

20.—REPORT UPON A COLLECTION OF FISHES MADE IN SOUTHERN FLORIDA DURING 1889.

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The months of February, March, and April, 1889, were spent by the writer in making an ichthyological exploration of the southern coast of Florida, in conjunction with the U. S. Fish Commission schooner *Grampus*, which was then at work upon the neighboring red-snapper grounds of the Gulf of Mexico.* A large seine boat and a dory belonging to that vessel were assigned to this investigation, and the necessary fishing appliances and camping utensils were also provided, chiefly from her outfit. The party consisted, besides the writer, of a pilot (Capt. William Pent, of Key West) and a seaman and the cabin boy from the schooner.

We left the *Grampus* at Indian Key February 11, with the intention of first proceeding northward inside of the Florida reefs to Miami, at the upper end of Biscayne Bay, but stormy weather interfering the work was begun in Card's Sound and carried thence through Barnes' Sound and northwestward along the Gulf coast as far as Tampa Bay. The *Grampus* was met at Charlotte Harbor March 4, for the purpose of replenishing our supplies, and again at Port Tampa March 29, where the regular shore investigation was concluded April 4. Some seining was, however, subsequently done at the Dry Tortugas and in the vicinity of Key West during the passage to New York.

Nearly all the work was limited to salt water, on account of the remoteness of the fresh-water streams from the shores and their inaccessibility from most places which we visited. We managed, however, to reach a few isolated fresh-water ponds by carrying the collecting outfit overland, but this proved to be a very difficult undertaking in the thickly-wooded section where the attempts were made.

Between Biscayne Bay and Charlotte Harbor practically no fisheries exist. The coast from Cape Sable to Pavilion Key consists of mangrove shores and islands, entirely unsuited to the hauling of large seines. On Estero Bay, just below Charlotte Harbor, there is a small fishing ranch operated by two men, but it is scarcely worthy of notice. At Gordon's Pass and at Marco a little fishing is also done by a few individuals to supply the local demand, but it is not upon a sufficiently large scale to entitle it to recognition from a commercial standpoint.

* Report upon an investigation of the fishing grounds off the West Coast of Florida. By A. C. Adams and W. C. Kendall. Bull. U. S. Fish Com., vol. ix, for 1889, pp. 325-349.

The present paper is a record of all the species of fishes collected or observed at each locality visited, together with such field notes respecting them as seem to merit publication. The specimens preserved in alcohol have been examined by Dr. David S. Jordan, and the specific identifications of the same rest upon his authority. I am also under special obligations to Mr. Louis Rettger, assistant in the museum of the University of Indiana, for the arrangement in order of the species given in the main list. The type series of specimens is contained in the U. S. National Museum at Washington. Partial sets have also been deposited in the museum of the University of Indiana and in the museum of the Cincinnati Society of Natural History.

Two lists are given. The first is limited to those species of which specimens were preserved and subsequently studied by Dr. Jordan and the writer. The second or supplemental list includes the larger species taken and not saved because of their size, and also those which were observed but not captured.

GALEORHINIDÆ.

1. *Eulamia limbata* (Müller & Henle) (?). Spotted-fin Shark.

San Carlos Pass, west coast of Florida. Teeth very narrow, scarcely serrate; first dorsal, pectoral, and lobe of caudal tipped with black; back dark; belly abruptly pale; a blackish stripe along side below the boundary of the dark area, extending to opposite pectoral; second dorsal very small, as large as anal. First dorsal well behind pectoral. A very young specimen, 20 inches long, too young to be certainly identified.

PRISTIDIDÆ.

2. *Pristis pectinatus* Latham. Sawfish.

West coast of Florida. Abundant in all bays of the west coast where mud flats occur. I observed schools of young ones feeding in shallow water. They use their "saws" for stirring up the mud or sand of the bottom in order to obtain their food. The motion of the saw is principally a forward and backward one. The young when born are nearly or quite 2 feet long, including the saw, which is about one-third their length. I captured several at Big Gasparilla, with a dip net, in shallow water, from 3 to 5 feet long, by entangling the net in their saws and towing them ashore. I also captured one on a shark line measuring fully 18 feet in length. The large ones frequently become entangled in the nets of fishermen and turtlers and do much damage in that way.

RAJIDÆ.

¹⁰¹ 3. *Raja lævis* Mitchell (?). Barn-door Skate.

Stump Pass. Several embryos, apparently of this species, although it has not hitherto been recorded from any locality so far south. These embryos were blown into the pass during a southwest gale, and when taken from their egg cases swam around very lively in a bucket of water.

SILURIDÆ.

- 165
4. *Ailurichthys marinus* (Mitchill). Gaff-topsail Catfish.

West coast of Florida. This and the next species are very abundant everywhere in the bays and inlets of Florida, and also ascend the brackish streams. They will take anything in the nature of a bait, dead or alive, from the artificial fly to a chip of wood. They are great nuisances to the angler or fisherman, and, though not a bad food fish, are never eaten. They make a continual grunting, rasping, or croaking noise when caught, and also when swimming. They are taken usually from one-half to 2 pounds in weight.

- 167
5. *Tachysurus felis* (Linnæus). Sea Catfish.

West coast of Florida.

STOLEPHORIDÆ.

- 749
6. *Stolephorus mitchilli* (Cuv. & Val.). Anchovy.

Card's Sound; Barnes' Sound; Key West; Marco; Gordon's Pass; Big Estero Pass. This and the next species are very abundant in most of the inlets and passes of the west coast, coming in and going out with the tide. At Marco or the Gasparillas fisheries for taking and curing anchovies ought to be very profitable if established.

- 737
7. *Stolephorus browni* (Gmelin). Anchovy.

Cape Sable Creek; Cape Romano; Big Gasparilla.

- 734
8. *Stolephorus per fasciatus* (Poey). Anchovy.

Marco Inlet. This anchovy was more abundant at Marco than anywhere on the west coast.

CLUPEIDÆ.

- 696
9. *Dussumieria stollifera* Jordan & Gilbert.

Card's Sound; Barnes' Sound. This beautiful little species, discovered a few years ago at Mazatlan, Mexico, by C. H. Gilbert, is common in the shallow waters of Card's Sound and Florida Bay.

- 716
10. *Harengula macrophthalmia* (Ranzani). Pilchard.

Key West. Common along the Florida Keys. It is sometimes used as bait for kingfish (*S. caballa*, *S. regalis*) and other large species.

- 718
11. *Harengula arcuata* (Jenyns). Pilchard. (*Clupea humeralis* Cuv. & Val., *Harengula pensacola* Goode & Bean.)

Cape Sable Creek; Marco; San Carlos Pass; Big Gasparilla; Egmont Key. This little herring is abundant at most of the inlets of the west coast, going in and out with the tide.

- 720
12. *Opisthonema oglinum* (Le Sueur). Thread Herring; Sprat.

Big Gasparilla; Egmont Key. Common along the west coast.

ELOPIDÆ.

- 677
13. *Elops saurus* Linnæus. Ten-pounder.

Marco; west coast of Florida. Of this species some very young specimens were obtained representing a larval or leptocephalous form, translucent and elongate, recognizable only by the fin rays and the structure of the jaws.

SYNODONTIDÆ.

- 833
14. *Synodus fœtens* (Linnæus). Lizard Fish. (*Synodus epizianus* Poey.)
Key West; Gordon's Pass; San Carlos Pass; Big Gasparilla. This voracious little marauder is common in all of the bays of the west coast.

CYPRINODONTIDÆ.

- 1016
15. *Jordanella floridæ* Goode & Bean. Jordan's Minnow.
Fresh pond near Myakka River. Common in fresh water throughout the State.
- 1032 1/2
16. *Heterandria formosa* Agassiz.
Fresh pond near Myakka River. This minute species and the next are common in fresh ponds and brackish waters.
- 997
17. *Lucania parva* (Baird & Girard). Rain-water Fish.
Card's Sound; Gordon's Pass; Big Gasparilla; Myakka River; Long Boat Key.
- 948
18. *Fundulus similis* Baird & Girard. Salt-water Minnow.
Barnes' Sound; Cape Romano; Marco; Big Gasparilla; Gordon's Pass; Myakka River; Stump Pass; Lemon Bay; Sarasota Bay.
At the mouth of Bowley's Creek, in Sarasota Bay, I saw this species congregated in thousands, spawning on the shallow sand bars. Two males would usually head off the female and, one on each side of her, convey her into water only deep enough to cover them, sometimes even forcing her out of the water on the bare sand. The males pressed close to the side of the female, their caudal fins lapped over her back, and with tremulous motions the spawn was emitted and fertilized. The males were quite black on top of head and shoulders, with bright yellow throat and sides.
- 953
19. *Fundulus ocellaris* Jordan & Gilbert. Salt-water Minnow.
Card's Sound. This and the following cyprinodonts are very abundant in the brackish water of all bays and bayous, in the small streams emptying into them, and also in adjacent fresh-water ponds.
- 952
20. *Fundulus heteroclitus* (Linnæus). Salt-water Minnow.
Barnes' Sound; Gordon's Pass; Myakka River; Stump Pass.
- 1006
21. *Cyprinodon variegatus* Lacépède. Toothed Minnow.
Barnes' Sound; Big Gasparilla; Myakka River; brackish pond near Stump Pass; Long Boat Key.
- 1013
22. *Cyprinodon carpio* Günther. Toothed Minnow.
Card's Sound; Barnes' Sound; Key West; Marco; Gordon's Pass; San Carlos Pass; Big Gasparilla; Long Boat Key; Sarasota Bay. This is *Cyprinodon mydrus* Goode & Bean.
- 981
23. *Zygonectes chrysotus* (Günther). Top Minnow.
Myakka River and fresh pond near the river. Female with pearl-colored dots scattered over the sides; male nearly plain, with narrow dark crossbars posteriorly.
- 975
24. *Zygonectes henshalli* Jordan. Top Minnow.
Gordon's Pass; Myakka River. Numerous specimens, apparently the young of this species. Body with about ten dark crossbars; caudal with crossbars of dark dots.
- 1021
25. *Gambusia patruelis* (Baird & Girard). Mud Minnow.
Myakka River and fresh pond near the river.
- 1041
26. *Mollienesia latipinna* Le Sueur. Big-finned Minnow.
Card's Sound; Barnes' Sound; Gordon's Pass; Stump Pass; Lemon Bay.

OPHISURIDÆ.

650 27. *Mystriophis interinctus* (Richardson).

Lemon Bay; one young specimen. *Mystriophis punctifer* (Kaup), *M. mordax* (Poey), and *M. schneideri* (Steindachner) are probably all identical with the present species.

SCOMBERESOCIDÆ.

1070 28. *Tylosurus notatus* (Poey). Billfish.

Card's Sound; Black Sound; west coast of Florida. This and the young of the next species are abundant in the bays and harbors of the west coast, swimming in large schools, and are preyed upon by all surface-feeding fishes, as the Spanish mackerel, kingfish, salt-water trout, etc. The steward of the *Grampus* cooked a quantity at Boca Grande, on Charlotte Harbor, which were greatly relished by the crew. When fried they remind one somewhat of smelts.

1080 29. *Tylosurus marinus* (Bloch & Schneider). Billfish.

Card's Sound; Lemon Bay; west coast of Florida.

1091 30. *Hemirhamphus roberti* Cuv. & Val. Needlefish.

Cape Sable Creek; west coast of Florida; also abundant in schools in similar situations as the billfishes; when fried are quite palatable.

SYNGNATHIDÆ.

1150 31. *Siphostoma affine* (Günther). Pipe-fish.

Card's Sound; Barnes' Sound; Key West; Marco; Big Gasparilla; Lemon Bay; Long Boat Key; Garden Key. The young of this, and the other pipe-fishes which follow, are common in the eelgrass and weeds of all shallow bays and coves.

1152 32. *Siphostoma louisianæ* (Günther). Pipe-fish.

Egmont Key.

1140 33. *Siphostoma floridæ* Jordan & Gilbert. Pipe-fish.

Gordon's Pass; Big Gasparilla.

HIPPOCAMPIDÆ.

1164 34. *Hippocampus zosterae* Jordan & Gilbert. Sea Horse.

Three specimens about 1½ inches long. That this species is adult at this small size is shown by the fact that the pouch of a male specimen is full of young more than a third of an inch long, the tails of two of them projecting conspicuously from his pouch.

MUGILIDÆ.

1211 35. *Mugil ourema* Cuv. & Val. Silver Mullet.

Barnes' Sound; Cape Romano; Marco; Gordon's Pass; Big Estero Pass. The silver mullet does not grow so large as the next species, nor is it so abundant; neither is it so desirable a food-fish.

1208 36. *Mugil cephalus* Linnæus. Striped Mullet.

Cape Sable Creek; west coast of Florida. This is the commercial "mullet." It is taken in immense numbers at the fishing ranches of the west coast, where it is salted and shipped to Key West and Havana. It is at its best in October and November,

when full of roe, being then quite fat and a delicious fish broiled. It spawns in October and November in brackish water. Its usual weight is a pound or two, as taken at the fishing ranches. The most abundant fish on the Florida coast.

The Pickens Ranch at Gasparilla was the only one in operation during my trip. They were taking mullet and sheepshead, with red-fish and salt-water trout, and salting them for the Cuban market during the Lenten season.

37. *Mugil trichodon* Poey. Fan-tail Mullet.

Key West. Three young specimens.

38. *Querimana gyrans* Jordan & Gilbert. Little Mullet.

Marco; Gordon's Pass; Myakka River. This pigmy mullet is abundant in most of the inlets and bays of the southwest coast.

ATHERINIDÆ.

39. *Atherina stipes* Müller & Troschel. Sardine.

Card's Sound; Barnes' Sound. Very common in the shallow waters of the sounds and of Florida Bay at the southern extremity of the peninsula. It is a good bait for any of the large surface-feeding fishes.

40. *Labidesthes sicculus* Cope. Duck-bill Silversides.

Myakka River. This is the southernmost record of this widely distributed species.

41. *Menidia vagrans* Goode & Bean. Silversides.

Barnes' Sound; Cape Sable Creek; Cape Romano; Marco. This and the next species of silversides are abundant in the shallow portions of all bays visited.

42. *Menidia peninsulæ* Goode & Bean. Silversides.

Barnes' Sound; Marco; San Carlos Pass; Big Gasparilla; Myakka River; Big Sarasota Bay; Long Boat Key.

SPHYRÆNIDÆ.

43. *Sphyræna picuda* (Bloch & Schneider). Barracuda.

Card's Sound; Key West; west coast of Florida. The shallow waters between the Florida Keys and the mainland seem to be the favorite feeding or breeding grounds of this formidable fish. I saw numerous specimens fully 6 to 7 feet long, and several of this size were speared by my pilot, a native of Key West, who was very expert in the use of the two-pronged spear or "grains." It is a favorite food-fish with Key West people, and is usually taken with the "grains."

ECHENEIDIDÆ.

44. *Echeneis naucrates* Linnæus. Shark Sucker.

Lemon Bay; Sarasota Bay; Garden Key. From one to half a dozen specimens of this fish, from 6 to 12 inches in length, are usually attached to sharks, and permit themselves to be taken from the water with their host when captured on the grains or with a shark-line.

While at anchor in Sarasota Bay I noticed several large ones attached to the rudder and stern-post of my boat. With a baited hook I soon caught them all, as they are very voracious, and will take anything in the way of fish or flesh bait. They were fully 2 feet long. When affixed by the "sucking disk" (a modification of the dorsal

fin) to a shark or other object it is difficult to detach one by a direct pull, but by a quick, sliding, forward motion it is easily removed. I have seen them 3 to 4 feet in length. They seem to attach themselves to sharks to secure fragments of food which are frequently ejected by their overfed hosts.

SCOMBRIDÆ.

1287

45. *Scomberomorus maculatus* (Mitchill). Spanish Mackerel.

West coast of Florida. Owing to the unusual coolness of the water this fine species did not put in an appearance in any considerable numbers until the latter part of March. In April the schools were abundant in Tampa Bay and were taken by anglers from the piers at Port Tampa, in company with the salt-water trout (*C. maculatus*).

CARANGIDÆ.

1309

46. *Oligoplites saurus* (Bloch & Schneider). Leather Jacket.

West coast of Florida. Not uncommon about the inlets.

1329

47. *Trachurus trachurus* Linnæus. Skipjack.

Gulf of Mexico; one specimen. Scutes 36-38, as usual in European specimens.

1370

48. *Caranx chrysus* (Mitchill). Runner.

West coast of Florida. This and the next species were abundant in all channels during the winter and spring, advancing and retreating with the tide. They bite readily at a bait or troll, or the artificial fly, and are caught in great numbers by anglers from the banks of inlets or passes, or by trolling in the channels. They are fair food-fishes and give considerable sport to the angler.

1338

49. *Caranx hippos* (Linnæus). Jack. Cavalla.

West coast of Florida.

1358

50. *Selene vomer* (Linnæus). Moonfish.

West coast of Florida. Not uncommon at the mouths of deep inlets.

1369

51. *Trachinotus carolinus* (Linnæus). Pompano.

Egmont Key. Owing to the cool water this prince of food-fishes was remarkably scarce during my voyage. At Pickens's Ranch, on Gasparilla, only about twenty-five had been taken at the time of my visit, though the fishermen hauled whenever the tide served on the outside beaches. It was full of nearly ripe spawn in April.

1363

52. *Trachinotus falcatus* (Linnæus). Cobbler; Pompano. (*Trachinotus ovatus* (L).)

Key West; one young specimen.

NOMEIDÆ.

1374

53. *Nomeus gronovii* (Gmelin).

Gulf of Mexico. Numerous specimens were taken from floating sea-weed and jelly-fishes, but mostly from the "Portuguese man-of-war" (*Physalia*).

STROMATEIDÆ.

1395

54. *Stromateus triacanthus* Peck. Dollar fish.

Lemon Bay; Big Sarasota Bay. Young specimens. As yet, no adult of this species seems to have been taken in the Gulf of Mexico. The specimens collected were all taken from beneath the disks of large floating jelly-fishes.

CENTRARCHIDÆ.

- 1415 55. *Chænobryttus gulosus* Cuv. & Val. Warmouth Bream.
Myakka River and fresh pond near the river. This and the other sunfishes obtained are common species of the southern lowlands.
- 1416 56. *Enneacanthus obesus* (Baird). Little Bream.
Myakka River. The most southern locality recorded for this species.
- 1434 57. *Lepomis holbrooki* Cuv. & Val. Yellow Bream.
Myakka River. The most southern locality yet recorded for this sunfish.
- 1422 58. *Lepomis punctatus* Cuv. & Val. Spotted Bream.
Myakka River. Abundant in all fresh waters in Florida. I have taken it much farther south on the east coast, in waters emptying into Biscayne Bay.
- 1431 59. *Lepomis pallidus* Mitchell. Blue Bream.
Western Florida. Specimens from a fresh-water pond on Point Pinellas were the most brilliantly colored sunfishes I have ever seen, the tints being yellow, green, rosy, and purple, the latter predominating below and of a very intense hue.

SERRANIDÆ.

- 1633 60. *Serranus subligarius* (Cope).
Big Gasparilla; Lemon Bay. Small specimens not uncommon in the bays.

CENTROPOMIDÆ.

- 1544 61. *Centropomus undecimalis* (Bloch). Ravallia; Snook.
West coast of Florida. Abundant in all bays and brackish waters and running up the larger fresh streams. A voracious, gamy fish with pikelike habits. My pilot grained some in Card's Sound ranging up to 25 or 30 pounds in weight. It is a fair food-fish, but tastes somewhat soapy or slimy unless skinned. The fin formula of several was D. VI, 10; A. II, 6.

SPARIDÆ.

- 1674 62. *Lutjanus synagris* (Linnaeus). Lane Snapper.
Barnes' Sound; Key West; Lemon Bay. This pretty and strongly marked species was very abundant along the Florida Keys, and is a favorite pan-fish at Key West. The young were common along the west coast.
- 1670 63. *Lutjanus analis* (Cuv. & Val.). Mutton-fish.
West coast of Florida. A common species in the channels about the Keys, and a fairly good food-fish, growing to a foot or two in length. Not seen along the mainland.
- 1662 64. *Lutjanus griseus* (Linnaeus). Mangrove Snapper.
Key West; Myakka River. Abundant about the mangroves in all bays and inlets, and often in brackish water. It is a good game fish, taking both bait and artificial fly, but being very shy it must be fished for cautiously. It is a good food-fish, usually weighing a pound or two, occasionally five or six.
- 1669 65. *Lutjanus aya* (Bloch). Red Snapper.
Key West; Snapper Banks. A large number of this well-known species was taken with hand-lines on the "banks" north of Dry Tortugas by the *Grampus*, weighing from 5 to 20 pounds each.

- 1664 66. *Lutjanus caxis* (Bloch & Schneider). Schoolmaster Snapper.
Card's Sound; Key West; Big Gasparilla; west coast of Florida. Especially common about the Keys, and one of the numerous pan-fishes taken to the Key West market.
- 1701 67. *Hæmulon plumieri* (Lacépède). Common Grunt; Sow Grunt.
Key West. The most common and most esteemed of the pan-fishes sold in the Key West market, and one of the most beautiful.
- 1700 68. *Hæmulon sciurus* (Shaw). Yellow Grunt; Boar Grunt.
Garden Key; Key West. The handsomest of the "grunts." It is abundant in the channels about the Keys, where it is taken by the fishermen with sea-crawfish for bait. It is popularly supposed to be the male of the preceding species. The young are found in grassy coves about Key West.
- 1695 69. *Hæmulon parra* (Desmarest). Black Grunt.
Card's Sound; Key West; Marco; Lemon Bay. The young of this species were more generally distributed along the west coast than those of the other grunts.
- 1761 70. *Lagodon rhomboides* (Linnæus). Bream; Sailor's Choice.
Key West; Marco; Gordon's Pass; Big Gasparilla; Myakka River; San Carlos Pass. This pretty and well-known species is abundant all around the coasts of Florida, and is a good pan-fish, though of small size. The very young were abundant in brackish water.
- 1765 71. *Archosargus probatocephalus* (Walbaum). Sheepshead.
Key West; west coast of Florida. One of the most abundant fishes on the west coast, particularly about mangrove roots covered with coon oysters, oyster beds, and barnacle-covered piles of wharves, etc. It is very rare about the Keys. I saw but one specimen at Key West, which was given to me by a fisherman, with the name of "sheepshead porgy." Large numbers are taken at the fishing ranches and salted with the mullet. Spawns in Florida in March and April.

MULLIDÆ.

- 1271 72. *Upeneus maculatus* (Bloch). Goat-fish.
Key West; Garden Key. Young specimens not rare about the Keys.

SCIÆNIDÆ.

- 1443 73. *Bairdiella chrysura* (Lacépède). Yellow-tail.
Myakka River. A pan-fish occurring commonly at Key West, and the young not scarce in the bays and bayous of the west coast.
- 1469 74. *Leiostomus xanthurus* (Lacépède). Spot.
Marco; Gordon's Pass; Big Gasparilla; Myakka River; San Carlos Pass; Egmont Key; Long Boat Key. The young are very abundant in all bays of the southwest and west coasts.
- 1488 75. *Menticirrus americanus* (Linnæus). Whiting.
Marco; Charlotte Harbor; Garden Key. The whiting is rather a rare fish on the west coast. I saw but one adult specimen, which I took at Cape Haze, at the head of Charlotte Harbor. The young were not uncommon.
- 1492 76. *Menticirrus littoralis* (Holbrook). Whiting.
Egmont Key. Still more scarce than the preceding species. Only a few young specimens seen.

147 ✓
77. *Micropogon undulatus* (Linnæus). Croaker.
Marco; Gordon's Pass. The young are especially abundant in the shallow coves
of the bays on the west coast, some being but an inch or two in length.

186 ✓
78. *Sciæna ocellata* (Linnæus). Redfish.
Gordon's Pass; Myakka River; west coast of Florida. Very abundant in the
bays and brackish water, and running up fresh-water streams. Not seen along the
Keys. No very young were observed, but we took adults up to 40 pounds in weight.
The characteristic spot on the tail was sometimes broken up into two or three, and
one taken by the seine of the *Fish Hawk* near Punta Gorda had as many as twelve
small spots.

GERRIDÆ.

177 4
79. *Gerres harengulus* (Goode & Bean). "Shad."
Barnes' Sound; Key West; Lemon Bay; Garden Key. This and the next species
of so-called "shad" are very abundant all along the west coast. Not esteemed as food-
fishes. 1774

80. *Gerres gula* (Cuv. & Val.). "Shad."
Card's Sound; Barnes' Sound; Key West; Cape Sable Creek; Cape Romano;
Marco; Gordon's Pass; San Carlos Pass; Big Gasparilla; Long Boat Key; Egmont
Key; Garden Key.

177 8
81. *Gerres cinereus* (Walbaum). Broad "Shad." Irish Pompano.
Card's Sound; Cape Romano; Gordon's Pass; Myakka River. This is a larger
species than the preceding and is sometimes sold in the Key West market. I have
heard it called "Irish Pompano."

EPHEPPIDÆ.

207
82. *Chætodipterus faber* (Linnæus). Angel-fish.
West coast of Florida. One of the best food-fishes, but not abundant along shore.

POMACENTRIDÆ.

1944
83. *Pomacentrus leucostictus* (Müller & Troschel). Cock-eyed Pilot.
Garden Key, Dry Tortugas. This beautiful little fish is not uncommon about
the coral reefs.

LABRIDÆ.

2012
84. *Lachnolaimus maximus* (Walbaum). Hog-fish.
Key West. A handsome and much esteemed food-fish at Key West, growing to
several pounds in weight, and rather common.

2021
85. *Halichæres radiatus* (Linnæus). Pudding-wife.
Key West. This gay-colored fish with rainbow hues is a common food-fish at
Key West. It reaches several pounds in weight.

2028
86. *Halichæres bivittatus* (Bloch). Slippery Dick.
Key West; Big Gasparilla; Lemon Bay; Garden Key. Almost as gaily colored
as the preceding species, but much smaller and not esteemed as a food-fish. The
young are not uncommon in quiet, grassy coves about the Keys.

2049
87. *Doratonotus megalepis* Günther.
Garden Key, Dry Tortugas. Two fine specimens of this rare and beautiful fish
were taken.

- 2073 88. *Sparisoma distinctum* (Poey). Parrot-fish.
Garden Key, Dry Tortugas. Small specimens, apparently of this species.
- 2078 89. *Sparisoma flavescens* (Bloch & Schneider). Parrot-fish.
Key West. Young specimens of this and the next species are abundant in the grassy coves, especially between the Marine Hospital and Fort Taylor, at Key West. A small and unimportant species as a food-fish.
- 2064 90. *Sparisoma hoplomystax* (Cope). Parrot-fish.
Key West. This is *Sparisoma cyanolepis* Jordan & Swain.

SCORPÆNIDÆ.

- 2244 91. *Scorpæna grandicornis* (Cuv. & Val.).
Key West. The young were found in the same situations as the preceding species.

TRIGLIDÆ.

- 2443 92. *Prionotus tribulus* (Cuv. & Val.). Sea Robin.
Cape Romano; Gordon's Pass; Big Gasparilla; San Carlos Pass. The young of this and the next species are common in the eelgrass of the bays and bayous.
- 2429 93. *Prionotus scitulus* Jordan & Gilbert. Sea Robin.
Cape Romano; Big Gasparilla.

GOBIIDÆ.

- 2539 94. *Microgobius thalassinus* Jordan & Gilbert.
Marco Inlet. This and the following little "gobies" are not uncommon among the grass and weeds of sheltered situations in the bays.
- 2537 95. *Microgobius gulosus* (Girard). Goby.
Card's Sound; Marco; Gordon's Pass; Big Gasparilla; Myakka River; Lemon Bay; Long Boat Key.
- 2501 96. *Gobius soporator* Cuv. & Val. Rock-fish.
Marco; Myakka River.
- 2505 97. *Gobius stigmaturus* Goode & Bean. Goby.
Card's Sound.
- 2518 98. *Gobius amaragdus* Cuv. & Val. Goby.
Marco; Gordon's Pass. Numerous specimens of this species, previously known on the Florida coast from only a single specimen taken at St. Augustine.
- 2504 99. *Gobiosoma molestum* Girard. Goby.
Card's Sound; Marco; Gordon's Pass; Big Gasparilla; Myakka River; Lemon Bay.

BLENNIIDÆ.

- 2640 100. *Auchenopterus marmoratus* (Steindachner). Blenny.
Card's Sound. This species and the next had not previously been taken north of Key West.
- 2645 101. *Auchenopterus fasciatus* (Steindachner). Blenny.
Card's Sound.

BATRACHIDÆ.

2406
102. *Batrachus tau* Linnæus. Toad-fish. Oyster-fish.

Big Gasparilla; Lemon Bay. This and the next *bizarre* species are common about oyster beds. They are harmless, but by the fishermen are thought to be poisonous.

9607
103. *Batrachus pardus* Goode & Bean. Toad-fish.
West coast of Florida.

LEPTOSCOPIDÆ.

2593
104. *Dactyloscopus tridigitatus* Gill.
Key West. Not common.

PLEURONECTIDÆ.

3028
105. *Platophrys ocellatus* Agassiz.

Key West; Garden Key. The young of this and the following "flat fishes" are common in quiet, grassy situations, the larger ones being found in deeper water.

2997
106. *Citharichthys macrops* Dresel.
Big Gasparilla; Egmont Key.

2977
107. *Paralichthys albigutta* Jordan & Gilbert.
Marco; Gordon's Pass; Big Gasparilla; Lemon Bay.

2476
108. *Paralichthys squamilentus* Jordan & Gilbert.
Egmont Key.

3004
109. *Etropus crossotus* Jordan & Gilbert.
Gordon's Pass; San Carlos Pass.

3046
110. *Achirus lineatus* (Linnæus).
Barnes' Sound; Gordon's Pass; Big Gasparilla.

3052
111. *Achirus fasciatus* Lacépède.
Myakka River.

3061
112. *Symphurus plagiusa* (Linnæus). Sole.
Marco; Gordon's Pass; Big Gasparilla; Lemon Bay; Long Boat Key.

BALISTIDÆ.

2140
113. *Balistes carolinensis* Gmelin. Turbot.
West Coast of Florida. Common. Taken to Key West as a food-fish.

2155
114. *Monacanthus ciliatus* (Mitchill). Leather-fish.
Big Gasparilla; Garden Key. This and the following "leather-fishes" are not uncommon, but are not used for food.

2156
115. *Monacanthus hispidus* (Linnæus). Leather-fish.
Key West; Big Gasparilla.

OSTRACIDÆ.

2144
116. *Ostracion trigonum* (Linnæus). Shell-fish.

West coast of Florida. This and other "cow-fishes" or "trunk-fishes" are roasted "in the shell," and are very fair food-fishes.

DIODONTIDÆ.

2190

117. *Chilomycterus schœpfi* Walbaum. Porcupine-fish.

Egmont Key. This and the other "puffers" or "swell-fish" are common, but never eaten.

TETRODONTIDÆ.

2172

118. *Spheroides spengleri* (Bloch). Swell-fish.

Key West; Big Gasparilla.

2174

119. *Spheroides maculatus* (Bloch & Schneider).

Big Estero Pass. This northern species has not hitherto been recorded from any point south of Beaufort, North Carolina.

ANTENNARIIDÆ.

3080

120. *Antennarius ocellatus* (Bloch). Toad-fish.

Lemon Bay. This queer form is rather common about mud-flats.

3070

121. *Pterophryne histrio* (Linnaeus). Mouse-fish.

Gulf Stream, off Savannah. Taken from floating sea-weed.

MALTHIDÆ.

3093

122. *Malthe radiata* (Mitchill). Bat-fish.

West coast of Florida. Rather common in sheltered bays with muddy or sandy bottom.

SUPPLEMENTAL LIST.

The following species were collected or observed during the investigation, but specimens were not retained because of the limited space available for the preservation of our collections.

GALEORHINIDÆ.

123. *Galeocerdo maculatus* (Ranzani). Leopard Shark.

Indian Key. A large one passed within a few feet of my boat off Indian Key. Recognized by its very long caudal fin and spotted coloration. Called by my pilot "leopard-shark."

49

124. *Carcharhinus platyodon* (Poey). Man-eater.

Florida Keys, west coast of Florida. Met with frequently at most of the inlets and passes, and taken on shark line. Teeth strongly serrate, upper and lower.

48

125. *Carcharhinus lamia* (Risso). Cub Shark.

Key Largo; Dry Tortugas. We caught one at Key Largo, 9 feet in length, and saw several in the harbor of Garden Key, back of Fort Jefferson, which answered the description of Dr. Jordan in Proc. U. S. National Museum, 1884, p. 104.

55

126. *Carcharhinus brevirostris* (Poey). Blue Shark.

Cape Sable Creek; Marco. Shot 2 specimens at the entrance to Cape Sable Creek, and caught one on a shark line at Marco Inlet, which I took to be this species. Lower teeth, entire and narrow; upper teeth, serrate.

- 59 127. *Carcharhinus terræ-novæ* (Richardson). White Shark.
Cape Sable Creek; Marco; Gasparillas. A common shark about the Keys and southwest coast. Captured several specimens on shark line.

SPHYRNIDÆ.

- 60 128. *Sphyrna tiburo* (Linnæus). Bonnet-head Shark.
Charlotte Harbor. Captured a small one with the seine of the *Grampus* at Boca Grande, Charlotte Harbor.
- 62 129. *Sphyrna zyæna* (Linnæus). Hammer-head Shark.
Card's Sound; Florida Bay. Saw several on the southern coast between the Keys and mainland. Caught a small one with the grains at Cottonwood Key.

TRYGONIDÆ.

- 130 130. *Trygon sayi* (Le Sueur). Sting Ray; Stingaree.
West coast of Florida. Abundant in all shallow bays on the west coast. Caught a number in Charlotte Harbor and Tampa Bay.

MYLIOBATIDÆ.

- 131 131. *Stoasodon narinari* (Euphrasen). Spotted Ray.
Captured one specimen in Lemon Bay which I took to be this species. Disk much broader than long; tail four times the length of disk; color olivaceous, with small grayish white spots.
- 132 132. *Rhinoptera quadriloba* (Le Sueur). Cow-nosed Ray.
A young ray was grained in Barnes' Sound, presumably of this species. Disk much broader than long; snout apparently four-lobed; tail slender, as long as disk, with serrated spine. A larger one, apparently of this species, was also seen in shallow water near Cape Sable.

CEPHALOPTERIDÆ.

- 143 133. *Manta birostris* (Walbaum). Devil-fish.
Bocilla Pass; Punta Rassa; Tampa Bay. Saw a school of young devil-fish in the Gulf near Bocilla Pass. They passed within a few feet of my boat, so near that this well-marked species could not be mistaken for anything else. They were about 2 feet across the pectorals. Also saw a school of large ones, off Punta Rassa, that would measure from 10 to 20 feet across disk. Captured a small one in the seine at Tampa Bay.

LEPISOSTEIDÆ.

- 155 134. *Lepisosteus osseus* (Linnæus). Garfish.
Estero Bay. Took a specimen 3 feet in length on the east side of Estero Bay, near the mouth of a brackish stream.

AMIIDÆ.

- 159 135. *Amia calva* Linnæus. Mudfish.
Tampa. Saw a number in Hillsborough River at Tampa, and several that had been caught by a negro while fishing.

410

CYPRINIDÆ.

136. *Notemigonus chrysoleucus* (Mitchill). Golden Shiner.

Myakka River; Tampa. This species is common in the fresh and brackish streams emptying into Myakka and Hillsborough Rivers.

688

ALBULIDÆ.

137. *Albula vulpes* (Linnaeus). Bonefish.

Key West; Pavilion Key; San Carlos Pass. Took a number of specimens with bait and artificial fly, and captured a few in the seines—all adult; young not seen.

686

ELOPIDÆ.

138. *Megalops atlanticus* (Cuv. and Val.). Tarpon.

Card's Sound. Grained several from 10 to 30 pounds in weight in Card's Sound, but did not meet with it again on the west coast owing to the water being unusually cold. When I arrived at Punta Rassa on March 3 I learned that the first tarpon of the season had been taken the day before, although a score of anglers had been fishing for them daily for several weeks. I have never seen the young on the Florida coasts, the smallest observed being from 8 to 10 pounds in weight.

718

CLUPEIDÆ.

139. *Clupea pensacolæ* (Goode and Bean). Striped Pilchard.

Florida Keys, west coast of Florida. A very common species at deep-water inlets and about the Keys.

MURÆNIDÆ.

140. *Sidera fumebris* (Ranzani). Green Moray.

Dry Tortugas; Key West; Marco. Captured a large one at Loggerhead Key, Dry Tortugas. Saw several at Key West, and took one in the seine at Marco, too large to preserve.

663 141. *Sidera moringa* (Cuvier). Moray.

Key Largo; Key West. Took two large specimens at Key Largo, and saw one at Key West.

BELONIDÆ.

1083 142. *Tylosurus crassus* (Poey). Hound.

Florida Keys. Took several along the Keys from 2 to 4 feet long. Frequently saw them skipping along the surface and sometimes making long horizontal leaps above the water.

1090 143. *Hemirhamphus unifasciatus* Ranzani. Needle-fish.

Florida Keys. Took a number of specimens of this and the next species along the Keys and at Dry Tortugas, but none small enough to go into my collecting jars.

1094 144. *Hemirhamphus balao* Le Sueur. Needle-fish.

Florida Keys.

1101 145. *Exocoetus exiliens* Gmelin. Flying-fish.

Gulf of Mexico; Atlantic Ocean. Saw numerous specimens; one or two were taken aboard, which I identified as belonging to this species.

HIPPOCAMPIDÆ.

- 1167 146. *Hippocampus hudsonius* De Kay. Sea Horse.

Egmont Key. Saw several large examples of this species in the collection at the light-house on Egmont Key. The specimens were dry, but speckled coloration and whitish streaks about the eye were plainly discernible. D. 19, covering $3\frac{1}{2}$ rings; 11 body rings.

SCOMBRIDÆ.

- 1289 147. *Scomberomorus regalis* (Bloch). Kingfish.

Key West; Florida Keys. Captured a number of this and the next species on trolling lines while sailing along the Keys. They bite readily at a bait of pork rind, a spinner, or even a bit of white rag. Small herring-like fishes, as pilchard, anchovy, etc., also make good baits. They are excellent food-fishes.

- 1290 148. *Scomberomorus cavalla* (Cuvier). Kingfish.

Key West; Florida Keys.

- 1284 149. *Sarda sarda* (Bloch). Bonito.

Florida Keys; West Coast of Florida. Also caught frequently while trolling. A handsome fish of good size, but dark-meated and not very desirable as a food-fish.

CARANGIDÆ.

- 1323 150. *Decapterus punctatus* (Agassiz). Scad.

Charlotte Harbor; Dry Tortugas. Took a specimen at Boca Grande, Charlotte Harbor, and one at Garden Key, Dry Tortugas. Scutes 38.

- 1362 151. *Trachinotus rhodopus* Gill. Permit.

Loggerhead Key, Dry Tortugas. Took one weighing fully 25 pounds at Loggerhead Key. Color, light olivaceous on back, silvery on sides and below; dorsal and caudal fins dark.

- 1316 152. *Seriola lalandi* Cuv. & Val. Amber Jack.

Florida Keys. Took several on trolling lines weighing from 20 to 35 pounds.

POMATOMIDÆ.

- 1372 153. *Pomatomus saltatrix* (Linnæus). Bluefish.

Lemon Bay. Saw but one specimen, a young example 3 inches in length, taken in the seine at Lemon Bay.

CENTRARCHIDÆ.

- 1438 154. *Micropterus salmoides* (Lacépède). Large-mouth Black Bass; Trout.

Myakka River; Hillsborough River. Took numerous specimens in Myakka and Hillsborough Rivers and tributaries, in fresh and brackish waters.

SERRANIDÆ.

- 1416 155. *Serranus atrarius* (Linnæus). Blackfish.

Tampa Bay. Took several large ones on hook and line in Tampa Bay.

- 1422 156. *Serranus formosus* (Linnæus).

Key West; Gordon's Pass. Saw several examples at Key West market, and took one on hook and line at Gordon's Pass. A handsome fish and very fair for the table.

1602 ✓ 157. *Mycteroperca falcata phenax* Jordan & Swain. Scamp.

Key West; Ironwood Key; Key Largo. Took several large specimens on hook and line along the Keys, weighing 4 to 10 pounds. Common in Key West market.

1594 ✓ 158. *Mycteroperca microlepis* (Goode & Bean). Gag.

Key West; west coast. Taken on trolling line along the Keys and west coast. Common in Key West market, where I saw many specimens.

1592 ✓ 159. *Mycteroperca bonaci* (Poey). Black Grouper.

Key West; west coast. Saw several large ones at Key West; took several on hook and line on west coast, all large ones.

1584 ✓ 160. *Epinephelus nigritus* (Holbrook). Jew-fish.

Marco; Gordon's Pass; Charlotte Harbor. At Marco and Caximbas Passes, just north of Cape Romano, and at Gordon Pass, I took on fishing line several weighing from 10 to 40 pounds, and at the latter place saw one taken weighing fully 60 pounds. On former occasions I took one at Jupiter Inlet, on the southeast coast, that weighed on the light-house steelyard 340 pounds, and one on the southwest coast at Little Gasparilla Inlet weighing fully 300 pounds. These two fishes were respectively 7 and 6½ feet long, and of about the same girth at the pectoral fin. Some large examples of jew-fishes have been heretofore confounded with the Guasa or Warsaw (*Promicrops itaiara*), but I do not remember to have ever seen the latter fish at all, or one answering to its description, on the coasts of Florida. All specimens of the jew-fish I have seen were of a uniform dusky coloration, both in small and large examples, with quite small scales (not less than 120 in the lateral line) and those of the lateral line not conspicuously furrowed. Teeth in broad bands, but without canines.

1583 ✓ 161. *Epinephelus morio* (Cuv. & Val.). Red Grouper.

Key West; Florida Keys; west coast. A common food-fish at Key West, seen in the market daily, and held in good favor. I have taken it along the Keys and on the southwest coast at various points ranging up to 10 or 12 pounds.

1580 ✓ 162. *Epinephelus striatus* (Bloch). Nassau Grouper.

Key West; Florida Keys. Another common food-fish brought to Key West daily, by the small fishing smacks, and caught in the channels between the Keys on hook and line, and with sea-crawfish bait. It sells readily with the other groupers, and is usually of several pounds weight.

1582 ✓ 163. *Epinephelus drummond-hayi* Goode & Bean. Speckled Hind.

Key West; Florida Keys. I saw several specimens of this handsome little grouper at Key West and the Dry Tortugas, though it does not seem to be as common as others of the genus. Color, a reddish or chocolate brown, with numerous white, stellate spots, covering the entire body. Length, 8 to 15 inches.

1591a ✓ 164. *Epinephelus apua* (Bloch). Red Hind.

Garden Key; Dry Tortugas. I took one specimen, apparently of this species, at Garden Key, called by my Key West pilot "Red Hind," and which answered to the description in most points, especially in coloration.

1595 ✓ 165. *Epinephelus ascensionis* (Osbeck). Rock Hind.

Key West. This species is brought to Key West almost daily, and is readily sold by the fishermen, being much esteemed as a food-fish, though of small size—about a foot in length.

1567 166. *Enneacentrus guttatus* (Linnaeus). Coney.

Key West; Dry Tortugas. A rather common food-fish at Key West, about a foot in length, and can be seen daily on the arrival of the small smacks. These are of the variety called *coronatus*, though I saw one at Key West, and several at Garden Key, called "Coney," which were apparently of the variety named *guttatus*, the coloration being quite red or scarlet instead of olivaceous or brown.

1569 167. *Enneacentrus fulvus* (Linnaeus). Nigger-fish.

Key West. The three varieties of the "nigger-fish," yellow (*fulvus*), red (*ruber*), and brown (*punctatus*), are occasionally seen in the Key West market. They are known, locally and collectively, as "nigger-fish," and sell readily with other pan-fishes, being of small size—less than a foot in length usually.

SPARIDÆ.

1679 168. *Ocyurus chrysurus* (Bloch). Yellow-tail.

Key West; Florida Keys. Very abundant along the Keys, and one of the commonest pan-fishes in the Key West market.

1739 169. *Orthopristis chrysopterus* (Linnaeus). Sailor's Choice.

Key West; west coast. A very good pan-fish, common at Key West and at the deep inlets of the west coast, where I took it at several points.

1720 170. *Anisotremus virginicus* (Linnaeus). Pork-fish.

Key West. A handsome and greatly esteemed fish in Key West, reaching several pounds in weight, and quite common in the channels between the Keys.

1704 171. *Hæmulon rimator* Jordan & Swain. Tom Tate.

Key West; Florida Keys. I saw this small pan-fish at Key West and along the Keys to the northeast. It is not very common.

1752 172. *Calamus bajonado* (Bloch & Schneider). Jolt-head Porgy.

Key West. Saw several specimens at Key West, where it is ranked as a good food-fish and occasionally weighs several pounds.

1750 173. *Calamus proridens* Jordan & Gilbert. Little-head Porgy.

Key West; Florida Keys. Took a number of this species along the Keys, also the two following species.

1749 174. *Calamus calamus* (Cuv. & Val.). Porgy.

Key West; Florida Keys.

1758 175. *Calamus arcifrons* Goode & Bean. Grass Porgy.

Key West; Florida Keys. This and the foregoing "porgies" are common about the Keys in grassy situations. They are very fair pan-fishes.

SCIÆNIDÆ.

1898 176. *Pogonias chromis* (Linnaeus). Drum.

West coast. One of the commonest species of the west coast about the inlets and bays, associating with the sheepshead wherever oysters abound. Its "drumming" can be heard all through the night in the quiet coves and bays. I have taken it up to 30 pounds. A fair food-fish.

1812 177. *Cynoscion maculatum* (Mitchill). Spotted Trout.

West coast. Abundant in all bays and sounds of the west coast, and often running up the fresh-water streams. It is a fine food-fish, and being a surface feeder is a great favorite with anglers, taking both natural bait and the artificial fly. I have taken it weighing upward of 10 pounds. Spawns in March and April in Florida.

OSTRACIDÆ.

425 178. *Ostracion tricorne* Linnæus. Cow-fish.

West coast. Abundant in grassy coves in all bays of the west coast. Like the other "trunk-fishes," it is roasted "in the shell," by the Key-Westerners.

2168 TETRODONTIDÆ.

179. *Lagocephalus lævigatus* (Linnæus). Puffer.

Florida Keys; west coast. Common about the Keys and inlets.

DIODONTIDÆ.

180. *Diodon hystrix* Linnæus. Porcupine-fish.

Florida Keys. Saw several large specimens at Key West, inflated and dried, and kept as curiosities, that were taken about the Keys. I took one small specimen at Dry Tortugas.