

REPORT UPON A COLLECTION OF FISHES MADE AT GUAYMAS,
SONORA, MEXICO, WITH DESCRIPTIONS OF NEW SPECIES.

BY

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(With Plates I-II.)

Through the liberality of the trustees of De Pauw University and of the Indiana State Normal school, the authors of this paper were enabled, during the summer of 1887, to make a collection of fishes in the Bay of Guaymas, Sonora, Mexico.

A preliminary account of the collection, with descriptions of seventeen species thought by us to be new, has been published in the Proceedings of the United States National Museum for 1888, pp. 137-158.

Many interruptions and other duties have prevented the preparation of a fuller account of the collection until the present time.

It is proper to refer here to the former studies of the fishes of the Gulf of California.

The first considerable collection of fishes from the Gulf of California was made by Mr. John Xantus, who was for some time stationed at Cape San Lucas as a tidal observer.

The fishes he obtained were sent to the Smithsonian Institution and were described by Dr. Theodore Gill in the Proceedings of the Academy of Natural Sciences of Philadelphia for the years 1862 and 1863. This collection was again studied by Professors Jordan and Gilbert, the results of which studies were published in the Proceedings of the U. S. National Museum for 1882. This collection, although comprising fewer than one hundred species, was a most valuable one, containing, as it did, a large proportion of new species and several new genera.

In 1873-'75, Dr. Thomas H. Streets, while on board the U. S. steamer *Narragansett*, engaged in making a survey of Lower California, made a collection of fishes in the Gulf of California, the account of which was published in Bulletin No. 7, U. S. National Museum, 1877.

In 1880-'81, Capt. Henry E. Nichols, during cruises of the U. S. Coast and Geodetic Survey steamer *Hassler* along the west coast of Mexico

* The order in the signature of this paper indicates nothing as to seniority of authorship. The authors shared equally both in making the collection and in the preparation of the report, and are to be held equally responsible for its contents. This statement applies also to the paper by them describing seventeen new species of this collection which has already appeared.

and Central America, including the Gulf of California and the Bay of Guaymas, made various collections of fishes.

These have been studied by Professors Jordan and Gilbert (Proc. U. S. Nat. Mus. 1881, p. 225).

In 1880-'81, Prof. Charles H. Gilbert spent ten weeks collecting fishes at Mazatlan, a point which may be considered as being at the mouth of the Gulf of California. During this time he obtained a large and very important collection. This collection was made for the U. S. National Museum and served as the basis for many papers by Professors Jordan and Gilbert which have appeared in the Proceedings of the U. S. National Museum and in the Bulletins of the U. S. Fish Commission. The first of these papers announced that one hundred and seventy species were obtained and gave descriptions of thirty-three new species.

Mr. W. N. Lockington has at various times given accounts of fishes from the Gulf of California, some of which he described as new.

In the Proceedings of the U. S. National Museum 1882, p. 378, Professors Jordan and Gilbert give an account of a collection of fourteen species made by Mr. L. Belding near Cape San Lucas.

In the Proceedings of the U. S. National Museum 1884, Dr. Jordan published an account of a small collection of four species made by Mr. H. F. Emeric at Guaymas. One of these, *Gobiosoma histrio*, was described as new.

Besides these collections, there have been described at various times from points in or near the Gulf of California, a number of species by others, especially by Dr. Günther and by Dr. Steindachner, the latter having at one time visited the west coast of North America with Agassiz on the *Hassler* expedition.

Nearly all the species heretofore reported from the Gulf of California have been from points south of Guaymas.

Guaymas is situated on the Bay of Guaymas, Gulf of California, in latitude 28° north and longitude 34° west, a position on the west coast of Sonora, Mexico, about opposite the middle portion of the peninsula of Lower California.

The climate is very dry, there being at most but very few light showers at any time.

The bay is surrounded by mountains wholly of volcanic origin. The coast line is an almost unbroken wall of rough, sharp-outlined rock which the sea has in many places undermined into overhanging cliffs or caves. This wall, always high, sometimes rises into immense precipices.

There are but few places in the region of the bay where the seine could be used to any advantage, and these had to be prepared by removing many rocks.

We were fortunate enough in being able to secure the aid of a French fisherman, Mr. Theodore Canevet, who, being a man of intelligence, was able to render us great aid in many ways. He was well informed as to

the most favorable fishing places and possessed fair fishing appliances, and was really the only fisherman there who was at all well equipped for his work.

The water of the bay, at least near the city of Guaymas, is very warm.

Although Guaymas is a considerable city, containing about ten thousand inhabitants, there is no regular fish market. The reason for this does not lie in the scarcity of fishes in the bay, for great numbers of the best of food fishes abound.

The extremely warm climate renders the keeping of fish even for a short time a matter of great difficulty, and the high price of ice makes its use impracticable. Otherwise the Bay of Guaymas might be made to furnish an abundance of a choice article of food to the people along the line of the Sonora Railroad, a thing of which they certainly stand in great need.

During our visit in the month of July, the weather was so hot that fishing in the daytime was nearly impossible, and nearly all of our seining was done after night. This was of course a serious interference to certain kinds of collecting.

From information gained from the fishermen, we have no doubt that many species visit these coasts in the winter months which are absent, or at least are not found near shore, during the summer. *Cynoscion macdonaldi*, recently described by Dr. Gilbert, is an example; it is a very large fish common along the east coast of the gulf in winter, but never seen there in the summer months.

The collection contains one hundred and ten species, of which twenty-one appear to be new. Three species and three genera had not before been reported south of San Diego or Cerros Island; forty-six species had already been reported from this geographical region north of Mazatlan; forty-one species were not hitherto known from any point north of Mazatlan; while but twenty-four species of the collection are known from both the Atlantic and Pacific coasts of the Americas. Of the whole collection only eleven species are known from any point north of the Gulf of California, while the remaining species, with the exception of those described by us as new, are known, in the main, along the southern coasts of Mexico and Central America to South America.

In the "Shore Fishes of Central America" (published in 1869), Dr. Günther considered the evidence of the existence of a water way through the Isthmus of Panama at a comparatively recent period, as shown by the similarity of the fish faunæ of the two coasts. There were known to Dr. Günther at that time one hundred and ninety-three species of marine or brackish-water fishes, as found on the two coasts of Central America, fifty-nine of which he regarded as common to both coasts. This is 31 per cent. of the whole number, and he thought that further exploration would increase this percentage. He was thus led to conclude that there was, at no very remote period, a depression of the

Isthmus of Panama permitting the passage of fishes from one side to the other.

Subsequently, Dr. Günther, in his "Introduction to the Study of Fishes" (1880, p. 280), claimed a still larger proportion of the fishes of tropical America to be identical on the two sides of the continent. He concluded that "with scarcely any exceptions the genera are identical, and of the species found on the Pacific side nearly one-half have proved to be the same as those of the Atlantic. The explanation of this fact has been found in the existence of communications between the two oceans by channels and straits which must have been open till within a recent period. The isthmus of Central America was then partially submerged, and appeared as a chain of islands similar to that of the Antilles; but as the reef-building corals flourished chiefly north and east of those islands, and were absent south and west of them, reef fishes were excluded from the Pacific shores when the communications were destroyed by the upheaval of the land."

But of the fifty-nine species which Dr. Günther regarded as identical on the two shores, thirty are now regarded as specifically distinct by Dr. Jordan (Proc. U. S. Nat. Mus. 1885, 394), and this leaves but 15 per cent. of the one hundred and ninety-three as common to both coasts.

Of four hundred and seven species from the two coasts known to Dr. Jordan in 1885, he regarded but seventy-one species, or $17\frac{1}{2}$ per cent., as specifically identical; and if to this be "added some eight hundred species known from the Caribbean Sea and adjacent shores, we have about 6 per cent. of the whole number known, as common to the two coasts."

Upon this evidence Dr. Jordan based his opinion that "fuller investigations will not increase the proportion of common species, and, if it does not, the two faunæ show no greater resemblances than the similarity of physical conditions on the two sides would lead us to expect."

The explorations since 1885 have resulted, (1) in an addition of about one hundred species to one or the other of the two faunæ; (2) in showing that at least two species that were regarded as identical on the two shores (*Citharichthys spilopterus* and *C. gilberti*) are probably distinct; and (3) in the addition of but two species to those common to both coasts (*Hamulon steindachneri* J. & G. and *Sidera castanea* J. & G. of the west coast probably being identical with *H. schranki* and *Gymnothorax funebris* of the east coast).

All this reduces still further the percentage of common species.

Of the one hundred and ten species obtained by us, twenty-four, or less than 21 per cent., appear to be common to both coasts. Of these twenty-four species, at least sixteen, from their wide distribution, would need no hypothesis of a former water way through the isthmus to account for their presence on both sides. They are species fully able to arrive at the Pacific shores of the Americas from the warm seas west. It thus appears that not more than eight species, less than 8 per cent. of our

collection, all of which are marine species, require any such hypothesis to account for their occurrence on both coasts of America.

As already stated, our studies have resulted in the addition of but two species (*Hamulon schranki* and *Gymnothorax funebris*) to the list of those thought to be identical on the two coasts.

This gives us, then, thirteen hundred and seven species that should properly be taken into account when considering this question, not more than seventy-two of which, or 5.5 per cent., seem to be identical on the two coasts. This is very different from the figures given by Dr. Günther in his "Study of Fishes."

Now, if from these seventy-two species admitted to be common to both coasts, we subtract the sixteen species of wide distribution—so wide as to keep them from being a factor in this problem—we have left but fifty-six species common to the two coasts that bear very closely upon the water-way hypothesis. *This is less than 4.3 per cent. of the whole number.*

But the evidence obtained from a study of other marine life of that region points to the same conclusion.

In 1881, Dr. Paul Fischer discussed this same question in his *Manuel de Couchylogie*, pp. 168, 169, in a section on the Molluscan Fauna of the Panamic Province, and reached the same general conclusions. He says: "Les naturalistes américains se sont beaucoup préoccupés des espèces de Panama qui paraissent identiques avec celles des Antilles, ou qui sont représentatives. P. Carpenter estime qu'il en existe 35. Dans la plupart des cas, l'identité absolue n'a pu être constatée et on a trouvé quelques caractères distinctifs, ce qui n'a rien d'étonnant, puisque dans l'hypothèse d'une origine commune, les deux races pacifique et atlantique sont séparées depuis la période Miocène. Voici une liste de ces espèces représentatives ou identiques." Here follows a list of twenty species. "Mais ces formes semblables," he says, "constituent une infime minorité (3 per cent.)."

These facts have a very important bearing upon certain geological questions, particularly upon that one concerning the cause of the cold of the Glacial Period.

In Dr. G. Frederick Wright's recent book, "The Ice Age in North America," eight different theories as to the cause of the cold are discussed: The particular theory which seems to him quite reasonable is that one which attributes the cold as due to a change in elevation of different parts of the country, and a depression of the Isthmus of Panama is one of the most important changes that he considers. He says (p. 409): "Should a portion of the Gulf Stream be driven through a depression across the Isthmus of Panama into the Pacific, and an equal portion be diverted from the Atlantic coast of the United States by an elevation of the sea-bottom between Florida and Cuba, the consequences would necessarily be incalculably great, so that the mere existence of such a possible cause for great changes in the distribution

of moisture over the northern hemisphere is sufficient to make one hesitate before committing himself unreservedly to any other theory; at any rate, to one which has not for itself independent and adequate proof."

In the Appendix to the same volume, Mr. Warren Upham, in discussing the probable causes of glaciation, says: "The Quaternary uplifts of the Andes and Rocky Mountains and of the West Indies make it nearly certain that the Isthmus of Panama has been similarly elevated during the recent epoch. * * * It may be true, therefore, that the submergence of this isthmus was one of the causes of the Glacial period, the continuation of the equatorial oceanic current westward into the Pacific having greatly diminished or wholly diverted the Gulf Stream, which carries warmth from the tropics to the northern Atlantic and northwestern Europe."

Any *very* recent means by which the fishes could have passed readily from one side to the other would have resulted in making the fish fauna of the two shores practically identical; but the time that has elapsed since such a water way could have existed has been long enough to allow the fishes of the two sides to become *practically distinct*. That the molluscs of the two shores are also almost wholly distinct, as shown by Dr. Fischer, is even stronger evidence of the remoteness of the time when the means of communication between the two oceans could have existed, for "species" among molluscs are probably more persistent than among fishes.

Our present knowledge, therefore, of the fishes of tropical America justifies us in regarding the fish fauna of the two coasts as being essentially distinct, and that there has not been, at any comparatively recent time, any water way through the Isthmus of Panama.

We are under great obligations to the Mexican minister at Washington, Señor Romero, and to other officials of the Mexican Government, for valuable assistance and for many courtesies extended to us; also to Hon. A. Willard, United States consul at Guaymas, who rendered us valuable aid in many ways; and to Dr. David S. Jordan, president of Indiana University, we wish to acknowledge our great indebtedness for the use of his valuable library and extensive collections.

The following is a list of the twenty-one species described as new to science:

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| 1. <i>Rhinoptera steindachneri</i> . | 12. <i>Gobius chiquita</i> . |
| 2. <i>Synodus jenkinsi</i> Jordan & Bollman. | 13. <i>Gobius longicaudus</i> . |
| 3. <i>Siphostoma aretum</i> . | 14. <i>Gillichthys y-cauda</i> . |
| 4. <i>Menidia clara</i> . | 15. <i>Gillichthys guaymasis</i> . |
| 5. <i>Menidia sardina</i> . | 16. <i>Scorpena sonora</i> . |
| 6. <i>Atherinops regis</i> . | 17. <i>Gnathypops scope</i> . |
| 7. <i>Centropomus grandoculatus</i> . | 18. <i>Opisthognathus ommata</i> . |
| 8. <i>Mycteroperca jordani</i> . | 19. <i>Anchenopterus asper</i> . |
| 9. <i>Hermosilla azurea</i> . | 20. <i>Pædnoblennius hypacanthus</i> . |
| 10. <i>Upeneus rathbuni</i> . | 21. <i>Citharichthys gilberti</i> . |
| 11. <i>Pseudojulis venustus</i> . | |

One of these species, *Gillichthys y-cauda*, has since been reported from San Diego by Dr. Gilbert, in the Proceedings of the U. S. National Museum, vol. XII, 363; while another species, *Synodus jenkinsi*, has been obtained off the coast of Colombia, from which specimens it was described by Dr. Jordan and Mr. Bollman in the Proceedings of the U. S. National Museum for 1889, p. 153.

The following genera and species have not been reported before from any point south of San Diego, California, or Cerros Island:

1. *Hemiramphus rosea*. (San Diego Bay.)
2. *Xenistius californiensis*. (San Diego; Cerros Island.)
3. *Isesthes gilberti*. (Santa Barbara and San Diego, California.)

The following forty-six species have already been recorded from the faunal area embracing the Gulf of California north of Mazatlan:

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| 1. <i>Sphyrna zygaena</i> . | 24. <i>Pomadasis axillaris</i> . |
| 2. <i>Rhinobatus glaucostigma</i> . | 25. <i>Hamulon maculicauda</i> . |
| 3. <i>Albula vulpes</i> . | 26. <i>Hamulon flavignittatum</i> . |
| 4. <i>Elops saurus</i> . | 27. <i>Hamulon schranki</i> . |
| 5. <i>Stolephorus opercularis</i> . | 28. <i>Hamulon sexfasciatum</i> . |
| 6. <i>Hemiramphus unifasciatus</i> . | 29. <i>Calamus brachysomus</i> . |
| 7. <i>Hippocampus ingens</i> . | 30. <i>Girella nigricans</i> . |
| 8. <i>Fistularia depressa</i> . | 31. <i>Kyphosus analogus</i> . |
| 9. <i>Mugil cephalus</i> . | 32. <i>Upeneus dentatus</i> . |
| 10. <i>Mugil curema</i> . | 33. <i>Umbriua xanti</i> . |
| 11. <i>Sphyrna argentea</i> . | 34. <i>Cyanoceion parvipinnis</i> . |
| 12. <i>Polydaetylus approximans</i> . | 35. <i>Gerres gracilis</i> . |
| 13. <i>Scomber colias</i> . | 36. <i>Harpe diplotenia</i> . |
| 14. <i>Trachurops ermenophthalmus</i> . | 37. <i>Glyphisodon saxatilis</i> . |
| 15. <i>Caraux caballus</i> . | 38. <i>Chatodipterus zonatus</i> . |
| 16. <i>Selene vomer</i> . | 39. <i>Gobius sagittula</i> . |
| 17. <i>Trachynotus fasciatus</i> . | 40. <i>Gillichthys mirabilis</i> . |
| 18. <i>Nematistius pectoralis</i> . | 41. <i>Gobiosoma histrio</i> . |
| 19. <i>Diplectrum radiale</i> . | 42. <i>Porichthys margaritatus</i> . |
| 20. <i>Serranus maculato-fasciatus</i> . | 43. <i>Labrosomus xanti</i> . |
| 21. <i>Hoplopogon güntheri</i> . | 44. <i>Paralichthys adspersus</i> . |
| 22. <i>Lutjanus novemfasciatus</i> . | 45. <i>Balistes polylepis</i> . |
| 23. <i>Orthopristis inornatus</i> . | 46. <i>Spheroides politus</i> . |

The following forty-one species have not hitherto been reported from any point north of Mazatlan:

1. *Galeus lanulatus*. Mazatlan.
2. *Galeus dorsalis*. Mazatlan; Panama.
3. *Eulamia fronto*. Mazatlan.
4. *Scoriodon longurio*. Mazatlan; Panama.
5. *Sphyrna tudes*. Mazatlan.
6. *Urolophus nebulosus*. Colima.
7. *Dasyatis longus*. Mazatlan; Acapulco; Panama.
8. *Tachysurus platypogon*. Mazatlan and southward.
9. *Chanos chanos*. Mazatlan; Chiapas.
10. *Opisthonema libertatis*. Mazatlan; Libertad; Panama.
11. *Stolephorus macrolepidotus*. Mazatlan and southward.
12. *Synodus jenkinsi*. Off the coast of Colombia.
13. *Gymnothorax funebris*. Mazatlan.

14. *Tylosurus stoltzmanni*. Mazatlan ; Panama.
15. *Scomberomorus maculatus*.
16. *Caranx latus*. Mazatlan ; Panama.
17. *Caranx hippos*. Mazatlan ; Panama.
18. *Caranx speciosus*. Mazatlan ; Panama.
19. *Chloroscombrus orqueta*. Mazatlan ; Panama.
20. *Oligoplites altus*. Mazatlan ; Panama.
21. *Oligoplites saurus*. Mazatlan ; Panama.
22. *Centropomus undecimalis*. Mazatlan ; Panama.
23. *Promierops guttatus*. Mazatlan ; Panama.
24. *Epinephelus analogus*. Mazatlan ; Acapulco ; La Union ; Panama.
25. *Lobotes surinamensis*. Punta Arenas ; Panama.
26. *Lutjanus argentiventris*. Mazatlan ; Panama.
27. *Lutjanus guttatus*. Mazatlan ; Panama.
28. *Lutjanus colorado*. Mazatlan ; Panama.
29. *Orthopristis chalcens*. Mazatlan ; Panama.
30. *Pomadasis elongatus*. Mazatlan and southward.
31. *Pomadasis macracanthus*. Mazatlan ; Punta Arenas ; Chiapam ; Panama.
32. *Kyphosus elegans*. Mazatlan.
33. *Upeneus grandisquamis*. Mazatlan ; Panama.
34. *Bairdiella icistia*. Mazatlan.
35. *Micropogon ectenes*. Mazatlan.
36. *Gerres lineatus*. Mazatlan ; Acapulco ; San Blas ; Chiapam.
37. *Chaetodon humeralis*. Mazatlan ; Colima ; Panama ; Sandwich Islands ?
38. *Pomacanthus zonipectus*. Mazatlan ; San Salvador ; Panama.
39. *Scorpena plumieri*. Mazatlan ; Panama.
40. *Isesthes striatus*. Panama.
41. *Achirus mazatlanus*. Mazatlan.

The following twenty-four species are now known from both the Atlantic and Pacific coasts of North America:

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| 1. <i>Sphyrna tudes</i> . | 13. <i>Caranx hippos</i> . |
| 2. <i>Sphyrna zygaena</i> . | 14. <i>Selene vomer</i> . |
| 3. <i>Albula vulpes</i> . | 15. <i>Oligoplites saurus</i> . |
| 4. <i>Elops saurus</i> . | 16. <i>Centropomus undecimalis</i> . |
| 5. <i>Hemiramphus unifasciatus</i> . | 17. <i>Diplectrum radiale</i> . |
| 6. <i>Mugil cephalus</i> . | 18. <i>Promierops guttatus</i> . |
| 7. <i>Mugil enrema</i> . | 19. <i>Lobotes surinamensis</i> . |
| 8. <i>Scomber colias</i> . | 20. <i>Hæmulon schranki</i> . |
| 9. <i>Scomberomorus maculatus</i> . | 21. <i>Gerres gracilis</i> . |
| 10. <i>Trachinops ermenophthalmus</i> . | 22. <i>Glyphisodon saxatilis</i> . |
| 11. <i>Caranx caballus</i> . | 23. <i>Scorpena plumieri</i> . |
| 12. <i>Caranx latus</i> . | 24. <i>Gymnothorax funebris</i> . |

1. *Galeus lunulatus* (Jordan & Gilbert).

Mustelus lunulatus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 108. (*Mazatlan*).

Jordan and Gilbert, Bull. U. S. Fish Comm. 1882, 105. (Name only. *Mazatlan*).

Galeus lunulatus Jordan, Proc. U. S. Nat. Mus. 1885, 363. (Name only). Jordan, Cat. Fishes N. A., 1885, 6.

We obtained but one specimen of this shark, 20 inches in length. It does not appear to be at all frequent in the bay, as it was not known to the local fishermen.

2. *Galeus dorsalis* (Gill).

Mustelus dorsalis Gill, Proc. Acad. Nat. Sci. Phila. 1864, 149. (*Panama*). Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 103. (*Panama*).

Galeus dorsalis, Jordan, Proc. U. S. Nat. Mus. 1885, 363. (Name only).

A half dozen fetuses of this species were sent to us by Mr. Theodore Canevet after we had left Guaymas.

Measurements of two specimens (Nos. 190, a ♂, and 191, a ♀) give the following results:

| | 190, ♂ | 191, ♀ |
|---|-----------|-----------|
| | mm. | mm. |
| Total length | 182 | 184 |
| Distance from snout to origin of first dorsal | 58 | 60 |
| Distance between dorsals | 35 | 38 |
| Length of first dorsal | 17 | 18 |
| Height of first dorsal | 21 | 18 |
| Length of pectoral | 19 | 21 |
| Length of second dorsal | 16 | 13 |
| Height of second dorsal | 13 | 14 |
| Length of snout | 16 | 17 |
| Tip of snout to mouth | 16 | 14 |
| Tip of snout to nostril | 11 | 11 |
| Distance between nostrils | 5 | --- |
| Width of mouth | 11 | 10 |
| Interorbital space | 11 | 10 |
| Greatest width of head | 20 | 19 |
| Depth of head | 8 | 9 |
| Length of ventral fin | 12 | 10 |
| Length of claspers (free part) | 5 | --- |
| Diameter of eye | 8 | 7 |

The head is relatively quite broad but flattened vertically, the snout rather long and tapering, while the body is long and very slender, tapering gradually to the tail. The shagreen is more or less developed over the entire body but is most pronounced on the head and along the median dorsal line; it is also well developed upon the pectoral fins but less so on the others.

3. *Eulamia fronto* (Jordan & Gilbert).*Tiburou.*

Carcharias fronto Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 102. (*Mazatlan*.); Bull. U. S. Fish Comm. 1882, 105. (Name only. *Mazatlan*.)

Carcharhinus fronto, Jordan, Proc. U. S. Nat. Mus. 1885, 363. (Name only.) *Ibid.*, Cat. Fishes N. A., 1885, 7.

One specimen, 28 inches long, was taken by us. This shark is very common in the Bay of Guaymas, where large specimens are frequently taken with the hook. It often seriously interferes with hook and line fishing by stealing the catch before it can be gotten out of the water by the fisherman.

4. *Scoliodon longurio* Jordan & Gilbert.*Tiburon.*

Carcharias longurio Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 106. (*Mazatlan.*)
Scoliodon longurio, Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 105. (*Mazatlan.*
 Name only.)

Carcharhinus longurio, Jordan, Proc. U. S. Nat. Mus. 1885, 363. (Name only.)
 Jordan, Cat. Fishes N. A., 1885, 8.

Two specimens, 17 and 18 inches long respectively, were taken.

5. *Rhinoptera steindachneri* sp. nov.

(Type No. 43235, U. S. N. M.)

Gabilan.

(Plate 1.)

Width of disk 1.8 times its length; anterior border nearly straight from spiracle for about two-thirds its length; thence to the tip slightly convex, thus giving the fin the outline of a wing; posterior border strongly concave in its outer half, nearly straight along its inner half. Length of anterior margin of pectoral not quite equal to the length of the disk, but about equal to that of the posterior border; inner border of pectoral more than half interorbital space; greatest width of ventral fins equals half the interorbital width, while its length is nine-tenths of the same.

Tail very slender, its length greater than that of the disk ($1\frac{1}{3}$ times length of disk in one specimen, while in the other it but slightly exceeds the disk).

Muzzle emarginate; interorbital space concave, its width equal to the distance between the spiracles, or the greatest depth of the body. The cephalic fin is a little broader than the head, and the length of the free portion is contained more than twice in the interorbital width.

Height of the dorsal fin $1\frac{1}{6}$ times its length. In one specimen there are two stout, strongly serrated spines near the base of the tail, these lying very close together, while in the other specimen there is but one spine; these spines are about equal in size, the length of the free portion being about $2\frac{1}{2}$ times that of eye.

Skin everywhere smooth.

Nasal valves confluent into a broad flap with a free margin which, together with the upper side, is covered with papillae.

Teeth in the lower jaw in seven series; seven teeth developed in the median, and six in each of the other, series. The teeth of the median series are hexagonal in shape, the length being three-elevenths of the breadth, which is nearly twice the breadth of a tooth of the second series; the teeth of the second series hexagonal, the length being seven-twelfths of the width, which is again nearly twice the width of those of the next series; in the next series the teeth are diamond-shaped, the length $1\frac{2}{5}$ times the breadth; those of the last (outer) series triangular, the length being about twice the breadth.

The teeth of the upper jaw very similar to those of the lower.

Color: Above, uniform dark brown all over, a little paler on head; below, creamy white, except outer third of pectorals, which are darker.

This very interesting species was frequently seen by us at various places in the bay of Guaymas. It has the habit of jumping some distance out of the water at irregular intervals, and at such times presents a very striking appearance.

None of the teeth are worn, except those of the first three transverse series.

It is known to the local fishermen as the *Gabilan*.

Two specimens were obtained by us, the measurements of which we here give in millimetres:

| Numbers on specimens | 64 | 65 |
|--|-----|-----|
| Length of disk to origin of dorsal fin | 390 | 386 |
| Width of disk | 710 | 700 |
| Length of tail | 410 | 520 |
| Length of ventral fins | 80 | 90 |
| Greatest width of ventral fins | 50 | 55 |
| Greatest depth of body | 95 | 93 |
| Depth of head measured over the jaws | 65 | 73 |
| Width of interorbital space | 98 | 107 |
| Width between spiracles | 98 | 107 |
| Length of anterior margin of pectoral | 380 | 347 |
| Length of posterior margin of pectoral | 360 | 360 |
| Length of inner margin of pectoral | 55 | 55 |
| Length of free portion of caudal spine | 34 | 32 |
| Longitudinal diameter of spiracle | 27 | 25 |
| Vertical diameter of spiracle | 20 | 20 |
| Diameter of eye | 14 | 13 |
| Distance from eye to spiracle | 20 | 25 |
| Length of free portion of cephalic fin | 45 | 45 |
| Depth of notch in cephalic fin | 18 | 18 |
| Width of mouth | 60 | 60 |
| Distance of mouth from notch in cephalic fin | 70 | 65 |
| Distance from mouth to vent | | 290 |

We take great pleasure in naming this interesting species for Dr. Franz Steindachner of Vienna, in recognition of his valuable services to American ichthyology.

6. *Sphyrna tudes* (Cuvier).

Zygæna tudes Cuvier, Règne Animal. Günther, Cat. Fishes, VIII, 382, 1870.

Sphyrna tudes, Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 105. (Name only; *Mazatlan*). Jordan, Proc. U. S. Nat. Mus. 1885, 364. (Name only.) Jordan, Cat. Fishes N. A., 1885, 9.

The collection contains but one specimen of this species twenty inches in length.

7. *Sphyrna zygaena* (L.).

Squalus zygaena Linnaeus, Systema Naturæ, 1753, x, 399.

Sphyrna zygaena, Jordan, Proc. U. S. Nat. Mus. 1885, 364 (*Mazatlan*; *Panama*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 32 (*San Diego, California*).

One specimen 2½ feet long.

8. *Rhinobatus glaucostigma* Jordan & Gilbert.

Rhinobatus glaucostigma Jordan & Gilbert, Proc. U. S. Nat. Mus. 1883, 210 (*Mazatlan*); Jordan, Proc. U. S. Nat. Mus. 1885, 364 (name only); Jordan, Cat. Fishes N. A., 1885, 10.

Rhinobatus productus, Streets, Bull. U. S. Nat. Mus. 1877, vii, 55 (*San Bartholome Bay, Lower California*).

Rhinobatus leucorhynchus, Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 105 (name only. *Mazatlan*).

One specimen 20 inches long.

9. *Urolophus nebulosus* Garman.

Raya.

Urolophus nebulosus Garman, Proc. U. S. Nat. Mus. 1885, 41 (*Colima, Mexico*).

This species, represented in the collection by eighteen specimens, scarcely differs from *Urolophus halleri* Cooper, except that the upper parts are light brown with small scattered inkish spots. These spots are most evident in the fœtuses in which they are placed regularly in a row around the pectorals, this regularity disappearing with age. In the younger fœtuses the skin of the upper margin of the spiracles is prolonged in a lanceolate flap as long as the eye; this character disappears at an early age.

Of the eighteen specimens secured by us fourteen were fœtuses, seven each from numbers 1 and 2 of the following table:

| | 1 | 2 | 3 | 4 |
|---|------------|------------|------------|------------|
| | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> |
| Length of disk..... | 215 | 190 | 200 | 200 |
| Width of disk..... | 200 | 243 | 185 | 195 |
| Length of tail from base of ventrals..... | 133 | 138 | 133 | 133 |

Three fœtuses give the following measurements:

| | 1 | 2 | 3 |
|-------------------------|----|----|----|
| Length of disk..... | 73 | 85 | 57 |
| Width of disk..... | 79 | 89 | 54 |
| Length of tail..... | 60 | 66 | 50 |
| Interorbital space..... | 10 | 12 | 9 |
| Snout to eye..... | 20 | 22 | 13 |

10. *Dasyatis longus* Garman.

Raya.

Dasibatis longa Garman, Bull. Mus. Comp. Zoöl. 1880, vi, 170 (*Acapulco; Panama*); Jordan & Gilbert, Synopsis, 1882, 66.

Dasybatis longus, Jordan, Proc. U. S. Nat. Mus. 1885, 364 (*Mazatlan*).

Four specimens of this species, and a pair of jaws of another specimen too large to preserve, are in the collection. The measurements are as follows:

| | 1 | 2 | 3 | 4 |
|---------------------|----------------|----------------|----------------|----------------|
| | <i>Inches.</i> | <i>Inches.</i> | <i>Inches.</i> | <i>Inches.</i> |
| Length of disk..... | 11.25 | 8.25 | 7.50 | 7.75 |
| Width of disk..... | 12.00 | 9.00 | 8.25 | 8.25 |
| Length of tail..... | 12 + | 12.00 | 11.00 | 11.50 |

In specimen No. 1 the tail is broken off, but it was probably not much over 12 inches in length. Mr. Garman, in his description, makes the tail of this species more than twice the length of the disk, which is far from the case in our specimens.

Our specimens indicate that the asperities on the younger specimens appear earlier on the back than on the shoulder girdles.

This record extends the range of this species north from Mazatlan.

11. *Tachysurus platypogon* Günther.

Bagre.

Arens platypogon Günther, Cat. Fishes Brit. Mus. v, 147, 1864. (*San José, Guatemala*); Steindachner, Ichthyol. Beiträge iv, 17, 1875; Jordan, Bull. U. S. Fish Comm. 1882, 44 (*Mazatlan; Libertad; Punta Arenas; Panama*).

Six specimens were obtained, the largest having a total length of 17 inches.

A good description is given by each of the naturalists referred to in the above synonymy.

12. *Albula vulpes* L.

Sabalo.

Albula vulpes, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 457 (*Monterey Bay; San Diego*); *ibid.*, 1881, 37 and 278 (*San Diego Bay; Pequina Bay, Lower Calif.*); *ibid.*, 1882, 622 (*Panama*).

Numerous specimens of this common and widely distributed fish were obtained. It is one of the most common species here.

13. *Elops saurus* L.

Sabalo.

Elops saurus Linnæus, Syst. Naturæ: Günther, Cat. Fishes, 1868, vii, 470. *Elops saurus*, Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 105 and 109 (*Mazatlan; Panama*); *ibid.*, Proc. U. S. Nat. Mus. 1882, 353 and 622 (*Cape San Lucas; Panama*); *ibid.*, 1885, 368 (*Mazatlan; Panama*); Jordan, Cat. Fishes, 1885, 34.

This, like the preceding, is a common fish at Guaymas, and is known by the same name, *Sabalo*, to the local fishermen. Of a half-dozen specimens brought home by us, the longest measures 17 inches in total length.

14. *Chanos chanos* (Forskäl).

Sabalo.

Mugil chanos Forskäl, Deser. Anim., 74; *Chanos chanos*, Jordan, Proc. U. S. Nat. Mus. 1885, 368 (*Mazatlan*).

Six individuals of this East Indian species were obtained. It appears to be common at Guaymas.

15. *Opisthonema libertatis* (Günther).

Sardina.

Meletta libertatis Günther, Proc. Zoöl. Soc. London 1866, 603 (*Libertad*).*Clupea libertatis* Günther, Cat. Fishes, 1868, VII, 433.*Opisthonema libertate*, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 622 (*Panama*);
Jordan, Proc. U. S. Nat. Mus. 1885, 366 (*Mazatlan*; *Panama*).

This species is very abundant at Guaymas, many specimens being obtained, the largest measuring $8\frac{1}{2}$ inches in total length.

The general color is the same as in *O. oglinum*, the humeral spot is very plain. This species is, however, more elongate, the depth being contained 3 times in the length; the head is larger and less deep, and is contained $3\frac{5}{8}$ instead of $4\frac{1}{4}$ in length.

16. *Stolephorus macrolepidotus* (Kner & Steind.).

Sardina bocona.

Engraulis macrolepidotus Kner & Steindachner, Abhandl. Bayer, Akad. Wiss., X, 1864, 21, Pl. III, Fig. 2 (*Rio Bayano*; *Panama*); Günther, Cat. Fishes, 1868, VII, 385.*Stolephorus macrolepidotus*, Jordan, Cat. Fishes, 1885, 37; *ibid.*, Proc. U. S. Nat. Mus. 1885, 367 (*Mazatlan*; *Panama*).

Very abundant. Great numbers of this species, together with many of *Opisthonema libertatis*, died in the summer of 1887, and their dead and decaying bodies, washed up along the shore, rendered a summer residence at Guaymas almost unendurable.

17. *Stolephorus opercularis* Jordan & Gilbert.*Stolephorus opercularis* Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 275 (*Punta San Felipe, Gulf of California*); Jordan, Cat. Fishes, 1885, 37; Jordan, Proc. U. S. Nat. Mus. 1885, 367 (*Gulf of California*).

Less common. Scales 39; anal rays 24; depth $3\frac{3}{4}$. Body more elongate than in *S. macrolepidotus*, the head much longer, bones less obliquely placed—this greater length showing itself in the greater length of the opercles and the greater basal width of the triangle of the cheeks. Body much less compressed and shorter.

18. *Synodus Jenkinsi* Jordan & Bollman.*Synodus jenkinsi* Jordan & Bollman, Proc. U. S. Nat. Mus. 1889, 153 (*Off coast of Colombia*).

Of this recently described species we obtained two specimens, 72 and 260 millimetres in length respectively.

19. *Gymnothorax funebris* (Ranzani).*Sidera castanea* Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 647 (*Mazatlan*); *ibid.*, 1883, 210; Jordan, Cat. Fishes North Am., 1885, 51; Jordan, Proc. U. S. Nat. Mus. 1885, 369 (*Mazatlan*).

Three specimens, the largest 38 inches long. The dorsal is very faintly edged with black.

We are informed by Dr. Jordan that *Sidera castanea* can not be distinguished from the common *Gymnothorax funebris* of the West Indian fauna.

20. Tylosurus Stoltzmanni (Steind.).

Belone stoltzmanni Steindachner, Ichthyol. Beiträge VII, 1878, 21.

Tylosurus sierrita Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 458 (*Mazatlan*).

Tylosurus stoltzmanni, Jordan, Cat. Fishes N. A., 1885, 59; Jordan, Proc. U. S. Nat. Mus. 1885, 370 (*Mazatlan*; *Panama*).

One specimen 28 inches long.

21. Hemiramphus unifasciatus Ranzani.

Hemiramphus unifasciatus Ranzani, Comm. Inst. Bon., 1842, v, 326, Tab. 25; Jordan & Gilbert, Synopsis, 1882, 376; *ibid.*, Proc. U. S. Nat. Mus. 1882, 356 (*Cape San Lucas*); Jordan, Cat. Fishes N. A., 1885, 60.

Apparently not common, but one specimen having been obtained. Valued here as a food fish.

22. Hemiramphus rosæ Jordan & Gilbert.

Hemiramphus rosæ Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 335 (*San Diego Bay*). Jordan & Gilbert, Synopsis, 1882, 376. Jordan, Cat. Fish. N. A., 1885, 60.

Very common in the bay at Guaymas. The largest individual obtained measures 136 millimetres in total length, and 111 millimetres without the beak.

23. Siphostoma arctum Jenkins & Evermann.

Siphostoma arctum Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 137 (*Guaymas*).

But one specimen 9 centimetres long was obtained.

24. Hippocampus ingens Girard.

Hippocampus ingens Girard, U. S. Pacific R. R. Survey, Fishes, 1858, 342 (*San Diego Bay*). Jordan & Gilbert, Synopsis Fish. N. A., 1882, 386. Jordan, Cat. Fish. N. A., 1885, 62.

Four specimens were obtained. Apparently it is quite rare, as even small specimens bring high prices as *curios*.

25. Fistularia depressa Günther.

Agujon.

Fistularia depressa Günther, Shore Fishes, Challenger Exp., 1830, 69, Pl. XXXII, fig. D (*Lower California*). Jordan & Gilbert, Bull. U. S. Fish. Comm. 1882, 106 (name only) (*Mazatlan*). *Ibid.*, 109 (name only) (*Panama*). Jordan, Proc. U. S. Nat. Mus. 1885, 371 (*Mazatlan*). Jordan, Cat. Fish. N. A., 1885, 63 (name only).

Represented in the collection by five specimens, each from 25 to 30 inches in length. One specimen measures as follows:

| | Millimeters. |
|------------------------------------|--------------|
| Total length | 735 |
| Length to base of caudal..... | 635 |
| Length of caudal filament..... | 102 |
| Snout to origin of dorsal | 521 |
| Snout to origin of anal..... | 514 |
| Snout to origin of pectorals | 235 |

| | Millimeter. |
|-----------------------------------|-------------|
| Snout to origin of ventrals | 316 |
| Depth of body at dorsal..... | 13 |
| Width of body at dorsal..... | 18 |
| Width of interorbital space..... | 10 |
| Length of cleft of mouth | 13 |

Head in length, $2\frac{7}{9}$; eye in snout, 8; eye in head, 11.

In some specimens the two principal ridges diverge toward the end of the snout and then again converge as described by Günther in the Shore Fishes of the Challenger Expedition.

26. *Mugil cephalus* L.

Liza.

To the synonymy of this species given by Jordan and Swain in the Proc. U. S. Nat. Mus. 1884, 263, the following may now be added :

Mugil cephalus, Jordan, Cat. Fishes N. A., 1885, 64; Jordan, Proc. U. S. Nat. Mus. 1885, 371.

Rather common, but only small specimens were obtained.

27. *Mugil curema* Cuv. & Val.

Liza.

To the synonymy of this species given by Jordan and Swain in Proc. U. S. Nat. Mus. 1884, 268, may be added :

Mugil curema, Jordan, Proc. Nat. Mus. 1885, 371 (*Mazatlan; Panama*). Jordan, Cat. Fish N. A., 1885, 64.

Mugil brasiliensis of most authors, but not of Agassiz, nor of Jordan and Swain.

This is a very common fish in the Bay of Guaymas, and is highly prized as food.

28. *Menidia clara* sp. nov.

(Type, No. 43237, U. S. N. M.)

Head, $4\frac{1}{5}$ ($4\frac{4}{5}$); depth, $6\frac{3}{10}$ ($7\frac{1}{5}$); eye, 3; D. V, 1-9; A. 25; scales 56, 11 in transverse series.

Body slender, general form that of *M. sardina*; eye large, equals width of interorbital space; distance between dorsal fins less than that from tip of snout to posterior rim of orbit. Origin of first dorsal nearer tip of caudal than snout; pectorals three-fourths length of head. Scales small and persistent.

General color that of *M. sardina*, the lateral band plumbeous above and silvery below.

Allied to *M. sardina* Jenkins and Evermann, from which it may be readily distinguished by the greater number of scales in longitudinal series.

One specimen, 72 millimetres long.

29. *Menidia sardina* Jenkins & Evermann.

Peje Reje of the fishermen.

Atherina sardina Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 137 (*Guaymas*).

Known from three specimens (No. 39633, U. S. National Museum).

30. *Atherinops regis* Jenkins & Evermann.*Pez del Rey.**Atherinops regis* Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 138 (*Guaymas*).

A common species.

31. *Sphyræna argentea* Girard.*Agujon.**Sphyræna argentea* Girard, Proc. Acad. Nat. Sci. Phila. 1854, 144. Girard, Pac. R. R. Survey, Zoöl., Fishes, 39, Pl. 14, 1859.*Sphyræna lucasana* Gill, Proc. Acad. Nat. Sci. Phila. 1863, 86.*Sphyræna argentea*, Steindachner, Ichthy. Beitr. VII, 1, 1878. Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 456 (*San Francisco; Santa Barbara Islands; Monterey*). Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 44 (*San Francisco; Monterey; Santa Barbara*). Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 358 (*Cape San Lucas*). Rosa Smith, Proc. U. S. Nat. Mus. 1883, 234 (*Todos Santos Bay, Lower California*). Jordan, Proc. U. S. Nat. Mus. 1885, 372 (name only). Jordan, Cat. Fishes N. A., 65, 1885.

Five specimens were taken. It is fairly abundant and is in much esteem as a food fish.

32. *Polydactylus approximans* Lay & Bennett.*Raton.**Polynemus approximans* Lay & Bennett, Beechey's Voyage to the Pacific, Zoölogy, 57.*Trichidion approximans*, Gill, Proc. Acad. Nat. Sci. Phila. 1862, 258.*Polynemus approximans*, Günther, Fishes Central America, 1869, 423. Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 365 (*Cape San Lucas*). Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 376 (*Panama*). Jordan, Proc. U. S. Nat. Mus. 1885, 372 (*Mazatlan; Panama*). Jordan, Cat. Fishes N. A., 1885, 66.

Six specimens were obtained.

33. *Scomber colias* Gmelin.Apparently not common, as but two specimens were secured. Head, $7\frac{3}{4}$ (8); depth, $11\frac{1}{2}$ (12); eye in head, $4\frac{1}{4}$; eye in snout, $1\frac{1}{3}$.34. *Scomberomorus maculatus* (Mitchill).*Pez Sierra.*

The Spanish mackerel is common at Guaymas, and there, as elsewhere, is an important food fish.

35. *Trachurops crumenophthalmus* (Bloch).*Mojara.**Trachurops brachychirus* Gill, Proc. Acad. Nat. Sci. Phila. 1862, 261 (*Cape San Lucas*). *Caranx crumenophthalmus*, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 358. (Two specimens from Cape San Lucas, types of *Trachurops brachychirus* Gill.)Two specimens, one of which measures 300 millimetres in total length, 245 millimetres to base of caudal, 265 millimetres to end of middle caudal rays; head, $3\frac{1}{5}$ (4); depth, $3\frac{1}{2}$ ($4\frac{1}{5}$); eye in head, $4\frac{2}{3}$, in snout, $1\frac{1}{5}$.

36. *Caranx caballus* Günther.

Caranx caballus Günther, Trans. Zool. Soc. London 1869, 431. Jordan, Proc. U. S. Nat. Mus. 1885, 374 (*Mazatlan; Panama*).

Sentes about 37. This species is difficult to distinguish from *C. chrysos* (Mitchill), of which it would perhaps better be regarded as a variety.

A full description is given by Jordan and Gilbert in the "Synopsis," and full synonymy may be found in Proc. U. S. National Museum for 1883, 199.

37. *Caranx latus* Agassiz.

Caranx latus Agassiz, Pisc. Bras., 1829, 105.

Caranx hippos, Günther, 11, 449, 1860.

For full synonymy of this species, see Jordan and Gilbert, Proc. U. S. National Museum 1883, 200.

One specimen was preserved. The species is quite common and is an important food fish.

38. *Caranx hippos* (Linnæus).

Curel.

For full synonymy of this and the following species, see Jordan and Gilbert, Proc. U. S. National Museum 1883, 200-201.

A common fish. Four specimens were taken.

39. *Caranx speciosus* (Forskål).

Palometa.

Four specimens were obtained of this rather common fish.

40. *Selene vomer* (L.).

This is a very common fish at Guaymas. Measurements of seventeen individuals are given in the following table:

| Specimen. | Distance from snout to dorsal curvature. | Total length. | Length to base of caudal. | Greatest depth. | Head in length. | Eye in snout. | Specimen. | Distance from snout to dorsal curvature. | Total length. | Length to base of caudal. | Greatest depth. | Head in length. | Eye in snout. |
|-----------|--|---------------|---------------------------|-----------------|-----------------|---------------|-----------|--|---------------|---------------------------|-----------------|-----------------|---------------|
| | mm. | mm. | mm. | mm. | | | | mm. | mm. | mm. | mm. | | |
| 1 | 73 | 188 | 137 | 92 | 23 | 31 | 10 | 58 | 138 | 113 | 73 | 23 | 3 |
| 2 | 53 | 128 | 103 | 70 | 23 | 3 | 11 | 58 | 140 | 116 | 76 | 23 | 3 |
| 3 | 53 | 131 | 109 | 73 | 23 | 3 | 12 | 60 | 135 | 113 | 76 | 23 | 3 |
| 4 | 53 | 134 | 109 | 73 | 23 | 3 | 13 | 51 | 128 | 103 | 66 | 23 | 3 |
| 5 | 58 | 134 | 109 | 73 | 23 | 3 | 14 | 53 | 140 | 113 | 73 | 23 | 3 |
| 6 | 60 | 140 | 122 | 76 | 23 | 3 | 15 | 58 | 140 | 107 | 73 | 23 | 3 |
| 7 | 60 | 140 | 119 | 76 | 23 | 3 | 16 | 64 | 153 | 122 | 83 | 23 | 3 |
| 8 | 58 | 139 | 115 | 76 | 23 | 3 | 17 | 38 | 81 | 73 | 51 | 23 | 3 |
| 9 | 51 | 131 | 100 | 66 | 23 | 3 | | | | | | | |

41. *Chloroscombrus orqueta* Jordan & Gilbert.*Curel de Castilla.**Chloroscombrus orqueta* Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 646 (*Panama*).*Chloroscombrus chrysurus* Jordan, Proc. U. S. Nat. Mus. 1885, 375 (*Panama*).

One specimen was obtained, which gave the following measurements:

| | Millimetres. | In length to base of caudal. | In head. |
|--|--------------|---------------------------------|-----------------|
| Length to base of caudal | 181 | ..... | ..... |
| Depth of body | 78 | 2 $\frac{3}{4}$ | ..... |
| Head | 45 | 4 | ..... |
| Snout | 13 | ..... | 3 $\frac{1}{2}$ |
| Eye | 13 | ..... | 3 $\frac{1}{2}$ |
| Maxillary | 17 | ..... | 2 $\frac{3}{4}$ |
| Pectoral fin | 70 | 2 $\frac{1}{2}$ | ..... |
| Chord of the curve of the lateral line | 56 | 3 $\frac{3}{5}$ | ..... |

42. *Trachynotus fasciatus* Gill.*Panpanito.*

Trachynotus fasciatus Gill, Proc. Acad. Nat. Sci. Phila. 1863, 86 (*Cape San Lucas*);
Jordan and Gilbert, Proc. U. S. Nat. Mus. 1882, 359 (*Cape San Lucas*); Jordan,
Proc. U. S. Nat. Mus. 1885, 375; Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881,
232 (*Porto Escondido, Mexico*); Günther, Fishes of Central America, 1864, 434
(*San José: Panama*).

Trachynotus glaucoides Günther, Proc. Zoöl. Soc., 1864, 150.

Seven specimens were obtained, three of which give the following measurements:

| | 1 | 2 | 3 |
|--|-----------------|-----------------|-----------------|
| | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> |
| Total length | 158 | 120 | 210 |
| Length to base of caudal | 110 | 85 | 147 |
| Head | 32 | 28 | 39 |
| Depth | 58 | 40 | 77 |
| Length of longest dorsal ray | 48 | 36 | 89 |
| Length of longest anal ray | 45 | 35 | 89 |
| Length of caudal lobe ..... | ..... | 36 | 70 |
| Length of middle caudal rays ..... | ..... | 13 | ..... |
| Length of pectoral rays ..... | ..... | ..... | 32 |
| Distance from snout to procumbent spine ..... | ..... | ..... | 60 |
| Distance from procumbent spine to base of caudal ..... | ..... | ..... | 107 |
| Head in length | 3 $\frac{1}{2}$ | 3 | 3 $\frac{1}{4}$ |
| Depth in length | 2 | 2 $\frac{1}{3}$ | 2 |
| Eye in head | 3 $\frac{1}{4}$ | 3 $\frac{1}{3}$ | 4 |

In the largest specimen (No. 3), the eye is about equal to the length of the snout, while in the others it is a little greater than the snout.

The origin of the anal is midway between the tip of the snout and the base of the caudal.

43. *Nematistius pectoralis* Gill.*Pez de Gallo.*

Nematistius pectoralis Gill, Proc. Acad. Nat. Sci. Phila. 1862, 259 (*Cape San Lucas*); Steindachner, Ichthy. Beitr. iv, 11, 1875 (*Panama and Magdalena Bay*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 277 (*Pichelugo, Lower California*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1885, 375; Jordan, Cat. Fish. N. A., 72.

Great numbers of small specimens of this fish were seen, but no large ones.

Fifty-two specimens were retained.

One of the largest of these gave the following measurements:

| | mm. |
|--------------------------------|-----|
| Total length | 162 |
| Length to base of caudal | 130 |
| Depth | 45 |
| Head | 41 |
| Eye | 10 |
| Snout | 10 |
| Longest dorsal rays | 85 |
| Length of pectoral | 39 |

44. *Oligoplites altus* (Günther).*Curel.*

Chorinemus altus Günther, Fishes of Central America, 1866, 433 (*Panama*).

Oligoplites altus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 374 (*Panama*); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 106 and 110 (*Mazatlan and Panama*); Jordan, Proc. U. S. Nat. Mus. 1885, 375 (*Mazatlan; Panama*); Jordan, Cat. Fish. N. A., 1885, 72.

Head, $3\frac{1}{2}$ (4) to $4\frac{1}{2}$ ($5\frac{1}{3}$); depth, 3 ($3\frac{1}{2}$) to $3\frac{1}{2}$ ($4\frac{1}{3}$); eye in head, $3\frac{2}{5}$ to 4; eye in snout, 1.

This differs chiefly from *O. saurus* in the deeper body and shorter snout. The maxillary reaches beyond the eye. Its length is greater than given by Günther, it being contained $1\frac{2}{3}$ times in the length of the head. Otherwise Günther's description applies very well to our specimens.

Of six specimens in our collection, four present the following measurements:

| | 1 | 2 | 3 | 4 |
|--------------------------------|-----|-----|-----|-----|
| | mm. | mm. | mm. | mm. |
| Total length | 56 | 45 | 107 | 86 |
| Length to base of caudal | 45 | 36 | 90 | 70 |
| Head | 14 | 11 | 20 | 17 |
| Depth | 16 | 13 | 26 | 20 |
| Eye | 4 | 3 | 5 | 5 |
| Snout | 3 | 3 | 6 | 5 |

45. *Oligoplites saurus* Bloch & Schneider.

Scomber saurus Bloch & Schneider, 1801, 32.

Chorinemus occidentalis, Günther, Cat. Fish., II, 1860, 475 (various West Indian localities).

Oligoplites inornatus Gill, Proc. Acad. Nat. Sci. Phila. 1863, 166 (Panama).

Chorinemus inornatus Günther, Fishes of Central America, 1866, 433.

Oligoplites occidentalis, Jordan, Proc. U. S. Nat. Mus. 1880, 18 (East Florida); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 374 (Panama); Jordan & Gilbert, Synopsis, 1882, 447; Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 240 (Pensacola); Goode & Bean, Proc. U. S. Nat. Mus. 1882, 235 (Gulf of Mexico).

Oligoplites saurus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 625 (Panama); Jordan, Cat. Fish. N. A., 1885, 72; Jordan, Proc. U. S. Nat. Mus. 1885, 375 (Panama; Mazatlan).

The one specimen we have is 102 millimetres long, or 88 millimetres to base of caudal fin. The head is contained four times in length to base of caudal; eye, $4\frac{3}{5}$ in head or $1\frac{3}{5}$ in snout. The depth is one-fifth of the total length.

46. *Centropomus undecimalis* (Bloch).

Sciæna undecimalis Bloch, Ichthy., 303, 1801; Vaillant & Bocourt, Miss. Sci. au Mex., IV, 17, 1874.

Centropomus undecimalis, Günther, Cat. Fishes, I, 79, 1859.

Centropomus appendiculatus Poey, Memorias de Cuba, II, 119, 1860; Günther, Fishes Cent. America, 406, 1866.

Centropomus viridis Loekington, Proc. Cal. Acad. Nat. Sci. 1877, 16.

Centropomus undecimalis, Jordan & Gilbert, Synopsis Fishes N. A., 528, 1882; Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 106, 110; *ibid.*, Gilbert, 112 (Punta Arenas); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 241, 625; Goode & Bean, Proc. U. S. Nat. Mus. 1882, 238; Jordan, Proc. U. S. Nat. Mus. 1884, 78; Jordan, Cat. Fishes N. A., 1885, 81; Jordan, Proc. U. S. Nat. Mus. 1885, 376; Jordan, Proc. U. S. Nat. Mus. 1886, 39, 578.

Four specimens were obtained. In one of these the preorbital was distinctly serrated; in others the serration was less distinct, while in one it was hardly perceptible.

D. VIII, 1-9, A. III, 6. Scales 10-73-12.

The measurements of three specimens are given below:

| | 1 | 2 | 3 | | 1 | 2 | 3 |
|--------------------------------|-----|-----|-----|---------------------------|-----|-----|-----|
| | mm. | mm. | mm. | | mm. | mm. | mm. |
| Total length | 210 | 180 | 204 | Maxillary | 27 | 17 | 18 |
| Length to base of caudal | 176 | 156 | 165 | Pectoral fin | 33 | 26 | 30 |
| Depth | 43 | 43 | 41 | Ventral fin | 34 | 29 | 33 |
| Head | 64 | 51 | 61 | Third dorsal spine | 31 | 26 | 27 |
| Eye | 10 | 11 | 10 | Fourth dorsal spine | 29 | 24 | 25 |
| Interorbital space | 8 | 9 | 8 | Second anal spine | 31 | 30 | 30 |
| Preorbital | 4 | 7 | 6 | Third anal spine | 30 | 31 | 28 |
| Snout | 17 | 14 | 16 | | | | |

47. *Centropomus grandoculatus* Jenkins & Evermann.

Robalo.

Centropomus grandoculatus Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 139, (Guaymas).

Not common.

48. *Diplectrum radiale* (Quoy & Gaimard).*Aguavina.*

Serranus radialis Quoy & Gaimard, Voyage Freycinet, 316 (*Rio Janeiro*); Cuvier & Valenciennes, Hist. Natur. des Poiss., II, 243, 1823.

Serranus radialis, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 274 (*Punta San Ignacio, Mexico*); Jordan, Proc. U. S. Nat. Mus. 1885, 376 (*Panama; Mazatlan*).

Centropristis radialis, Günther, Cat. Fishes, 1, 83, 1859 (*Bahia*).

Centropristis ayresi Steindachner, Ichthyol. Notizen VII, 1, Taf. 1, Fig. 1, 1868 (*Santos*).

Centropristis radialis, Steindachner, Ichthyol. Beiträge IV, 6, 1875.

Common; about a dozen specimens are in our collection.

We have compared these with specimens from Havana and Panama, and find that some specimens have six rows of scales on the cheek and no notch in the preopercular margin; others show seven, eight, and ten rows of scales on the cheek and a more or less evident angle in the margin of the preopercle (*radiale*).

All of our specimens are some lighter, and the caudal spot is more pronounced than in the Havana specimen, and are also a little lighter than those from Panama.

Six of our Guaymas specimens measure as follows:

| | 81 | 478 | 479 | 480 | 481 | 482 |
|--|-----|-----|------|-----|------|-----|
| | mm. | mm. | mm. | mm. | mm. | mm. |
| Total length | 225 | 175 | 190 | 60 | 205 | 182 |
| Length to base of caudal..... | 175 | 142 | 150 | 50 | 160 | 144 |
| Depth | 52 | 35 | 40 | 13 | 44 | 39 |
| Head | 63 | 50 | 55 | 16 | 59 | 54 |
| Eye | 13 | 11 | 12 | 6 | 13 | 11 |
| Snout | 15 | 13 | 12 | 5 | 15 | 13 |
| Interorbital space | 12 | 11 | 10 | 3 | 11 | 10 |
| Preorbital | 9 | 6 | 8 | 2 | 9 | 7 |
| Maxillary | 30 | 19 | 25 | 5 | 26 | 24 |
| Pectoral | | 32 | 35 | 12 | 40 | 35 |
| Ventral | | 27 | 28 | 10 | 31 | 28 |
| Ninth dorsal spine..... | | | | | 13 | 13 |
| Tenth dorsal spine..... | | | | | 13 | 13 |
| Head in length to base of caudal | | 2.8 | 2.8 | 3 | 2.7 | 2.7 |
| Depth in length | | 4 | 3.75 | 4 | 3.63 | 3.7 |
| Eye in head | | 4.5 | 4.6 | 2.3 | 4.6 | 5 |
| Eye in snout..... | | 1+ | 1 | 1- | 1+ | 1+ |

49. *Serranus maculato-fasciatus* (Steind.).*Cabrillo Pinto.*

Serranus maculato-fasciatus Steindachner, Ichthyol. Notizen VII, 5, Taf. 2, 1868 (*Mazatlan*); Vaillant & Bocourt, Miss. Sci. au Mex., IV, 72, 1874.

Serranus maculofasciatus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 456 (*San Pedro; San Diego*); Jordan & Jony, Proc. U. S. Nat. Mus. 1881, 12 (*San Diego Bay*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 46 (*San Pedro; San Diego*); Jordan & Gilbert, Synopsis, 1882, 536; Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*); Jordan, Proc. U. S. Nat. Mus. 1885, 376 (*Mazatlan*); Jordan, Cat. Fishes N. A., 1885, 83.

This is an abundant fish in this locality, and is perhaps the most important food fish found here.

Color in life: dirty yellowish white, covered with dark yellowish spots, thickest on the back, these changing to brown in alcohol; belly with few or no spots; tip of lower jaw darker; iris orange; pectoral and anal fins blue. The young have a black lateral band from above the eye straight to the middle of the soft dorsal, another from the eye to the upper base of the caudal fin, and still a third from the pectoral to the lower base of the caudal.

These colors make it a very handsome fish when alive.

The teeth are less developed than in most species of the genus, and the dorsal fin has its last spines much shorter than the first few. These are the characters which Girard used to separate his genus *Paralabrax* from *Serranus*, and if these be of generic importance, this species will, of course, fall in *Paralabrax*. Head $2\frac{2}{3}$; depth $3\frac{1}{2}$; eye in head 5; scales 12-82-20; D. X. 14; A. III, 7.

Measurements (in millimetres) of nine specimens give the following results:

| | 466 | 467 | 468 | 469 | 470 | 471 | 39 | 90 | 835 |
|--|----------------|----------------|----------------|-----------------|-----------------|----------------|----------------|-----------------|----------------|
| Total length..... | 180 | 165 | 148 | 172 | 162 | 160 | 155 | 283 | 212 |
| Length to base of caudal..... | 150 | 140 | 122 | 143 | 135 | 125 | 125 | 233 | 202 |
| Head..... | 56 | 52 | 45 | 53 | 50 | 50 | 50 | 89 | 75 |
| Depth..... | 41 | 40 | 35 | 40 | 35 | 35 | 35 | 65 | 60 |
| Eye..... | 10 | 10 | 10 | 12 | 10 | 10 | 10 | 15 | 14 |
| Snout..... | 18 | 15 | 13 | 15 | 15 | 14 | 15 | 25 | 22 |
| Interorbital..... | 10 | 9 | 8 | 10 | 9 | 8 | 9 | 11 | 13 |
| Preorbital..... | 9 | 7 | 6 | 7 | 7 | 6 | 7 | 15 | 12 |
| Pectoral..... | 30 | 30 | 29 | 32 | 30 | 29 | 30 | 48 | 40 |
| Ventral..... | 30 | 25 | 25 | 29 | 27 | 27 | 25 | 41 | 39 |
| Longest dorsal spine (fourth)..... | 28 | 27 | 24 | 27 | 25 | 25 | 23 | 42 | 44 |
| Longest dorsal ray..... | 18 | 17 | 16 | 20 | 15 | 16 | 20 | 32 | 20 |
| Longest anal spine (third)..... | 11 | 12 | 12 | 14 | 12 | 11 | 14 | 18 | 13 |
| Longest anal ray..... | 23 | 23 | 20 | 22 | 17 | 21 | 22 | 34 | 30 |
| Head in length to base of caudal..... | $2\frac{2}{5}$ | $2\frac{2}{3}$ | $2\frac{2}{3}$ | $2\frac{2}{3}$ | $2\frac{7}{10}$ | $2\frac{1}{2}$ | $2\frac{1}{2}$ | $2\frac{2}{3}$ | $2\frac{2}{3}$ |
| Depth in length to base of caudal..... | $3\frac{3}{4}$ | $3\frac{1}{2}$ | $3\frac{1}{2}$ | $3\frac{1}{3}$ | $3\frac{6}{7}$ | $3\frac{1}{2}$ | $3\frac{1}{2}$ | $3\frac{7}{13}$ | $3\frac{1}{3}$ |
| Eye in head..... | $5\frac{3}{8}$ | $5\frac{1}{6}$ | $4\frac{1}{2}$ | $4\frac{5}{12}$ | 5 | 5 | 5 | 6 | $5\frac{1}{3}$ |

50. *Promicrops guttatus* (L.).

Merito of the fishermen.

One small specimen 116 millimetres long. Head $2\frac{1}{2}$ (3); depth $5\frac{5}{7}$ ($3\frac{1}{3}$); eye in head 5—equal to snout. D. XI, 15; A. III, 7; scales about 85.

All of the Pacific coast references to *P. itaiara* mean this species.

51. *Mycteroperca jordani* Jenkins & Evermann.

Baya.

(Plate I.)

Epinephelus jordani Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 140 (*Guaymas*).

Rather common. This interesting and valuable food fish is known as *Baya* by the local fishermen.

If *Mycteroperca* and *Epinephelus* are to be separated, as they perhaps should be, this species belongs in the first.

52. *Epinephelus analogus* Gill.

Pintitas.

For full synonymy *vide* Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 393.

One small specimen, 142 millimetres long.

53. *Lobotes surinamensis* (Bloch & Schneider).

Viejo.

Holocentrus surinamensis Bloch & Schneider, Systema Ichthyologia, 1801, 316 (*Surinam*).
Lobotes surinamensis, Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 110 (*Panama*):
 Gilbert, 112 (*Punta Arenas*); Jordan, Proc. U. S. Nat. Mus. 1885, 378 (*Panama*).

We secured but one small specimen, 115 millimetres in total length. This we have compared with a specimen of nearly the same size from Charleston, South Carolina, in Dr. Jordan's collection. In ours the preopercular spines are more numerous and very much smaller, the base of the anal fin is longer, the depth of the body is not so great, and the profile is steeper. The eye is longer than the snout, and the color is much darker than in the Charleston specimen. D. XI, 16; A. III, 11; scales 10-44-17.

54. *Xenistius californiensis* (Steindachner).

Roncador.

Xenichthys californiensis Steindachner, Ichthyol. Beiträge III, 3, 1875 (*San Diego*); Sitzber. Ak. Wiss. Munich, LXXII, 1875; Streets, Bull. U. S. Nat. Mus. VII, 49, 1877 (*Cerros Island*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 47 (name only); *ibid.*, 278 (*Cerros Island*); Jordan & Gilbert, Synopsis, 1882, 547.
Xenistius californiensis, Jordan, Proc. U. S. Nat. Mus. 1885, 378 (name only); Jordan, Cat. Fish. N. A., 1885, 86.

Common; numerous specimens were taken.

In life: white below, back greenish, with greenish-brown stripes.

Measurements of eleven specimens in millimetres:

| | 421 | 419 | 418 | 417 | 416 | 11 | 3 | 55 | 420 | 605 | 80 |
|----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|
| Total length | 133 | 150 | 145 | 140 | 153 | 145 | 140 | 145 | 145 | 175 | 174 |
| Length to base of caudal | 110 | 120 | 120 | 115 | 130 | 120 | 110 | 120 | 120 | 143 | 149 |
| Head | 36 | 42 | 40 | 36 | 44 | 40 | 38 | 40 | 39 | 45 | 45 |
| Depth | 30 | 36 | 36 | 31 | 38 | 33 | 32 | 34 | 36 | 40 | 41 |
| Eye | 11 | 13 | 13 | 12 | 14 | 12 | 11 | 12 | 11 | 13 | 14 |
| Snout | 10 | 11 | 11 | 10 | 11 | 11 | 9 | 10 | 10 | 12 | 12 |
| Preorbital | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Pectoral fin | 27 | 29 | 32 | 31 | 30 | 27 | 29 | 32 | 30 | 35 | 40 |
| Ventral fin | 19 | 20 | 25 | 20 | 24 | 22 | 19 | 20 | 20 | 27 | 25 |
| Length of fourth dorsal spine .. | 19 | 18 | 22 | 18 | 19 | 21 | 20 | 20 | 20 | 25 | 27 |
| Length of third anal spine | | 13 | 13 | 12 | 14 | 14 | 13 | 13 | 13 | 17 | 16 |
| Head in length | 3+ | 3- | 3 | 3 $\frac{1}{2}$ | 3- | 3 | 3- | 3 | 3 | 3+ | 3 $\frac{1}{2}$ |
| Depth in length | 3 $\frac{2}{3}$ | 3 $\frac{1}{2}$ | 3 $\frac{1}{3}$ | 3 $\frac{2}{3}$ | 3 $\frac{1}{3}$ | 3 $\frac{2}{3}$ | 3 $\frac{7}{16}$ | 3 $\frac{2}{3}$ | 3 $\frac{1}{3}$ | 3 $\frac{1}{3}$ | 3 $\frac{1}{2}$ |
| Eye in head | 3+ | 3+ | 3 | 3 | 3+ | 3 $\frac{1}{3}$ | 3 $\frac{1}{2}$ | 3 $\frac{1}{3}$ | 3 $\frac{1}{2}$ | 3 $\frac{1}{3}$ | 3 |

55. *Hoplopagrus güntheri* Gill.*Pargo Raisero* of the local fishermen.

Hoplopagrus güntheri Gill, Proc. Acad. Nat. Sci. Phila. 1862, 253 (*Cape San Lucas*); Steindachner, Beiträge vi, 1, Tafel 1, 1878 (*Altata*); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 and 112 (*Mazatlan*; *Punta Arenas*); Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 429 (*Cape San Lucas*; *Punta Arenas*; *Mazatlan*); Jordan, Proc. U. S. Nat. Mus. 1885, 378 (*Mazatlan*); Jordan, Cat. Fishes N. A., 1885, 86.

Apparently not very common. It will be seen that the measurements of the two small specimens obtained by us agree pretty well with those given by Jordan & Swain of a specimen the length of our largest.

| | 32 | 115 | 863 |
|-------------------------------------|------------------------------------|-----------------------------------|-----------------------------------|
| | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> |
| Total length | 145 | 165 | 105 |
| Length to base of caudal | 118 | 135 | 86 |
| Head | 47 | 52 | 33 |
| Depth | 55 | 62 | 38 |
| Eye | 11 | 12 | 9 |
| Snout | 19 | 22 | 13 |
| Preorbital | 11 | 13 | 7 |
| Interorbital | 12 | 13 | 8 |
| Longest dorsal spine (fourth) | 21 | 24 | 14 |
| Last dorsal spine | 12 | 14 | 10 |
| First anal spine | 9 | 10 | 6 |
| Second anal spine | 16 | 20 | 13 |
| Pectorals | 38 | 43 | 26 |
| Ventrals | 31 | 35 | 22 |
| Longest dorsal ray | 23 | 24 | 16 |
| Longest anal ray | 25 | 27 | 17 |
| Head in length | $2\frac{1}{2}$ ($3+$) | $2\frac{3}{8}$ ($3\frac{1}{8}$) | $2\frac{2}{3}$ ($3\frac{1}{3}$) |
| Depth in length | $2\frac{1}{2}$ ($2\frac{7}{11}$) | $2\frac{1}{8}$ ($2\frac{3}{8}$) | $2\frac{1}{4}$ ($2\frac{1}{2}$) |
| Eye in head | $4\frac{3}{11}$ | $4\frac{1}{8}$ | $3\frac{2}{3}$ |
| Eye in snout | $1\frac{1}{11}$ | $1\frac{1}{8}$ | $1\frac{1}{3}$ |

D. X, 14; A. III, 9.

From the above it will be seen that, as compared with Dr. Gill's specimen, our specimens have the depth some greater, the head and snout each a little shorter, and the preorbital is not so deep. The pectoral fin and the longest dorsal and anal spines in ours are some shorter. We find the preopercle and suprascapular bone quite strongly serrate.

Color in life: breast and belly maroon purple, becoming less distinct on opercles and body; upper parts dark brown, with six double bands running obliquely downward and backward, the fourth and fifth pairs appearing as one. There is a large jet black spot upon the base of the caudal peduncle and extending some little upon the posterior rays of the soft dorsal.

Color in alcohol as given by Jordan & Swain (*l. c.*), except that the black spot on base of caudal peduncle and last rays of soft dorsal is very distinct.

56. *Lutjanus argentiventris* (Peters).

Mesoprion argentiventris Peters, Berlin. Monatsber., 1869, 707 (*Mazatlan*).

Mesoprion griseus Günther, Fish. Centr. Am., 385, 1866 (not of Linnaeus).

Lutjanus argentivittatus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 354 (a misprint for *L. argentiventris*): Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107, 110 (*Mazatlan*; *Panama*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 625 (*Panama*).

Lutjanus argentiventris, Jordan, Proc. Acad. Nat. Sci. Phila. 1883, 285; Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 431 and 434; Jordan, Proc. U. S. Nat. Mus. 1885, 378; Jordan, Cat. Fishes N. A., 1885, 87.

Depth, 2.7 (3.4); head, 2.6 (3.3); eye, 4.2.

Scales, 5-45-12, the rows above the lateral line parallel with it.

Color in life: belly and lower portion of sides light red; upper parts grayish, with blue reflections; a bright blue horizontal line just below the eye, extending from in front of the eye to the opercular flap.

This is one of the most important food fishes at Guaymas. Ten specimens were obtained.

The measurements of five of these specimens are here given:

| | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------|------------|------------|------------|------------|------------|
| | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> |
| Total length | 208 | 130 | 130 | 165 | 155 |
| Length to base of caudal | 164 | 105 | 103 | 132 | 122 |
| Depth | 61 | 40 | 37 | 50 | 47 |
| Head | 63 | 40 | 38 | 51 | 48 |
| Eye | 15 | 10 | 10 | 12 | 11 |
| Snout | 20 | 13 | 13 | 18 | 18 |
| Interorbital | 12 | 8 | 9 | 9 | 10 |
| Preorbital | 12 | 6 | 6 | 8 | 8 |
| Maxillary | 23 | | | | |
| Ventral fin | 37 | 20 | 24 | 27 | 27 |
| Pectoral fin | 48 | 25 | 26 | 37 | 34 |
| Longest dorsal spine (fourth) | 28 | 15 | 15 | 17 | 18 |
| Longest anal spine (second) | 23 | 17 | 16 | 20 | 20 |
| Longest dorsal ray | 25 | | | | |
| Longest anal ray | 28 | | | | |

57. *Lutjanus novemfasciatus* Gill.

Lutjanus novemfasciatus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 251 (*Cape San Lucas*).

Lutjanus prieto Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 232, 338, 353, 355 (*San Blas*; *Mazatlan*). (Full description on page 353.)

Lutjanus pacificus Vaillant & Boeourt.

Two specimens give the following measurements in millimetres:

| | 128 | 856 | | 128 | 856 |
|--------------------------------|-----|-----|--------------------------------------|-----|-----|
| Total length | 320 | 180 | Maxillary (exposed portion 20) | 39 | 16 |
| Length to base of caudal | 254 | 145 | Pectoral | 68 | 35 |
| Head | 95 | 55 | Ventral | 51 | 29 |
| Depth | 81 | 51 | Longest dorsal spine (fourth) | 34 | 29 |
| Eye | 17 | 12 | Third dorsal spine | 32 | 28 |
| Snout | 31 | 18 | Second anal spine | 19 | 15 |
| Interorbital | 17 | 10 | Third anal spine | 20 | 13 |
| Preorbital | 17 | 9 | | | |

Head, $2\frac{2}{3}$ ($3\frac{1}{3}$); depth, 3 (4); eye, 5.6 to 4.6; D. X, 14; A. II, 8 in No. 128, III, 7 in the others.

The interorbital is wider and the preorbital narrower than in *L. cubera* Poey, with which this is closely related. The maxillary reaches to the middle of the pupil. Canine teeth large in both jaws, two very large ones in the upper and ten in the lower. The soft dorsal and anal fins both rounded, the latter less than half length of head. Caudal lunate, not at all forked. Gill rakers stout, seven below the angle. Six rows of scales on the cheek, seven on the opercle, one on the subopercle, one on the interopercle, and two series on the occipital region.

58. *Lutjanus guttatus* (Steindachner).

Pargo Chibato of the local fishermen.

Mesoprion guttatus Steindachner, Ichthyol. Notizen IX, 18, 1869, Tafel VIII (*Mazatlan*).

Lutjanus guttatus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 354 (*Mazatlan*); (partial description); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 625 (*Panama*); (name only); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*), and 110 (*Panama*); Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 447 (*Mazatlan; Panama*): (full description); Jordan, Proc. U. S. Nat. Mus., 1885, 378 (*Mazatlan; Panama*); (name only); Jordan, Cat. Fish. N. A., 1885, 87.

D. X, 12; A. III, 8; scales, 6-48-14.

Color in life: general color bright red, clearest on caudal and outer edge of dorsal fin; anal and pectorals bright yellow, edged with white; body covered with short oblique, brownish lines; a large black spot mostly above the lateral line just below posterior portion of spinous dorsal. Inside of mouth yellow. Iris red.

This is a common and valued fish at Guaymas.

We here give measurements in millimetres of four specimens:

| | 619 | 620 | 677 | 1 |
|-------------------------------|----------------|----------------|----------------|----------------|
| Total length..... | 190 | 182 | 140 | 320 |
| Length to base of caudal..... | 150 | 145 | 110 | 260. |
| Head..... | 56 | 54 | 43 | 87 |
| Depth..... | 58 | 53 | 40 | 87 |
| Eye..... | 13 | 13 | 11 | 17 |
| Snout..... | 17 | 18 | 13 | 31 |
| Interorbital..... | 11 | 11 | 8 | 16 |
| Preorbital..... | 8 | 9 | 7 | 15 |
| Pectoral..... | 44 | 41 | 30 | 68 |
| Ventral..... | 33 | 33 | 24 | 51 |
| Head in length..... | 2.7 (3.4) | 2.7 (3.4) | 2.6 (3.2) | 3 (3.6) |
| Depth in length..... | 2.6 (3.5) | 2.7 (3.4) | 2.75 (3.5) | 3 (3.6) |
| Eye in head..... | $4\frac{1}{3}$ | $4\frac{1}{6}$ | 4 | 5 |
| Eye in snout..... | $1\frac{1}{3}$ | $1\frac{1}{3}$ | $1\frac{1}{6}$ | $1\frac{1}{2}$ |

59. *Lutjanus colorado* Jordan & Gilbert.

Pargo Raisero.

Lutjanus colorado Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 338, 351 (description), and 355 (*Mazatlan*); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*), 112 (*Punta Arenas*); Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 457 (*Mazatlan; Panama*); Jordan, Proc. U. S. Nat. Mus. 1885, 378; Jordan, Cat. Fish. N. A., 1885, 87.

This fish does not appear to be common as but three specimens were taken.

A full description is given by Jordaa & Gilbert (*op. cit.*). In our specimens (113, 137, and 170 millimetres long respectively) the eye is *greater* than the interorbital width, and the conical teeth of the lower jaw are *smaller* than those of the upper jaw.

This species is, curiously enough, confounded by the Guaymas fishermen with *Hoplopagrus guntheri* under the name *Pargo Raisero*.

60. *Orthopristis inornatus* (Gill).

Microlepidotus inornatus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 256 (*Cape San Lucas*).
Orthopristis inornatus, Jordaa, Cat. Fish. N. A., 1885, 83; Jordaa, Proc. U. S. Nat. Mus. 1885, 379.

Head, 3.3 in length of body to the base of the caudal; depth of body 3.1.

Dorsal fin, XIII, 1-15; anal fin, III-12; scales, 9-78-20.

Color in alcohol: steel blue, with metallic reflections above, lighter below; belly almost white; sides of body with seven narrow, light, horizontal stripes, three above the lateral line and four below; those below are more distinct; those above often interrupted and obscure; fins plain and somewhat dusky.

Body stout, compressed posteriorly, deepest at about below the fourth dorsal spine. Eye, 4.3 in head; snout blunt, 3.5 in head.

The maxillary slipping under the preorbital for its whole length and just reaching the vertical from the anterior margin of the orbit.

Teeth in both jaws; bands of minute teeth, with the outer series projecting slightly. No teeth on vomer or palatines.

Gill rakers on the anterior arch 8-16, slender, one-third the diameter of the eye, much shorter on the succeeding arches.

The slit behind the fourth arch is 4.3 in head. Head covered with small scales, except snout, maxillaries, and anterior part of lower jaw. Scaled sparingly on the posterior portions of soft dorsal and anal. Caudal fin scaled. Posterior margin of the opercle rounded, entire, no perceptible flap. Vertical limb of the preopercle concave, weakly serrated, lower limb entire.

Five specimens were obtained. The measurements of two are given below:

| | 884 | 4005 |
|-------------------------------|-----|------|
| | mm. | mm. |
| Total length | 183 | 305 |
| Length to base of caudal | 150 | 253 |
| Depth | 47 | 83 |
| Head | 45 | 77 |
| Eye | 11 | 17 |
| Preorbital | 5 | 12 |
| Interorbital | 12 | 25 |
| Snout | 13 | 22 |
| Pectoral | 40 | 65 |
| Ventral | 27 | 42 |
| Longest dorsal spine (fourth) | 22 | 31 |
| Longest anal spine (third) | 8 | 13 |

61. *Orthopristis chalceus* (Günther).

Pristopoma chalceum Günther, Proc. Zool. Soc. Lond. 1864, 146 (*Panama*).

Pristopoma kueri Steind., Ichth. Notiz. VIII, 1869, 3 (*Mazatlan*).

Pomadasys chalceus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 387; Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 625 (*Panama*); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107, 110.

Orthopristis chalceus, Jordan, Proc. U. S. Nat. Mus. 1885, 387; Jordan, Cat. Fishes N. A., 88, 1885.

Head, 3 in body to base of caudal; depth 3. Dorsal, XII-15; Anal, III-11. Scales, 8-55-18.

Color in life: body gray, with numerous narrow, brown, wavy lines running the direction of the scales, horizontal below the lateral line, oblique above.

Dark indistinct spot on the humeral region. Among the numerous specimens, some had, in addition to these marks, dark indistinct cross bands or blotches. These, however, varied very much.

Inside of the mouth, orange. Dorsal, dark brown, with a whitish stripe along about the middle of the fin, extending nearly the whole length. This was much more distinct in some than in others.

Each scale on the upper and anterior part of the body with a blue spot with a metallic reflection.

Body somewhat slender, compressed, deepest at below the fourth dorsal spine.

Profile of the head nearly straight, gently ascending, curved over the neck to the dorsal.

Eye, 4-4½ in head; snout, 2.7; preorbital slightly less than diameter of eye.

The maxillary does not quite reach the anterior margin of the orbit.

Teeth small; more than one series of curved teeth projecting beyond the rest in each jaw.

Gill-rakers on the anterior arch small and slender, 8-12.

The slit behind the fourth gill is less than the diameter of the eye.

Snout, front portion of preorbital, maxillaries, and lower jaws naked; the rest of the head covered with very small scales; dorsal and anal naked; caudal, base of pectoral, and under side of ventral covered with small scales.

Posterior margin of the opercle rounded, entire, no perceptible flap; posterior margin straight, or nearly so, very finely pectinate; lower limb entire, slightly rounded, making about a right angle with posterior margin.

Anal spines slender, the third the longest, a little longer than the diameter of the eye.

This fish is very abundant, being one of the most common species taken in the seine. A considerable variation of color is seen among them.

The measurements of four specimens are given below :

| | 782 | 15 | 787 | 788 |
|-------------------------------------|-----|-----|-----|-----|
| | mm. | mm. | mm. | mm. |
| Total length | 215 | 162 | 150 | 150 |
| Length to base of caudal | 175 | 133 | 125 | 120 |
| Depth | 57 | 48 | 39 | 43 |
| Head | 59 | 43 | 39 | 40 |
| Eye | 13 | 10 | 10 | 9 |
| Snout | 22 | 16 | 14 | 15 |
| Preorbital | 13 | 8 | 7 | 8 |
| Interorbital | 16 | 10 | 10 | 11 |
| Pectoral | 40 | 34 | 30 | 30 |
| Ventral | 37 | 26 | 25 | 24 |
| Longest dorsal spine (fourth) | 23 | 22 | 20 | 18 |
| Longest anal spine (third) | 15 | 12 | 13 | 12 |
| Second anal spine | | 11 | 12 | 11 |
| Second soft dorsal ray | 15 | 14 | 12 | 12 |
| Second soft anal ray | 18 | 16 | 13 | 14 |
| Maxillary | 12 | 11 | 11 | 10 |

62. *Pomadasis elongatus* (Steindachner).

Pristipoma leuciscus elongatus Steindachner, Neue und Seltene Fisch-Arten aus des K. K. Zoologischen Museen zu Wien, Stuttgart und Warschau, 1879, 30, Tafel 9, Fig. 2 (*Tumbez, west coast of South America*).

Pomadasyis leuciscus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 387 (in part only) (*Mazatlan; Panama*).

Pomadasyis elongatus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 352; Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*), 110 (*Panama*); Jordan, Proc. U. S. Nat. Mus. 1885, 378; Jordan, Cat. Fish. N. A., 1885, 88.

We have six specimens which we refer to this species, though it is not clear to us that *Pristipoma leuciscus elongatus* Steind. can be separated from *Pristipoma leuciscus* Günther. The former is said to have the body more slender, but Günther gives the depth of the latter as 3 to 3½ in length to base of caudal, and this agrees well with our examples. Jordan & Gilbert, in the Proceedings for 1881 (*op. cit.*), speaking of their specimens of *Pomadasyis leuciscus* from Mazatlan and Panama, say that all but two "are slenderer, with more pointed snout and deeper sub-orbital, the anal spines being quite small, the second 3½ to 4 in head." This of course means Steindachner's variety *elongatus*, and agrees with ours, unless it be that ours are but little if any slenderer than *leuciscus*, and the anal spines are not quite so small. The head of ours agrees exactly with Steindachner's figure (as to shape, length of snout, depth of suborbital, eye, membranous flap upon border of anterior nostril, and squamation of cheek), but instead of about seven rows of scales upon the opercle, there are but four or five, agreeing in this last respect with Günther's figure of *leuciscus*. The anal spines agree better with *leuciscus*, the second being large and strong (3½ in head), and the third is longer and more slender (less than 3½ in head).

A light lateral band, about one scale in width, begins at the posterior margin of the opercle just above the origin of the pectoral and extends backward in a direct line, meeting the lateral line under the posterior fourth of the soft dorsal, and continuing direct to the base of the caudal chiefly below the lateral line.

In the center of each scale in this band is a faint dark blotch, these forming a fairly distinct darker line through the middle of the light one. There are three other faint dark bands along the sides, one above and two below the light band.

These markings are least distinct toward the ends. There is a dark blotch upon the upper edge of the opercle.

Describing the color markings of his three specimens from Tumbez, Dr. Steindachner says :

Ausnahmslos zieht eine silberhelle, oben und unten ziemlich breit grau eingefasste Längsbinde über der Höhe der Pectorale in horizontaler Richtung vom Schultergürtel zur Caudale und grenzt erst am Schwanzstiele nach oben an die Seitenlinie. Sie nimmt mit Ausschluss der dunkleren Einfassung die Höhe einer ganzen Schuppenreihe (der vierten) unter dem Beginne der Seitenlinie ein, ist jedoch zuweilen im vordersten Theile des Rumpfes nicht sehr scharf ausgeprägt, und wurde wohl nur aus diesem Grunde von Dr. Günther nicht erwähnt.

It should perhaps be added that Dr. Steindachner does not use the name *elongatus* in connection with his description, but uses it only with his figure.

63. *Pomadasis axillaris* Steindachner.

Pristipoma axillare Steindachner, Ichthyol. Notizen VIII, 7, Tafel 4, 1869 (*Mazatlan*).

Pristipoma leuciscus, Streets, Bull. U. S. Nat. Mus. VII, 49, 1877 (in part) (*Lower California*).

Pomadasys axillaris, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 337 (*Mazatlan*);

Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*) (name only);

Jordan, Proc. U. S. Nat. Mus. 1885, 379; Jordan, Cat. Fishes N. A., 1885, 88.

Head 3.1 (3.9); depth 3 (3.6); eye 4.7.

The one specimen we obtained measures 220 millimetres in total length, or 183 millimetres to the base of the caudal. The eye is contained a little more than $1\frac{1}{2}$ times in the snout, and equals the interorbital and preorbital; the maxillary does not reach vertical at front of eye. Gill rakers 14, well developed. Scales 5-50-9, four rows on the opercle.

Pectoral fin about as long as head. D. XI, 1-13; A. III, 7.

Our specimen agrees very closely with Steindachner's description.

64. *Pomadasis macracanthus* (Günther).

Pristipoma macracanthum Günther, Proc. Zoöl. Soc. London 1864, 146 (*Chiapam*);

Günther, Fish. Centr. Am., 416, Pl. 61, Fig. 1, 1866 (*Chiapam*).

Pomadasys macracanthus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 356 (*Mazatlan*;

Punta Arenas; *Panama*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 625

(*Panama*) (name only); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107

(*Mazatlan*); 110 (*Panama*); 112 (*Punta Arenas*) (name only); Jordan, Proc. U.

S. Nat. Mus. 1885, 379 (*Mazatlan*; *Panama*) (name only); Jordan, Cat. Fishes

N. A., 1885, 89; Jordan, Proc. U. S. Nat. Mus. 1888, 330 (name only).

Eight individuals of this species were brought home by us. It is a common fish at Guaymas, and, like all others of the family found there, is of value as a food fish.

We here give measurements in millimetres of three examples :

| | 43 | 859 | 27123 |
|--------------------------------|-------------|-------------|-------------|
| Total length..... | 205 | 155 | 200 |
| Length to base of caudal..... | 173 | 130 | 165 |
| Head..... | 65 | 48 | 58 |
| Depth..... | 65 | 50 | 58 |
| Eye..... | 13 | 11 | 13 |
| Snout..... | 25 | 19 | 21 |
| Interorbital width..... | 15 | 12 | 13 |
| Preorbital depth..... | 16 | 11 | 14 |
| Snout to origin of dorsal..... | 76 | 58 | 70 |
| Snout to pectoral..... | 65 | 49 | 59 |
| Snout to ventral..... | 68 | 50 | 63 |
| Snout to anal..... | 124 | 93 | 121 |
| Head in length..... | 2.66 (3.10) | 2.71 (3.22) | 2.84 (3.44) |
| Depth in length..... | do. | do. | do. |
| Eye in head..... | 5 | 4.4 | 4.5 |
| Eye in snout..... | 2 | 1.73 | 1.61 |

65. *Hæmulon maculicauda* (Gill).

Roncador Rayado.

Orthostarchus maculicauda Gill, Proc. Acad. Nat. Sci. Phila. 1862, 255 (*Cape San Lucas*).

Hæmulon mazatlanum Steindachner, Ichthyol. Notizen VIII, 12, Taf. VI, 1869 (*Mazatlan*).

Hæmulon maculicauda, Steindachner, Ichthyol. Beiträge III, 14, 1875 (*Acapulco*; *Mazatlan*).

Diabasis maculicauda, Jordan & Gilbert, Bull. U. S. Fish Comm. 1881, 325; *ibid.*, 1882, 110 (*Panama*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 362 (*Cape San Lucas*); *ibid.*, 372 (*Colima*); *ibid.*, 626 (*Panama*); Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 315 (*full description*).

Hæmulon maculicauda, Jordan, Proc. U. S. Nat. Mus. 1885, 380 (*Panama*); Jordan, Cat. Fish. N. A., 1885, 89; Jordan, Proc. U. S. Nat. Mus. 1886, 537.

Common; known as *Roncador Rayado* by the Guaymas fishermen.

66. *Hæmulon flaviguttatum* Gill.

Roncador.

Hæmulon flaviguttatus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 254 (*Cape San Lucas*).

Hæmulon margaritiferum Günther, Proc. Zool. Soc. London 1864, 147; Günther, Fish. Centr. Am., 419, Pl. 65, Fig. 2, 1869; (*Panama*).

Hæmulon flaviguttatum, Steindachner, Ichthyol. Beiträge III, 14, 1875 (*Mazatlan*; *Acapulco*; *Altata*; *Panama*); Streets, Bull. U. S. Nat. Mus. VII, 79, 1877 (*Lower California*).

Diabasis flaviguttatus Jordan & Gilbert, Bull. U. S. Fish. Comm. 1881, 324; *ibid.*, 1882, 107 (*Mazatlan*), 110 (*Panama*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 361 (*Cape San Lucas*); *ibid.*, 381 (*Panama*); *ibid.*, 626 (*Panama*).

Hæmulon flaviguttatum, Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 314 (*full description*); Jordan, Proc. U. S. Nat. Mus. 1885, 380 (*Mazatlan*; *Panama*); Jordan, Cat. Fish. N. A., 1885, 89.

Hæmulon flaviguttatum, Jordan, Proc. U. S. Nat. Mus. 1886, 537.

A careful examination of many specimens (24) in our collection shows some differences from the descriptions hitherto published.

The head is contained in length to base of caudal $3\frac{1}{4}$ instead $3\frac{2}{3}$ times; the preorbital is a little narrower; the gill rakers are 18 or 19 instead of

22; the longest anal ray is contained in length of head at least $3\frac{3}{4}$ times, and the second anal spine is contained 3 to $3\frac{1}{2}$ times in the head.

In life, the belly is whitish with some fine black dots; sides and back olivaceous, each scale with a light spot, these forming longitudinal lines below the lateral line, but oblique ones above it. The dorsal fin is golden brown, the pectorals and anal bronze.

67. *Hæmulon schranki* Agassiz.

Hamulon schranki Agassiz, Spix, Pisc. Brésil., 121, Pl. 69, 1829.

Hamulon candidimacula Steindachner, Ichthyol. Beiträge III, 15, 1875 (*Acapulco*; *Rio Janeiro*; *Rio Grande do Sul*; *Maranhão*). (Not of Cuv. & Val.)

Hæmylum flaviguttatum, Bean, Proc. U. S. Nat. Mus. 1880, 96 (*Colima*).

Diabasis steindachneri Jordan & Gilbert, Bull. U. S. Fish Comm. 1881, 322 (*Panama*; *Mazatlan*) (full description); *ibid.*, 1882, 107 (*Mazatlan*), 110 (*Panama*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 361 (*Cape San Lucas*), 372 (*Colima*).

Hamulon steindachneri, Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 299; Jordan, Proc. U. S. Nat. Mus. 1885, 380 (*Mazatlan*; *Panama*); Jordan, Cat. Fishes N. A., 1885, 90; Jordan, Proc. U. S. Nat. Mus. 1886, 535 and 537.

A half-dozen specimens were secured.

Color in life, silvery, with tinge of yellow, greenish on back; a dark spot at base of caudal fin; all the fins old gold in color.

It seems pretty certain that *Hæmulon steindachneri* J. & G., should be identified with *Hæmulon schranki* Agassiz.

68. *Hæmulon sexfasciatum* Gill.

Hamulon sexfasciatum Gill, Proc. Acad. Nat. Sci. Phila. 1862, 254 (*Cape San Lucas*); Steindachner, Ichthyol. Beiträge III, 13, 1875 (*Panama*).

Diabasis sexfasciatus, Jordan & Gilbert, Bull. U. S. Fish Comm. 1881, 324; *ibid.*, 1882, 107 (*Mazatlan*), 110 (*Panama*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 361 (*Cape San Lucas*), 372 (*Colima*), 626 (*Panama*); Jordan, Proc. Acad. Nat. Sci. Phila. 1883, 286.

Hamulon maculosum Peters, Berliner Monatsberichte, 705, 1869 (*Mazatlan*).

Hamulon sexfasciatum, Jordan & Swain, Proc. U. S. Nat. Mus. 1884, 288; Jordan, Proc. U. S. Nat. Mus. 1885, 380 (*Mazatlan*; *Panama*); Jordan, Cat. Fishes N. A., 1885, 90; Jordan, Proc. U. S. Nat. Mus. 1888, 330 (*Tres Marias Islands*).

Our five specimens agree very closely with the published descriptions. They measure in total length 162, 176, 210, 210, and 215 millimetres respectively.

The young specimens are not as distinctly colored as the older ones.

69. *Calamus brachysomus* (Lockington).

Sparus brachysomus Lockington, Proc. U. S. Nat. Mus. 1880, 284 (*Lower California*).

? *Chrysophrys calamus* Günther, Fishes Cent. Amer. 1869, 386 (*Panama*).

Sparus brachysomus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 277 (*Lower California*).

Calamus bajonado Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*).

Calamus brachysomus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1884; Review of the species of the genus *Calamus*, Jordan, Proc. U. S. Nat. Mus. 1885; Jordan, Cat. Fishes N. A., 1885, 90.

Color silvery, each scale with a pearly spot, forming longitudinal rows.

In the young the head and body are crossed by eight or nine conspic-

uous brown bands, the first vertically through the eye, the second from the nape of the neck over the opercles, the third from just in front of the dorsal, passing down just behind the base of the pectoral; the remaining ones divide the space to the caudal, the last one being around the caudal peduncle. There are four dark cross-bands on the caudal fin. The dorsal, anal, and the ventrals are dusky. The snout and space between the eyes are dusky. These dark bands gradually disappear with age.

This fish is very abundant in the Bay of Guaymas. Since it often reaches a large size, it forms an important part of the fisherman's catch

70. *Girella nigricans* (Ayres).

Camarina nigricans Ayres, Proc. Cal. Acad. Nat. Sci. 1860, 81.

Girella dorsimacula Gill, Proc. Acad. Nat. Sci. Phila. 1862, 244.

Girella nigricans Jordan & Gilbert, Proc. U. S. Nat. Mus. 1880, 456 (*California*); Jordan & Jony, Proc. U. S. Nat. Mus. 1881, 12 (*California*); *ibid.*, Jordan & Gilbert, 47 (*Santa Barbara Islands*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 363 (*Cape San Lucas*); Jordan & Gilbert, Synop. Fish. N. A., 560, 1882; Rosa Smith, Proc. U. S. Nat. Mus. 1883, 234 (*Todos Santos Bay*); Rosa Smith, Proc. U. S. Nat. Mus. 1881, 553 (*San Cristobal, Lower California*); Jordan, Proc. U. S. Nat. Mus. 1885, 380; Jordan, Cat. Fish. N. A., 1885, 91.

Nine specimens of this fish were taken.

71. *Kyphosus analogus* (Gill).

Chopa.

Pimelepterus analogus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 245 (*Cape San Lucas*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 232 (*Porto Escoudido, Mexico; Nichols*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 363. (Note on Gill's types.)

Kyphosus analogus, Jordan, Proc. U. S. Nat. Mus. 1885, 380 (in part) (*Mazatlan; Panama*).

Kyphosus elegans, Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 142 (*Guaymas*).

We took altogether nine specimens of *Kyphosi*, eight of which we refer to this species.

A reëxamination of all our material leads us to believe that we were in error in a former paper (Proc. U. S. Nat. Mus. 1888, 142) in referring the specimen now in the U. S. National Museum, and bearing the number 39635, to *Kyphosus elegans* (Peters). This, together with seven other examples in our collection, we now refer to *Kyphosus analogus* (Gill).

An examination of these specimens leads us to question the opinion expressed by Drs. Jordan & Gilbert, in the Proceedings U. S. National Museum 1882, 363, and later by Dr. Jordan, in the Proceedings U. S. National Museum 1885, 380, that *Pimelepterus analogus* Gill is the same fish that Peters described as *Pimelepterus elegans*.

Our specimens differ from Dr. Peters's description of *P. elegans* in the following particulars: *Kyphosus analogus* has much smaller scales, fewer teeth, narrower interorbital (as compared with the diameter of the eye), and has more rays in the soft dorsal and anal.

For purposes of comparison we append the following table:

| | Peters's description of <i>K. elegans</i> . | Gill's description of <i>K. analogus</i> . | Our specimens of <i>K. analogus</i> . |
|-----------------------------|---|--|---|
| Scales | 11-56-12 | 13-75-20 | 13-70 to 78-20 |
| Teeth in each jaw | 38 | 22 | 24 |
| Interorbital | Nearly twice diameter of eye. | ..... | $1\frac{2}{3}$ to $1\frac{1}{2}$ times eye. |
| Dorsal | XI-12 | XI-14 | XI-14 |
| Anal | III-12 | III-13 | III-13 |
| Head in total length | 4.5 | 4.5 | 4 |
| Depth in total length | 2.5 | 2.6 to 2.7 | 2.6 |

Measurements of five of the largest of our specimens are given in the following table:

| | 1 | 2 | 3 | 109 | 13 |
|--|------------|------------|------------|------------|------------|
| | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> | <i>mm.</i> |
| Total length | 130 | 123 | 126 | 170 | 140 |
| Length to base of caudal fin | 110 | 104 | 104 | 136 | 115 |
| Length of head | 30 | 31 | 30 | 38 | 35 |
| Depth of body | 51 | 45 | 45 | 65 | 56 |
| Length of snout | 9 | 9 | 9 | 12 | 11 |
| Width of interorbital space | 12 | 11 | 11 | 15 | 13 |
| Diameter of eye | 9 | 9 | 9 | 11 | 9 |
| Length of maxillary from tip of snout | 9 | 9 | 9 | 10 | 10 |
| Length of sixth dorsal spine | 12 | 11 | 12 | 16 | 13 |
| Base of spinous dorsal | 27 | 24 | 24 | 35 | 35 |
| Base of soft dorsal | 29 | 26 | 26 | 35 | 27 |
| Height of soft dorsal | 10 | 9 | 9 | 11 | 9 |
| Length of second anal spine | 5 | 5 | 5 | 8 | 6 |
| Base of soft anal | 23 | 22 | 23 | 30 | 25 |
| Height of anterior portion of soft anal | 11 | 10 | 10 | 15 | 11 |
| Height of posterior portion of soft anal | 8 | 8 | 8 | 10 | 9 |
| Length of ventral fin | 16 | 14 | 16 | 23 | 19 |
| Length of pectoral fin | 18 | 15 | 16 | 20 | 19 |

We here give Dr. Peters's description of *Kyphosus elegans*, from "D. Monatsber. d. Königl. Akad. d. Wiss. zu. Berlin."

Pimelepterus elegans n. sp.

B. 7, D. 11, 12; A. 3, 12 Lin. lat. 56; tr. $\frac{1}{2}$.

Höhe zur Totallänge wie 1: $2\frac{1}{2}$, Kopflänge zu derselben wie 1: $4\frac{1}{2}$. Schnauze conoav, etwas länger als das Auge, Oberkiefer bis zur Verticallinie des vorderen Augenrandes reichend. Die Breite des Interorbitalraums ist fast gleich dem doppelten Augendurchmesser. Zähne oben wie unten 38. Schuppen fest anliegend, die senkrechten Flossen bis zum Rande bedeckend. Braun mit röthlichbraunen Langlinien, unter Seitenlinie etwa 15 bis 16. Rand der Kiemerdeckelhaut und Fleck unmittelbar hinter dem unteren Theile der Brustflosse schwarz. Ein silberner Streif auf dem Präorbitale. Totallänge 0.^m 290. Gekauft; angeblich aus Mazatlan.

72. *Kyphosus elegans* (Peters).

Chopa.

Head $3\frac{1}{2}$ in body to base of caudal fin ($4\frac{1}{2}$ in total length). Depth 2 ($2\frac{1}{2}$); eye 3 in head; snout equals the eye. D. X-13; A. III-12. Scales 12-60-18.

Body elliptical, compressed; snout very blunt, anterior profile nearly vertical from lip to front of middle of eye where there is a broad angle, from which the arch is gentle and uniform to the origin of the dorsal fin.

Month small, horizontal, maxillary short, just reaching vertical of anterior border of eye; each jaw with a single series of close-set incisors, about twenty-six in number.

Dorsal fin long, its spines strong, depressible in a groove, the fifth to seventh longest, about $2\frac{1}{5}$ in head; the soft portion rather lower, its last rays about $3\frac{1}{3}$ in head.

Anal spines short, the second about $4\frac{5}{7}$ in head; soft anal high, its anterior rays being longest and more than equaling half of head; the posterior rays of anal are contained $3\frac{1}{3}$ times in head, and thus equal the last rays of the dorsal; caudal fin widely forked; caudal, pectorals, and ventrals well sealed at the base, while the soft parts of the dorsal and anal are densely sealed throughout. Scales rather large—sixty in lateral line—except on the fins, where they are very small, and about the head, where they are small and much crowded; the snout is naked.

Color in alcohol not noticeably different from that of *K. analogus*.

This species is closely related to *K. analogus* (Gill), from which it appears to differ in the larger scales, fewer scales in the lateral line, much higher anal fin, wider interorbital space, and more blunt snout.

It does not agree with Peters's description as to number of teeth in each jaw (Peters giving thirty-eight while our specimen has but twenty-six), the width of the interorbital and in the fin formulæ, but these discrepancies may be due to errors of observation or copying.

At our request Dr. F. Hilgendorf recently examined Peters's types and we are indebted to him for the following note: "Schuppen über L. 1, zähle ich 64–66 und ausserdem etwa 10 kleinere auf den Schwanzflosse. * * * Die Höhe des ersten weichen Strahles der Anals beträgt 38^{mm}. Die Basis-Länge der ganzen Flosse ist 68^{mm}."

This, of course, shows that Peters's description is not accurate. We obtained but one specimen.

73. *Hermosilla azurea* Jenkins & Evermann.

PLATE I.

Hermosilla azurea Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 144. (*Guaymas*.)

One of the most beautiful and interesting species of the collection.

74. *Upeneus grandisquamis* Gill.

Upeneus grandisquamis Gill, Proc. Acad. Nat. Sci. Phila. 1863, 168 (*West Coast of Central America*); Günther, Fish. Centr. Am., 1864, 420 (Gill's description copied); Steindachner, Ichthyol. Beiträge IV, 1875, 6 (*Panama*) (description); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 363 (note on this species as compared with *U. dentatus*); *ibid.*, 378 (*Colima*) (name only); *ibid.*, 626 (*Panama*) (name only); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*), 111 (*Panama*); Hall & McCaughan, Proc. Acad. Nat. Sci. Phila. 1885, 155 (no specimens examined); Jordan, Proc. U. S. Nat. Mus. 1885, 381 (*Mazatlan*; *Panama*) (name only); Jordan, Cat. Fish. N. A., 1885, 93.

Upeneus tetraspilus Günther, Proc. Zool. Soc. London 1864, 148 (*Panama*); Günther, Fish. Centr. Am. 1864, 420, Pl. 66, Fig. 1 (*Panama*).

Numerous specimens of this species were obtained. Measurements

of all of these (ten of which we give below) show but slight variations among the individuals.

The head is but very slightly greater than the depth, and is contained from 3 to 3½ in the body to base of caudal fin, while the depth varies from 3 to 3.6 in the same, this least depth being found in the smallest specimens.

The variation in the distance between dorsals is due in part to the difficulty of determining where the membrane of the first fin ends, as in some specimens it is more or less torn.

The scales are usually 2-31-5, but in one individual they seem to be 2-32-5, while in another they are 2-30-5.

| | 807 | 808 | 809 | 811 | 805 | 832 | 27126 | 27127 | 27129 | 831 |
|------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|  | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | mm. | <i>mm.</i> |
| Total length | 125 | 108 | 152 | 135 | 171 | 112 | 180 | 185 | 172 | 173 |
| Length to base of caudal | 100 | 82 | 122 | 105 | 137 | 90 | 115 | 147 | 135 | 140 |
| Head | 32 | 27 | 39 | 32 | 41 | 29 | 48 | 47 | 45 | 45 |
| Depth | 31 | 26 | 37 | 30 | 41 | 25 | 45 | 45 | 44 | 42 |
| Eye | 8 | 7 | 9 | 8 | 11 | 8 | 10 | 11 | 11 | 11 |
| Snout | 14 | 10 | 18 | 15 | 20 | 13 | 21 | 22 | 20 | 20 |
| Preorbital | 10 | 8 | 13 | 8 | 15 | 9 | 13 | 16 | 14 | 16 |
| Interorbital | 9 | 7 | 10 | 8 | 11 | 8 | 12 | 12 | 11 | 11 |
| Third dorsal spine | 20 | 17 | 27 | 20 | 32 | 20 | 28 | 33 | 31 | 32 |
| Head to margin of preopercle | | | 28 | | 31 | 21 | | 33 | 34 | 32 |
| Distance between dorsal fins | 12 | 10 | 14 | 14 | 16 | 9 | 18 | 16 | 21 | 16 |
| Base of first dorsal | | | 21 | | 25 | 17 | | 28 | 26 | 26 |
| Base of second dorsal | | | 22 | | 23 | 15 | | 25 | 23 | 24 |
| Ventrals | 22 | 16 | 26 | | 30 | 20 | 30 | 30 | 30 | 30 |
| Pectorals | 23 | 20 | 29 | | 31 | 21 | 32 | 35 | 35 | 34 |
| Snout to hind edge of orbit | | | 26 | | 30 | 20 | | 32 | 30 | 30 |
| Head in length | 3½ | 3+ | 3½ | 3¼ | 3½ | 3½ | 3+ | 3½ | 3 | 3½ |
| Depth in length | 3¼ | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | 3+ | 3½ |
| Eye in head | 4 | 4- | 4½ | 4 | 4- | 3½ | 4½ | 4+ | 4 | 4 |

75. *Upeneus dentatus* Gill.

Upeneus dentatus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 256 (*Lower California*); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 363 (*Cape San Lucas*) (note on Gill's types); Hall & McCaughan, Proc. Acad. Nat. Sci. Phila. 1885, 154 (no specimens seen); Jordan, Proc. U. S. Nat. Mus. 1888, 330 (partial description of a specimen from *Tres Marias Islands*).

Three specimens were obtained by us. These, together with Dr. Gill's types from Cape San Lucas and one specimen 10¾ inches long from Tres Marias Islands, examined by Dr. Jordan (*op. cit.*), are the only specimens of this species yet recorded.

Head, 3.4 (4.3); depth, 4 (5.1); eye, 3.8; D. VII-I, 8; A. I, 6; scales, 2-37-5.

The scales are much more deciduous than in the two other species found by us, and the upper parts are very much darker.

| | 827. | 829. | | 827. | 829. |
|--------------------------------|------------|------------|-------------------------------------|------------|------------|
| | <i>mm.</i> | <i>mm.</i> | | <i>mm.</i> | <i>mm.</i> |
| Total length | 210 | 210 | First to second dorsal | 21 | 20 |
| Length to base of caudal | 165 | 165 | Base of first dorsal | 29 | 30 |
| Head | 49 | 49 | Base of second dorsal | 22 | 21 |
| Depth | 41 | 41 | Longest dorsal spine (second) | 30 | 28 |
| Eye | 13 | 13 | Pectorals | 31 | 30 |
| Preorbital | 15 | 15 | Ventrals | 32 | 31 |
| Interorbital | 16 | 16 | Snout to edge of preopercle | 37 | 37 |
| Snout | 20 | 20 | Snout to hind edge of orbit | 32 | 31 |

76. *Upeneus rathbuni* sp. nov.

(No. 43241, U. S. National Museum.)

PLATE II.

Head, $3\frac{1}{2}$ ($4\frac{2}{5}$); depth, 4 (5); D. VIII-I, 8; A. I, 6; scales, $2\frac{1}{2}$ -41-6.

Body slender; dorsal outline well arched; profile from snout to origin of first dorsal regularly curved, except above the eyes, where it is very slightly flattened; from first dorsal to posterior end of second dorsal gently convex, and from there to the caudal slightly concave; ventral outline nearly straight to caudal fin; head triangular; snout blunt-pointed; least depth of caudal peduncle $2\frac{3}{4}$ in head, and its length $1\frac{1}{4}$ in the same; mouth slightly oblique; the maxillary, which is $3\frac{1}{4}$ in head, greatly broadened behind, almost reaching anterior margin of orbit; preorbital deep and broad, its depth $3\frac{1}{2}$ in head; lower jaw slightly included; barbels moderate, scarcely reaching posterior edge of opercles; preopercle very weakly serrate. Eye large, $2\frac{2}{3}$ in head, or $1\frac{1}{2}$ in snout. First dorsal spine *minute*, the second, third, and fourth subequal, $1\frac{1}{2}$ in head, the others decreasing gradually, the eighth being contained less than 3 times in head; longest soft dorsal ray $2\frac{1}{5}$ in head; anal spine evident; longest anal rays $2\frac{2}{3}$ in head; pectorals $1\frac{1}{2}$ in head, reaching posterior edge of spinous dorsal; ventrals equal the pectorals. Scales large, etenoid; head well scaled, there being three scales upon the maxillary bone, a row of six upon the cheek, and an odd one on its lower margin; preopercle and opercle with about two rows each; preorbital without scales, but roughened by a very evident set of irregularly radiating lines, thus, ; the branches of the

pores in the scales of the lateral line are large and numerous, as many as thirteen being counted in some scales. Teeth villiform, in a band broadest in front and narrowing backward. Gillrakers slender, the longest $3\frac{1}{2}$ in maxillary, about 16 below the angle. Peritoneum black.

This species is allied to *U. preorbitalis* Smith & Swain, from which it differs in the slightly shorter head, greater depth, deeper caudal peduncle, shorter maxillary, larger eye, wider interorbital, much narrower preorbital, longer ventrals, slightly longer pectorals, the outline of the spinous dorsal, the more numerous scales, and in not having the lower jaw produced.

It seems to be related also to *U. vanicolensis* (Cuv. & Val.), but may be distinguished from that species by the slightly longer head, greater depth, shorter and deeper caudal peduncle, much shorter maxillary, larger eye, narrower interorbital, slightly longer snout, smaller scales, and in having the ventral line straight.

One specimen 194 millimetres in total length. We have named this species for Prof. Richard Rathbun, assistant in charge of scientific inquiry, U. S. Fish Commission.

77. *Bairdiella icistia* (Jordan & Gilbert).

Sciæna icistia Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 356 (*Mazatlan*).

For synonymy, see Jordan & Eigenmann, A Review of the *Sciænidae* of America and Europe, Report of the U. S. Comm. of Fish and Fisheries, for 1886, 1889.

Numerous specimens were obtained.

78. *Micropogon ectenes* Jordan & Gilbert.

Micropogon ectenes Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 355 (*Mazatlan*); Bull. U. S. Fish Comm. 1882, 107 (*Mazatlan*); Jordan & Eigenmann, Review of the *Sciænidae* of Am. and Eur., Report U. S. Comm. Fish and Fisheries for 1886, 1889.

Five specimens were obtained.

79. *Umbrina xanti* Gill.

Umbrina xanti Gill, Proc. Acad. Nat. Sci. Phila. 1862, 257 (*Cape San Lucas*).

For synonymy, see Jordan & Eigenmann, *op. cit.*, 420, 421, 423.

One specimen, 280 millimetres in length, was taken.

D. XI-29; A. II-7. Scales, 6-50-10.

Depth, 3.4 (4.2); head, 3.5 (4.3); eye in head, 4.6; snout, 3.25.

80. *Cynoscion parvipinnis* Ayres.

Cynoscion parvipinnis Ayres, Proc. Cal. Acad. Nat. Sci. 1861, 156.

For synonymy, see Jordan & Eigenmann, *op. cit.*, 354, 369.

Three specimens of this fish were preserved. It is common in the bay and has a good reputation as a food fish.

81. *Gerres lineatus* (Humboldt).82. *Gerres gracilis* (Gill).

Each of the above species of *Gerres* was found to be abundant at Guaymas, and, to our surprise, of the eight or ten species of this genus reported from the Pacific coast of America, these two are the only ones seen by us.

For full synonymy and analysis of the species of *Gerres* found in American waters, *vide* Evermann & Meek, Proc. Acad. Nat. Sci. Phila. 1886, pp. 256-272.

83. *Harpe diplotænia* Gill.

Harpe diplotænia Gill, and

Harpe pectoralis Gill, Proc. Acad. Nat. Sci. Phila. 1862, 141 (*Cape San Lucas*).

Bodianus pectoralis, Jordan, Proc. U. S. Nat. Mus. 1885, 384; Jordan, Cat. Fish. N. A., 1885, 97.

A single specimen was obtained, which gives the following measurements:

| | mm. |
|---|-----|
| Length to the tip of the middle caudal rays..... | 370 |
| Length to the base of the middle caudal rays..... | 320 |

Head (107 millimetres) equals the depth, each being 3 in length to base of caudal.

Eye (16 millimetres) 6.7 in head.

Prolonged caudal 90 millimetres in length, and is contained $1\frac{1}{2}$ times in head. Height of dorsal rays, 81 millimetres; of anal rays, 115 millimetres.

D. XII-11; A. III-13; scales 5-34-12.

It seems certain that *H. diplotenia* is the female and *H. pectoralis* the male.

84. *Pseudojulis venustus* Jenkins & Evermann.

PLATE II.

Pseudojulis venustus Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 145 (*Guaymas*).

Not common.

85. *Glyphisodon saxatilis* (L.).

Seven specimens from Guaymas, where it is not uncommon.

86. *Chætodipterus zonatus* (Girard).

Barbero.

Ephippus zonatus Girard, U. S. Pacific R. R. Exp., Zoöl., 1858, 110 (*San Diego*).

Chatodipterus faber Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 48; Goode & Bean, Proc. U. S. Nat. Mus. 1882, 238; Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 108, 111 (*Panama; Mazatlan*); Jordan, Cat. Fish. N. A., 1885, 102.

D., VIII-1, 23; A., III-16-18; scales about 90; dorsal spine 0.77 of head.

Two specimens, $4\frac{1}{2}$ and 6 inches in total length respectively.

87. *Chætodon humeralis* Günther.

Chætodon humeralis Günther, Cat. Fishes, II, 19, 1860 (*Sandwich Islands?*); Günther, Fishes Centr. Am., 419, Pl. 65, Fig. 3, 1866 (*Panama; Guatemala?*); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 108 (*Mazatlan*), 111 (*Panama*); Jordan, Cat. Fishes N. A., 102, 1885 (name only); Jordan, Proc. U. S. Nat. Mus. 1885, 385 (*Mazatlan; Panama*); Eigenmann & Horning, Ann. N. Y. Acad. Sci. IV, 1887, 1 (*Colima*).

Many specimens were obtained.

88. *Pomacanthus zonipectus* (Gill).

Pomacanthodes zonipectus Gill, Proc. Acad. Nat. Sci. Phila. 1862, 241 (*San Salvador*); *ibid.*, 1863, 162 (*west coast of Central America*).

Pomacanthus zonipectus, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 376 (*Nicaragua; San Salvador*); Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 108 (*Mazatlan*), 111 (*Panama*); Jordan, Proc. U. S. Nat. Mus. 1885, 386 (*Mazatlan; Panama*); Jordan, Cat. Fishes N. A., 103, 1885.

Pomacanthus crescentalis, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 358 (*Mazatlan; Panama*.) (young).

Pomacanthus zonipectus, Günther, Fishes Centr. Am., 419, 1861 (*San Salvador*).

The only specimen we obtained, 110 millimetres long, is between the young (which was described by Jordan & Gilbert as *P. crescentalis*) and the adult *zonipectus*.

89. *Gobius sagittula* (Günther).

Euctenogobius sagittula Günther, Proc. Zöol. Soc. London 1861, 3.

For synonymy, see Jordan & Eigenmann, Proc. U. S. Nat. Mus. 1886, 497.

Numerous specimens were taken.

90. *Gobius chiquita* Jenkins & Evermann.

Gobius chiquita Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 146. (*Guaymas*.)

Common.

91. *Gobius longicaudus* Jenkins & Evermann.

Gobius longicaudus Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 146. (*Guaymas*.)

Abundant.

92. *Gillichthys y-cauda* Jenkins & Evermann.

Gillichthys y-cauda Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 147. (*Guaymas*.)

Gilbert, Proc. U. S. Nat. Mus. 1889, 363. (*San Diego, Cal.*)

Very abundant.

93. *Gillichthys guaymasiæ* Jenkins & Evermann.

Gillichthys guaymasiæ Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 148. (*Guaymas*.)

In the Proceedings of the U. S. National Museum for 1889, 363, Dr. Gilbert raises the question regarding the validity of this species as distinct from *G. y-cauda*. We have reëxamined our specimens of each species, and have compared them with specimens of what we regard as *G. guaymasiæ* collected by Dr. Gilbert.

It is evident that the two species are very closely related and probably they should be combined. The following differences, however, seem to be constant:

G. y-cauda has a shorter head, more pointed snout, and larger eye. The pattern of coloration of the two seems about the same, but the white spots or blotches are more pronounced in *G. guaymasiæ*, while in *G. y-cauda* the black spots on the back are more prominent, and there is a series of black spots along the middle of the side which does not appear in the other species.

Putting the differences in tabular form we have the following:

| | <i>G. y-cauda</i> | <i>G. guaymasiæ</i> |
|----------------------|-------------------|---------------------|
| Head in length | 3½ (4) | 3 (3½). |
| Snout | More pointed. | More blunt. |
| Eye in head | Larger, 3 to 4. | Smaller, 4 to 5. |
| Color | Darker. | Lighter. |

94. *Gillichthys mirabilis* Cooper.

Gillichthys mirabilis Cooper, Proc. Cal. Acad. Nat. Sci. 1863, 109 (*San Diego Bay*); Lockington, Am. Naturalist, 1877, 474 (*San Francisco Bay; Gulf of California*). For full synonymy, vide Jordan & Eigenmann, Proc. U. S. Nat. Mus. 1886, 510.

Probably common, though we obtained but six specimens.

Dr. Gilbert has examined the types of *Gobius townsendi*, recently described by Eigenmann & Eigenmann (Proc. U. S. Nat. Mus. 1888, 463), from San Diego, and finds them to be the young of *Gillichthys mirabilis*.

95. *Gobiosoma histrio* Jordan.

Gobiosoma histrio Jordan, Proc. U. S. Nat. Mus. 1884, 260 (*Guaymas*); Jordan, Cat. Fishes N. A., 106, 1885 (name only); Jordan, Proc. U. S. Nat. Mus. 1885, 387; (name only); Jordan & Eigenmann, Proc. U. S. Nat. Mus. 1886, 506 and 508.

Two specimens of this interesting species were obtained. They measure 39 and 47 millimetres in total length and agree well with the original description.

96. *Scorpæna plumieri* Bloch.

Five specimens of this fish were obtained in the bay, where it is quite common.

97. *Scorpæna sonoræ* Jenkins & Evermann.

Scorpæna sonora Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 150 (*Guaymas*).

One small specimen obtained.

98. *Porichthys margaritatus* (Richardson).

Batrachus margaritatus Richardson, Voyage Sulphur, 67 (*Gulf of Fonseca*).

Porichthys notatus Girard, Proc. Acad. Nat. Sci. Phila. 1851, 111; U. S. Pac. R. R. Survey, 1859, 134.

Porichthys porissimus Günther, Cat. Fishes N. A., III, 176 (in part); Jordan & Jony, Proc. U. S. Nat. Mus. 1881, 5; Jordan & Gilbert, *ibid.*, 65 and 274 (*Gulf of California*); Jordan & Gilbert, Synop. Fishes N. A., 751 (in part), 1882.

Porichthys margaritatus, Jordan & Gilbert, Synop. Fishes N. A., 985, 1882; Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 626; Jordan, Proc. U. S. Nat. Mus. 1884, 41; Proc. U. S. Nat. Mus. 1885, 388; Cat. Fishes N. A., 1885, 116.

One specimen was obtained, which, compared with specimens from Santa Barbara, California, differs from them in the more slender form of the body, and in having the inside of the mouth and the gill cavities black.

99. *Gnathypops scops* Jenkins & Evermann.

Gnathypops scops Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 152 (*Guaymas*).

Three specimens were taken.

100. *Opisthognathus ommata* Jenkins & Evermann.

Opisthognathus ommata Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 153 (*Guaymas*).

Three specimens were taken.

101. *Hypsoblennius gilberti* Jordan.

Isesthes gilberti Jordan, Proc. U. S. Nat. Mus. 1882, 349 (*Santa Barbara*).

Isesthes gentilis, Jordan & Gilbert, Synopsis, 757, 1882.

Hypsoblennius gilberti, Jordan, Cat. Fishes N. A., 119, 1885.

The collection contains two small blennies, which we refer with some hesitation to this species. In one of them, however, there is a very dark spot upon the anterior part of the dorsal fin, while in the other it is not so dark.

Although the generic name *Hypsoblennius* was introduced by Dr. Gill without further explanation or definition than reference to a *type* (*H. hentzi*), it is probable that less confusion will be caused if Canon XLII, C. A. O., be strictly followed and *Hypsoblennius* be retained.

102. *Hypsoblennius striatus* Steindachner.

Blennius striatus Steindachner, Ichthyol. Beiträge v, 15, Tafel VIII, 1876 (*Panama*).

Hypsoblennius striatus, Jordan, Proc. U. S. Nat. Mus. 1885, 389 (name only).

Head $3\frac{1}{3}$ (4); depth 4 (5); eye 4 to 5 in head; D. XII-17; A. 18 or 19.

The head is a little greater than the depth; the snout steep and gently curved; orbital tentacles $1\frac{1}{2}$ to 2 times diameter of eye, usually four branches.

Dorsal fin little notched, its longest rays nearly 3 in head; anal lower, its rays $3\frac{1}{2}$ to 4 in head; pectorals $1\frac{1}{3}$ in head, just reaching anal.

Color yellowish; five quadrate spots of darker extending from dorsal fin to a line drawn from middle of eye to lower base of caudal, the anterior one above tip of pectoral; median line of side with a more or less distinct series of small spots; a short dark vertical line behind the eye; a dark blotch in front of origin of dorsal fin, and another on the humeral region; under side of head with two ill-defined bands of dark; dorsal fin more or less speckled with black; the anal with a narrow white border, above which is a broader band of dark brown.

Six specimens were obtained.

103. *Labrosomus xanti* Gill.

Labrosomus xanti Gill, Proc. Acad. Nat. Sci. Phila. 1860, 107 (*Cerro Blanco, Lower California*).

Clinus xanti, Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 368 (*Cape San Lucas*);

Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 108 (*Mazatlan*) (name only).

Labrisomus nuchipiinnis xanti, Jordan, Proc. U. S. Nat. Mus. 1885, 389 (*Mazatlan*);

Jordan, Cat. Fishes N. A., 120, 1885.

One specimen, 95 millimetres in total length, was obtained.

104. *Auchenopterus asper* Jenkins & Evermann.

(Plate II.)

Auchenopterus asper Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 154 (*Guaymas*).

Six specimens.

105. *Pseudobleinnius hypacanthus* Jenkins & Evermann.

Pseudobleinnius hypacanthus Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 156 (Guaymas).

One specimen.

106. *Citharichthys gilberti* Jenkins & Evermann.

Citharichthys gilberti Jenkins & Evermann, Proc. U. S. Nat. Mus. 1888, 157 (Guaymas.)

Citharichthys spilopterus Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 382 (Panama); *ibid.*, 1882, 630 (Panama); Jordan & Gilbert, Bull. U. S. Fish. Comm. 1882, 108 and 111 (Mazatlan; Panama); Jordan & Gilbert, Synopsis Fishes N. A., 1882, 817 (in part; Panama); Jordan, Proc. U. S. Nat. Mus. 1885, 391 (Mazatlan; Panama); Günther, Fishes Centr. America, 1869, 471, Pl. LXXX, Fig. 2 (Chiapam).

Citharichthys sumichrasti Jordan, A Review of the Flounders and Soles, in Ann. Report of Commr. Fish and Fisheries for 1886, bearing date 1889, 276 (Rio Zana-tenco, Chiapas; Panama).

It seems to us that Günther was wrong in identifying his west coast specimens with the east coast *Spilopterus*, and regard all Pacific coast references to *Spilopterus* as meaning the form which we have described as *C. gilberti*.

107. *Paralichthys adpersus* (Steindachner).

Pseudorhombus adpersus Steindachner, Ichthyol. Notizen v, 1867, 9, Tafel 2 (Chinchas Islands.) Jordan & Gilbert, Proc. U. S. Nat. Mus. 1882, 370 (Cape San Lucas.)

But one specimen taken.

108. *Achirus mazatlanus* (Steindachner).

Solea mazatlanus Steindachner, Ichthyol. Notizen IX, 1869, 23, Tafel 5 (Mazatlan.)

Common; eleven specimens were obtained.

109. *Balistes polylepis* Steindachner.

Pez de Puerto.

Balistes polylepis Steindachner, Ichthyol. Beiträge v, 21, 1876 (West coast of Mexico); Jordan & Gilbert, Proc. U. S. Nat. Mus. 1881, 276 and 277 (Punta San Felipe; Cape San Lucas), (name only); *ibid.*, 1882, 631 (Panama) (name only). Jordan & Gilbert, Bull. U. S. Fish Comm. 1882, 108 (Mazatlan); 111 (Panama), (name only); Jordan, Proc. U. S. Nat. Mus. 1885, 392 (Panama; Mazatlan), (name only); Jordan, Cat. Fishes N. A., 140, 1885 (name only).

Head, 3 (4); depth, 2 (2.4), greater in young; eye 4 to $4\frac{2}{3}$ in head. D. III-27; A. 25; scales.

Profile from snout to spinous dorsal gently arched, thence to soft dorsal nearly straight, and from there to caudal peduncle very slightly arched; under side a regular curve from snout to caudal peduncle, with slight irregularity at chin and ventral fin.

First dorsal spine long ($1\frac{2}{5}$ in head), stout, quadrilateral in cross-section, greatly roughened upon the anterior angles; second spine less than half length of first, while the third is about one-third length of the first.

The soft dorsal is greatly produced at the second to ninth rays, the longest about $1\frac{1}{2}$ in head; those back of the fifth gradually decrease in length and become more and more directed forward; the length of the base of the soft dorsal is greater than the head.

The first anal rays are less produced than the dorsal and are contained $1\frac{2}{3}$ in head; the base of the anal fin is some shorter than that of the soft dorsal. Pectorals short, $2\frac{1}{2}$ in head. Upper and lower caudal rays much produced in older specimens. Gill-slit extends from in front of the upper edge of pectoral obliquely upward and backward, its upper end being in a vertical line under the first dorsal spine. Eight teeth in each jaw, the middle pair strongest, pointed and curved, the lateral ones shorter and somewhat double pointed.

Eight specimens, ranging from 150 to 260 millimetres in total length, were obtained at Guaymas, where it is known as *Pez de Puerco* by the local fishermen.

110. *Spheroides politus* Girard.

Tetraodon politus Girard, U. S. Pac. R. R. Expl. Ex., Fishes, 1859, 340 (*San Diego, California*).

For synonymy, see Jordan & Edwards, Proc. U. S. Nat. Mus. 1886, 235, 239.

Up to the present time only large specimens, 1 foot in length, were known. As these differ from *Spheroides testudineus annulatus* in only a few important differences, Jordan & Edwards (*loc. cit.*) express the opinion that the former may be but the adult of the latter.

We have compared our specimens with *Spheroides testudineus annulatus* of corresponding sizes, and our specimens, including those from 3 inches in length to those of 1 foot, are all *entirely smooth*, except occasionally one shows a small patch of very small prickles on the breast. The interorbital space is flat in our specimens, concave in *S. testudineus annulatus*; the small, dark, round spots on the sides are much smaller in our specimens. From these facts it would seem that *S. politus* may be regarded as a good species.

The following species have been recorded by others from the Bay of Guaymas, but were not seen by us:

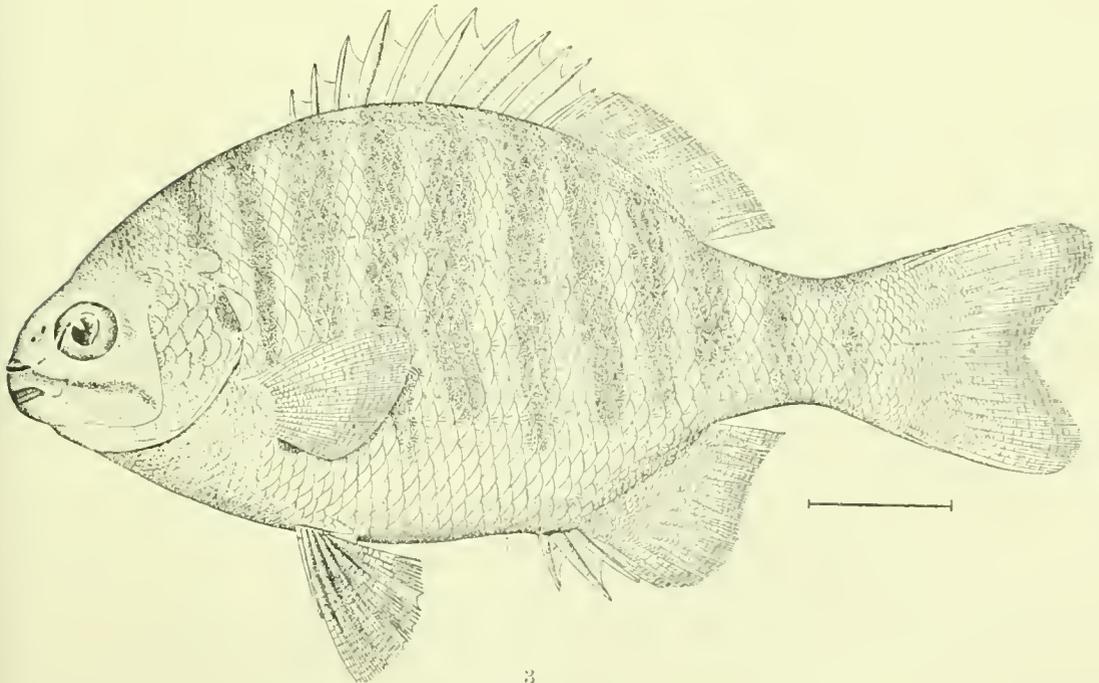
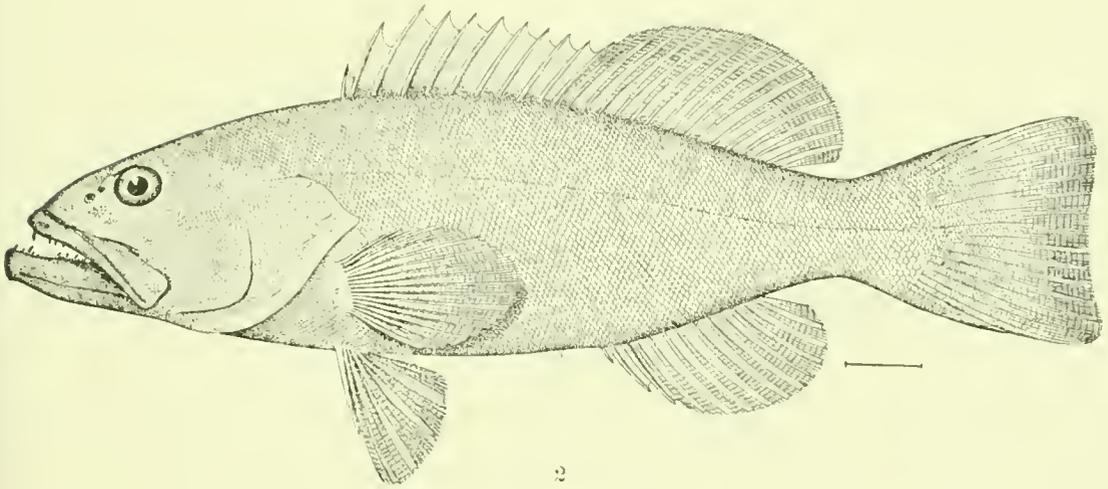
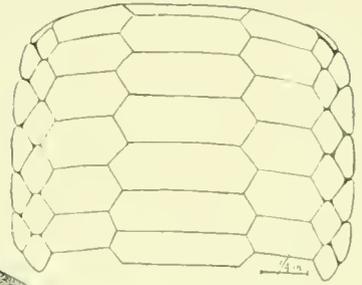
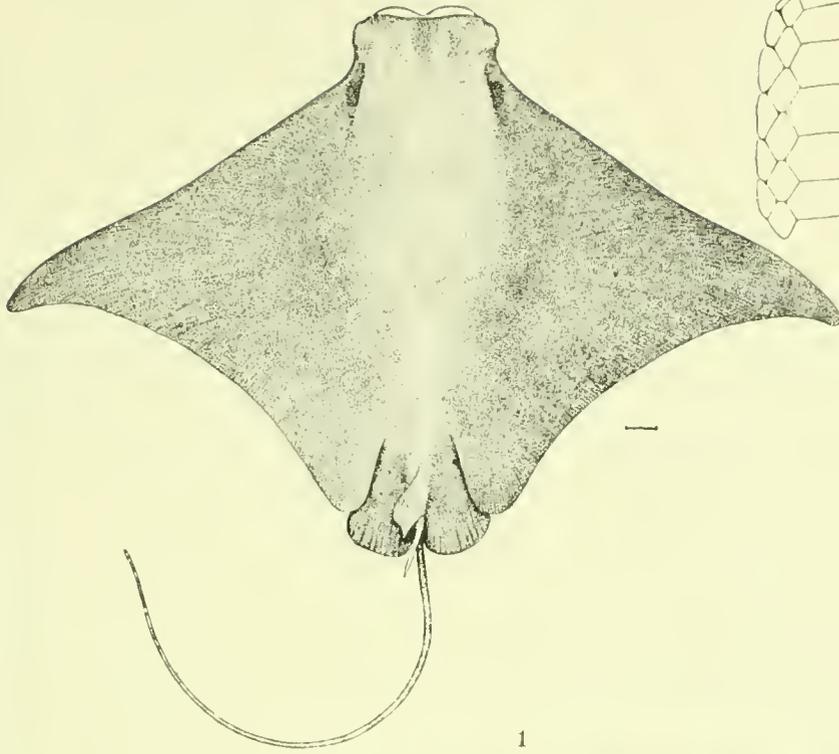
1. *Myrophis vafer*. Jordan, Proc. U. S. Nat. Mus. 1884, 260 (*Emeric*).
2. *Orthopristis cantharinus*. Jordan, Proc. U. S. Nat. Mus. 1885, 379 (*Nichols*).
3. *Cynoscion othonopternum*. Jordan, Proc. U. S. Nat. Mus. 1885, 383 (*Nichols*).
4. *Cynoscion macdonaldi*. Gilbert, Proc. U. S. Nat. Mus. 1890, 64.
5. *Gerres californiensis*. Jordan, Proc. U. S. Nat. Mus. 1885, 383 (*Nichols*).
6. *Gobius saporator*. Jordan, Proc. U. S. Nat. Mus. 1884, 260 (*Emeric*).
7. *Platophrys leopardinus*. Jordan, Proc. U. S. Nat. Mus. 1884, 260 (*Emeric*); *ibid.*, 1885, 391 (*Emeric*).

INDIANA STATE NORMAL SCHOOL, TERRE HAUTE, IND.;

DE PAUW UNIVERSITY, GREENCASTLE, IND.

December 15, 1890.





1. RHINOPTERA STEINDACHNERI. 2. MYCTEROPERCA JORDANI. 3. HERMOSILLA AZUREA.

