

4.—NOTES ON FISHES COLLECTED AT COZUMEL, YUCATAN, BY THE U. S. FISH COMMISSION, WITH DESCRIPTIONS OF NEW SPECIES.

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The U. S. Fish Commission steamer *Albatross* was sent by the Commissioner, Prof. Spencer F. Baird, late in January, 1885, to the Island of Cozumel for the purpose of investigating its natural history, with special reference to the fishes and their associates.

The vessel was in command of Lieutenant-Commander Z. L. Tanner, U. S. Navy. The naturalists on board were Mr. James E. Benedict, naturalist in charge, Capt. J. W. Collins, Mr. Thomas Lee, and the writer, who was detailed more especially for the investigation of the fishes.

On the 22d of January the *Albatross* arrived off the north shore of the island and anchored at the only anchorage laid down upon the present charts, in the extensive shallow bight towards which the bottom very gradually falls for a long distance off shore, making it very difficult to reach the land for the purpose of daily exploration. Hand-lines were immediately put into requisition here, and in a short time several species of fishes were captured. These were *Ocyurus chrysurus*, one or two species of *Hæmulon*, and one species of shark, *Carcharias cæruleus*. *Ocyurus* and *Hæmulon* accepted our bait of salt mackerel very freely.

On the following day the vessel steamed around to the northwest side of the island and anchored off the village of San Miguel, the principal settlement of Cozumel. There is no harbor here, but a very good lee during easterly winds. Here the vessel remained, with but one interruption, caused by a sudden norther, until the 29th of January, when our position was changed to the south end of the island for a few hours before our departure to the northward. Seining parties were sent out from the *Albatross* in a seining-boat when the distance to be traveled was short, and the boat was towed by a steam-launch when distant points were to be explored. Collections were made near the village of San Miguel, in and near a lagoon about 4 miles below San Miguel, and along the beaches at the southern end of the island. Seining was everywhere made difficult by the presence of sharp rocks, the prevalence of submerged vegetation, and the abundant *Porites*. Hook-fishing was essentially a failure. The water is everywhere clear, so that multitudes of fishes may be seen darting here and there, but none of them would take the hook freely. Certain species, which one would not expect to capture with the hook, were caught by angling. These were, *Balistes vetula* and *Ostracion bicaudalis*. A gill-net was used on one occasion, and took only two species, *Scarus guacamaia* and *Scarus cuzamilæ*.

The great majority of our fishes were taken in a capelin seine 25 fathoms in length.

The total number of species collected is sixty. Two-thirds of these species have already been recorded from Key West, Fla. The fish fauna is essentially West Indian.

The shore line of Cozumel abounds in tide-pools formed by the beating of the surf upon the exposed rock. These pools are usually small and deep, and in them may be obtained an abundance of fishes of the genera *Gobius*, *Chatodon*, *Glyphidodon*, *Hæmulon*, *Lutjanus*, *Pomacanthus*, *Harengula*, and many others belonging to the shore fauna.

One might easily empty the majority of these pools by pumping out the water, and the results obtained would amply repay the trouble. Besides fishes the collector would secure sea-urchins, brittle-stars, crabs, shrimps, squillas, sea-anemones, chitons, annelids, and other invertebrates in abundance.

Among the characteristic shore fishes are *Atherina*, *Stolephorus*, *Harengula*, *Sparisoma*, *Gerres*, *Hæmulon*, *Lutjanus*, *Tylosurus*, and *Dussumieria*; most of these can be taken among the algæ along shore even with a small Baird seine. The absence of cyprinodonts is rather remarkable.

The fish best known to the people of Cozumel for food purposes, apparently, is the barracuda, *Sphyræna picuda*, which we found to be an excellent table-fish. The *Trachurops crumenophthalmus* proved to be a most palatable fish, and *Harengula sardina* is a fish of great delicacy. The species of *Hæmulon*, *Lutjanus*, and *Ocyurus* are also very acceptable as food.

A very large species of ray was seen groping around the bottom in the vicinity of our steamer, which was not obtained, and consequently could not be identified, but, judging from its size, it may have been a species of *Manta*.

There was no fishing by natives during our stay. Casting-nets were seen on the island, but not in use.

Unless otherwise indicated the species about to be mentioned were taken in the seines. The management of the fishing apparatus by Captain Collins was perfect, and the results obtained were due principally to his skill.

1. *Diodon liturosus* Shaw.

The length of the single individual obtained is 106 millimeters; it was taken in the seine. Museum No. 37110.

2. *Orbidus spengleri* Bloch.

Two examples, catalogue No. 37065, were secured in the seine. These measure 110 and 125 millimeters, respectively. Both specimens have scattered, slender filaments on the back and sides, and from twelve to thirteen roundish dark blotches close to the ventral outline.

3. *Ostracion triqueter* L.

Two specimens, catalogue No. 37117, were caught with the hook, January 28, in the lagoon harbor. One of these measures $6\frac{7}{10}$ and the other $7\frac{3}{10}$ inches in length.

The carapace is three-ridged, spineless, and forms a continuous bridge across the back behind the dorsal fin. The body and tail are profusely covered with white spots, none of which are as large as the pupil. Lips, roots of the fins, and margin of the caudal dark brown.

4. *Ostracion bicaudalis* L. *Pesce Toro*; Bull-fish. (Pl. 28, Figs. 1-3.)

A fine example, catalogue No. 37130, was seined January 29, at the southern end of the island. This is $10\frac{1}{2}$ inches long. The species is known at Cozumel as *Pesce Toro* (the Bull-fish).

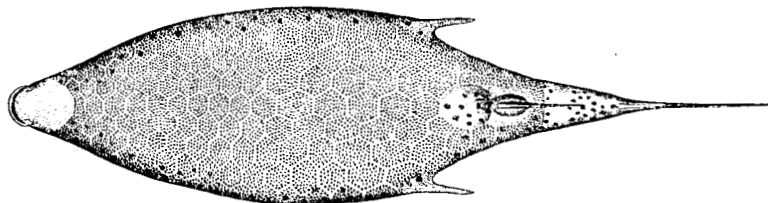


FIG. 1. *Ostracion bicaudale*. (Page 194.)

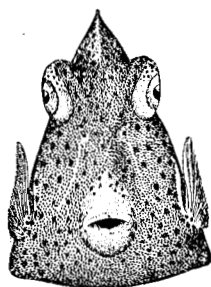


FIG. 2. *Ostracion bicaudale*. (Page 194.)

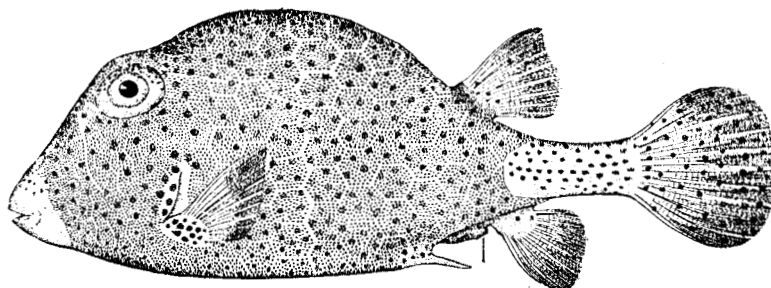


FIG. 3. *Ostracion bicaudale*. (Page 194.)

The carapace is three-ridged, with a flat spine on each ventral ridge. The ventral spine is vertically beneath the base of the dorsal fin; the spine of the left side is as long as the eye. The carapace forms a continuous bridge across the back behind the dorsal fin. All parts except the pectoral, dorsal, and anal profusely covered with roundish-brown spots, the largest of which are one-half as long as the pupil. Dorsal, pectoral, and anal with several brown spots. Each hexagonal plate bears from four to seven brown spots.

5. *Ostracion quadricorne* L.

A single specimen, catalogue No. 37138, measuring 10 inches in length, was seined January 29, at the southern end of the island.

The carapace is three-ridged, with a flat spine on each ventral ridge under dorsal base. A pair of supraorbital spines pointing straight forward, projecting from the forehead a distance about equal to one-half diameter of eye.

6. *Ostracion trigonum* L.

Two specimens were seined January 29 at the south end of Cozumel. One of these, catalogue No. 37116, is $6\frac{1}{2}$ inches long and the other, No. 37140, measures $13\frac{3}{16}$ inches.

The carapace is three-ridged, with a spine on each ventral ridge.

7. *Monacanthus hispidus* (L.).

Three specimens, catalogue No. 37071, were obtained January 29 in the seine. One of these, about 3 inches long, has D. 33; A. 33.

8. *Balistes vetula* L.

This species was caught occasionally with a hook. Example No. 37139 was so taken by Mr. Schroeder, and another one was captured in the same way by Mr. Baker. The fish could be seen in large numbers around the steamer, but they generally refused the bait, unless it became detached from the hook. Floating fragments of vegetables and meat were eagerly followed by the *Balistes*, whose brilliant colors flashing at the surface made it a conspicuous and attractive object. A small purse seine might be used successfully in the capture of this species and the large scaroids with similar feeding-habits.

9. *Siphostoma mackayi* Swain & Meek.

One male and one female of this species were seined along shore. The catalogue No. is 37122. The female is 180, and the male 151 millimeters long. The marsupium of the male contains eggs in two somewhat imperfect series on each side. The dorsal covers 2 + 5 rings, and contains 30 rays. The number of body rings is 17; caudal rings 35. The opercle is not keeled. The greatest depth of the female equals the width of $3\frac{1}{2}$ body rings; while in the male the depth equals the width of $2\frac{1}{2}$ body rings. The snout of the female is 17 millimeters long and its head 29.

The species was originally found by Professor Jordan at Key West, and is described in Proceedings U. S. National Museum, Vol. VII, page 239.

10. *Malthe vespertilio* var. *longirostris* C. & V.

A single specimen, No. 37123, was caught in the seine. It is 205 millimeters long. The length of the snout is 26 millimeters, or nearly one-sixth of the total length without the caudal. The lips and the outer third of the pectoral, anal, and caudal are very dark. The length of the supraoral cavity equals twice its width. The anal rays are

one and two-thirds times as long as the dorsal rays. The general color in spirits is light gray.

11. *Platophrys lunatus* (L.).

One specimen, catalogue No. 37074, is 105 millimeters long; it was seined January 29. D. 93; A. 76; tubes in lateral line, 82; scales 93. Many of the blue spots are larger than the eye. Three dark blotches along the lateral line, the middle one darkest, the third almost obsolete.

12. *Gobius soporator* C. & V.

Seven examples were caught with a dip-net in tide-pools; their agility both in and out of water is astonishing. We had great difficulty in keeping this species unless we killed the fish at once in alcohol.

13. *Scoræna plumieri* Bloch.

One young example, catalogue No. 37103, was seined January 27. D. XI, I, 10; A. III, 5; tubes in l. lat. 26.

14. *Scarus cuzamilæ*, new species. (Pl. 29, fig. 4.)

The type of the present species, catalogue No. 37128, was taken in a gill-net at Cozumel, on the 28th of January, 1885. It is 330 millimeters long to the end of the middle caudal rays; 294 to the end of the lateral line.

The species is evidently related to *Scarus superbus* and *Scarus acutus* of Poey. I have compared it with a specimen of *Scarus superbus* which was sent to the National Museum by Professor Poey. In this species the external caudal rays are produced more than twice as much as in the species about to be described. The coloration, also, is very different, the under surface of the head of my species being uniform whitish. *Scarus acutus* is said to have a broad, whitish band from the base of the pectoral to the caudal. The snout of *acutus* has two deep blue bands and there are two bands of carmine on the chin. Poey makes no reference to lateral canines in the upper jaw. The coloration and dentition of the Cozumel species are so different from Poey's description that I can not identify the species with *S. acutus*.

The body is somewhat fusiform in shape. The jaws are whitish at the margin and olivaceous over the rest of their surface. There are three canines directed outward and slightly backward on the lower posterior edge of the upper jaw. The upper lip covers rather less than one-half of the surface of the upper jaw. The snout is attenuated. There is a considerable depression above the nostrils. The distance from tip of the upper jaw to the iris, measured obliquely, equals one-third of the length of the entire dorsal base and nearly one-half the length of the head. The length of the eye is contained seven and one-half times in the total length of the head; it is situated rather less than one of its diameters from the upper profile of the head and nearly three of its diameters from the lower profile. There are four rows of scales on the cheeks besides a row of scales upon the suboperculum and interoperculum. The lower series on the cheek contains five scales and the other series contain from six to seven. There are seven series of scales on the median line of the back before the dorsal.

The greatest height of the body is contained about three and one-third times in the length to end of scales; it is not equal to the length of the head. The least height of the tail equals the length of the postorbital part of the head, and is not quite one-

half the greatest height of the body. The origin of the dorsal is about over that of the pectoral. The base of the dorsal is exactly twice as long as that of the anal. The dorsal spines are about equal in size, the fourth spine equals one-third the greatest height of the body, and is contained three times in the distance from the tip of the upper lip to the origin of the dorsal. The length of the pectoral is about one-fifth of the total length to the end of the middle caudal rays. The ventral is a little more than one-half as long as the head.

D. IX, 10; A. III, 9; P. 14; V. I, 5. Scales 2-25-7. The lateral line interrupted under the end of the soft dorsal, eighteen scales being pierced before the interruption.

Colors of the alcoholic specimen: Spinous dorsal with a narrow, dark margin; soft dorsal with a broad, dusky margin, the rest of the fin lighter. Anal light at base, a faint, dusky band covering about the outer two-thirds of the fin. Pectoral and ventral pale. Caudal, light at base, and with several broad, light areas, extending out on the rays, the major portion of the fin, however, is very dark. General color dusky olivaceous, many of the scales having a rosy blotch at the base. Operculum with a few irregular blotches of blue. Iris yellowish. Sclerotic very dark.

The species is called *cuzamila* in allusion to the ancient name of the island from which it came.

Scarus acutus Poey. Poey, Mem., II, 216, 217. Common name *Loro*.

The individual which I describe is 310 millimeters long. The tip of the muzzle is rounded, but the head is prolonged and attenuated towards its anteriorextremity, the superior line of its profile being nearly straight, a little depressed above the nostrils; the curve of the throat, as far as the mandible, is, on the contrary, well pronounced. The cleft of the mouth is horizontal; the mandible is slightly included, and the teeth are naked, regularly arranged in quineuncx order, on a smooth and polished surface; the cutting-edge has no inequalities. The nostrils have two orifices, very small and very close together, distant from the eye one of its diameters. The pores of the head are not numerous. The height of the body is contained three and one-half times in its total length; it equals the length of the head, which contains the eye seven times; the eye is situated in the middle of the length of the head at the first quarter of its height. The fins are situated as usual; the unarticulated rays are not sharp; their extremities bend to form fringes on the margin of the dorsal and the anal; the caudal is straight in the middle, but its angles are slightly produced.

D. 9, 10; A. 2, 9; P. 15. The scales are large, much higher than long on the cheek; there are none on the head in front of the eye; there is a series supporting the base of the dorsal. The lateral line is interrupted; the scales which form it have only a longitudinal tube, which sends two branches upward. There are twenty-four scales from the shoulder to the caudal; they are not ciliated.

The head is olivaceous above, violaceous on the sides, rosy below and on the throat. A small oblique space in front of the eyes is clearer without forming a broken band. There are two deep blue bands above the upper teeth and two of carmine under the lower teeth. The iris is reddish-brown. The back is violaceous, the belly also, but paler. A large whitish band traverses the sides from the base of the pectoral to the tail. The dorsal is obscurely violaceous; the caudal deep reddish-brown; the other fins are rosy. — 373.

This translation of Poey's description is introduced here for comparison with the preceding species.

15. *Scarus guacamaia* Cuvier. "Loro."

A single specimen, No. 37126, was taken in a gill-net January 28, in the harbor lagoon; this example is 14 inches long. The following color-notes were taken in the fresh condition: Scales bluish, with a brown margin. Sides of head, except cheeks, blue. A blue band around the snout; another across the snout in front of the eyes; between these two bands there is a brown one. A dark blotch above the eye. Teeth blue, with a white margin. Iris golden. Dorsal, anal, and ventrals with a narrow blue margin. Most of dorsal, anal, and ventral dark brown. The pectoral is dark brown.

16. *Scarus croicensis* Bloch.

A single individual, catalogue No. 37052, was taken in seine January 24. It is 3 inches long.

17. *Sparisoma cyanolene* Jor. & Swain.

Numerous specimens were obtained by seining on the 24th, 27th, and 29th of January. Catalogue Nos. 37058, 37091, and 37101. Length 2 to 3½ inches.

18. *Sparisoma flavescens* (Bl. Schn.).

Numerous examples, catalogue Nos. 37056 and 37100, were caught January 24 and 27 in seine. Length 2 to 6½ inches.

19. *Sparisoma xystrodon* Jor. & Swain.

Three specimens, catalogue No. 37073, were seined January 29. Length 2¾ to 3 inches.

20. *Thalassoma nitidum* (Gthr.).

One specimen, seined January 29. D. VIII, 13; A. II, 11; scales 2-28-9.

21. *PlatyGLOSSUS bivittatus* (Bloch).

A single individual, catalogue No. 37109, was caught in the seine January 29. Length 3 inches. D. IX, 11; A. III, 12.

22. *Xyrichthys ventralis*, n. s. (Pl. 29, fig. 1.)

The type of the present species is No. 37077 of the National Museum Catalogue. It was the only authentic example secured. The species belongs to the subgenus *Novacula* of Bleeker. It has some points of resemblance to *Xyrichthys modestus* Poey, but differs from this species in form, in the structure of the spinous dorsal, the shape of the caudal, and in the size and location of the eye.

The body is compressed and of moderate height. The upper profile of the head does not form a very sharp edge. The profile descends in a very regular curve from the beginning of the dorsal to the tip of the snout. The snout is comparatively short and blunt and the preorbital is low, its width at the angle of the mouth equaling the length of the eye. The maxillary scarcely reaches the vertical from the front of the orbit and equals two-sevenths of the length of the head. There are two strong canines in the front of each jaw, those of the mandible being received within the maxillary canines. Both sets of canines have a lateral and backward curve. No posterior canines.

The eye is distant from the upper profile only about one-third of its diameter, which is contained one and one-half times in its distance from the tip of the snout, and four and one-half times in the length of the head to the end of the opercular flap.

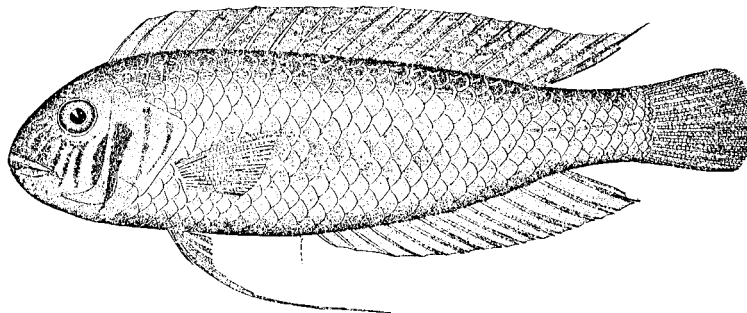


FIG. 1. *Xyrichtys ventralis*. (Page 198.)

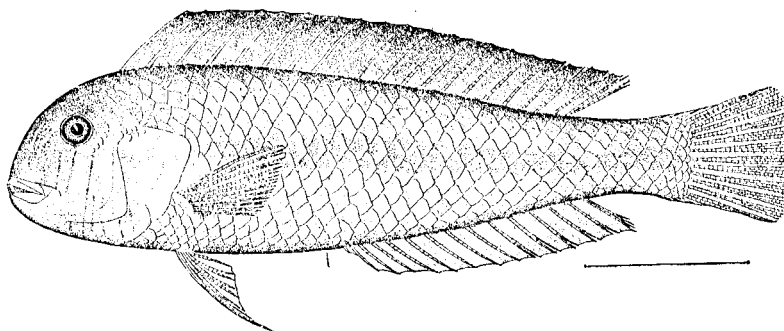


FIG. 2. *Xyrichtys infirmus*. (Page 199.)

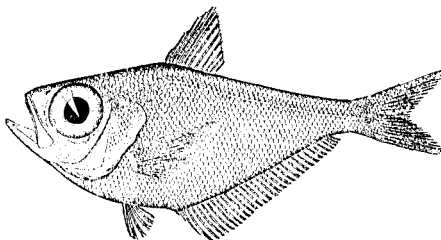


FIG. 3. *Pempheris mulleri*. (Page 204.)

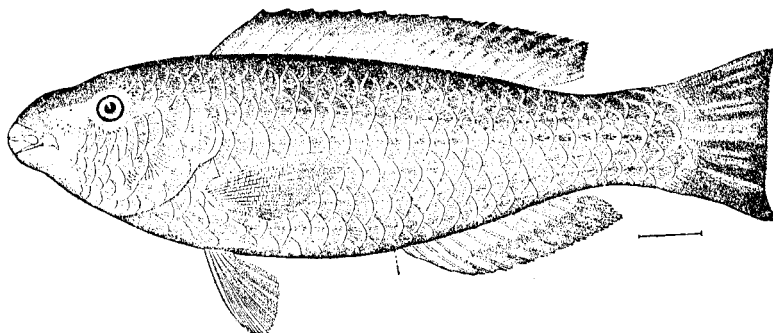


FIG. 4. *Scarus euzamila*. (Page 196.)

There are a few faint rudiments of scales behind and below the orbit. The interorbital width equals the short diameter of the eye. The distance from the snout to the eye is one-third of the length of the head.

The length of the head is contained three and two-thirds times in the total length to caudal base. The greatest height of the body, a little behind the origin of the ventral, is contained three and one-half times in the standard length.

The first two dorsal spines are flexible, slenderer and longer than the others; still they are not evidently differentiated from the rest of the fin, as in *X. rosipes* and some other species. The length of the first spine is almost one-half that of the head. The second spine is slightly shorter than the first. The third spine is one-third as long as the head. The ninth spine is slightly longer than the third. The first soft ray is three-sevenths as long as the head, while the last ray is one and two-thirds times as long as the first spine, its length being about one-fifth of the total without caudal.

The anal spines are moderately strong. The first spine is about two-thirds as long as the eye. The third spine is as long as the third spine of the dorsal, and nearly one and one-half times as long as the eye. The last anal ray is one-half as long as the head.

The caudal is slightly rounded. Its middle rays, from the end of the scales, are contained six times in the total to caudal base.

The ventral spine is one fourth as long as the head. The first ray is produced, extending, when laid backward, to the base of the fourth anal ray. The length of the ventral is one-third of the total with caudal.

The pectoral is as long as the head without the snout.

D. IX, 12; A. III, 12; V. I, 5; P. 11; scales 2-26-8. The lateral line pierces twenty scales before the interruption, which occurs under the tenth ray of the dorsal.

In spirits the general color is purplish-gray. There is a broad streak of solferino in the middle of the sides, beginning near the head and extending back to above the middle of the anal fin. The width of this stripe is uncertain now, but it was probably twice that of the eye. The iris is solferino with the exception of a narrow light circle around the pupil. Several narrow stripes a little darker than the body color extend from the eye over the preorbital and cheeks, a similar stripe running almost vertically on the operculum. The dorsal is mottled with dusky. The other fins are pearly, except the caudal, which is slightly dark with a light margin, and the anal, which shows some faint mottlings in alcohol.

I refer, with some doubt, another young specimen of a *Xyrichtys* to the foregoing species. It is only 57 millimeters long. The first two dorsal spines are flexible and the others stiff. The ventral scarcely reaches to the anal origin. Across the top of the head and back are nine or ten light blotches, some of these being continued down the sides, forming about six indistinct bands.

23. *Xyrichtys infirmus*, n. s. (Pl. 29, fig. 2.)

There are four specimens of the present species, catalogue No. 37076. The length of the types is from 107 to 123 millimeters. This species also belongs to the subgenus *Novacula* of Bleeker, and is remarkable in having all of the dorsal spines flexible. The shape of the body is similar to that of *X. ventralis*, but the descent of the profile is more abrupt; the species in this respect bears more resemblance to *X. psittacus*. The upper profile of the head does not form a very sharp edge. The snout is comparatively

short and blunt, but the preorbital is very much higher than in *X. ventralis*, the shortest distance from the angle of the mouth to the eye equaling nearly twice the length of the eye. The maxillary does not reach to the vertical from the front of the orbit; its length equals one-fourth that of the head. The canines are as in *X. ventralis*. No posterior canines.

The eye is distant from the upper profile nearly one-half of its own diameter, which is contained about six times in the length of the head and more than twice in the distance of the eye from the tip of the snout. The interorbital width equals the length of the eye.

There are a few scales below the orbit. The distance from the snout to the eye is two-fifths of the length of the head.

The length of the head is contained about three and one-half times in the total length to caudal base. The greatest height of the body, which is about at the origin of the ventral, equals the length of the head.

All of the dorsal spines are flexible, and of about equal length. The third spine is one-third as long as the head. The last soft ray is very slightly produced, and is about two-fifths as long as the head.

The anal spines are very weak. The third spine is about two-sevenths as long as the head. The last anal ray is a little more than one-third as long as the head.

The caudal is usually nearly truncate; in some specimens the middle rays are very slightly longer than the external rays. The middle rays, from the end of the scales, are one-seventh of the total length to base of caudal.

The ventral spine is slender and weak, and about twice as long as the eye. The first ray reaches about to the vent when extended. The fin is about two-thirds as long as the head, and one-fifth of the total length without caudal.

The pectoral is nearly as long as the ventral.

D. IX, 12; A. III, 12; V. I, 5; P. 11; scales 2-27-11. The lateral line pierces twenty scales before the interruption, the twentieth pierced scale being under the tenth ray of the dorsal. The scales of the breast and abdomen are much smaller than any of the others. The posterior angle of most of the scales is acutely produced.

The color in spirits is light olive gray, the dorsal and anal fins being darker except along their basal portions. The axil of the pectoral is very dark and the dark blotch is sometimes bordered behind by several bluish streaks on the scales. Three narrow bluish stripes extend from the eye over the preorbital and cheek, and the interoperculum has six or seven short, nearly vertical, lines of bluish. Iris solferino. The dark color of the dorsal is more pronounced on the spinous portion.

24. *Xyrichtys venustus* Poey.

Xyrichtys lineatus, C. & V., Hist. Nat. Poiss., xiv, 1839, p. 50; not *Coryphæna lineata* Gmelin, Linné, Syst. Nat., p. 1195.

The species to which I refer under the above name is perhaps the best known upon our coasts. It has a large pearl-colored blotch in the pectoral region connected with its fellow of the opposite side by numerous narrow bands extending around the belly. It may be identical with *X. psittacus*, but I am disposed for the present to consider it a distinct species and present herewith a complete description.

The collection made at Cozumel contains sixteen specimens, catalogue No. 37075, these ranging from 92 to 105 millimeters in length. All these examples have the

pearly blotches and the connecting lines well developed. The dorsal spines of these specimens are flexible and the species bears a close resemblance to *X. infirmus*, but the coloration is quite different and the caudal is more nearly truncate in *X. venustus* than in *X. infirmus*. Other points of distinction will appear as we proceed with the description.

The descent of the profile of the head is not abrupt, and the edge of the profile does not form a very sharp edge. The snout is short; the preorbital is rather low, the shortest distance from the angle of the mouth to the eye scarcely exceeding the length of the eye. The maxillary does not reach to the vertical from the front of the orbit; its length equals one-fourth the length of the head to the end of the opercular flap.

The canines are weak. No posterior canines. The eye is distant from the upper profile nearly one-half of its own diameter, which is contained five times in the length of the head and nearly twice in the distance of the eye from the tip of the snout. The interorbital width is about equal to the length of the eye. In some examples there are several scales below the orbit. The distance from the snout to the eye is contained about two and two-thirds times in the length of the head.

The length of the head is contained nearly four times in the total length to caudal base. The greatest height of the body, which is a little behind the ventrals, exceeds the length of the head and is contained about three and one-half times in the total without caudal.

All of the dorsal spines are flexible, and of nearly equal length; the third spine is a little more than one-third as long as the head. The last soft ray is scarcely produced; its length equals less than two-fifths the length of the head. The anal spines are very feeble; the third spine is less than one-fourth as long as the head. The last anal ray is contained nearly three and one-half times in the length of the head.

The caudal is usually truncate or very slightly rounded. The middle rays from the end of the scales are contained about seven and one-third times in the total to caudal base.

The ventral spine is slender and weak, and about twice as long as the eye. The longest ventral ray does not quite reach to the vent when extended; it is about two-thirds as long as the head. The length of the ventral is contained five and one-third times in the total without caudal. The pectoral is about as long as the ventral.

D. IX, 12; A. III, 12; V. I, 5; P. 11; scales 2-27-11. The lateral line pierces twenty scales before the interruption, the twentieth pierced scale being under the tenth ray of the second dorsal. The scales of the breast and abdomen are somewhat smaller than those of the rest of the body. The posterior angle of some of the scales on the hinder portion of the body is somewhat acute.

The color in spirits is as follows: The ground color of most of the examples is olive-gray, sometimes with a faint orange tinge. The spinous dorsal is somewhat dusky; otherwise the fins are usually pale. A pearly blotch on the side behind the pectoral, and about as long as the pectoral, connected with its fellow of the opposite side by numerous, sometimes about seventeen, narrow whitish bands. A conspicuous dark blotch covering most of the operculum and suboperculum in marked contrast with milky-white marking in front of the head, the one behind the head occupying the whole of the opercular flap. There are at present no traces of bluish lines upon the head. Iris dusky.

I am somewhat in doubt concerning the relationship of this species to *X. infirmus*, which it resembles in many respects, but the coloration is always different, and there are other points of distinction which may be observed in the descriptions of the two. There is no doubt that this is the species which we have long known as *Xyrichthys lineatus* C. & V., but, as Poey has noticed, it is probably not the same as *Coryphæna lineata* of Gmelin.

***Xyrichthys psittacus* (L.).**

The only large example of this species available for comparison with the type of *X. vermiculatus* Poey is No. 31915 of the Museum catalogue. It was taken by Silas Stearns at Pensacola, Fla. The length of the example is 207 millimeters. The shape of the body is similar to that of *X. vermiculatus*, and the profile of the head is about the same. The width of the preorbital at the angle of the mouth is nearly one-half the length of the head and contains the length of the eye only about two and one-third times. The eye in *X. psittacus*, if we may depend upon the material at hand, is always larger than in *X. vermiculatus*. The maxillary scarcely reaches the vertical from the front of the eye, its length is about two-sevenths of the greatest length of the head measured somewhat obliquely over the tip of the snout to the tip of the opercular flap.

The canines show nothing different from those of the species already mentioned. There are no posterior canines.

The eye is distant from the upper profile of the head about one-half of its own diameter, which is contained less than five times in the length of the head, even less than five times in the greatest length of the head from the tip of the snout to the tip of the opercular flap.

Scales below the orbit in two series, the lower series containing two scales. The interorbital width equals the short diameter of the eye. The distance from the snout to the eye is one-sixth of the total length to caudal base, and about three-fifths of the greatest length of the head.

The length of the head, measured on the axis of the body, is contained three and two-thirds in the total without caudal.

The greatest height of the body at or a little behind the ventral origin equals one-third of the total length without caudal.

The first two dorsal spines are flexible. The length of the first is less than one-third of the length of the head. Length of the ninth spine is more than a third of the length of the head. Length of the first soft ray is more than two-fifths of the length of the head, and the last ray is more than one-half the length of the head and equals the least height of the caudal peduncle.

The anal spines are short and rather blunt, the third being scarcely longer than the eye. The first soft ray is about three-sevenths as long as the head, and the last ray is equal to the last ray of the dorsal. The caudal is very slightly rounded; its middle rays from the end of the scales is contained five and two-thirds times in the total to caudal base.

The ventral spine is one-fourth as long as the head, the first ray reaches to the vent. The length of the fin is contained five and two-thirds times in the total length without caudal.

The pectoral is contained about four and three-fourths times in the total length without caudal.

D. IX, 12; A. III, 12; scales 2-10-27. The lateral line pierces nineteen scales, the nineteenth scale being under the interspace between the eighth and ninth ray of the dorsal.

In spirits the general color is light yellowish-brown, most pronounced on the cheek. The well-defined bluish lines which are usually so noticeable in *X. vermiculatus* are replaced in this example by numerous irregular and crooked very narrow brownish streaks. The dorsal fin at present is uniform pale in color, without mottlings of any kind. The anal is pale, except along its margin, which has numerous very narrow dark streaks nearly at right angles with the direction of the rays, besides some vague pearly mottlings. The caudal has seven or eight very narrow dark bands.

It is proper to state that another example, which should probably be referred to *X. psittacus*, catalogue No. 29972, 200 millimeters in length, taken at Charleston, S. C., by Mr. C. C. Leslie, is intermediate between the Pensacola example and Poey's type of *X. vermiculatus*. The length of the eye in this example is contained nearly three times in the least height of the preorbital, and there is only one series of scales below the orbit. The lateral line also pierces scales to the twentieth, and is under the tenth ray of the dorsal.

25. *Pomacentrus leucostictus* Müll. & Trosch.

Three specimens, catalogue No. 37061, were taken in a tide-pool January 28. Length 1 to 2¼ inches.

26. *Glyphidodon saxatilis* (L.).

Numerous individuals, catalogue Nos. 37063, 37069, and 37084 were obtained by seining.

27. *Gerres harengulus* (Goode & Bean).

37067. (2 specimens.) January 24, 1885. Seine.
 37068. (10 specimens.) January 29, 1885. Seine.
 37085. (5 specimens.) January 27, 1885. Seine.

The smallest of the above examples is 1¾ inches long, and the largest 6 inches. The species is abundant, and was found wherever we hauled the seine.

I have compared *harengulus* with *gracilis* of the Pacific coast, and can not at present believe that the two are identical.

28. *Gerres lefroyi* Goode.

This species was found only at San Miguel, January 24. Two individuals, No. 37066, were seined. These are 6 inches and 7¾ inches long, respectively.

29. *Gerres zebra* Müll. & Trosch.

Only two specimens of *G. zebra* were obtained. The larger one, No. 37131, was seined January 27, near the harbor lagoon. It is 11½ inches long. The other, No. 37118, was caught with a hook, in the same lagoon, January 28. It is 8 inches long. Both of these examples still show the dark bands, seven or eight in number, on the sides.

30. *Pomacanthus aureus* (Bloch).

One very young individual, catalogue No. 37064, one-half inch long, was taken in a tide-pool January 28.

31. *Teuthis hepatus* (L.).

A single individual, measuring $5\frac{1}{10}$ inches, catalogue No. 37120, was seined January 29.

32. *Chætodon striatus* L.

A single specimen of this beautiful species, measuring $1\frac{1}{4}$ inches, catalogue No. 37062, was taken in a tide-pool January 28.

33. *Trachurops crumenophthalmus* (Bloch).

A small number of this species, catalogue No. 37081, was seined on the 24th of January. These varied in length from 9 to $10\frac{1}{2}$ inches.

34. *Caranx ruber* (Bloch).

Numerous young specimens, catalogue Nos. 37107 and 37108, were seined on the 27th and 29th of January. D. —, 1, 28; A. 1, 22; scutes 29.

35. *Trachynotus glaucus* (Bloch).

A single example, 12 inches long, was taken in the seine, January 27, near the harbor lagoon. This specimen has four evident bands on the sides and a faint trace of a fifth. D. VI, I, 20; A. II, I, 16; P. 16.

The height of the body is one-half of the length to the end of the scales. The least height of the caudal peduncle equals the distance from the tip of the snout to the middle of the eye, and is slightly more than one-third of the length of the head. The length of the maxilla is contained two and two-thirds times in the length of the head, and eleven times in the distance from the snout to the end of the middle caudal rays. The eye is about three-elevenths as long as the head. The anterior rays of the dorsal and anal reach somewhat beyond the middle of the caudal.

36. *Trachynotus goreënsis* C. & V.

Three young individuals, No. 37102, were seined, January 27, near the harbor lagoon. The smallest is $1\frac{3}{8}$ inches and the largest $3\frac{3}{8}$ inches long. D. VI, I, 19; A. II, I, 17.

37. *Pempheris mülleri* Poey. (Pl. 29, fig. 3.)

Numerous examples taken in seine January 27, catalogue No. 37111. These varied in length from 1 to $1\frac{1}{4}$ inches. D. V, 8-9; A. III, 31; V. I, 5; scales 52.

38. *Hypeneus maculatus* (Bloch).

A single specimen, catalogue No. 37104, was seined January 27. Length $4\frac{1}{2}$ inches. D. VIII, I, 8; A. I, 6; scales 2-30-5.

39. *Ocyurus chrysurus* (Bloch).

Four specimens were caught January 22 with hooks from the vessel; only one of these, No. 37113, was preserved. This species is excellent for food. In our seining at Cozumel we found no young examples, but at Key West, earlier in the same month, they were very common.

40. *Hæmulon arcuatum* C. & V.

Eight specimens, catalogue No. 37088, were seined January 27. They varied in length from 5 to 6 inches, and some of them were infested with an *Æga*-like parasite.

41. *Hæmulon flavolineatum* (Desm.).

Large numbers, catalogue Nos. 37086, 37087, were seined on the 27th and 29th of January. These vary in length from $2\frac{1}{2}$ to $4\frac{1}{2}$ inches.

42. *Hæmulon melanurum* (L.).

A large number of this species, catalogue No. 37078, was seined on the 29th of January. The largest specimen measures 7 inches and the smallest about $4\frac{1}{2}$ inches.

43. *Hæmulon sciurus* (Shaw).

One example taken in the seine January 27; catalogue No. 37089. Length of specimen $5\frac{3}{4}$ inches.

44. *Lutjanus caxis* (Bl. Schn.).

Young individuals, No. 37119, measuring $2\frac{1}{8}$ to $2\frac{3}{4}$ inches in length, were seined, January 29, at the south end of the island. One specimen, $3\frac{1}{2}$ inches long, No. 37060, was caught in a tide-pool, January 28, in company with *Gobius soporator*, *Pomacentrus leucostictus*, *Glyphidodon saxatilis*, *Pomacanthus aureus*, and *Chaetodon striatus*. All of these young examples of *L. caxis* have whitish bars on the sides.

45. *Lutjanus griseus* (L.).

Lutjanus griseus, Jordan & Swain, Proc. Nat. Mus., 1884, 431, 439.

This species was taken in the seine, January 27. The specimens preserved are No. 37129. *L. griseus* was much less common than the other species, *caxis* and *synagris*. The young were not seen; our examples vary from 14 to 16 inches in length.

46. *Lutjanus synagris* (L.).

Specimens were taken in the seine, January 27, near the harbor lagoon; these, No. 37083, range from 4 inches to $6\frac{1}{2}$ inches in length. Others were obtained by seining, January 29, at the south end of Cozumel; these, No. 37070, were also small, one of them being only $2\frac{1}{2}$ inches long.

47. *Centropomus undecimalis* (Bloch).

A large example, 23 inches long, No. 37137, was seined, January 27, near the deep lagoon which serves as a harbor for small vessels. The species was not seen by us at any other time around the island.

D. VIII, I, 10; A. III, 6; scales, 70, to the end of the black portion of the lateral line.

48. *Sphyræna picuda* Bl. Schn.

On the 24th of January we took several individuals, No. 37135, in the seine at San Miguel. On the 29th of the same month the species was seined again at the south end of the island, and one specimen, No. 37134, was kept. *S. picuda* is very abundant here and very destructive to weaker fishes. In company with *Tylosurus caribbeus* and *T. notatus* it scourges the shoals of *Harengula* and *Stolephorus*, driving the panic-stricken masses upon the shoals, where the gluttonous pelicans continue the rush of devastation.

As already mentioned, this species of barracuda is a fair food-fish.

49. *Atherina aræa* Jor. & Gilb.

Catalogue Nos. 37094 and 37097. Very plentiful, caught in the seine January 29. Length, $2\frac{1}{4}$ to $2\frac{3}{4}$ inches. D. VI, I, 10; A. I, 12; scales, 42.

50. *Atherina velieana* Goode & Bean.

Eight individuals, catalogue No. 37054, were taken in the seine January 24. These measure from $1\frac{3}{16}$ to $2\frac{3}{4}$ inches in length. D. V, I, 10; A. I, 13; scales, 38.

51. *Atherina stipes* Müll. & Trosch.

Many specimens, catalogue Nos. 37059, 37096, 37098, 37099, and 37112, were caught in the seine on January 24 and 29. Length, $2\frac{1}{4}$ to $2\frac{3}{4}$ inches. D. V, I, 11; A. I, 13; l. lat. 39; transv. 6.

52. *Tylosurus notatus* (Poey).

Numerous examples, catalogue No. 37093, were seined January 29.

53. *Tylosurus caribbæus* (Les.).

A single specimen, catalogue No. 37124, was obtained by seining January 29. This was 11 inches long.

54. *Albula vulpes* (L.).

The lady-fish was not uncommon at Cozumel. No very young specimens were taken, the smallest being $5\frac{1}{2}$ inches long. Our specimens, No. 37132, were seined January 27, near the harbor lagoon and Nos. 37121 and 37133 were obtained in the seine January 29 at the south end of the island.

55. *Harengula sardina* (Poey).

Numerous examples, catalogue Nos. 37079, 37092, and 37115, were seined on the 24th, 27th, and 29th of January. These varied in length from $2\frac{1}{16}$ to $6\frac{1}{2}$ inches.

56. *Harengula pensacolæ* Goode & Bean.

Five specimens, catalogue Nos. 37080 and 37114, were caught in the seine January 24 and 27.

57. *Stolephorus mitchilli* (C. & V.).

A large number of this species, catalogue Nos. 37053 and 37105, were seined January 24 and 27. Length, $3\frac{1}{4}$ to $3\frac{1}{2}$ inches. D. I, 11; A. I, 25; scales, 39.

58. *Dussumieria stolidifera* Jor. & Gilb.

Abundant. Catalogue Nos. 37055 and 37106. A large number of these were seined January 24 and 29. Length, 1 to 2 inches.

59. *Narcine brasiliensis* (Olfers).

A single specimen, catalogue No. 37125, was seined January 29.

60. *Carcharias cœruleus* DeKay.

One example, No. 37141, was taken with a hook baited with salt mackerel. The species was abundant on the north side of the island at our first anchorage and soon destroyed the fishing for *Ocyurus* and *Hæmulon*. During all of our efforts with hooks from the steamer while we were lying off San Miguel no species of shark was captured.