The *Bulletin of the Bingham Oceanographic Collection*, established by Harry Payne Bingham (Yale 1910) in 1927, published scientific articles and monographs on marine and freshwater organisms and oceanography for the Bingham Oceanographic Collection at Yale University.

The series ceased independent publication after Volume 19, Article 2, and was merged into the *Bulletin of the Peabody Museum of Natural History* monograph series after 1967.

See also the Bingham Oceanographic Collection Archives, Invertebrate Zoology, Yale Peabody Museum, in the Archives at Yale:
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BULLETIN

THE BINGHAM OCEANOGRAPHIC COLLECTION
PEABODY MUSEUM OF NATURAL HISTORY
YALE UNIVERSITY

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Scientific Results of the First Oceanographic Expedition
of the "Pawnee"

1925.

FISHES

By C. M. Breder, Jr.,
New York Aquarium.

Issued October 19, 1927.
THE BINGHAM OCEANOGRAPHIC COLLECTION

"Founded for the purpose of
Oceanographic Research"

Rooms 1814 32 Broadway, New York, N. Y.
SCIENTIFIC RESULTS OF THE FIRST OCEANOGRAPHIC EXPEDITION OF THE “PAWNEE”
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INTRODUCTION

The present paper is based on a collection of fishes made in the West Indies by Mr. Harry Payne Bingham in 1925 as an ichthyological nucleus for the Bingham Oceanographic Collection. Field work was engaged in, with some interruption, from February to April and ranged from off the coast of southern Florida, through the Bahamas, Cuba, the Isle of Pines and Grand Cayman, westward to Swan Island and the coast of British Honduras. The accompanying chart, Figure 1, gives the collecting sites and dates in greater detail. Collections were made on Misteriosa Bank and Glover Reef, localities of especial interest because of our scant previous knowledge concerning them.

The material was collected by means of trawls, seines, dynamite, hand lines and dip nets. Mr. Louis L. Mowbray, now Curator of the Bermuda Aquarium, was in charge of the preservation, selecting for preservation, and recording of the specimens obtained. Most of the material was preserved in solution, but a considerable number of interesting forms were mounted in exceptionally excellent taste by Mr. Francis West, taxidermist of the expedition. Far from one of the least important results of the trip is a collection of an exceedingly valuable and well executed water color paintings from the brush of Mr. Wilfrid Swancourt Bronson, artist attached to the expedition.

When the collection reached the writer’s hands it had already been partly sorted and classified by Mr. Mowbray to the extent of his naming seven new species. At this time he was called away on other matters, but such notes as he left, including his descriptions, are pub-
lished in the present paper and credited accordingly. The fact that there has been a break in the continuity of the work militates against it, as everyone knows who has taken over a collection on which a start has been made by someone else, especially when the relinquisher is not present in person or readily available for the discussion of details.

Fig. 1. Chart of the first oceanographic cruise of the "Pawnee."

It has been deemed best to list the entire collection according to the catalogue numbers, giving the full data accompanying each jar of specimens or mounted fish just as found. Consequently, directly following the discussion under each species is placed a list, in smaller type, indicating these details. The first number is that of the catalogue. Immediately following this the number of individual specimens that the catalogue number refers to is given in parenthesis.
Then follows the locality and date and whatever other data were found on the original labels. It is understood that the specimens are entire and in solution unless otherwise indicated. In certain cases the letters (A), (B) and (C) follow on the data lines. These simply refer to unlabeled tanks so marked for convenience.

The collection consists primarily of shallow water and shore forms although some deep water work was engaged in. For various reasons, including the present writer's predilection and a desire to get the long delayed first report to press, a considerable number of the truly oceanic specimens have been simply listed and held for further treatment in connection with later collections which have since been accumulated. The same is true of the leptocephalus larvae and the more confused members of the families Gobiidae and Blenniidae.

It became apparent early in the examination of the material that it had been carefully selected, as many of the common West Indian forms are absent from it. This is unfortunate in regard to the collections from Misteriosa Bank and Glover Reef as a tabulation of all the forms encountered there would be useful. Because of this and the fact that a considerable amount of the material is without any very definite data, the present report is, of necessity, largely a list of the specimens collected, with such annotations and descriptions as it allowed. There are several interesting taxonomic, distributional and anatomical points which have been barely touched on, in the belief that they would be more suitable for special treatment in further and separate publications.

Measurements of the lengths of the specimens are all given in "standard lengths," i.e., the distance in a straight line from the tip of the snout to the root of the tail, unless otherwise specified.

In all twenty new species are described, seven of which were left by Mr. Mowbray, when he relinquished the task. The latter are as follows:

<table>
<thead>
<tr>
<th>Anguillichthys bahamensis</th>
<th>Amia gloverensis</th>
<th>Pseudocirrhites pinos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grammicoepis squamilineatus</td>
<td>Gramma hemichrystos</td>
<td>Rupescartes cubensis</td>
</tr>
<tr>
<td>Amia aurodentatum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Those described by the present writer are:

<table>
<thead>
<tr>
<th>Pseudoxenomystax dubuis</th>
<th>Cypselurus vitripinnna</th>
<th>Caribrhegma gregoryi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myrophis platyrhyncus</td>
<td>Holocentrus esasperatus</td>
<td>Hepatus paunee</td>
</tr>
<tr>
<td>Synodus nicholsi</td>
<td>Pemphris polio</td>
<td>Lysosperma digitatus</td>
</tr>
<tr>
<td>Saurida caribbicus</td>
<td>Amia townsendi</td>
<td>Paralimanda inermis</td>
</tr>
<tr>
<td>Saurida suspicio</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
One new family and two genera are described, *Anguillichidae* (to include *Anguillichthys*) and *Pseudocirrhites* by Mowbray, and three new genera, *Pseudoxenomystax*, *Caribrhegma* and *Paralimanda* by the present writer.

Aside from Mr. Bronson's carefully executed field work in colors, he has been of more than ordinary assistance to the writer because of an exceptionally sympathetic attitude toward the more prosaic work of preparing the figures for this paper.

The finished plates in color that Mr. Bronson executed for the collection are as follows:

No. 1. *Pomadasis croco*, *Brachygenus chrysargyreus*, *Diplectrum radiale*.
No. 2. *Harpe rufa*, *Halicherpes radiatus*.
No. 3. *Ocyurus chrysurus*, *Lutianus campechanus*.
No. 4. *Balistes vetula*, *Melichthys piceus*.
No. 5. *Upeneus maculatus*, *U. martinius*.
No. 6. *Apsilus dentatus*, *Lutianus blackfordii*.
No. 7. *Angelichthys ciliaris*, *Holocanthurus tricolor*.
No. 8. *Chaunaz pictus*.
No. 9. *Callionymus hymantaphorus*.
No. 10. *Hollardia hollardi*.
No. 11. *Caranx ruber*.
No. 12. *Xyrichthys petitius*.
No. 13. *Halicherpes kirchii*.
No. 15. *Halicherpes garnoti*.
No. 16. *Thalassoma bifasciatus*.
No. 17. *Doratotomus megalops*, *Novaculichthys rosipes*.
No. 18. *Xyrichthys binghami*.
No. 19. *Elacatinus oceanops*.
No. 20. *Myrichthys acutus*, *M. acuminatus*.
No. 21. (Invertebrate.)
No. 22. *Hamulum sciurus*, *Eques pulcher*.
No. 23. *Clupeites parra*.
No. 25. *Sparisoma guamani*, *S. viride*, *S. rubripinne*.
No. 27. *Pseudocirrhites pisos*, *Prionodes tigrinus*, *Hypoplectrus unicolor nigricans*, *H. u. puella*.
No. 28. *Scorpaena granaticornis*, *Scorpaenoides tredecimspinosa*.
No. 29. *Holocentrus ascensionis*, *H. virilis*, *H. tortuga*.
No. 30. *Amia maculatus*, *A. binotatus*, *A. townsendi*, *A. aurolineatum*, *A. gloverensis*, *Apogonichthys stellaris*.
No. 31. *Malacanthus plumieri*.
No. 32. *Rypichthys saponaceus* (arenatus and saponaceus phase).
No. 33. *Gramma hemichrysa*.
ANOTATED SYSTEMATIC LIST OF SPECIES

Class ELASMOBRANCHII.

Order ASTEROSPONDYLII.

Family SCYLLIORHINIDAE.

1. Catulus retifer (Garman).
   1 (1) (C).

Family CARCHARHINIDAE.

2. Scoliodon lalandii Müller & Henle.
   A single mounted specimen is referred to this species. Although it disagrees considerably from descriptions in its present condition, as there has been evident shrinkage, it agrees most closely with this form. It is certainly not S. terrenovae Richardson even if, as Meek & Hildebrand 1925 contend, these are differentiable.
   114 (1) — (mounted).

Family CESTRACIONIDAE.

3. Cestracion tiburo (Linnaeus).

There is also the following fragmentary material:

5 (1) Caudal fin of a fair sized shark. (Dried.)

Order BATOIDEI.

Family PRISTIDAE.

4. Pristis pectinatus Latham.
   3 (1) — (mounted).

Family DASYBATIDAE.

5. Dasybatis hastatus (De Kay).

Two embryos, with large filaments from the gill slits, show the following measurements:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>109</th>
<th>113</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length in mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length to end of disc in mm</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Breadth of disc in mm</td>
<td>51</td>
<td>52</td>
</tr>
</tbody>
</table>

The essential diagnostic characters of the species are present, but the dorsal keel and ventral fold of the whip is colorless, like the entire body.

6 (1) embryo. Corrientis Bay, near Caiman Point, Cuba, April 3.
7 (1) embryo. Pt. Francis, Isle of Pines, April 5 (or Saddle Rock March 237).
8 (1) tail of a large specimen. (A).

9 (1) Metal tag 6 (mounted).

55 (1) —

Class TELEOSTOMI.

Order APODES.

Family MURRINESOCIDÆ.

Genus *Pseudoxenomystax* new genus.

Body robust, scaleless. Dorsal and anal well developed, rays evident. Dorsal origin between gill-opening and vent. Mouth large, teeth in jaws in several series, none prominently enlarged, no long canines. Posterior nostril immediately in front of eye, elliptical. Lateral line conspicuous. Pectorals well developed. Mouth cleft to under eye; teeth depressable, conic; lower jaw shorter than upper.

Type of genus: *Pseudoxenomystax dubius*.

This genus differs from *Xenomystax* in the more posterior insertion of the dorsal, posterior to pectoral base instead of anterior to it; in the shorter mouth cleft, to under eye instead of to beyond eye; in the more usual type of maxillary, lacking a longitudinal groove and in the position of the posterior nostril, just in front of eye instead of midway between it and anterior nostril. It differs from *Murannesox* in lacking long canines and in the much more posterior origin of the dorsal, posterior to pectorals instead of over gill opening. Named for its resemblance to *Xenomystax*.


Type No. 25, Bingham Oceanographic Collection. Total length 213 mm. Head 2.2 in head and trunk, 3.7 in tail. Head and trunk 2.9 in total length.

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Eye 1.3 in snout, 5.3 in head. Cleft of mouth, from tip of snout to under middle of eye, 3.3 in head; snout 4.4, muzzle broad. Pectoral equal to mouth cleft,
3.3 in head. Posterior nostril just anterior to eye, elliptical. Anterior nostril just under the overhanging snout, with a short tube above lip. Snout cavernous and spongy to touch. A series of ten large pores from under one eye to the other along upper lip laterally, passing above anterior nostrils anteriorly. Two pores at symphysis of both upper and lower jaw. A row of seven on either side at ventral profile extending backward from the latter. Teeth all conic and slightly recurved, depressable, on vomer and jaws. None particularly enlarged or prominent. Dorsal inserted over pectoral tips, midway between vent and middle of eye, posterior to gill opening a distance equal to gape, 3.3 in head. Depth of body 2.6 in head. See Figure 2.

Coloration: A light tan on sides, yellowish below and brownish above, upper surface of head darkest. Vertical fins nearly white, anal narrowly edged with black most prominent posteriorly, dorsal similarly edged with dusky.

There is one paratype. Its measurements, as compared with the type, are given in Table 1.

**Table 1. Measurements of Pseudoxenomystax dubius.**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Type</th>
<th>Paratype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length mm</td>
<td>213</td>
<td>125</td>
</tr>
<tr>
<td>Head in head and trunk</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Head in tail</td>
<td>3.7</td>
<td>4.1</td>
</tr>
<tr>
<td>Head and trunk in total length</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Eye in snout</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Eye in head</td>
<td>5.3</td>
<td>5.6</td>
</tr>
<tr>
<td>Snout</td>
<td>4.4</td>
<td>4.5</td>
</tr>
<tr>
<td>Mouth Cleft</td>
<td>3.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Pectoral</td>
<td>3.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Depth</td>
<td>2.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Dorsal past gill opening</td>
<td>3.3</td>
<td>2.8</td>
</tr>
</tbody>
</table>

The coloration of the paratype is essentially similar to that of the type but lighter.

Named *dubius* in reference to its doubtful relationships.

25 (1) Type, North of Glover Reef, April 20, No. 2, 484 faths.
26 (1) Paratype, do.

**Family Myricè.**

8. *Ahlia egmontis* (Jordan).

Measurements of three specimens of this little known species are given below:

<table>
<thead>
<tr>
<th>Total length mm</th>
<th>280</th>
<th>180</th>
<th>163</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleft of mouth in head</td>
<td>3.1</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Head in head and trunk</td>
<td>5.1</td>
<td>4.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Head in tail</td>
<td>7.3</td>
<td>6.2</td>
<td>6.6</td>
</tr>
<tr>
<td>Dorsal fin behind head in head</td>
<td>3.3</td>
<td>3.4</td>
<td>2.5</td>
</tr>
</tbody>
</table>
27 (1) Glover Reef, April 18. At night with light.
28 (1) Swan Island, April 20.
29 (1) —

In addition there are two bottles of stomach contents of barracudas (possibly from the same fish). One contains three Myriidae and the other about ten, together with remains of other fishes largely skeletonized. The eels may be Ahlia.

39 (3) (From barracuda stomach) Corrientes Bay, Cuba April 2.
40 (10) (From barracuda stomach, also other fishes. See also under Synodus.) Do.


Type No. 30, Bingham Oceanographic Collection. Total length 196 mm.

Head 3.5 in head and trunk, 6.1 in tail; head and trunk 2.8 in total length; tail 1.6 in total length; depth 2.3 in head, snout broad depressed 4.7 in head;

![Fig. 3. *Myrophis platyrhyncus* new species. Type.](image)

eye 1.7, in snout 7.5 in head, mouth large, the gape reaching well behind eye, 2.2 in head measured from tip of upper jaw, 2.4 from tip of lower jaw; interorbital 7.5; teeth all pointed, slightly recurved, on jaws and vomer, a single backwardly produced series on the latter; anterior nostril in a short downwardly directed tube; dorsal origin midway between snout and vent, confluent with anal around tail; pectorals about as long as snout; body rather compressed, nearly as much so as tail. See Figure 3. The form of the tubular nostril is shown in Figure 4.

Coloration: Pale brownish, uniform, lower parts slightly lighter.

![Fig. 4. Detail of anterior tubular nostril of *Myrophis platyrhyncus*.](image)
This species differs from _M. punctatus_ Lütken in the much larger eye, the longer snout, the longer gape, the more compressed body and in coloration, and from the Pacific _M. vafer_ Jordan & Gilbert in the single series of vomerine teeth and the much longer snout. It differs from _M. longleii_ Sylvester in the much more anterior insertion of the dorsal. In _longleii_ the insertion is only \( \frac{2}{3} \) length of head in advance of vent whereas in the present species this distance is 1.9. It also differs in various minor proportions and was probably not green in life.

There are eight paratypes ranging down to 125 mm. As these decrease in size they become progressively less compressed, more cylindrical and worm-like. Some of the paratypes have a slight reduction of the height of the vertical fins just before the tip of the tail giving the tail a slightly lanceolate form. The proportions vary considerably with size. Those of the type and smallest paratype are given in Table 2. The rest are intermediate.

### Table 2. Measurements of _Myrophis platyrhyncus_.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Type</th>
<th>Paratype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length in mm.</td>
<td>196</td>
<td>125</td>
</tr>
<tr>
<td>Head in head and trunk</td>
<td>3.5</td>
<td>3.1</td>
</tr>
<tr>
<td>Head in tail</td>
<td>6.1</td>
<td>5.0</td>
</tr>
<tr>
<td>Head and trunk in total length</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Tail in total length</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Depth in head</td>
<td>2.0</td>
<td>3.2</td>
</tr>
<tr>
<td>Snout in head</td>
<td>4.3</td>
<td>4.3</td>
</tr>
<tr>
<td>Eye in snout</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Eye in head</td>
<td>7.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Gape (from upper jaw tip)</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>Gape (from lower jaw tip)</td>
<td>2.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Interorbital in head</td>
<td>7.5</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Named for the peculiar broad flat snout.

30 (1) _Type_, Glover Reef. April 18. At night with light.
31 (5) Paratypes, do.
32 (1) Paratype, S. W. Harbor, Bahamas. March 16. At night with light.

10. _Bascanichthys scuticaris_ (Goode & Bean).

The present specimen shows the following differences from the description but they are not considered sufficient to warrant calling it new

- Head in head and trunk ............... 8.6
- Head in tail ......................... 6.4
- Eye in snout ........................ 2.4

36 (1) (With _Myrichthys oculatus_ No. 37.)
Family **Anguillichthyidae** new family Mowbray.

"Anguilloid eels, with distinct dorsal and anal fins, separated from the homoceral, lunate caudal fin by a long peduncle; dorsal opposite anal, some distance behind the vent; tongue adnate to the mouth; gape angular, anterior half oblique; anterior nostril labial and tubular; lateral line straight, well developed; pectorals developed; teeth minute. Number of caudal vertebrae one-half to four-sevenths of the number of body vertebrae. Dorsal and anal fins opposite each other, both confined to the tail."

Genus **Anguillichthys** new genus Mowbray.

"This genus is based on three specimens of eels of one species, differing from other forms by a well developed lunate caudal fin, the insertion of the dorsal and anal fins behind the vent, their separation from the caudal fin by a long peduncle and the lateral line ending some distance in advance of the last caudal vertebra and other characters mentioned above in the family description."

11. **Anguillichthys bahamensis** new species Mowbray.

Type No. 34, Bingham Oceanographic Collection, 115 mm., total length.

"Body anguilliform, slender; lateral line well developed, commencing behind the eye, ending some distance in advance of the last caudal vertebra; nostrils lateral, the anterior tubular, on the lip; the posterior a slit close to the eye; mouth with the anterior half oblique; posterior half straight horizontally; upper lip deep with a free margin; tongue not free at the tip; teeth feeble, two or more on vomer, none on palatines; dorsal and anal separated from the caudal, some distance behind the vent; anterior rays of both fins high, posterior rays very low; the posterior outline of the fins slightly concave; caudal distinctly lunate, the outer rays the longest, well developed; the fin entirely separated from the dorsal and anal by a long peduncle; pectorals well developed, close to the gill opening; gill openings a vertical lateral slit as wide as the base of the pectorals. Vertebrae $72 + 38 = 110$. Dorsal and anal on fifth to tenth caudal vertebra inclusive; caudal on the last eleven vertebrae; 28 vertebrae behind the dorsal and anal fins; dorsal 30 rays; anal 34 rays; gills 4, a slit behind the fourth."

Fig. 5. **Anguillichthys bahamensis** new species Mowbray. Type.
On the second and third vertebra the neural spines form a ridge, covering the whole length of the two vertebrae; beginning on the fourth vertebra they become more spine-like to the origin of the dorsal fin, here they meet the radials, there being three radials between each of the neural spines; the neural spines are longer than the haemal spines; 31 dorsal rays and 34 anal; branchiostegals 7: Head slightly more than 8 in total length; depth 4.5 in head; the distance from the vent to the tip of the caudal nearly twice in the distance from the snout to the vent; origin of the dorsal, and anal fins distant from the vent by 1.5 the length of the anal base; diameter of eye 1.5 in the snout; snout 6 in head; pectorals 2.25 in head; gape extending back to just beyond middle of the eye; anterior nostril remote from the eye, near the edge of the lip; posterior nostril a slit and very close to eye, and laterally slightly above the center of the pupil; both nostrils are in line laterally, the anterior has a short tube; the lateral line begins behind the eye, a distance equal to twice the length of the snout, and ends some distance in advance of the last caudal vertebra; there are 85 to 90 pores in the lateral line; the caudal is well developed and lunate; the anterior rays of the dorsal are high; the posterior rays very low, the fins are slightly falcate behind; the base of the pectoral is very close to the gill slit; the teeth are few; two or three on both jaws are slightly enlarged, behind these is a single series of very small blunt teeth, disappearing posteriorly; there are a few teeth on the vomer, none on the palatines; the anterior half of the upper lip is very oblique; the posterior half is straight horizontally; the angle is very pronounced. Dorsal 30; anal 34." See Figure 5.

Color pale greenish, lighter on the belly; caudal lobes tipped with black; three specimens 115 mm. long taken at Green Cay, Bahamas, March 19, 1925. These specimens were taken at night on the surface; they are very quick and swim with the posterior third of the body, keeping the anterior portion straight. When placed in an aquarium they were extremely sensitive to movements outside the aquarium, and would dart about with great rapidity. They appear to be eels that have taken to a midwater life, and lost the fins found in bottom-living forms, developing fins for speed; the dorsal, anal and caudal resemble roughly in appearance those of *Strongylura*. This interesting form appears to be between *Anguilla* and the type of the true fishes."

34 (1) Type, Green Cay, March 19, at night.
35 (1) Paratype: do.

(The second paratype, at this writing, could not be located.)

Family OPHICHTHYIDÆ.


The present specimens, none of which are over 242 mm. in total length differ in lacking the light central areas to the dark spots which are supposed to separate this from the Pacific *M. tigrinus* Girard. One much larger specimen taken
on this cruise and still living at the New York Aquarium at this writing (June 19, 1927,) however, shows these light centers well.

37 (3) —.

13. Myrichthys acumenatus (Gronow).
   Dorsal margined with whitish instead of dusky as described.

Family Muraenidae.

   One large example.
   10 (1) Bahamas. No date. Metal tag 7. (mounted).

LEPTOCEPHALUS.

There are also fourteen bottles of Leptocephali larve. As is usual, these are reserved for a separate report to be made in connection with more similar material since collected.

42 (4) S. W. Harbor, New Providence, Bahamas. March 16. At night with light.
43 (7) do.
44 (10 approximate) do.
45 (10 approximate) do.
46 (20 approximate) Green Cay, Tongue of the Ocean. March 17. At night, surface.
47 (20 approximate) Green Cay, Tongue of the Ocean. March 17. At night, surface.
50 (10 approximate) Swan Island. April 11. At night.
51 (20 approximate) Swan Island. April 12.
52 (3) Glover Reef. April 18. At night, with light.
53 (2) —.
54 (10 approximate) —.

Order ISOSPONDYLI.

Family Elopidae.

15. Elops saurus Linnaeus.
   12 (1) (B).

Family Clupeidae.

16. Sardinella macrophthalmaus (Ranzani).
   14 (1) Royal Island, Bahamas. March 15.
16 (9) Glover Reef. April 15.

There is also one tiny mutilated example from Siguanea Bay, just out of the larval state, which is referred to this genus.

17 (1) Siguanea Bay, Isle of Pines. April 5.

17. *Opisthonomia oglinum* (Le Sueur).

11 (1) (B).

18. *Jenkinsia stolifera* (Jordan & Gilbert).

19 (2) Siguanea Bay, Isle of Pines. April 5.
20 (3) Swan Island. April 11.
21 (3) Swan Island. April 12.
22 (400 approximate) Glover Reef. April 15. Surface, at night.
24 (15) —.

Order INIOMI.

Family SYNODONTIDÆ.


There is a large number of small specimens which are referred to this species with little doubt. They range from 35 to 55 mm. in standard length and show the dark spots along the gut through the flesh more prominently in the smaller sizes, as figured and mentioned by Weber 1911 for East Indian forms, and by Nichols 1911 for this form. In the larger individuals these become less prominent as the vertical bands begin to appear which are the same in number and directly above them on the sides. Compared with some adults taken in Sandy Hook Bay, N. J. these marks agree in position with the rather vague shades on the sides of latter.

60 (106) Green Cay, March 17. At night.
58 (1) do.
61 (15) Pt. Francis, Isle of Pines. April 5. (Or Saddle Rock. March 23?)

Also in the stomach contents of a barracuda (No. 40) there is the remains of a specimen of this genus. See under *Ahlia egmontis*.


Type No. 56, Bingham Oceanographic Collection. Standard length 86 mm., total length 99 mm.

Head 2.9; depth 6.0; dorsal 13 1/2 anal 9 1/2; lateral line 56. Body comparatively short; head about as wide as deep; interorbital space concave, 8.5 in the long head; eye 5.6 in head; snout short, pointed, 4.0 in head; lower jaw slightly longer, rather pointed with a suggestion of a fleshy knob; gape large
reaching well past eye, 1.8 in head; gill-rakers minute, pseudobranchia large; scales with evenly rounded membranous borders, no keel on the lateral line, dorsal fin height 2.3 in head, anterior rays not reaching past the others when depressed, outer margin nearly straight, anteriorly, slightly convex posteriorly, inserted midway between adipose fin and middle of eye; caudal forked, the lower lobe a little longer; anal fin low, its base 3.6 in head; ventral fins long, 1.3 in head, measured from axil, reaching over half way to anal; pectoral short 2.6 in head reaching nearly to dorsal origin, inserted high and over edge of operculum; anterior nostril with a filament equal to one-half eye. See Figure 6.

Fig. 6. Synodus nicholsi new species. Type.

Coloration—Brownish above, lighter below, the sides with vague cross bars becoming more definite posteriorly, one over pectoral, at dorsal origin and at end of base, before adipose and on peduncle. Cheeks somewhat mottled. All fins including adipose with dusky irregular lines, only one on the latter and in anal. Five on ventrals, three on pectorals, faintest on caudal.

This species differs from S. fatens (Linnaeus), to which it appears to be closest, in the much larger head 2.9 as against 4.05 to 4.3 and in various minor measurements not especially significant independently of each other but when taken together give the fish a much different appearance.

Named for my good friend J. T. Nichols, of the American Museum of Natural History who must include in his numerous kindnesses to me, instrumentality in placing the present collection in my hands.

56 (1) Type Royal Island, Eleutheria, Bahamas, March 15, No. 7.

21. Trachinocephalus myops (Forster).


22. Saurida caribbeus new species.

Type No. 57, Bingham Oceanographic Collection. Standard length 111 mm., total length 131 mm.

Head 4.0; depth 7.5; dorsal 11 1/2 anal 12 1/2; lateral line 59. Interorbital space flat with a shallow median depression, 6.0 in head; snout broad and rounded, 3.9; gape long reaching well past eye, 1.6 in head; maxillary 1.4; the
curve of the mandible fits that of the upper jaw which is slightly longer, gill-rakers small irregular; pseudobranchia large; eye 5.0 in head; lateral line very slightly keeled; dorsal fin high, longest ray (third), 1.2 in head, reaching well past tips of last rays when depressed, inserted about midway between adipose and posterior margin of eye; anal fin low, its base 2.3 in head, inserted midway between base of caudal and middle of vent rai, the latter moderate 1.7 in head, rays of about equal length, inserted slightly in advance of dorsal; pectoral long reaching beyond dorsal origin, 1.2 in head. A series of small regular teeth on maxillary inside of which is a row of large and recurved teeth and double row on palatines, all depressable. See Figure 7.

Fig. 7. Saurida caribbae new species. Type.

Coloration—Brownish above, silvery below, variously mottled with darker. Distal third of dorsal dusky, distal half of caudal dusky, other fins plain.

This species differs from other species of the genus in the higher anal count and numerous proportions.

Named for the Caribbean Sea.

57 (1) Type North of Glover Reef. April 20. No. 2. 48 fath.

110 (5) Paratypes. do.


Type No. 62, Bingham Oceanographic Collection. Standard length 75 mm., total length 86 mm.

Head 4.1; depth 6.5; dorsal 10 1/2; anal 12 1/2; lateral line 56.

Interorbital somewhat concave and sculptured 4.6 in head, snout broad and rounded 3.7; gape long reaching well past eye, 1.6 in head, the curve of the mandible fitting that of the upper jaw which is slightly longer, pseudobranchia large, gill-rakers small irregular, eye with orbit partly open above so that very mobile eyeball looks diagonally upward and out, eye 4.0 in head; lateral line scarcely keeled; dorsal high, longest ray (third), 1.3 in head, reaches well past tips of last rays when depressed, inserted midway between adipose fin and front of eye; anal fin low base 2.3 in head inserted midway between base of caudal and about tip of ventrals, the latter moderate 1.4 in head, rays of nearly equal length
inserted in advance of dorsal, pectorals inserted just past edge of operculum, not quite reaching base of ventrals, 2.2 in head. Teeth fine and numerous; some slightly enlarged on maxillary, a double row on palatines, all depressable. See Figure 8.

![Fish diagram](image)

**Fig. 8. Saurida suspicio new species. Type.**

Coloration—Brownish above and lighter below, above lateral line each scale is edged with dusky points making them very pronounced. Ten partial vertical bars from pectoral to caudal base, most evident along mid-line. Proximal two-thirds of dorsal dusky, distal third hyaline; caudal marked with dusky; other fins plain. Tip of snout and lower jaw dusky.

This species differs from others in a manner similar to that of *S. caribbeaus*

![Views of fish](image)

**Fig. 9. Occipital and palatal views of Saurida caribbeaus (upper) and Saurida suspicio (lower).**
and from the latter in the much shorter pectoral, the larger eye, finer teeth, arrangement of palatine teeth (see Figure 9), insertion of the anal, the more prominent up-turning of the eyes, and in coloration.

Named for the curious upward glancing eyes.

62 (1) Type Misteriosa Bank. April 10. Surface with light.
111 (1) Paratype. do.

Family MYCTOPHIDAE.

24. Lampanyctus lacerta (Goode & Bean).

On examples of less than 50 mm. the duskniness of the lower caudal lobe is very faint.

421 (4) S. W. Harbor, New Providence, Bahamas. March 16. At night with light.
422 (1) Green Cay. March 17. At night.
423 (1) Turneffe Cay. April 21. At night light.
424 (35) Swan Island. April 11. At night.
425 (8) Swan Island. April 12.


Only a few show a very faint suggestion of luminosity to the dorsal peduncular scales. These fishes do not agree especially well with the Jordan & Evermann 1896 description, but agree well with the Goode & Bean 1896 figure. The scales fall a little short of 40 (39 in the figure and 37 to 39 in the present material) and the head is larger than 4.25 (4.0 in the figure and 4.0 to 4.1 in the material). The present material ranges from 25 to 50 mm. in s. l.

426 (16) Green Cay. March 19. At night, surface.
427 (34) Green Cay. March 17. At night.
429 (1) Pt. Francis, Isle of Pines. April 5 (or Saddle Rock. March 23?)


430 (4) Tongue of the Ocean. March 20. 300 to 400 faths. Trawl.

In addition to the above there are several other specimens held for further study and analysis as follows.

498 (40 approximate) S. W. Harbor, New Providence, Bahamas. March 16. At night with light.
499 (50 approximate) Swan Island. April 11. At night with light at surface
500 (20 approximate) Green Cay. March 14. At night.
501 (1) Green Cay. March 19. At night, surface.
502 (2) Green Cay. March 17. At night.
503 (4) Turneffe Cay. April 21. At night, light.
504 (1) Swan Island. April 12.
514 (1) Tongue of the Ocean. March 20. 3 to 400 faths.
Family CHAULIODONTIDÆ.

27. Cyclothone microdon (Gunther).

Sixteen small mutilated specimens are referred to this species with some hesitancy.

416 (6) Tongue of the Ocean. March 20. 300 to 400 faths.


29. Chauliodus stoveri Bloch & Schneider.

415 (2) Tongue of the Ocean. March 20. 300 to 400 faths. No. 45.

There are also two bottles of badly distorted specimens belonging to this family.

418 (2) April 20. No. 1. 366 faths.

Family STERNOPTYCHIDÆ.

A few mostly small examples, of this family are reserved for late study.

511 (4) Tongue of the Ocean. March 20. 300 to 400 faths.

Order SYNENTOGNATHI.

Family BELONIDÆ.

30. Strongylura notatus (Poey).

68 (1)—.

31. Strongylura ardeola (Cuvier & Valenciennes).

These specimens show a considerable range of variation in several characters. Some have a slight arch near the base of the jaw, approaching the condition of S. caribbeus (Le Sueur). In others, especially the younger individuals, it is almost flat. The proportions of the head in body and eye in postorbital part of head varies greatly although there is a slight increase in both with size, which is unusual. The measurements are given in Table 3.

64 (1) Saddle Rock, Bahamas. March 23.
66 (1) (A).
69 (10) (B).

A very imperfect specimen of this genus of 42 mm. s. l. (No. 72) not showing a sufficient number of diagnostic characters in its poor condition to enable specific identification has vestigial gill-rakers similar to those found in Ablennes of a small size by Nichols and Breder MS.
Table 3. Proportions of Strongylura ardeola.

<table>
<thead>
<tr>
<th>Standard length mm.</th>
<th>Eye in Post-orbit</th>
<th>Head in body</th>
</tr>
</thead>
<tbody>
<tr>
<td>329</td>
<td>1.8</td>
<td>2.8</td>
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<tr>
<td>325</td>
<td>1.8</td>
<td>2.7</td>
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<tr>
<td>322</td>
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<td>2.9</td>
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<tr>
<td>298</td>
<td>1.8</td>
<td>2.9</td>
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<tr>
<td>283</td>
<td>1.7</td>
<td>2.7</td>
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<tr>
<td>273</td>
<td>2.0</td>
<td>2.8</td>
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<td>3.0</td>
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<td>256</td>
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<td>2.9</td>
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<tr>
<td>254</td>
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<tr>
<td>245</td>
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<td>2.9</td>
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<tr>
<td>212</td>
<td>2.1</td>
<td>3.2</td>
</tr>
<tr>
<td>188</td>
<td>2.0</td>
<td>3.2</td>
</tr>
</tbody>
</table>

72 (1) S. W. Harbor, New Providence, Bahamas. March 16. At night with light.

32. Strongylura raphidoma (Ranzani).

67 (1) Royal Island, Bahamas. (B).
112 (1) Bahamas. (Mounted).

33. Ablennes hiens (Cuvier & Valenciennes).

71 (1) —.

Family HEMIRHAMPIDÆ.

34. Hemirhamphus brasiliensis (Linnaeus).

74 (1) Signanea Bay, Isle of Pines. April 5.
115 (1) (B).

35. Hyporhamphus unifasciatus (Ranzani).

76 (1) Saddle Rock, Bahamas. March 23.
77 (6) Signanea Bay, Isle of Pines. April 5.
78 (1) Misteriosa Bank. April 10. Surface with light.

Family EXOCETIDÆ.

36. Parexocetus mesogaster (Bloch).

Eggs taken from a gravid female were found to range from 1.3 to 1.4 in diameter and average about 1.35. See figure 10b. This figure shows the comparative differences of three species and obviates the need of lengthy description.
158 (2) Misteriosa Bank. April 11. At night, surface, light.
159 (vial of eggs) do.
116 (1) —.
118 (1) (A).
160 (vial of eggs) —.

37. *Cypselurus heterurus* (Rafinesque).
Eggs taken from a gravid female were found to range from 1.6 to 1.8 mm. in diameter and average about 1.7. See Figure 10a.

![Figure 10a](image)

**Fig. 10.** Flying fish eggs. A. *Cypselurus heterurus.* B. *Parexocoetus mesogaster.* C. *Cypselurus vitripinna.*

161 (vial of eggs) Bahama Channel. March 26.
162 (vial of ripe eggs) do.
120 (3) (A).
121 (1) (B).
166 (2) (A).
127 (1) (mounted).

38. *Cypselurus furcatus* (Mitchill).
Referred to this species on the basis of the opinion of Nichols 1924 referring *C. nigricans* (Bennett) to the Pacific.
122 (1) (A).

Type No. 459 Bingham Oceanographic Collection. Standard length 183 mm., total length 226 mm.
Head 4.0, depth 5.2, dorsal 12 1/2, anal 9, eye 3.3, snout 3.7, lateral line 46. Head broad and flat above, interorbital 3.4, snout pointed (for a *Cypselurus*).
Second pectoral ray divided, fin reaching to a point half way between end of dorsal and tip of last ray, depressed; pectoral 1.6, ventrals reaching to base of
last anal ray, inserted midway between base of tail and a point a pupil's diameter behind eye; anal inserted under fifth dorsal ray, midway between ventral insertion and root of upper caudal lobe; dorsal inserted one-third of distance between base of caudal and middle of eye; lower caudal lobe 0.8 in head; base of anal 1.8 in base of dorsal, dorsal height 2.4 in head; 27 predorsal scales; 21 preventral scales; 7 rows of scales between origin of dorsal and lateral line; body not as quadrate as in most species of *Cypselurus*.

Coloration—Dusky above, lighter below, a dark spot on operculum and another just above it. Membranes of all fins absolutely clear and without any marks or pattern, ribs of pectorals dusky, rays of ventrals dusky proximally, rays of caudal scarcely dusky, rays of dorsal and anal pale.

There are eight paratypes scarcely different in size or character.

Fig. 11. *Cypselurus vitripinna* new species. Type.

It may seem to be rather unwarranted to attempt to describe a new West Indian flying fish at this time. However, after just finishing, with J. T. Nichols of the American Museum, a review of those collected by the "Arcturus" it is evident that we have here a form not recognized in the literature. It is of course possible that some old name now "hanging in air" might be made to serve for it but it is believed that in the present confusion of names in the group, that of the lesser of two evils is the adding of another name rather than again reshuffling the old ones. It points out once more the urgency of a thorough revision of world Exocoetidae based on adequate material.

This species is marked by the great body depth which gives a slight superficial resemblance to *Halocypselus* and *Parexocetus*. In addition it differs from other species of *Cypselurus* in the entire lack of any pattern on either set of paired fins as well as from most on fin counts, and the comparatively pointed snout and placement of the ventral fins.

Eggs taken from a gravid female were found to range from 1.20 to 1.45 mm. in diameter and average about 1.28. See figure 10c.

Named for the glass-like "wings."
459 (1) Type (A).
125 (3) Paratypes, do.
167 (5) Paratypes, do.
168 Eggs from 167.

40. Cypselurus bahiensis (Ranzani).

One specimen of this species has one pectoral much shorter than the other. As there is a transverse scar-line across the rays about one-third from the edge, it is believed that the outer part of the fin is regenerated, possibly after having been bitten off. This definite and large amount of asymmetry must have caused the fish to curve to the side of the smaller “wing” in flight. Never-the-less it evidently succeeded in surviving and maintaining a physical well being equal to that of the rest. The fish measures 240 mm. in standard length. The right pectoral is 128 mm. long and the left (normal) 164 mm. This condition led to a curiosity concerning the normal amount of irregularity in this respect. As the pectorals were all in good condition measurements were made. They are given in Table 4.

<table>
<thead>
<tr>
<th>Species</th>
<th>Standard length</th>
<th>Right pectoral</th>
<th>Left pectoral</th>
</tr>
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<tr>
<td>C. bahiensis</td>
<td>240</td>
<td>128</td>
<td>164</td>
</tr>
<tr>
<td>C. bahiensis</td>
<td>247</td>
<td>174</td>
<td>171</td>
</tr>
<tr>
<td>C. bahiensis</td>
<td>248</td>
<td>162</td>
<td>167</td>
</tr>
<tr>
<td>C. furcatus</td>
<td>137</td>
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<td>101</td>
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<tr>
<td>C. heterurus</td>
<td>210</td>
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<td>193</td>
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<td>C. heterurus</td>
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<td>C. vitropinna</td>
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<tr>
<td>Parexocetus</td>
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<td>96</td>
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<td>78</td>
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</tr>
<tr>
<td>Parexocetus</td>
<td>75</td>
<td>38</td>
<td>39</td>
</tr>
</tbody>
</table>
Out of these twenty-four examples, only nine (three-eights) have the left pectoral longer than the right and if the injured one be discounted only eight. This would almost suggest a slight asymmetrical bias for even in such a small number of variates one should expect a somewhat closer approximation to equality of overgrown rights and lefts if there was no asymmetrical tendency. It would be interesting to compare these with similar measurements of bird wings of a somewhat analogous shape.

124 (2) (A).
126 (1) ——. (mounted).

Order THORACOSTEI.
Family AULOSTOMIDÆ.

41. Aulostomus maculatus Valenciennes.
   80 (1) Isle of Pines. April 5.
   80 (1) Swan Island. April 12.

Family FISTULARIDÆ.

42. Fistularia tabacaria Linnaeus.
   113 (1) Metal tag 20 (mounted).

Family SYNGNATHIDÆ.

43. Hippocampus punctulatus Guichenot.
   82 (4) Loggerhead Key, Fla. Feb. 21.
   83 (5) ——.

44. Hippocampus stlyifer Jordan & Gilbert.
   84 (1) Royal Island, Bahamas. March 16.

45. Syngnathus mackayi (Swain & Meek).
   85 (2) Loggerhead Key, Fla. Feb. 21.
   86 (1) Royal Island, Royal Palm Cay, Bahamas. March 15.
   87 (1) Siguanea Bay, Isle of Pines. April 5.

46. Syngnathus rousseau Kaup.
   89 (1) Saddle Rock, Bahamas. March 23.

47. Syngnathus crinigerum (Bean & Dressel).
   90 (3) Royal Island, Bahamas. March 15.
   91 (1) S. W. Harbor, New Providence, Bahamas. March 16.
   92 (1) Saddle Rock, Bahamas. March 23.
Order ACANTHOPTERI.

Family Atherinidæ.

48. Hepsetia stipes (Müller & Troschel).

The examples from Misteriosa Bank show more evident crenulations on the scales than is usual for this species but detailed examination failed to reveal any correlated differences from the rest.

93 (3) Royal Island, Bahamas. March 15. Seined.
95 (15) Corrientes Bay, Cuba. April 3.
96 (9) Grand Cayman. April 8.

49. Atherina harringtonensis arca (Jordan & Gilbert).

Jordan & Hubbs 1919 are followed in considering arca a race of the Bermudian A. h. harringtonensis Goode.

100 (1) Saddle Rock, Bahamas. March 23.
101 (2) Grand Cayman. April 8.
102 (9) Swan Island. April 11.
103 (8) Swan Island. April 12.
104 (3) Turneffe Cay. April 21.

There are also six small specimens (10 mm. and less) from Swan Island provisionally referred to this genus.

106 (6) Swan Island. April 12.

Family Mugilidæ.

50. Mugil curema Cuvier & Valenciennes.

108 (1) Green Cay. March 19. At night.
109 (1) (A).

Family Sphyreiniæ.

Sphyraena sp.

Stomach contents. See under Ahlia egeonitis and Synodus fetsus. Species not indicated.

39 (3) (From Barracuda stomach). Corrientes Bay, Cuba, April 2.
40 (10) (From Barracuda stomach) do.

Family Polynemidæ.

51. Polynemus virginicus Linnaeus.

A single small example. It is figured (Figure 12) as it is the smallest positively
identified example of this species of which we have record (31 mm. standard length).


**Family SEPHANOBERYCIDÆ.**

*Hoplostethus* sp.

One very small example.


**Family HOLOCENTRIDE.**

52. *Holocentrus ascensionis* (Osbeck).

128 (1) Corrientes Bay, near Caiman Point, Cuba. April 3.

53. *Holocentrus vexillaris* Poey.

The present material agrees perfectly with the elaborate description of Meek & Hildebrand 1925 and it is suspected that *H. siccifer* (Cope) is identical with it as suggested by Jordan & Thompson 1905.

129 (1) Double headed Shot Cay. March 6.

130 (1) Corrientes Bay, near Caiman Point, Cuba. April 3.

131 (1) Isle of Pines. April 5.

132 (2) Pt. Francis, Isle of Pines. April 5 (or Saddle Rock. March 23?).

133 (1) Swan Island. April 11.

134 (7) Glover Reef. April 15.

135 (1) Glover Reef. April 17.

136 (1) — .

54. *Holocentrus tortuga* Jordan & Thompson.

One specimen from Glover Reef (No. 138), is much lighter than the rest, the longitudinal lines being nearly obsolete, although the dorsal mark is as dark and distinct as in the others. That it is not *H. riparius* Poey is evident by its
slimness. Body depth 3.6 in standard length, 4.2 in total length. One small example (42 mm. s. l.) is provisionally referred to this species.

137 (3) Saddle Rock, Bahamas. March 23.
138 (1) Glover Reef. April 15.
508 (1) Swan Island. April 12.

55. *Holocentrus exasperatus* new species.

Type No. 505 Bingham Oceanographic Collection. Standard length 34 mm., total length 40 mm.

Head 2.3; depth 2.6; dorsal X–II 13 1/2; anal IV 9 1/2, lateral line 36. Interorbital broad, slightly convex, 3.7 in head, sculptured, with a longitudinal median groove edged by low paired crests and one over each eye. Preopercule with a prominent spine at angle with serrate edges; coarse serrations above and below it; operculum with the usual spinations, scales prominently ctenoid, three rows above lateral line at dorsal insertion, seven below it and anal insertion; suborbital strongly serrate, maxillary reaching to under posterior edge of pupil 2.4; lower jaw included; caudal peduncle abruptly constricted and very narrow, 1.5 in eye; snout with sharp rostral process equal to eye, 3.5 in head; nostrils prominent, half way between tip of snout and eye; minute weak teeth on jaws, none on vomer or palatines; third dorsal spine longest 2.2 in head; second anal spine 3.1. See Figure 13.

![Fig. 13. *Holocentrus exasperatus* new species. Type.](image)

Coloration—Body uniform light brown, probably silvery in life; head posterior to a vertical at front of eye similar, light anterior to such a line; caudal peduncle light from a vertical line from ends of posterior dorsal rays when depressed; a faint dusky mark at base of caudal rays, spinous dorsal dusky, other fins clear.

Unless subsequent dissection and study shows this to be a "fixed larval type" this is clearly the young of some *Holocentrus* in the "*Rhynchichthys* stage."
The particular combination of fin and scale counts and other points not directly associated with youth leads to the conclusion that it is the young of an undescribed form. There is little possibility of this species being referable to Myripristes Cuvier or Plectrurus Gill on anatomical grounds all of which point to Holocentrus. There are five paratypes of similar sizes and counts. Presumably the type came from either of the adjacent localities mentioned below.

The designation exasperatus is patent.

505 (1) Type ——.
506 (2) Swan Island. April 12.

56. Flammae marianus (Cuvier and Valenciennes).
143 (1) Pt. Francis, Isle of Pines. April 5.

Family POLYMIXIID.E.

57. Polymixia lutea Günther.

A single small specimen of 60 mm. in standard length is referred to this species. Although it shows various differences from the existing descriptions it is believed that they will all prove to be within the normal range of variation or ascribable to age. A comparison with the description of Jordan & Evermann 1896 in differing items is given below:

<table>
<thead>
<tr>
<th></th>
<th>J. &amp; E.</th>
<th>Glover Reef Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scales</td>
<td>50</td>
<td>48</td>
</tr>
<tr>
<td>Head</td>
<td>3.75</td>
<td>3.20</td>
</tr>
<tr>
<td>Depth</td>
<td>3.75</td>
<td>2.70</td>
</tr>
<tr>
<td>Eye</td>
<td>3.00</td>
<td>3.20</td>
</tr>
<tr>
<td>Interorbital</td>
<td>4.00</td>
<td>3.90</td>
</tr>
</tbody>
</table>

The only notable difference is that of body depth which shows the present example to be a much deeper fish. Aside from this the only other disagreement other than in trivial items is the insertion of the dorsal which is midway between the tip of the snout and the middle of the peduncle instead of midway between the snout and the caudal base. Although Jordan & Evermann 1896 do not give the size of their fish, it is presumably larger than the present one and very likely smaller than Günther's which was 228 mm. in total length (Günther 1859). The depth of this latter fish was 4.5 which is still slimmer. It would seem that we have here a species becoming rapidly more elongate with age.


Family MULLID.E.

58. Upeneus maculatus (Bloch).

There are seven large examples (146 and 147) clearly referable to this species
and thirty-one small examples of 50 mm. and less which are provisionally referred to it. They are from Green Cay, Glover Reef, Turneffe Cay, Swan Island and Grand Cayman. The differences they show are in proportions which such variations might be expected, such as a slightly larger eye, slightly longer barbel, less depth and different coloration. This latter is the most striking. Some show traces of the lateral blotches of the adults although others vary all the way to plain silvery. In some this is prominent and gives them a quite different appearance. There are no tangible characteristics evident in these fishes that justifies calling them new at this time, although it is recognized that some of them may actually be the young of an undescribed form.

146 (1) Alligator Reef, Fla. Feb. 22.
147 (6) Royal Island, Bahamas. March 16.
150 (3) Green Cay. March 17.
154 (2) Grand Cayman. April 9.
151 (21) Swan Island. April 12.
152 (1) Glover Reef. April 19.
153 (1) Turneffe Cay. April 21. At night, light.
156 (1) ——.

59. *Upeneus martinius* Cuvier & Valenciennes.

149 (2) Royal Island, Bahamas. March 15.

Family **Scombridae**

*Scomberomorus* sp.

157 (2) Male and female gonads (ripe). Corrientes Bay, Cuba, April 3.

Family **Gempylidae**

60. *Gempylus serpens* Cuvier & Valenciennes.

A small specimen of 40 mm. s.l. is questionably referred to this species.

381 (1) ——.

Family **Lepidopidae**


One example of this little known form 230 mm. s.l. In poor condition, apparently taken from the stomach of some fish.

380 (1) ——.

Family **Trichiuridae**


519 (1) (B).

Family **Carangidae**

63. *Selar crumenophthalmus* (Bloch).

64. *Caranx lugubris* Poey.
   163 (1) (mounted).

65. *Caranx ruber* (Bloch).
   All three specimens from the smallest 66 mm. s. l. have the lower caudal lobe dusky and the upper light.
   170 (2) (A).
   164 (1) Metal tag 14 (mounted).
   177 (1) ——.

There is also the following material.

*Caranx* sp.

*Caranx* sp.
   175 (1) Tiny example. (This may be *C. ruber* 19 mm. s. l.) Siguanea Bay, Isle of Pines. April 5.

   Meek & Hildebrand 1925 are agreed with in considering this the same as *S. islandi* Cuvier and Valenciennes. If, however, this latter species should eventually be shown to be valid these specimens should doubtless be referred to it on a basis of body depth, as it is over 3.0 in both the larger two. In the smaller (No. 176) of 95 mm. s. l. it is just 3.0.
   176 (1) Royal Island Cay, Eleutheria, Bahamas. March 15.
   169 (1) ——.
   165 (1) (mounted).

Family **Rachycentridae**

   171 (1) Key West. (Mounted).

Family **Stromoteidae**

68. *Nomeus Gronovii* (Linneus).
   179 (2) Dog Rocks. March 2. Under *Physalia*.

*Psenes* sp.
   A single small example reserved for further study.

Family **Grammicolepidae**

Genus *Grammicolepis* Poey.

"Body rhomboid, deep, compressed, the posterior dorsal and ventral outlines very oblique with spinous plates, each plate with three to five spines, caudal
peduncle very slender, body covered with vertical linear striate scales. Mouth very small, complicated. The premaxillaries doubly protractile (telescoping). Teeth in both jaws, none on vomer or palatines. Frontals, orbital rim and angles of the preoperculum with small spines, dorsal, anal and ventral spines, spinous. Dorsal, anal and pectoral rays simple; ventral and caudal rays branches. Operculum united by membrane which is attached to the isthmus, a notch behind the membrane. Second dorsal spine looks the first when erect. Branchiostegals 7. Gill-rakers short, blunt. Lateral line following the dorsal outline."

"The above was taken from three fresh specimens and more fully describes Poey's genus."\(^1\)

69. \textit{Grammicoepis squamilineatus}, new species Mowbray.

Type No. 517 Bingham Oceanographic Collection. Standard length 83 mm., total length 101 mm.

"Body rhomboid, deep and much compressed, with linear scales, the depth 1.66 in total length. The upper anterior profile is concave, the lower convex on the breast, straight from the ventrals to the anal spines, behind anal spines slightly concave, then obliquely straight to the caudal peduncle. The posterior upper profile from the dorsal spines to the caudal peduncle is slightly convex, the caudal peduncle is very slender, broadened posteriorly, its depth slightly more than three in the diameter of eye."

"The head is 3 in body, 3.66 in total. The greatest depth of the head is 5/6 its length. Eye large 2.5 in head. The snout is about 3.25 in head. The caudal peduncle is 2.25 in head. The pectorals are about 2 in head. The upper caudal lobe is the longest, the rays about 1.33 in head,—the distance from the first dorsal spine to the anterior margin of the scales which begin in the interorbital space. Interorbital deeply concave, the posterior processes of the protractile premaxillaries slipping into the concavity. The mouth is very complicated, the maxillaries are without scales. The temporals, preorbitals, orbital rim and both angles of the preoperculum have small spines. The second spine and base of the third have spines, also the ventral and first anal. There is a ridge of spinous plates at the base of the dorsal and ventral rays, each plate having a large spine in the middle with one or two (mostly two) small spines on either side of the larger spine."

"The scales are of most peculiar structure. They are long vertically. On some parts of the body there only appears to be one or two, sometimes three, covering the greatest depth of the body and are arranged in pleats. Each scale is vertically striate; posteriorly the scales become shorter and on the caudal peduncle they take the shape of normal scales."

"There are 5 dorsal spines, the first very small and easily over looked; the second by far the largest with spines on its three angles; the third with a few

\(^1\)This genus redescribed by L. L. Mowbray.
small spines at its base. There are 30 dorsal rays, round at the base and becoming noticeably compressed and articulated outwardly. The middle rays are the highest.

"The anal has 2 spines, the first short and heavy and spinous, the second smaller, the base of which looks into a notch of the first and locks it when erect (as in the dorsal spines of Balistidae). There are 28 rays rounded at the base and compressed outwardly. The middle rays are the highest."

Fig. 14. Grammicoelipis squamlineatus new species. Mowbray. Type.

"Ventral 1, 6, the rays more than twice the length of the spine, and branched. The caudal is forked, the upper lobe slightly the longer. The rays are all branched with exception of the upper and lower. The pectorals are rounded, the rays simple, 14 in number. The membrane that unites the operculum is scaled."

"There are teeth in both jaws in a single series—small and erect. No teeth on vomer or palatines. Gill-rakers short, about 9. Formula; D. V. 30; A II, 28; P. 14; C. 17. Branchiostegals 7. Color silvery, spinous dorsal and outer caudal rays black." See Figure 14.

517 (1) Type North of Glover Reef.
Family Pempheridæ.

70. *Pempheris poeyi* Bean.

The present series show the following sizes: 53, 26, 26, 22, 23 mm. s.l. The measurements of the largest and smallest example are given in Table 5.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>53</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard length mm.</td>
<td>53</td>
<td>23</td>
</tr>
<tr>
<td>Head</td>
<td>3.1</td>
<td>2.8</td>
</tr>
<tr>
<td>Depth</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Eye</td>
<td>2.5</td>
<td>2.3</td>
</tr>
<tr>
<td>Snout (in eye)</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Dorsal</td>
<td>IV,8</td>
<td>IV,8</td>
</tr>
<tr>
<td>Anal</td>
<td>III,24</td>
<td>III,24</td>
</tr>
<tr>
<td>Scales</td>
<td>2-58-10</td>
<td>Undeveloped</td>
</tr>
<tr>
<td>Mandible (in depth)</td>
<td>2.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Dorsal height</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Anal base (in depth)</td>
<td>1.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Anal base (in head)</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Pectoral</td>
<td>3.6</td>
<td>3.2</td>
</tr>
</tbody>
</table>

The other examples are strictly intermediate except that the two 26 mm. specimens have 25 anal rays. Measurements not given agree with the type description.

383 (5) Corrientes Bay, Cuba; April 3; 3 faths.

71. *Pempheris polio* new species.

Type No. 182 Bingham Oceanographic Collection. Standard length 44 mm., total length 52 mm.

Head 3.3; depth 2.4; dorsal IV, 9; anal III, 31; lateral line 55; eye 2.3; snout 4.9; interorbital 3.3. Body compressed, covered with smooth, thin, cycloid scales. Anal inserted about under middle of dorsal, at a point equidistant from its snout and end of its own base, base of anal two in length, lateral line running close to dorsal profile descending abruptly under origin of dorsal, extending on to caudal rays, caudal broken but evidently forked; ventrals short, 1.5 in eye, just reaching vent; pectorals broken, maxillary 1.7, to under middle of eye; mouth upturned, lower jaw slightly excluded, back flattened behind dorsal (this may be partly incidental). See Figure 15.

Coloration—Body pale tan, probably silvery in life, base of anal marked with a thin dark line, the dorsal marked by a much fainter and less intense darkening. All other fins scarcely dusky.

There is one paratype of 19 mm. Caudal forked, a dusky triangle on peduncle. Body pale, dusky at area about base of dorsal, pectoral pointed, reaching to a
little beyond middle of anal. Otherwise similar to type except for slight age characters. See Figure 16.

Fig. 15. *Pemphris polio* new species. Type.

The present species differs from other West Indian species in the scale and fin counts and in the possession of cycloid scales. This latter character suggested the specific designation—*polio*.

Fig. 16. *Pemphris polio* (young).

182 (1) **Type.** Isle of Pines. April 5 (or Saddle Rock. March 23 ?).

183 (1) **Paratype, Corrientes Bay, Cuba.** April 3. Dynamite. 3 faths. No. 51.
Family CHILODIPTERIDE.

72. Amia maculatus (Poey).

At all sizes the caudal blotch is not as intense as the dorsal one. In general they both become fainter with age and in the largest example (No. 190) 58 mm. s.l. the caudal blotch is practically gone. The marks on the operculum, although varying in intensity, are present in all examples down to the smallest (No. 189) of 18 mm. s.l.

185 (1) Saddle Rock, Bahamas. March 23.
186 (1) Pt. Francis, Isle of Pines. April 5 (or Saddle Rock. March 23?).
187 (4) Grand Cayman. April 9. 10 ft. water.
188 (3) Pt. Francis, Isle of Pines. April 5. (Reef).
189 (3) Glover Reef. April 17.
190 (1) Grand Cayman. April 9. 10 fath.
191 (1) Royal Island, Eleuthera, Bahamas. March 16.

There are also two very small examples not yet showing the sub-dorsal spot which may be this species.

472 (1) Pt. Francis, Isle of Pines. April 5.

73. Amia binotatus (Poey).

This species differs from A. townsendi in the longer snout, the somewhat larger head and in the simple caudal bar which may be narrow and dark or broad and diffuse but never wide and dark edged. The vertical fins may be plain or with a dark line close to the nose and running forward from the vertical bar at the bases of the posterior rays but never with a dusky mark nearly a third out from the base and especially connected with the body mark.

454 (1) Royal Island, Eleuthera, Bahamas. March 4.
455 (1) Grand Cayman. April 9. 10 ft. water.
456 (3) Glover Reef. April 17.

74. Amia townsendi new species.

Type No. 460 Bingham Oceanographic Collection. Standard length 37 mm., total length 49 mm.

Head 2.7; depth 3.0; dorsal VII–I, 13–1/2; anal II, 8; lateral line 31; eye 2.4; snout 4.2; inorbital 4.5. Third dorsal spine much the heaviest and largest, soft dorsal and anal high, somewhat falcate; soft dorsal somewhat in advance of anal, longest dorsal ray 1.4 in head; longest anal ray 1.5; caudal peduncle equal to eye; preoperculum serrate; pectoral 1.4 in head; lower jaw barely included; 6 predorsal scales; 1 row of scales between dorsal origin and lateral line; maxillary to a little beyond posterior margin of pupil.

Coloration—Similar to that of binotatus, dusky about nape and shoulders, a dark vandyke brown band from base of last dorsal rays to last anal rays,
widest above lateral line, a broad lighter band on peduncle a pupil’s diameter from base of caudal, and as wide as eye. This band has a nearly vertical edge anteriorly, while the posterior one tends to follow the curve of the caudal base. This band saddles the peduncle above and stops abruptly at the ventral profile so that when viewed from below a light line appears to separate the two sides, not visible from the lateral view. This band is edged anteriorly and posteriorly by a dark edging. The soft dorsal and anal each has a dark band paralleling the body contour. Other fins colorless. See Figure 17.

This species is closest to *A. binotatus* but differs widely in the peduncular mark which is constant in this material in both species and *townsendi* is readily separable on this character as well from the large series of *binotatus* and all other specimens in the American Museum collection. Correspondence has failed to reveal any approach to the condition found here in other places.

There are four paratypes showing very little divergence from the type.

Named for Dr. C. H. Townsend, my chief at the New York Aquarium.

463 (1) Paratype, do. March 22.
464 (1) Paratype, do. March 23.
465 (2) Paratypes, Glover Reef. April 17.

75. *Amia aurolineatum* new species Mowbray.

Type No. 461 Bingham Oceanographic Collection. Standard length 44 mm., total length 55 mm.

“Head 2.75; depth 2.75; eye 3; D. VI-1, 9; A. II, 7; pectoral short equal to ventral, 1.75 in head, and not reaching vertical through second anal spine; scales 3-30-6; teeth on vomer and palatines more developed than in other West Indian species.”
"Coloration—Rose red, reddish-golden on the opercles; belly pale yellow; fins yellow head and body covered with dark points; the body has eight well marked golden stripes, the upper three take the curve of the lateral line, and are above it; the fourth is nearly straight, and ends where the straight part of the lateral line begins; the lower four are almost straight, their edges are well defined; there is an obscure dark blotch at the middle of the base of the caudal fin. 6 and 6.5 c. m. long."

"Three specimens were taken in a dredge in three fathoms of water Siguanea Bay, Isle of Pines, April 6, 1925."

Fig. 18. *Amia aurolineatum* new species Mowbray. Type.

"Siguanea Bay is exceedingly muddy, and has a very smooth bottom, covered with eel-grass, and occasionally large logger-head sponges. As *Amia* is nocturnal in its habits it conceals itself during the period that the sun is at a high altitude. As numerous logger-head sponges were taken in the same haul, I presume that this species lives amidst these large sponges."

The specimen marked "Type" had lost its ventrals and healed over, see Figure 18. The paratype was too mutilated to be available for this purpose. Note also that the tail is less forked than in other species. This figure and the following were prepared after Mr. Mowbray left and he consequently cannot be held for any errors therein.

461 (1) Type Siguanea Bay, Isle of Pines, April 6.
462 (1) Paratype, do.

The second paratype could not be located at this writing.

76. *Amia gloverensis*, new species Mowbray.

Type No. 466 Bingham Oceanographic Collection. Standard length 36 mm., total length 48 mm.

"Head 2.66, 3.6 in total; depth 2.75 to 3, 3.8 to 4 in total; eye moderate,
slightly more than 3 in head; D. VI–1.9; P. 10; scales 1–23–6; 22 pores. First dorsal spine short and weak, slightly more than 1/3 the length of the second spine which is much heavier than the rest. Soft dorsal high, 2/3 higher than the spinous dorsal; the anterior rays of the dorsal and anal much longer than the posterior rays; pectoral very long and narrow; when depressed its tip reaches a vertical through the middle of the anal, the ventrals reaching the base of anal; caudal deeply forked, the angle acute; preopercle serrate."

"Coloration—Reddish, with violet reflections; each scale almost covered with brown, the whole surface giving the effect of longitudinal and vertical rows of blocks; these cover the entire body; they are closest on the nape; the spinous dorsal is dark brown; the base of the dorsal and anal is dark brown: a large brown blotch at the middle of the base of the caudal rays; caudal dusky, the margin of the outer and inner rays is darkest; pectoral salmon colored; ventrals pale yellow; outer portion of dorsal and anal rays pale salmon; opercle golden; each scale with minute specks of gold, two or three on each scale; eyes black, with a silvery ring around the pupil."

"Taken at Glover Reef, Caribbean Sea. Seven specimens were taken in four fathoms of water by dynamite, April 18, 1925. This species is well marked and separated from other forms. The largest specimen taken was a female 6 1/2 cm. long, carrying eggs nearly ripe."

To this description the present writer adds the following.

This species is apparently somewhat similar to *A. pigmentarus* (Poey) but differs decidedly in coloration and scale formula, as shown by comparison with American Museum material. See Figure 19.

466 (1) Type Washerwoman Cut. March 22.
467 (4) Paratypes, Grand Cayman. April 9. 10 ft. water.
470 (1) Paratype, ——.
469 (4) April 18.
There is also a very small example which may be referable to the present species.

473 (1) Swan Island. April 11.

With A. imberbis (Linnaeus) disposed of by Fowler 1918 and sellicauda (Evermann & Marsh) by Metzelaar 1919, the known West Indian species may be separated on pattern as follows:

A. Body light with a distinct mark on it at base of soft dorsal and on peduncle.
B. Mark at base of soft dorsal a roundish blotch, with a line reaching downward ........................................ maculatus
BB. Mark at base of soft dorsal, a nearly vertical line reaching to or nearly to ventral outline.
C. A mark at base of caudal as a vertical line on peduncle or more or less elliptical spot............................... binotatus.
CC. A mark on peduncle consisting of a wide dusky band (about as wide as eye) bounded anteriorly and posteriorly by a dark line, each equal in color and width to the sub-dorsal line, the posterior one sometimes fragmented or lighter............ townsendi.
AA. Body with numerous small dark marks, a peduncular blotch but no sub-dorsal one.
D. Fins plain, body marked with faint longitudinal lines.................. aurolineatum.
DD. Dorsal and usually anal dark at bases, each scale marked with a dark spot.
E. Spots on scales forming definite horizontal lines especially prominent above pectoral and under first dorsal, obscure elsewhere.............. pigmentarius.?
EE. Spots on scales not forming as definite horizontal lines, but due to their placing giving equally well the concept of two sets of crossing diagonals, not more prominent above pectoral and below first dorsal than elsewhere.............. gloverensis.

77. Apogonichthys stellatus Cope.

Hildebrand & Ginsberg 1926b are followed in considering A strombi Plate as a synonym of A. stellatus Cope. The present specimen of 42 mm. s. l. agrees well with the figures given by these students. The coloration, however, is somewhat different than that described by them. This is by far the darkest fish in the present series of this family, the head and body being covered with

2 (It is suspected that A. powelli Fowler described from Rhode Island is a synonym of maculatus. Amin conklini Sylvester cannot be distinguished from A. maculatus any more than can sellicauda be distinguished from the latter.
3 (Based on specimens of Amin pigmentarius (Poey) in the American Museum of Natural History collection).
various sized dark spots. All the vertical fins are marked with dark, the pectorals are clear and the ventrals jet black.


One specimen of 56 mm. s. l. in poor condition.

419 (1) April 20. No. 1. 366 fathms.


192 (1) April 20. No. 1. 366 fathms.

Family **Centropomidè**.

80. *Centropomus pectinatus* Poey.

172 (1) (B).

Family **Serranidè**.

81. *Cephalopholis fulvus* (Linnaeus).

195 (1) Royal Island. March 15.
196 (1) Swan Island. April 12. Hand line.

82. *Petrometopon cruentatus* (Lacepede).

197 (2) Swan Island. April 12.
537 (2) Grand Cayman. April 9.
538 (1) (A).

83. *Mycteroperca venenosa* (Linnaeus).

556 (1) (mounted).

84. *Mycteroperca falcata phenax* Jordan & Swain.

199 (1) Florida Keys. Feb.

85. *Mycteroperca tigris* (Cuvier & Valenciennes).

520 (1) (B).

86. *Epinephelus striatus* (Bloch).

200 (4) Royal Island. March 15.
201 (1) Royal Island Cay, Bahamas. March 15. Seined.
202 (1) Swan Island. April 11.

87. *Hypolpectrus unicolor* (Walbaum).

There are two distinct and apparently non-intergrading types represented in the present series. Although the many names proposed for the various color
phases of this species have led to much confusion the two present forms are evidently distinct. A key to separate these, here understood as *H. u. puella* and *nigricans* might read as follows.

A. Body light with 6 darker irregular cross shades reaching the light ventral surface, the last, on the peduncle often darker than the rest and saddle like (similar to that of *Epinephelus striatus*); soft dorsal spotted or lined, a dark line from anterior edge of orbit to end of maxillary; snout decidedly concave; 11 or 12 scales from dorsal to lateral line.............. *puella*.

AA. Body dark and uniform in color, no lines or spots on head or markings on fins, which are likewise dark; snout little concave; 10 scales from dorsal to lateral line................................. *nigricans*.

It is suspected that these two are worthy of specific rank but a decision is reserved until more material comes to hand.

*Hypoplectrus unicolor puella* (Cuvier & Valenciennes).

The accompanying table lists the proportions of three specimens of comparable sizes with those of *nigricans*. The differences in the upper profile may in part be brought out by a rather unusual measurement. If the distance from the posterior margin of the orbit to the insertion of the dorsal fin is laid off from the tip of the snout in this form it reaches not quite to or a little beyond the prepectoral whereas in *nigricans* it reaches only to the posterior margin of the orbit or a trifle beyond. It is also contained in the head a greater number of times in the latter; that is, it is relatively smaller. The number of scales from the origin of the dorsal to the lateral line (not including it) is slightly greater in *puella*.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>204</td>
<td>Saddle Rock, Bahamas</td>
<td>March 22</td>
</tr>
<tr>
<td>205</td>
<td>Siguanea Bay, Isle of Pines</td>
<td>April 6</td>
</tr>
<tr>
<td>206</td>
<td>Glover Reef</td>
<td>April 15</td>
</tr>
<tr>
<td>207</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*Hypoplectrus unicolor nigricans* (Poey).

The differences indicated under the preceding form together with the lack of pattern of the present, mentioned in the provisional key, readily separates these quite differently appearing fishes. If it were not for the many other described forms it is doubtful if anyone would have thought of considering these two as races.

It is thought likely that a through study of adequate material would show that there are actually two exceedingly variable species of which the various proposed names may or may not be races. If such should prove to be the case the form here called *puella* would become *H. unicolor* (Walbaum) with *puella* (C. &. V.), *vitulus* (Poey) and *pinnivarius* (Poey) as synonyms or races and the form here called *nigricans* would be *H. indigo* (Poey) with *guttavarius* (Poey),
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gummigutta (Poey), crocatus (Cope), aberrans (Poey), accensus (Poey), affinis (Poey), chlorurus (C. & V.), nigricans (Poey) and bovinus (Poey) as synonyms or races.

208 (1) Royal Island, Bahamas. March 14.
209 (2) Glover Reef. April 15.

Although there is great variation in body proportions as well as coloration there is a distinct increase in body depth with the increase of absolute size. Both this variation and trend are indicated on the accompanying diagram, Figure 20 and in Table 6.

![Figure 20](image)

**Fig. 20.** Change of body depth with size in *Hypoplectrus*. Single circle—*puella*. Double circle—*nigricans*.

**Table 6. Proportions of *Hypoplectrus uniculus***

<table>
<thead>
<tr>
<th></th>
<th><em>puella</em></th>
<th><em>nigricans</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>S. l. in mm</td>
<td>69-78</td>
<td>74-78</td>
</tr>
<tr>
<td>T. l. in mm</td>
<td>86-97</td>
<td>90-97</td>
</tr>
<tr>
<td>Dorsal</td>
<td>X, 14</td>
<td>X, 14-15</td>
</tr>
<tr>
<td>Anal</td>
<td>III, 7</td>
<td>III, 7</td>
</tr>
<tr>
<td>Scales; D. to L.L.</td>
<td>11-12</td>
<td>10</td>
</tr>
<tr>
<td>Head</td>
<td>2.6-2.7</td>
<td>2.6-2.7</td>
</tr>
<tr>
<td>Depth</td>
<td>2.3-2.6</td>
<td>2.3-2.5</td>
</tr>
<tr>
<td>Eye to dorsal</td>
<td>1.4-1.5</td>
<td>1.6-1.7</td>
</tr>
<tr>
<td>Peduncular depth</td>
<td>2.6-2.8</td>
<td>2.8-2.9</td>
</tr>
<tr>
<td>Eye</td>
<td>3.7-4.0</td>
<td>3.4-3.8</td>
</tr>
<tr>
<td>Snout</td>
<td>2.9-3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Maxillary</td>
<td>2.0</td>
<td>2.0-2.1</td>
</tr>
<tr>
<td>Interorbital in eye</td>
<td>1.2-1.3</td>
<td>1.1-1.3</td>
</tr>
<tr>
<td>Longest dorsal spine</td>
<td>2.3-2.7</td>
<td>2.1-2.5</td>
</tr>
<tr>
<td>Longest anal spine</td>
<td>2.3-2.8</td>
<td>2.4-2.7</td>
</tr>
</tbody>
</table>
88. *Gramma hemichrystos* new species Mowbray.

Type No. 526 Bingham Oceanographic Collection. Standard length 50 mm., total length 62 mm.

''Head 3.5; 4.1 in total; depth 3.5; 4.1 in total; interorbital 3.3 in head; maxillary reaching vertical through posterior margin of eye; dorsal XII, 9 or 10; anal III, 9 or 10; ventrals 1, 5; pectorals 15; caudal 18 developed rays. The lateral line is high and interrupted, the upper part curves abruptly upward, following the curve of the back, ending under the 6th or 7th dorsal ray and close to it, almost on the base of the rays. There are 36 or 38 pores in the upper part; the lower portion runs straight on the caudal peduncle, and ends in the middle of the base of the caudal rays. It has 11 or 13 pores. Scales 3 or 4-48

or 50-14 to 16. The teeth scattered behind the outer series which are most numerous posteriorly; the teeth in the lower jaw are the largest; there are two enlarged canines in the front of the upper jaw and 4 or 8 in the lower jaw, those in front are the largest and curved; the palatines have a single series of very strong thick teeth; the vomer has nine strong teeth, the one in the center enlarged; the gill-rakers are long, slender, close together and well developed, 10 + 20; branchiostegals 6; the ventral spine is long and slender, the rays are filamentous, reaching beyond the base of the anal spines; the anal spines are long but slender, equally graduated, the third the longest; the dorsal fin is long, continuous and without a notch; the base of dorsal rays is slightly more than 2 in the base of the spinous portion; the fins are not scaled, the dorsal fin has one row of scales just cutting its base; the caudal fin is emarginate, the lobes rounded; nostrils close together, the anterior one with a short tube; the top of the head is scaleless and has many pores; there are many pores on the mandible, ocular rim and temporal region; the opercules and posterior portion of the preopercules are scaled, the
Breder: Fishes

1925

preopercule is serrate; the opercle has two spines, the upper at the angle is bluntly rounded, the lower is sharp and is exposed. The vertebrae are \(11 + 17 = 28\). The stomachs were filled with copepods and other small crustaceans, but could not find a trace of other food."

"Coloration—Royal purple on the anterior half, the posterior is bright lemon yellow; pectorals pale with a yellowish tinge, three stripes of greenish-yellow behind the eyes, the lower extending on the opercle, the premaxillary has a small spot of the same color; there is a black blotch on the anterior dorsal spines." See Figure 21.

"The type specimen was taken at Royal Island Harbor, Bahamas with two other specimens on March 15th, 1925. Three others were taken at Corrientes Bay, April 2nd, seven more at Glover Reef, April 22nd. Eight of these were secured by dynamite, the others were taken alive and kept alive for several weeks on the Yacht Pawnee. They live about coral reefs and heads, always in pairs. Sometimes there are several pairs about the same part of the reef. They swim slowly and when alarmed dart off with jerky movements. They do not dart into holes or crevices of the reef when surprised like most coral reef fishes. They are extremely wary, although bold, will not take the hook, but show great curiosity when other fish go toward the bait or chum. They swim about half way from the bottom to the top of the reef in about 10 or 20 feet of water. Without question, they are among the most conspicuous coral reef fish, their bright colors contrasting against the reef. The largest specimen is 75 mm. long."

"This species is close to G. loreto Poey. It differs in many important respects as well as color. Poey states that his specimen was red posteriorly."

526 (1) Type Royal Island Harbor. March 15.
215 (1) Paratype, do.
219 (1) Paratype, Royal Island. March 15.
218 (1) Paratype, Glover Reef. April 17.
220 (13) Paratypes, Corrientes Bay, Cuba, Royal Island Harbor, Swan Island. April 12. (or Saddle Rock. March 22?). All or only one locality?
217 (1) Swan Island. April 11.

89. Priononodes tigrinus (Bloch).

210 (1) Pt. Francis, Isle of Pines. April 5 (or Saddle Rock. March 23?).
211 (2) Glover Reef. April 14.
212 (1) Glover Reef. April 17.

90. Diplectrum radiale (Quoy & Gaimard).

214 (1) Turneffe Island. April 2. Hand line.
Genus *Caribrhegma* new genus.

Close to *Rhega* of the Pacific but differing in the possession of two opercular spines instead of none, the possession of anterior canines in the upper and lower jaw instead of none, the more projecting lower jaw and the shorter pectoral fins which are pointed instead of rounded. Otherwise similar.

It might be recommended to expand the definition of the genus *Rhega* to include the present form but with the present day tendency to break up genera into smaller and smaller units such stretching, although personally considered desirable, would only add to the confusion at this time for almost surely the next investigator to obtain this form would make such a split.

Based on *C. gregoryi* described below.

Named for the Caribs; the *rhega* of the Caribs.

91. *Caribrhegma gregoryi* new species.

Type No. 476 Bingham Oceanographic Collection. Standard length 44 mm., total length 52 mm.

Fig. 22. *Caribrhegma gregoryi* new species. Type.

Head 2.7; depth 3.1; dorsal VII, 15; anal III, 12; lateral line 48; eye 4.2; snout 4.3; maxillary 2.1; interorbital 2.0 in snout. Body and head compressed, somewhat as in *Rhapticus*; mouth large, maxillary reaching past eye; dorsal profile of head evenly arched; preopercule with a single spine, opercle ending in a thin broad flap in which are imbedded two broad flat spines; opercle attached to shoulder girdle above angle by a membrane; pseudobranchia well developed. Scales thin, weakly ctenoid, covering most of head; lateral line following curve of back to end of soft dorsal, recommencing on mid-line of peduncle. Dorsal low, continuous; anal low, the spines separated from the rest of the fin by a slight notch. A single tentacle over each eye. Ventrals well in advance of pectorals; caudal rounded. Tip of lower jaw slightly excluded. Pectoral pointed, 1.4 in head, reaching anal rays; ventrals short, reaching about half way to vent; anterior nostril in a short simple tube. Fine teeth on vomer,
palatines and jaws, a few canines near tip of upper and lower jaw. Gill membranes free from isthmus and not united. Gill rakers short and stout, 5 developed below arch and a few rudiments above.

Coloration—Brownish above, lighter below, a dark spot on operculum about the size of eye, a dark line from eye across cheek. Fins all dusky, the paired fins lightest. See Figure 22.

There are two paratypes with the same data. They measure 41 and 32 mm. in s. l. The larger is very similar to the type but the smaller has the body spotted with paler in such a manner as to suggest reticulations. The opercular spot is exceedingly prominent and outlined above with a partial light ring. There is a strong white transverse bar running from the eye across the maxillary and mandible. This is also suggested in the larger paratype. The fins of the smaller are all light.

Named for Dr. W. K. Gregory, my chief at the American Museum of Natural History.

476 (1) Type Glover Reef. April 18.
221 (2) Paratypes do.


222 (1) Alligator Reef. Trawl 12 ft. No. 6.

Family Priacanthidae.


528 (1) (A).
531 (1) ——), (mounted).

Family Lutianidae.

94. *Lutianus analis* (Cuvier & Valenciennes).

535 (1) (A).

95. *Lutianus buccanella* (Cuvier & Valenciennes).

534 (1) (A).


Hildebrand & Ginsburg 1926a make a real effort to untangle the status of the "red snappers." Their tabulation would appear to be clear enough but the present material does not completely corroborate their analysis as the characters tend to overlap and change somewhat with size to say nothing of the nomenclatural difficulties involved. However, for the present, although the material is not in perfect agreement it is clear we have both and they may stand for the present, at least, according to the opinions of those students.

550 (1) (mounted).
551 (2) (B).
387 (1) ——.

See discussion under preceding species.

552 (1) (mounted).
553 (3) (B).

98. *Lutianus jocu* (Bloch & Schneider).

410 (1) Metal tag 1. (mounted).


557 (2) (B).

100. *Lutianus brachypterus* Cope.

There is one mounted specimen of this little known form. It agrees quite closely with the description to which may be added the scale count from the anal to the lateral line; 15. The colors given to this mounted specimen are as follows. Dusky above blending into a rosey flush on the sides which in turn blend to the slightly silvery ventral surface. The iris is silvery with a yellow tinge above and a similar rose one below. The dorsal and anal are a pale yellow, edged with rose. The caudal is a deeper shade of rose than the sides, doubtless accounting for the dark tail of the preserved type. The paired fins are pale, tinged with rose and yellow. 320 mm. s.l.

554 (1) ——. (mounted).


546 (3) (B).
547 (1) Misteriosa Bank. (Mounted).

Family HEMULIDÉ.

102. *Bathystoma rimalor* (Jordan & Swain).

The two larger specimens (No. 224) well over 100 mm. s.l. superficially appear to be quite different but fall within the limits of variation set by Meek & Hildebrand 1925.

The rest, of 45 mm. s.l. and less, show the strong stripes and heavy caudal spot characteristic of the immature fish. The caudal spot is very pale in the two larger specimens.


103. *Bathystoma striatum* (Linnaeus).

A single specimen separated from *B. rimalor* is referred to this species on the strength of the Jordan & Evermann 1896 and Meek & Hildebrand 1925 descriptions. In the latter key it runs to *striatum* on a basis of scale count and lack of a caudal spot although it is just as deep as *rimator*. In the former key it runs the
same on the basis of size of mouth and number of gill rakers. This fish, although not a clear cut case is clearly not *B. aurolineatum* (Cuvier & Valenciennes), the only other possibility.

225 (1) Double-headed Shot Cay. March 6-8. 4 faths.

104. *Brachygenys chrysargyreus* (Günther).

226 (1) Royal Island. Eleutheria, Bahamas. March 15.

227 (1) Double-headed Shot Cay. March 6-8. 4 faths.

228 (1) ——.

538 (4) Grand Cayman. April 8.

539 (3) (A).

105. *Hemulon flavolineatum* (Desmarest).

545 (1) (B).

106. *Hemulon sciurus* (Shaw).

386 (1) ——.

548 (1) (B).


549 (1) (B).

There is also one small example referable to the genus *Hemulon.*

234 (1) Pt. Francis, Isle of Pines. April 5. (or Saddle Rock. March 23?).

108. *Pomadasis croero* (Cuvier & Valenciennes).

229 (1) Double-headed Shot Cay, Cay Sal Bank. March 5.

230 (6) Double-headed Shot Cay. March 5-6.

231 (5) Double-headed Shot Cay. March 6-7. 4 faths.

232 (1) Pt. Francis, Isle of Pines. April 5. (or Saddle Rock. March 23?).


555 (1) ——. (mounted).

**Family Dipterygonotidae.**

110. *Inermia vittata* Poey.

Jordan 1922 gives what is apparently the only other record of this species since the time of Poey. His fish was from Curacao. He erects the family Dipterygonotidae to include *Inermia* and *Dipterygonotus.* Known only from Cuba and Curacao. The present example was taken from the stomach of an *Epinephelus.* It is in fair condition and of 130 mm. in s. 1.


**Family Gerriidae.**

111. *Eucinostomus californiensis* (Gill).

Meck & Hildebrand 1925 are followed in considering *E. pseudogula* Poey
identical with *californiensis* which has priority. The present material fits easily into the broad limits of this variable and widely distributed form.

236 (3) Royal Island Cay, Bahamas. March 15.
237 (2) Pt. Francis, Isle of Pines. April 5 (or Saddle Rock. March 23?).
413 (1) (B).

112. *Diplerus rhomboeus* (Cuvier).

414 (1) (B).

Family **Sciaenidae**.

113. *Eques acuminatus* (Bloch & Schneider).

559 (8) Corrientes Bay, Cuba. April 3.
239 (3) Double headed Shot Cay, Bahamas. March 7.

114. *Eques pulcher* Steindachner.

240 (1) Royal Island, Bahamas. March 14.
241 (2) Saddle Rock, Bahamas. March 23.


411 (1) (B).

Family **Cirrhitidae**.

Genus *Pseudocirrhites* new genus Mowbray.

"Body compressed, oblong, covered with large cycloid scales; lateral line continuous, nearly straight; the pores turned obliquely upward, extending on the base of caudal; mouth small, low; eye high, the upper margin above the outline of the straight profile; premaxillaries little protractile; maxillary narrow, 3/4 entirely covered by preorbital; villiform teeth in both jaws; a few strong canines on the side of the lower jaw which are turned backward; three or four canines in front of upper jaw; a cluster of small teeth at the extreme base of the upper jaw; vomer and palatines with teeth; preopercle serrate; opercle with a broad flat spine; gill membranes united, free of the isthmus, covered with small scales; branchiostegals 6; a few gill-rakers developed below the angle; pseudobranchia present; a fringed tentacle over the anterior nostril; scales on nape with many branched pores; five lower rays of the pectoral simple, and produced 2/3 longer than the branched upper rays; membrane connecting dorsal spines with many hair-like filaments; maxillary and premaxillary without scales; membrane at base of dorsal scaled."

"The above new genus is based on the broadly united gill membranes."


Type No. 382 Bingham Oceanographic Collection. Standard length 55 mm.

"Head 2.66 in s. l., 3.5 in t. l.; depth 2.6 in s. l., 3.25 in t. l.; D. X. 11; A. 111
6; scales 5-42-8; pores 42 body oblong, compressed; eye 4; snout 3; second anal
spine 1.5 in head; interorbital 5.1; upper simple ray of pectoral about equal to head from tip of snout to tip of opercular spine; the longest dorsal spine, the 6th, 2. in head; depth of caudal peduncle 2.66 in head; first anal spine about two in second spine, and slightly longer than the third; caudal truncate, its rays about equal in length to the second anal spine; the ventrals reaching beyond the vent nearly to the base of the anal; villiform teeth in both jaws; some small canines in front of upper jaw; sides of lower jaw with six or eight small canines which are turned backward; some small but strong canines in posterior part of upper jaw; vomer and palatines with teeth; a tentacle over the anterior nostril;

the membrane connecting the dorsal spines ends in many hair-like filaments at the end of the spines; preopercle serrate; opercle ending in a broad flat spine; the membrane reaches considerably behind the spine; the scales in the temporal region are covered with numerous pores; the interorbital covered with small scales which extend forward to the anterior nostril; the snout and premaxillaries are without scales; opercles and membrane connecting opercles covered with scales; pectorals with 14 rays, the upper one simple; the second to eighth branched; the five lower ones are simple, and nearly twice as long as the upper rays." See Figure 23.

"Coloration—Head and nape light brown; three vertical light bands on the body; a narrow line of the same color between the broad bands; a broad band
of dark brown covering the entire caudal peduncle; a large dark brown spot larger than the eye at the base of the dorsal rays, two-thirds of which is on the body. The broad bands of the body extend on to the dorsal fin; the pectorals, ventrals and caudal pale, as are the spaces between the bands. The head and nape including the maxillary and dorsal fin with bright red spots."

"This species is exceedingly wary and is most difficult to approach. On being disturbed, it takes to the holes and crevices, moving from place to place with the greatest caution. While hunting for its prey its actions resemble those of Mycteroperca and Epinephelus."

"One specimen taken in shallow water among the corals at Point Francis, Isle of Pines, April 5, 1925, named for the Isle de Pinos."

382 (1) Type. Pt. Francis, Isle of Pines. April 5.

Family Pomacentridae.

117. Chromis marginatus (Castelnau).

On the basis of the present large series all West Indian species of the sub-genus Furcara Poey are referred to the synonymy of Chromis marginatus (Castelnau). Although the material shows much variation it agrees well with the description given by Meek & Hildebrand 1925 based on ten specimens from Porto Bello, Panama. These students suspected that actually one species was represented in the West Indies but had insufficient material to back up their supposition. The distinguishing characters given for C. cyaneus (Poey) and multilineatus (Guichenot) by Jordan & Evermann 1896, break down, through the presence of various intermediates. A minute examination of the material was made with the hope of retaining the former specific names for races. As a purely tentative outline the following key may be used to separate the present material, at least, into such races.

A. Scales without any blue spots.
B. Peduncle without distinct yellow spots at base of last dorsal ray, although sometimes a light area is present, axil light or dark, sides with faint lines or nearly plain..........................marginatus.
BB. Peduncle with some light spots yellowish in life, at base of last dorsal ray (1 to 8), axil dark, sides with faint lines or nearly plain...multilineatus.
AA. Scales with blue spots anteriorly most numerous, fading to whitish in preservative, axil dusky, no peduncular spot, sides with faint lines along scale rows........................................cyaneus.

The justification for not considering these differences of more than racial value is given in Table 7, based on detailed measurements of twenty-seven samples from the various collections. The only reason for not considering the differences as simple individual variation is the fact that there is a certain uniformity about each collection suggesting some sort of segregation. It is
recognized as a possibility, however, that the condition of the gonads or other seasonal or incidental factors may be expressing themselves in these color differences but at present it is felt that there is no reason to argue from such an assumption.

The distribution of the races so far as known seems to be as follows.

C. m. marginalus; Bahia, Isle of Pines, Bahamas, Glover Reef.

C. m. multilineatus; Cuba, Bahamas, Panama.

C. m. cyaneus; Cuba, Bahamas.

Regional lists that mention any of these as species without comment of course cannot be quoted in this connection. It should be clear from an inspection of Table 7 that the fish of Meek & Hildebrand 1925, as here understood, is C. m. multilineatus. The distributions as above indicated hardly seem to suggest geographic races but when the diversified coral reef environments are considered it becomes evident that likely we are dealing with ecological races occupying closely adjacent (geographically) but separate (environmental) areas near each of the places named. Thus we would have as the most generally distributed form C. m. marginalus and C. m. cyaneus as a Cuba-Bahama differentiation probably associated with a slightly different habitat or possessing slightly different habits and C. m. multilineatus as a Cuba-Bahama-Panama differentiation associated with still a third ecological “complex.” More than this would be mere speculation and the material is being held for additional data and specimens from other localities.

The segregation of these provisional races may be indicated by the collections as they were made.

Double-headed Shot Cay, Bahamas.

100 (4) C. m. cyaneus March 6.

Saddle Rock, Bahamas.

558 (15) C. m. marginalus March 22.
319 (55) C. m. marginalus March 23.
242 (59) C. m. multilineatus March 23.

Pt. Francis, Isle of Pines.

243 (3) C. m. marginalus April 5.

Glover Reef.

244 (1) C. m. marginalus April 15.
245 (3) C. m. marginalus April 17.

Only amongst the C. m. marginalus from Saddle Rock were the light areas on the peduncle to be found (on about 5% of the specimens) which strongly suggests an approach to C. m. multilineatus which were only taken at that place. At Double-headed Shot Cay the fish were straight C. m. cyaneus and at the Isle of Pines and Glover Reef all typical C. m. marginalus.
The present understanding of these forms may be indicated by the following descriptions.

*Chromis marginatus marginatus* (Castelnau).

Head 3.0 to 3.7; depth 2.2 to 3.0; peduncle 2.1 to 2.7; eye 2.6 to 3.1; snout 3.3 to 4.1; maxillary 2.4 to 3.0; interorbital 2.5 to 3.0.

Axil of pectoral light or dark, no yellow spots on peduncle at base of last dorsal ray although a light area is sometimes present. Very faint lines along scale rows or almost plain. No blue spots any place. Apparently differing from *C. m. cyaneus* only in the lack of blue spots.


*Chromis marginatus multilineatus* (Guichenot).

Variations in proportions are indicated in second column of Table 7. Differs from *C. m. marginatus* in the possession of from one to eight small yellow dots at the base of the last dorsal ray. None with “a sulphur yellow blotch across tail behind dorsal” as given by Jordan and Evermann 1898. This may be still another form, unnamed or properly holding this one.

*Heliasis multilineatus* Guichenot, Ramon de la Sagra Poiss., (Cuba) 76, pl. 2, fig. 2, 1855, (Havana); in part; confused with *Kyphosus incisor*; Gunther, Cat, IV, 64, 1862.

*Furcaria puncta* Poey, Memorias II 195 1860 (Havana).


*Chromis marginatus cyaneus* (Poey).

Variations in proportions indicated in first column of Table 7. Differs from *C. m. marginatus* in the possession of bluish spots on the scales especially anteriorly. Differs from *C. m. multilineatus* in the same manner that *C. m. marginatus* does, differs from it only in the possession of blue spots.

*Furcaria cyanea* Poey, Memorias, II 196, pl. 14 figs. 5-8, 1860 (Havana).

*Heliasis cyanea* Gunther Cat IV 64, 1862.


Proportions and measurements not shown in Table 7 were so consistent as to be of no significance in the present connection. A statistical study of the sizes reveals but little, as all but one collection contains too few individuals to be useful. In this latter (*C. m. multilineatus*) we have a single prominent mode, at 58 mm. (s. 1.) which slopes off to 51 and 74 respectively. Above the latter there is a single fish of 81 mm. no doubt of another year class.

Meek & Hildebrand 1925 record a ripe female on March 15 at Porto Bello, Panama. The present earliest material, from the Bahamas, *C. m. cyaneus*, March 5 and 6, is in the same condition. One from Glover Reef, April 15 of
Table 7. Variation in Chromis marginatus.

<table>
<thead>
<tr>
<th>Character</th>
<th>Upper Keys</th>
<th>Lower Keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard length mm.</td>
<td>59-73</td>
<td>59-81</td>
</tr>
<tr>
<td>Lateral line scales</td>
<td>29-30</td>
<td>29-31</td>
</tr>
<tr>
<td>Head</td>
<td>3.1-3.5</td>
<td>3.1-3.3</td>
</tr>
<tr>
<td>Body depth</td>
<td>2.6-2.8</td>
<td>2.4-3.0</td>
</tr>
<tr>
<td>Peduncle depth</td>
<td>1.9-2.1</td>
<td>2.2-2.6</td>
</tr>
<tr>
<td>Eye</td>
<td>2.7-3.0</td>
<td>2.6-3.0</td>
</tr>
<tr>
<td>Snout</td>
<td>3.8-4.0</td>
<td>3.5-4.0</td>
</tr>
<tr>
<td>Maxillary</td>
<td>2.8-3.4</td>
<td>2.5-3.0</td>
</tr>
<tr>
<td>Interorbital</td>
<td>2.3-2.7</td>
<td>2.8-3.0</td>
</tr>
<tr>
<td>Longest dorsal spine</td>
<td>2.1-2.6</td>
<td>2.1-2.6</td>
</tr>
<tr>
<td>Longest dorsal ray</td>
<td>1.5-1.7</td>
<td>1.5-2.0</td>
</tr>
<tr>
<td>Longest anal ray</td>
<td>1.7-2.0</td>
<td>2.0-2.2</td>
</tr>
<tr>
<td>Axil of pectoral</td>
<td>Dusky</td>
<td>Dark</td>
</tr>
<tr>
<td>Peduncular spot</td>
<td>None</td>
<td>Small dots (1 to 8)</td>
</tr>
<tr>
<td>Body markings</td>
<td>Faint lines on scale rows, blue spots on scales anteriorly, almost plain, very faint, no blue spots.</td>
<td>Almost plain, very faint, no blue spots.</td>
</tr>
<tr>
<td></td>
<td>Faint lines or almost plain, no blue spots.</td>
<td>Faint lines or almost plain, no blue spots.</td>
</tr>
<tr>
<td></td>
<td>Faint lines or almost plain, no blue spots.</td>
<td>Yellow spots.</td>
</tr>
</tbody>
</table>

59 mm. s. l. *C. m. marginatus* is apparently spent. Three from the same place, April 17 of from 40 to 50 mm. are undeveloped sexually. This might be interpreted to mean that they take two years to mature but this is not believed to be the case. Although the viscera of all is poorly preserved the larger series from Saddle Rock, March 23, mostly *C. m. multilineatus*, seems to have just spawned. The ripe ovarian eggs of a 78 mm. female of March 6 range from 0.35 to 0.47 mm. in diameter and average 0.41.
The stomach contents, along with the poorly preserved viscera, was so far mascerated as to be reduced to a characterless pulp.

118. *Pomacentrus fuscus* Cuvier & Valenciennes.

The present series of specimens of this genus presents some interesting but confusing material. A careful examination of it yields examples which fit each of the descriptions of the current West Indian species; *Pomacentrus adustus* Troschel, *P. diencaeus* Jordan & Ruther, *P. fuscus* Cuvier & Valenciennes, *P. analis* Poey, *P. olrophorus* Poey, *P. leucostictus* Muller & Troschel, *P. planionter Troschel, P. partitus* Poey, *P. chrysurus* (Bean) and *P. planifrons* Cuvier & Valenciennes. However there are various intermediates which readily nullify some of the above ten names and others which if the above were all allowed to stand should be called new. If the latter course were taken, the writer could be justly criticized as an impossible “hair-splitter” and actually the material is of such a nature that such species would be purely arbitrary. On the other hand if the former course were pursued the writer could be equally well criticized as being a most temertious “lumper” for it is almost impossible to believe that certain of the forms belong all to the same species. Therefore in the present report, pending further evidence and material nothing of a definite judgment is set forth. The sentiments of Meek & Hildebrand 1925 are here echoed—“We . . . do not understand the relationship of the Atlantic species. Owing to much individual variation, confusion has arisen, and the need of a thorough study and revision, based on a large series of specimens from various localities is evident.”

Tables 8 and 9, and the accompanying data are given in a preliminary way for what they may be worth.

Specimens which are evidently *P. fuscus*, plain colored and dusky are mostly of large size (60 mm. s. l. and over) but a few small ones (under 35 mm.) show the same coloration. Both large and small grade insensibly into forms with a saddle-like blotch on the peduncle and into the *P. leucostictus* group. Along with this may appear a spot on the dorsal fin and a general lightening of the posterio-ventral part of the fish.

The vertical fins may lighten posteriorly in various ways. One type shows the tail light, somewhat resembling *Microspadodon chrysurus*. None over 37 mm. show a dorsal ocellus but many have an unocellated spot in its place. Some have dots on the head and upper parts of the back which are not present unless there is a spot but not an ocellus on the dorsal, although these spots frequently occur alone. There is the greatest variation in the size, shape, placement and intensity of these various marks. Specimens of 12 mm. s. l. and below do not show these characteristics, being a uniformly pale shade. The correlation between these various markings so far as presence or absence is concerned is given in Table 8.
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**Table 8. Markings of Pomacentrus.**

<table>
<thead>
<tr>
<th>Dots</th>
<th>Saddle</th>
<th>Ocellus</th>
<th>Spots</th>
<th>No marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Saddle</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ocellus</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Spots</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>No other marks</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Various proportional measurements were taken, tabulated and plotted but without success. No correlation between body depth and absolute size could be found, nor did it vary with the pattern in the least, except on one light form which may be *P. chrysus* (Bean) or a new form where the average is slightly less than for the rest but does not exceed some of the others. In all the range of body depth was from 1.65 to 2.4. This slight depth is not characteristic of *P. chrysus* according to the original description.

It may be that we have to deal with one or two unexpectedly highly variable species or simply with forms that resemble each other closely and have very variable patterns but may be satisfactorily separated on the basis of some character which has not as yet been examined systematically.

It may be noteworthy to mention that the writer has noted, for a number of years back, the striking color changes in specimens of *Pomacentrus* brought to the New York Aquarium from Key West, Florida. These have been for long labeled *P. leucostictus* largely because when they arrive they generally show a color phase which approaches the description of this form most closely. However, after they have been given the freedom of their permanent exhibition tank for some time, they usually change slowly so that our *leucostictus* frequently becomes a *fuscus* or some other form.

Five specimens which might be referred to *P. chrysus* (Bean) average less depth than the rest.

With this discussion of the problem the material is listed. Only (Nos. 432 and 433) are referred positively to *P. fuscus*.

434 (3) Double headed Shot Cay. March 6.
439 (1) Royal Island, Bahamas. March 15, No. 40.
Table 9. Depth and Patterns of Pomacentrus.

<table>
<thead>
<tr>
<th>Number</th>
<th>S. L. mm.</th>
<th>Depth</th>
<th>Pattern type</th>
</tr>
</thead>
<tbody>
<tr>
<td>433</td>
<td>86</td>
<td>2.1</td>
<td>fuscus</td>
</tr>
<tr>
<td>432</td>
<td>76</td>
<td>2.0</td>
<td>fuscus</td>
</tr>
<tr>
<td>441</td>
<td>77</td>
<td>1.65</td>
<td>faint saddle fuscus</td>
</tr>
<tr>
<td>438</td>
<td>76</td>
<td>2.0</td>
<td>leucostictus-fuscus</td>
</tr>
<tr>
<td>453</td>
<td>86</td>
<td>2.1</td>
<td>small saddle fuscus</td>
</tr>
<tr>
<td>439</td>
<td>82</td>
<td>2.0</td>
<td>small saddle fuscus</td>
</tr>
<tr>
<td>443</td>
<td>56</td>
<td>2.1</td>
<td>fuscus-light peduncle</td>
</tr>
<tr>
<td>434</td>
<td>51</td>
<td>2.1</td>
<td>leucostictus-no ocellus or spot</td>
</tr>
<tr>
<td>451</td>
<td>35</td>
<td>2.0</td>
<td>intermediate between</td>
</tr>
<tr>
<td>449</td>
<td>48</td>
<td>2.3</td>
<td>spot-dots fuscus</td>
</tr>
<tr>
<td>450</td>
<td>40</td>
<td>2.2</td>
<td>leucostictus</td>
</tr>
<tr>
<td>452</td>
<td>32</td>
<td>2.2</td>
<td>leucostictus</td>
</tr>
<tr>
<td>444</td>
<td>33</td>
<td>2.3</td>
<td>ocellus-saddle</td>
</tr>
<tr>
<td>445</td>
<td>26</td>
<td>2.4</td>
<td>spot</td>
</tr>
<tr>
<td>447</td>
<td>9</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>446</td>
<td>12</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>448</td>
<td>11</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>442</td>
<td>64</td>
<td>2.3</td>
<td>pale</td>
</tr>
<tr>
<td>443</td>
<td>56</td>
<td>2.3</td>
<td>pale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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119. *Abudefduf saxatilis* (Linnæus).

533 (2) (A).

120. *Microspathodon chrysurus* (Cuvier & Valenciennes).

On the basis of the present material *Microspathodon niveatus* (Poey) is reduced to a synonym of *M. chrysurus* (Cuvier & Valenciennes) and is considered as one of the immature color phases shown by the later species. The following tabulation indicates these differences.

Two specimens of 12 mm. s. l. (No. 247) show various larval characters but both have the abruptly light tail of the typical adults. The spinous dorsal and basis of the soft dorsal and anal are dusky as are the ventrals. The remaining finnage is light. The body is dusky with heavier pigment on the scale margins giving the effect of longitudinal lines. One specimen has suggestions of four faint vertical lines (on one side only) reminiscent of the young of *Abudefduf saxatilis*. The snout and jaws are colorless, probably yellow in life.

One specimen 47 mm. s. l. (No. 431) is a typical "niveatus." The head, body, dorsal and anal are sprinkled with pale blue spots the size of a scale. The tail is dusky but lighter than the body. At the base of it is found a still lighter vertical band. A note accompanying it written by Mowbray reads "Lives among the coral heads. This is possibly the young of *M. chrysurus.""

Four specimens 88 to 110 mm. s. l. (Nos. 246 and 248) show the typical adult coloration except the smallest which has the tail dusky just as described above for "niveatus" but lacks the blue spots entirely.

Thus there remains nothing but the presence of blue spots to separate the two forms which is certainly not of specific significance especially as it occurs only in specimens up to a certain size.

The synonymy of *M. chrysurus* thus stands as follows.
Glyphisodon chrysurus Cuvier and Valenciennes, Hist. Nat. Poist., V, 1830, 476 (St. Thomas).

Pomacentrus denegatus Poey, Memorias, II, 1860, 190 (Cuba).

Pomacentrus niveatus Poey, Enumeratio, 102, 1875 (Honaor).

Microspathodon chrysurus Jordan & Evermann, Bull. U. S. Nat. Mus., XLVII, 1898, 1567, Pl. CCXXXV, fig. 593.


121. Harpe rufa (Linnaeus).

249 (1) Siguanea Bay, Isle of Pines. April 3.

389 (1) Dog Rocks. (Mounted).

122. Clepticus parra (Bloch & Schneider).

Although the present material shows some differences from the description of this species, none is considered great enough to be without the normal limits of individual variation. The varying items are as follows: Scales 33–35, Head 3.2–3.6, Depth 3.3–3.3, Pectoral 1.1–0.9 in head. The smaller example is dusky all over, with no evident markings. The larger is similar but has the posterior half slightly lighter, that is posterior to a line from the ventrals and the last dorsal ray. These two specimens seem to be somewhat slimmer than is usual for this species.

250 (2) Washerwoman Cut, Bahamas. March 23.

123. Lachnolaimus maximus (Walbaum).

388 (1) (mounted).

124. Halicheres radiatus (Linnaeus).

Meek & Hildebrand MS. refer Halicheres bivittatus (Bloch) to H. radiatus. This view is accepted here although the present material should be referred to the former, except No. 390, if it is eventually shown to be valid. However, there seems to be little doubt that the depth, coloration and change in fin shape is simply a matter of age. If the present material was extensive enough very likely a graphic visualization of it could be shown, similar to that given for Thalassoma bifasciatum, which see. It is clearly a group characteristic for fishes of this and related genera to change greatly with age. These changes center largely in the depth of the body, the coloration and the shape of the fins, especially the caudal. Overlaying this condition is the fact that these fishes
show a great amount of individual variation. As pointed out under Thalassoma all this has given rise to an usually large number of nominal species. It is recognized, however, that synonymizing these forms must be done with caution and until we know more of the life histories of the various forms it is frequently somewhat hazardous. However, in the present case Meek & Hildebrand have made such a lucid analysis that there can be little doubt of the correctness of their interpretation. The chief reason for proceeding with caution in reducing the number of species in this group is a consideration of the ever present possibility of some of the forms which appear to be the young stages of others actually being "fixed juveniles" such as one frequently find in the Carangidae. However, the sporadic occurrence of sexual development in an otherwise immature form does not necessarily establish the validity of a doubtful species. It may merely represent a neotenic condition. This should especially be borne in mind as the secondary sexual characteristics in this group do not develop uniformly, one or the other taking precedence indifferently as shown for Thalassoma. Only be a thorough study of the life histories of the species in question can we arrive at a satisfactory conception of the taxonomic significance of the variables at play in these fishes. The group represents one of the prettiest cases in fishes of the significance of life history work to systematics.

The following life color notes are paraphrased from the tag accompanying No. 252 by L. L. Mowbray.

The larger (65 mm. s. l.) was grass green and did not show a lateral stripe when taken. The smaller (46 mm. s. l.) showed three stripes, the ridge of the back was chestnut, below this a dark stripe with a reddish one under it, belly yellowish. The body had eight pale cross bands, a black spot at the base of the last dorsal ray, blue lines and spots on cheeks.

In preservation the larger is pale greenish and with the typical single stripe of this age with the darker spot on the aperculum. The smaller is similar to it but browner and with a suggestion of the lowest band that Mowbray mentions. There is no evidence of an upper stripe along the back. The spot at the base of the last dorsal ray is evident as is a smaller one in the same place on the larger example.

252 (2) Alligator Reef, Fla. Feb. 22. In 12 ft.
390 (1) Washerwoman Cut, Bahamas. (mounted).
393 (1) ——.

125. Halichoeres garnoti (Cuvier & Valenciennes).

Mowbray mentions on tags attached to some specimens of 88 mm. s. l. and under (March 16 Bahamas) that they had a blue lateral stripe. In some of the smaller examples of these there is evidence at present of some lateral streak. The marks that set these young examples off from the others of the present series are the radiating lines at the eye and the general lack of body markings, accompanied by an exceedingly light color.
253 (1) Pt. Francis, Isle of Pines. April 5. (or Saddle Rock. March 23?.
254 (2) Royal Island, Eleutheria, Bahamas. March 15.
255 (1) Glover Reef. April 17.
391 (1) No data. Metal tag 15 (mounted).

126. Halichares kirshii (Jordan & Evermann).

Even young fish of not more than 54 mm. s. l. may be distinguished from the rest of the present material by the dark spot behind the eye, the dark line at the pectoral base and the spot at the last dorsal ray accompanied by no lateral stripe.

A tentative key separating the young of these three forms may be based on the pattern alone as the proportions are of such a nature as to be thoroughly unreliable. It is clear from the present series however that we have three very similar young fishes developing into entirely distinct adults. The following characteristics seem to be constant however.

A. A definite lateral stripe from tip of snout to caudal, sometimes followed below by a fainter and narrower second. A dark spot about one-half of eye at edge of operculum and in lateral stripe, over a snout's length from eye. 

AA. Lateral stripe faint or absent, never followed by a second below. No dark spot at opercular edge.

B. Two broken lines radiating from eye upward and backward with various dots frequently on snout. Pectoral base plain, no dot at base of last dorsal ray. 

BB. No radiating lines about eye, but a dark spot immediately in back of it, less than one-half its diameter, no dots on snout, pectoral base with a dark line marking it, a distinct dark dot at base of last dorsal ray.

This key is applicable on material from about 90 mm. s. l. to about 40. Above this range the fish gradually take on adult characters and below it there is no consecutive material.

127. Thalassoma bifasciatius (Bloch).

There appear to be several causes at work to make the differentiation of Thalassoma of more than ordinary difficulty. They are as follows:

1. There is a great change in the "standard color" pattern with age.
2. There is a considerable change in the shape of the caudal with age, see Figure 26. This and the preceding character do not always develop at the same rate of speed in all specimens but one or the other may have precedence indifferently.

3. There are two typical color phases, a light and a dark, especially in the younger fishes.

4. There is a considerable amount of individual variation.

The accompanying diagram, Figure 25, shows the degree of overlapping of these variables of coloration and tail shape. In the overlapping areas various intermediates occur and it is to be noted that at no place do more than two phases overlap. This fact suggests that, despite the confused appearance of a given collection, all individuals would seem to pass through the various stages in a regular sequence, only the relative speeds of development being irregular.

Fig. 24. *Thalassoma bifasciatus* (young). 21 mm. standard length.

Fig. 25. Diagram showing pattern changes, decrease in eye size and caudal development in *Thalassoma bifasciatus*. 
Descriptions of the four main points of development follow, arranged according to the sizes found in the present two larger series, aggregating 39 specimens:

21 to 40 mm. (s. 1.)

Caudal slightly convex, central rays longest, outer ones margined with dusky. A dark longitudinal band, about diameter of eye from base of caudal to eye, passing through eye and meeting its fellow of the other side over snout. Dorsal with a light band mesially and a lighter one distally separated by a broader dark band which swells to a nearly black elliptical spot on the first four spines. Tips of pectorals dusky. Other fins plain. A dark axillary spot. The smallest example in the entire collection 21 mm. in s. 1. is colored essentially as the smallest in this series. The eye is 3.0. See Figure 24.

38 to 88 mm. (s. 1.)

Caudal truncate or concave.
(Dark phase). Coloration similar to that of the above except lateral band wider and broken into generally six more or less quadrate spots. Each scale darker near its tip. Mesial light band on dorsal gone. The anterior elliptical spot on dorsal occasionally scarcely evident.
(Light phase). Similar to above but lighter. The anterior dorsal spot which is not much darker than the band in the dark phase does not fade out and is consequently much more prominent, as is the axillary spot.

84 to 108 mm. (s. 1.)

Caudal produced at upper and lower lobes. In large specimens filamentous. Occasionally the central rays slightly longer than those adjacent to the produced tips which are shortest.

![Fig. 26. Caudal fins of Thalassoma bifasciatus reduced to one scale showing the change from convex to concave with age.](image-url)

Lateral band entirely gone. Head dark, followed by a light, more or less vertical band which is followed by a dark vertical band (under tips of pectorals). This latter is apparently a vertical extension of the second quadrate spot of the broken lateral band. The rest of the body plain. Dorsal band gone, fin transparent except for the anterior dark spot which remains and now extends backward to the seventh spine.
The significant measurements of these specimens are given in Table 10. Only the eye shows any consistent change with age becoming relatively smaller as indicated in the diagram, Figure 25. These proportions and color changes overlap the descriptions of *T. niditus* (Gunther) completely and force us to question the validity of that species. Specimens of alleged *niditus* cannot separate from the present material which on the basis of the foregoing data is all referred to *bifasciatus*.

*T. niditus* is not thrown into the synonymy of *bifasciatus* at this time, however, for the following reasons: It is quite conceivable that there may be existing in closely adjacent but different environments two such species in which one matures to a very different looking fish from its young whereas the other almost or quite indistinguishable when small, matures without losing its juvenile characters. As on the basis of the present material it is quite impossible to either prove or disprove such a proposition it may be allowed to rest for the present although it is believed that eventually the two will be synonymized.

The range of sizes represented in these collections doubtless represents two year classes. The adult “blue-head” forms the older and all the rest the other whose great variance in sizes suggests a rather prolonged spawning season, whereas the single small example is obviously of a very recent spawning.

### Table 10. Proportions of *T. bifasciatus*.

<table>
<thead>
<tr>
<th>Component</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard length mm.</td>
<td>40–108</td>
</tr>
<tr>
<td>Total length mm.</td>
<td>47–140</td>
</tr>
<tr>
<td>Head</td>
<td>3.1–3.3</td>
</tr>
<tr>
<td>Depth</td>
<td>3.5–4.2</td>
</tr>
<tr>
<td>Peduncle</td>
<td>2.0–2.3</td>
</tr>
<tr>
<td>Eye</td>
<td>3.7–5.1</td>
</tr>
<tr>
<td>Snout</td>
<td>3.1–3.2</td>
</tr>
<tr>
<td>Maxillary (in eye)</td>
<td>0.9–1.1</td>
</tr>
<tr>
<td>Interorbital (in snout)</td>
<td>1.1–1.3</td>
</tr>
</tbody>
</table>

Proportions not given in Table 10 showed practically no changes.

- 354 (2) Washerwoman Cut, Bahamas. March 23. 3 fathoms.
- 355 (1) Corrientes Bay, Cuba. April 3. (Near Caiman Pt.)

128. *Doratonotus megalepis* Günther.

Meek & Hildebrand MS. synonymize *D. decoris* Evermann & Marsh with this form which the present material tends to confirm, being somewhat intermediate between the two.

There are four rather small examples in the present collection of the typical greenish color and 61 very small specimens referred to this species. These
latter are entirely plain in coloration except for a black spot on the posterior dorsal and anal rays. The two smallest of the larger lot (32.5 and 28 mm. s.l.) still retain vestiges of this juvenile mark, although larger (43 mm. and over) have lost it. The sizes of the small group range from 8.5 to 13.0 mm. s.l. and show a mode of 11.5 mm., see Figure 27. Breder 1925, found ripe females on the Atlantic coast of Panama (May 4 to 8). The present young fish (April 11 and 12) from Swan Island must have been hatched from eggs laid some time in March which is considerably in advance of the Panama material when latitude is considered.

Fig. 27. *Doratonotus meglepis* (young) 9.5 mm. standard length.

*D. bakei* Metezelaar would surely seem to be merely nominal being separable from the present form only on color which is known to be exceedingly variable.

260 (1) Alligator Reef, Fla. 12 ft. water, No. 9.
293 (1) Pt. Francis, Isle of Pines. April 5. Trawl 2 faths.
262 (1) Royal Island Cay, Eleutheria, Bahamas. March 15, Seine.
263 (25) Swan Island. April 11. At night.
264 (36) Swan Island. April 12.

129. *Xyrichtys binghami* Mowbray.

The description of this species appeared as a single leaf, the first number of a new publication "Marine Life" which to date has not been further issued. The reference should stand as below:

Mowbray, L. L. "A New Bahaman Razor Fish."

As there is some danger of it being lost the description is here republished:

"Head 3.33, 4.1 in total; depth 3.2, 3.9 in total; eye 6 in head; distance from anterior border of the eye to anterior margin of profile in front of the eye, 5.5 in head. Pectorals as long as the ventrals which reach beyond the vent; last rays of dorsal and anal somewhat produced. Scales 2-29-8. Dorsal IX, 12; Anal III, 12; profile very steep."
"Color a pale green, back slightly darker than the sides; belly pale, inclined to be rosy in the region of the vent. Each scale at the base of the dorsal along the ridge of the back is opalescent and pearly blue or green; dorsal fin madder rose, the last five or six rays are spotted and streaked with pale blue. Caudal fin orange at the base, the outer margin bright madder rose; the whole caudal is spotted and streaked with lines of blue. Anal fin madder rose, paler at the base edged with blue; the whole fin has oblique lines of blue; at the base of each ray there is a blue dot. Chin with orange band bordered with blue. Cheek with vertical lines of orange and blue, those of orange the broadest. The scales of the whole body have a vertical blue line each, becoming more numerous and finer on the nape. There is a large oblique madder blotch on each side, covering from twelve to sixteen scales. The centers of these scales are very bright blue. The ventrals are rosy, the first ray is edged with blue. The pectorals are pale, their tips overlapping the large body blotch, and are colored like it. The eye is bright blue, with a golden ring around the black pupil."

"Ten specimens of this beautifully colored razor-fish were taken and kept in an aquarium in the laboratory of the yacht PAWNEE for sixteen days and were studied. They ranged in size from 120 to 200 mm. or about 4 3/4 to 7 1/8 inches."

"Although small and beautiful they have a most savage disposition. By biting the hand they inflict a wound with their sharp canine teeth that is deep enough to draw the blood. They showed a rather antagonistic feeling towards other forms and readily took charge of the aquarium. They feed well on the meat of Strombus gigas the large conch, and crawfish Panulirus argus. At sundown they would burrow in the sand and remain there until sunrise."

"This beautiful species has been carefully compared and is named in honor of Harry Payne Bingham of New York, who has great interest in furthering the study of Ichthyology, and is on the cruise of the yacht PAWNEE."
"The type of the above named fish is number thirteen in the collection of Mr. Bingham. It was collected on March 2, 1925, on Cay Sal Bank, Bahama Islands."

To this description the following notes are added. In preservative the smallest of the paratypes (106 mm. s. l., 120 mm. t. l.) lacks the characteristic madder blotch on the sides although all the larger ones retain it. Just below the place occupied by this spot in the others, this example has a dusky diagonal mark about equal to snout in length and one-half eye in width. It extends from a point one and one-half times eye over anal origin forward and slightly upward so that its anterior end is above the ventral outline a distance equal to .8 of peduncular depth. It is otherwise similar except that the vertical lines on the cheeks are rather vague. The coloration of the rest of the preserved material is as follows:

Body light and plain except for a brick red blotch under the tip of the pectoral fins when folded back. Head with numerous more or less vertical faint dark lines. Dorsal plain. Caudal with numerous fine, faint irregular dusky vertical lines. Anal with similar diagonal lines. Paired fins plain. See Figure 28.

Metzellar's (1919) X. psillicus is surely Mowbray's X. binghami but unless it could be shown that psillicus appears in two phases, sexual or otherwise, there are certainly two species here. This genus is in need of revision and detailed study before we can be sure of the number of species represented and their relationships.

256 (6) Paratypes, do.
266 (2) Paratypes, Royal Island Cay, Eleuthera, Bahamas. March 15.
392 (1) Paratype, (mounted).
394 (1) Paratype, (B).

130. Xyrichthys psillicus (Linnaeus).

The most evident difference between this form and X. binghami other than color is the greater length of the ventrals in the latter which reach beyond the vent in all except the smallest (106 mm.) in which they do not quite reach it. In X. psillicus of comparable size (110 mm. s. l.) these fins are much shorter reaching not more than three-quarters of the way to it and an eye's diameter short of the pectoral tips.


131. Xyrichthys argentinaeclata Steindachner.

There is a single specimen in the present collection which is referred, tentatively to this species, described from Brazil.

140 (1) Cay Sal Bank. March 1.
There is also a specimen of 90 mm. which may represent a new species close to X. psitticus. It has the long ventrals of X. binghimi and a less trenchant profile. It is reserved for further study owing partly to the present confusion within this genus.

139 (1) Alligator Reef. Feb. 22.

132. *Novaculichthys rosepes* (Jordan & Gilbert).

Further study and comparison may prove some of the smaller examples of the present series as referable to other species or may invalidate some of those.

268 (1) Alligator Light. Feb. 22. Inside Reef No. 2 Trawl 12 ft.
269 (1) Alligator Light Reef. Feb. 22. No. 3.
270 (1) Double-headed Shot Cay. March 6. 12 ft. dip net.
271 (2) Royal Island, Eleuthera, Bahamas. March 15. No. 7.
272 (3) Royal Island Cay, Eleuthera, Bahamas. March 15. Seine.

Family *Scaridae*.

133. *Cryptotomus beryllinus* Jordan & Swain.

The present series shows considerable divergence from the described proportions. These variations compared with those of Jordan and Evermann 1898 are given below:

<table>
<thead>
<tr>
<th>Specimens</th>
<th>J. &amp; E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>s. l. mm.</td>
<td>152–37</td>
</tr>
<tr>
<td>Head</td>
<td>3.0–2.7</td>
</tr>
<tr>
<td>Eye</td>
<td>5.4–3.5</td>
</tr>
<tr>
<td>Snout</td>
<td>2.3–3.5</td>
</tr>
<tr>
<td>Depth</td>
<td>4.4–3.3</td>
</tr>
<tr>
<td>Eye to mouth</td>
<td>1.5–0.5</td>
</tr>
</tbody>
</table>

The only proportion outside the present range is the head which would be expected to reach 3.6 in a larger fish such as Jordan & Evermann doubtless refer to. All the others fall within the present range of measurements. Meek & Hildebrand MS. in referring to larger specimens of *C. ustus* (Cuvier & Valenciennes) which they suspect to be identical with *beryllinus* find heads of from 3.24 to 3.25 in fishes of 150 to 200 mm. in total length. Their opinion is concurred with here but as none of the present material shows any sign of posterior canines the synonymy of the two is withheld pending more material. If proven identical, which is very likely, *C. ustus* should stand. Figure 29 shows the trend of the proportions which change with relation to absolute size. The two proportions, snout in head and eye to angle of mouth in head, show of course, a high degree of purely geometric corelation. It might be argued that for this reason the ordinary measurement of the snout length should suffice for toxiconomic purposes. However, the finding of a disagreement in such geomet-
ricular relationships should prove of especial value as it would indicate the presence of a third variable that might otherwise pass unnoticed. It seems that the value of such geometrical relationships have never been stressed, although unconsciously employed by all systematists from time to time. The proportional parts ordinarily considered for such purposes usually bear little relationship to one another and it would seem are most often chosen for their relative independence of other measured variables. With regard to such relationships the measurements taken on fishes may be of three sorts, as follows:

I. Independent variables. Measurements may be taken which are absolutely independent of each other from a geometrical standpoint and be limited only by the factors controlling the needs of biological structure.

![Diagram showing proportional changes in Cryptomus beryllinus with age.](image)

An example is the head and depth of the body, both referred to the length of the fish. Illustrations of the independence of these two variables are seen in such forms as Angelichthys, Gymnothorax, Fistularia, etc.

II. Geometrical variables. Measurements may be taken which vary directly or inversely with each other for purely geometric reasons. An example is the height of the dorsal fin to the distance its longest ray reaches when depressed. That measurements having a purely geometrical relationship are absent or only accidentally present in taxonomic papers is patent.

In other studies these rise to considerable importance, however. Gregory, MS. in a physical study of the body form of fishes gives a complete terminology for his special studies in which many of his measures are completely interlocked by geometrical law.

III. Quasi-independent variables. Measurements may be taken which are only in part independent of geometrical functions. These form a great part of
taxonomic measurements. An example is the case here considered concerning the snout and eye position. The antero-posterior position of the eye in part determines the snout's length and as well the angle this measure makes with the horizontal axis of the fish. However, that this relationship (between snout and eye to angle of mouth) is not absolute is evident from the fact that the depth of the mouth cleft and its slant is not controlled by the snout measure. Also the vertical position of the eye is in part indicated by the snout as the measurement is taken along the shortest line between the two points.

From such considerations it is believed that a careful study of the geometrical relationships of both the "independent" and "quasi-independent" variables would be of very real systematic value. For purely taxonomic work the simple geometric variables have none, although of course they are of considerable significance in matters bearing on the fish as an object of physical study. It might be profitable to try to reduce some of the former to indices not dissimilar to those of anthropologists. Gregory MS. does this in a general way, designating various functional types by a special terminology. Such is not referred to here as it is too broad for close taxonomic use. Rather fractional or decimal figures are thought of which might be worked with to any desired degree of accuracy.

Use of this method should find a place in discriminating between close but distinct species which, especially in the case of a single or few individuals, which sometimes defies diagnosis by the present method of direct and simple proportional measurement.

Regarding the lack of a membranous fold across the isthmus, this species is at such an intermediate point in this respect that it might be interpreted as being either with or without. Specifically, the membrane is adnate for a very short distance across the isthmus but gives the appearance of having a fold across it for at this point there is a slight ridge continuous with the free edge of either side, under which a needle may be scarcely introduced without encountering the solidly attached part.

275 (7) Alligator Light, Fla. Feb. 22. No. 4.
276 (1) Alligator Reef, Fla. Feb. 22. 12 ft.
274 (2) Royal Island, Elentheria, Bahamas. March 15.
278 (3) Royal Island Cay, Bahamas. Seine.

134. Sparrisoma radians (Cuvier & Valenciennes).

It is with considerable satisfaction that due to Dr. Hildebrand's kindness in making the third volume of "The Marine Fishes of Panama" Meek & Hildebrand, available in manuscript form that I am able to refer a number of nominal forms to the present species. To quote from this paper, still in press, after describing sexual and other differences at some length, the authors write, "This difference in the color of the male and female together with the large
variation among individuals of the same sex, has led to the description of several nominal species, of which *S. xystodon* seems to represent the most highly colored male and *S. cyanolene* the most modest female.” They refer the following current nominal forms to their synonomy of *S. radians*, *S. hoplomystax* (Cope), *S. cyanolene*, Jordan & Swain, *S. xystodon* Jordan & Swain. This condition was suspected, but on the basis of the present material alone, without Meek & Hildebrand's manuscript, it would have been unwise to attempt this deduction. If, on the other hand, however, someone should succeed in reestablishing these species, No. 279 should be referred to *xystodon*, and 280 and 281 to *hoplomystax*.

279 (2) Royal Island, Elentheria, Bahamas. March 15. No. 7.
280 (2) Alligator Reef, Fla. Feb. 22. No. 8, grassy bottom, 12 ft.
281 (15) Royal Island Cay, Bahamas. No data. Seined.
542 (1) (A).

296 (1) Washerwoman Cut, March 23.
349 (1) (mounted).

478 (1) March 7.

137. *Sparisoma viride* (Bonnaterre).

According to the coloration of the present mounted specimen, the areas mentioned by Jordan & Everman 1896 as being brownish are a brilliant vermillion, i.e., the edges of the scales, the gill membranes, the lines about the head, the dorsal fin and the central part of the anal fin. The tips of the caudal, central rays are pale blue instead of transparent. This species, *S. lorito* Jordan & Swain and *S. chrysopterum* (Bloch & Schneider) are suspected of being the same, as the distinguishing characters are in from 1 to 4 posterior canines and in coloration, both of which characters are exceedingly variable in this family.

350 (1) (mounted).

346 (1) ——. (mounted).
541 (1) (A).

139. *Scarus croicensis* (Bloch).
544 (1) (A).

140. *Scarus caruleus* (Bloch).
295 (1) Royal Island, Bahamas. March 15.
344 (1) ——. (mounted).
141. *Pseudoscarus guacamaia* (Cuvier).

347 (1) Royal Island, Bahamas.  (mounted).
351 (1) ——.  (Skeleton).


348 (1) ——.  (mounted).

Family **Zeidi**.

143. *Zenion hololepis* (Goode & Bean).


Family **Chetodontide**.

144. *Chelodon striatus* Linnaeus.

284 (1) Royal Island Cay.  March 15.  No. 7.
285 (1) ——.
286 (2) (A).


287 (2) Siguanea Bay, Isle of Pines.  April 5.
288 (1) ——.
407 (3) (A).

146. *Chelodon ocellatus* Bloch.

402 (1) ——.  (mounted).

147. *Angelichthys ciliaris* (Linnaeus).

289 (1) Royal Harbor, Bahamas.  No data.
405 (1) (mounted).


406 (1) ——.  (mounted).

149. *Pomacanthus arcuatus* (Linnaeus).

290 (1) Saddle Rock.  March 22.  No. 53.
404 (1) (mounted).

150. *Pomacanthus paru* (Bloch).

403 (1) ——.  (mounted).

151. *Holacanthus tricolor* (Bloch).

409 (1) (A).

There are also the following very small forms referred to the following genera.

*Angelichthys* sp.

Pomacanthus sp.

292 (1) Swan Island. April 12.

Family Hepatidae.

152. Hepatus hepatus (Linnaeus).

Two young examples are referred to this species which differ evidently from specimens of similar size of Hepatus bahianus (Castelnau). For discussion and comparison see under that head.

297 (1) Royal Island, Bahamas. March 15.
298 (1) Pt. Francis, Isle of Pines. April 5.

153. Hepatus bahianus (Castelnau).

Three young examples are referred to this species which differ from the young of H. hepatus as is indicated in Table 11.

**Table 11. Diagnostic Characters of Young Hepatus.**

<table>
<thead>
<tr>
<th>Character</th>
<th>H. bahianus</th>
<th>H. hepatus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard length mm.</td>
<td>53 48 33</td>
<td>65 36</td>
</tr>
<tr>
<td>Body depth</td>
<td>2.0 1.9 1.8</td>
<td>2.0 1.7</td>
</tr>
<tr>
<td>Shape of caudal</td>
<td>Emarginate upper lobe the longer.</td>
<td>Very slightly concave.</td>
</tr>
<tr>
<td>Edge of caudal</td>
<td>Deep edging of blue</td>
<td>Edge just touched with blue.</td>
</tr>
<tr>
<td>Sides of body</td>
<td>No vertical marks on sides.</td>
<td>sides sides with three with light vertical faint bands and diagonal vertical light lines lines.</td>
</tr>
</tbody>
</table>

Fig. 30. Diagram showing proportional differences in the young of Hepatus. A. H. bahianus. B. H. hepatus.
*Hepatus caeruleus* (Bloch & Schneider) even of a considerably larger size has a greater body depth than any of these. Figure 30 gives a graphical presentation of the decrease in depth accompanying growth. *H. hepatus* is evidently proportionally deeper (1) in diagram. *H. bahianus* of this collection (2) is not so deep and compares with *H. bahianus* from the San Blas coast of Panama (3) although these latter fish are somewhat slimmer above a length of 38 mm. and somewhat deeper below it. These Panama figures are taken from Breder 1925. The differences in the caudals of these young as mentioned in Table 11 is shown in Figure 31.

![Caudal fins of young Hepatus](image)

**Fig. 31.** The caudal fins of young Hepatus. A. *H. hepatus*. B. *H. bahianus*.

299 (1) Pt. Francis, Isle of Pines. April 5.
300 (1) Royal Island, Bahamas. March 15.
301 (1) ——.

343 (2) (A).


Type No. 302 Bingham Oceanographic Collection, 26.5 mm. standard length, 33.5 mm. total length.

Head 2.8, depth 1.4, dorsal IX, 27, anal III, 26, lateral line about 75. Upper profile of body rather evenly curved, lower deep, trenchant; eye large, 2.8; snout 2.1; interorbital 3.0; pectoral inserted below median axis of body, rather long, equal to head; caudal peduncle narrow, equal to eye; ventrals inserted directly under pectorals; dorsal inserted over axil, a line drawn from dorsal origin to ventral insertion passing through it; anal inserted under seventh dorsal spine which is strongest, largest and heaviest, equals eye and postorbital part of head, 1.7 in head; second anal spine strongest and heaviest, 1.8 in head. Mouth small, teeth typical as in *H. elegans* (Garman); vertical folds extending nearly for entire depth in most cases; gill-rakers 8. See Figure 32.
Coloration—Plain, except for a purplish black blotch on nape which extends downwards and fades on the operculum. A dark triangular patch on peduncle, after spine and a small median one at base of last dorsal ray. A dusky band occupying distal third of caudal, edged by a very narrow light line. Other fins plain, except anterior face of second dorsal spine which is dusky, slight dusky punctuations on upper lip. The viscera shows through translucent skin.

Fig. 32. *Hepatus pawnee* new species. Type.

That this is not *Hepatus elegans* (Garman) is evident from the following tabulation of the prominent differences:

<table>
<thead>
<tr>
<th></th>
<th><em>H. elegans</em></th>
<th><em>H. pawnee</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsal</td>
<td>IX, 22</td>
<td>IX, 27</td>
</tr>
<tr>
<td>Anal</td>
<td>III, 21</td>
<td>III, 25</td>
</tr>
<tr>
<td>Gill-rakers</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

Many of the proportions show minor differences not of significance each by itself. Garman 1899 gives a color plate of *H. elegans* which shows the pattern to be close but not identical with the present form.
That this is not the highly modified young of some known West Indian species is evidenced by the fact that young of *H. hepatus, cœruleus* and *bahianus* of comparable sizes are familiar. These do not differ widely from their adults except in depth, are heavily pigmented and do not show the peculiar vertical folds on the body. It would seem that these forms should represent another genus on the basis of the usual modern interpretation of the word. From a casual examination the "folds" seem actually to be exceedingly deep and narrow scales. A detailed discussion of this is reserved for another paper.

There are numerous paratypes of closely similar size. Their discussion is likewise reserved for further study.

Named for the yacht "Pawnee" from which this collection was made.

302 (1) Type, Glover Reef. April 15. Light at night surface.
303 (44) do.
304 (5) ——.

**Family Triacanthidæ.**

156. *Hollardia hollardi* Poey.

Apparently a small second ventral spine had passed unnoticed until observed in the fresh material by L. L. Mowbray. See Figure 33.

540 (1) 484 faths. April 20. Dredge.
543 (1) ——. (mounted).

---

**Fig. 33.** *Hollardia hollardi* Poey, showing second ventral spine.
Family Balistidae.

   305 (8) Royal Island, Eleatheria, Bahamas, March 15. No. 17.
   397 (1) Metal tag 13 (mounted).

   398 (1) Dog Rocks, Bahamas. (mounted).
   399 (1) ——. (mounted).

159. *Canthidermis sufflamen* (Mitchill).
   400 (1) Metal tag 16. (mounted).

Family Monacanthidae.


Although there is no difficulty in separating the adults or half grown specimens of this species and the somewhat similar *Monocanthus ciliatus* (Mitchill), there seems to have been considerable confusion of the young. Although proportional measurements show no reliable differences and the usual differential characteristics such as development of the pelvic flap, peduncular spines, etc., are very variable, the form of the profile of comparable sized fishes is characteristic. Those of the present series, longer than 39 mm. s. 1. are decidedly deeper (1.7) whereas *M. ciliatus* does not deepen so rapidly or to such an extent (2.0). The fin counts, as given by Jordan & Evermann, 1896, are without value as they overlap completely in the present series.

   306 (1) Hawk Channel, Loggerhead Key, Fla. No. 2.
   307 (2) Royal Island Harbor, Eleutheria Bahamas. March 15. No. 4.
   308 (1) Siguanea Bay, Isle of Pines. April 5.


A single small example (30 mm. s. 1.) has an anal count of 29 and a dorsal of 1–30. Meek & Hildebrand MS separate the two species as follows, and on color:

Dorsal and Anal rays 31 to 35.............. *hispidus*
Dorsal and Anal rays 27 to 29.............. *oppositus*

While it is suspected that the two intergrade, it is not thought justifiable to synonymize them on the basis of this single small and possibly aberrant example.

   310 (1) Siguanea Bay, Isle of Pines. April 5.

162. *Monocanthus ciliatus* (Mitchill).

Specimens of this species when too small to have the diagnostic characters ordinarily separating it from *Stephanolepis* may be distinguished by the more
concave and pointed snout which to a certain extent reminds one in “expression” of an \textit{Aluera}. The young of this species resembles its adults much less than does the young of \textit{Stephanolepis} resemble its adults.

311 (20) Hawk Channel, Loggerhead Key, Fla. No. 2 Sta. February.
313 (21) Royal Island Harbor, Eleuthera, Bahamas. March 15.
314 (2) Siguenea Bay, Isle of Pines. April 5.

163. \textit{Monacanthus tuckeri} Bean.

The following color notes were made on the present series.

A faint dark band about the diameter of eye runs from under it to the base of caudal, the ventral outline is bounded by another. These bands and the snout above the mid-line are covered with minute dark punctuations, the rest of body plain and pale. Ventral flap edged with light followed distally by two narrow dark lines. At its attachment to body, caudal, there is a dark ovate spot about size of eye. From this to the pelvic spine and parallel to the edge of the flap there runs a faint dusky band equal in width to the ovate spot. Dorsal and anal plain; Caudal light distally followed by three vertical but irregular dark bands. The coloration is markedly variable. In some the light area between the two bands is quite silvery, in others nearly as dark as the bands themselves. In one there is a faint suggestion of three cross shades extending from the dorsal to anal.

The range of proportions is indicated in Table 12. No correlation with size difference in these respects could be found. The smaller examples do not show the peduncular spines. That is, three fish from 60 to 52 mm. s. l. have them and five from 53 to 33 lack them.

316 (1) Royal Island Harbor, Eleuthera Bahamas. March 15.
318 (4) Glover Reef. April 18.

**Provisional Key**

**Adults**

\textit{Monacanthus}

A. Ventral flap greatly developed, extending notably beyond the ventral spine, \textit{two or three pairs of recurved spines on peduncle.}

B. Dorsal rays 31 to 35; anal 31 to 35 \textit{ciliatus.}

BB. (Adults unknown) dorsal rays 33 to 35; anal 34 to 36 \textit{tuckeri.}

\textit{Stephanolepis}

AA. Ventral flap not reaching beyond pelvic spine, no recurved spines on peduncle.
C. Dorsal rays 31-35.
DD. Depth more than one-half body. spilonotus.
CC. Dorsal and anal rays each 27-29. oppositus.

**Monacanthus**

A. Profile notably concave, the ventral flap even if not reaching beyond pelvic spine is covered with coarse granulations, generally a dark spot or blotch on it, margin convex or straight.

B. Eye 2.9 to 3.2, depth 2.0 to 2.2; dorsal rays 31 to 35; anal 31 to 35 ciliatus.

BB. Eye 3.5 to 3.7, depth 2.7 to 2.8, dorsal rays 33 to 35, anal 34 to 36 Tuckeri.

**Stephanolepis**

AA. Profile only slightly, if at all, concave, ventral flap little evident, not nearly reaching tip of pelvic spine, not covered with coarse granulations and with no dark mark, margin concave hispidus.

The body depth in the three forms considered here has been taken at the origin of the dorsal fin owing to the difficulty in obtaining an accurate measure elsewhere on account of the variously fixed positions of the movable pelvic processes.

**Table 12. Ranges of Measurements in the Young of Pseudomonacanthus, Stephanolepis and Monacanthus.**

<table>
<thead>
<tr>
<th>Species</th>
<th>Monacanthus ciliatus</th>
<th>Monacanthus Tuckeri</th>
<th>Pseudomonacanthus amphioxys</th>
<th>Stephanolepis hispidus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard lengths</td>
<td>34-53</td>
<td>33-60</td>
<td>62</td>
<td>30-49</td>
</tr>
<tr>
<td>Total lengths</td>
<td>43-66</td>
<td>42-72</td>
<td>74</td>
<td>38-1/2-63</td>
</tr>
<tr>
<td>Head</td>
<td>2.7-3.2</td>
<td>2.7-3.1</td>
<td>3.0</td>
<td>2.7-2.8</td>
</tr>
<tr>
<td>Eye</td>
<td>2.9-3.2</td>
<td>3.5-3.7</td>
<td>3.2</td>
<td>3.0</td>
</tr>
<tr>
<td>Snout</td>
<td>1.2-1.3</td>
<td>1.2-1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Depth</td>
<td>2.0-2.2</td>
<td>2.7-2.8</td>
<td>2.3</td>
<td>1.7-2.2</td>
</tr>
<tr>
<td>Dorsal Spine</td>
<td>1.2-1.4</td>
<td>1.3-1.4</td>
<td>1.2</td>
<td>1.3-1.8</td>
</tr>
<tr>
<td>Flap</td>
<td>1.5-2.1</td>
<td>1.2-2.0</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Dorsal</td>
<td>1-30-32</td>
<td>1-33-35</td>
<td>1-34</td>
<td>1-30-32</td>
</tr>
<tr>
<td>Anal</td>
<td>30-31</td>
<td>34-35</td>
<td>30</td>
<td>29-31</td>
</tr>
</tbody>
</table>

164. *Pseudomonacanthus amphioxys* (Cope).

A single specimen of this little known form is present in the collection:

* The key from here on is modified from J. & E. 1898 and M. & H. MS, and it is believed that *spilonotus* and *oppositus* are invalid as noted in the text.
Its proportions are given in the accompanying table. The body coloration is uniform drab. The pelvic flap and the membrane of the single spine is dusky. The caudal is barred obscurely with darker.

319 (1) Royal Island Harbor, Eleutheria, Bahamas. March 15.

165. *Alutera schapfi* (Walbaum).

Meek & Hildebrand MS. synonymize *A. punctata* Agassiz with *A. schapfi* which is followed here.

320 (1) Siguanea Bay, Isle of Pines. April 5, 1925.
342 (1) (A).
321 (1) No. 1. 366 fathoms. April 20, 1925.
345 (1) Royal Island, Bahamas. (mounted).

**Family Ostrachidiæ.**

166. *Lactophrys trigonus* (Linnaeus).

322 (1) Siguanea Bay, Isle of Pines. April 5.
338 (1) ——. (mounted).


340 (1) ——. (mounted).


339 (1) Royal Island, Bahamas. March 15.
341 (1) Bahamas. (mounted).

**Family Tetraodontidae.**


323 (2) Alligator Light, Fla. Feb. 22. Sandy bottom.
324 (1) Double-headed Short Cay, Bahamas. March 6, 12 ft.
325 (3) Royal Island, Bahamas. March 15.


In differentiating this from *S. spengleri* the following points were noted

<table>
<thead>
<tr>
<th></th>
<th><em>S. marmoratus</em></th>
<th><em>S. spengleri</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>S. l. in mm.</td>
<td>75</td>
<td>95</td>
</tr>
<tr>
<td>Eye, in snout</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Interorb., in eye</td>
<td>1.8</td>
<td>1.3</td>
</tr>
<tr>
<td>Head</td>
<td>2.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Caudal band, in caudal</td>
<td>1.8</td>
<td>3.0</td>
</tr>
<tr>
<td>Depth at eye, in head</td>
<td>1.7</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The proportions tabulated in the above table do not give the impression of as much difference between the two species as actually exists. This is partly
because there are no *S. spengleri* of a strictly comparable size. The present species is a much chunkier fish as is indicated by the greater depth through the orbital region. In *S. spengleri*, even in specimens nearly half as small, this distance is less (at 49 mm. 1.9 as against 1.7 at 75 mm.). The snout is proportionally longer in *S. spengleri* being (2.0 at 49 mm. as against 2.0 at 75 mm.) These combined with the other differences give quite a distinct appearance to the two species.

In the large specimen (75 mm.) there are two bands on the caudal similar to those on *S. spengleri* but fainter and the outer one is much broader and the light interspace consequently narrower. This fish agrees with the description given by Nichols 1914 except that the belly is covered with evident prickles and there is no “sharp fold or keel along the lower angles of the body.” This latter feature has frequently been noted in a variety of species of this genus and is considered of no taxonomic value in the forms considered in this list at least. It appears to be entirely incidental, very likely being associated with the condition of the specimen at the time of preservation with relation to the stretching of the skin incident to sudden deflation on death. Very emaciated examples of *S. maculatus* in the New York Aquarium frequently show such ridges in life.

In studying this species, curious scale-like structures were clearly discernable in the skin. Meek & Hildebrand MS. have noted this and point out that “The one character, however, that readily separates this species from all others, examined by us, is the distinctness of the scale-like dermal development on sides of head and body. This character is not mentioned in current descriptions, but it certainly is worthy of consideration.” Metezelaar 1919 noted this to an excessive point on his *S. eulepidotus*. In connection with other matters *Spheroides maculatus* (Bloch & Schneider) from New York Bay and *S. harperi* Nichols from Key West, Florida, were examined. Neither of these were examined by Meek & Hildebrand, and both have dermal structures similar to those of *S. marmoratus*. *S. harperi* either appears as two phases, a smooth (almost spineless) and a rough (with spines about twice as far apart as on *S. maculatus*) or there are two species in Key West waters differing in this respect. The local fishermen recognize them as distinct for there is a great difference in handling the inflated fish, the smooth type being held only with considerable difficulty. In either event the entire group needs a thorough revision.

326 (69) Green Cay. March 17. At night.
327 (1) Royal Island, Bahamas. March 15.
328 (1) Swan Island. April 11. At night.
329 (1) ——.


All the present specimens agree in having 9(9 1/2) dorsal rays. Jordan & Evermann 1898 give it as 6, as do authors generally. Mr. B. A. Bean of the U. S. National Museum kindly looked over the material there (two specimens)
and counted 10 (9 1/2) dorsal rays. Lowe 1839 and Metezaelaar 1919 also noted this. There is thus evidently a misprint in the original description, the "6" likely being simply an inverted "9".

The only difference other than color, given by Jordan and Evermann, between this species and the Pacific E. punctatissimus (Günther) thus disappears. However, by comparing the present material with the detailed description of E. punctatissimus of Meek & Hildebrand MS., it is possible to construct the following key to replace that based on fin counts:

A. Caudal fin moderately convex, dorsal origin a little nearer anterior margin of eye than tip of tail, fins all plain, sides with green spots nearly as large as pupil. punctatissimus.

AA. Caudal fin slightly concave, dorsal origin half way between anterior margin of eye and middle of tail, or a little nearer nostril than tip of tail, caudal edged above and below with dark, sides marked faintly, dark radiating lines from lower half of eye, dark anastomosing lines on ventral half of peduncle. rostratus.

331 (3) Royal Island, Cay, Bahamas. March 15. Seined.
332 (1) Siguanea Bay, Isle of Pines. April 5.
335 (1) Swan Island. April 11. At night.

Family Diodontidæ.

172. Diodon hystrix Linnaeus.

173. Lgosphera digitatis new species.

Type No. 337, Bingham Oceanographic Collection. Standard length 10.5 mm. Head 2.7; depth 2.2; dorsal 12; anal 12; caudal 10. Form somewhat ovoid; head broad; interorbital space flat, broad, 1.2 in head. Dorsal and anal far back, scarcely separated from the small caudal. Rays feeble; pectoral short and broad, of about 20 rays, length less than interorbital width. No median suture in jaw; upper jaw with a medium prolongation giving a beak-like shape to coalesed teeth. Skin of body faintly papilose. Nostril a simple tube with two lateral openings. Five pairs of finger-like protuberances arranged as follows. One small pair over eyes, one larger below angles of mouth directed forward, another smaller pair midway between these and gill opening; two posterior pairs, the larger even with anal and the smaller slightly anterior to these. See Figure 34.

Coloration—Covered with dark rings all over body. These are sparser below, nearly twice as far apart as above and on sides. Each fleshy protuberance
is tipped with a single ring, some of which are closed almost to a dot. Ground color, a very light plumbus above, creamy on sides and white below. The areas within the circles are slightly lighter on the back. Fins plain. The following life colors are taken from a field sketch made by W. S. Bronson: Body a uniform pale yellow, circles nearly black. Dorsal surface and sides slightly flushed with pinkish. This may be due to underlaying structure at these places. Iris pale bluish. Fins hyline.

Fig. 34. *Lyosphara digitatus* new species. Type. Dorsal and lateral views.

This specimen is referred to *Lyosphara* on the basis of the dermal covering but is evidently not *L. globosa* Evermann and Kendall, on the basis of the fin counts alone, not to mention the remarkable fleshy protuberances. That it is none of the forms compared with *L. globosa* by Jordan & Evermann 1896 is also evident. It is difficult to imagine what known form it might be the young of.

Named *digitatus* in allusion to the finger-like processes.

337 (1) Type ——.

Family SCORPÉNIDÉ.


357 (4) Hawk Channel, off Loggerhead Key. Feb. 19. No. 2.
356 (2) Royal Island. March 15. Trawl 18 fath.
175. *Scorpaena colesi* Nichols.

One example of 48 mm. s. l. is referred to this species with some question. It shows numerous differences from the type which are largely age characters but may actually be *S. brasiliensis* Cuvier & Valenciennes, although it is from relatively deep water, the supposed habitat of *S. colesi*.

479 (1) April 20. 366 faths. No. 1.

176. *Scorpaenoides tredecimspinosa* (Metezaal).

With the present understanding of the genera *Scorpaena* and *Scorpaenoides* this species must be referred to the latter as it lacks palatine teeth, dermal flaps on the scales and has thirteen dorsal spines.

The coloration of the smallest specimen, 27 mm. s. l., is slightly different from the larger ones, 64 and 69 mm. which resemble the type description closely. In the smallest, the fish anterior to a line connecting the last dorsal and anal ray is nearly uniformly dark except for a darker spot on the last few dorsal spines and the light pectorals marked with dark dots. The peduncle is light but slightly mottled and has two broken vertical bars just in advance of the base of the caudal. The soft dorsal, anal and caudal are light with dark spots.

475 (3) Glover Reef. April 18.

There are also two tiny *Scorpaenas*.

358 (2) Swan Island. April 12.

**Family Callionymide.**

177. *Callionymus himantaphorus* Goode & Bean.

One example is only 26 mm. s. l. but is readily identifiable (No. 477).

384 (1) Pt. Francis, Isle of Pines. April 5 (or Saddle Rock. March 23?).
181 (2) No. 52.
477 (1) Green Cay. March 17.

**Family Gobiidae.**

178. *Mapo soporator* (Cuvier & Valenciennes).

369 (1) Saddle Rock. March 23.
370 (4) Glover Reef. April 18.


The present material agrees with Jordan & Everman 1896 and Meek & Hildebrand MS. in fin and scale counts, but varies from these two in color.
and pattern about as they vary from each other. All are light, with pale fins. All except the next to the smallest (16 mm. s. l.) have a dark spot above the operculum which is probably not apparent in a dark phase. There are faint lines running down, back and forward from the eye, a faint vertical band at base of caudal, a row of about seven pale dots along median axis, another along base of dorsal and some fainter ones between these two rows. The length of the vertical fins increases with age to a slight extent but in none of these do they reach more than slightly past the base of the caudal, even the largest (46 mm. s. l.). In the next to the smallest there is a suggestion of two lateral stripes which probably break up to form the rows of dots seen in the larger examples. The smallest (10 mm. s. l.) is uncolored as yet.

373 (3) Double headed Shot Cay. March 6.
374 (2) Glover Reef. April 17.
375 (1) Glover Reef. April 18.

In addition to the above there are a number of interesting specimens, mostly very small, which are being held for further analysis, to form the basis of some future report.

490 (1) Royal Island. March 15. Trawl. 8 ft.
491 (1) Glover Reef. April 18.
493 (1) Glover Reef. April 19.

Family ECHENEIDAE.

181. Leptechneis naucrates (Linnaeus).

The mounted specimen in the present collection is unusually large (850 mm. s. l.) and was taken attached to a Manatee.

359 (1) Saddle Rock, Bahamas. March 23.
360 (1) Glover Reef. March 15.
412 (1) British Honduras. (mounted).
321 (1) (C).

182. Remora remora (Linnaeus).

522 (1) (B).

183. Rhombochirus osteochir (Cuvier).


Family MALACANTHIDAE.

184. Malacanthus plumieri (Bloch).

523 (1) Cay Sal Bank. March 5.
1925]  

Breder: Fishes  

85  

Family Gobiidae.  

185. Gobiesox yuma Nichols.  

In the present confused state of the genus and the often fragmentary descriptions, it is impossible to be absolutely certain of the identity of small specimens. This identification is therefore provisional.  


Family Blenniidae.  

186. Rupiscartes cubensis new species Mowbray.  

Type No. 376 Bingham Oceanographic Collection, standard length 49 mm., total length 58 mm.  

"Head 4.5–4.66 in total; greatest depth 4 to 4.95 in total; eye 3 in head. D. XII. 20; A. 23; V. 4; P. 15."

"Supraorbital tentacles well developed; a tentacle before each anterior nostril, with four or five branches at its tip; a very short tentacle on each side of the nape; the two posterior canines are very large, hooked backward, depressible and fang-like; teeth in both jaws hair-like, in a single series; the tip of the upper jaw is papillose; the lateral line takes the curve of the back ending between the vertical through the second and third dorsal rays; the pores are too close to count with certainty; the lower portion of the lateral line is entirely different; it begins in advance of the posterior end of the upper line and is curved upward anteriorly; the pores are far apart and there are 23 in number; the pectoral scarcely reaches the vent, the lower rays the longest; base of anal 1.9 in base of dorsal; last ray of dorsal connected by membrane to the base of the caudal."  

See Figure 35.  

"Color chocolate-brown; abdominal region and pectorals pale; ventrals and anal darker; dorsal, upper and lower caudal rays with a broad orange band; the outer ray of lower caudal lobe is dark; there is a black quadrato blotch behind the eyes."
"This description was taken from a specimen 6 cm. long, taken with dynamite near Cayman Point, Cuba, April 3, 1925."

"The food of the above specimen consisted of hydroids, mollusks, crustaceans, and algae. There were several small shells found in the stomach contents that looked like Trivia."

376 (1) Type Near Cayman Pt., Cuba. April 3. Dynamite.


188. *Labrisomus muchipinnis* (Quoy & Gaimard).

378 (2) Glover Reef. April 16.
379 (1) Glover Reef. April 18.

In addition to this material there are a considerable number of specimens mostly very small which are held for further analysis and comparison on account of the confused state of the literature. To properly review these would retard the publication of the present report for an unwarranted period whereas an attempt to properly name them with the material and literature available to the writer would doubtless only add to the confusion. The specimens follow.

480 (1) Glover Reef. April 18.
483 (1) Glover Reef. April 18.
484 (1) Saddle Rock. March 23.
486 (1) Glover Reef. April 18.
488 (24 approx.) S. W. Harbor, New Providence, Bahamas. March 16. At night with light.
489 (100 approx.) Swan Island. April 12.
468 (75 approx.) Swan Island. April 11. At night.

Family Brotulidae.

Reserved for further study.


Family Macrouridae.

Reserved for further study.


Family Pleuronectidae.

Genus *Paralinus* new genus.

Body dextral; teeth chiefly uniserial; lateral line with a distinct arch in front and with no accessory dorsal branch, scales imbricated, cycloid and deciduous.
This genus is close to *Limanda* Gottsche but differs in the lack of rough adherent ctenoid scales and in the lower dorsal and anal counts. The species on which this genus is based, *Paralimanda inermis* appears to be closest to *Limanda beamii* Goode.

189. *Paralimanda inermis* new species.

Type No. 516 Bingham Oceanographic Collection. Standard length 90 mm., total length 111 mm.

Head 4.3; depth 2.3; dorsal 62; anal 53; lateral line 63 approx. Body elliptical, strongly compressed; head and snout short. Snout 4.0; eyes large, close together 2.8; interorbital 2.0 in pupil. Teeth practically uniserial, on blind side only which jaws are more strongly curved. Lateral line abruptly arched, the arch 1.2 in head, its highest reach even with dorsal outline above eye; scales thin and deciduous, cycloid. Pectoral short, 2.3 in head. Gill rakers short, about 2.0 in pupil, 11 + 3 on eyed side. Caudal peduncle short and deep, 2.0 in head, ventrals symmetrical, a little longer than eye; longest dorsal ray 1.8 in head, equaled by anal rays. Caudal spatulate, the middle rays longest. See Figure 36.

Coloration—Plain tan on eyed side with a dusky dusting, most of which has been removed with the falling off of the very deciduous scales. The viscera shows through on the eyed side as a dark blotch. Caudal fin dusky near tip and with a dark blotch about equal to eye at dorsal and ventral margin, half way from tip. Dorsal and anal dusky on distal two-thirds. Pectoral of eyed side dark, nearly black, ventral of same side dusky to same degree as anal. The blind side is light for most part but is marked by four longitudinal series of faint dusky spots; five in the upper two which are above the midline and staggered...
in regard to each other, while below the midline is their mirrored image so that the two central rows of spots are opposite each other and the two outer rows are staggered in reference to their neighboring rows. The ventral and pectoral of the blind side are white but the dusky marks of the vertical fins show through their membranes from the other side.

Aside from the generic differences this species differs quite evidently from *Limanda beanii* in its much larger head.

Named *inermis* in allusion to its weak cycloid scales.


363 (2) Royal Island, Eleutheria, Bahamas. March 15. No. 7.

364 (1) ——.


367 (1) Royal Island, Bahamas. March 15.


366 (1) Hawk Channel, Loggerhead Key, Fla. No. 2. Station.

194. *Citharichthys arctifrons* Goode.

The present specimens are all small and consequently the head, eye and maxillary measurements are somewhat too large. That these are not *C. platophrys* Gilbert, the only other possible form is evident by the relative eye positions and the scale counts.

365 (4) Gulf Stream, off Sonibero Light. Feb. 20. 65 faths. No. 3.

Family *Antennariidae*.


525 (1) Coast of British Honduras, April 20, 484 faths.
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