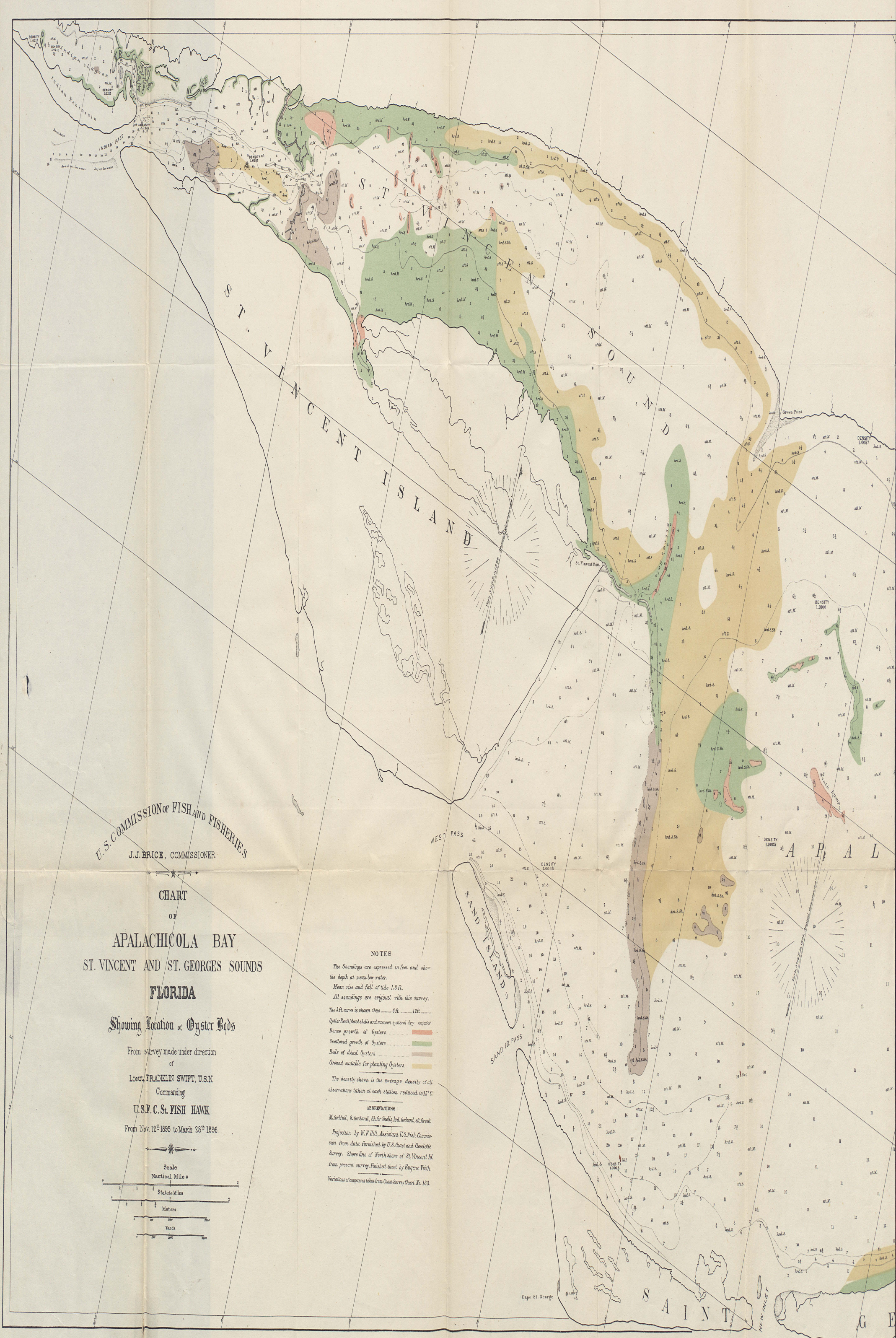
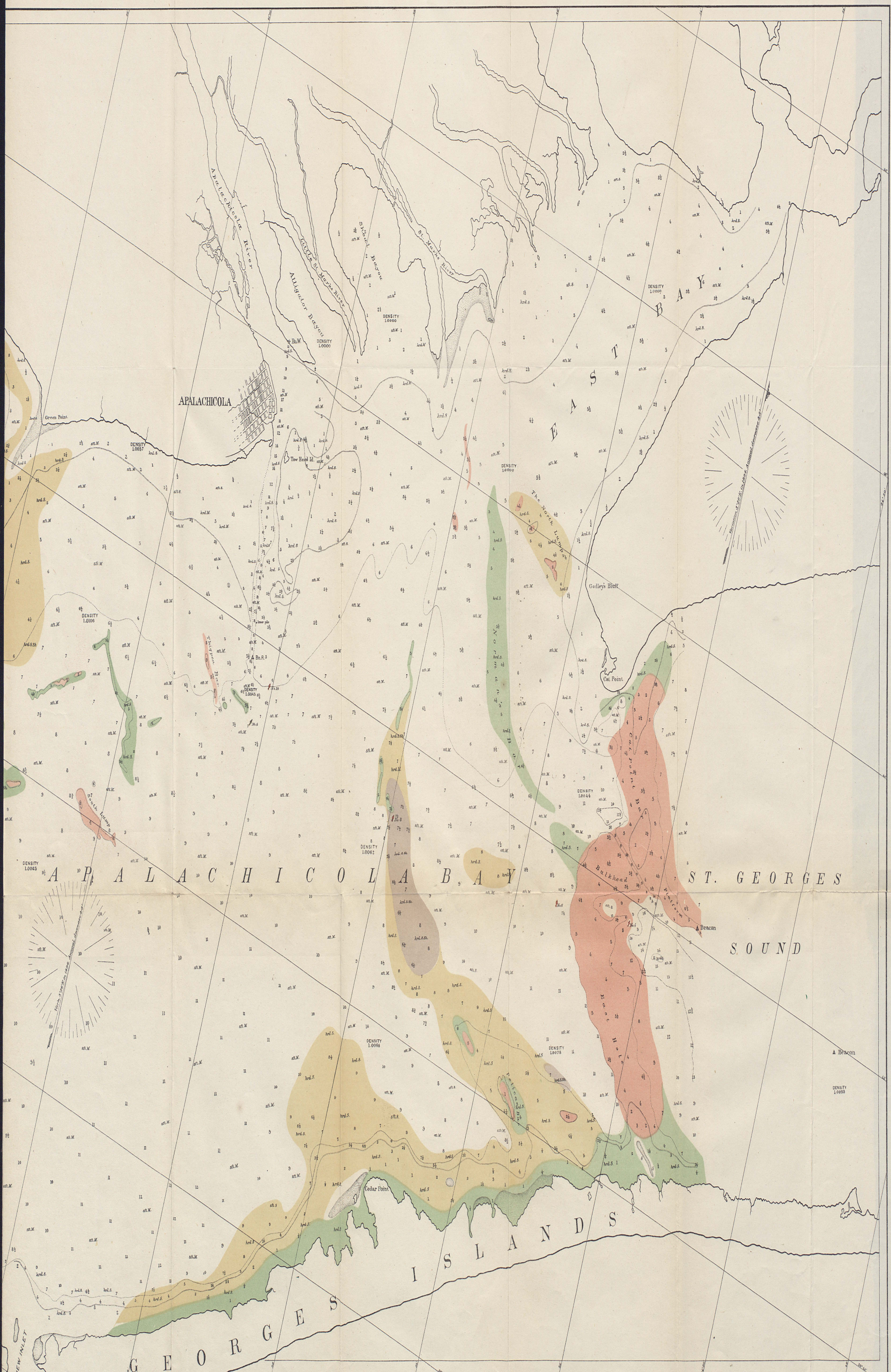

U.S. COMMISSION OF FISH AND FISHERIES
J.J. BRICE, COMMISSIONER
CHART
OF
APALACHICOLA BAY
ST. VINCENT AND ST. GEORGES SOUNDS
FLORIDA
Showing Location of Oyster Beds
From survey made under direction
of
Lieut. FRANKLIN SWIFT, U.S.N.
Commanding
U.S.F.C.St. FISH HAWK
From Nov. 12th 1895 to March 28th 1896.
Scale
Nautical Miles
Statute Miles
Meters
Yards
NOTES
The Soundings are expressed in feet and show the depth at mean low water.
Mean rise and fall of tide 1.8 ft.
All soundings are original with this survey.
The 3 ft. curve is shown thus 6 ft. 12 ft.
Oyster Reefs [dead shells and raccoon oysters] dry
Dense growth of Oysters
Scattered growth of Oysters
Beds of dead Oysters
Ground suitable for planting Oysters
The density shown is the average density of all observations taken at each station reduced to 15° C.
ABBREVIATIONS
M. for Mud, S. for Sand, Sh. for Shells, hrd. for hard, sft. for soft.
Projection by W. F. Hill, Assistant U.S. Fish Commission from data furnished by U.S. Coast and Geodetic Survey. Shore line of North shore of St. Vincent Id. from present survey. Finished sheet by Eugene Veith.
Variations of compasses taken from Coast Survey Chart No. 183.
ST. VINCENT SOUND
ST. VINCENT ISLAND
INDIAN PASS
Indian Peninsula
St. Vincent Point
Green Point
WEST PASS
SAND ISLAND
SAND ID. PASS
Cape St. George
NEW INLET
SAINT
APAL



APALACHICOLA
Apalachicola River
Little St. Marks River
Alligator Bayou
St. Marks River
Green Point
Tow Head Id.
DENSITY 1.0057
DENSITY 1.0000
DENSITY 1.0106
DENSITY 1.0045
DENSITY 1.0044
DENSITY 1.0061
DENSITY 1.0025
DENSITY 1.0066
DENSITY 1.0076
DENSITY 1.0053
E A S T B A Y
The North Lump
Godley's Bluff
Cat Point
Bulkhead
East Hole
Beacon
A P A L A C H I C O L A B A Y
ST. GEORGES
SOUND
Cedar Point
G E O R G E S I S L A N D S
NEW INLET
JULIUS BIEN & CO. PHOTO LITH.

U. S. COMMISSION OF FISH AND FISHERIES,
JOHN J. BRICE, Commissioner

REPORT

ON THE

FISHERIES OF INDIAN RIVER, FLORIDA,

TRANSMITTED TO

THE UNITED STATES SENATE BY THE COMMISSIONER
OF FISH AND FISHERIES, JANUARY 5, 1897.

Extracted from Report of Commissioner for 1896. Appendix 5, Pages 223 to 262, Plates 23 to 59.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1897.

5.—THE FISHERIES OF INDIAN RIVER, FLORIDA.

UNITED STATES COMMISSION OF FISH AND FISHERIES,
Washington, D. C., January 5, 1897.

SIR: I have the honor to transmit herewith a report of an investigation of the condition of the fisheries of Indian River, Florida.

This investigation was made in accordance with a provision of the act of Congress approved March 2, 1895, calling upon the Commissioner of Fish and Fisheries "to make special investigation as to the extermination of migratory fishes of the Indian River, Florida." It was begun January 9 and continued until February 2, 1896, and was designed to cover the following points:

What food-fishes occur in Indian River, continuously or as regular visitants; their present abundance as compared with that of former years; their distribution in different parts of the river; their migrations or other movements; the character of bottom on which they are usually found; their spawning time and place; their food; upon what other fishes the various species prey; the weights of the commercial species; the presence in the river of fish not used as food, and their relation to the food-fishes; and such other facts as would bear upon the abundance of the different fishes in the river; also the commercial aspects of the fisheries, as to the number of persons employed, the capital invested, the value and kind of appliances used, the quantity and value of the fish and other products taken, as well as the development of the industry. The inquiry necessarily included also a study of the physical characteristics of the river.

A great deal of information was gained through interviews with fish-dealers, fishermen, and others, and by an examination of the fish in the fish-houses or as brought in by the boats. The knowledge thus obtained was supplemented by making collections with fine-meshed collecting seines, which proved very important in determining the presence or absence of the young of the various food-fishes.

The natural-history and physical investigations were carried on by Prof. Barton W. Evermann, assisted by Mr. Barton A. Bean, of the United States National Museum, and Mr. A. G. Maddren; and those concerning the commercial aspects of the fisheries by Mr. W. A. Wilcox. Detailed reports, together with illustrations of the more prominent fishes of the region, are appended.

NOTE.—This report of the Commissioner of Fish and Fisheries, with the accompanying reports, was first printed as Senate Document 46, Fifty-fourth Congress, second session.

As a factor in the fish supply in the United States, the Indian River has, within a comparatively short time, attracted much notice. Although only a few years old, the fishing industry of this arm of the Atlantic has already attained considerable prominence, and in 1895 contributed over 2,500,000 pounds of food-fish to the public markets. While the business of taking green turtles antedates the civil war, the fisheries proper did not begin until 1878, when a smack from Connecticut visited one of the inlets with seines and nets, and caught fish for the Savannah market. Up to 1880 this was the only economic fishing carried on in the Indian River, except that for turtles, and it was not until 1886, after the river had been brought into railroad communication with Jacksonville, that the fisheries may be said to have become thoroughly established.

This section of Florida was sparsely settled and practically inaccessible except by water prior to the building of a railroad to Titusville, at the northern end of the river, in 1885, and the abundant fishery resources consequently received but little attention. Mr. George W. Scobie, of Connecticut, may be regarded as the pioneer in Indian River fisheries. In the year named he established an oyster business at Titusville, and in the subsequent year began a regular fishing trade. In 1886 Messrs. A. M. Hambleton & Co. also began operations at Titusville.

From this beginning of the commercial fisheries of the river the business has seen many changes. A second railroad reached Titusville in 1893, and in the two following years extended along the entire length of the river. This resulted in the establishment of new fishing stations farther south and greatly increased the importance of the fisheries, at the same time diminishing the business at the northern end of the river, until in 1895 there were 19 firms with headquarters at 9 points, as follows: Titusville, Cocoa, Eau Gallie, Melbourne, Sebastian, Fort Pierce, Eden, Jensen, and Stuart.

The relative importance of each of these places as a fishing center has varied with the successive completion of the railroad to each, and the regular development of the business. A number of other factors, some of them resulting indirectly from the railroad, have also been potent in influencing the business in particular places, such as the decline in communication along the river by boat, the formation of new settlements, and the success or failure of other vocations. As illustrating this last point, the severe cold of 1894–95 resulted in a relatively large increase in the number of fishermen, as the destruction of the orange and pineapple orchards caused a number of men to engage in the fishing business. This may prove only temporary, and a return of prosperity to the cultivators of the land will call back many who have for a time abandoned their orchards.

Fort Pierce was at the time of the investigation the most important point, partly due to its vicinity to Indian River Inlet, in and near which the commercial fishes occur in greatest numbers. The fishing-grounds

were within a few miles of Fort Pierce, and fishing was carried on as near the inlet as the law would permit.

The principal fishing in the extreme lower end of the river was near Santa Lucia Inlet and in the vicinity of Sewall Point.

The Indian River fisheries in 1895 gave employment to 254 persons, representing an investment of $41,512, and yielded 2,659,815 pounds of products, valued at $37,657. The most prominent fishery objects are mullet, pompano, sheepshead, squeteague, and oysters. The catch of mullet was 1,610,869 pounds, worth $12,251. The next valuable fish—and the most highly esteemed of all the species in the river—was the pompano, of which only 149,000 pounds were taken, but which brought the fishermen $9,475.

Besides the fishes mentioned there are other species of some importance, but these are only of secondary value commercially. Some of them, as the gray drum, mutton-fish, and crevallé, are held in low esteem, while many are found in only limited numbers. Some of them, as the gray drum, crevallé, and sergeant-fish, are destroyed in considerable numbers by the commercial fishermen. The gray drum is said to be very destructive to nets, and for that reason is killed when caught. The sergeant-fish and crevallé, and at times others, are allowed to die on the shore when not marketable.

The evidence shows that though possibly in some parts of the river the mullet is less abundant than when fishing first began, it is now sufficiently plentiful to enable the fishermen to secure readily more than are required, and the dealers are frequently under the necessity of putting a limit upon the number which they will accept. So long as this condition of affairs continues the mullet fishery will regulate itself. But an increase in the demand for mullet throughout the country, the rapid development of the salted-mullet industry, cheaper express and freight rates, and cheaper ice are probabilities of the near future, and if the productiveness of the mullet fishery is to be maintained to provide for these greater demands restrictive measures are necessary. One way by which this may be accomplished is to establish a close season during the more important part of the spawning period.

The pompano has decreased greatly, especially since 1894, and the explanation of the fishermen that the decrease is due chiefly to the severe weather in the winter of 1894–95 is not without reason. As this species seems to spawn inside the river, a close season during its spawning period would prove advantageous. Any proposed restrictive legislation should, however, await further investigation of the exact time of spawning, which is not conclusively proved, though probably in April and May.

The sheepshead has apparently been able to hold its own since commercial fishing began in Indian River, and many of the fishermen think there has been an increase.

The sea trout, or spotted squeteague, which, like the sheepshead, is not only a food-fish but one of the important game-fishes of the river, also appears to be as abundant now as formerly, as does the red drum, another of the game-fishes.

The bluefish, which is one of the most important game-fishes, seems to have been able to maintain itself in normal numbers in Indian River. It has, however, never been found in sufficient abundance to constitute any considerable part of the commercial catch, and, being more or less erratic in its movements, it is doubtful if restrictions should be imposed upon its capture.

Other valuable fishery resources of Indian River are green turtles and oysters. The turtles are much less numerous than formerly, owing to excessive fishing, and there has also been a large reduction in the average size of those caught. The oysters are of fair size and good quality, but have received little attention; their more general utilization and the formation of artificial beds, which will doubtless soon be undertaken, will be important factors in the growth of the fishing industry.

Regarding the future of the fisheries of the Indian River region, it may be said that while the resources are great and the supply is still ample, yet owing to the comparatively limited area of the fishing-grounds it would appear that the present tendency to overfishing may result in the ultimate destruction of the business. But with the enforcement of proper restrictive laws and the establishment of close seasons there is no good reason why Indian River should not continue to furnish a reasonable amount of commercial and game fishing. Under the present laws of Florida there is no close season, nor any regulation concerning the character of nets to be used, and the only restriction on fishing in Indian River is an act (chapter 4215, No. 101), approved May 22, 1893, which provides:

> That from and after the passage of this act no seines, gill nets, or other nets, except a common cast net, shall be set or used for the taking of food-fish for sale, within one mile of any pass or inlet, or continuation thereof, from the Atlantic Ocean into any inland waters of this State, or in any of the tributaries of the rivers emptying into the Atlantic Ocean.

This law is undoubtedly a wise one and its rigid enforcement will, in the long run, prove advantageous to the commercial fishermen. So many of the more important species play in and out with the tides that the use of nets near the inlets is analogous to pot-hunting. Without restriction the fishermen would flock to the inlets and in a short time commercial fishing could not be carried on profitably in any other part of the river. The first result would be that all the fishermen not living within easy reach of the inlets would very speedily be driven out of the business, and the final result would be the complete destruction of the fishing industry of Indian River.

The use of nets in the inlets would prove destructive not only to the species desired, but to all other species large enough to be taken in

them. The limit at one mile scarcely covers the area of too easy capture, and it should be extended rather than made less.

Every fisherman should interest himself in seeing that this law is not violated, and the wisdom of the law will be fully demonstrated.

Very respectfully,

J. J. BRICE, *Commissioner.*

To the PRESIDENT OF THE SENATE.

INDIAN RIVER AND ITS FISHES.

By BARTON W. EVERMANN AND BARTON A. BEAN.

THE PHYSICAL FEATURES OF INDIAN RIVER.

General description.—Indian River is not a river at all, but a long, narrow, and shallow salt-water lagoon or sound extending along the east coast of Florida, from latitude 28° 47′ on the north to 26° 58′ on the south. Its entire length is about 135 miles. From the sea it is separated by a long and narrow strip of land which rises nowhere more than a few feet above the water. Its width varies from only a few rods at Jupiter Narrows to 5 or 6 miles just below Titusville. The water is usually very shallow, the depth varying from 2 or 3 feet to 17 feet, rarely, however, exceeding 8 to 12 feet.

Just below Titusville is the upper end of Merritt Island, a long, triangular island, separated from the land on the north by Banana Creek and tapering southward in a long, slender point which extends almost to Eau Gallie, a distance of 30 miles. East of this island is Banana River, connecting with Banana Creek on the north and with Indian River opposite Eau Gallie. East of Banana River is the long and narrow outlying sandy island which extends throughout the greater part of the length of the east Florida coast.

Opposite Titusville Indian River is less than a mile in width and the depth ranges from 2 to 12 feet. A few rods above Titusville a depth of 16 feet is found off Sand Point, this being one of the greatest depths given on the Coast Survey charts. Above Titusville the river gradually widens to 1½ miles and then suddenly expands to 3 miles in width. The depth in this portion rarely exceeds 5 or 6 feet and in many places is not over 2 or 3 feet. Below Titusville the river widens rapidly until a width of about 5½ miles is attained opposite the head of Merritt Island proper. The depth also increases somewhat, the average being

7 to 8 feet except near the shores, where it is only about 2 to 4 feet. At Cocoa and Rockledge, about 20 miles south of Titusville, the river is less than three-fourths of a mile in width, the depth being 10 to 15 feet.

For the next 45 miles southward the river continues uniformly narrow, the width nowhere scarcely exceeding a mile, except off the mouth of Sebastian River, where it in some places reaches about 2 miles. From Cocoa to Melbourne the depth runs from 10 to 15 feet. At one place, about 4 miles above Eau Gallie, the Coast Survey chart shows a depth of 17 feet in the channel, which is the greatest depth given for Indian River. Between Melbourne and Sebastian the eastern shore-line is much more irregular, the width variable, and the depth 2 or 3 feet less. A short distance below Sebastian are the "Narrows," where several small islands reduce the width of the river to a few rods. Below this it again widens to 1½ to 2 miles, the depth running from 4 to 9 feet. Opposite St. Lucie the minimum width is less than 1 mile, but immediately below it increases to about 2 miles. From Fort Pierce to below the mouth of St. Lucie River, a distance of about 22 miles, the width varies from 1 to 2 miles and the depth from 3 to 10 feet.

About 2 or 3 miles below the mouth of the St. Lucie are found the North Jupiter Narrows, which for nearly a mile are only 20 to 30 rods wide. Below these is a slight expansion known as Peck Lake. Then the river again contracts, and, under the name of South Jupiter Narrows, extends southward a distance of 3 miles as an extremely narrow and somewhat tortuous waterway, with a depth varying from 3 to 14 feet. Below South Jupiter Narrows is a slight expansion known as Hobe Sound, the greatest width of which is about one-fourth mile, the length about 5 or 6 miles, and the depth 3 to 9 feet. Near latitude 27° is another short narrows separating Hobe Sound on the north from Jupiter Sound on the south. Jupiter Sound is similar to Hobe Sound, and extends from this "narrows" to the mouth of Jupiter River, a little over 3 miles. Opposite the mouth of Jupiter River is Jupiter Inlet, which is regarded as being at the southern end of Indian River.

Inlets.—Indian River at present is connected more or less directly with the ocean at four different places. One of these is near the northern end of the river, and is known as the Haulover Canal. This canal cuts through a very narrow sand isthmus and connects Indian River with Mosquito Lagoon or Hillsboro River, which, in turn, is connected with the ocean by Mosquito Inlet.

Indian River Inlet is in latitude 27° 30′, and almost opposite St. Lucie. This inlet is less than half a mile long and only a few rods wide. Its depth varies from 7 to 12 feet, except at the inner end, where it is normally quite shallow. The Government is doing considerable dredging at this place, and the inlet will doubtless be greatly improved. Besides the inlet proper there are several other shallower channels or cuts, as Fort Pierce Channel, Baker Cut, Garfield Cut, and Blue Hole Cut, all of which connect directly or indirectly with the outer end of the inlet.

Just opposite the mouth of St. Lucie River, in latitude 27° 10′, is Santa Lucia Inlet, which was made some years ago by cutting through the sandstone and coquina rock of Gilbert Bar at a point where it was but a few yards wide. This inlet is said to be quite shallow, but it can be very readily deepened by a little dredging and blasting away a small reef across the outer end.

At the extreme southern end and opposite the mouth of the Jupiter or Lokahatchie River is Jupiter Inlet. This inlet is narrow and usually more shallow than any of the others.

Character of bottom and shores.—Indian River throughout most of its extent has a moderately hard sand bottom. The areas covered by soft mud are few, scattering, and limited in extent. Along the immediate shores and on the shallows about the numerous small islands there is in some places considerable mud, but this is unimportant in comparison with the area having solid bottom, and even on the mud flats the mud is rarely more than 4 or 5 inches deep. In some parts of the river the bottom is of comparatively hard cemented sandstone; in others it is of coquina of various degrees of pureness; most of the coquina found along Indian River has considerable sand mixed with the shell fragments.

The river is well supplied with various species of algæ and other species of aquatic plants suited to shallow salt or brackish waters. So generally is the vegetation distributed and so firm is the bottom that no considerable shifting of the bottom by storms seems to have taken place recently. The stability of bottom is of great importance to the fishery interests of the river, as will be shown farther on in this report.

The shores of Indian River are generally low and composed of sand, with considerable coquina in some places. In the southern part of the river mangrove bushes are abundant on the mud flats and on the shores, while northward the cabbage palmetto is the principal tree.

Streams tributary to Indian River.—The streams carrying fresh water into Indian River are few and usually small. Beginning at the north the only ones worthy of mention are Eau Gallie Creek, and Sebastian, St. Lucie, and Jupiter rivers.

Eau Gallie Creek flows into Indian River between Eau Gallie and Sarno. At its mouth it has considerable width, but only a mile or so above it narrows to only a few feet. It has a very slight current and probably at no time carries any considerable amount of fresh water into Indian River.

Sebastian River, near the station of that name, is a stream of some importance, but it is only a few miles long.

St. Lucie River is the most important tributary, and carries more fresh water into Indian River than all others combined. Its mouth, opposite Santa Lucia Inlet, is from one-fourth to one-half mile wide and has a depth of 7 to 21 feet. It is 30 miles long or more, and is fresh down to near its mouth.

Jupiter River is somewhat smaller than the St. Lucie and empties near the lower end of Indian River opposite Jupiter Inlet.

Salinity and temperature.—Tests were made at different places to determine the temperature and density of the water of Indian River. These are recorded in the following tabular statement:

Table of observed temperatures and densities.

Date.	Hour.	Place.	Temperature of water in Fahrenheit degrees.	Density corrected to 15° C.
Jan. 14	9 a. m.	Scobie's fish-house, at Titusville	59	1.01800
14	11 a. m.	....do	60	1.01919
17		Cocoa	62	1.01636
20	8 a. m	Sarno wharf, Eau Gallie Creek	55	1.01116
20	10 a. m.	Eau Gallie Creek, 1 mile from mouth	55	1.00022
22	8.30 a. m.	Hotel wharf at Fort Pierce	63	1.01978
22	8.43 a. m.	Between Fort Pierce and St. Lucie		1.01962
22	9.20 a. m.	Senator Quay's wharf at St. Lucie	64	1.01952
23		Indian River Inlet	65	1.02205
25	1 p. m.	Outer end of wharf at Jensen	69	1.01975
29		Wharf at Stuart	64	1.00894
30	7.40 a. m.	St. Lucie River at mouth	65	1.02506

THE COMMERCIAL FISHES OF INDIAN RIVER.

The commercial fishes of Indian River number about 24 species. Of these, only about 16 species are found in sufficient abundance to be of importance. The 24 species, named approximately in the order of their value as food-fishes, are as follows:

1. Common mullet (*Mugil cephalus*).
2. Pompano (*Trachinotus carolinus*).
3. Sheepshead (*Archosargus probatocephalus*).
4. Trout or spotted squeteague (*Cynoscion nebulosus*.
5. Channel bass or red drum (*Sciænops ocellatus*).
6. Mangrove snapper (*Neomænis griseus*).
7. Bluefish (*Pomatomus saltatrix*).
8. Whiting (*Menticirrhus americanus*).
9. Crevallé (*Caranx hippos*).
10. Sailor's choice (*Lagodon rhomboides*).
11. Black drum (*Pogonias cromis*).
12. Southern flounder (*Paralichthys lethostigma*).
13. Spanish mackerel (*Scomberomorus maculatus*).
14. Croaker (*Micropogon undulatus*).
15. Permit (*Trachinotus falcatus*).
16. Key West permit (*Trachinotus goodei*).
17. Silver mullet (*Mugil curema*).
18. Triple-tail (*Lobotes surinamensis*).
19. Pigfish (*Orthopristis chrysopterus*).
20. Spot (*Leiostomus xanthurus*).
21. Yellow-tail (*Bairdiella chrysura*).
22. Mutton-fish (*Gerres olisthostoma*).
23. Pinfish (*Diplodus holbrookii*).
24. Sergeant-fish (*Centropomus undecimalis*).

Only the first 15 or 16 species of this list are caught in sufficient quantities to figure separately in the records of shipments.

In the following pages each of the 24 species is considered in detail, chiefly with reference to its present and former abundance, its migrations and other movements, its spawning habits, its food, and its size and importance as a food-fish. The conclusions have been reached from a consideration of all the evidence obtained from dealers, fishermen, and others, supplemented by the original observations of the party.

MULLET (*Mugil cephalus*).

This fish, which is here known only by the names mullet or common mullet, is the most abundant and generally distributed food-fish in the Indian River. The opinions obtained from the fishermen upon the habits, abundance, and spawning of the mullet appear, at first sight, quite diverse and contradictory in character. Most of these differences, however, are susceptible of a reasonable explanation, and the various views, when fully and properly understood, are not inconsistent. The apparent differences are mainly due to the fact that the opinions of most of the fishermen are based solely upon their observations in one limited portion of the river; and it is probable that what is true of the mullet in one section of the river may not be true throughout the entire river.

A careful examination of the various opinions given by the fishermen, in the light of the original observations, leads to the following statements regarding the habits and abundance of the common mullet in Indian River.

Ever since commercial fishing began in Indian River the mullet has been the most abundant food-fish there. In the north end of the river, as far south as Fort Pierce, it constitutes 60 to 70 per cent of the entire catch. In the south end it is apparently rather less abundant, though it is likely that this is because it is not fished for to any extent south of Fort Pierce. There has probably been some decrease during the last ten years, but dealers still obtain all the mullet they want to fill their orders, and some dealers limit their fishermen in the number of mullet which they will accept, thus showing that, in a night's fishing, more mullet can be taken than can be disposed of. So long as this condition exists it would seem that the mullet fishery will regulate itself.

The mullet is doubtless found throughout the year in Indian River in considerable numbers. The periods of least abundance seem to be in July and August, and again in early winter. It is most abundant in the fall, from September to December. Its movements are not well understood. That it runs in and out through the inlets with the tides seems well established, and it is apparently greatly influenced by changes in the weather, the shallowness of the river causing it to respond very promptly to temperature changes in the air. A norther blowing for more than a day will cause a marked change in the temperature of the water. The mullet, being a warm-water fish, is affected by the cold and driven out to warmer water. As to whether they run with or against the winds depends upon the direction they must go to get outside or to reach warmer water.

The spawning time for the species seems to extend over a considerable period, probably from September to the last of January. Mullet examined the last week in January, that had been caught at Fort Pierce, were in full roe. These were the only ones, however, which were in roe. Many others were examined at Titusville, Cocoa, Eau Gallie,

and Sebastian, but none contained developed eggs. The theory that different schools spawn at different times seems reasonable. While the spawning of different schools may extend over several months, any particular school occupies but a very short time in spawning. The period may not exceed two or three days. The majority of the schools probably spawn from October to December.

The fishermen are agreed that the mullet go outside to spawn, but just where no one seems to know. If they run in and out while spawning, as many believe, the spawning-grounds can not be far from the inlets.

Some of the fishermen speak of a large mullet which they call the "mangrove mullet." It is doubtless simply a large common mullet. They think it remains in the river all the time, not going outside even to spawn. They reach a weight of 5 pounds.

POMPANO (*Trachinotus carolinus*).

Of all the fishes of Indian River the pompano is most valued and brings the best price to the fishermen and the dealer. In the light of the inquiries and of the testimony obtained we believe that the following is an approximately correct statement of the present status of this fish in Indian River:

The pompano is present in Indian River throughout the year, and is probably most abundant during the winter. The best fishing seems to be from late in January to April. They are probably common in the summer months, but are not fished for then. They are most abundant about the inlets, and play in and out with the tides. They run in bunches or schools, and are easily influenced by changes in temperature. They seem to be a warm-water fish, and continued cold weather causes them to leave the river temporarily. The unusual cold of December, 1894, and February, 1895, appears to have had a serious effect upon them, not only in driving them away but in actually killing many.

So far as Indian River is concerned, the pompano is not properly a migratory fish, and it is probable that when it goes outside it does not wander far from the inlets and soon comes inside again. Very little can be said definitely as to its spawning habits. The evidence indicates that they spawn inside the river, chiefly during April and May. The spawning period may be even more prolonged and extend from March to early summer.

It could not be learned where young pompano may be found, nor whether they remain in the river. Though considerable collecting was done with fine-meshed seines, no young were taken, and no information was obtained as to the capture of the young at any time in Indian River.

The fishermen are well agreed as to the food of the pompano. It consists chiefly of small bivalve mollusks and small crustaceans. The fish feed extensively about the inlets, and in the surf outside are often seen feeding near the shore. The habit of digging in the mud and sand, referred to by some fishermen, is probably a searching for food.

The average weight of the pompano now handled by the Indian River dealers is about 2 pounds. The smallest observed weighed about half a pound each. The largest one, seen on January 24, weighed 4½ pounds and measured 21½ inches to the tips of the caudal lobes, or 16 inches to the base of the caudal fin.

Examples of a fish which the fishermen agree in calling pompano are taken occasionally, weighing 20 to 27 pounds, but none was seen during the investigation. The largest reported weighed 27 pounds. They are probably the same species of *Trachinotus* known about Key West as the "permit," recently decided to be a distinct species and named *Trachinotus goodei* by Jordan & Evermann. They are, of course, not the permit of Indian River, which is a small fish. The true pompano of Indian River does not exceed 7 or 8 pounds in weight.

SHEEPSHEAD (*Archosargus probatocephalus*).

Next to the mullet, the sheepshead is the most abundant food-fish in Indian River, and is one of the most important to the commercial fishermen. It is constantly present in considerable numbers. Though at times it runs in and out with the tide and moves about from place to place in the river, it is not properly a migratory fish. It does not school as does the mullet, but is often found in bunches made up of individuals brought together on account of food. Feeding almost wholly, as it does, upon mollusks, crustaceans, and plants, it frequents the oyster beds and similar places, particularly in the vicinity of the inlets. Stomach contents examined at different places consisted of fragments of small crustaceans and mollusks, together with a large amount of vegetable matter. In some instances the stomachs contained scarcely anything but large masses of green plants.

The spawning time seems to be in February, extending perhaps into April. Specimens examined at Eden, Sebastian, and Eau Gallie contained well-developed roe, which indicated a spawning time in February. Other specimens contained roe not so well developed, and it is probable that they would not have spawned until March or April. It is an interesting fact that males seemed much scarcer than females. Some fishermen state they have rarely, if ever, seen examples with milt; but several were examined at Eden which contained milt. A large majority of those examined were females. But little information could be obtained as to where sheepshead spawn. Their principal spawning-beds are probably in the vicinity of the inlets and inside the river.

In all the collecting with fine-meshed seines only a few small sheepshead were obtained. The smallest were secured at Indian River Inlet, and were 2¾ to 4 inches in total length.

The average weight of sheepshead handled by the fishermen is probably from 3 to 4 pounds, and the maximum as much as 12 to 15 pounds. A female seen at Eden weighed 7 pounds.

The fishing for sheepshead is practically all done with gill nets. They are run in different places, but the best grounds are evidently in

the vicinity of the inlets. The general opinion among the fishermen is that the sheepshead has not suffered any decrease in recent years.

SPOTTED SQUETEAGUE OR SEA TROUT (*Cynoscion nebulosus*).

This species ranks fourth among the commercial fishes of Indian River. In 1880 the spotted squeteague was not known to extend south of St. Augustine, on the east Florida coast. The present investigation has shown its presence in abundance in Indian River. It is also common in Lake Worth, and has long been known as an important food-fish on the west coast of Florida and on the coast of Texas. The evidence points to its continuous presence in Indian River in considerable numbers, though the largest catches are during the latter part of winter and early spring. It is more of a wanderer than any of the others yet mentioned, and is found in schools, which pass in and out with the tides in pursuit of the various smaller fishes.

This fish has apparently held its own in Indian River. The fishermen all claim that there has been little or no decrease, some even maintaining that it has increased in numbers. No definite statements regarding its spawning habits can be made. Only two or three of the dealers ventured any opinion upon the matter, and they do not agree, one giving May and another November and December. Young fish caught at various places in Indian River were 4½ to 8 inches long, which would indicate that they were probably spawned in the river.

The average weight of those handled by the commercial fishermen is 2 to 4 pounds, though the maximum size is very much greater. The largest example seen was at Fort Pierce and weighed 13½ pounds.

REDFISH OR RED DRUM (*Sciænops ocellatus*).

This fish is known locally on the east coast of Florida as bass, redfish, and channel bass; the most appropriate names are redfish and red drum. The Spanish name is *verbena*. It ranks fifth among the commercial fishes of the river and is one of the best game-fishes.

There is lack of agreement among the fishermen as to its habits. That it is a constant resident of Indian River seems certain. It is most abundant during winter and early spring. The larger ones, such as are usually called channel bass, appear to leave the river for a brief period during the coldest season; they also probably go outside for a short time during the warmest season.

Specimens of various sizes were collected, the smallest being less than half an inch in length and the others varying from that size up to a foot or more. This would indicate that the spawning season extends over a considerable period, probably from spring until fall. The abundance of very young fish in the river makes it quite certain that the species spawns inside.

The fishermen are pretty well agreed as to the food and size of this species. Small free-swimming fish, such as young mullet, together with

crustaceans and mollusks, seem to constitute the chief part of the food supply. About 40 pounds is the greatest weight attained by the red drum in Indian River. There is little or no demand, however, for those of such large size, and those weighing more than 12 or 15 pounds are not usually handled by the dealers. The average weight of those shipped by the dealers is from 4 to 6 pounds.

The red drum seems to be as abundant now in Indian River as at any time. Commercial fishing has not resulted in any apparent decrease in recent years, and there seems to be no reason for apprehension as to the result of the continuance of present fishing methods.

PERMIT (*Trachinotus falcatus*).

The permit is not a common or important species in Indian River, and nothing was learned as to its habits. The fishermen seem to know very little about it. It is scarce in the upper part of the river, and was not seen at any of the fishing centers north of Eau Gallie. During the inquiries at that place, four examples were brought in by fishermen, who had no name for the fish and said it was rare in that part of the river. It was also noticed at Sebastian, Eden, and Stuart, but only a few specimens were seen at each place and they were all small, none weighing over a pound, which seems to be the average. The maximum weight is about 3 pounds.

MANGROVE SNAPPER (*Neomænis griseus*).

This species is of considerable commercial importance in Indian River and is regarded as a very good fish. It is rarely or never seen in the northern portion of the river, but from Indian River Inlet southward it is present in some numbers throughout the year. It is said to be equally plentiful at all seasons. Its favorite feeding-grounds seem to be among the little mangrove islets and about the narrows and inlets, especially where it is somewhat rocky. Extreme cold is said to have killed a good many fish of this species. The average weight is about 2 pounds, the maximum 6 or 7 pounds. Nothing could be learned regarding its spawning habits.

BLUEFISH (*Pomatomus saltatrix*).

The bluefish is one of the most important game fishes. It is also eagerly sought by commercial fishermen, but the annual catch has never been large. It is the most truly migratory species found in Indian River. It appears in the fall, usually about October, according to the fishermen, and remains until April or May, when most of them disappear. A few are said to remain throughout the year. During the winter it is most common about the inlets, frequently running in and out with the tides and preying upon other fishes. It is voracious in the extreme and causes great havoc among the schools of mullet, menhaden, and other species.

As long since pointed out by Professor Baird, the bluefish is very erratic in its movements. During certain years, which can not be predicted, it is present on our Atlantic coast in enormous numbers; then it suddenly disappears and may not be seen again except in moderate numbers for many years. The cause of these apparent irregularities has not yet received an adequate explanation.

The bluefish entering Indian River in the fall evidently come from the coast of the Carolinas and farther north, and when they leave in the spring it is to return northward. So far as can be learned, there has never been any remarkable fluctuation in their abundance in Indian River. They have never been especially numerous, and appear not to have suffered any serious diminution in numbers.

The average size of those taken in Indian River is 3 to 5 pounds, the range being from about 2 to 14 pounds. One weighing 14 pounds was seen at Stuart, and four others were seen there whose combined weight was 47 pounds. Several which were caught by trolling at Fort Pierce weighed 2 to 3 pounds each.

With a fine-meshed seine very young examples, less than 2 inches long, were secured at Fort Pierce. This would indicate that the bluefish spawn in the river to some extent at least, and probably in the summer or fall; but as the fishermen have not seen them in roe it is probable that they usually spawn elsewhere.

WHITING (*Menticirrhus americanus*).

The whiting is of some importance in Indian River. Though not abundant, it is considered a very good fish and always finds a ready sale. It is caught in largest numbers from December to March, in mullet gill nets. On January 16 one net at Cocoa took 20 pounds, and that was regarded as a very good catch. It is believed to remain in the river all the time and probably spawns in the early spring. The average size is about 1 to 1½ pounds. The fishermen believe that it is as common now as it has been at any time since commercial fishing began in Indian River. One dealer thinks it is increasing to some extent.

CREVALLÉ (*Caranx hippos*).

The crevallé is probably common in Indian River at all times, but is not highly esteemed by commercial fishermen. A good many are caught, but are thrown away. It is most abundant in the lower end of the river and in Lake Worth, and is said to be common outside. It bites voraciously, and affords much sport to the angler, who takes it by trolling. It is very ravenous, swimming with great swiftness and preying upon smaller fishes, particularly mullet, menhaden, and young red drum. It is said to attain a weight of 20 pounds; but the average probably does not exceed 3 pounds. Several examples taken and others seen at Eden, Stuart, and Lake Worth averaged about 3 pounds. It probably spawns in salt-water lagoons and bays during the summer, as schools of young have been seen going out in the fall.

SAILOR'S CHOICE (*Lagodon rhomboides*).

This species is said by fishermen not to be very common in Indian River. Its small size, however, allows it to pass through the meshes of the nets used for other species, and its scarcity may be only apparent. It is highly prized as a pan-fish, and is permanently resident in Indian River. The average weight is one-half pound or less, and the maximum probably not over a pound.

GRAY DRUM (*Pogonias cromis*).

This is also sometimes called the black drum. It is a constant resident of the river in considerable numbers, but is not valued as a food-fish. Large numbers are caught, but they are usually killed and thrown away, as they do great damage to the nets and are known to be destructive to the oyster beds. They reach a large size, specimens weighing 40 to 75 pounds often being taken. The large individuals are said to be infested with worms. Several large specimens examined at Santa Lucia Inlet the last of January contained well-developed roe, which indicates late winter or early spring as the spawning season.

SOUTHERN FLOUNDER (*Paralichthys lethostigma*).

This is the most common flounder found in Indian River and is apparently the only species handled by fishermen. It is well regarded, but the catch is small. There is no special fishery for it and its abundance is probably greater than indicated by the present catch. Nothing important was learned of its habits.

SPANISH MACKEREL (*Scomberomorus maculatus*).

This species is very scarce in Indian River. One dealer at Titusville received four early in January and regarded that as an unusually large number—generally only one or two are secured per day by his entire fishing force. The weight of the four was 15 pounds. They are rarely or never caught as far up the river as Cocoa, but are occasionally taken about the inlets.

CROAKER (*Micropogon undulatus*).

Not abundant in Indian River. It is said to be present throughout the year and to spawn early in spring. It was seen only at Fort Pierce and points below. One fine example, a female, 18½ inches long and weighing 3 pounds, was seen at Eden. It was quite full of well-matured roe and would doubtless have spawned early in March.

SILVER MULLET (*Mugil curema*).

Besides the common mullet of Indian River, there is a second species which is usually known as the "silver mullet," or "white mullet." It may be readily told from the common mullet by its more silvery color, the absence of dark longitudinal streaks, the narrower and more pointed snout, and the presence of small scales on the dorsal and anal fins. It is considerably smaller than the common mullet and much less abun-

dant. According to some dealers, it averages only about half the size of the common mullet, and not more than one out of every hundred mullet taken is a silver mullet. Very little could be learned of its habits as distinct from the common species, except that it is more of a sea fish than the other.

TRIPLE-TAIL (*Lobotes surinamensis*).

This species does not appear to be very well known to the fishermen of Indian River. None was observed north of Fort Pierce, but from that place southward a few were found at each fish-house. Very few fishermen were certain as to its right name; it is known locally as "rockfish," "grouper," "black grouper," or "black drum." The greatest numbers were seen at Stuart. At Eden one of 8 pounds and one of 10 pounds were noticed. It is said to run as high as 50 pounds. The average of those taken is probably 8 or 10 pounds. It is regarded as a very good fish. It is said to come into the river in December and go out in the spring. Nothing is known of its spawning habits in this region.

PIGFISH, SPOT, AND OTHER MINOR SPECIES.

The pigfish (*Orthopristis chrysopterus*) is a small fish which enters only sparingly into the commercial catch. Only a few could be found at any of the fishing centers during the investigation.

The spot (*Leiostomus xanthurus*) is probably abundant, but the catch is small, as the mesh of the nets used is not suited to its capture. It attains a length of a foot or less and a weight of half a pound. Little is known of its habits in Indian River, but it probably spawns in shallow water about the inlets. Local names for this fish on Indian River are "mazuca" and "jimmy."

The yellow-tail (*Bairdiella chrysura*) is a small species that is not abundant and not taken in noteworthy quantities for food. It is very different from the yellow-tail of Key West.

Gerres olisthostoma, known as the mutton-fish in Indian River, was not observed north of Fort Pierce, and only a few were seen there, but a good many were noticed at Eden and a few at Stuart. It is not highly valued and is thrown away by most fishermen. The specimens seen averaged less than one-half pound in weight.

The pinfish (*Diplodus holbrookii*) is found occasionally in the catch, but it is not sufficiently abundant to be of much commercial importance.

The sergeant-fish or snook (*Centropomus undecimalis*) is not uncommon in the river, especially in the southern part. It is a food-fish of some value, but is frequently not utilized when caught, unless better fishes are scarce.

ANNOTATED LIST OF THE FISHES KNOWN FROM INDIAN RIVER.

In the following list are included all the species of fishes which are known to occur in Indian River. A few of these are fresh-water fishes which were not obtained by us, but which have been reported from streams tributary to Indian River by Dr. Goode, Dr. Jordan, Dr. Henshall, and others. Common names more or less local in their use by Indian River fishermen are inclosed in quotation marks. The total number admitted to the list is 106. In nomenclature and sequence of species Jordan & Evermann's Fishes of North and Middle America, recently issued as Bulletin 47, U. S. National Museum, is followed.

1. **Carcharhinus milberti** (Müller & Henle). *Blue Shark.* Probably common, but not seen during this investigation. Reported from Indian River in 1879 by Dr. Goode.
2. **Scoliodon terræ-novæ** (Richardson). *Sharp-nosed Shark.* Probably common. One example, 2½ feet long, seen at Indian River Inlet.
3. **Sphyrna tiburo** (Linnæus). *Shovel-nosed Shark.* Mr. Scobie says this shark is not uncommon about the inlets. A dead one was seen near Titusville.
4. **Sphyrna zygæna** (Linnæus). *Hammer-headed Shark.* Not seen during this investigation, but reported from Indian River by Dr. Goode in 1879. Probably not uncommon.
5. **Squalus acanthias** Linnæus. *Dogfish; Dog Shark; "Puppy Shark"; "Herring Shark."* This little shark is probably the most abundant shark in Indian River. Said to be a permanent resident.
6. **Pristis pectinatus** Latham. *Common Sawfish.* The sawfish is an abundant species, permanently resident in Indian River, where it does considerable damage to the fishermen by becoming entangled in their nets. The larger ones tear or cut the nets, while the smaller ones become entangled and are difficult to remove. The examples observed were usually less than 3 feet in total length, saw included, but it is known to reach a very large size in this river. Several very large "saws" were seen at Eden, Stuart, and elsewhere, the largest being 6 feet long, thus indicating a fish of 12 or 15 feet. One fisherman has seen them 16 or 17 feet long. Another reports that a sawfish 12½ feet long and weighing 425 pounds was caught near Eau Gallie in October, 1895. He thinks fully 300 sawfish were taken in his nets last season.

   Some very interesting information concerning the young sawfish was obtained from Mr. F. B. Everett and Mr. Stypmann. Mr. Everett says that from a large sawfish which he caught a few years ago he took a number of young, which swam away when placed in the water. The "saws" were enveloped by a membrane, which disappeared in specimens left to dry in the sun, and the teeth became visible. Mr. Stypmann says he has taken eighteen or twenty young from a sawfish about the first of July. The "saws" were well developed, but they, including the teeth, were soft like leather. He says he has found the young in a sawfish 16 or 17 feet long.

   There is some variation in the number of teeth, and there is usually one more tooth on one side than on the other. The numbers most frequently found were 25 and 26.
7. **Dasyatis sabina** (LeSueur). *Sting Ray.* Said to be quite common. Three young examples from Cocoa and Stuart.
8. **Dasyatis say** (LeSueur). *Southern Sting Ray.* Probably more common than the preceding species, though the collection contains but a single specimen, taken at Stuart. This species may be distinguished from *Dasyatis sabina* by its smoother skin and the absence of a median series of prickles on the back.

9. **Pteroplatea maclura** (LeSueur). *Butterfly Ray.* Reported from Indian River by Dr. G. Brown Goode in 1879.

10. **Acipenser brevirostris** LeSueur. *Short-nosed Sturgeon.* Sturgeon are occasionally taken in Indian River. One was taken in 1894 and one in 1895. Two others were obtained several years ago; they weighed 15 or 16 and 20 pounds, respectively. Two others were caught near Indian River Inlet about eight years ago; the larger weighed 40 pounds, dressed, the other 20 pounds.

11. **Lepisosteus tristœchus** (Bloch & Schneider). *Alligator Gar.* Mr. Scobie states that this species is found in the creeks emptying into Indian River. One large specimen was seen at Cocoa that had been obtained at Lake Poinsett, a few miles west of Cocoa.

12. **Felichthys marinus** (Mitchill). *Gaff-topsail.* Not so abundant as *G. felis*, but not at all uncommon.

13. **Galeichthys felis** (Linnæus). *Sea Catfish.* The common catfish of Indian River and one of the most abundant fishes found there. The young are extremely abundant everywhere; large schools can be seen at almost any time about the wharves and landings. Large numbers were taken wherever the seine was used. It was particularly numerous at Stuart. The freeze of 1894–95 is said to have killed vast numbers of this species, but it is still very abundant.

    Mr. Stypmann assures us that eggs are never found in this catfish, but that the young are brought forth alive. He says during March the adult females are found filled with well-developed young, each rolled up in a ball, and the various balls connected in a long string. He thinks they hatch out very much like the sawfish. Others give the same information, and it seems certain that this species is ovoviparous.

14. **Ameiurus erebennus** Jordan. *Catfish.* This species of fresh-water catfish, originally described from St. Johns River in 1877, was recorded by Dr. Jordan from Sebastian River in 1880. Not seen during this investigation.

15. **Erimyzon sucetta** (Lacépède). *Chub Sucker.* Reported by Dr. Jordan (as *Erimyzon goodei*) in 1880 from Sebastian River. Not seen during this investigation.

16. **Anguilla chrysypa** Rafinesque. *Common Eel.* Not uncommon, but apparently of no commercial importance. Young individuals were obtained at Cocoa and Eau Gallie; others seen at Titusville.

17. **Tarpon atlanticus** (Cuvier & Valenciennes). *Tarpon.* The tarpon is the prize most sought by the angler who goes to Indian River, and it is doubtful if any other portion of our coast furnishes more and better tarpon fishing than the East Florida coast from Titusville on the north to below Biscayne Bay on the south. Many phenomenal catches are reported from Indian River, Lake Worth, and Biscayne Bay.

18. **Elops saurus** Linnæus. *Big-eyed Herring; Tenpounder; "Bony-fish."* Observed at Fort Pierce and at mouth of St. Lucie River. Known to some of the fishermen as "Lady-fish." Frequently taken in the seines. Examples from Fort Pierce preserved.

19. **Alosa sapidissima** (Wilson). *Shad.* On May 5, 1892, the United States Fish Commission made a plant of 800,000 shad fry in Halifax River, north of Titusville, with the assistance of Capt. M. Moseley, then State fish commissioner of Florida. Since then shad have been taken occasionally in Indian River. Mr. Ricou reports one taken in the St. Lucie River and another at Eden. Captain Saunders caught a roe shad weighing 5 pounds in January, 1895, and another without roe a year before. Mr. Collins has heard of shad being taken, but has not seen any himself. It is said that since the opening of Gilbert Bar several have been seen in the St. Lucie. Mr. Church reports two or three shad taken near the mouth of the St. Lucie; they weighed about 4 pounds each. Mr. Stypmann says that four or five fine shad were caught near the St. Lucie a year ago.

Whether or not Indian River and its connecting streams furnish favorable conditions for the establishment of a large run of shad is not known. No examination has been made of Sebastian and St. Lucie rivers for the purpose of determining the presence or absence of suitable spawning-grounds. The Sebastian is probably too short a stream to promise much in this respect, but the St. Lucie is much larger, and is said to be very much like the St. Johns in general character. The St. Johns has long been known as one of the most important shad streams. The opening of Gilbert Bar, thus making a good inlet from the sea opposite the mouth of the St. Lucie, will probably prove very helpful to shad in making it easier for them to reach the St. Lucie for spawning purposes. The possibility of establishing a run of this valuable fish in St. Lucie River warrants an experimental plant of shad fry in that stream, and this has recently been made.

20. **Opisthonema oglinum** (LeSueur). *Thread Herring.* Doubtless common, but the only examples seen during this investigation were two found in the nest of a brown pelican (*Pelecanus fuscus*) at Pelican Island. They measured 6⅞ and 7⅜ inches, respectively. D. 19; A. 22; scales 50–12; scutes 17+12.

21. **Brevoortia tyrannus** (Latrobe). *Menhaden; Bunker; Stink Shad.* The menhaden is abundant in Indian River and along the entire eastern coast of Florida, and is considered a great nuisance. It is seldom utilized in any way by Indian River fishermen. Among the names heard for this fish on Indian River are menhaden, bunker, stink shad, bony fish, yellow-tailed shad, jack shad, hickory shad, yellow-fin shad, pogy, and bonefish.

22. **Stolephorus mitchilli** (Cuvier & Valenciennes). *Anchovy.* Found in considerable numbers in small coves and around a sand spit at Cocoa. Many seined along shore of St. Lucie River 5 miles from its mouth. D. 13; A. 25.

23. **Fundulus similis** (Baird & Girard). Seven examples, 1 to 1¼ inches long, are in the collection from Pelican Island. Not obtained at any other place.

24. **Fundulus heteroclitus** (Linnæus). *Common Killifish; Mummichog.* This species, which was more or less common in January and undoubtedly abundant in summer, was taken in the seines at Titusville January 14, at Indian River Inlet January 22, Cocoa January 17, and Pelican Island January 21, 1896. The specimens measured from 3 to 4½ inches in length, and the species is doubtless valuable as food for larger fishes.

25. **Fundulus chrysotus** Holbrook. Indian River (Jordan, 1884).

26. **Fundulus henshalli** (Jordan). This cyprinodont was originally described from Sebastian River in 1879 by Dr. Jordan. The types were collected by Dr. J. A. Henshall.

27. **Fundulus rubrifrons** (Jordan). The types of this species were also obtained in Sebastian River by Dr. Henshall, and were described in 1879.

28. **Fundulus nottii** (Agassiz). *Star-headed Minnow.* The specimens collected in Elbow Creek, near Eau Gallie, by Dr. Henshall, and described in 1881 by Goode & Bean as *Zygonectes craticula*, seem to belong to this species.

29. **Lucania ommata** (Jordan). The types of this species were obtained near Titusville by Mr. R. Edward Earll and described by Dr. Jordan in 1884.

30. **Lucania venusta** (Girard.) This small killifish [illegible] one of the most abundant species of Indian River, being seined along [illegible] grassy shores in considerable numbers. Examples were obtained at Titusville, Cocoa, Indian River Inlet, Pelican Island, and other points. D. 12; A. 11; scales 28–7.

31. **Cyprinodon variegatus** Lacépède. *Sheepshead Killifish.* This species was abundant at Titusville, Indian River Inlet, Cocoa, Pelican Island, and Stuart. The individuals vary in length from 1 to 2 inches.

32. **Jordanella floridæ** Goode & Bean. This species, originally described from Lake Monroe, Florida, has been recorded from Sebastian River (Jordan, 1880) and from Indian River (Jordan, 1884).

33. **Gambusia affinis** (Baird & Girard). *Top-minnow.* Recorded from Sebastian River by Dr. Jordan in 1880.

34. **Mollienisia latipinna** LeSueur. Numerous fine specimens were obtained at Titusville, and a few at Indian River Inlet.

35. **Tylosurus notatus** (Poey). *Silver Gar.* One specimen was taken in seine at Titusville. D. 14; A. 14. Head 2⅞; eye 9.

36. **Tylosurus marinus** (Walbaum). *Silver Gar.* One small example, 3¼ inches long, taken at Pelican Island. Quite a number taken at Indian River Inlet, 17 of which are very small, measuring from 4 to 6½ inches. D. 15; A. 18. Eye 2½, in posterior part of head.

37. **Hyporhamphus unifasciatus** (Ranzani). *Halfbeak.* Not seen during this investigation, but recorded by Dr. Jordan from Indian River.

38. **Siphostoma scovelli** Evermann & Kendall. *Pipefish; "Needle-fish."* The common pipefish of the Indian River. Many examples were seined at Titusville and Cocoa; one specimen at Pelican Island. One Titusville lot contained 69 females and 10 males. Six of the small males, 2½ to 2¾ inches long, have eggs in pouch. The two largest examples, 4 and 4½ inches, have a few eggs in their pouches. D. 30 or 31, very high in the females, low in males. One example has D. 34.

39. **Siphostoma louisianæ** (Günther). *Pipefish.* One secured at Titusville and two at Cocoa.

40. **Menidia peninsulæ** (Goode & Bean). *Silverside.* Abundant throughout Indian River. Specimens obtained from Titusville, Cocoa, Pelican Island, and Indian River Inlet. D. usually V–I, 8 or 9; A. I, 16 or 17. The dorsal varies from IV to VII–I, 8 to 10. Scales 3-38 to 40-5.

41. **Labidesthes sicculus** (Cope). *Brook Silverside.* One specimen of this interesting little fish, 1¾ inches long, was obtained at Pelican Island, January 21, 1896. D. IV, 10; A. about 20; scales 70. Color: Pale green; top of head black; a black stripe composed of black dots along dorsal line from head to tail; a similar stripe along ventral line from throat to tail; lateral band dark silvery, edged with dark dots; all the scales bordered with spots of black pigment.

42. **Mugil cephalus** Linnæus. *Common Mullet.* By far the most abundant and most important food-fish of Indian River. From the silver mullet, which is much less abundant, it may be distinguished by its less silvery color, the presence of dark longitudinal streaks, the broader and more rounded snout, and the absence of scales on the dorsal and anal fins. The mangrove mullet spoken of by some of the fishermen is apparently a large example of the common mullet. The name *galan botic* (variously spelled *gallan botic, gallan bota,* and *gallam bote*) is a term used chiefly by the Minorcans to designate spent mullet, and is probably applied to large spent mullet of either species when in poor condition.

43. **Mugil curema** Cuvier & Valenciennes. *Silver Mullet; White Mullet.* Will probably not average more than half as large as the common mullet and is much less abundant. Examples obtained at only a few of the places visited.

44. **Scomberomorus maculatus** (Mitchill). *Spanish Mackerel.* Taken in Indian River only occasionally; more common outside. One 15 inches long taken at Santa Lucia Inlet January 30.

45. **Oligoplites saurus** (Bloch & Schneider). *Leather Jack.* Indian River (Jordan, 1880).

46. **Caranx hippos** (Linnæus). *"Cavally;" Crevallé.* Common, particularly in the lower half of the river. Life colors: Opercle with an inky black spot; pectoral with rather plain black blotch near tips of lower rays; anterior parts of anal bright lemon yellow; under part of caudal peduncle, caudal, and top of head, orange yellow; lower lobe of caudal yellowish; pectoral long, falciform, longer than the head; axil of pectoral dark; eye golden.

47. **Caranx crysos** (Mitchill). *Hard-tail; Yellow Mackerel.* Not seen during this investigation, but doubtless not rare here. Recorded from Indian River by Dr. Jordan.

48. **Vomer setipinnis** (Mitchill). *Moonfish; Horsefish.* Recorded from Indian River in 1881 by Dr. Goode.

49. **Selene vomer** (Linnæus). *Moonfish; Look-down; "Old Man-of-the-Sea."* Common, particularly in lower portion of Indian River.

50. **Chloroscombrus chrysurus** (Linnæus). *Casaba; Bumper.* Recorded from Indian River in 1880 by Dr. Jordan. Probably not uncommon.

51. **Trachinotus falcatus** (Linnæus). *"Permit"; Round Pompano.* This species should be called round pompano, a name by which it has long been known, to distinguish it from the larger species, *Trachinotus goodei*, which also probably occurs in Indian River. The round pompano appears to be rare in the north end of the river, and was not seen north of Eau Gallie, but examples were seen at Eau Gallie, Eden, and Stuart. Its usual weight is about a pound.

52. **Trachinotus goodei** Jordan & Evermann. *Key West Pompano*, or *"Permit" of Key West.* All of the very large pompano reported from Indian River probably belong to this species. Mr. Scobie has seen examples weighing 20 to 25 pounds; Mr. Collins, 20 pounds; Mr. Church, 27 pounds; Mr. O'Brien, 26 pounds, and Mr. Keller 22 pounds.

53. **Trachinotus carolinus** Linnæus. *Common Pompano.* The most highly prized fish of Indian River.

54. **Pomatomus saltatrix** (Linnæus). *Bluefish.* Not abundant, but highly prized both by commercial fishermen and anglers. Young less than 2 inches long were obtained near Indian River Inlet.

55. **Elassoma evergladei** Jordan. This interesting fish was described in 1884 from specimens obtained in Lake Jessup and Indian River, near Titusville, by Mr. R. Edward Earll.

56. **Chænobryttus gulosus** (Cuvier & Valenciennes). *Warmouth.* Recorded from Sebastian River in 1880 by Dr. Jordan.

57. **Enneacanthus obesus** (Baird). Recorded in 1880 by Dr. Jordan from Sebastian River.

58. **Apomotis punctatus** (Cuvier & Valenciennes). *Spotted Sunfish.* Recorded by Dr. Jordan from Sebastian River in 1880.

59. **Lepomis pallidus** (Mitchill). *Blue Bream; "Brim."* The most common sunfish in the fresh-water streams tributary to Indian River. Two specimens were obtained from Eau Gallie Creek and numerous examples from South Lake, near Titusville. One of the Eau Gallie specimens, 4½ inches long, has the following characters: Head 3; depth 2½; eye large, 3 in head, and slightly greater than the snout. D. x, 12; A. iii, 11; scales 6–42–14. Fins rather high and long; pectorals slightly longer than head; opercular flap short; body with faint dark-greenish vertical bars; black blotch at base of posterior dorsal and anal rays very distinct.

60. **Eupomotis holbrooki** (Cuvier & Valenciennes). *"Bream"; "Brim."* Doubtless found in all the streams flowing into Indian River. Two specimens, 5½ and 9 inches long, respectively, were taken in South Lake, near Titusville. Head 3; depth 2⅔; eye 4. D. x, 12; A. iii, 11; scales 7–45–15.

61. **Micropterus salmoides** (Lacépède). *Large-mouthed Black Bass; "Trout."* Obtained in Eau Gallie Creek and South Lake. Said to be common in all the fresh waters near Indian River. Dr. Henshall obtained specimens from Sebastian River.

62. **Boleichthys fusiformis** (Girard). The only darter ever reported from waters tributary to Indian River. Dr. Jordan (1884) records it (as *Pœcilichthys barratti*) among the species collected by Mr. Earll near Titusville.

63. **Centropomus undecimalis** (Bloch). *Sergeant-fish; "Snook."* Rather common in Indian River, particularly in the southern part. It is a food-fish of some importance, but is sometimes not utilized if better fish are caught in sufficient abundance. Dark silvery; dark-greenish above, becoming silvery along the lateral line, with many black punctulations below; head pale-greenish

above, silvery on sides, white below; black stripes along lateral line, very plain; dorsals, anal, and pectorals olivaceous; ventrals pale lemon; caudal olivaceous; lower lobe darker.

64. **Promicrops guttatus** (Linnæus). *"Grouper"; Guaza; Spotted Jewfish.* Probably not uncommon. Four young examples obtained from Indian River Inlet. They measure 1⅝, 2⅝, 2, and 3 inches respectively. D. XI, 15; A. III. 8. A fresh example showed the following life colors: Dark olivaceous, with somewhat regular darker vertical bars; first bar most indefinite and just back of the gill-opening; the second under last four dorsal spines and connected with first above pectorals; third extends from third to seventh soft dorsal ray and divided to inclose a paler spot; fourth bar under the last seven dorsal rays and continued on to the anal fin; fifth bar on caudal peduncle and inclosing a pale spot below. Anterior part of body, opercles, cheeks, upper jaw, and top of head, with some round black spots varying from one-sixteenth to one-eighth of an inch in diameter. Somewhat similar, paler spots on the pectorals, arranged in five or six more or less definite vertical rows. Under parts pale, dirty olivaceous; dorsal membrane dirty olivaceous, black margined with a row of black spots; soft dorsal with two or three irregular rows of dark spots; caudal similar. Anal dark olivaceous; ventrals similar. Inside of mouth flesh-colored. Eye greenish.

65. **Lobotes surinamensis** (Bloch). *Flasher; Triple-tail.* Not common in Indian River and not well known by any of the fishermen; apparently most frequent in the southern portion of the river. It attains a length of 3 feet and a weight of 25 or 30 pounds, but those taken in Indian River are usually much smaller.

66. **Neomænis griseus** (Linnæus). *Mangrove Snapper.* A common and important species from Fort Pierce southward. The following life colors were exhibited by fresh examples examined at Fort Pierce: Back, down to lateral line, dark-greenish, with lighter on margin of scales; scales with coppery centers, very faint on anterior part, brightest under the soft dorsal and on side of caudal peduncle; scales of middle side rich iridescent copper on anterior half, then a narrower paler streak; next a greenish-white margin, this margin plainer posteriorly.

Another specimen had the belly pale rosy; top of head dark-greenish; cheeks and opercles iridescent greenish, becoming coppery below and on lower mandible; preopercular flap iridescent greenish; spinous dorsal dark-greenish, with wine-colored margin fringed with black; soft dorsal rays whitish, membranes black; anal rosy purple; the fine scales on membrane greenish; caudal very dark purplish; pectorals uniform pale; ventrals white, tinged with purplish; white in the axils; pectorals dusky in the axils; eye coppery; mouth white inside.

67. **Neomænis synagris** (Linnæus). *Lane Snapper.* Two young examples, 2¼ and 3¼ inches long, respectively, obtained at Indian River Inlet. Not known to the fishermen.

68. **Neomænis apoda** (Walbaum). *Schoolmaster.* Eight young examples, 1½ to 2½ inches long, from Indian River Inlet. D. X, 13 or 14; A. III, 7; scales 6-44-12. The fishermen do not know this species.

69. **Hæmulon macrostoma** Gunther. Indian River Inlet, January 23, 1896, five specimens, 1½ to 2 inches long. D. XII, 17; A. III, 8; scales 50.

70. **Anisotremus surinamensis** (Bloch). *Pompon.* A fine example, 15 inches in total length, obtained from Capt. Joseph Smith at Fort Pierce.

Head 3½; depth 2⅞; eye 4½; snout 2⅞; maxillary 3. D. XII, 16; A. III, 8 or 9; scales 5-50-13. Body deep, back elevated, greatly compressed, profile steep, nearly straight from snout to above eye, a slight depression in front of nostril and another in interorbital space; from interorbital space to dorsal strongly arched in a broad curve. Head moderate; cheek deep; mouth rather small; jaws subequal, maxillary barely reaching front of orbit; ven-

tral line of body nearly straight; caudal peduncle moderately long, its least depth equal to snout; teeth in several bands, the outer enlarged and canine-like. Fourth dorsal spine strongest and longest, its length 2⅓ in head; soft dorsal as well as anal, pectoral, ventrals, and caudal densely covered with minute scales; height of longest soft dorsal ray 3 in head; second anal spine very stout, its length equal to that of fourth dorsal spine; third anal spine broad at base, but shorter; free edge of soft anal straight; dorsal and anal fins depressible in a scaly sheath. Pectoral long and falcate, nearly reaching tip of ventrals, 1⅓ in head; ventral shorter, 1⅓ in pectoral. Caudal well forked, the lobes about equal to ventral. Preopercle strongly but irregularly serrate. Scales of cheek in about 7 rows; those on opercle in about 8 rows; those on interorbital and nape small and crowded; scales of back and sides arranged in oblique rows not parallel with the lateral line. Lateral line arched, following approximately the contour of the back. Gillrakers rather short, stiff, 13 + 19.

Color grayish, darkest on anterior half of body, where each scale is dark brown on its basal half, then with a white ellipse, the narrow border darker, the contrast between the dark base and the white ellipse very marked; owing to the irregular arrangement of the scales the dark bases in some cases appear as spots; upper side of caudal peduncle brown, sides nearly plain white; snout and under parts of head lilac-brown; under parts of body rusty brown; fins all dark brown, especially the soft parts of dorsal and anal.

This is the first time this fish has been recorded in our waters, it hitherto being known only from Cuba and south to Brazil.

71. **Orthopristis chrysopterus** (Linnæus). *Pigfish.* One example obtained at Eden, from Capt. Nathan Saunders, January 24, 1896. D. XII, 16; A. III, 13.

72. **Lagodon rhomboides** (Linnæus). *Sailor's Choice.* Common, though not abundant in Indian River at the time of this investigation. Small examples were seined at Titusville and Indian River Inlet.

Pale; side with about nine pale-bluish streaks, the upper five plainest; two above lateral line, the third running just below the lateral line and connecting with the fourth under origin of soft dorsal; the first five streaks alternate with four or five brassy lines of about equal width, the one on the lateral line the plainest; under parts white, with silvery and rosy iridescence; cheeks silvery, with brassy and rosy iridescence; belly white; dorsal pale, with irregular, longitudinal, brassy lines, margined with brassy; anal pale whitish, with a bright orange or brassy line through the middle; pectoral plain; ventrals with some orange; caudal pale, with orange spots, margin dark; a dark spot near beginning of lateral lines.

73. **Archosargus probatocephalus** (Walbaum). *Sheepshead.* Young sheepshead were seined at Titusville, Cocoa, and Indian River Inlet. Very abundant in Indian River.

74. **Diplodus holbrookii** (Bean). *Sailor's Choice; "Spot."* Observed at different points. Examples preserved from Eden. D. XII, 14; A. III, 13; scales 7-61-13. Sides dusky silvery, with rich sheen of olivaceous, steely, purplish, etc., darkest above, plain white on belly; about 18 faint longitudinal stripes through center of scales; black blotch on anterior upper part of caudal peduncle, absent underneath; axil of pectoral purplish black, the color showing slightly on outside above; inside of ventrals washed with purple; anal faint purplish; dorsal dark; base of spines lighter; cheeks purplish, iridescent.

75. **Eucinostomus gula** (Cuvier & Valenciennes). A number taken at Pelican Island, Indian River Inlet, and from St. Lucie River at Stuart.

76. **Gerres olisthostoma** Goode & Bean. *"Mutton-fish"; Irish Pompano.* Quite common in Indian River, where it is known as mutton-fish. Examples preserved from Fort Pierce. Head 3; depth 2⅓; D. IX, 11; A. III, 9; scales 6-40-9.

The following notes are from specimens examined at Eden: Premaxillary space narrow, slightly curved; height of longest dorsal spine 1¼ in head; longest anal spine 1⅜ in head; second anal spine strongest, but third slightly longer; pectoral as long as head; eye about 4 in head. Color plain silvery, with purplish iridescence on anal sheath and on part of sides and opercles; top of head and body above lateral line somewhat olivaceous, with steely iridescence; sides with fine dark punctulations.

Another example had anal spine 2 in head.

77. **Cynoscion nebulosus** (Cuvier & Valenciennes). *"Trout"; Spotted Squeteague.* Abundant throughout Indian River; young examples taken at Titusville, Cocoa, and Indian River Inlet.

78. **Sciænops ocellatus** (Linnæus). *Red Drum; "Bass"; "Channel Bass."* Very abundant in Indian River. Young examples, from 1 to 4 inches long, obtained at Pelican Island January 21, and at Indian River Inlet January 23.

79. **Leiostomus xanthurus** Lacépède. *"Spot,"* confused with *Croaker.* Examples 5½, 6, and 6½ inches long were seined at Titusville. One specimen was taken at Indian River Inlet. A large example, 13½ inches long, was obtained at West Palm Beach, Lake Worth, from Mr. G. W. Jennings, who says it is called "Jimmy" by the fishermen. D. x, 1, 30; A. II, 12; scales 60.

80. **Micropogon undulatus** (Linnæus). *Croaker,* confused with *"Spot."* Abundant.

81. **Menticirrhus americanus** (Linnæus). *"Whiting."* Common; examples obtained at Cocoa January 17, 1896, from Mr. Fred. Church.

82. **Pogonias cromis** (Linnæus). *Gray Drum; "Drumfish"; Black Drum.* Common in Indian River. Reaches a large size and said to be destructive to the oyster beds and fishing nets. Not esteemed as food. Examples from Cocoa and Fort Pierce were preserved. Other very large examples were seen at Santa Lucia Inlet.

83. **Cryptotomus ustus** (Cuvier & Valenciennes). A single specimen, 2½ inches long, from Indian River Inlet. Head 3½; depth 3½; eye 3⅜; snout 3½. D. IX, 10; A. II, 9; scales 2-23-6.

84. **Chætodipterus faber** (Broussonet). *Angel-fish.* Not uncommon, especially in lower part of river. Said to reach a weight of 20 pounds. Examples seen at Fort Pierce and Eden.

85. **Spheroides spengleri** (Bloch). *Southern Puffer; Swell-toad.* Probably common. Four specimens obtained from mouth of St. Lucie River and 3 from Cocoa.

86. **Spheroides maculatus** (Bloch & Schneider). *Globe-fish; Puffer; Blower.* Five small specimens, ⅝ to 1⅜ inches long, from Cocoa; no large ones seen. These specimens can be readily inflated by applying a blowpipe at the mouth. The specimen 1⅜ inches long, when inflated, measured 1 inch wide and ⅞ of an inch deep, while the width of the head is ½ inch. Eye 3⅞ in head; interorbital width 2 in snout, or 6 in head.

Possessing young individuals, of approximately the same size, of these three species of *Spheroides (S. spengleri, S. testudineus,* and *S. maculatus*), their relative inflating abilities have been compared. The one possessing this power in the greatest degree is *S. maculatus.* When fully inflated the young of this species are nearly globular and look like marbles. The surface is evenly rounded. *S. spengleri* can not be inflated so greatly, and *S. testudineus* is inflatable in a still less degree. Moreover, these two species when inflated differ very materially in shape from *S. maculatus,* in that the nose projects noticeably and the inflated belly is not continuously and regularly rounded where it joins the back, but a considerable angle is formed on a line parallel with the lower edge of the pectoral fin. The young of *S. maculatus* is most uniformly covered with prickles, differing but slightly from *S. spengleri* in this respect, while *S. testudineus* has considerable areas without prickles. Of the three species *S. maculatus* is best entitled to the name globe-fish.

87. **Spheroides testudineus** (Linnæus). One specimen 1¼ inches long from St. Lucie River at Stuart. Head 2½; depth, when not inflated, 3⅛; snout 3; eye 3½. Back dark, with whitish curved lines; lower part of side with a series of large black spots; belly white; fins all pale except caudal, which has a subterminal black bar. Back and sides from nape nearly to front of dorsal closely covered with small prickles; belly, with similar prickles from throat to vent; anterior half of head and posterior third of body nearly smooth. This specimen is inflatable to only a relatively slight degree, differing in this respect very markedly from *Spheroides maculatus*, but in a less degree from *Spheroides spengleri*.

Another specimen, 7 inches long, was taken at Cocoa. It differs from the smaller specimen in having fewer prickles on the throat and belly and the less distinct color pattern on the back.

88. **Diodon hystrix** Linnæus. *Porcupine-fish.* Probably not common; seen only at Cocoa.

89. **Chilomycterus schœpfi** (Walbaum). *Burfish; Spiny Swellfish.* Two examples seined at Cocoa.

90. **Scorpæna brasiliensis*** Cuvier & Valenciennes. *Rascascio.* A fine example was presented at Fort Pierce by Mr. Harry Munson, of New York City. D. XI–I, 9; A. III, 5; P. 18; scales in about 33 rows. A young example, 2 inches long, was seined at Indian River Inlet.

91. **Gobius soporator** Cuvier & Valenciennes. Four specimens from Indian River Inlet, each about 2½ inches long. D. VI–I, 10; A. I, 8; scales 38.

92. **Gobius boleosoma** Jordan & Gilbert. Four examples were seined at Indian River Inlet. The length of each is about 1½ inches.

93. **Gobius stigmaticus** (Poey). An example 2½ inches long, apparently of this species, was seined at Indian River Inlet. Head 4; depth 4⅓; D. VI, 11; A. 12; scales 28.

94. **Gobius lyricus** Girard. A single specimen from Indian River Inlet. D. VI, 10; A. 11; scales 32.

95. **Microgobius gulosus** (Girard). *Goby.* Very abundant. Taken at Titusville, Cocoa, Pelican Island, and Indian River Inlet. The collection from South Lake, which is fresh water, contains 8 specimens of this species. They are all very much darker than any of those from Indian River. Length about 2 inches. D. VI or VII, 16; A. 16; third, fourth, and fifth spines of dorsal ending in filaments.

96. **Gobiosoma bosci** (Lacépède). Common in Indian River. Specimens from Titusville, Cocoa, Pelican Island, and Indian River Inlet; the largest scarcely more than an inch in total length.

97. **Hypsoblennius punctatus** (Wood). A single specimen of this little blenny, 2 inches long, was taken at Indian River Inlet.

98. **Chasmodes saburræ** Jordan & Gilbert. This interesting blenny seems to be abundant in all suitable places in Indian River. The collection contains 76 fine specimens from Titusville and 3 from Cocoa. The largest are about 4 inches in total length. Head 3⅜; depth 3⅜; eye 4⅛; snout 3⅝; maxillary reaching posterior border of eye. D. XI, 18; A. III, 17.

A specimen 2 inches long, probably a male, has the following colors: Side with six broad, dark vertical bars, the anterior four extending on the dorsal fin; these bars separated by irregular narrow pale spaces; entire side profusely covered with small white spots; a small black spot at base of caudal; head mottled with light and dark; two small dark spots on under side of lower jaw; just behind these and extending downward from the angles of the mouth are two other larger, blacker spots, while behind these, extending downward and backward from middle of cheek, is an irregular black line;

* Equals *Scorpæna stearnsi* Goode & Bean.

whole head with numerous fine dark punctulations; dorsal and anal variously spotted or barred with light and dark; spinous dorsal with a large dark area at top of anterior spines; caudal faintly barred; pectorals and ventrals more plainly barred.

99. **Prionotus evolans** Linnæus. *Striped Gurnard.* An example, 12¾ inches in length, was examined at Collins's fish-house at Cocoa. It was caught in the Indian River. D. x, 11; A. 9; pectoral half length of body.

100. **Prionotus tribulus** Cuvier & Valenciennes. *Sea Robin.* An example 4 inches long was seined at Indian River Inlet. D. x, 12; A. 12; scales 57; head 2½; depth 3⅝; cranial spines strong. General color dark above, with small whitish markings; white underneath; black blotch on side of head from eye to end of mandible; black blotch covering almost entire membrane between fourth and sixth spines of dorsal, this blotch extending on body to pectoral base; a narrow bar from membrane of fourth and fifth dorsal rays downward on body to below lateral line, another from tenth ray, and still another from upper caudal base on peduncle; pectorals dark, with four darker cross-bands; ventrals and caudal whitish.

101. **Remora remora** (Linnæus). *Remora; "Sucker."* Specimens seen at Cocoa; they were obtained in Indian River.

102. **Gobiesox strumosus** Cope. Four specimens obtained at Titusville, each 1 to 2½ inches long. Head 2½; eye 5½; D. 11; A. 8. The type of this interesting species came from Hiltonhead, S. C. Titusville is the second locality from which the species has been collected.

103. **Paralichthys lethostigma** Jordan & Gilbert. *Southern Flounder.* The common flounder of Indian River. Examples in the collection from Fort Pierce and Stuart.

104. **Citharichthys spilopterus** Günther. One example, 1¼ inches long, obtained in St. Lucie River opposite Stuart.

105. **Achirus lineatus** (Linnæus). *Sole; Hog-choker.* A single example, 1 inch long, seined in St. Lucie River opposite Stuart.

106. **Symphurus plagiusa** (Linnæus). *Tongue-fish.* Two examples seined at Indian River Inlet.