

BULLETIN OF THE BINGHAM OCEANOGRAPHIC COLLECTION

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.

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BULLETIN

THE BINGHAM OCEANOGRAPHIC COLLECTION.

VOL. II, ART. I.

*Scientific Results of the Second Oceanographic Expedition
of the "Pawnee"*

1926.

ELASMOBRANCHII FROM PANAMA TO LOWER
CALIFORNIA.

BY C. M. BREDER, JR.,

New York Aquarium.

Issued March, 1928

SCIENTIFIC RESULTS OF THE SECOND OCEANOGRAPHIC
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INTRODUCTION

The second Oceanographic Expedition undertaken by the "PAWNEE" was directed toward accumulating a representative collection of fishes from the Pacific coast of America approximately opposite the one made in 1925 from the Atlantic. Figure 1 gives the itinerary of this journey. The same personnel that accompanied Mr. Bingham on the first trip were also present on this second cruise. The vessel, however, was new, although bearing the same name, "PAWNEE," and was built especially for prosecuting such field work as the director might see fit to follow.

Unlike the collection of 1925 when it came into the writer's hands, it was still practically untouched and save for a few stray identifications, presumably made in the field, the specimens stood as collected. Although the preservation for most part is excellent, the data is unfortunately scanty. This collection has clearly not been subject to as much selection as the earlier one, apparently being preserved very nearly as collected and is consequently of more value, to the writer at least.

In addition to the collection of specimens in fluid, Mr. Francis West mounted a series of the larger and more attractive species and Mr. Wilfrid Swancourt Bronson executed a series of paintings, mostly

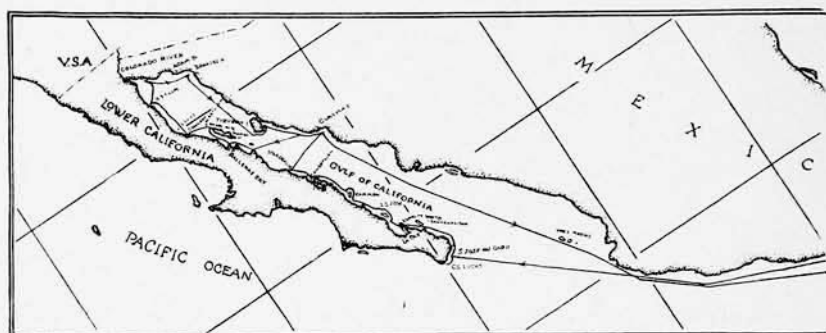


Fig. 1. Chart of the second oceanographic

in oil. These will be referred to in the articles of this volume to which they pertain.

Instead of publishing the entire report as one paper it has been deemed expedient to break it up into natural groups of convenient size. In other respects the treatment and abbreviations are uniform with Vol. I. No. 1¹ of the present series of reports.

The sharks and rays of the 1926 expedition form the basis of the present paper and although the specimens are few in number as compared with the remainder of the collection, there are several items of interest discussed in the systematic list and two rays described as new under the following names:

Narcine vermiculatus

Urotrygon binghami

Measurements of length in this group refer to "total lengths" and not "standard lengths" as used elsewhere in this series. Photographs have been used chiefly in the belief that they serve the purpose better than would semi-diagrammatic drawings only of the rays considered desirable to figure in detail. The three line drawings have been executed by Mr. Bronson. The labels accompanying the specimens have been copied exactly and although, in some cases, slightly ambiguous it was considered best to let the reader make his own interpretations.

¹ Bull. Bing. Oceanographic Collection, Vol. I, Art. I, Scientific Results of the First Oceanographic Expedition of the "PAWNEE" 1925. Fishes. By C. M. Breder, Jr., pp. 1 to 90, figs. 1 to 36.



cruise of the "PAWNEE" 1926.

ANNOTATED SYSTEMATIC LIST OF SPECIES.

Order ASTEROSPONDYLI.

Family **HETERODONTIDÆ.**

1. **Gyropleurodus francisci** (Girard).

- 1000 (1) Conception Bay. May 3.
- 1125 (1) San Francisquito Bay. May 7. No. 7.
- 1146 (1) Mounted.

Family **GALEORHINIDÆ.**

2. **Galeorhinus californicus** (Gill).

There seems to be little in the existing descriptions to separate this species from *G. dorsalis* (Gill) but as no comparable material is present we feel some doubt concerning this identification and in fact the validity of the two forms.

- 1020 (1) Between San Felipe and Shoal Point, Rio Colorado, May 19. 19 faths. Trawl.
- 1137 (1) ———.

Family **CARCHARHINIDÆ.**

3. **Scoliodon longurio** (Jordan & Gilbert).

- 1138 (1) ———.

4. **Galeocerdo arcticus** (Faber).

- 1147 (1) Mounted.

Family **CESTRACIONTIDÆ**.5. **Cestracion tudes** (Cuvier).

The label with No. 1001 bears the following data: 23 embryos, 12 females, 11 males, 14 to 16 inches long. Presumably the other 21 specimens, listed below, are part of this same litter as they are all of similar size and appearance.

1001 (2) San Francisquito Bay. May 9.

1008 (2) With umbilical cords (Part of 1001?).

1123 (13) (Part of 1001?).

1124 (4) San Francisquito Bay. May 7. No. 7 (Part of 1001?).

There is also the following material:

1047 (1) Small jaw. San Francisquito Bay. May 12. (Dried.)

Order BATOIDEI.

Family **PRISTIDÆ**.6. **Pristis pectinatus** Latham.

There are two young specimens and the rostrum of a third. The rostral teeth are still covered with the embryonic protective sheath and from the appearance of the umbilicus were either just about to be born or had been very recently.

Their sizes and numbers of rostral teeth follow:

Total length mm.	Right teeth	Left teeth
724	28	29
710	27	26
	26	26

Specimens of *P. microdon* Latham only slightly longer than these, 800 to 1075 mm. Meek & Hildebrand 1923² and 770 to 965 mm. Breder 1927³ are common in the rivers of Darien, Panama far above tide, but we do not know of the present species entering fresh water.

1135 (2 and rostrum).

Family **RHINOBATIDÆ**.7. **Rhinobatus leucorhynchus** Günther.

There are two specimens each of 165 mm. in length (1028 and 1099). No. 1139 is 486 mm. long and has about ten irregularly roundish slaty spots scattered

² The Marine Fishes of Panama. Part I, Meek, S. E. & Hildebrand, S. F. Field Muse. Nat. Hist. Pub. 215, Vol. XV, Zool. Series.

³ The Fishes of the Rio Chucunaque Drainage, Eastern Panama. Breder, C. M., Jr. Bull. Amer. Muse. Nat. Hist. Vol. LVII, Art. III.

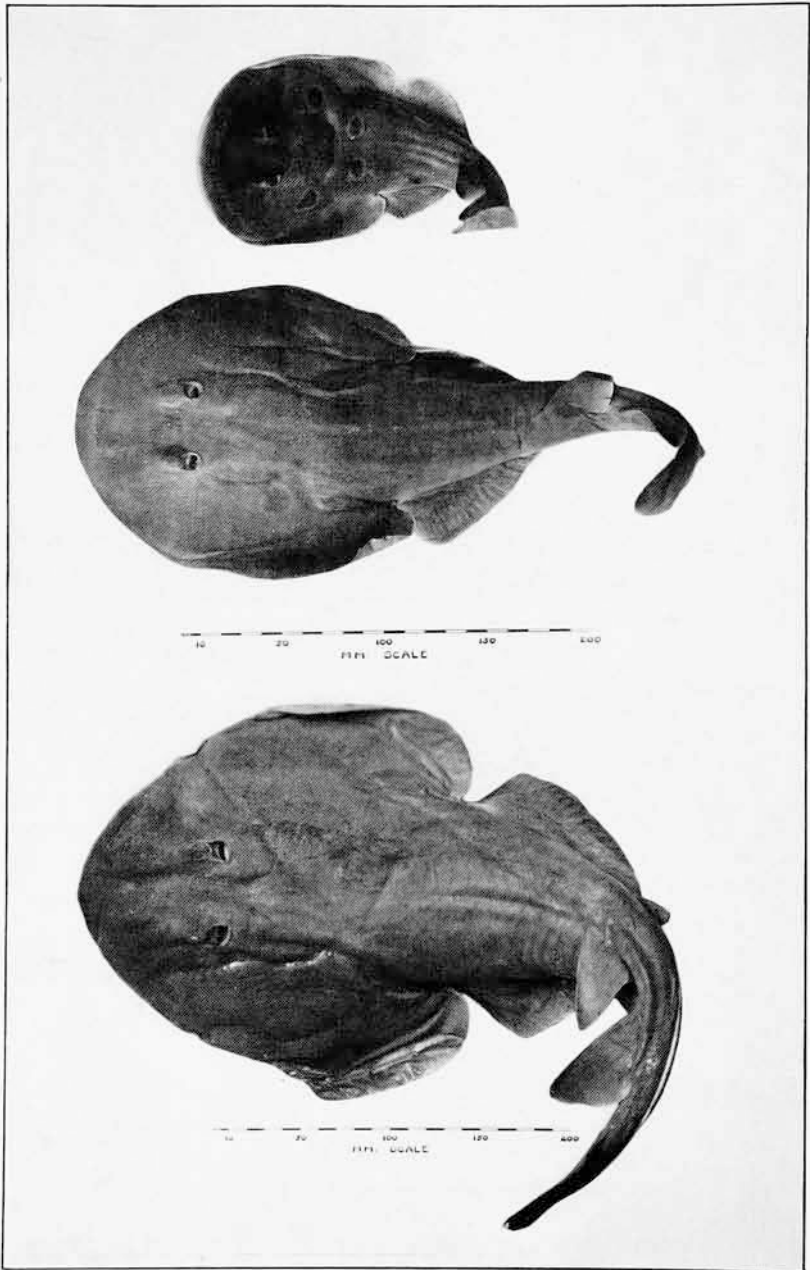


Fig. 2. *Narcine entemedor*. Three sizes showing loss of light circles with age.

in a very asymmetrical manner. This suggests the possibility of *R. glaucostigma* Jordan & Gilbert being identical with it or a race.

1018 (1) — (Part of 1099?).

1099 (1) (also ovarian eggs.) Lat. 14.48.40 N. long. 92.54.40 W. April 9,
30 faths. Taken out of adult, 2 young removed.

1139 (1) Bahia Hunda, Panama, April 5-6.

8. *Syrrhina exasperata* (Jordan & Gilbert).

1131 (1) San Francisquito. Gonzago Bay. San Felipe.

Family **NARCACIONTIDÆ.**

Narcine entemedor Jordan & Starks.

The younger specimens show numerous light circles above. There are two very small ones between the juncture of the eye and spiracle; another slightly larger pair, equal to diameter of eye and spiracle just anterior to the pectoral axil; a smaller and fainter pair above middle of ventral bases; another, the largest, about over middle of electric organs. These are varied in some specimens. That is, there may be one missing or a single median circle may replace a pair. These circles fade out with age so that in the largest they are practically gone. In the smallest a light line parallels the margin of the snout about two eye diameters from it and extends to approximately opposite the eyes laterally. Several shown in Figure 2 indicate this loss of pattern with age.

A field sketch by Mr. Bronson shows the colors of a 480 mm. specimen from San Felipe. It is judged from this sketch that the rings and other markings fade considerably on preservation, as on the preserved specimens of this size such markings are all but absent. The sketch may be described as follows.

Ground color light tan with a slightly purple cast. The marks are formed as described for the smaller preserved examples and are a light yellowish-tan. The circles are centered with darker, the two largest pair (over electric organs and the next pair caudad) being centered with a deep vandyke-brown darker than the rest. There is a purplish tip to each dorsal and the upper caudal lobe. There is a small circle faintly suggested at the base of each dorsal of which they mark the longitudinal diameters.

A note with the sketch reads, "Sand and boulder bottom." We do not know just what connection this may have with the pattern or of how much color change this species is capable.

1132 (1) San Francisquito. Gonzago Bay. San Felipe.

1133 (1) do.

1142 (1) San Felipe Bay. May 19. Seine.

1100 (1) Jaws of 30 inch specimen. Ballenas Bay, Carmen Island. April
30.

1144 (1) ———.

10. *Narcine vermiculatus* new species.

Type No. 1143 Bingham Oceanographic Collection. Total length 204 mm.

Disk subcircular, a little longer than wide, width 1.05 in length of disk; snout broadly rounded; eyes small, 3 in internarial space; spiracles close to eyes and larger than them, 1.7 in internarial space; spiracles with entire edges; interorbital space flat, 1.6 in preoral part of snout, 1.7 in preocular part of snout; mouth transverse, armed with small, simple, diamond-shape teeth; origin of first dorsal half way between axil of ventrals and tips of claspers; origin of second dorsal one-third of distance from origin of first to middle of caudal fin; second dorsal a little higher than first; caudal truncate, the lower angle rounded, the upper acute; mouth small 2.1 in preoral part of snout, 2.0 in preocular part; tips of ventral fins half way between posterior edge of pectoral and end of base of second dorsal.

Coloration—Deep chocolate brown above with numerous irregular spots and vermiculations of white; ventral surface white except posterior edges of ventrals and pectorals which are slightly dusky; posterior edge of both dorsals and caudal edged with white; a single white spot a little longer than spiracle at the center of each dorsal; two irregular white bands across caudal; line bounding upper and lower coloration on peduncle, above dermal fold, wavy. In general the light marks tend to run transversely over body. See Figures 3 and 4.

Named *vermiculatus* in reference to the pattern.

This species, in general form, resembles *N. entemedor* of the same size but differs greatly in pattern. Compare figures 2 and 3. Furthermore this form matures earlier and probably consequently does not reach so large a size. The well developed claspers of the type reaching past tip of ventrals and ending under middle of first dorsal (measured from vent) are equal to preocular part of snout whereas in a 220 mm. specimen of *N. entemedor*, the rudimentary claspers, not yet reaching the tips of the ventrals and only to origin of first dorsal, are contained 1.2 in preocular part of snout. In the latter the upper angle of the caudal is well rounded instead of angulated as in the present species.

It is noted that newly born *Narcine brasiliensis* (Olfers) have patterns somewhat approaching that of the present species, but the white marks are so broad as to give the effect of a light ground with dark spots. See plate 11 in Bean and Weed 1911.⁴ Another point suggesting the early maturity of the present species is the angulation at the upper end of the caudal which neither *N. entemedor* or *N. brasiliensis* has at this size. See plate 10 and text of Bean & Weed, *l. c.* discussing the change of caudal shape with age.

1143 (1) TYPE Lat. 14.40.20 N. Long. 92.40.30 W. April 9. Otter trawl.

⁴ An electric ray and its young from the west coast of Florida. Bean, Barton A. and Weed, Alfred C., Proc. U. S. Nat. Muse. Vol. 40, pp. 231-232. April 13, 1911.

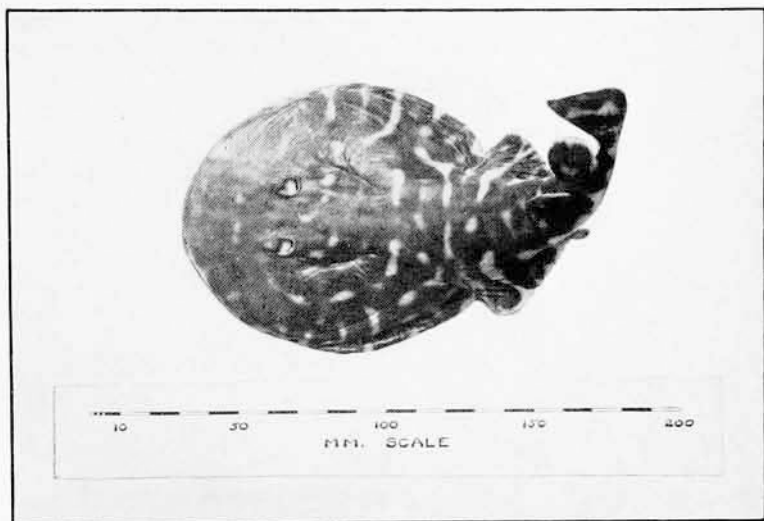


Fig. 3. *Narcine vermiculatus* new species. Type.

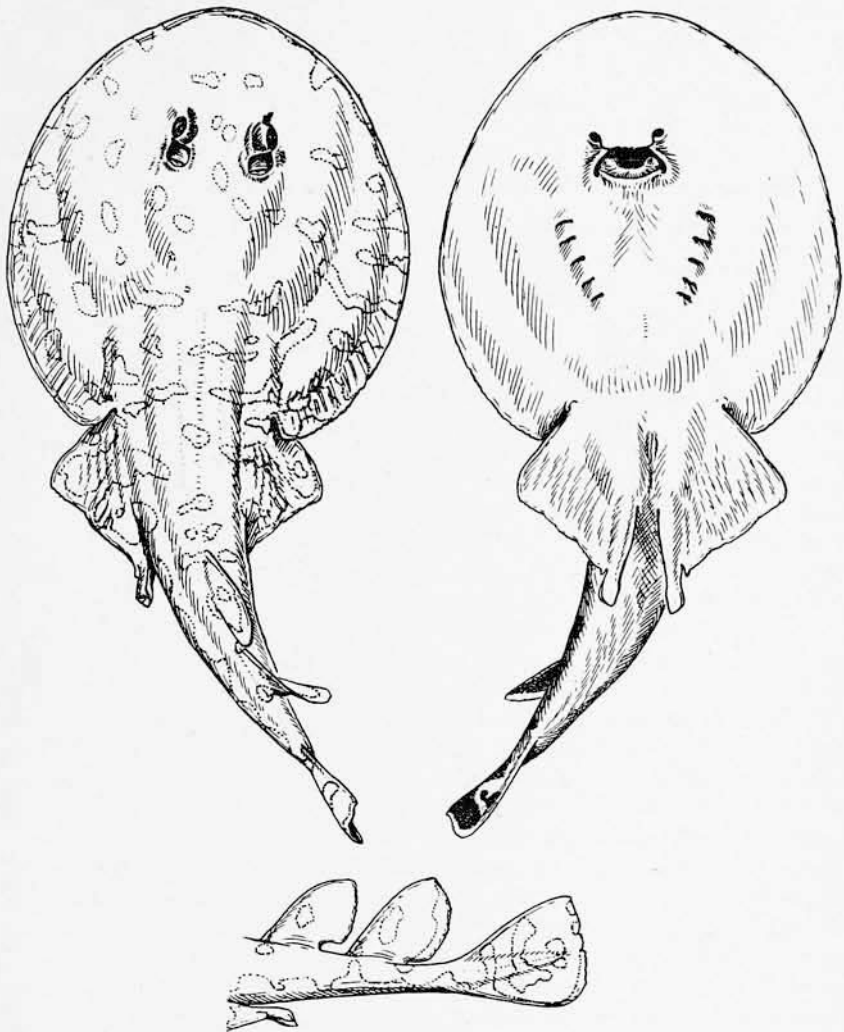


Fig. 4. *Narcine vermiculatus* new species. Type. Dorsal, ventral and lateral views. Outline of pattern indicated by dotted lines only in dorsal and lateral views.

11. *Discopyge ommata* Jordan & Gilbert.

Six specimens from three localities show a most remarkable amount of color and pattern variation. Just what the significance of this may be we do not know. It may represent racial differentiation or simply a large amount of individual variation although those from any one locality resemble their fellows most closely. The differences in proportional measurements are not great enough to warrant an attempt to recognize these nor are there enough specimens to give value to such an attempt. The photograph, Figure 5, shows an example from each collection.

The pattern differences may be described as follows:

No. 1021—Dorsal surface light brown; covered closely with small dark (nearly black) dots and vermiculations except anterior to the eyes. Here the ground color is replaced by a smooth slaty grey. This is crossed by broad translucent bars. One radiates from each eye diagonally forward and there is a "Y" shaped mark directly in front of each eye. The adjacent arms meet, giving the effect of a dark spot at the tip of the snout. The two radial lines previously mentioned are slightly deflected at their inner ends so that the entire light areas if connected might be spoken of as a written "M." Both dorsals and caudal are spotted similarly to the back but with a finer pattern. The central ocellus is least distinct in this specimen. It is an area of a more reddish brown circled by two heavier irregular and broader circles of dark. Inside this there are small and faint, more or less concentrically arranged, dots.

No. 1022—Dorsal surface grayish brown spotted coarsely with dark dots except anterior to eyes. Here the ground color is slaty gray. This is crossed by broad translucent lines. They may be described as similar to that of 1021 but with the "M" completed or as four "Y"s with arms in contact as at either end of the "M" short lines run outward and backward. Both dorsals and caudal are spotted in a manner similar to the back. The central ocellus is a reddish brown surrounded with a faint light line distant from it by a snout's length. Immediately surrounding the reddish area is an irregular broken circle. The above is the condition of the largest example. The two smaller are similar except for being generally lighter and with a different condition of the central ocellus. In one it may be described as follows, beginning at the center. A light tan spot (about $\frac{1}{2}$ eye) is surrounded by a broad black circle equal in width to spiracle. Surrounding this is a slaty gray band of equal width surrounded by a light brown band of equal width, but darker than the ground color. Along both edges of this outer annular band is a circle of round dark dots. The ocellus of the other small example is similar except that in the central tan spot is a still smaller one of black and the inner row of dark dots on the outer band is much heavier than the other and partly doubled on one side.

No. 1023—Dorsal surface light tan with numerous still lighter areas. This extends anterior to the eyes and clouds the marks of the snout. However

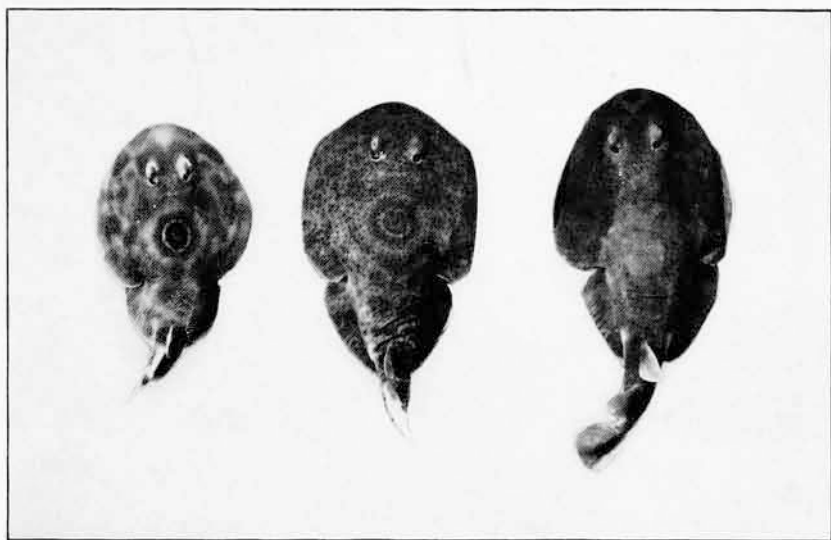


Fig. 5. *Discopyge ommata*. Three types of pattern. From left to right 1023, 1022, 1021.

they are closely similar to those of the others. The back, aside from the central ocellus, is marked with about 16 circles of dark dots more or less symmetrically placed. There is one on either side of the caudal base, one on either side of the base of each dorsal and a pair half way between the insertion of the first and the central ocellus. There is one at the pectoral axil and three on each pectoral. The dorsals and caudal are light and plain. The central ocellus is most closely similar to that last described under No. 1022. It differs however in that the inner ring of dots of the outer tan band is solid black and heavy and the band itself is half as wide as the inner bands and equal to the "fused" circle of dots. Also the outer band is scarcely heavier in color than the general ground color. It appears to be more so, however, because it is surrounded by one of the lightened areas, mentioned previously, which is about as wide as half the radius of the ocellus proper. This is the condition of the larger example. The smaller is similar except that the outer tan band is covered with dark dots so that no outer ring of dots appears separately, although the inner circle of "fused dots" is distinct but narrow. The innermost dark annulus (next to the light central spot) is somewhat broader in this specimen. The circles of dots variously scattered over the back are more broken and tend to be filled up with smaller dots and there is a suggestion of dots on the caudal, leading from the circle of dots on its base.

A field sketch by Mr. Bronson shows the following life colors.

Dorsal surface slaty-tan with bright yellowish-tan areas coincident with the circles of dark spots. This color is also suffused on the snout, anterior of the eyes. The central ocellus is colored as follows. The center is a dark, almost black, spot. This is surrounded by a yellowish-tan circle, brighter and more yellow than any other part. Around this is a solid purplish-brown ring, circumscribed by a light, nearly white one, which is spotted with fine yellowish-tan spots. Then follows a dark, nearly black, ring and finally the light tan outer ring flecked with dark dots.

Below, the fish is a pale blue and pink turning brownish at the edges.

Evidently age is connected with the distinctness and complication of the pattern of this species, being most distinct and involved in the smaller examples and dullest and most simple in the largest. However the range of sizes of this series is not great (172 mm. to 100 mm.) Figure 5 suggests this to a certain extent. The groups that these three specimens represent have the following sizes respectively:

No. 1021	172 mm.
No. 1022	168, 109, 100 mm.
No. 1023	150, 141 mm.

Some of the differences described previously in detail might easily be thought to be ascribable to age alone, but nevertheless a great amount of individual variation is apparent as well.



Fig. 7. *Urotrygon binghami* new species. Type. Dorsal, ventral and lateral views. Irregular pattern indicated in dorsal view. The small circles indicated light dots, not spines. The irregular dark marks of the under surface are not indicated in the ventral view.

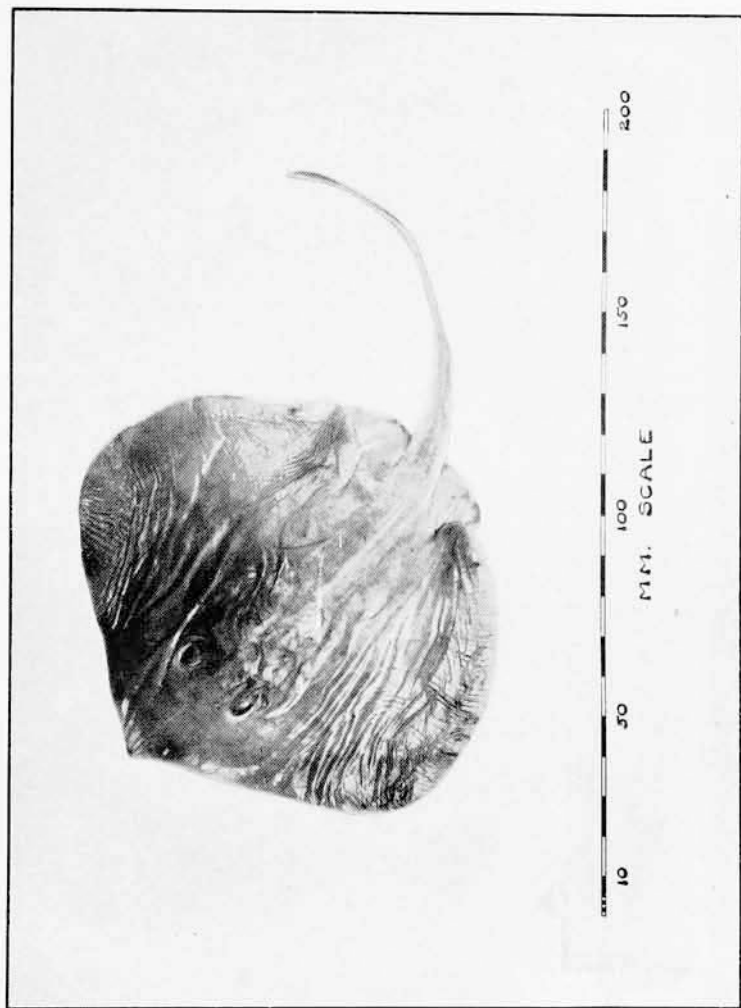


Fig. 6. *Urotrygon binghami* new species. Type.

- 1021 (1) Puerto Refugio, Angel Island. May 15. Seine.
 1022 (3) Gonzago Bay. May 17. Seine.
 1023 (2) San Francisco Island.

Family **DASYBATIDÆ.**

12. **Dasybatus brevis** Garman.

- 1126 (1) San Francisquito Bay. May 7. No. 7.

13. **Urotrygon binghami** new species.

Type No. 1019 Bingham Oceanographic Collection. Total length 190 mm.

Disk somewhat angular; broader than long, length 1.2 in breadth; the anterio-lateral margins slightly convex to directly in front of eyes where they become concave to meet at the rather produced tip of snout; the postero-lateral margins strongly convex; interorbital space 2.2 in preocular part of snout; spiracles a little larger than eyes and placed immediately behind them; mouth slightly curved, 2.7 in preocular part of snout; teeth pointed, small, diamond shaped; tail somewhat shorter than disk, 1.2 in disk; caudal fin low and long, pinnaform, extending on tail, 2.7 measured from tip to vent; spine inserted a little more than an eye's diameter nearer to vent than to tip of tail; tail strongly depressed, but with no lateral keels; ventral fins broad, with posterior margins continuing curve of pectorals; skin smooth, no distinct prickles anywhere but with small light points that suggest the possible development of them at a greater size. See Figures 6 and 7.

Coloration—Nearly uniform grayish tan above, light below with numerous sub-dermal dark splotches. Caudal fin dusky, edged with light. There are a few light dots on snout and wings and a few dark blotches irregularly placed.

This form is closest to *U. mundus* Gill but differs prominently in the much broader disk, the shorter tail, the more prominent snout, the curve of the ventrals and in other minor details. It also differs from *U. mundus* in the lack of prickles, which, however, it may develop at greater size and from *U. asterias* (Jordan & Gilbert) in the lack of a median row of spines which would surely be evident at this size.

Named *binghami* in recognition of the service to ichthyology that Mr. Bingham is now rendering in amassing his private collection and arranging for its utilization.

- 1019 (1) TYPE. Between San Felipe and Shoal Point, Rio Colorado.
 May 19. 10-14 faths. Trawl.

14. **Urotrygon asterias** (Jordan & Gilbert.)

Figure 8 is rendered here for comparison with those of *U. mundus* (Jordan & Gilbert) by Meek and Hildebrand 1923, *l. c.*, Garman 1913⁵ and with that of *U. binghami* herein described.

1140. (1) Bahia Hunda, Panama. April 5-6.

⁵ The Plagiostomia. Mem. Mus. Comp. Zool. Harv. Coll., 1913, 36, 1-528. 77 pls.

15. *Urobatis maculatus* Garman.

There are thirteen specimens in the present collection, six females of from 306 to 126 mm. and seven males of from 420 to 293 mm. Their color patterns approximate that of the type but are usually not nearly as regular as given in Garman's description. In addition to the black markings all show suggestions of lightened areas of the ground color. Figure 9 shows these pattern conditions in two examples of each sex.

A field sketch by Mr. Bronson shows the colors of a male specimen about 400 mm. long. The disc is edged with a reddish-brown becoming lighter posteriorly and deepening anteriorly to a chocolate on the entering angle. Inside of this and parallel to the edge runs a broken vandyke-brown band, darkest and widest across the snout. The central part of the disc is lighter and variously mottled with light tan, pale slate, and greenish-brown. The claspers are purplish and the caudal base anterior of the spine, is similarly suffused. Posterior to the spine and on the fin proper there is a slightly bluish cast. The iris is yellow. Below, the central part of the disc is a very pale tan edged with reddish tan and a faint olive tint.

1128 (4) San Francisquito Bay. May 7. No. 7.

1130 (2) San Francisquito. Gonzago Bay. San Felipe.

1136 (4) ———.

1141 (1) ———.

1026 (2) Gonzago Bay. May 17. Seine.

16. *Urobatis halleri* (Cooper).

Figure 10 shows our specimen of this well marked species.

1127 (1) San Francisquito Bay. May 7. No. 7.

17. *Pteraplatea marmorata* Cooper.

We are doubtful, judging from various descriptions of the validity of *P. crebripunctata* Peters which does not appear to differ in significant characters from the present species. *P. rava* Jordan & Starks seems also to be uncertain. In our males the dermal folds above and below are slight whereas in the females they are well developed. The largest is 390 mm. long. Young males also show larger light spots, see Figure 11, whereas at a still smaller size (Figure 12) both males and females are less distinctly marked and the dermal folds on the tail are relatively large and approximately equal in size in both males and females. The scale for size reference is given in both figures.

A field sketch by Mr. Bronson shows the colors of a male example of 243 mm.

It is marked both with light and dark spots on a tan ground darkened by seal-brown dots. The light spots are a pale, almost lemon, yellow surrounded by a usually broken seal-brown edging. The dark spots are a faint vandyke-brown. The ventral fins are reddish-brown and the claspers a greenish-brown.

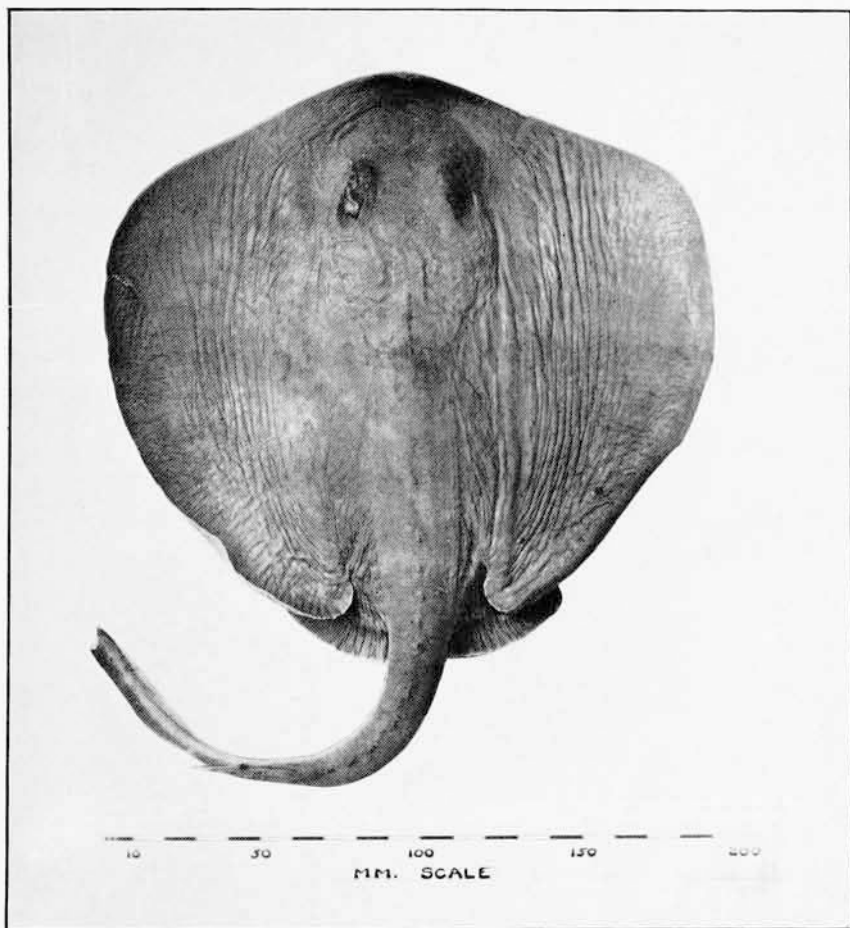


Fig. 8. *Urotrygon asterias*.

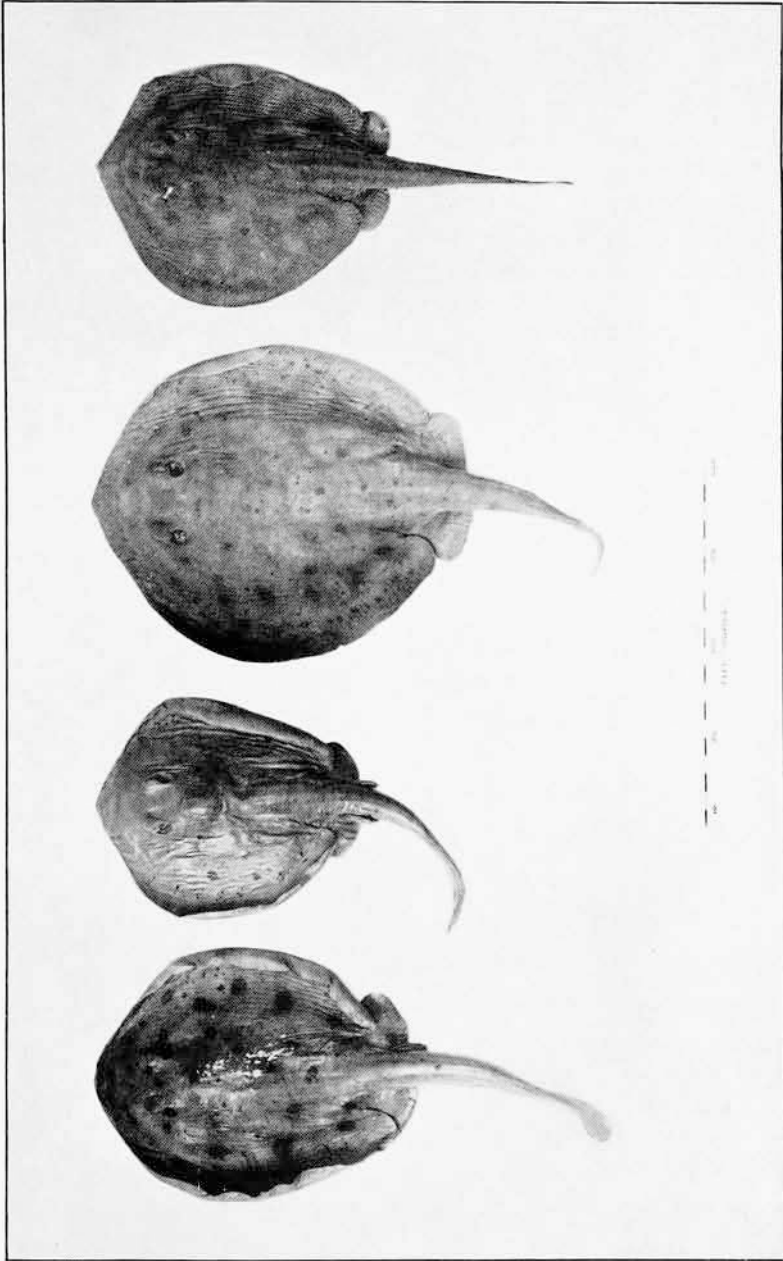


Fig. 9. *Urobatis maculatus*. Males and females of two sizes.

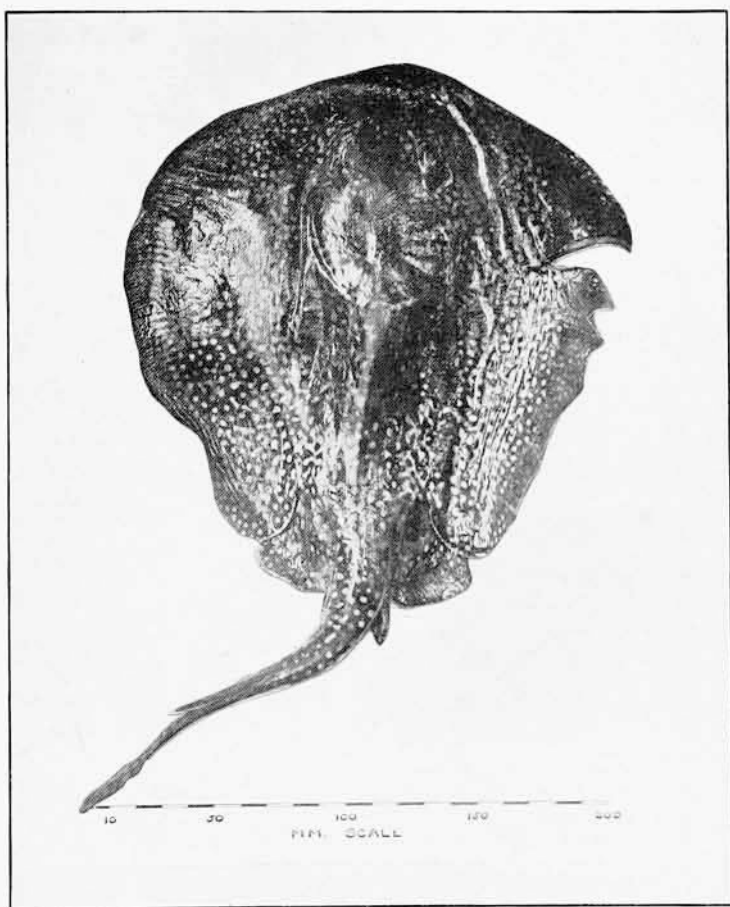


Fig. 10. *Urobatis halleri*.

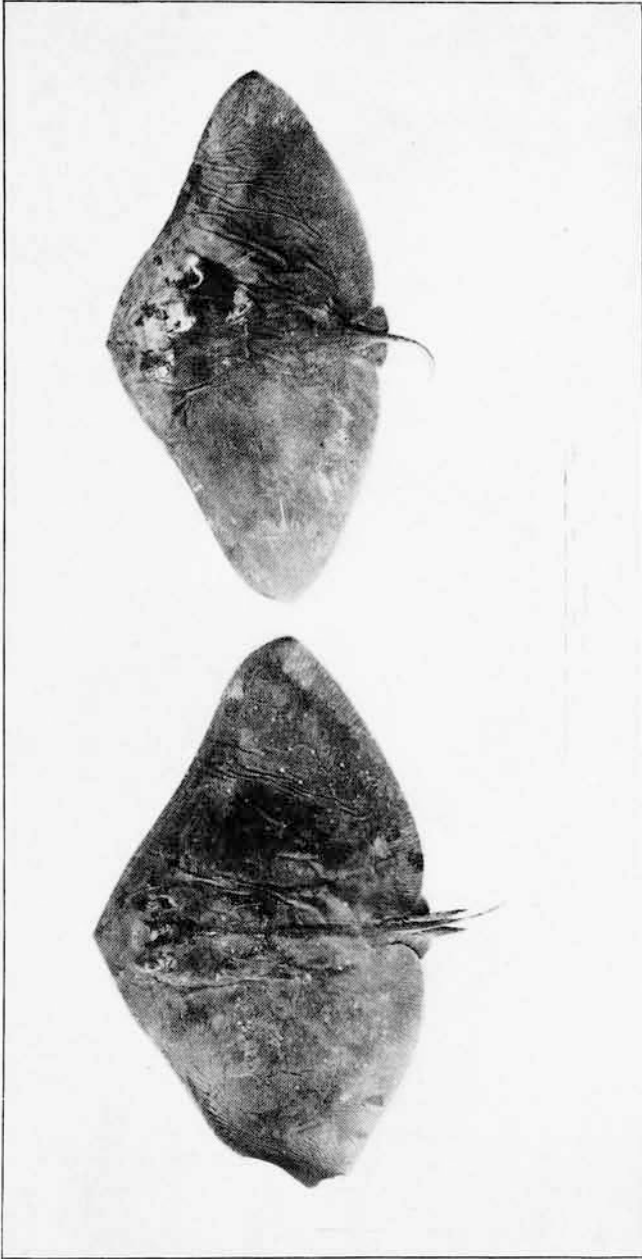


Fig. 11. *Pteraplatea marmorata*. Male and female.



Fig. 12. *Pteraplatea marmorata*. Male and female.

The tail is mottled greenish-brown and seal-brown. The posterior parts of the pectorals and the ventrals are edged with Naples yellow.

1003 (2) North of San Felipe Bay. May 20. 14 faths.

1129 (1) San Francisquito. Gonzago Bay. San Felipe.

1134 (4) ———.

Family **MYLIOBATIDÆ.**

18. **Rhinoptera steindachneri** Evermann & Jenkins.

1002 (2) Between San Felipe and Shoal Point, Rio Colorado. May 19.
Trawl 10-14 faths.

19. **Aëtobatus narinari** (Euphrasen).

1122 (1) ———.