differences observed in the stems of adult specimens occur also among the young. The internodal joints are generally of subequal length, but in two specimens thick and thin joints alternate, although the differences between them are not very great.

The youngest specimen in the lot and one of intermediate size furnish the following measurements and other details:

Dimensions of two young specimens.

	Smallest specimen.	Intermediate specimen.
Total length..... millimeters..	28	66
Length of stem..... do.....	12	26
Number of internodes.....	7	7
Number of internodal joints.....	3	6
Length of cirri..... millimeters..	5	16
Number of joints in cirri.....	12	24
Diameter of calyx (top of first radials)..... millimeters..	2.8	4.6
Height from point of attachment of stem to upper edge of third radials..... millimeters..	3.2	5
Number of free arms.....	10	27
Length of arms..... millimeters..	15	38
Number of joints in arms.....	19	44

In the smaller specimen the interarticular pores extend through the upper three or four internodes, and in the latter through the same number; in the former the radials are proportionally longer; the basals are comparatively large in both. In the smaller each ray divides regularly into two arms; in the larger into 5 or 6 arms each, with two distichals and two palmars.

There are in the collection of 1884 two interesting specimens that appear to be modifications of this species in the direction mentioned by Carpenter (*loc. cit.*, p. 311), with respect to two specimens collected by the Coast Survey steamer Blake off Martinique and Barbadoes; but the extent of the variation in our specimens is much greater, though mainly limited to the lower brachials of the arms. One specimen came from station 2134, south of Cuba, depth 254 fathoms; the other is from a depth of 300 fathoms, at station 2155, off Havana. For convenience in describing them we will designate the former A, the latter B. With specimen A one typical example of *P. Mülleri* was collected, and B came from the same locality where the largest hauls of this species were made, though it was the only specimen obtained at that particular station. Both specimens are in very perfect condition, A being slightly larger than B. In A the stem is 168^{mm} long, with 19 internodes, and terminates with a nodal joint; the diameter of the stem is 4.2^{mm}, the number of internodal joints 7. The stem is very decidedly pentagonal in A, but in B is more rounded; in both, the joints are of subequal length; the cirri in A are about 34^{mm} long, and consist of 33 joints each.

The basals are very small, and very widely separated in A, but in B they are somewhat larger and touch slightly exteriorly. There are three radials on each ray of both specimens, in A being comparatively low and broad; the diameter of the calyx at the top of the first radials in A is 9^{mm}. In the latter there are 30 arms, each ray dividing regularly into 6, the arrangement being 2. 1; 1. 2; there are two distichals and three palmars; the longest free arm measures 103^{mm}, and consists of 88 joints. The surfaces of all the joints of the calyx and arms, up to and including the first brachial, are slightly more raised, and appear harder and

smoother than the remaining brachials, as often happens in this species; they are also darker in color. The free arms above the first brachials appear much more delicate and are of a lighter color. The lower 7 or 8 brachials on each arm are much flattened, dorsally and laterally, the edges along which these surfaces meet being more or less sharply angular and produced to form narrow wing-like extensions reaching nearly the entire length of the joint, or short, stout, more or less spiniform projections most developed at the upper ends of the joints and directed upward and outward. The one is but a modification of the other, all gradations occurring from the elongate process to the simple spine, the former often breaking up into two or even three spines, the lower of which are much the smaller and generally quite minute. One of the most common conditions is a slightly raised subangular or rounded edge, beginning just above the lower end of the joint and continuing without much, if any, increase in size to near the upper end, where it becomes abruptly enlarged, the spine-like process thus formed being sometimes acutely, at others obtusely, pointed, and often squarely cut off above. Where the raised edge is not continuous, it is generally represented by the one or two smaller spines above mentioned.

In addition to the lateral processes, there is on most of the arms a median series of spines, of about the same length as the lateral ones; but more spine-like in shape, and acutely or bluntly pointed, though occasionally transversely expanded at the tip. They are located at the extreme upper end of the joints, slightly overlapping the next above, are directed upward and outward, and may begin anywhere from the 5th to the 12th brachial. They extend over from 2 to 13 joints, being generally largest below and gradually decreasing in size upward, becoming at the same time more acute and more appressed. Above the flattened brachials the joints become normal. All the joints below the free arms are much more flattened than usual, and some of the palmars and distichals are more or less produced at the sides.

In specimen B the ray and arm joints are all less flattened than in A, and the lateral edges less continuously produced, generally bearing only from 1 to 3 spines, which are smaller and more acute. The median series of spines is more constant, and reaches farther up on the arms, and there are often two, three, or even more spines along the upper edge of each joint, not always regularly arranged, and generally limited to one side or the other. The spines of this series are frequently very broad, thin and square at the upper end.

RECORD OF SPECIMENS.

Off Havana, Cuba:

Stations 2156-2169, 78 to 278 fathoms, Cr., 1884, 16 specimens (12357).

Stations 2319-2350, 67 to 279 fathoms, Cr., 1885, 75 specimens (12358).

South of Cuba:

Latitude $19^{\circ} 56' 06''$ N., longitude $75^{\circ} 47' 32''$ W., 254 fathoms; station 2134, 1884, 1 specimen (12547).

(Young specimens.)

Off Havana, Cuba :

Station 2152, 387 fathoms (12543); station 2163, 133 fathoms (12545); station 2164, 192 fathoms (12544); station 2166, 196 fathoms (12364); stations 2319-2350 (12542); station 2347, 216 fathoms (12546); station 2349, 182 fathoms (12541). One or two specimens are contained in each of these lots.

(Variety described in notes.)

South of Cuba :

Latitude $19^{\circ} 56' 06''$ N., longitude $75^{\circ} 47' 32''$ W., 254 fathoms; station 2134, 1884, 1 specimen (12548).

Off Havana, Cuba :

Station 2155, 300 fathoms, Cr., specimen (12549).

Pentacrinus asterius (Linn.) Lütken.P. H. Carpenter, *loc. cit.*, p. 300.

The lower portion of the stem of a large individual was collected off Havana, Cuba, in 1885. It was associated with *Pentacrinus Mülleri* and *Pentacrinus decorus*, and was only detected when the large collection of specimens made by the Albatross, and contained in several tanks, was being overhauled at the National Museum. The exact locality was, therefore, not noted by the naturalists on board the steamer, but it came from one of the stations, 2319 to 2350 inclusive, with depths of 67 to 279 fathoms. The catalogue number is 12363.

This specimen consists of the lower five internodes and part of another internode above, the upper break presenting an irregular and fresh surface, indicating that the upper part of the stem, with its calyx and arms, had probably been broken off by the tangles at the time this fragment was secured. The lower end of the stem terminates with a nodal joint. The entire length of the stem is about 155^{mm} , the diameter 7^{mm} ; the internodes are about 26^{mm} long each, and consist of 18 to 19 joints; the cirri are about 72^{mm} long, with 47 joints.

This stem agrees very well with the description of Dr. Carpenter (*loc. cit.*), and compares favorably with the lower part of his figure given on Plate XI. It adds a new locality to those previously recorded for the species, but we cannot help regretting that a more perfect example was not obtained.

NOTES ON THE GREAT DOLPHIN, *CORYPHÆNA HIPPURUS*, LINNÉ.

By SILAS STEARNS.*

It is a surface swimmer, living not deeper than half-way to the bottom, in 20 or 30 fathoms of water, and yet never coming into the very shoal water close to the coast. Dolphins are generally distributed over the Gulf of Mexico during the summer months, but in winter the chilly surface water drives them and their food to the lower parts, about the

* Extracted from a letter in reply to inquiries concerning specimen number 37227, accession 16171, forwarded to the Museum by Mr. Stearns about June 17, 1885.—T. H. BEAN.